
Universal Access to Broadband – Trends and Practices

**ITU MIIT Seminar
on
Broadband Development and Innovation using Internet
30 June -1 July 2014, Yinchuan**

**Ashish Narayan
International Telecommunication Union**

Specialized Agencies of the United Nations



United Nations



UNESCO



WHO



ILO



UPU



ICAO



WMO



IMO



IAEA



THE WORLD BANK

WB



UNWTO

UNWTO



FAO

FAO



IFAD

IFAD



UNIDO

UNIDO



WIPO

WIPO



WFP

WFP



INTERNATIONAL MONETARY FUND

IMF



*A specialized agency of the UN
with focus on **Telecommunication /
ICTs***

*Founded in **1865***

ITU: A brief overview



193 Member States
567 Sector Members
159 Associates
60 Academia



ITU-R: ITU's Radio-communication Sector globally manages radio-frequency spectrum and satellite orbits that ensure safety of life on land, at sea and in the skies.



ITU-T: ITU's Telecommunication Standardization Sector enables global communications by ensuring that countries' ICT networks and devices are speaking the same language.



Headquartered in Geneva,
4 Regional Offices
7 Area Offices.

ITU-D: ITU's Development Sector fosters international cooperation and solidarity in the delivery of technical assistance and in the creation, development and improvement of telecommunication/ICT equipment and networks in developing countries.

Presentation Overview

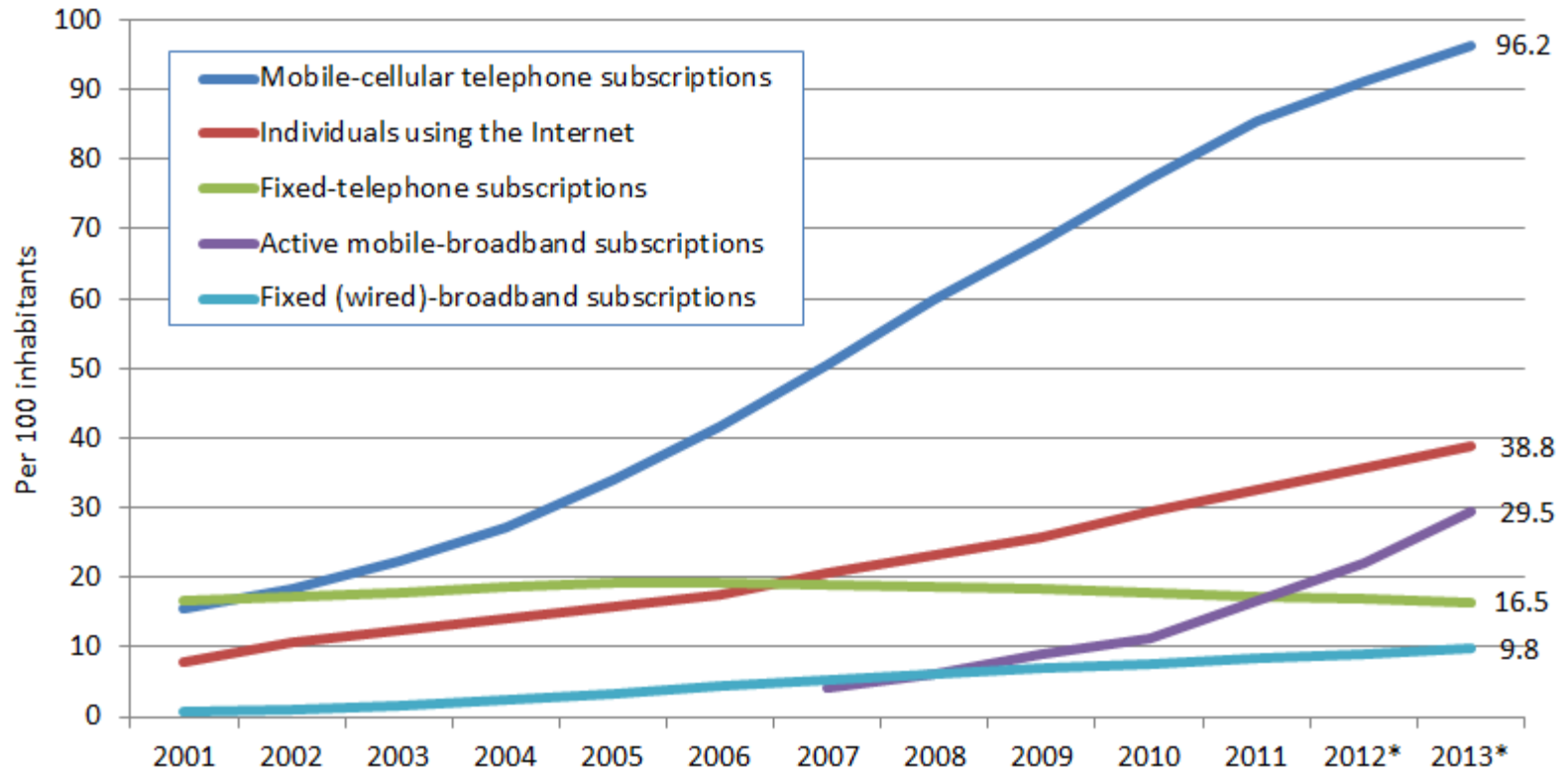
- ❖ **ICT – the integrating thread**
- ❖ **Universal Access to Broadband – Trends**
- ❖ **ICT embedded society and cross-sectoral collaboration**



Committed to connecting the world

ICT – the integration thread

Global ICT developments, 2001-2013

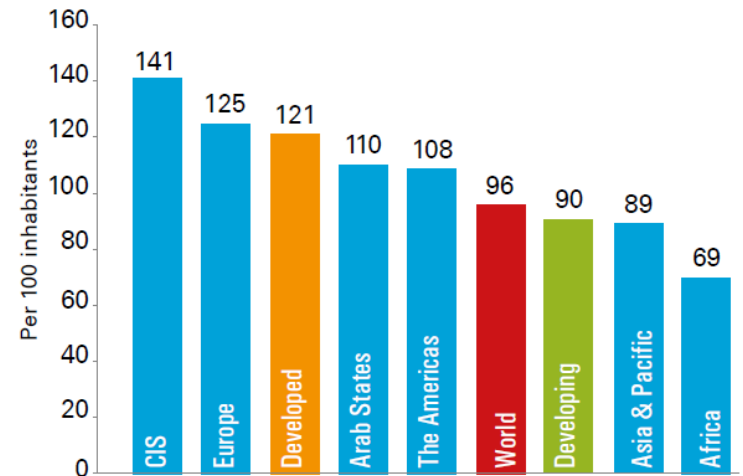
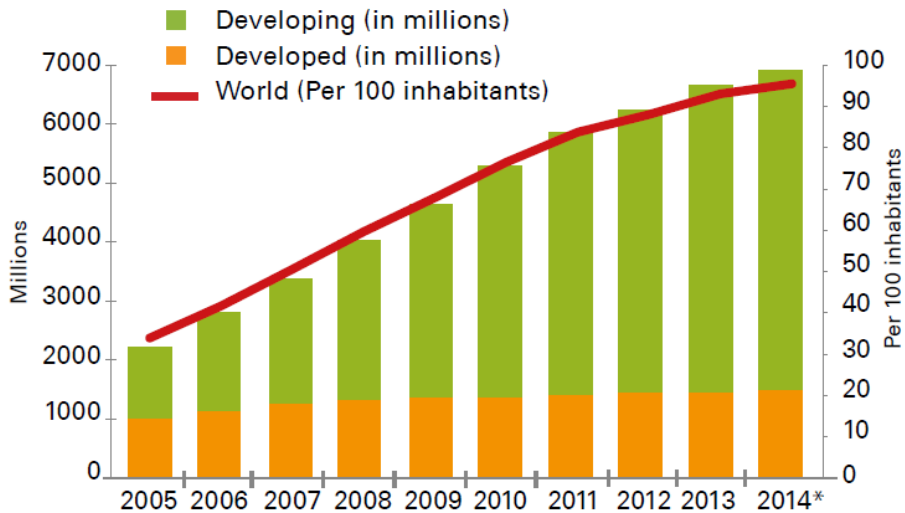


Note: * Estimate

Source: ITU World Telecommunication / ICT Indicators database

Mobile broadband growth continues.....

Mobile-cellular subscriptions, total and per 100 inhabitants, 2005-2014*, and by region, 2014*

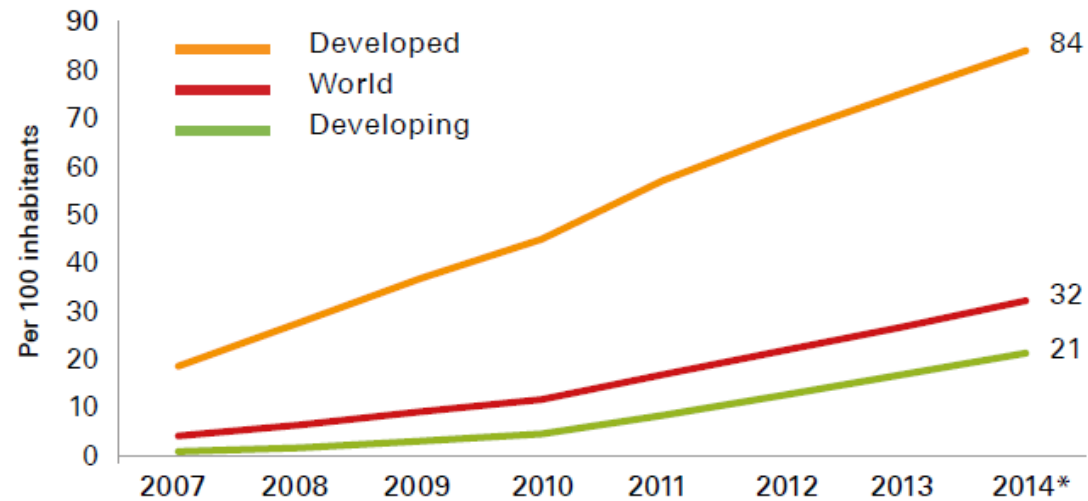


Note: * Estimate

Source: ITU World Telecommunication/ICT Indicators database

Mobile broadband growth continues.....

Active mobile-broadband subscriptions per 100 inhabitants, 2007-2014*



Note: * Estimate

Source: ITU World Telecommunication/ICT Indicators database

By end 2014, the number of mobile-broadband subscriptions will reach 2.3 billion globally, almost 5 times as many as just six years earlier (in 2008).



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Steep growth in mobile broadband.....

