

# Infrastructure Sharing: Need, Scope and Regulation



## ITU Asia Pacific Centres of Excellence Training Course On Infrastructure Sharing

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# An important regulatory starting point



***Build***

*Interconnection*

*Co-location*

*Leased lines*

*Infrastructure Sharing*

*Licensing*

*Ownership*



***Buy***

# ***Infrastructure Sharing***

**Need**

# ***Why encourage infrastructure sharing?***

*Encourage  
competition*

*Choice  
Easy entry  
Better quality*

***Optimize  
Resources***

*Infrastructure  
Environment protection  
etc.*

***Universal  
access***

*Quick roll out  
Serving underserved areas  
Affordable tariffs*

# ***But infrastructure sharing happens even when not mandated for***

***Saving costs and investments (capex, opex etc.)***

***Increased coverage (roaming, areas with site access restrictions, etc.)***

***New service areas (Infra sharing business, Service based businesses, Emergency communication)***

# ***If everything is good, why is infrastructure sharing a regulatory issue?***

**Cases where existing network seen as a service differentiator**

***e.g. India***

**Market dominance or build up of significant market power**

***e.g. Australia***

**Adverse impact on the principle of Non Discrimination (terms & conditions)**

***e.g. New Zealand***

# ***Infrastructure Sharing***

**Scope**

# ***What can be shared?***

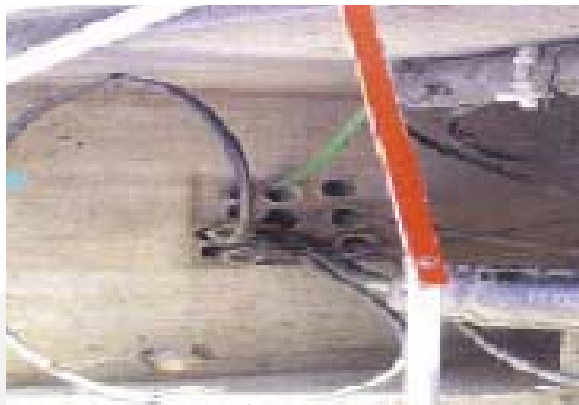
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***Passive Sharing***

***Active Sharing***



# Passive Sharing



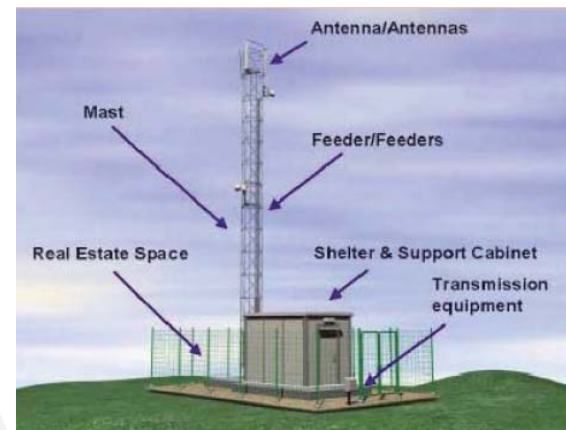
Source: Jim Forster, ITU and ARCEP

## *Ducts*

## ***Non Exhaustive List***

Site  
Masts  
Cables  
Ducts  
Splitters  
Shelters  
Generators

Air-conditioning equipment  
Diesel electric generator  
Battery  
Electrical supply  
Technical premises  
Easements, ducts and pylons  
Broadcasting Infrastructure



## *Mobile site*

Source: TRAI Consultation Paper on Infrastructure Sharing,



## *Trenches*

Source: Jim Forster, ITU and ARCEP

# Active Sharing

*Mobile*

**RAN & Core Network  
Spectrum  
Roaming**

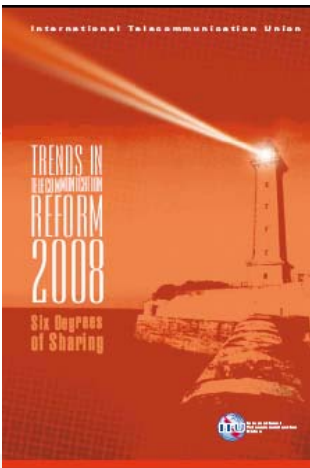
*Copper*

**Full Unbundled Local Loop  
Unbundled Sub Loop  
Bitstream**

*Fibre*

**Fibre Sharing  
Wavelength Sharing  
Bitstream**

[illegible]



