

Overview of regulatory challenges in the converged telecommunication/ICT environment

ACMA International Training Program 2007

**Melbourne
October 26, 2007**

**Ashish Narayan
ITU Regional Office for Asia-Pacific**

ITU ASP RO



International
Telecommunication
Union

Overview

ITU activities in the Asia-Pacific region

ICT trends

Regulatory trends

Regulation in the transforming Telecom/ICT Sector

Challenges arising from convergence of carriage and content

Conclusion

ITU activities in the Asia-Pacific region

ITU ASP RO



International
Telecommunication
Union

ITU-D Sector: Programs & Initiatives

**WTDC
2006**

The World Telecommunication Development Conference (WTDC Doha, 2006) adopted *Doha Declaration* including: e.g.,

Six Programs

- Program 1:** *Regulatory reform*
- Program 2:** *Technologies and telecom network development*
- Program 3:** *E-strategies and e-services/applications*
- Program 4:** *Economics & finance incl. costs and tariffs*
- Program 5:** *Human Resource Development*
- Program 6:** *Special program for least developed countries (LDC)*

**Centres of
Excellence**

Special initiatives

Private sector initiatives: promotion & partnership
Gender & youth initiatives
Assistance to indigenous peoples, communities, and people with disabilities

Regional Initiatives (RIs)
5 for each of the five ITU's geographic region

Asia Pacific RIs
(Next Slide)

International
Telecommunication
Union

WTDC
2006

Asia-Pacific Regional Initiatives

Six Programs
Special initiatives

Res 17: Regional Initiatives (RIs)
5 for each of the five ITU's geographic region

*Asia-Pacific
Centres of
Excellence*

Five Asia Pacific RIs

1

- Telecommunication/ICT policy and regulatory cooperation in the Asia-Pacific region

2

- Rural Communications – Infrastructure development

3

- Next Generation Networks (NGN) planning

4

- The unique telecommunication/ICT needs of Pacific islands and small island developing states (SIDS) in the Asia-Pacific region

5

- Strengthening the collaboration between ITU-T and ITU-D

Asia-Pacific Regional Actions: 2007 (I)

Program 1: Regulatory reform

- P1. ITU-IDA Executive Training Program in Singapore (Jul 30-Aug 3)
- P1. Regulatory Study-Visits: Bhutan and Nepal in Hong Kong/China (Sep)
- P1. ITU-MII Seminar on Telecom/ICT Policy and Regulation for China (Jul 24-5)
- P1. [Workshop on Planning & Establishing New Regulators and Sub-Regional Telecommunication Meeting for Cambodia, Lao PDR, Myanmar, & Vietnam in Laos \(Oct. 22-27\)](#)
- P1. [ITU-ACMA Policy & Regulation for Asia-Pacific in Australia \(Oct.22-Nov.2\)](#)

Program 2: Technologies and telecom network development

- P2. ITU-APT Asia-Pacific Forum on NGN_Planning (Mar 26-30)
- P2. Training on Spectrum Management Software, Cambodia (April 9-13)
- P2. ITU-R/D Workshop on IMT-Advanced in Japan (May 22)
- P2. ITU-MIC Enhancing knowledge & application of ITU-T Rec in Japan (June)
- P2. New Telecommunication/ICT Technologies and Services: Bangladesh, DPR Korea
- P2. ITU-MII Training on Spectrum Management in China (June 4-13)

Asia-Pacific Regional Actions: 2007 (II)

Program 3: E-strategies and e-services/applications

- P3. Joint ITU-APT-PITA Workshop on “Principles of ICT legislation” in New Zealand for the Pacific Islands (Mar 28-30)
- P3. Ensuring Cybersecurity through Standard Solutions in Vietnam (Aug 28-31)
- P3. Establishment of Model Community ICT Center for the USF in Pakistan
- [P3. Workshop on ICT Applications for Rural Communication Development in Indonesia \(Nov.28-30\)](#)
- P3. ICT Policy and Strategies and Mobile Communication Licensing in Nauru

Program 5: Human Resource Development

- P5. Regional workshop on Strategic Human Resources Management
- P5. Online training on Policy and Regulation
- P5. Virtual Forum on Knowledge Management
- P5. Regional workshop on Knowledge Management: The Pacific Islands
- P5. Regional workshop on "Competencies for Competitiveness"
- P5. Support to the implementation of the **Asia-Pacific Center of Excellence:**

Asia-Pacific Regional Actions: 2007 (III)

Program 6: Special program for least developed countries

P6. Telecommunication Development Plan & Act: Kiribati

P6. Assistance in Human Capacity Building: Myanmar

P6. Improving Distribution & Quality of Access to ICT Networks & Services/Setting up of Management Information System: Cambodia

P6. Implementation of MCT: Tonga, PNG, Marshall Islands

P6. Study on rural communications development: PNG, Tonga & Nepal

Special Initiatives

SI: PPF: Promoting Low Cost Access to the Unconnected, India (April 3-5)

SI: Engendering ICTs in R.O.Korea (July 16-21)

SI: Joint ITU-ESCAP Workshop on ICT Indicators for Asia and the Pacific in Thailand (Nov. 6-8)

SI: ICT for Marginalized Groups: Sri Lanka

Ad Hoc and Others (ASEAN Member Countries)

- Capacity Building on Developing and Maintaining ICT Indicators and Statistics in Indonesia (Oct 2007)

Special Regional Projects



Australian Government
Department of Communications,
Information Technology and the Arts

Disaster Management

Policy & Regulation

Direct Country Assistance

e.g. Regulatory support to Kiribati, Tonga, PNG, Vietnam

Seminars & Workshops

e.g. Regional Workshop on “Frameworks for Cybersecurity and Critical Information Infrastructure Protection (CIIP)”, Regulatory Forum for Pacific, Cyber-legislation

Trainings / Fellowships

e.g. ACMA ITP, SMS4DC, Emerging Regulators Workshop

Infrastructure Support

e.g. MCT Support in PNG, Marshall Islands, Tonga



International
Telecommunication
Union

Asia Pacific Centre of Excellence

ITU ASP RO



International
Telecommunication
Union

ITU Asia Pacific Centres of Excellence ASP CoE

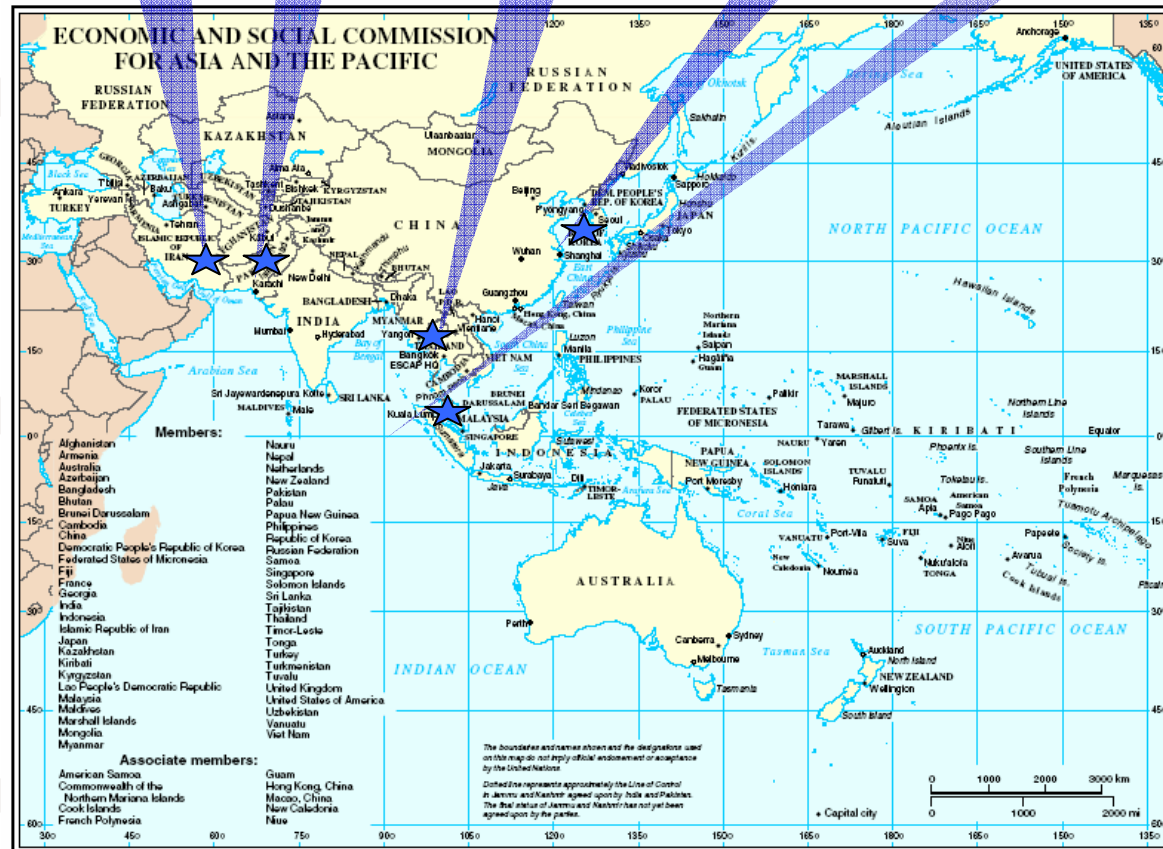
Spectrum Management (Iran)