Figure 1.1: LTE deployments, 2010 and 2013

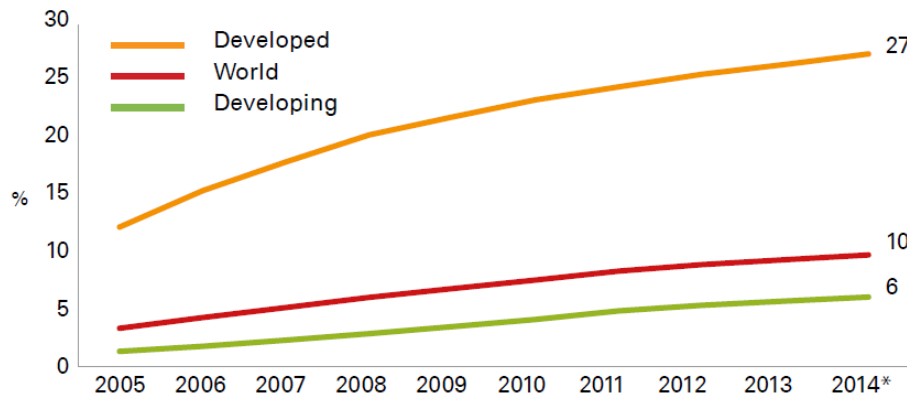


Source: GSMA <https://gsmaintelligence.com/analysis/2013/11/global-lte-network-forecasts-and-assumptions-201317/408/>

- *50 per cent of the world's population was covered by a 3G network in 2013.*
- *The migration to Long-Term Evolution (LTE) technology seems to be happening much faster than did the earlier migration from 2G to 3G networks.*
- *According to the GSM Association (GSMA), commercial LTE networks were operating in 88 countries in 2013, up from 14 in just three years. Another organization, the Global mobile Suppliers Association (GSA), puts that number at 101 countries.*

Fixed broadband

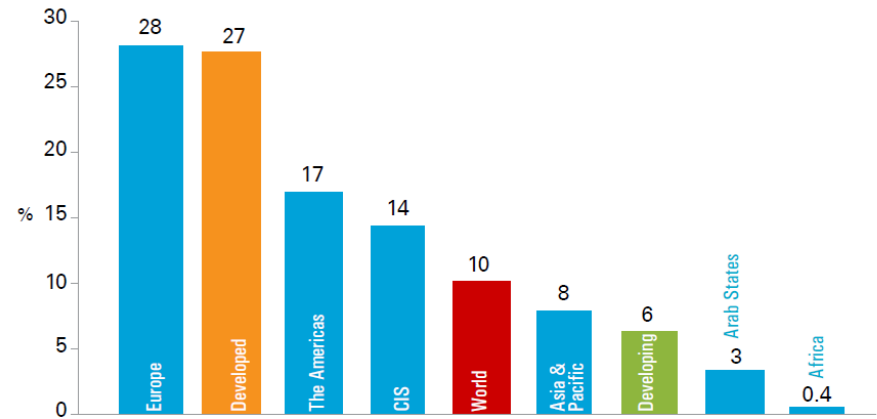
Fixed (wired)-broadband subscriptions per 100 inhabitants, 2005-2014*



Note: * Estimate

Source: ITU World Telecommunication/ICT Indicators database

Fixed (wired)-broadband subscriptions per 100 inhabitants, by region, 2014*

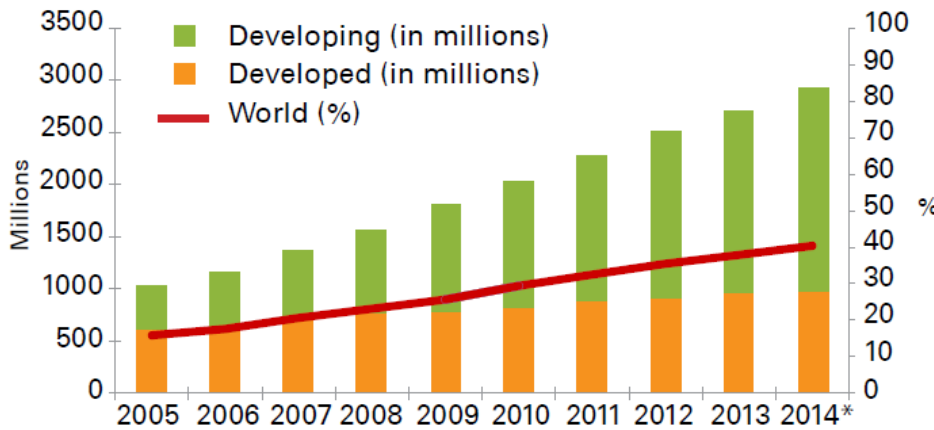


Note: * Estimate

Source: ITU World Telecommunication/ICT Indicators database

Internet users continue to grow.....

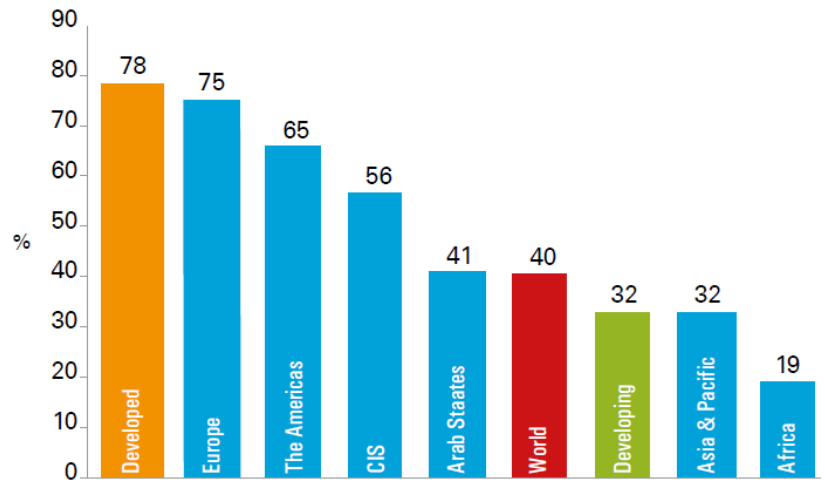
Individuals using the Internet, total and percentage, 2005-2014*



Note: * Estimate

Source: ITU World Telecommunication/ICT Indicators database

Percentage of individuals using the Internet, by region, 2014*



Note: * Estimate

Source: ITU World Telecommunication/ICT Indicators database

40% of the world's population are using the internet

Close to one out of three people in the developing countries are online

The global ICT targets in the proposed draft ITU Strategic Plan [2016-2019]

Goal 1 Growth – Enable and foster access to and increased use of telecommunications/ICTs

- **Target 1.1:** Worldwide, 55% of households should have access to the Internet by 2020
- **Target 1.2:** Worldwide, 60% of individuals should be using the Internet by 2020
- **Target 1.3:** Worldwide, telecommunication/ICTs should be 40% more affordable by 2020

Goal 2 Inclusiveness – Bridge the digital divide and provide broadband for all

- **Target 2.1.A:** In the developing world, 50% of households should have access to the Internet by 2020
- **Target 2.1.B:** In the least developed countries (LDCs), 15% of households should have access to the Internet by 2020
- **Target 2.2.A:** In the developing world, 50% of individuals should be using the Internet by 2020
- **Target 2.2.B:** In the least developed countries (LDCs), 20% of individuals should be using the Internet by 2020
- **Target 2.3.A:** The affordability gap between developed and developing countries should be reduced by 40% by 2020
- **Target 2.3.B:** Broadband services should cost no more than 5% of average monthly income in developing countries by 2020
- **Target 2.4:** Worldwide, 90% of the rural population should be covered by broadband services by 2020
- **Target 2.5.A:** Gender equality among Internet users should be reached by 2020
- **Target 2.5.B:** Enabling environments ensuring accessible telecommunications/ICTs for persons with disabilities should be established in all countries by 2020

Goal 3 Sustainability – Manage challenges resulting from the telecommunication/ICT development

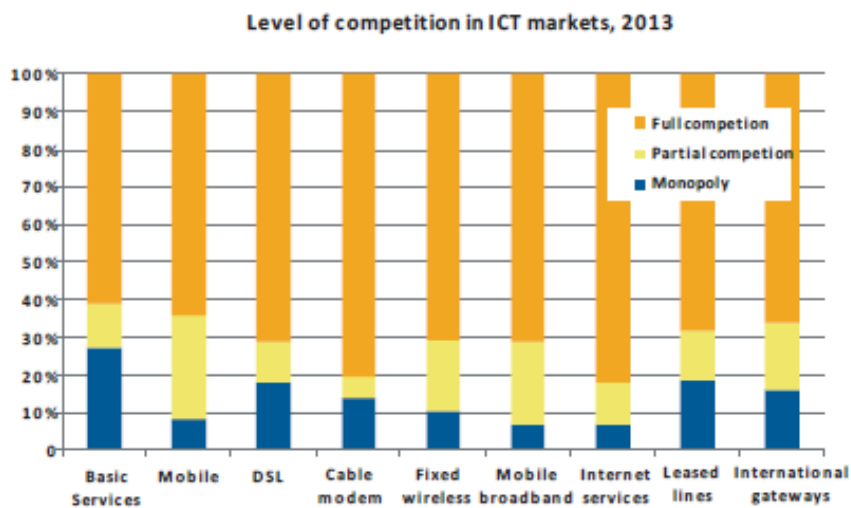
- **Target 3.1:** Cybersecurity readiness should be improved by 40% by 2020
- **Target 3.2:** Volume of redundant e-waste to be reduced by 50% by 2020
- **Target 3.3:** Green House Gas emissions generated by the telecommunication/ICT sector to be decreased per device by 30% by 2020

Goal 4 Innovation and partnership – [Lead,] shape and adapt [the Union] to the changing telecommunication/ICT environment

- **Target 4.1:** Telecommunication/ICT environment conducive to innovation
- **Target 4.2:** Effective partnerships of stakeholders in telecommunication/ICT environment

