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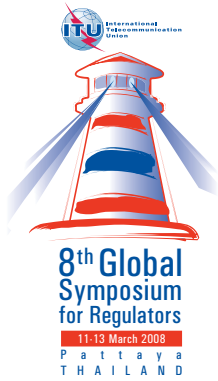
# GSR 2008

## Discussion Paper

Comments are welcome and should be sent by 13 April 2008 to [GSR08@itu.int](mailto:GSR08@itu.int)



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INTERNATIONAL TELECOMMUNICATION UNION

## 8<sup>th</sup> Global Symposium for Regulators

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# WHAT DO WE MEAN BY 6 DEGREES OF SHARING?

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## 1 WHAT DO WE MEAN BY 6 DEGREES OF SHARING?

The title of this year's Global Symposium for Regulators (GSR) was inspired by the theory 'six degrees of separation', which argues that all people in the world can be *connected* through no more than five intermediaries. This name was in turn used by Professor Martin Cave as the title for his seminal article on functional separation<sup>1</sup>. This year's GSR will explore a range of regulatory and policy sharing measures that both developed and developing countries can implement to ensure that all people on earth are *connected* to ICT networks offering affordable broadband services. The sharing options to be explored can be used alone or in combination, mixing and matching regulatory initiatives to achieve desired policy objectives.

The GSR will examine passive and active sharing in both mobile and fibre backbone networks, sharing international gateways and submarine cable landing stations, functional separation of legacy fixed line networks, spectrum sharing to promote broadband wireless access technologies, end-user sharing devices and applications, international mobile roaming regulation as a form of regulatory sharing or harmonization, and trends in IPTV and mobile TV regulation, addressing new regulatory challenges when content and carriage share the same network.

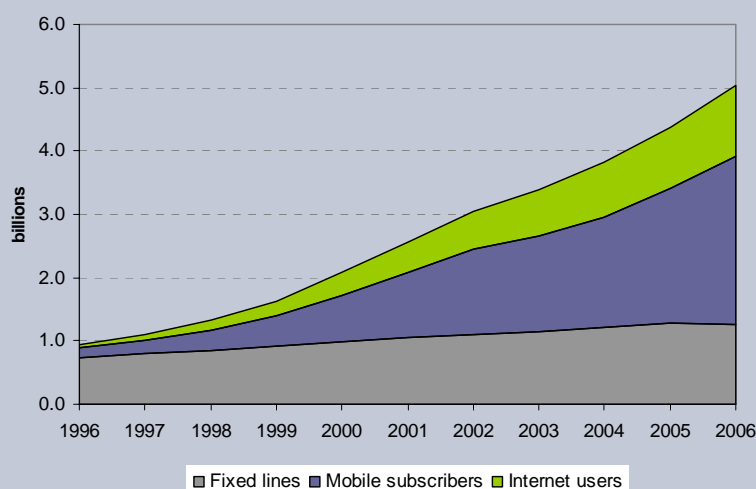
## 2 WHY SHARING, WHY NOW?

The single biggest reason to adopt sharing is to lower the cost of deploying broadband networks to achieve widespread and affordable access. Developing countries can harness the technological, market and regulatory developments that have fostered access to mobile services to promote widespread and affordable access not only to voice, but to broadband services as well, reaching those un-served or under-served today. For developed countries, infrastructure sharing promises to play an important role in the move to FTTx access as well as to reduce the environmental impact of ICT network deployment. In short, both developed and developing countries share the goal of further network deployment and development.

But this goal costs real money. Deploying mobile base stations or fibre backbone networks to reach rural areas may be uneconomic if each company builds its own network. Likewise, laying fibre to every home, building or street cabinet may be unattainable where operators act alone. Companies can, however, share some infrastructure but compete on services. Provided an effective legal and regulatory framework and the right incentives, the critical factor in creating new, affordable broadband access and backbone networks will be government will.

Initially, many developing countries sought to expand their telecommunication networks by extending exclusivity periods granted to incumbent state-owned fixed-line operators in exchange for geographical and population coverage commitments. Few of these strategies were successful. Countries then moved cautiously to liberalize their ICT networks in an effort to encourage investment in ICT networks to connect more end-users. In most developing countries, such initial liberalization strategies resulted in unexpectedly high levels of growth in the mobile sector. At first, the results were confined to urban areas, but today increasing levels of mobile population coverage have been attained in most developing countries, at least in terms of numbers of people who live within a mobile signal – although not necessarily those that actually access the signal. In the Asia Pacific region, for example, 74 per cent of the population is currently covered by a mobile signal.