Policy & Regulation (Pakistan)

Business Management (Thailand)

Technology Awareness (Rep. of Korea)

Rural ICT Development (Malaysia)



Asia-Pacific Centre of Excellence Courses 2007

Type	Centre of Excellence Node	Date	Curriculum
Face to Face	Universiti Utara Malaysia	May 29-31	Broadband Technologies for Rural Connectivity
Face to Face	Ministry of ICT, Iran	Aug 13-17	Spectrum Management
Face to Face	Pakistan Telecom Authority, Pakistan	Aug 22-24	Mobile Number Portability
Face to Face	Pusan National University, Rep. of Korea	Sep 3-6	WiBro / Wi-Max technologies
Forthcoming courses in 2007			
Face to Face	Universiti Utara Malaysia	Dec 10-13	Universal Service Obligation and Rural ICT Development
Face to Face	Ministry of ICT / TOT, Thailand	Dec 11-14	The economics of Next Generation Networks

ICT Trends

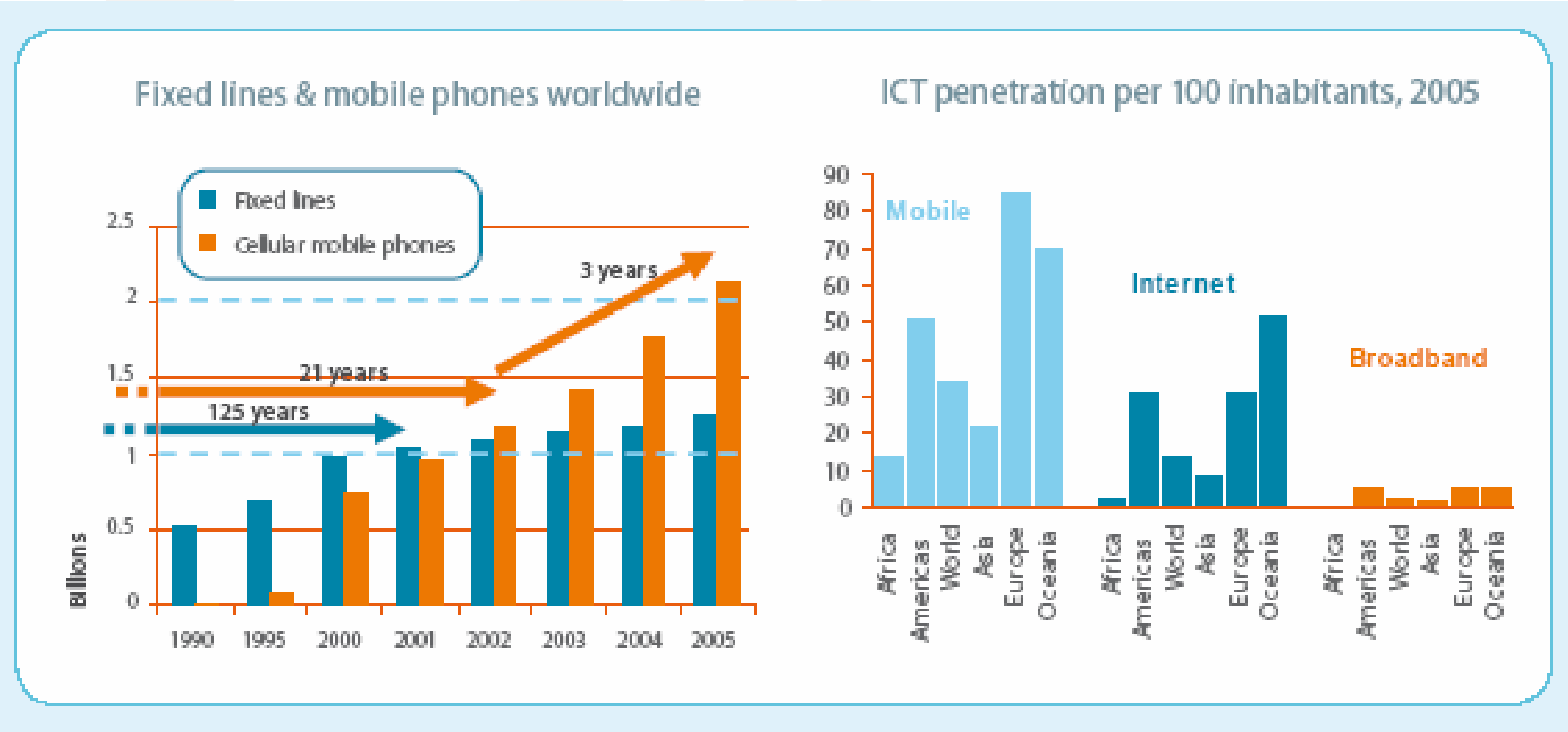
Source: digital. Life, ITU Internet Report 2006

ITU ASP RO



International
Telecommunication
Union

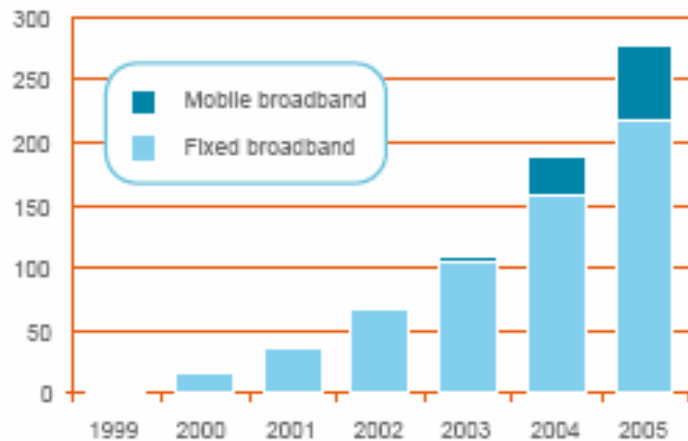
ICT Growth Trend



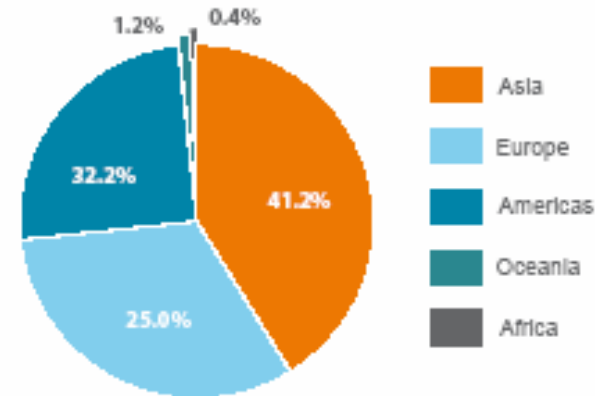
Source: digital. Life, ITU Internet Report 2006