# ***International Practices***

Country	Operators (Examples)	Details
U.K.	Orange and Vodafone	2G and 3G Networks including RAN. U.K. Sharing agreement expected to reduce capital and operating costs by 20 to 30 percent.
Spain	Orange and Vodafone	3G RAN Sharing for rural areas. Agreement expected to reduce the number of sites by 40%.
United States	AT&T and Cingular	GPRS and Edge. US Approach in general has been to avoid intervening in voluntary infrastructure sharing agreements
India	Many operators	Voluntary agreements specially in passive sharing; In case of towers funded through USO, it is mandatory



# International Practices (cont'd)

Country	Operators	Details of Sharing agreement	Regulatory position
Australia	Telstra and H3G	Commercially negotiated 3G site and RAN sharing. Telstra purchased 50% ownership of H3G network assets. 3GIS, an administrative group, was established to own and operate H3G's existing RAN and funds future network roll-out plans as agreed with Telstra and H3G.	Regulator approved sharing of 3G RAN.
Germany	T-mobile and 02	Site sharing of 3G networks. 02 uses T-mobile network for national roaming.	Site sharing permitted as it encourages faster roll-out and It does not restrict competition as is limited to basic infrastructure. National roaming exempted from competition rules.
Netherlands	Albert Heijn on KPN, Debitel on KPN and Vodafone, Hema on KPN, Scarlet on Orange, UPC on Orange, Versatel on KPN, Tele2 on KP, T-mobile and Orange	Commercial MVNO agreements; Co-operation in building UMTS infrastructure (estimated to have saved the companies up to \$785 million each)	OPTA does not regulate MVNO agreements directly. NMa and OPTA allowed collaboration in the construction of UMTS network components on the condition competition existed between each party.
Sweden	All licensed operators	There are five operators, four of whom have formed two separate consortiums of two operators each. Each consortium has built out a joint network.	Regulator permitted this level of sharing, but required each operator to maintain 30% of its network separately.