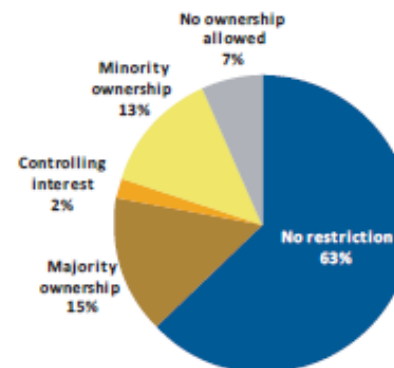
Competition Trends

Figure 1.9: Market liberalization highlights, 2013

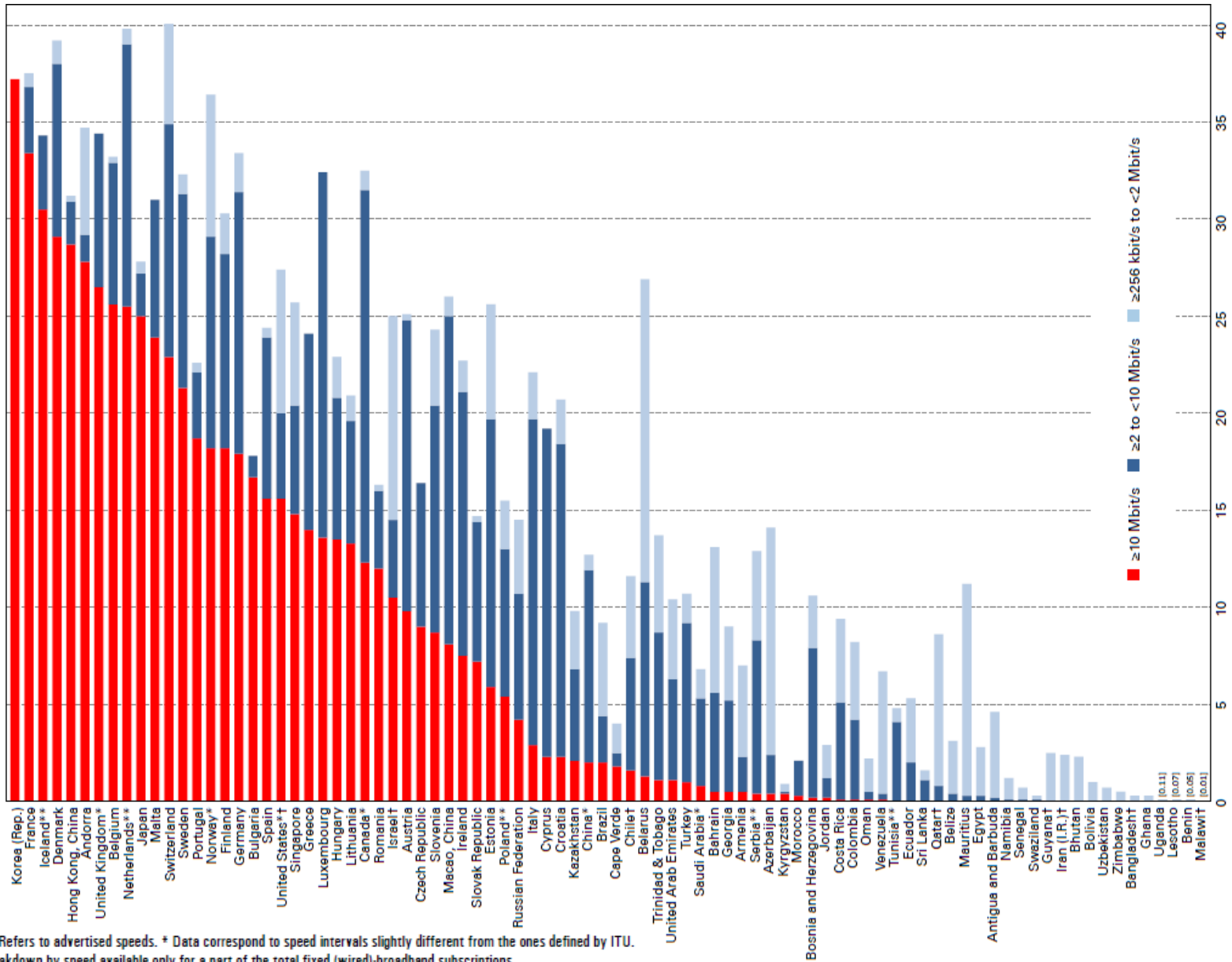


Source: ITU, www.itu.int/icteye.

Foreign ownership in the ICT sector, 2013



Fixed-broadband subscriptions per 100 inhabitants, by speed, early 2013.....



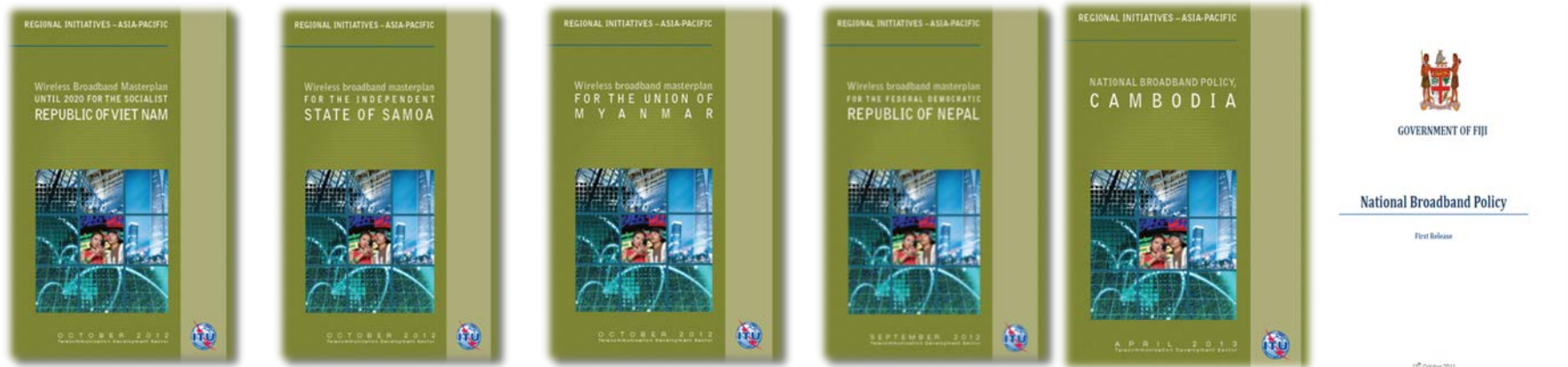
Note: Refers to advertised speeds. * Data correspond to speed intervals slightly different from the ones defined by ITU.

** Breakdown by speed available only for a part of the total fixed (wired)-broadband subscriptions.

† Early 2012 data.

Source: ITU World Telecommunication/ICT Indicators database

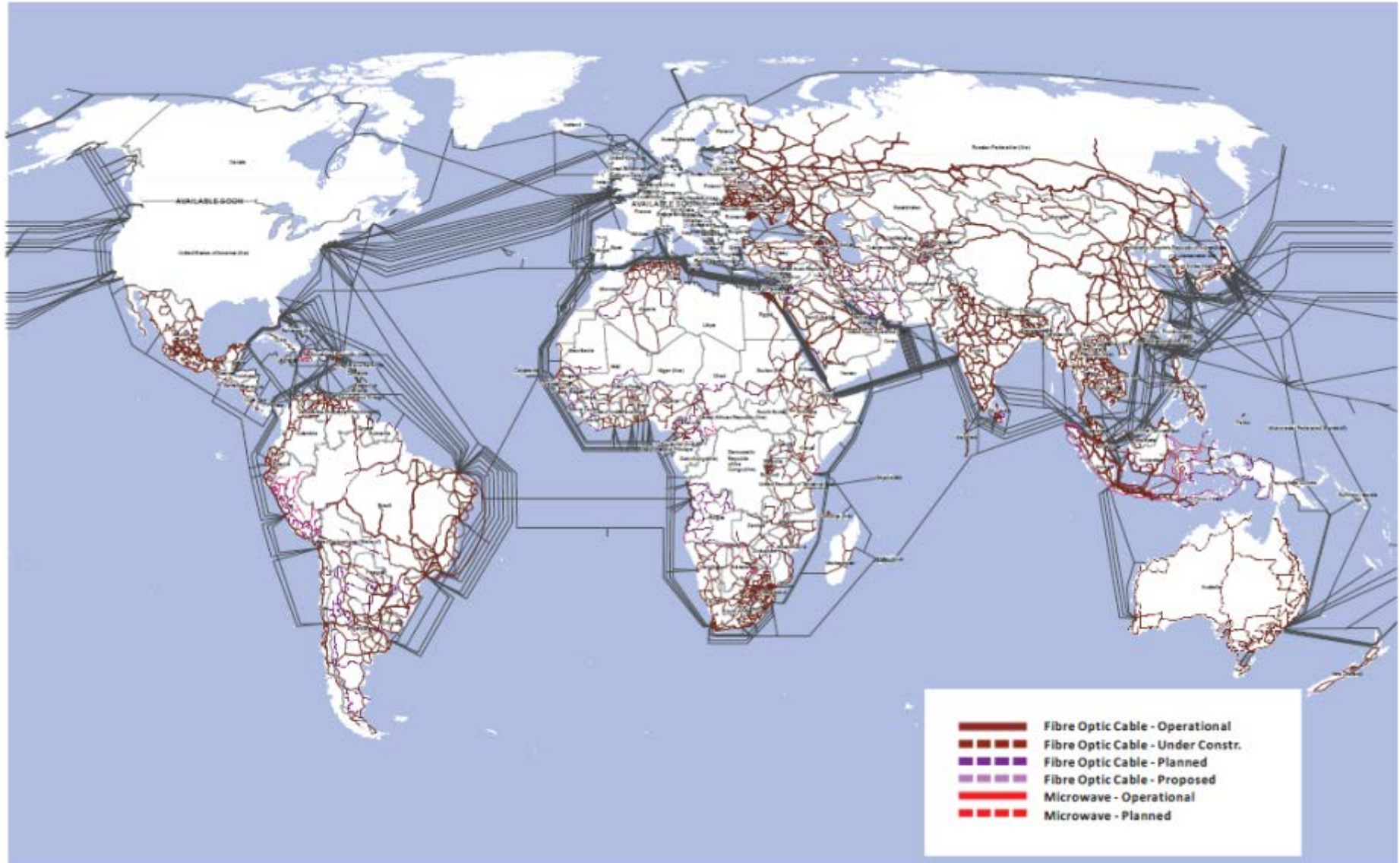
Asia-Pacific Broadband Plans – ITU activities



Broadband Policies adopted at highest level: Fiji, Cambodia, Brunei

Broadband policy support for Vietnam, Samoa, Nepal, Myanmar, Bhutan, Bangladesh, Cambodia, Nepal, PNG, Indonesia, Pakistan, Lao PDR, Vanuatu, Marshall Islands, Brunei, Philippines

Growing network.....

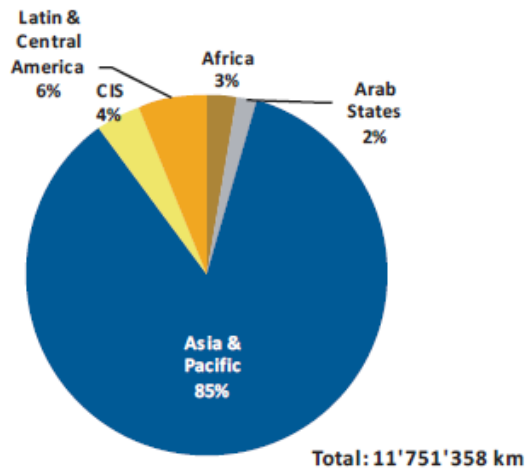


Note: Data collection for this map is a work in progress.