Broadband Penetration Trend

Total broadband subscribers, worldwide, millions



Total broadband worldwide, 2006

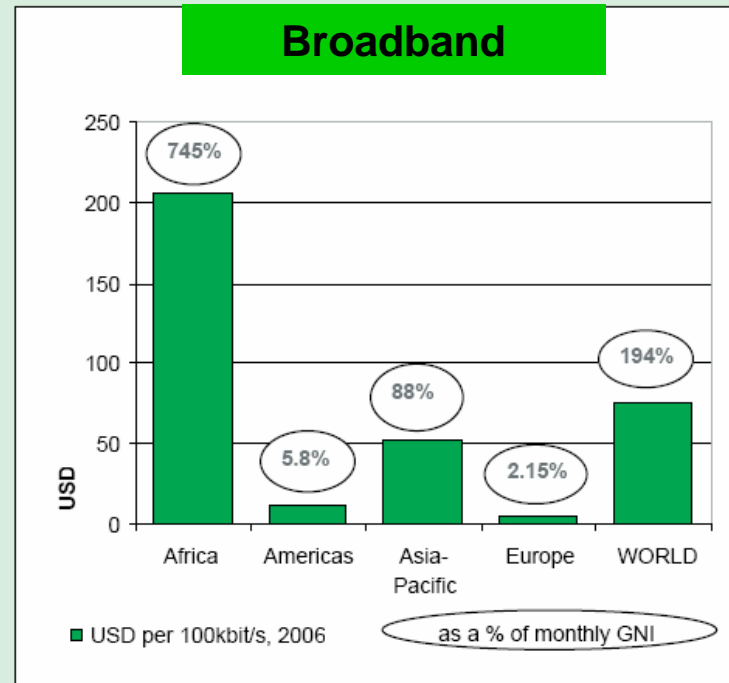
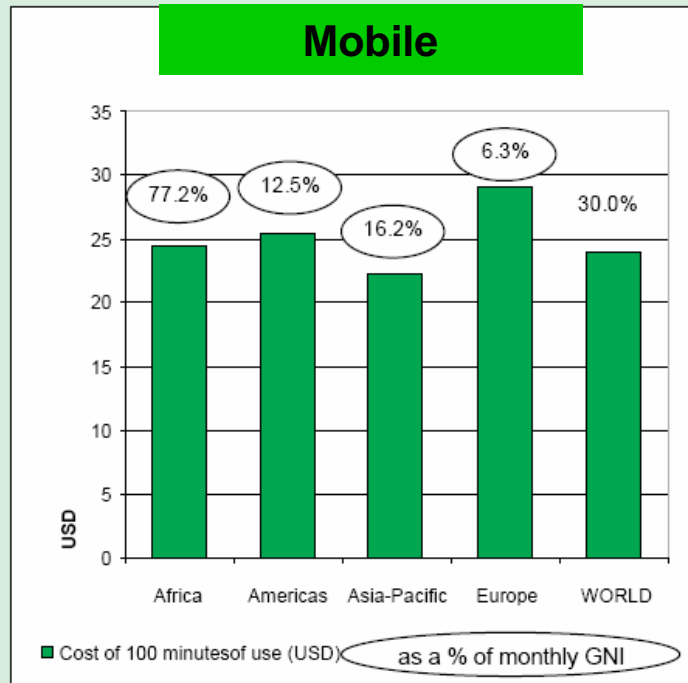


Total 2006: 277 million

Note: "Broadband" in this context means networks offering capacity equal to or greater than 256 kbit/s in one or both directions. For mobile services, this includes W-CDMA, CDMA 1x EV-DO and CDMA 1x EV-DV. For fixed-line broadband it includes DSL, cable modems, metro ethernet, fixed wireless access, fibre to the home, etc. (see Technical notes).

Source: digital. Life, ITU Internet Report 2006

Affordability of mobile and broadband tariffs



Note (left chart): Mobile cellular tariffs: 100 minutes of use includes the tariff components of 50 minutes of local peak time calling and 50 minutes of local off-peak calling. The connection charge is not taken into account, except where this is bundled into the cost of an account. A percentage of per capita income is computed by dividing the 100 minutes of use by the Gross National Income (GNI) of the country (World Bank, Atlas method, current USD).

Note (right chart): ITU's methodology for evaluating broadband access assesses the cost of a monthly subscription to broadband on the basis of a representative sample of offers for each country with commercial broadband available in USD per 100 kbit/s (to take into account packages at different speeds). Where charged by time, the cost of 100 hours of Internet access is evaluated. Where charged by data download, the equivalent of 1 Gbit of data per month is assessed.

Source: ITU, Measuring the Information Society 2007 (left chart) and ITU-UNCTAD World Information Society Report 2007: Beyond WSIS (right chart).

Source: Trends in Telecommunication Reform 2007

ITU ASP RO



International
Telecommunication
Union

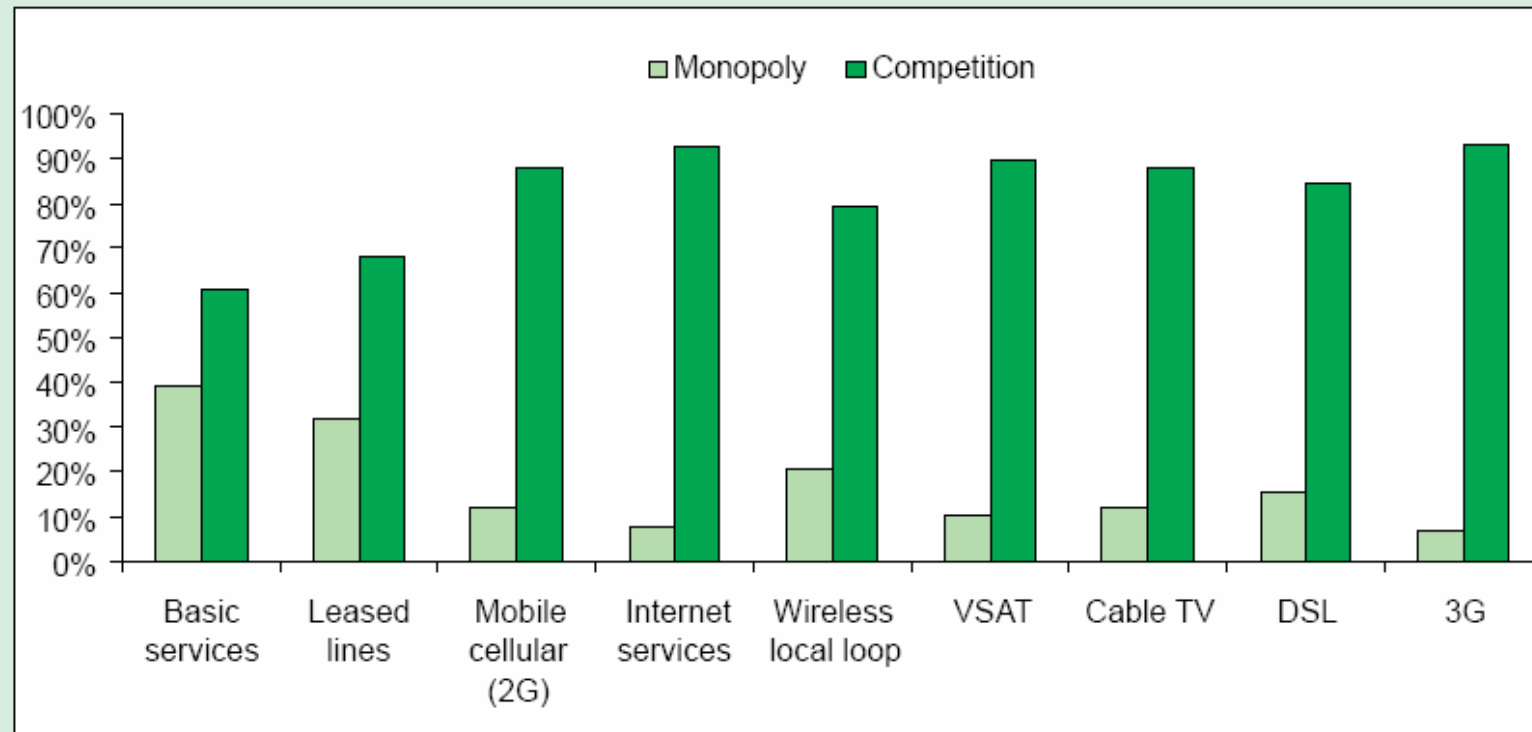
Regulatory Trends

ITU ASP RO



International
Telecommunication
Union

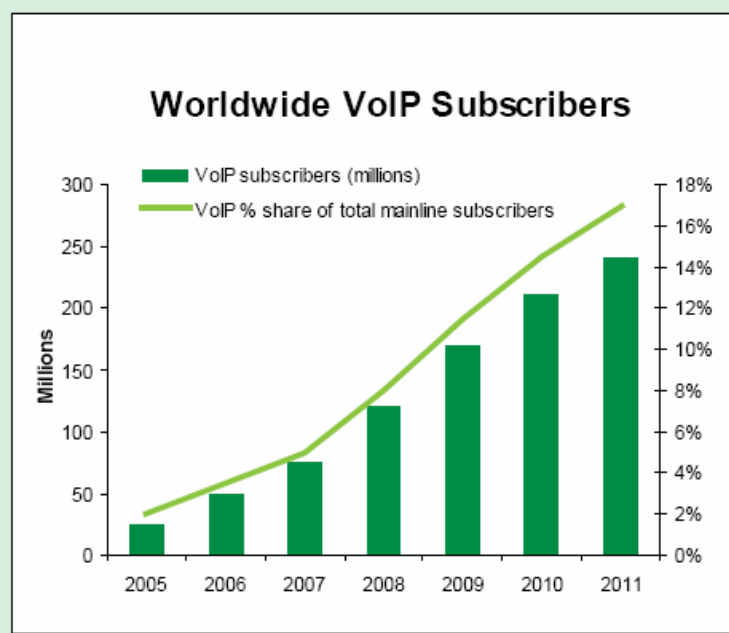
Competition: International Trend



Source: ITU World Telecommunication Regulatory Database.