# Convergence:

## *From end-users to Information Society*

### Invention



*Computer .....*



*Telephone .....*



*Television .....*

### Improvisation



### Digitalization

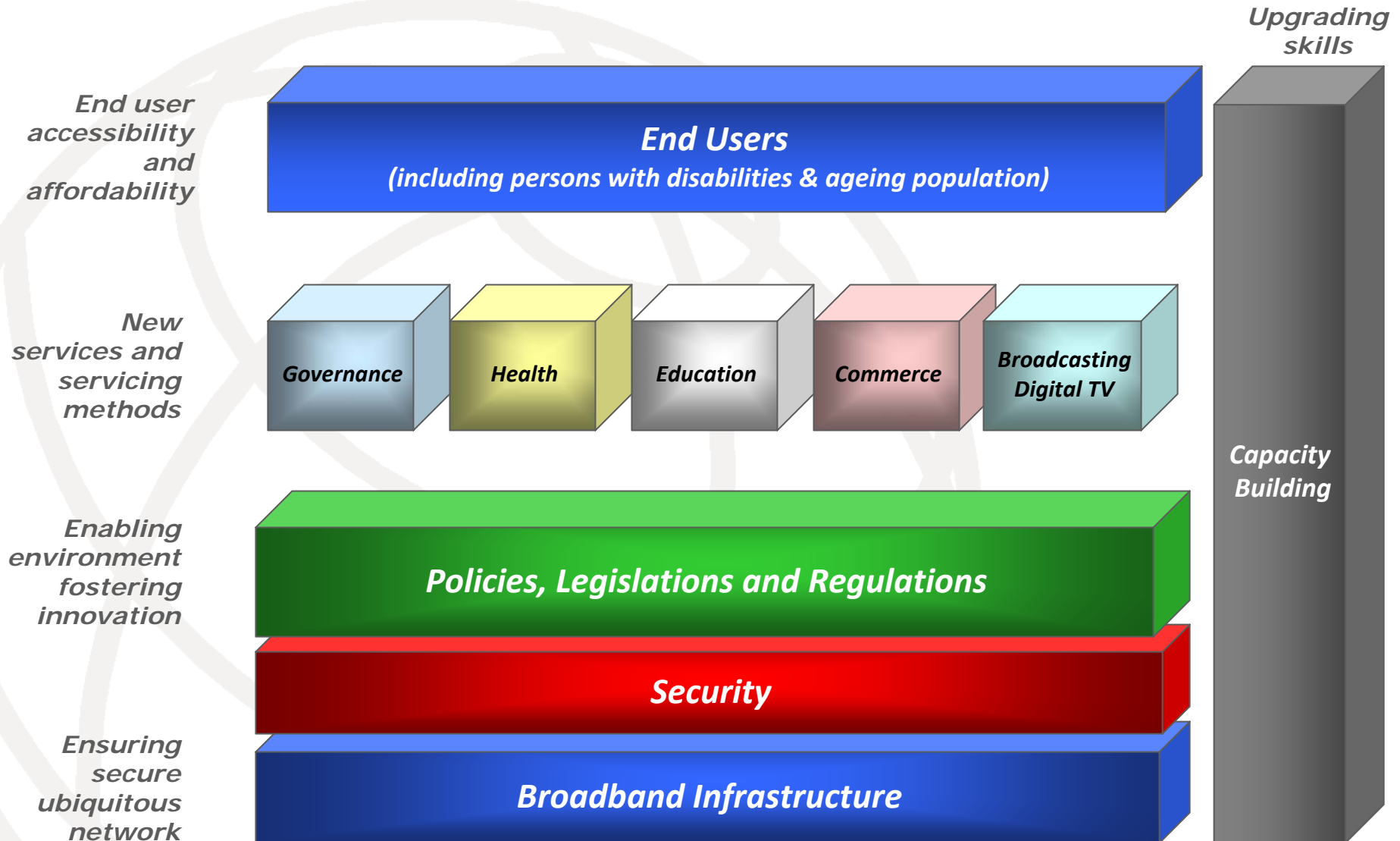


### Convergence



**The innovation continues .....**

# Infrastructure Sharing & Convergence



# ***Broadband network sharing examples***

## **Several Public Initiatives**

**City of Amsterdam  
Stokab: Sweden  
Vienna**

## **National Broadband Network Initiatives**

**Australia  
Malaysia  
New Zealand  
United States**

## **Broadcasting Network**



# Sharing in Fixed Service examples-I

## Mid-Atlantic Broadband Cooperative, United States

**Collocation**  
**Connection**  
**24-hour access**  
**Security**  
**Quality of service**



**Source:** Mid-Atlantic Broadband Cooperative.

# Sharing in Fixed Service examples - II

Requirements for unbundled access  
to the local loop



Source: ITU World Telecommunication/ICT Regulatory Database.

## Types

**Full Unbundled Local Loop**  
**Unbundled Sub Loop**  
**Bitstream**

## Approaches

**Mandated**  
**Encouraged**  
**Left to market forces**

# ***Spectrum sharing need and paths***

## ***Demand***

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Using administrative methods,  
including in-band sharing

## ***Administrative Process***

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Creating new, secondary  
market mechanisms

## ***Technical Issues***

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Adopting unlicensed or  
spectrum “commons” approaches