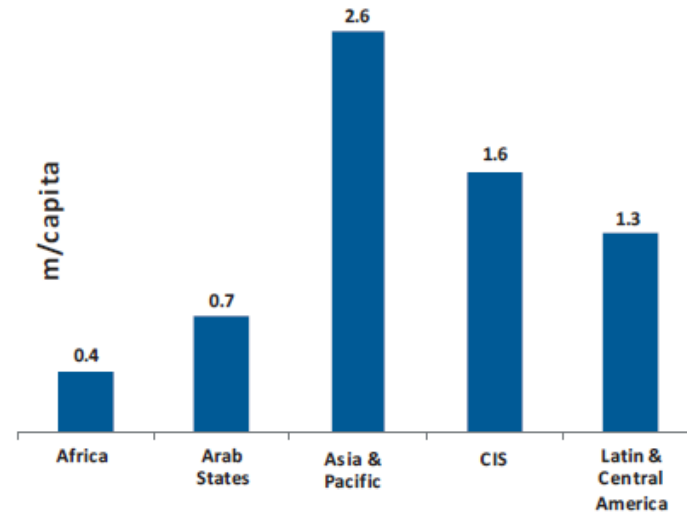
Source: ITU, Telegeography, www.itu.int/itu-d/tnd-map-public/.

Figure 1.4: Fibre and microwave routes in selected regions, 2013

Route km, fibres and microwaves, selected regions, 2013



Fibres and microwaves Routes, m/capita, selected regions, 2013

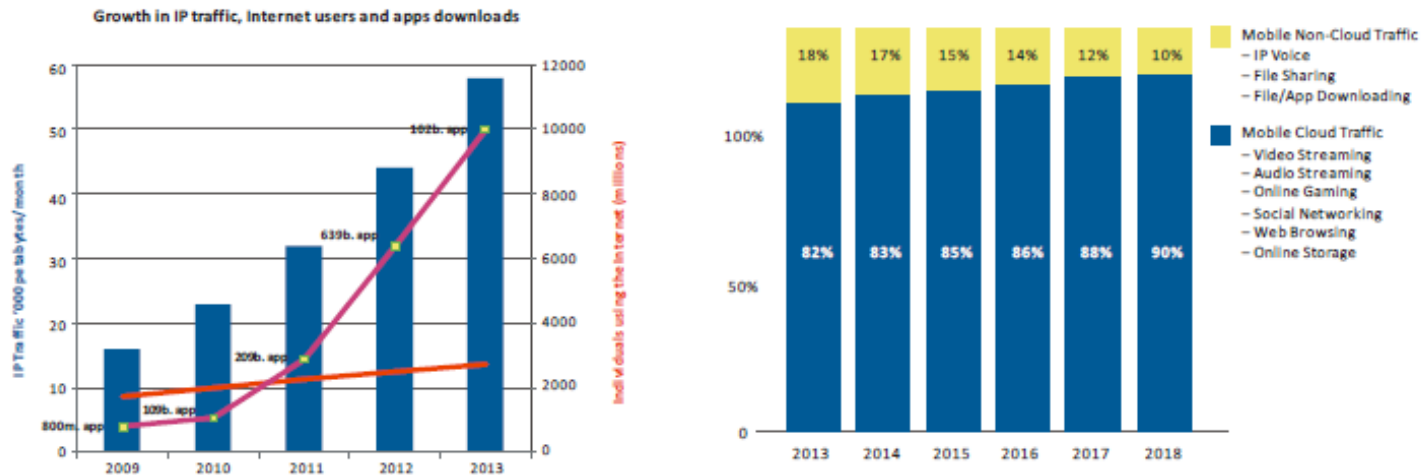


Note: The charts do not include data for Europe and North America. Data for these remaining regions will be available at the end of 2014.

Source: ITU.

IP Traffic Growth

Figure 1.2: Global growth of IP traffic, Internet users, apps downloads and mobile traffic



Source: ITU, based on data from ITU, Gartner, Cisco VNI, Telegeography and IDC (left chart); Cisco CNI Mobile, 2014 (right chart).

Broadband, Millennium Development Goals, WSIS



Environment



Gender Equality



End Poverty & Hunger



Maternal health



Universal Education



Partnership



HIV/AIDS



Child Health



IMPROVING QUALITY OF LIFE..



Emergency



Education



Health



Agriculture



Investment



Applications



Policy & Regulation



Governance



Sensor Networks



Universal Broadband



Capacity Building



Transport



Measurements



Electricity



**SMART
SUSTAINABLE
CITIES**



Green ICT & E-Waste



Privacy & Security



Water

Infrastructure Security



Digital Inclusion



Spectrum Management



Standards, Conformity & Interoperability



Teleworking

Universal Access to Broadband Trends

Summary of Universal Service / Access Trends

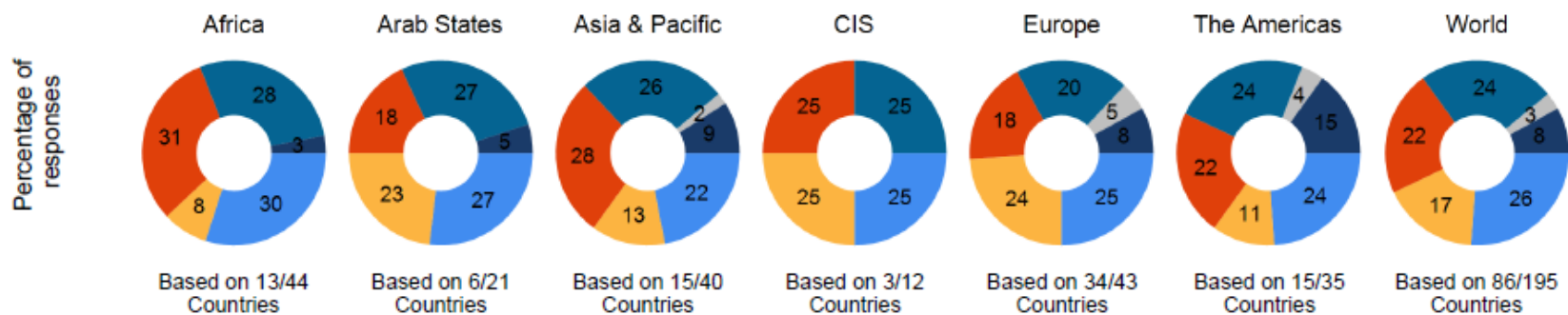
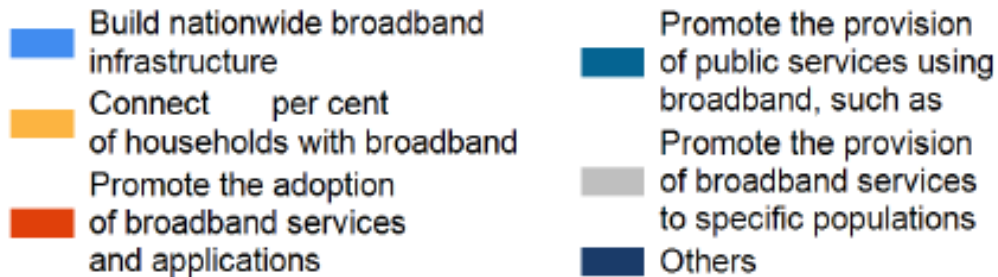
Number of countries/economies

		Africa	Arab States	Asia & Pacific	CIS	Europe	The Americas	Total
Definition of universal service/access exists	Yes	33	14	30	5	38	27	147
	No	10	6	6	7	3	7	39
Voice services included in Universal service/access definition *	Fixed line private residential service as part of universal service definition	20	13	19	5	37	18	112
	Fixed line public payphone service as part of universal service definition	27	9	20	5	31	19	111
	Individual mobile cellular service as part of universal service definition	14	7	13	0	5	13	52
	Public mobile payphone service as part of universal service definition	14	4	6	0	2	8	34
Internet services included in Universal service/access definition *	Dial-up Internet access as part of universal service definition	13	6	10	0	28	6	63
	Broadband as part of universal service definition	11	5	15	2	13	13	59
Other services included in Universal service/access definition *	Telecentres as part of universal service definition	21	6	15	1	3	14	60
	Schools (primary, secondary post secondary)	9	3	8	2	3	12	37
	Health centres	7	3	7	0	2	8	27
	Emergency services as part of universal service definition	23	10	17	3	31	17	101
	Services for impaired/ elderly	7	2	8	2	25	12	56
	Directory services as part of universal service definition	16	8	11	2	32	6	75
Region size		44	21	40	12	43	35	195

* This indicator allows multiple choice per country/economy

Source: ITU World Telecommunication/ICT Regulatory Database

What are the goals of the broadband plans?



Source: ITU Telecommunication/ICT Regulatory Database

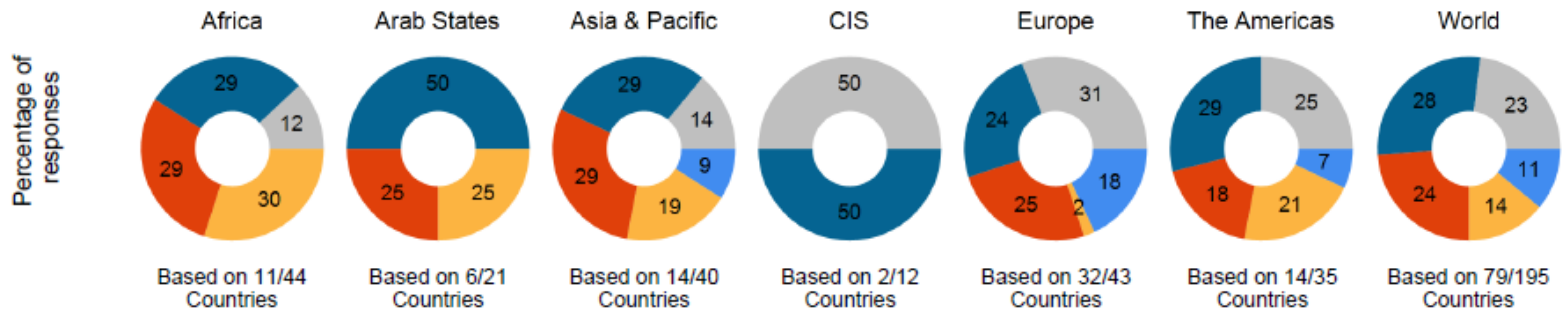
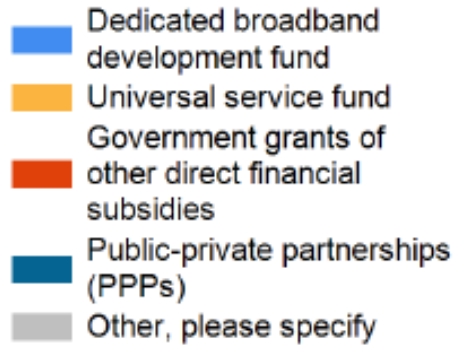
Universal Access to Broadband Schemes

- Licence-based obligations (e.g. Roll out obligations);
- Provision of grants on a competitive basis, representing evolution of traditional universal access programmes;
- Creation of new, broadband, optical fibre-based and state-run networks.



