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The role of economic regulation in facilitating SGDs – infrastructure sharing, examples of cooperative agreements, modalities of IXP governance

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Partnerships in the ITU Telecommunication Development Sector' mandate

- Chapter IV of the ITU Constitution sets out the mandate of the ITU Telecommunication Development Sector (ITU-D), including to:
- .. promote, especially by means of partnership, the development, expansion and operation of telecommunication networks and services, particularly in developing countries, …;
- ..But deploying these networks to rural and remote areas challenging – economic, geographic and/or demographic barriers mean that many people remain unconnected to the digital world.
- Regulators and policy-makers have a major role to play in changing this.

Different types/models of infrastructure sharing (passive, active)

1. **Passive infrastructure sharing**: sharing of civil-engineering works without any electronic telecommunication elements, to reduce the costs related to the leasing and acquisition of property items such as real estate, civil engineering, access rights/rights of way and site preparation.
    a. Implementation of the passive infrastructure-sharing model does not necessarily require changes to the regulatory framework.
2. **Active infrastructure sharing:** advanced technical model and a more complex type of sharing, whereby operators share not only passive elements but also the active layer of their networks.
    a. Active sharing can be extended to joint management systems, whereby an operator can negotiate access to its mobile switching centres and/or its packet-switching core network with other operators.

Internet exchange points

1. Internet exchange points (IXPs) are organizations allowing Internet service providers (ISPs) to share the IXP infrastructure so as to route their upstream traffic in a cost-effective and technically efficient way. IXPs provide an example **Active infrastructure sharing**.
2. Traffic sharing through peering at IXPs is cost effective since, once an ISP is a member of an IXP, it will have no extra interconnection costs for exchanging traffic, neither to reach the peer, as they are already co-located at the IXPs, nor to pay for the costs of interconnection, as public peering is often free, being **based on reciprocity**. IXPs facilitate the exchange of Internet traffic in a cost-effective manner.
3. Routing may be achieved through public peering at IXPs, where member providers are connected to each other. Peering between two members of an IXP is based on mutual willingness to peer (to interconnect), **as there is no obligation to do so**. (In essence, the participants place their router at the IXP and advertise their IP routes that they are willing to share with their peers)
4. Peering at an IXP can be **private peering**, since it is taking place at an already shared location it still reduces cost in comparison with linking two providers at two different locations.

The key benefits of infrastructure sharing at IXPs

- The key cost-saving feature of IXPs is that **every member has to deploy just one link, to the IXP, rather than a number of links equal to the number of premises of all other ISPs.**
- **Local traffic stays local**, instead of being re-routed, possibly over international routes, by upstream transit providers.
- **Quality of service is particularly enhanced** by virtue of the reduction of routing and hops, and by keeping local traffic exchanges at the local IXP.
- Benefits like **reduced transit costs**, reduced investment costs and improved QoS for consumers are all major success factors in local ICT ecosystems.
- However, **not all members of an IXP will have peering access to all other members' routes**.
- Effectiveness in reducing ISPs' costs will **vary on members' mutual willingness to peer**;
- and decisions are based on ISPs' characteristics, and notably the differences between its members in terms of routes advertised, membership size or traffic routed

Q4.1 report looked at the distribution of IXPs across regions-Still uneven

- IXPs provide shared infrastructures among different types of members:
- Private ISPs, national research and education networks (NRENs), Internet infrastructure operators, over-the-top (OTT) providers, application service providers (ASPs), online service providers (OSPs) or content and application providers (CAPs) and possibly governmental e government networks.
- **However, across regions the distribution is uneven**