Encouraging use of low-power radios or  
advanced radio technologies



***International  
gateway***

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***Submarine  
Cable***

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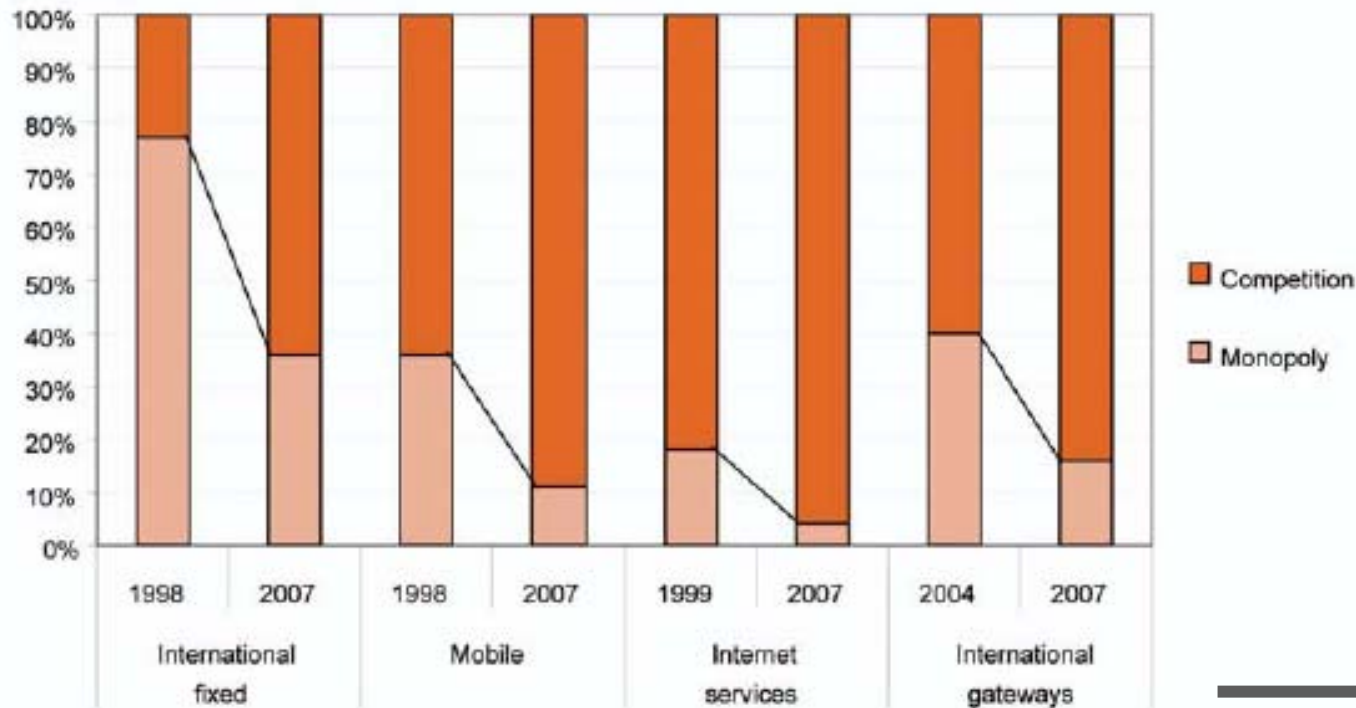
***Satellite  
Networks***

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# International gateway sharing

## Percentage of ITU Member States that have liberalized IGW markets



**More  
Competition**

**Lower  
Tariffs**

**New  
Services**

*Note:* This figure reflects what is legally permissible.

*Source:* ITU World Telecommunication Regulatory database.

## East Africa Submarine Cable System



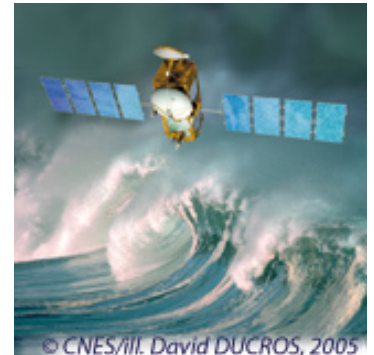
Owned and operated by a group of 16 African (92%) and international (8%) telecommunications operators and service providers.