**Figure 1: Growth in fixed lines, mobile cellular subscribers and Internet users worldwide, in billions, 1996-2006**



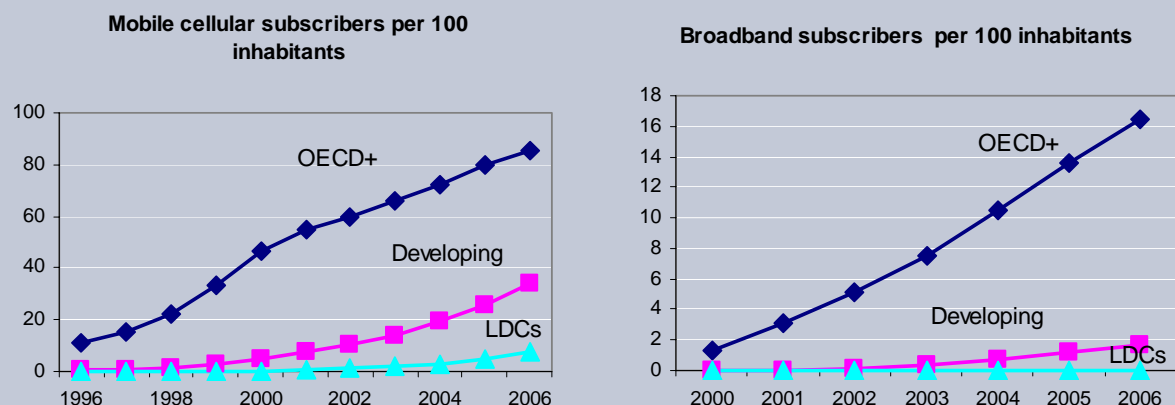
Source: ITU World Telecommunications/ICT Indicators Database

The major challenge for many developing countries is to build on the success of current mobile deployment to both increase levels of voice penetration and coverage while encouraging second generation mobile operators to migrate to broadband wireless systems as well as to promote fixed line broadband (ADSL, Cable TV, Broadband over Power Lines, FTTx, etc.) where economically viable. In addition, it is critical for developing countries to create national fibre backbones to provide backhaul services, especially where satellite connections remain too costly and microwave technology lacks the capacity required for broadband services and applications. Developing countries can leverage the decline in the price of optical fibre technology and adopt open access policies to meet this goal. Further, it is essential that developing countries adopt measures to lower the cost of access to international Internet connectivity, i.e. by promoting competitive and non-discriminatory access to international submarine cable and satellite networks. Further, a number of countries have established universal access strategies to connect the unconnected. Such universal access strategies equally have obtained mixed results. Where successful, smart subsidies have been provided, under a competitive framework, and granted to roll out networks in rural areas. In many countries, however, there is room for improvement both in modalities and implementation, in particular disbursement of funds and adapting policies for the broadband era.

The combination of these factors has given rise to the need for new regulatory strategies. Fortunately, many developing countries have reached the end of exclusivity periods allowing them to adopt a new wave of regulatory reforms to meet the objectives established by the World Summit on the Information Society (WSIS) and the Millennium Development Goals (MDGs). This second wave of regulatory reform, based on sharing, promises to unleash an array of new opportunities for business, government and consumers alike, as ICTs are increasingly relied upon as a tool for economic and social development.



**Figure 2: Growth in cellular mobile and broadband subscribers**



Source: ITU

Sharing does not mean abandoning market liberalization and universal access practices. On the contrary, further market liberalization is required, e.g. in the international gateway and to allow a new range of market players to meet the pent-up demand for broadband services. Universal access practices also can be refined and improved. All sharing practices, and infrastructure sharing in particular, in fact, are part and parcel of a competitive regulatory framework. Infrastructure sharing regulations, whether mandatory or optional, are usually included in a country's interconnection framework, although they are occasionally contained in operators' licensing agreements. The themes explored in the 8<sup>th</sup> annual GSR adapt for developing country markets those infrastructure sharing practices that have been implemented in a handful of developing countries, and which are more widely used in developed countries. What is new and innovative is their application and adaptation to meet the needs of developing countries. What is the same is that they use time-tested pro-competition tools, such as the regulation of essential or bottleneck facilities, transparency, and the promotion of collocation and interconnection.