- **Competition is authorized in more than 60% of the countries in Basic and leased line services**
- **Competition is authorized in more than 80% of the countries in Broadband and Mobile services**

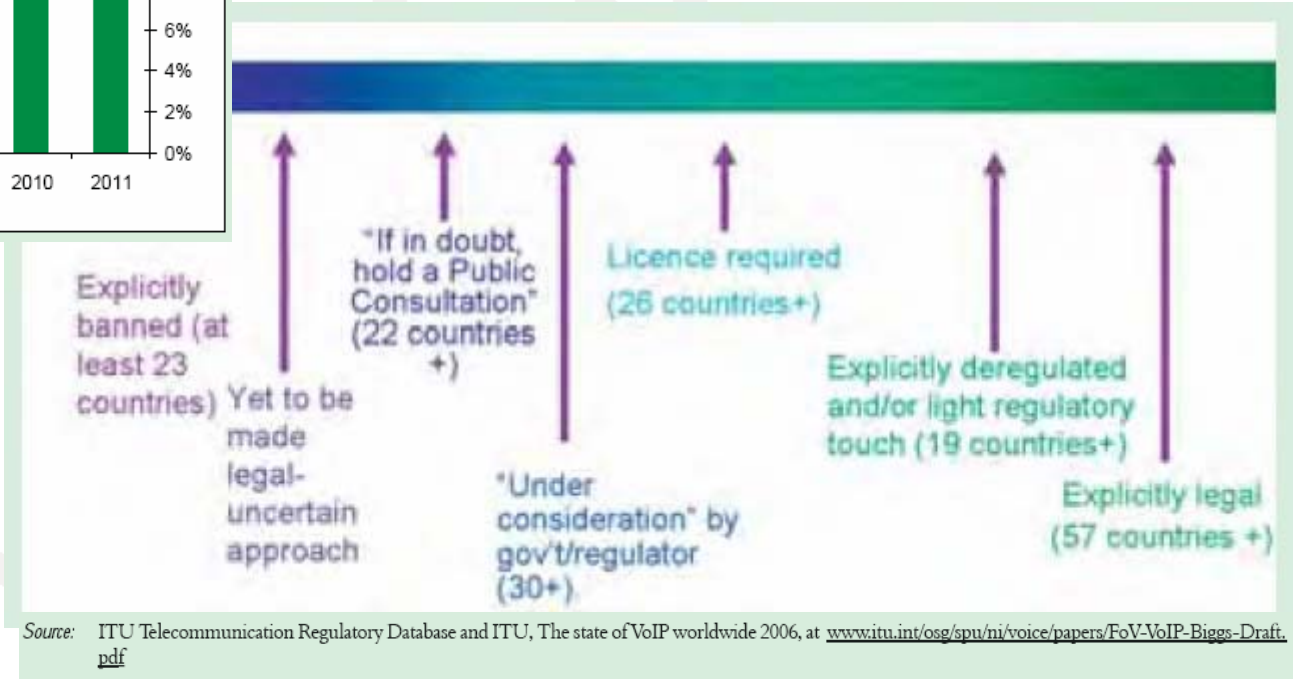
Voice over IP



Growth of VoIP

Source: ITU Telecommunication Regulatory Survey 2006 and ITU, The state of VoIP worldwide 2006, at www.itu.int/osg/spu/ni/voice/papers/FoV-VoIP-Biggs-Draft.pdf (right chart), iDATE (left chart).

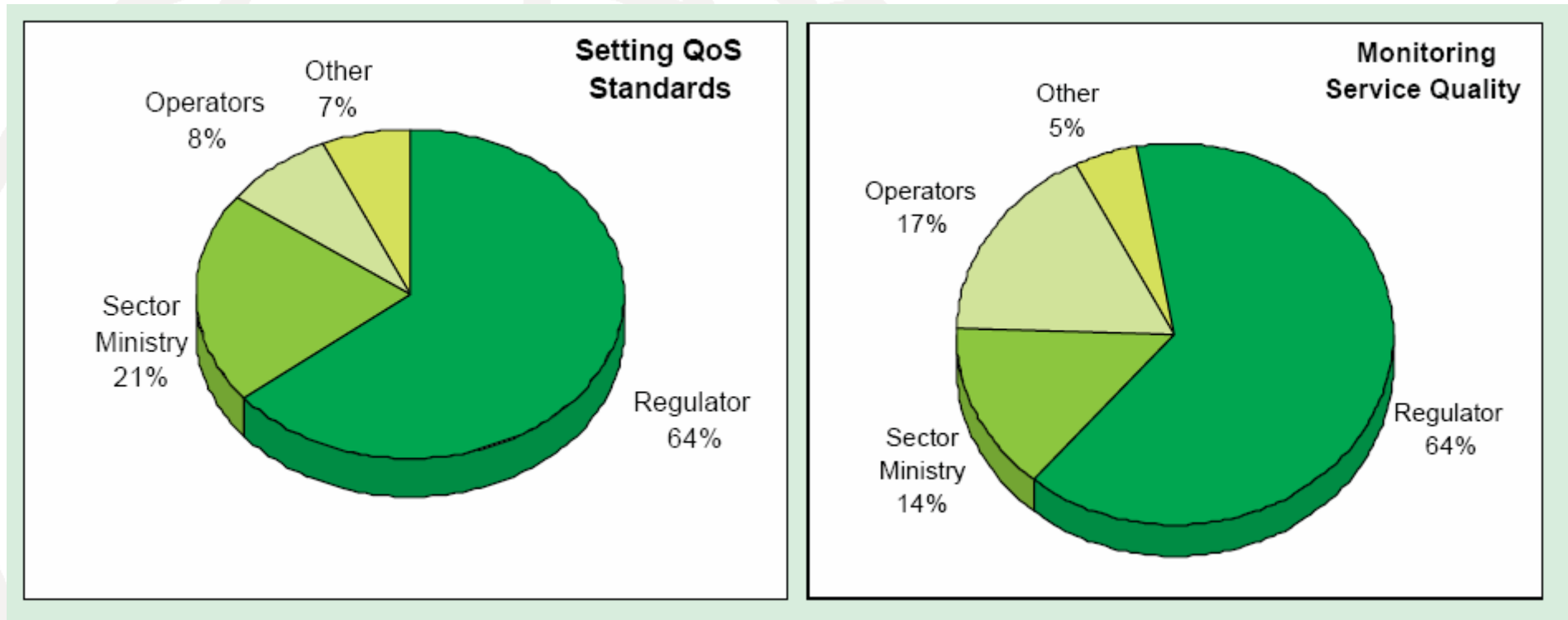
VoIP Regulation



Source: ITU Telecommunication Regulatory Database and ITU, The state of VoIP worldwide 2006, at www.itu.int/osg/spu/ni/voice/papers/FoV-VoIP-Biggs-Draft.pdf