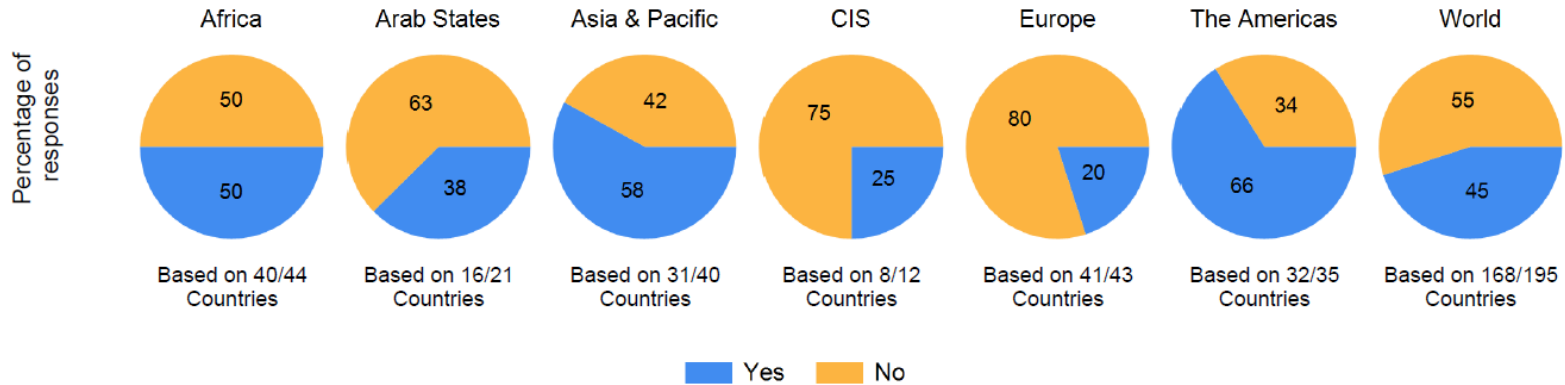
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How are broadband plans being funded?

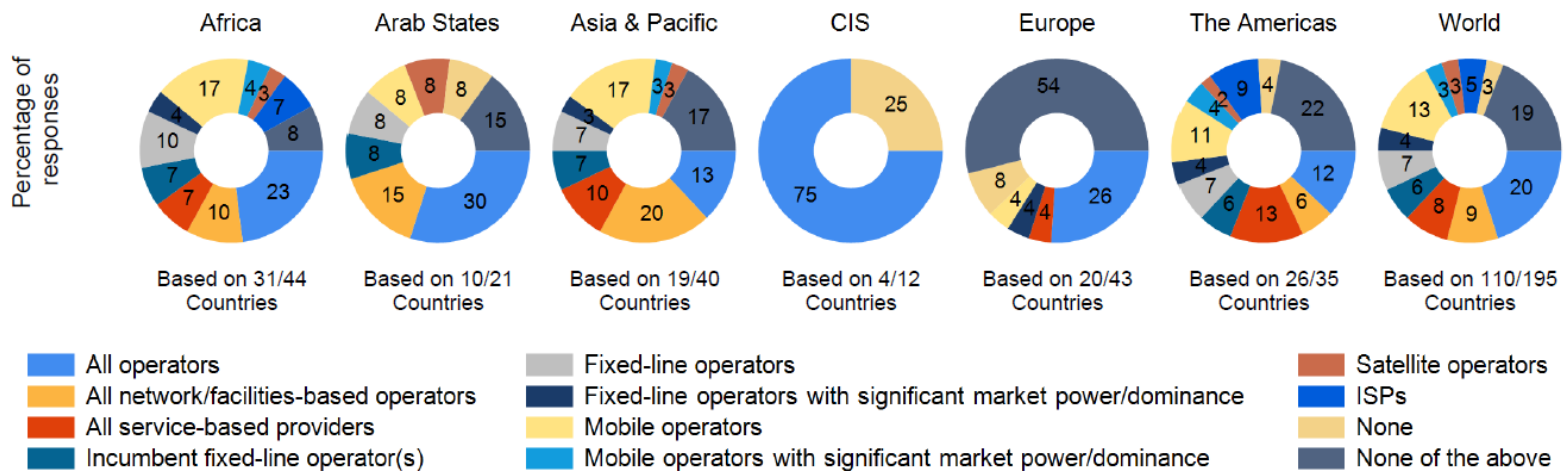


Source: ITU Telecommunication/ICT Regulatory Database

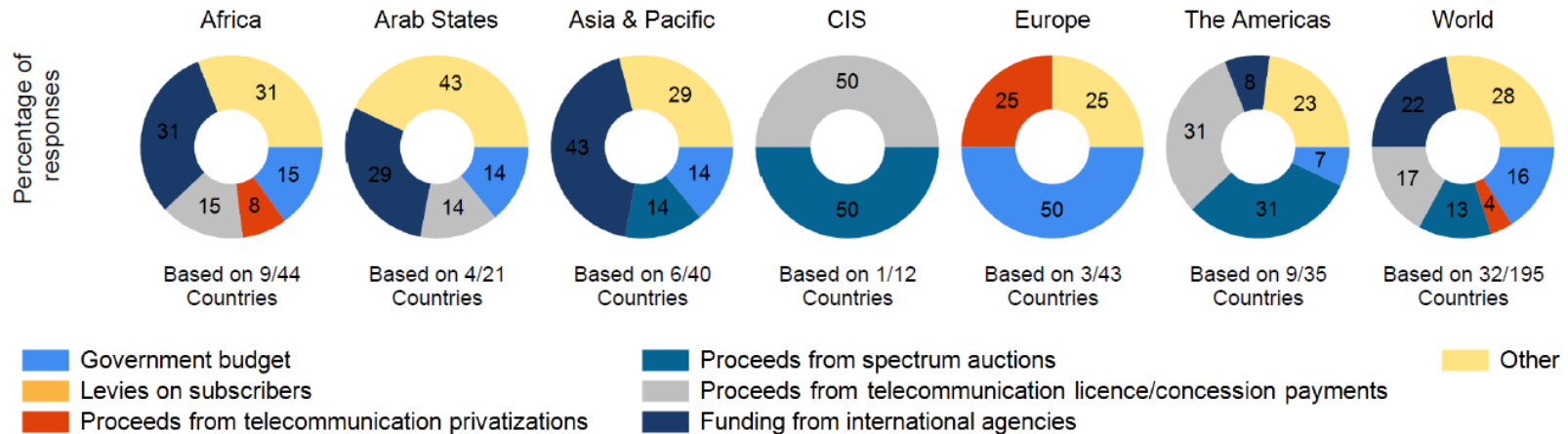
Operational USO Funds



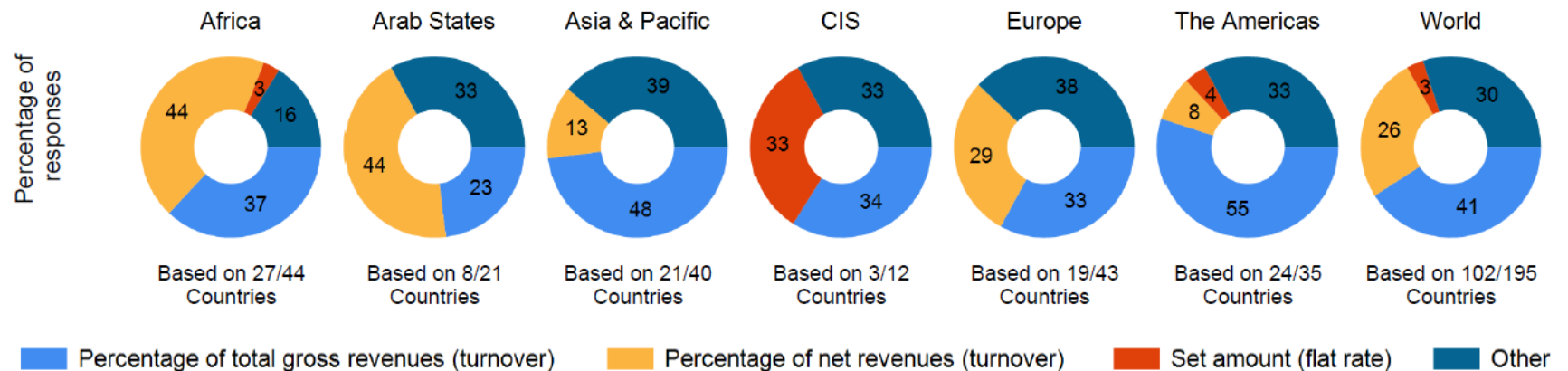
Operators/ service providers required to contribute to USF