Sharing options are also being closely examined among regulators in developed countries. Because they are now facing the difficult task of encouraging efficient deployment of next-generation networks (NGN) to meet bandwidth-hungry consumers' needs while maintaining a pro-competitive environment that fosters the emergence of new innovative players.

In a nutshell, infrastructure sharing promises to reduce network deployment costs, making rollout more affordable in areas that are not connected to any network today or which have access only to 2G mobile services. The idea is to examine critically where there is an absence of a working market to ensure that market forces are fully able to work to meet the WSIS targets.

### **3 PASSIVE AND ACTIVE INFRASTRUCTURE SHARING**

Infrastructure sharing takes two main forms, passive and active. Passive infrastructure sharing involves operators sharing the non-electrical, civil engineering elements of telecommunications networks. This might include rights of way/easements, ducts, pylons, masts, trenches, towers, poles, equipment rooms and their related power supply, air conditioning, and security. There are, of course, different civil engineering elements dependent on the kind of network. Mobile networks require tower sites, while fibre backhaul and backbone networks require rights of way for fibre cables to be deployed either on poles or in trenches. International gateway facilities, such as submarine cable landing stations, can be opened for collocation and connection services so that competitive operators can directly compete in the international services market.

Active infrastructure sharing involves operators sharing the active network elements or the intelligence in the network, e.g., base stations and Node Bs for mobile networks and access node



switches and management systems for fibre networks. Many countries have restricted active infrastructure sharing out of concern that it could enable anti-competitive conduct, such as collusion on prices or service offerings eliminating consumer choice. These concerns remain valid, but have to be balanced with advances in technology and applications that enable service providers to distinguish their offerings. In addition, for some remote and hard to reach areas, having fewer consumer choices can be balanced against the choice of having no services at all, to at least allow active infrastructure sharing for a limited time until demand for ICT services grow to support multiple network operators.

Regulators and policy makers may elect to adopt only one kind of infrastructure sharing, or they can use many options simultaneously. Some regulatory frameworks today may authorize passive infrastructure sharing, while prohibiting active infrastructure sharing. Some may simply have not addressed the issue, neither explicitly authorizing nor prohibiting infrastructure sharing. This give rise to a number of policy decisions. Should regulators and policy makers now move to more actively encourage passive infrastructure sharing, e.g. where it is now merely allowed but not promoted? This could include a variety of incentives, ranging from tax benefits to low licensing fees, to providing subsidies from universal access or other government funds to defray civil engineering costs. Where regulatory frameworks do not include passive infrastructure sharing provisions, should they now be added? Is the time ripe to review policies that prohibit active infrastructure sharing, carefully weighing concerns about anti-competitive behavior? In addition, are new models of infrastructure sharing required for new technologies, such as fibre backhaul and backbone and IMT services?

Infrastructure sharing can also be examined as a range of options or degrees on a scale of the regulatory intervention required. Interconnection and local loop unbundling can both be considered as forms of infrastructure sharing, with interconnection being less interventionist than local loop unbundling. Functional and even structural separation of networks can be seen as an extreme end of the infrastructure sharing spectrum. More widely used tools, such as accounting separation and mandating access to bottleneck facilities, may be less intrusive ways of achieving similar goals.

Likewise, some sharing options can be considered flip sides of the same coin. Functional separation forces legacy operators to open their networks to downstream competitors. When sharing is incorporated into an open access model to encourage market entry by Greenfield players who do not compete in the downstream market, resistance to forced sharing is replaced by the incentive to provide capacity to as many downstream service providers as possible.

Some widely used infrastructure sharing practices, such as mobile site sharing, were designed to address environmental and local planning constraints. The trick is to see how some of these practices could be modified for developing countries to promote deployment of Greenfield networks where none currently exist. Ancillary goals, such as protecting the environment, may also be served. Other initiatives are those currently being pioneered in a handful of developing countries specifically to promote ICT network rollout in rural areas. India is one of the leaders promoting mobile tower sharing. India is granting subsidies from its universal service fund to encourage network rollout to rural areas where towers are shared by at least three competitive operators. Such inspiring new practices lay at the heart of this year's GSR discussions, and could be adapted and adopted throughout the developing world in order to meet the WSIS objectives of connecting all the world's peoples to ICT by 2015.