Source: Trends in Telecommunication Reform 2007

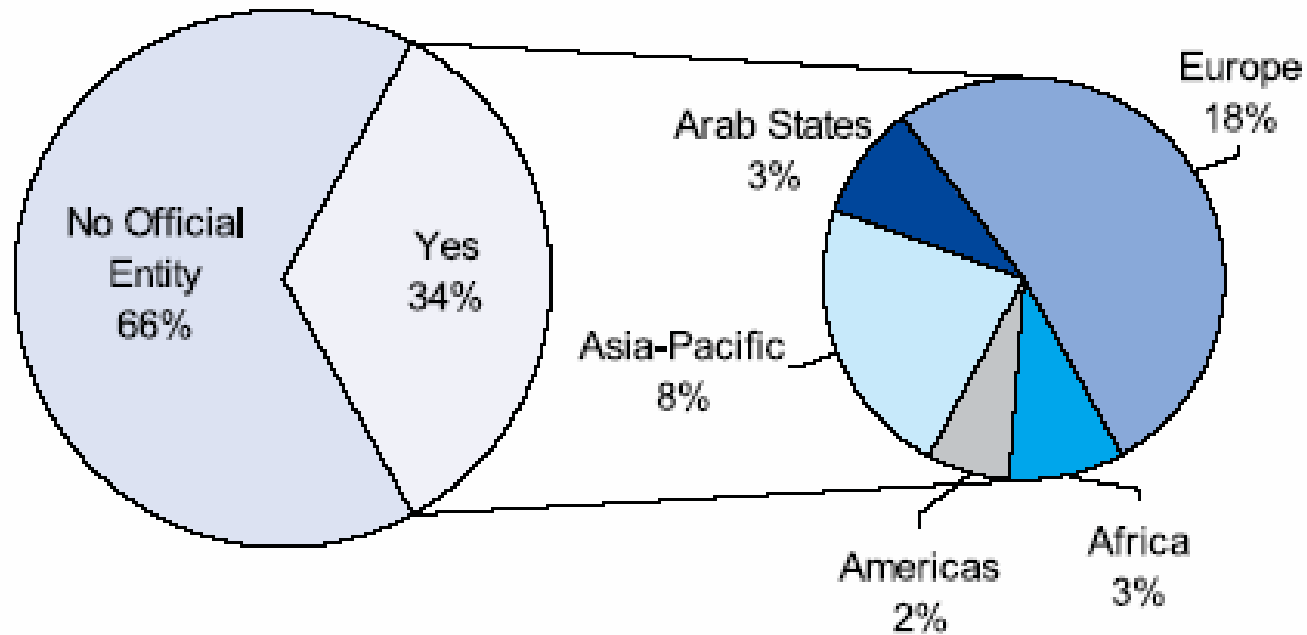
Quality of Service



Source: Trends in Telecommunication Reform 2007

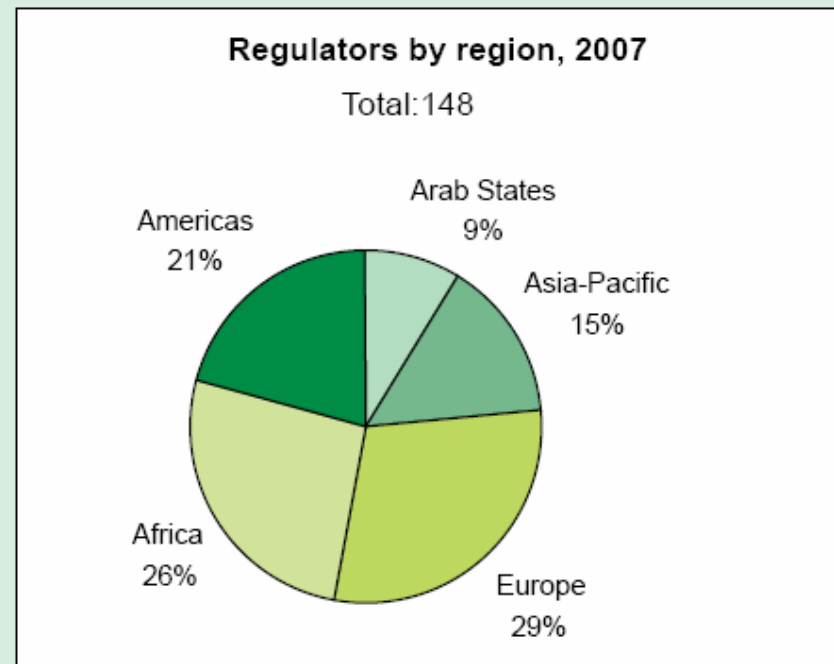
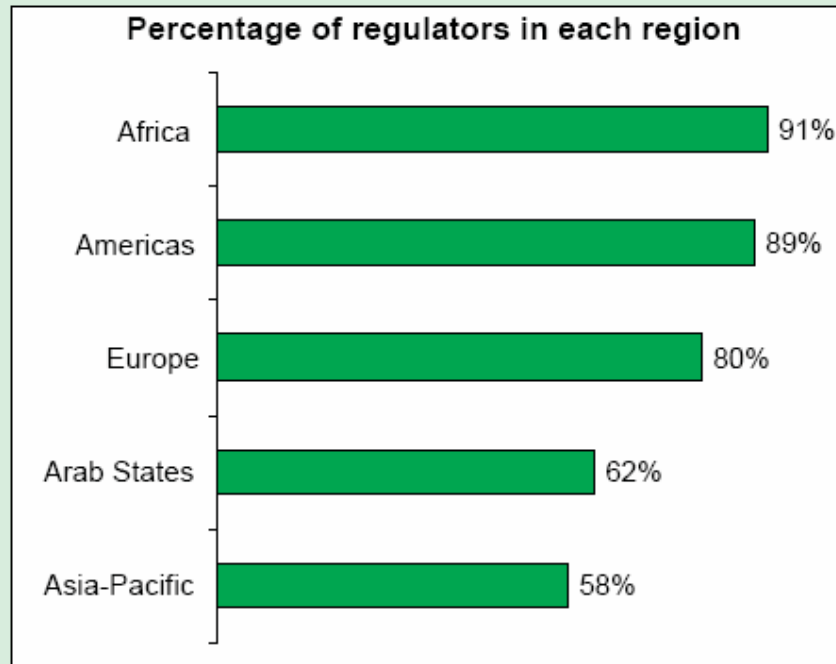
Spam Regulation

Is there an Entity Responsible for Combatting Spam?



Source: Trends in Telecommunication Reform 2006

Regulators: Institutional Trend



Source: ITU World Telecommunication Regulatory Database.

Examples of Converged and Multi-Sector Regulators

- **Converged Regulators: Australia, Austria, India, Malaysia**
- **Multi-sector Regulators: Costa Rica, Gambia, Germany**

Regulation in the Transforming Telecom/ICT Sector

ITU ASP RO



International
Telecommunication
Union

The Telecom Transformation

Policy & Regulatory Drivers

- Introduction of competition
- Lowering barriers to entry and operation
- Fostering business innovation and converged services
- Promoting ubiquity of services
- Recognizing telecommunication networks as a backbone for e-economy
- Increasing interests from governments to capitalize on the benefits of telecom networks

Technology Drivers

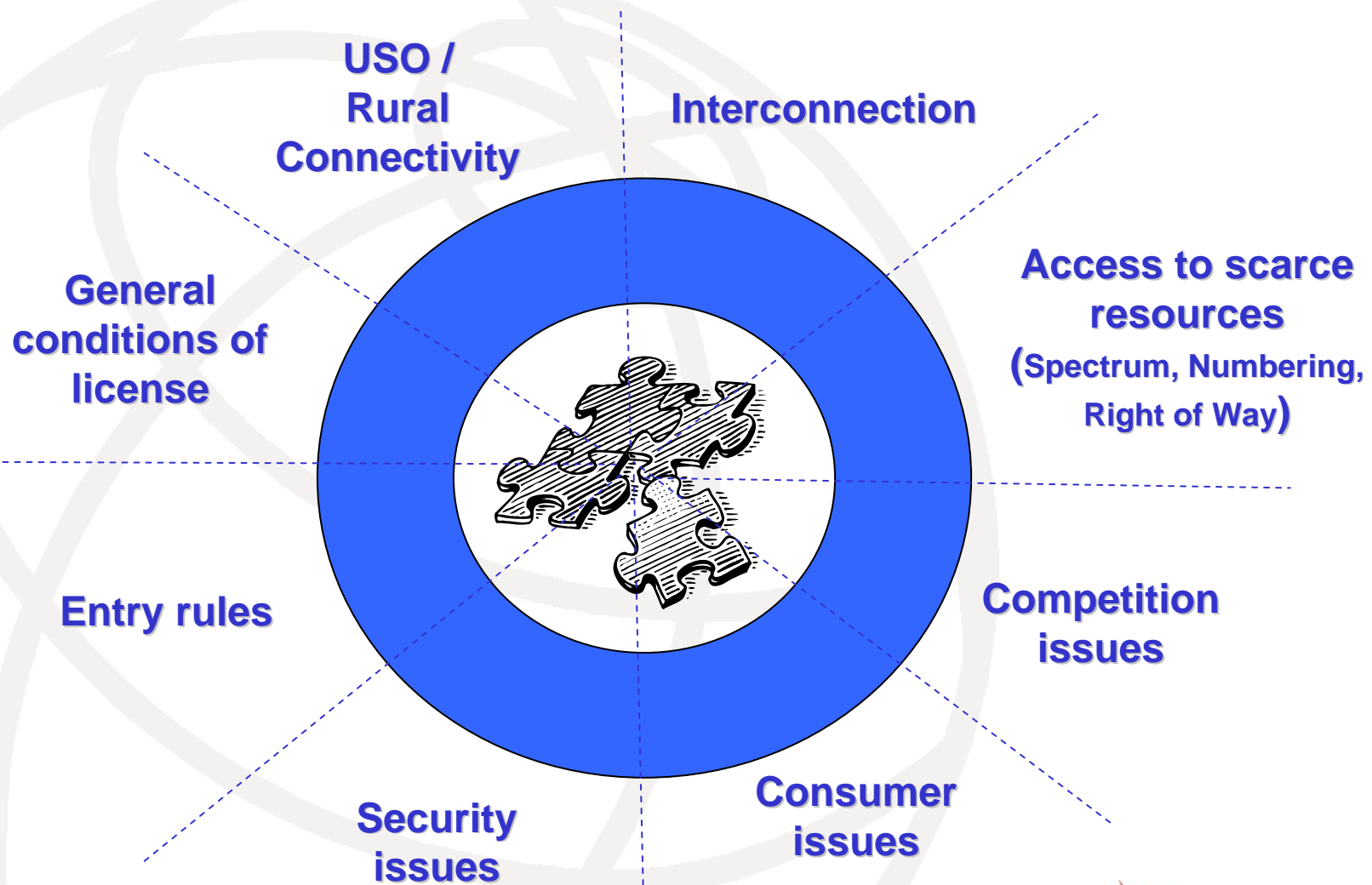
- Switch from copper to wireless and optical fibre
- Increasing role of software
- Increasing capacity to accommodate multiple services
- Centralized to distributed network architectures
- Operator-centric to User-centric
- Standardized to customized