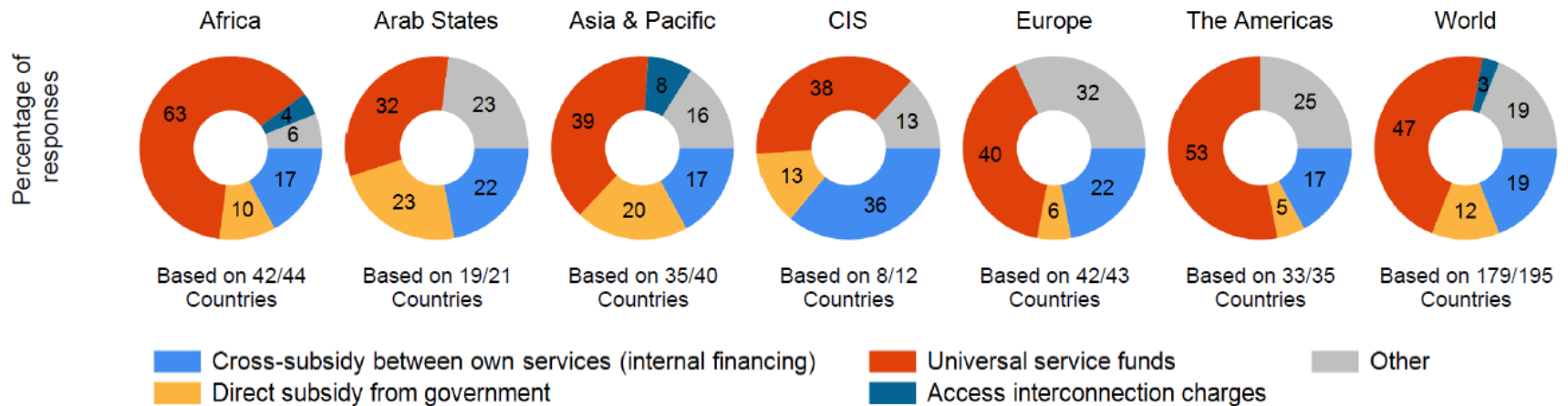
USF budget financing by source



Means of calculating USF contribution amount



Means of financing operator(s) universal access/service obligations



Key issues in the formulation of a wireless broadband masterplan

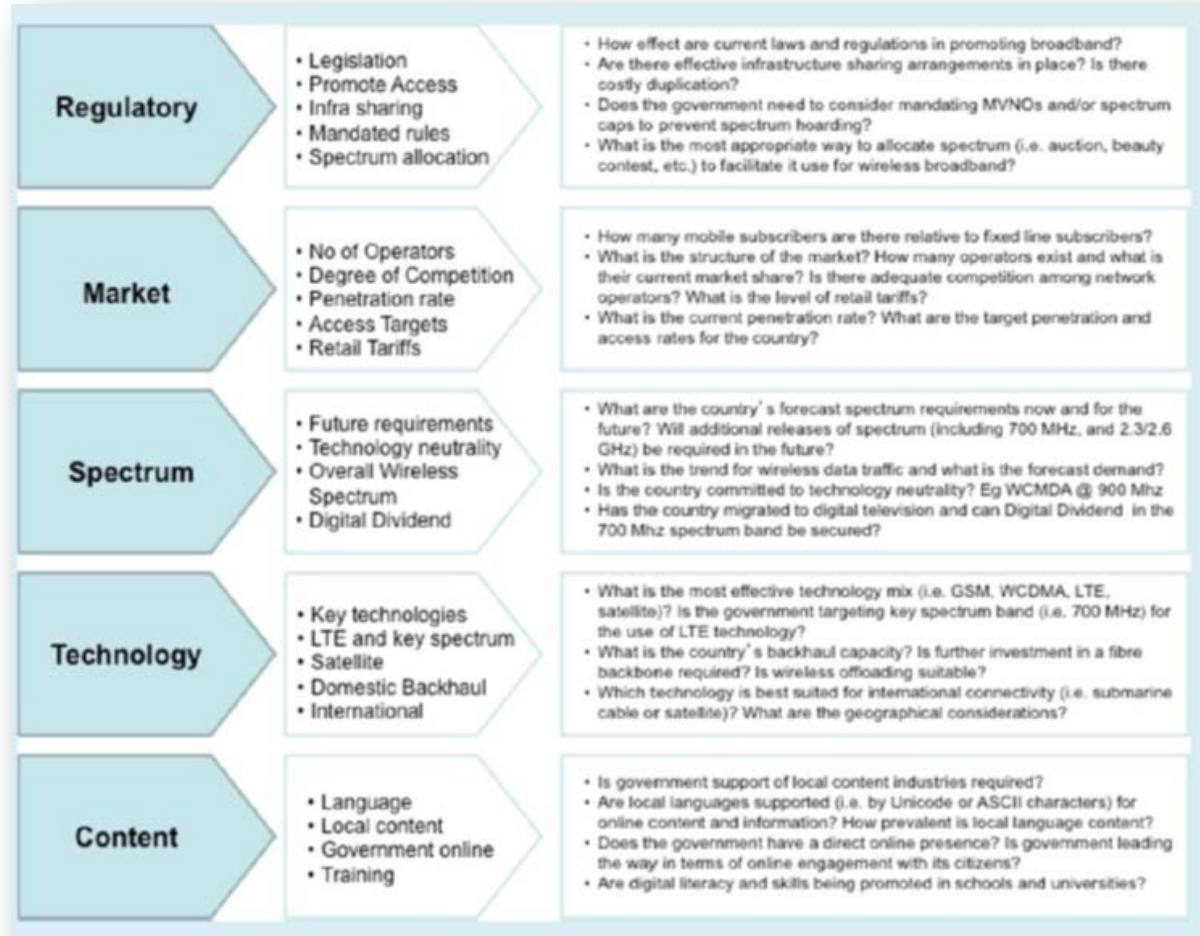
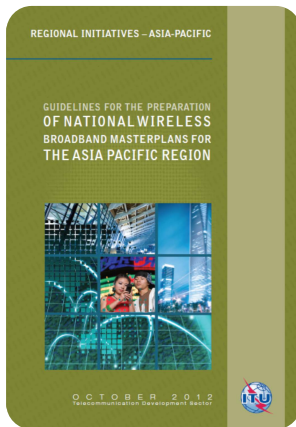
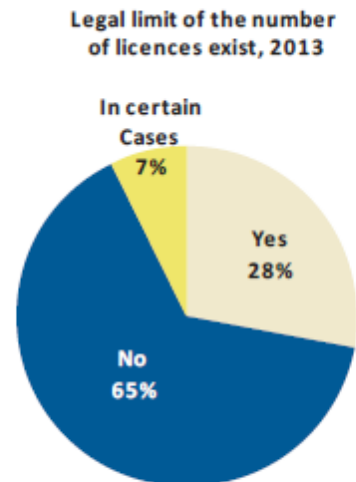
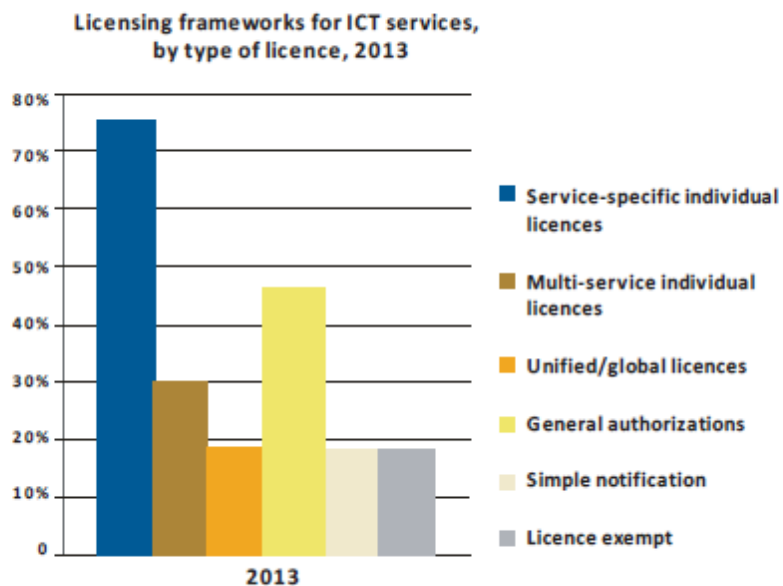


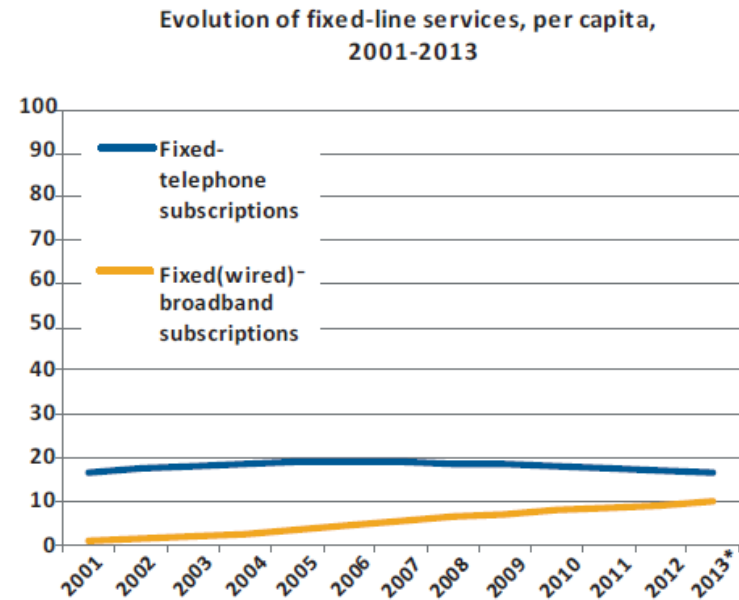
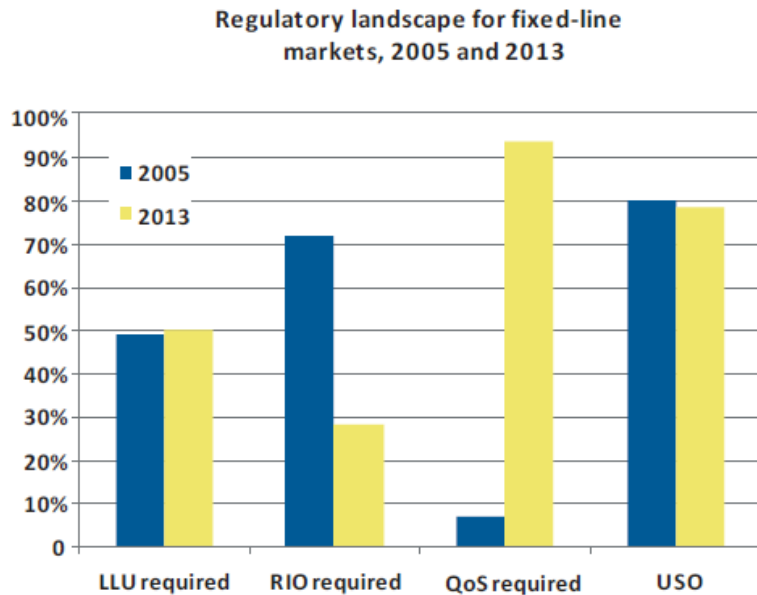
Figure 1.8: Licensing frameworks for ICT services, 2013



Source: ITU, www.itu.int/icteye.

Regulating fixed line services

Figure 1.6: Regulating fixed lines



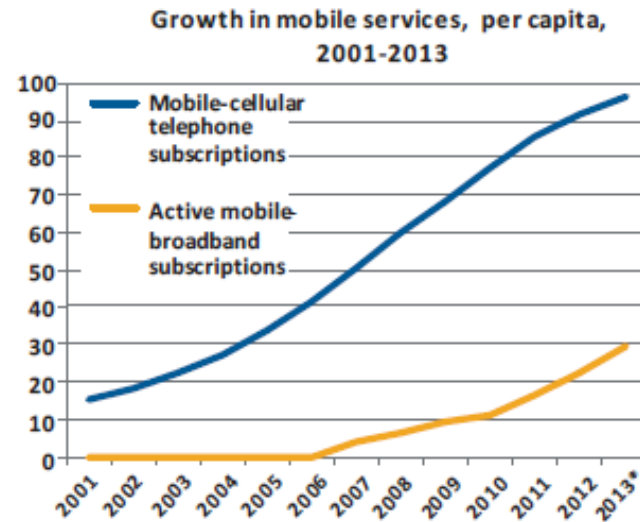
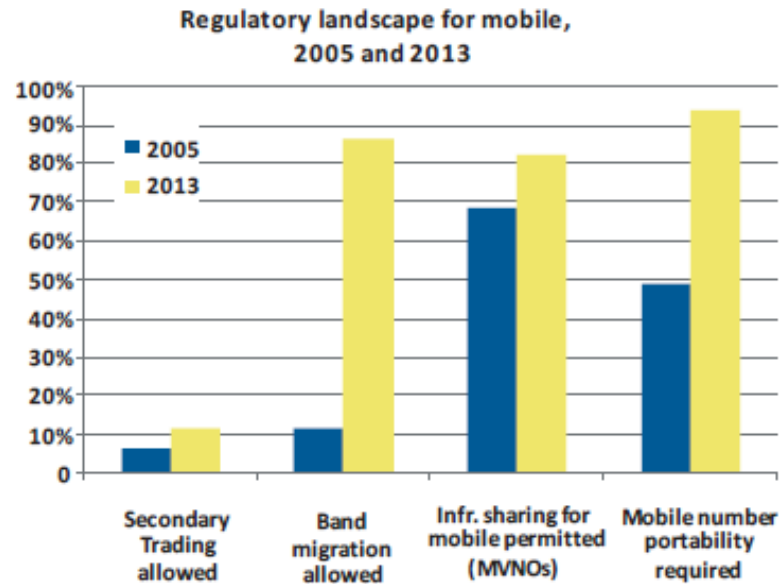
Legend: LLU = Local Loop Unbundling
 RIO = Reference Interconnection Offer
 QoS = Quality of Service
 USO = Universal Service Obligations

Note: * estimates.