#### **4 DOES SHARING MEAN SELLING LESS EQUIPMENT OR REDUCING COMPETITION?**

Equipment manufacturers may be concerned by discussions about infrastructure sharing. They seek to sell as much ICT equipment as possible. Here, it is important that the goal of this year's GSR discussions be well understood. It is not to limit the number of market players by putting infrastructure back in the hands of monopoly providers which have demonstrated their past failure to invest in equipment and plant. Rather the goal is to use infrastructure sharing together with existing tools and mechanisms, such as universal access strategies, within a competitive

regulatory framework. Although infrastructure sharing policies could leverage the role played by current market players, e.g. by encouraging them to roll out to rural areas or upgrade their existing networks, sharing can also create new players eager to invest in equipment, such as tower companies or Greenfield fibre network companies. Such Greenfield providers may not even compete for end user customers. Instead they would serve a full range of end-user service providers that do, including those seeking to provide mobile broadband services or resell dark fibre, provide services to small communities, or provide backhaul to mobile networks upgrading to broadband. Infrastructure sharing can be embraced as a tool that could unleash a new wave of network deployment and upgrades, resulting in new equipment sales. The whole idea is to use sharing strategies to encourage new networks to expand to those areas that are completely un-served or which currently are served by only the most basic of telecommunication services – at least until markets develop to the point where they can support facilities-based competition.

In a way, infrastructure sharing is part of the “Market Efficiency Gap” analysis, the universal access theory that has extolled policy makers and regulators to use market forces and remove regulatory hurdles which impede universal access goals. By lifting licensing restrictions that artificially limit the number of market players developing countries are enabled to attract new investors to reach those that are un-served. Likewise, regulatory impediments to ICT development such as high license fees, unfair interconnection terms and conditions or inadequate spectrum allocations all can hinder attainment of universal access goals. Past editions of *ITU Trends in Telecommunication Reform* and GSR Discussion Papers have explored key regulatory issues such as interconnection, universal access and licensing of domestic service provision. These issues make up the first wave of regulatory reform and have been vital to growing the information and communication technology (ICT) sector in developing countries. The 2008 GSR will address a second wave of regulatory reforms to promote widespread, affordable broadband access under the umbrella “six degrees of sharing”.

While progress has been made, as is evident in the mobile boom, it is also clear that many developing countries still have significant gains they can realize by pushing the market gap envelope even further. By doing so, they can focus only on the “True Access Gap” where subsidies are needed to encourage private players to serve remote and rural areas, as well as the affordability gap. In some cases, like in India, not only can infrastructure sharing mechanisms be used to reduce Capex and Opex, but they can be used together with universal access funds to subsidize initial capital expenditures, e.g. for mobile tower site sharing, to attract investment while promoting competition.

There is also a concern that the investment case simply cannot be made to reach rural areas even if using new infrastructure sharing options such as open access. Of course, only time will tell if this concern is merited. Affordability for Internet access, for example, whether in urban or rural areas, will depend, in large part, on the cost of international access. Promoting open access to submarine cable landing stations, such as in Singapore, has reduced international access costs by 95 per cent.

In addition, the investment case may also largely depend on how flexible national policy making becomes. For example, can open access providers which deploy their networks to the remotest of rural areas – serving a small population of impoverished users – really expect a return on their investments? At first glance, this does not sound very likely. However, if instead of encouraging a new Greenfield fibre backbone operator to expand its network to meet every town, village and hamlet such fibre backbone operators could snake their fibre strands through the ducts and rights of way of existing roads, railways, pipelines and other non-telecom infrastructure in the country, where these exist, the level of capital expenditure can be reduced. Alternatively, if other infrastructure providers have already laid their own fibre, they too can become open access providers selling fibre capacity to local communities along their routes who can simply lay the needed fibre from their locality and splice into the existing network. Or all of these players can join forces to create new joint ventures or co-operatives that can serve the entire nation, perhaps even receiving initial government funding. But this requires planning by all major infrastructure projects in a country to require access to ducts, provision of dark fibre and access points so smaller players

can connect to the backbone. It also requires greater flexibility in many of the legal and regulatory frameworks that currently exist.