Service
&
Technology
Neutral
Licensing
Regime

Business Drivers

- Ability to provide triple & quadruple play
- Internet becoming the common delivery platform for all types of content services
- Increasing capacity to accommodate multiple services
- Ability of ISPs to provide services closely competing with Telcos

Key Elements of Regulatory Framework

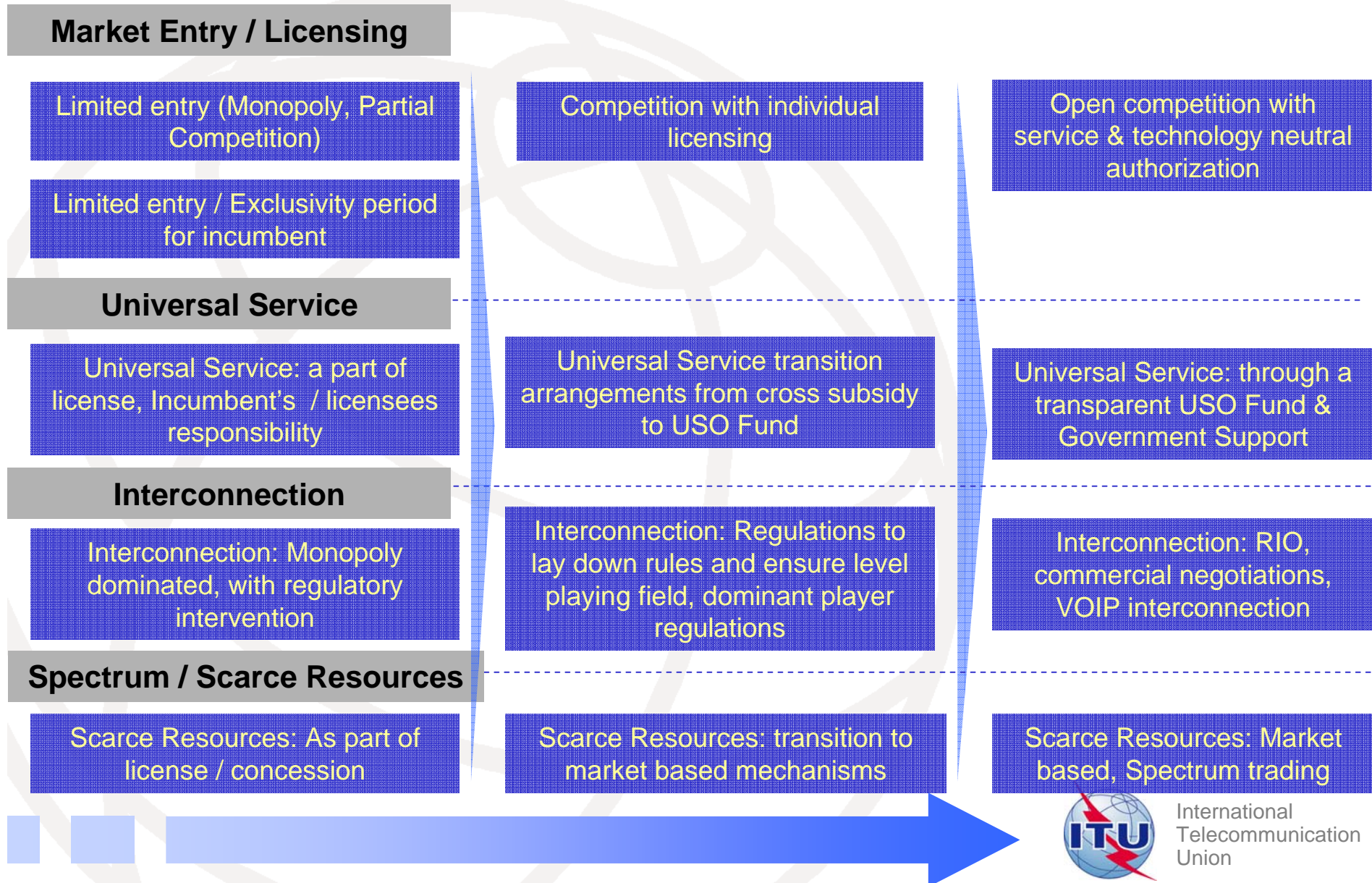


ITU ASP RO

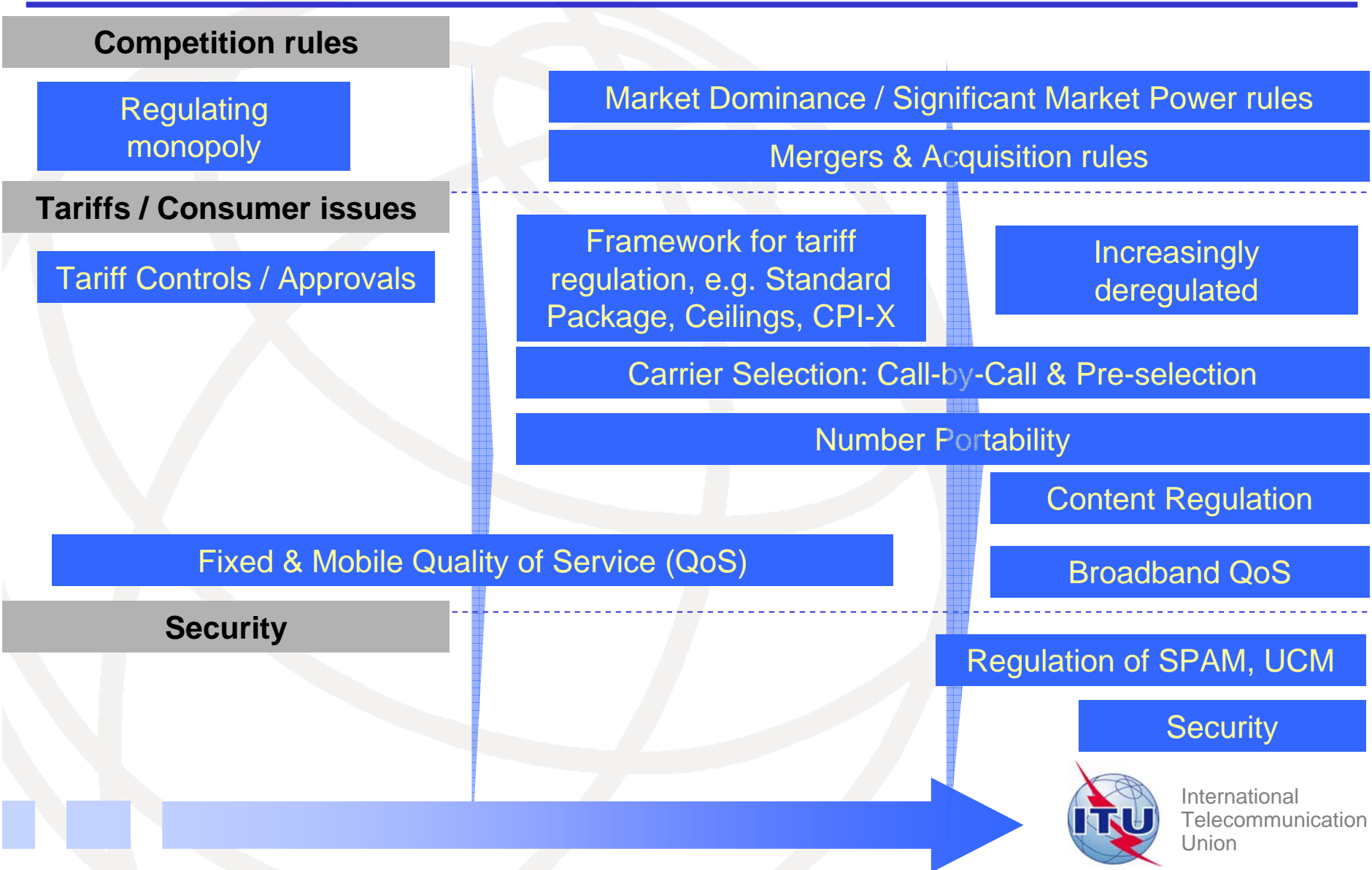


International
Telecommunication
Union

Evolution of Existing Regulatory Framework [I]