Source: ITU, www.itu.int/icteye.

Regulating mobile services

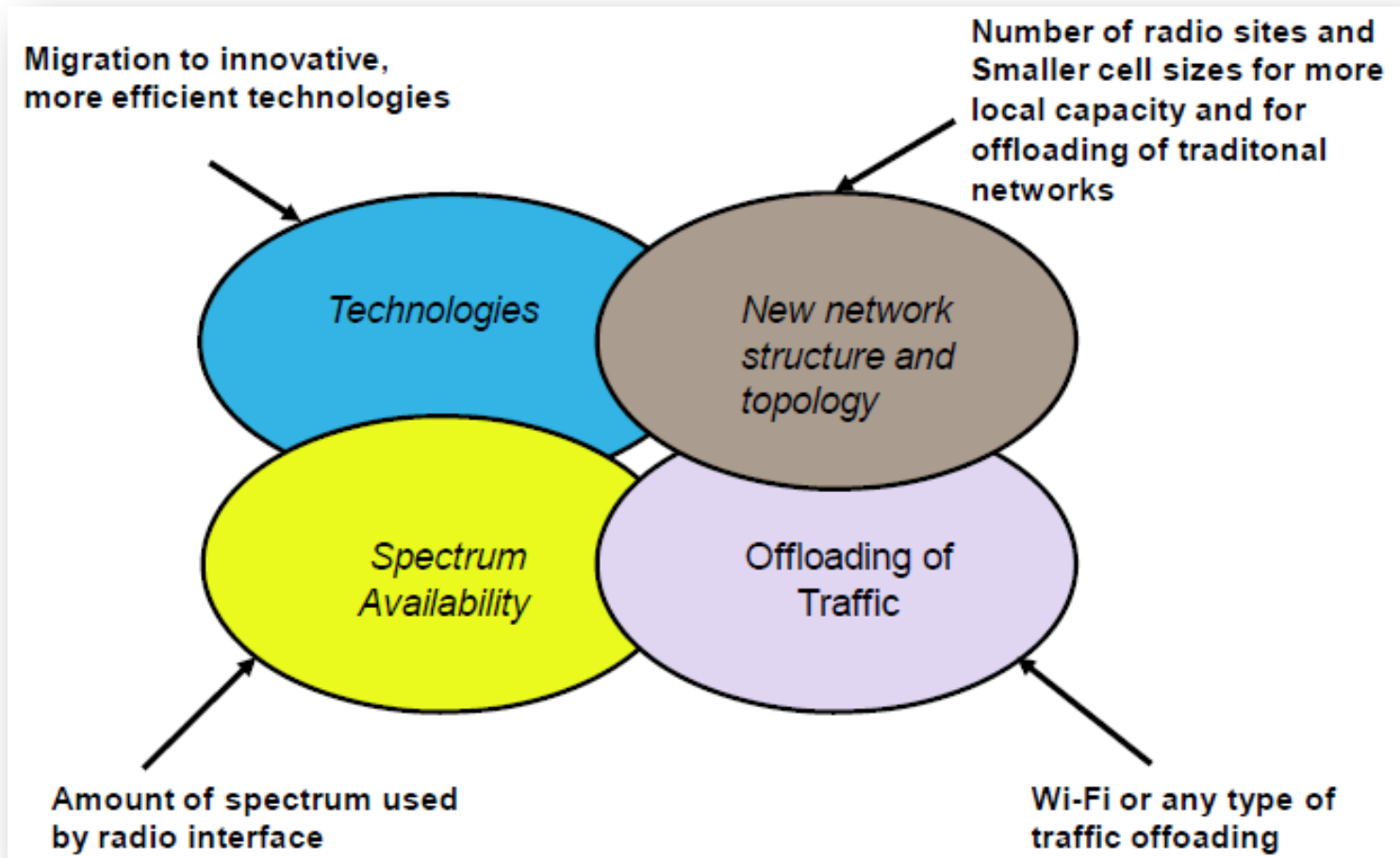
Figure 1.7: Incentive regulation and growth in mobile services



Note: * estimates.

Source: ITU, www.itu.int/icteye.

Options to manage mobile demand



Source: Report ITU-R M.2243 (00/2011)

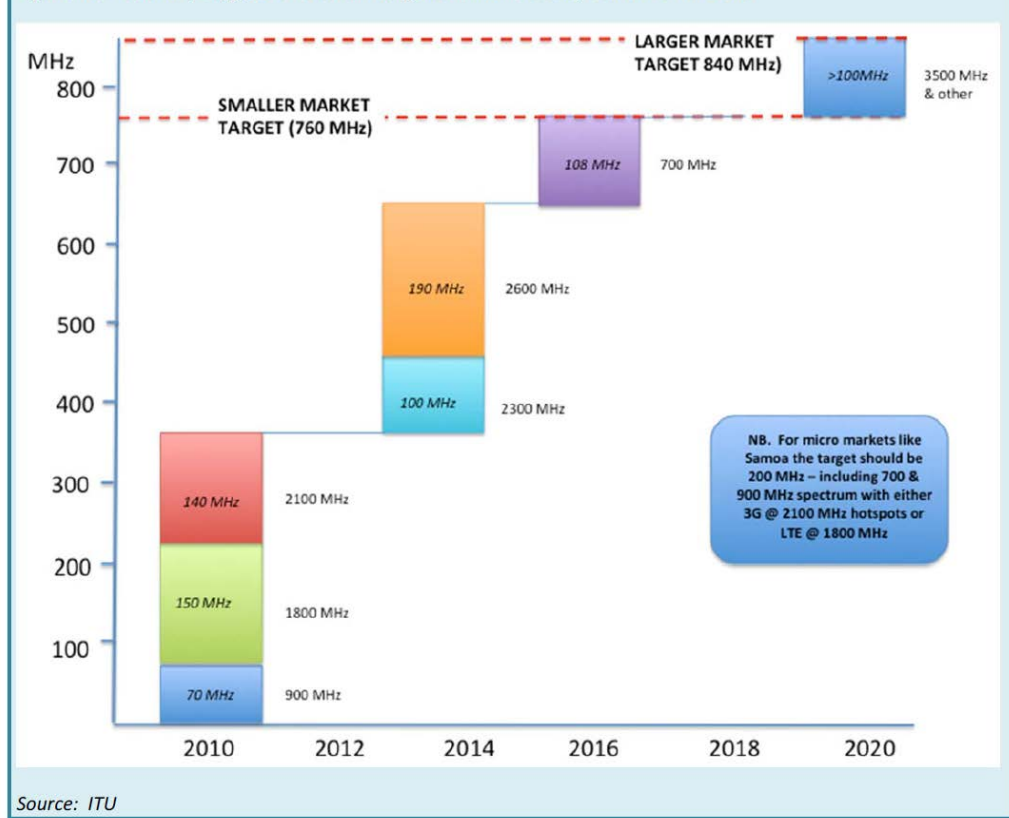
Wireless broadband spectrum estimates

	Amount (in MHz)
European Union	At least 1200 MHz by 2015
Australia	At least 950 MHz by 2015 and 1100 MHz by 2020
India	Additional 500 MHz for IMT Service by 2020*
Japan	1500 MHz by 2020
Republic of Korea	988 MHz
United States	Additional 500 MHz

Source: Report ITU-R M.2243 (00/2011)

* NTP 2012

Figure 16: Country suggest allocation targets for wireless spectrum until 2020



Source: [http://www.itu.int/ITU-](http://www.itu.int/ITU-D/tech/broadband_networks/WirelessBDMasterPlans_ASP/Masterplan%20guidelines%20EV%20BAT1.pdf)

[D/tech/broadband_networks/WirelessBDMasterPlans_ASP/Masterplan%20guidelines%20EV%20BAT1.pdf](http://www.itu.int/ITU-D/tech/broadband_networks/WirelessBDMasterPlans_ASP/Masterplan%20guidelines%20EV%20BAT1.pdf)

Wireless broadband spectrum estimates

RATG 1:
Pre-IMT,
IMT-2000 and
its enhancements

RATG 2:
IMT-Advanced
(new mobile access
and new nomadic/
local area access)

RATG 3:
Existing radio
LANs and their
enhancements

RATG 4:
Digital mobile
broadcasting
systems and their
enhancements

Total spectrum requirements for both RATG 1 and RATG 2 in the year 2020

	Total spectrum requirements for RATG 1	Total spectrum requirements for RATG 2	Total spectrum requirements RATGs 1 and 2
Lower user density settings	440 MHz	900 MHz	1 340 MHz
Higher user density settings	540 MHz	1 420 MHz	1 960 MHz

Source: Report ITU-R M.2290-0 (12/2013)