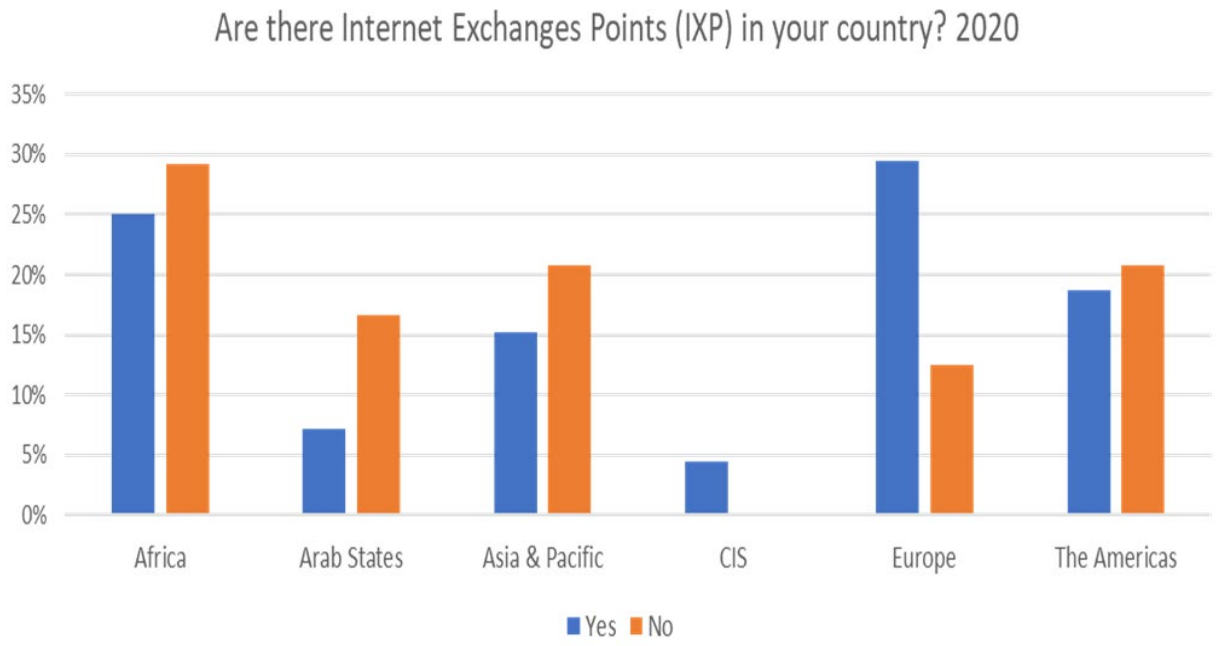


Figure 2.1.3. Availability of IXPs in regions, 2020, Source: ITU Tariff Policies Survey