Evolution of Existing Regulatory Framework [II]



Licensing Legacy and Emerging Trend

Legacy Licenses

- Long term contracts
- Inflexible
- Service specific
- Possible barrier to innovation

Emerging trend

- Shift from service specific license to technology and service neutral licensing regimes (Converged/Unified license and Authorizations)
- In general, allocation of spectrum and scarce resources are de-linked from the license
- Low cost of entry and annual license fees

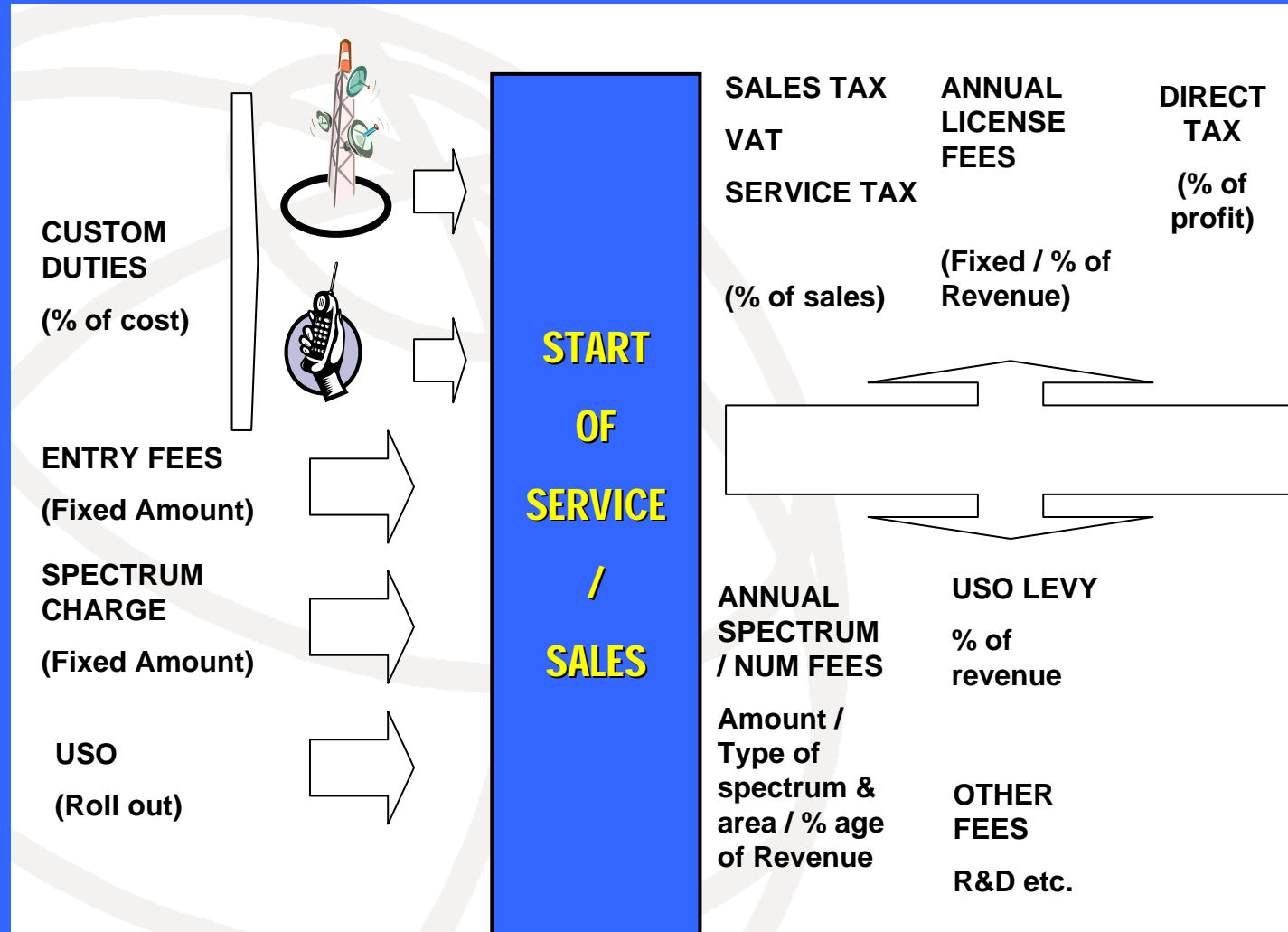
Examples : Australia, EU countries, Japan, Malaysia, Republic of Korea, Singapore

Duties & Levies paid by Licensees

Pre-launch stage

Post-launch

Post-profit



Duties & Levies paid by licensees need to be examined in totality, specially while using benchmarks