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Means to control dominance

Wholesale price controls

Accounting separation

Non-discrimination rules

Ex-post competition law



Functional Separation

Virtual Separation

Equivalence of Input

Monitoring &
effective enforcement

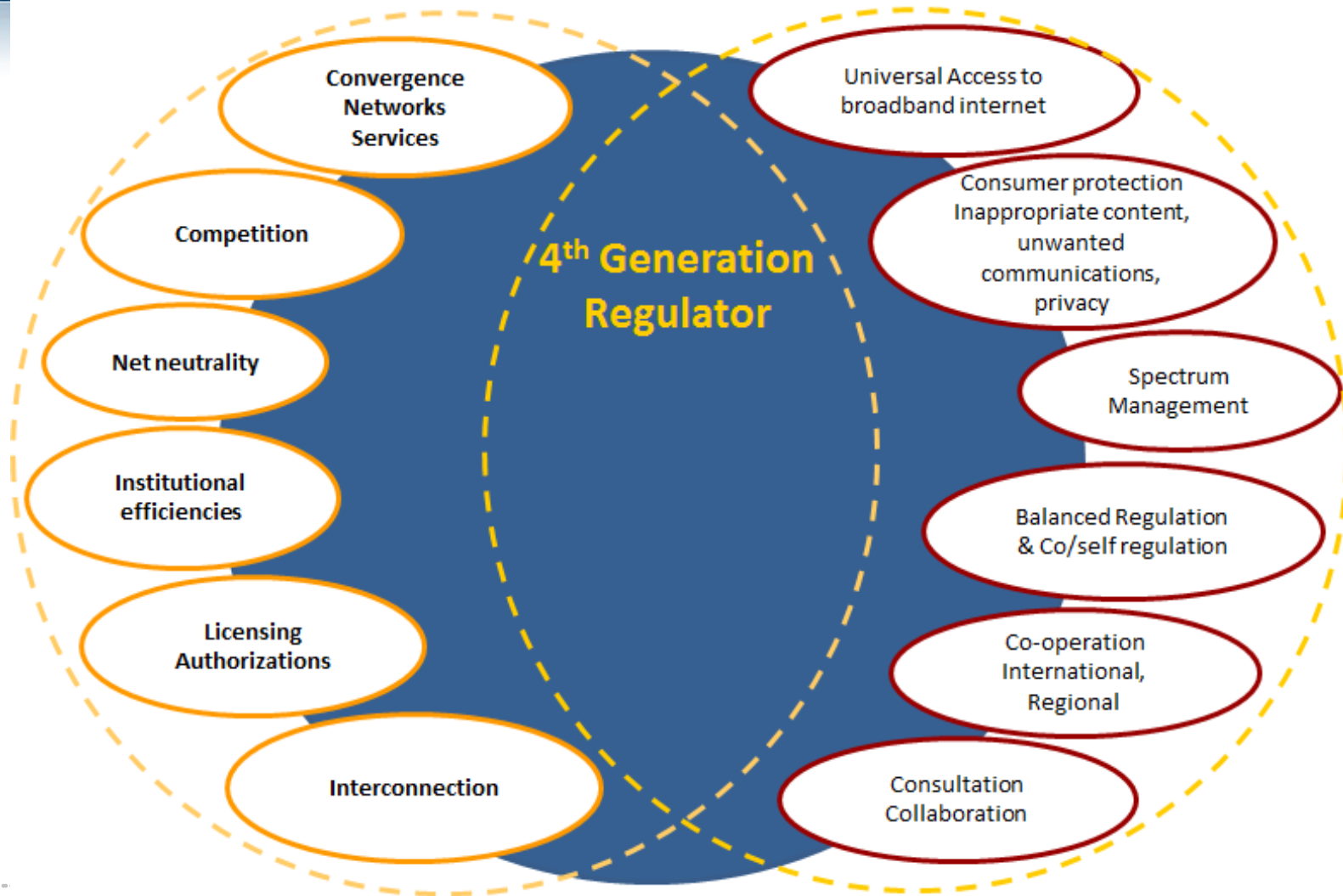
Legal Separation

Structural Separation





Regulation 4.0



ICT embedded society and cross-sectoral collaboration



Policy & Regulation

Need for cross-sector collaboration



Sensor Networks



Universal Broadband



Green ICT & E-Waste



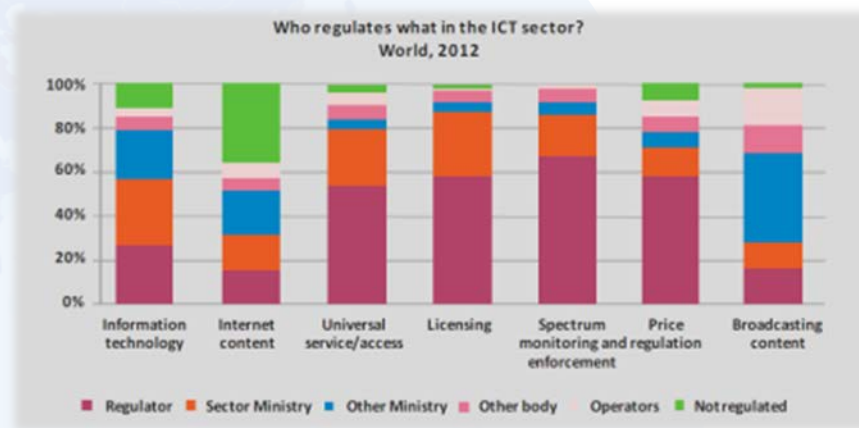
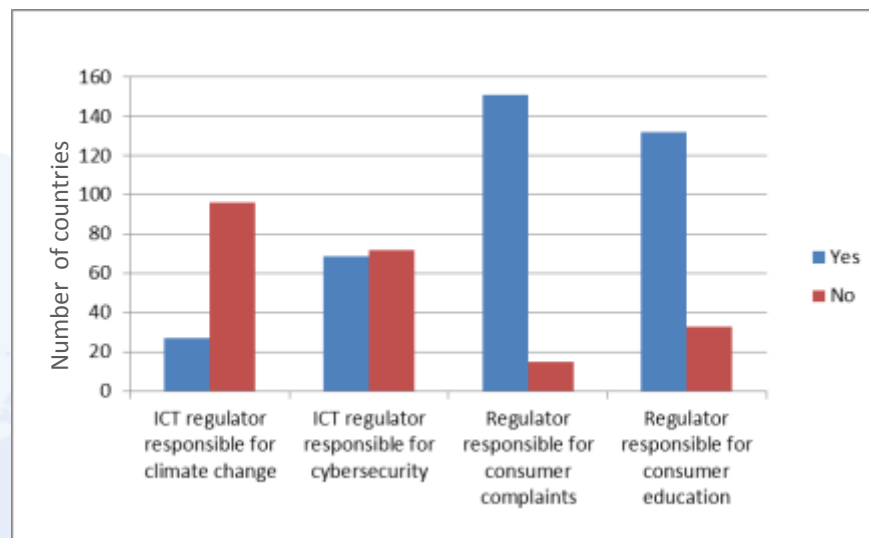
Infrastructure Security



Spectrum Management



Standards, Conformity & Interoperability



Source: ITU Telecommunication/ICT Regulatory Database, www.itu.int/icteye

ICT SECTOR REGULATORY RESPONSIBILITY - Who regulates what?

NATIONAL REGULATORY ENTITY (Lead Agencies Examples)..



Emergency

National Disaster Management Authority, Military, Internal Affairs



Education

Ministry of Education, Education Boards, Local Government



Health

Ministry of Health, Local Government



Electricity

Ministry of Power, Regulator Local Government



Governance

City, Municipal, provincial, Central Government Agencies



Transport

Local Government, Department of Transport



Water



Teleworking

Ministry of Finance, Banking Regulator



Finance & Payment



Sensor Networks



Universal Broadband



Green ICT & E-Waste



Infrastructure Security



Spectrum Management



Standards, Conformity & Interoperability

Competition Authority

Standardization Bodies

Security Agencies

Sector Regulators

Ministry of ICT



COLLABORATION MECHANISMS



Emergency



Education



Health



Electricity



Governance



Transport, Trade, Logistics



Water



Teleworking



Infrastructure Security



Integrated Policy



Legislation



Co-Regulation



Standardization (International / National)



MoU or Cooperation Agreement



Coordination Committee



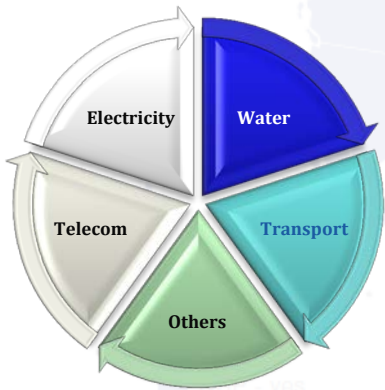
Projects, Coordination on Case to Case basis





**SMART
SUSTAINABLE
CITIES**

REGULATORY COLLABORATION



yes

■ NBP - planning

**MULTI UTILITY
REGULATOR**





Mobile Banking

Tanzania	MoU signed between Bank of Tanzania (BoT) and Tanzania Communication Regulatory Authority (TCRA).
India	Statutory guidelines for operationalizing M-Banking issued by the Reserve bank of India (RBI) for banks and Regulations by the Telecom Regulatory Authority of India (TRAI) on QoS, Tariffs for service providers.
Pakistan	MoU between Pakistan Telecommunication Authority (PTA) and State Bank of Pakistan (SBP)



Competition

Australia	Legislation separates powers between Australian Consumers and Competition Commission (ACCC) and Australian Communications and Media Authority (ACMA). Chairman of ACCC and ACMA are Associate Members in ACMA and ACCC respectively.
Mauritius	MoU Signed between Competition Commission (CCM) and ICT Authority (ICTA)
United Kingdom	Agreement on procedures between Office of Fair Trade (OFT) and Office of Communications (OFCOM).



Green ICT & E-Waste

Egypt	Green ICT Strategy implemented through a MoU between Ministry of Communications & IT (MCIT) and Ministry of Environmental Affairs (MEA)
Singapore	E2PO is a multi-agency committee led by the National Environment Agency (NEA) and the Energy Market Authority (EMA) and comprises the Economic Development Board (EDB), Land Transport Authority (LTA), Building and Construction Authority (BCA), Housing and Development Board (HDB), Infocomm Authority of Singapore (IDA) , Agency for Science, technology and Research (A*STAR), Urban Redevelopment Authority (URA), Jurong Town Corporation (JTC) and National Research Foundation (NRF). The Ministry of the Environment and Water Resources (MEWR) and Ministry of Trade and Industry (MTI) are also represented in the committee.



Health

-
- | | |
|---------------|--|
| Singapore | Joint project on Tele-health by Ministry of Health and Infocomm Development Authority (IDA) |
| United States | Joint Statement and MoU between Federal Communications Commission (FCC) and Food and Drug Administration (FDA) on broadband and wireless enabled medical devices |
-



Electricity

-
- | | |
|-----|---|
| UAE | <u>Environment Agency - Abu Dhabi (EAD)</u> and the Telecommunications Regulatory Authority (TRA) have signed a Memorandum of Understanding (MoU) to promote cooperation and partnership in the field of technology and information security, |
|-----|---|
-



Transport, Trade, Logistics

-
- | | |
|-----------|---|
| Egypt | Green ICT Strategy implemented through a MoU between Ministry of Communications & IT (MCIT) and Ministry of Environmental Affairs (MEA) |
| Singapore | Infocomm@SeaPort programme is a collaboration between the Infocomm Development Authority of Singapore (IDA) and the Maritime and Port Authority of Singapore (MPA). e-freight is a joint programme between IDA and Civil Aviation Authority of Singapore seeking to enhance competitiveness and increase productivity in the air cargo logistics sector through infocomm. |
-

UK Regulators' Network (UKRN) is an initiative of the UK economic regulators: CAA, FCA, Ofcom Ofgem, ORR, Ofwat, UR. Monitor and the Water Industry Commission for Scotland (WICS) are also participating as observers