# ***Satellite network sharing examples***

***INTELSAT***

***INMARSAT***

***IRIDIUM***



# ***Infrastructure Sharing***

**Policy  
&  
Regulation**



# Infrastructure sharing and regulation



**Infrastructure based  
competition**



**Cost saving  
Service coverage**

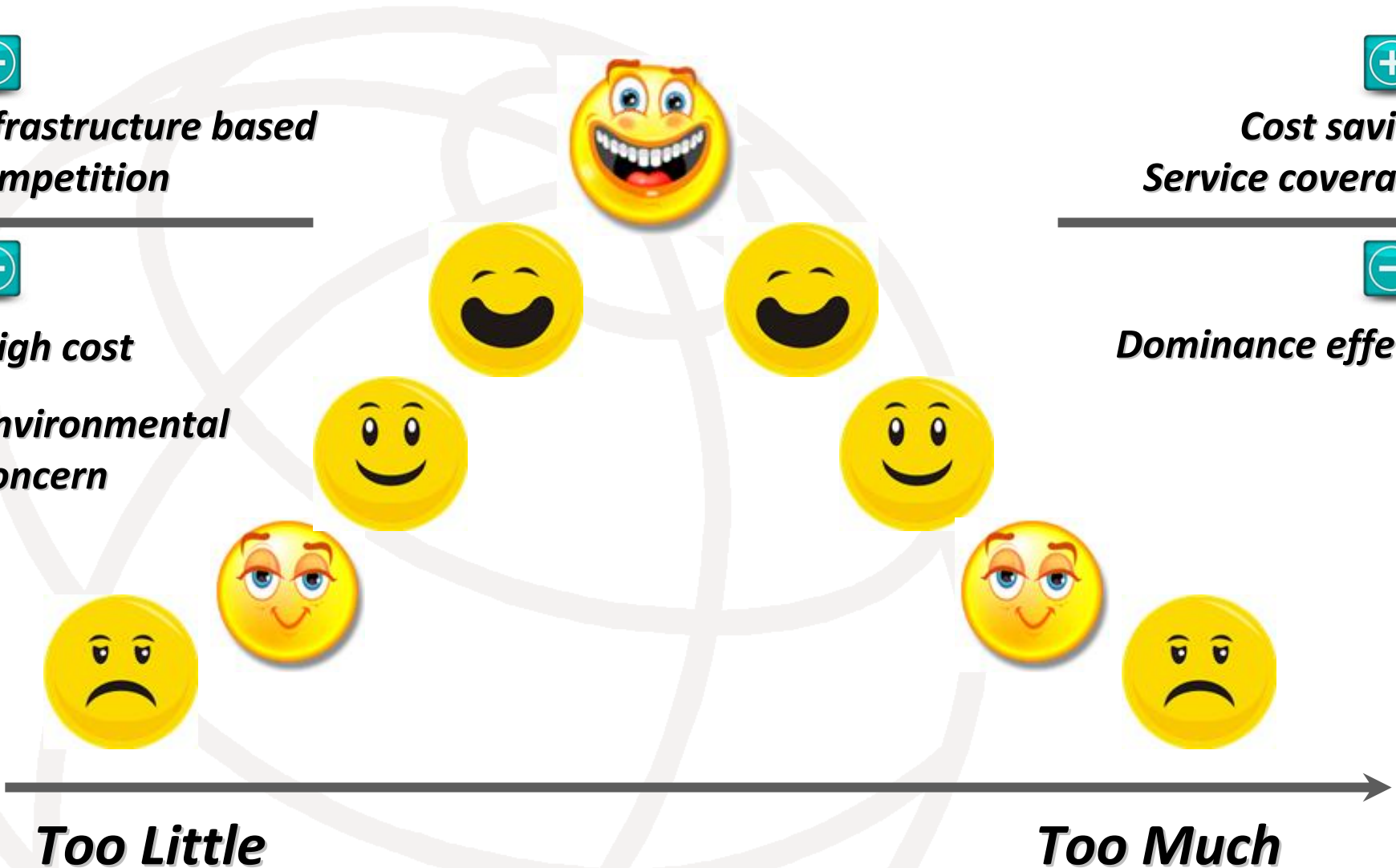