## **5 COMMON APPROACHES DEPEND ON POLITICAL WILL**

Participants in this year's GSR can expect to hear some common approaches. Whether for mobile, fibre or international gateway facilities, such as submarine cable landing stations, a couple of key practices are common. These include providing collocation space and connection services and sharing information (e.g. publicizing the location of mobile sites that can be shared, who controls rights of way or when access to rights of way are expected to be dug up so others can lay their fibre equipment). Other common approaches include site sharing, the provision of power and air conditioning, access to collocation space for maintenance and providing connections at guaranteed levels of quality of service. These provisions can be included in reference interconnection offers.

Infrastructure sharing also involves common principles, such as neutrality, transparency, non discrimination, fair prices, provisioning on a first-come, first-served basis and timely responses to requests for sharing, fair competition, essential facilities doctrine, and speedy dispute resolution.

Again, all of these are well-tested principles and practices. There is an enormous body of regulatory experience and practice on which developing countries can build and develop their regulatory framework to incorporate these practices. Due to increased transparency among regulators, many of these practices and principles are freely available on regulators' website, and can be used by those developing their own frameworks.

Some of the newer areas involve sharing of active network elements. Many of the GSR Discussion Papers identify active infrastructure sharing practices regulators could use, while cautioning about their impact on competition and consumer choice. Of course, these practices can be expected to continue to develop over time, given advances in technology and business practices as increased intelligence either in the core or the end of the network permits service providers increasingly to differentiate their service offers. Regulators can continue to share with each other these developments as they occur.

One of the keys to promoting infrastructure sharing and its benefits, however, is a clear policy decision to promote greater competition to foster widespread network deployment through the adoption of infrastructure sharing and open access. Once political will for such measures is articulated, regulators can then move to establish clear regulatory frameworks for implementation. It is hoped that this series of discussion papers will not only address how to achieve sharing, but why sharing is so important on a policy level.

## **6 A BROAD PERSPECTIVE ON SHARING**

In a way, many regulatory tools and practices can be viewed as sharing. That is why this year's GSR will address not only active and passive infrastructure sharing, under the umbrella theme of Six Degrees of Sharing, but also includes business sharing, end-user sharing, regulatory sharing and sharing where the same network provides both content and carriage. The business sharing discussions will focus on whether the growing trend toward functional separation makes sense for developing countries. The mobile sharing discussions will examine passive and active infrastructure sharing as well as the challenges and opportunities of national roaming, which can be seen as another form of business sharing. The GSR will further explore how other forms of sharing, such as spectrum sharing and the sharing of end user devices and developing innovative broadband applications for developing country users, can impact accessibility and affordability of ICT services. The regulatory sharing discussions will focus on international mobile roaming rate regulation, which has captured the attention of regional regulatory associations, many of which now seek to harmonize their approach to international mobile roaming.

The rise of broadband networks means the rise of new applications and services, like IPTV and mobile broadcasting. This gives rise to the need for regulatory frameworks designed for an ICT

environment in which multiple services – including content and audio-visual services – share a single network. Where the legacy telecommunications network *is* this single network, and is currently regulated only for telecommunication services, there is need for telecommunication regulators to begin addressing new issues such as protection of minors and intellectual property rights, especially as IPTV, mobile TV and other content services become more readily available. These issues will be taken up in the session on regulatory sharing, along with the move to harmonization by regional regulatory associations.

## **7 THE GSR DISCUSSION PAPERS**

There will be 10 GSR Discussion Papers:

- What do we mean by 6 Degrees of Sharing?
- Mobile Sharing
- Extending Open Access to National Fibre Backbones in Developing Countries
- Breaking Up is Hard to Do: The Emergence of Functional Separation as a Regulatory Remedy
- Spectrum Sharing
- WRC-07 Results and Impact on Terrestrial Broadband Wireless Access Systems
- End-User Sharing
- IPTV and Mobile TV: New Challenges for Regulators
- International Mobile Roaming Regulation – An Incentive for Cooperation.
- International Gateway Liberalization: the Singapore experience

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<sup>1</sup> Professor Cave used the name for his 2006 article, “Six Degrees of Separation – Operational Separation as a Remedy in European Telecommunication Regulation,” analyzing the recent trend in some European countries to functionally separate the access business of their legacy fixed line operator from its retail business. Professor Cave’s paper explored the functional separation trend under a “ladder of investment” approach, where six different functional separation approaches were presented as options, only one of which could be adopted or implemented at a time as competitors move up the ladder of investment. The organizers of the 8th GSR wish to thank Professor Cave for inspiring the theme of this year’s global gathering of regulators.