International Telecommunication Union

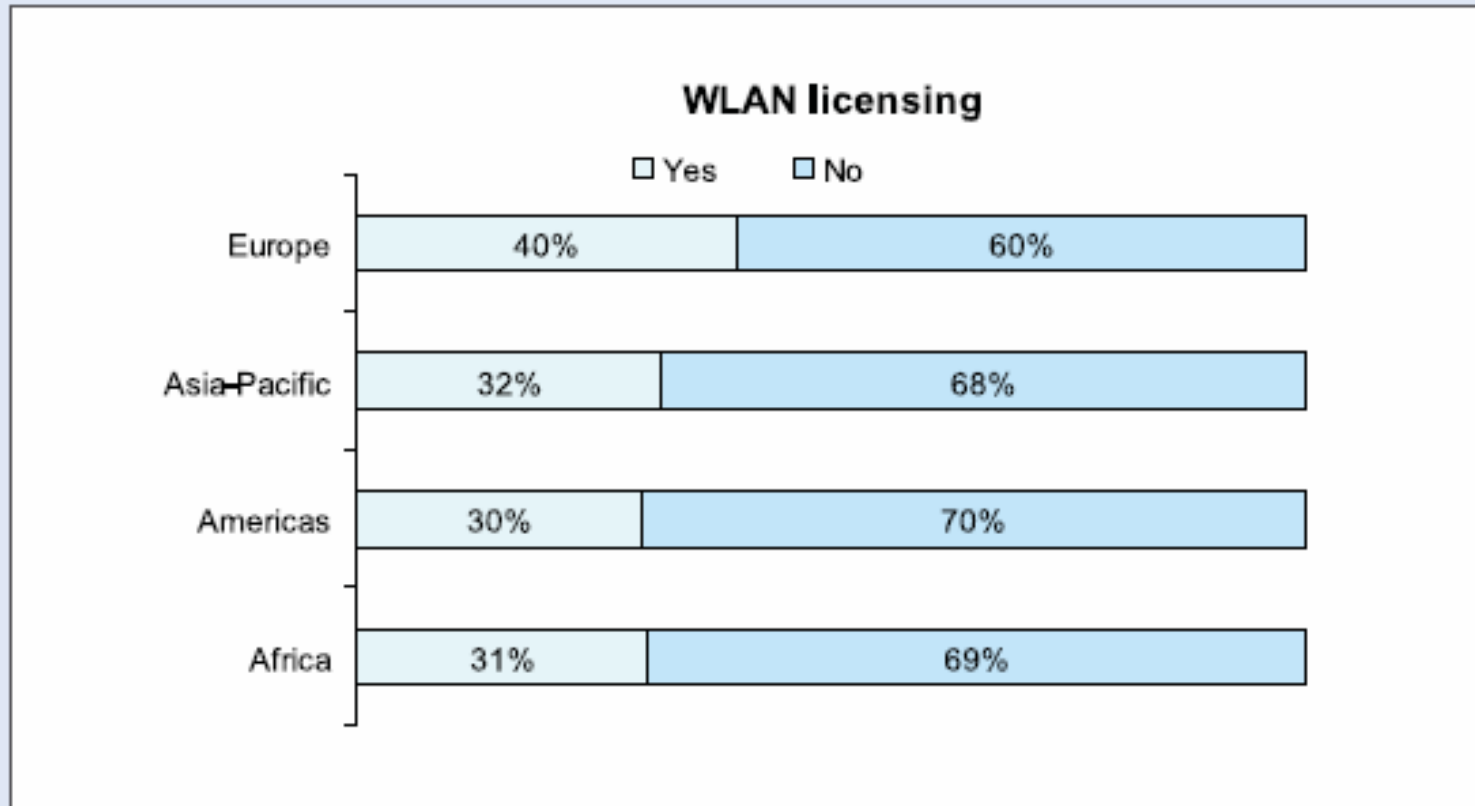
Annual Non Spectrum License Fees

<i>Country</i>	<i>Annual non-spectrum-related fees</i>	<i>Fee type</i>	<i>Licence types</i>
Austria	0.1-0.2% of gross turnover	Revenue sharing	All licences
Bahrain	1% of gross revenues	Revenue sharing	Mobile
Bhutan	Pre-determined fixed amount	Annual licensing fee	All licences
Chile	Variable fixed fees	Annual licensing fee	All licences
Croatia	USD 6.6 million	Annual licensing fee	3G Mobile*
France	1% of 3G revenues	Revenue sharing	3G Mobile
Greece	0.025-0.5% of gross turnover	Revenue sharing	All licences
Hong Kong, China	15% of gross revenues with escalating annual minimum payment	Revenue sharing	3G Mobile
India	6-10% of gross revenues	Revenue sharing	Fixed and mobile
Ireland	0.2% of gross turnover	Revenue sharing	Fixed and mobile
Italy	EUR 38 million	Annual licensing fee	3G Mobile
Jordan	10% of gross revenues USD 100,000 5% gross revenues	Revenue sharing Annual licensing fee Revenue sharing	Mobile Mobile Fixed monopoly
Kenya	0.5% of gross turnover	Revenue sharing	All licences except paging
Korea (Rep. of)	Approximately 1-3.0% of gross revenues (annual adj.)	Revenue sharing	All licensed operators
Luxembourg	0.2% of gross turnover	Revenue sharing	Mobile
Maldives	5% of gross turnover	Revenue sharing	Mobile, fixed and ISPs
Oman	12% of gross revenues	Revenue sharing	Mobile
Spain	0.2% of gross turnover	Revenue sharing	Fixed and mobile
Tanzania	1.0% of annual turnover 1.5% of annual turnover	Revenue sharing	Fixed, long distance Mobile
Venezuela	5.3% of gross revenues	Revenue sharing	Mobile

Sources: Adapted from ITU World Telecommunication Regulatory Database; various regulator websites.

W-LAN licensing

Figure 1.18: Are Licences Required for WLANS, 2005?



Source: ITU World Telecommunication Regulatory Database.

Emerging Challenges in Interconnection

Interconnection

- **Voice centric**
- **Time based settlement**
- **Internet traffic carried separately**
- **Service specific termination charges**
- **Local Loop Unbundling**

Emerging challenges

- **NGN networks would necessitate re-negotiation of existing POIs**
 - Possible change in level of Interconnection
- **Negotiated settlement mechanisms driven by Service Level Agreements**
 - Capacity / Quality/Time
- **Changing Interconnect cost drivers**

Emerging Trends in Universal Access

Universal Service

Scope

- Access to voice telephony and low speed data
- Support linked with providing service through financing deficits in Payphones/ MCTs

Source of support

- USO: Telecom service sector

Universal Access to ICT

Scope

- Access to higher speed data to support ICT services such as e-Governance
 - Broadband nation (e.g. Korea R.O., Japan, Mauritius),
 - Australia
 - Municipal networks

Source of funding

- USO: Telecoms service sector
- Government / PPP / loans etc.

Emerging Trends in End User Quality of Service

Fixed

- Service Availability**
Fault Rate / complaint
Network related
- **Call completion rate**
 - **Dial tone delay**
 - **Grade of Service**

Mobile

- Service Availability**
Fault Rate/ Complaint
Network related
- **Call Drop Rate**
 - **Call Success Rate**

Broadband

- Service Availability**
Fault Rate / complaint
Network related
- **Latency**
 - **Throughput**
 - **Availability**
 - **Packet Loss**
 - **Speed**

- Examples of Asia-Pacific countries with established Broadband regulation include India, Malaysia, Singapore

- Delivery of end-to-end Quality of Service over Internet is a challenge

NGN QoS



Regulatory challenges arising from convergence of carriage and content

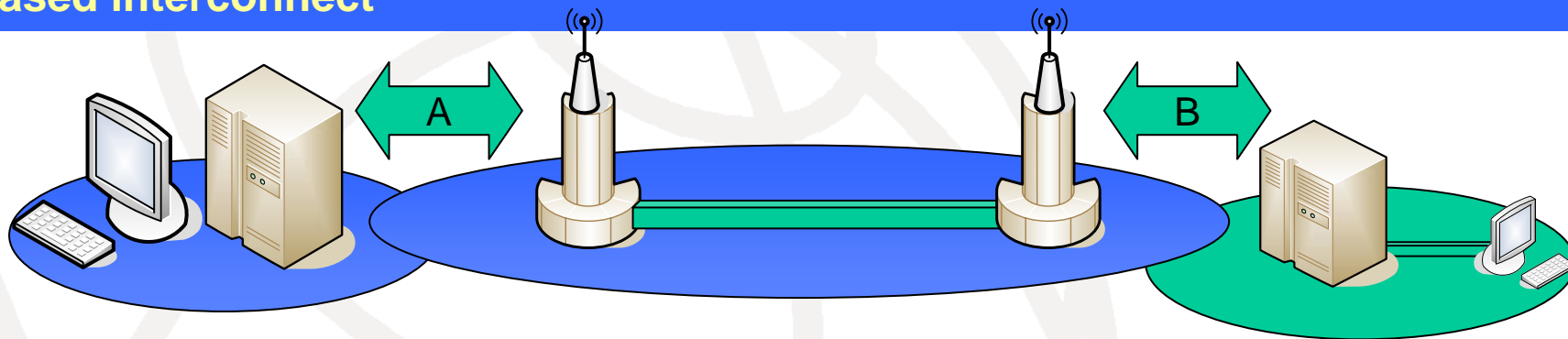
ITU ASP RO



International
Telecommunication
Union

Regulatory challenges introduced by content (I)

Bundling of content with network services raises issues of dominance in tariffs and interconnection. Also, it challenges the current regimes of cost-based interconnect



Content Provider and Carriage Provider

Premium Content
Premium Quality
Revenue Share

Terminating carrier

Premium Content
Quality ??????
Revenue Share ??

What are the necessary regulatory initiatives to ensure level playing field?

Regulatory challenges introduced by content (II)

Physical Infrastructure
&
Voice telephony

Existing Telecom & Broadcasting legislation (s)

(Market entry, Competition, Tariffs, Interconnection, Universal Service, Unbundling, Standards, Quality of Service, Adjudication, Number Portability, Equal Access, Numbering, Standards, Consumer Protection etc.)



e-mail
&
Web surfing

Anti-SPAM

Intellectual Property Rights (*Domain name , copyright, trademark etc.*)

Security of Information

Safer content



e-transactions,
e-governance,
e-commerce
Entertainment services

e-authentication (e-signature)

Enhanced Cybersecurity

Data protection / Privacy

Electronic payment, e-transaction

Cross border dispute resolution

Conclusion

- Broadband services, which is on the rise, has opened new vistas for convergence
- Technology and service neutrality on the rise in licensing
- Traditional regulatory tools such as licensing, interconnection, tariffs etc. are undergoing shifts from heavy-handed regulations to light-handed
- Increasing role of governments witnessed in making broadband universal
- Migration to Next Generation Networks are necessitating regulatory preparedness
- New regulatory challenges are emerging from the convergence of content and carriage, which results in issues of dominant behavior and security.



ITU Publication Research Resource

Policy
Regulation
Statistics



<http://www.itu.int/pub/D-REG-TTR.9-2007>



<http://www.itu.int/ITU-D/icteye/Default.aspx>



ict regulation toolkit

<http://icttoolkit.infodev.org/en/index.html>

Spectrum
Management



<http://www.itu.int/ITU-D/tech/spectrum-management/index.html>

Spectrum Fees Databank

http://www.itu.int/ITU-D/study_groups/SGP_2002-2006/SF-Database/index.asp

Network
Planning

Network Planning

http://www.itu.int/ITU-D/tech/network-infrastructure/GNPT_Final_17August2005.pdf

Capacity
Building

Centre of Excellence

<http://www.itu.int/ITU-D/hrd/>

E-learning Centre

Standards



**ITU-T
Lighthouse**

<http://www.itu.int/ITU-T/lighthouse/index.phtml>

**ITU-R
Publications**

<http://www.itu.int/publications/sector.aspx?lang=e§or=1>

Cybersecurity

CYBERSECURITY GATEWAY

Various Handbooks on topical issues such as NGN, IP, Emergency Communications, Cybersecurity etc.



International
Telecommunication
Union





Thank You

Visit us at <http://www.itu.int>

For HRD <http://www.itu.int/ITU-D/hrd/>

ITU ASP RO



International
Telecommunication
Union