**High cost**

**Environmental  
concern**



**Dominance effect**



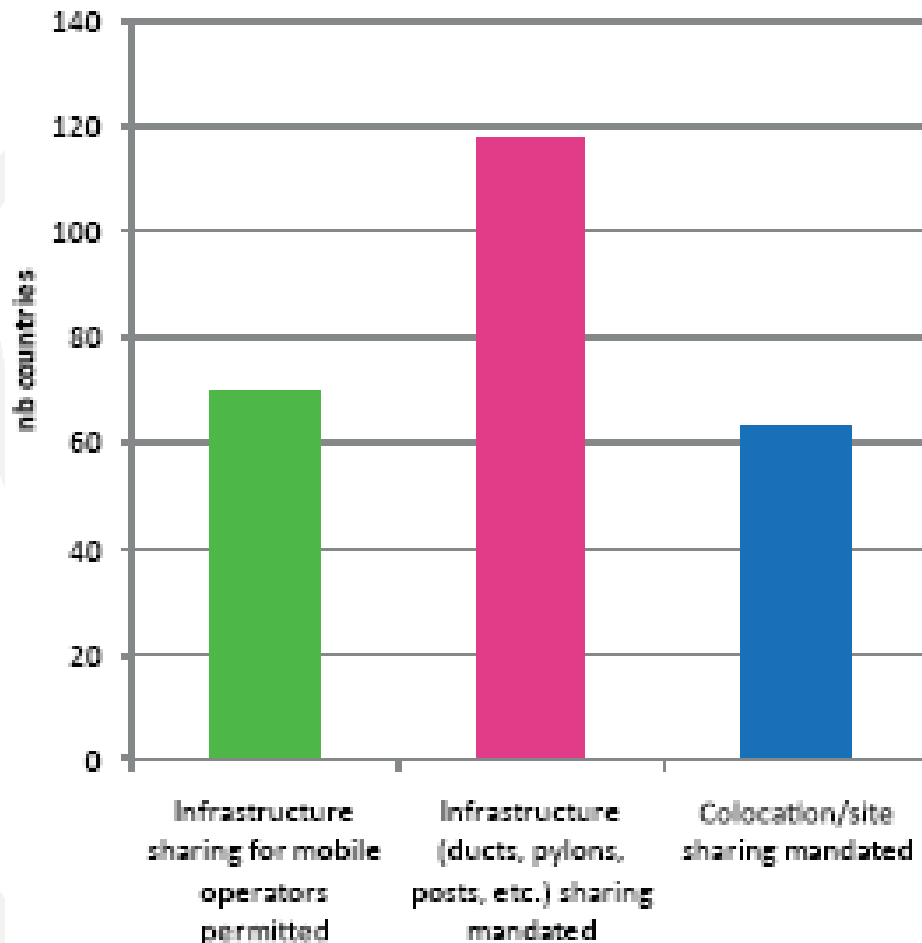
**Too Little**

**Too Much**

**Optimizing infrastructure sharing benefits: A challenge**

# Infrastructure sharing and regulation

Infrastructure sharing regulation, world, 2009



Source: ITU World Telecommunication/ICT Regulatory Database.