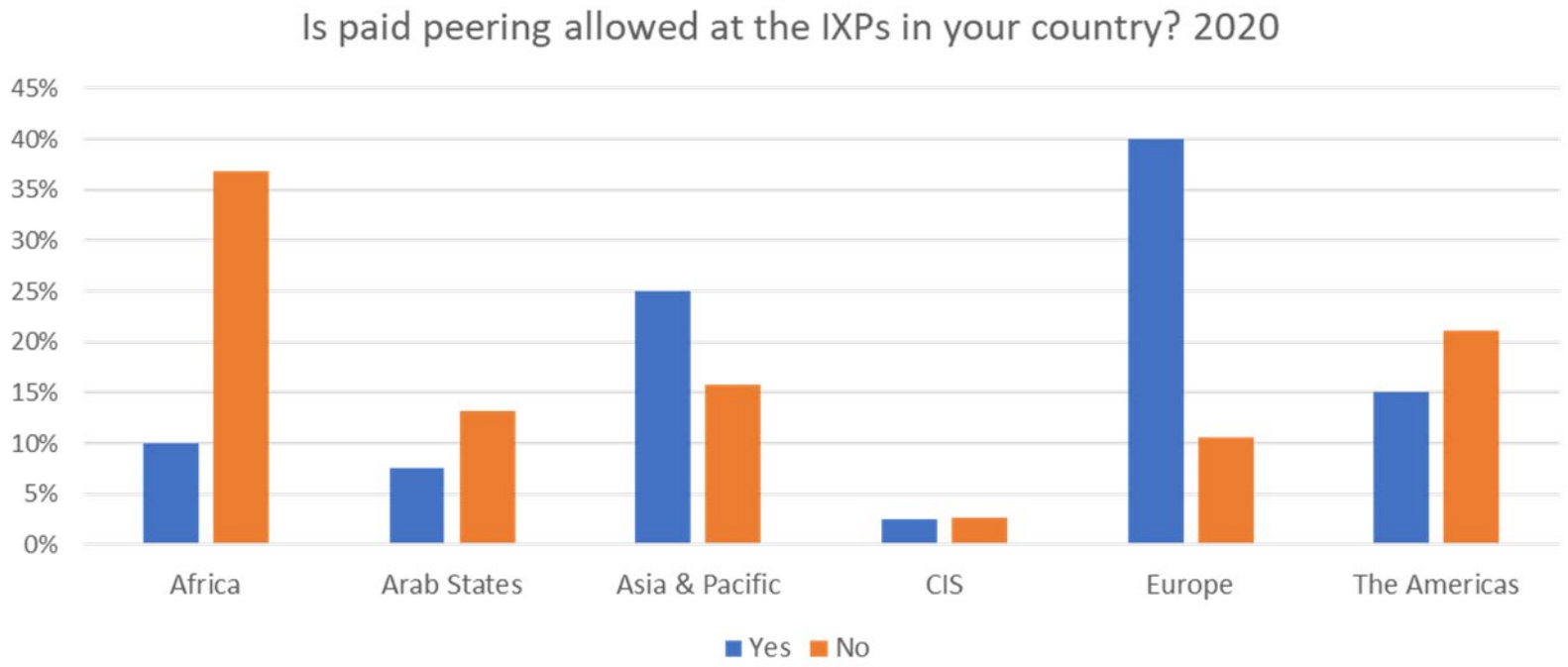
IXP governance

- Another aspect of paramount importance for the functioning of IXP **infrastructures is their governance**.
- The interconnection cost is critically linked to whether IXPs are profit-driven or are cooperative membership-driven infrastructures aimed at maximizing benefit for the membership as a whole.

Source ITU Tariff Policies survey

Where is paid peering is allowed at the IXP

1. A further key feature of the governance of this infrastructure-sharing mechanism relates to the issue of whether **paid peering** is allowed at the IXP.
2. This is important, since, as soon as paid peering occurs, the paid transactions at the IXP are similar to interconnection fees, and would then become a possible subject of regulatory relevance.



Source ITU Tariff Policies survey

Policy Trade-offs for access to essential facilities and infrastructure sharing

- **Essential facilities** are elements provided by an operator that, cannot be replicated by other competitors, who need these facilities as an input to their retail services.
- **Operators that control essential facilities** enjoy more bargaining power than other operators and new entrants seeking to access these essential facilities.
- **Asymmetric regulations redresses the consequences** of market power and needs to distinguish between infrastructure-sharing agreements and mandatory access
- However, **open access can slow down the deployment of alternative access networks**, leading to inadequate capacity, lower service quality and slow deployment of new technologies in the future.
- NRAs need the right balance based on specific national circumstances encourage infrastructure sharing and access to facilities while promoting investment that enables infrastructure-based competition and deployment of new networks and services.

Bottlenecks as a new form of essential facility

- In the past, it was easier to identify essential facilities in telecommunication/ICT networks, as **incumbent operators owned the main public switched telephone** network (PSTN).
- More recently, **mobile operators have acquired a new role as "bottlenecks"** (a form of access control similar to an essential facility) owing to their control over **access to end users.**
- **Number portability** is an effective regulatory instrument for overcoming these bottlenecks and reducing potential monopolistic behaviours
- However, number portability alone may prove **insufficient** when providers are supplying other **value-added services which are not "portable"** to a competitor just by transferring the same number.

Digital Platform (Over the Top, OTT)

- OTTs provide benefits, such **as profiles, time maps, contacts, histories, friends and friends of friends**, the switching costs associated with changing OTT provider, or digital platform, have become increasingly significant
- The costs involved in switching OTT may differ, between **younger and older consumers or more/less digitally skilled ones**. This raises **new regulatory questions, as a market can have different levels of contestability for different socio-economic demographics.**
- Number portability does not deal with these new bottlenecks because of the **captivity/loyalty of consumers due to the most useful features and innovations introduced by OTTs**.
- While the technologies, services and benefits are recent, **the challenges arising from the presence of bottlenecks remain the same**, insofar as they are linked to incentives to raise barriers to entry into digital infrastructures, barriers that may be based either on pricing or on quality of access.

Algorithms and the new digital essential facilities

- To provide high-quality, tailored services, increasing customer loyalty and targeted advertising revenue, OTTs **need to feed large amounts of personal data into their profiling algorithms**.
- Such algorithms also generate higher, and asymmetric, switching costs, potentially leading to the emergence of **new digital essential facilities**.
- These bottlenecks, by providing **increased personalized choices within a platform**, reduce consumer choice **between platforms**, affecting contestability and innovation in the markets concerned.
- Regulatory scrutiny of these digital infrastructures (platforms) poses new challenges for regulators, who need to **invest in the required analytical and digital skills** to stay ahead of the emerging technological, strategic and behavioural challenges, **within a time-frame that is constantly accelerating** because of the use of artificial intelligence (AI) in building the smart services the platforms offer.
- These challenges can only be addressed by equipping NRAs to adopt **best-practice prioritization procedures** and **developing the necessary skills** to implement new forms of algorithmic, just-in-time regulatory scrutiny

Thank you

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