## Passive sharing

In general  
encouraged,  
incentivized, or  
mandated

## Active Sharing

Varied response  
Regulatory concerns

# 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**



# Curtailing effects of dominance

## Australia

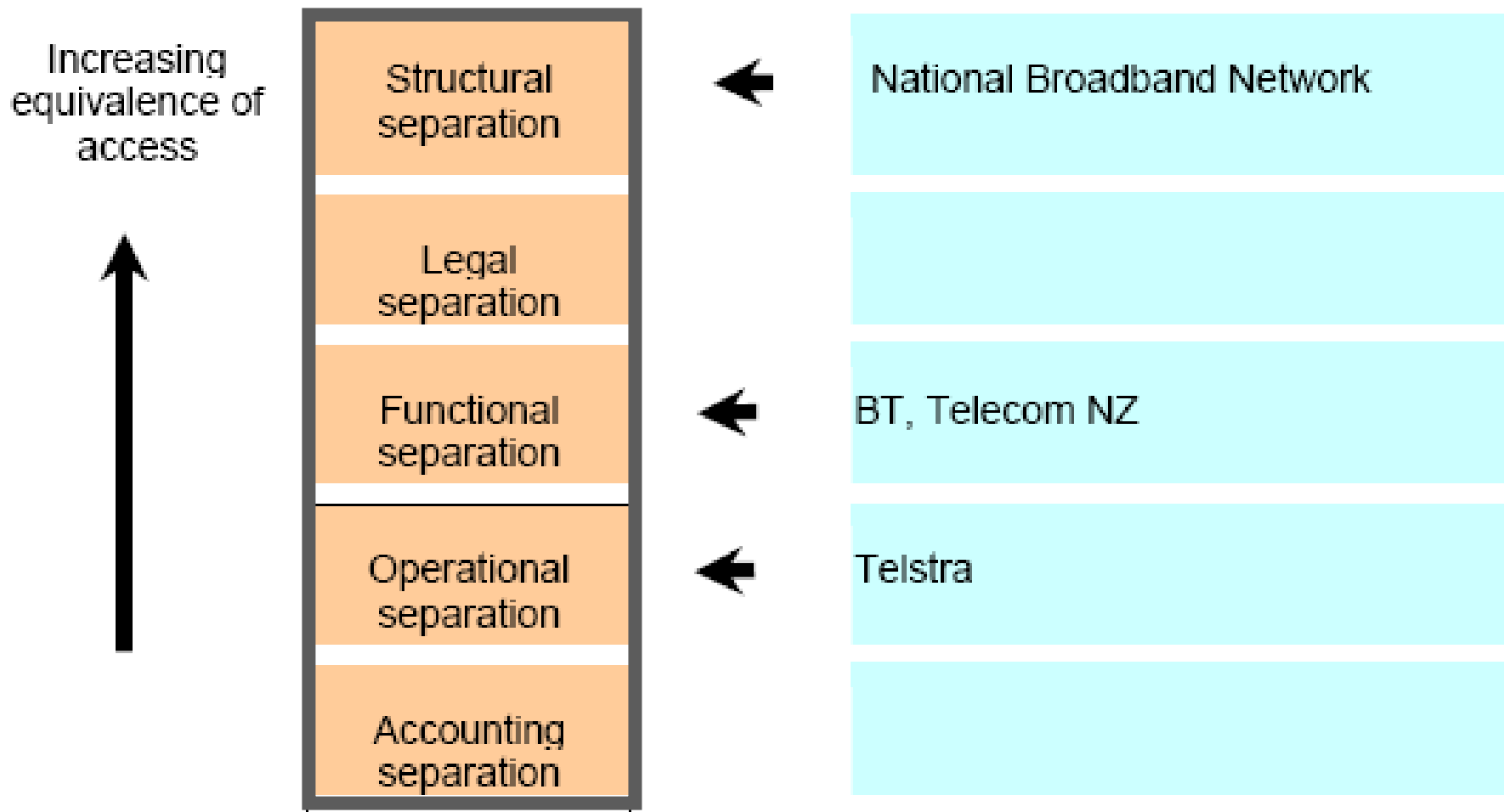
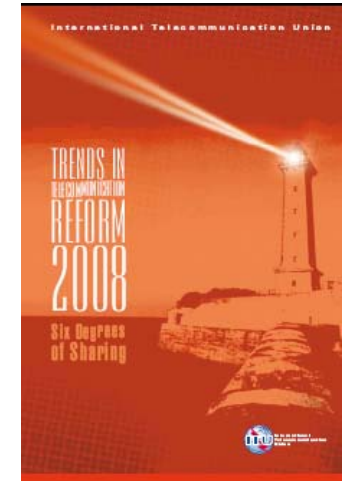


Diagram from *National Broadband Network: Regulatory Reform for 21<sup>st</sup> Century Broadband*, page 20.

# Best-practice guidelines on sharing



“The guidelines emphasized “promoting an enabling environment” for sharing by enacting an appropriate regulatory framework and establishing competition and investment incentives.”



# Best-practice guidelines I

***Reasonable terms and conditions*** – Infrastructure-sharing terms should not impose price or non-price discrimination;

***Pricing*** – Pricing for shared facilities or network elements should provide the right economic signals to help market players make the right “build-or-buy” decisions;

***Efficient use of resources*** – Non-replicable facilities such as towers, ducts, and rights-of-way can be shared for optimal use;

***Scarce resources*** – As a scarce resource, radio spectrum can be shared, as long as harmful interference is controlled;

# Best-practice guidelines II

***Dispute-resolution mechanisms*** – Regulators recognize the need to explore alternative dispute-resolution mechanisms, and to introduce necessary enforcement tools;

***Universal access*** – With proper incentives, infrastructure sharing can be used to support regulators' universal access goals, particularly in rural or underserved areas;

***Sharing with other market players and industries*** – Infrastructure sharing need not be limited to telecommunication or ICT sector players, it can also embrace other industries with viable assets, including utilities (i.e., gas, electricity, water, etc.);

***Sharing of regulatory practices*** – Regional organizations have a role to play in exchanging information and harmonizing regulatory practices related to sharing.

# Best-practice guidelines III

***Licensing*** – Regulators can consider licensing market players that seek to provide only network operation and/or wholesale capacity to retail service providers;

***Conditions for sharing and interconnection*** – Regulators recognize that neutral, fair, and transparent interconnection rules are needed to promote infrastructure sharing;

***Establishing an infrastructure-sharing one-stop-shop*** – This would facilitate coordination of access and sharing among all telecommunication service providers, and among operators and other utilities;

***Improving transparency and information sharing*** – Market players need to know what is available for sharing, and terms and conditions should be clearly established;





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