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# Panel Discussion:
# How to Master Europe's Digital Infrastructure Needs?

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## Introduction

The White Paper "How to Master Europe's Digital Infrastructure Needs" discusses vision for the Digital Networks of the Future in the direction of "Connected Collaborative Computing" (the "3C Network").

Connectivity and computing have always been considered a 'cooperating dipole'. Computing, as a pendulum swinging between its centralized-decentralized extremes, pushed connectivity forward or connectivity by making decentralized computing possible pushed computing forward instead.

The mainframe of the '70s (centralized) the PC of the '90s (decentralized), the cloud computing of late 2000's (centralized) and the edge-computing (decentralized) dynamics of today (put simply, our smartphones) counted on Connectivity to 'swing' decentralized each step along the way.

If the name of the game in computing and connectivity today is efficiency - power and cost efficiency in specific – then 'connectivity' is the tool that allows us to meet current and future efficiency targets by enabling us to strike the right balance between local and remote computing.

To achieve this vision we need three components:

1. Development of cutting-edge technology – i.e. innovation. This is addressed by Pillar I of the White Paper that discusses the creation of an innovation ecosystem (investments + capacity building).
   - It is worth discussing the interplay between innovation and regulation. Innovation and technology advance faster than regulation and we need to make sure that regulation does not block innovation. The approach should be to monitor the developments and to identify issues that might require regulatory interventions in the future while avoiding early regulations and allowing the technology to develop. Regulators are still part of innovation ecosystem with tools such as collaborative regulation and regulatory sandboxes.
2. Establishment of an appropriate Regulatory Framework. This is addressed by Pillar II of the White Paper that focuses on the Single Market.
   - Different issues are still discussed including: Authorization, Barriers to core networks centralization, Spectrum issues, Copper switch-off, Access policy in a full fibre environment, Universal service and Sustainability.

- A key point in this part is striking the right balance between harmonization (among EU Member States) to create scale (necessary to address investment challenges) and flexibility to adapt to special needs at Member State level.
3. Addressing the overriding issues of security/resilience and cybersecurity. This is addressed by Pillar III that focuses on secure and resilient digital infrastructures and the need to protect the value of the massive investments required to build them.
   - Future software-defined, new-services carrying, networks will need to get hardware-level supply-chain traceability to avoid having our ultra-flexible ICT infrastructure from getting 'poisoned' in its very own 'silicon roots', compromising all concepts of cyber-security we consider. No cybersecurity measures really make sense if the hardware we use is compromised.

**Market structure**

We would all agree that those expected to invest also rightly expect to have reasonable returns for their investments. On the other hand, we need to keep prices competitive, especially in economic environments of high inflation, to fuel and support uptake. This is a tough exercise to solve, and one that historically has been solved with economies of scale.

BEREC in its response to the public consultation concludes that VHCN being rolled out at supra-national scale is not expected to bring any significant cost savings and efficiencies determined, inter alia, by the scale of their operation. Economies of scale can be largely reached at subnational level for fixed networks, while at national scale for mobile networks. BEREC also notes that consolidation requires careful analysis in all Member States given its potential negative impact on competition.

**Copper switch-off and transition to a full fiber environment**

The 1 Gbps fixed connectivity objective towards 2030 is technology neutral but….

fiber broadband access networks offer several advantages compared to other network technologies such as higher speeds, lower latencies and smaller cost/speed ratios, as well as increased reliability and scalability. They are also the most technologically secure and in-the-field validated solution we have, with a clear future/technology roadmap for further development (towards 25/50 Gbps GPON). They are also the most energy efficient ones because of the reduced role played by active equipment compared with legacy technologies/copper.

Fiber-based access networks are also expensive to deploy, so accelerating their use requires significant policy and regulatory interventions:

1. Copper switch off: we need simple and transparent procedures to switch-off copper networks because
   - Copper networks performance cannot scale up to 1 Gbps
   - Copper networks consume much more energy than fiber networks
   - We need to make sure that copper networks will not be competing with FTTH/FTTB investments

2. Address full coverage and avoid having commercially interesting areas covered in parallel/multiple times, and less commercially interesting ones left uncovered
3. Address the homes passed vs homes connected gap. This is an unprecedented challenge and the key reasons for this are:
   - civil engineering costs,
   - availability of personnel to install/deploy FTTH/B, and
   - subscriber reluctance (typically due to technician intervention in subscriber's space)

As regards the last point we need to promote adding some flexibility in the way we perceive and define Fiber-based access networks and start thinking in hybrid deployments terms where fiber gets to the most Cost-Efficient Point and then any technology that may achieve 1Gbps speeds can be used to connect the end user (including technologies that may use legacy in building cabling infrastructure).

**Access regulation and access to physical infrastructure**

Civil engineering costs represent the larger part of electronic communications networks deployment costs. We need to see the big picture and focus on how to reduce civil engineering costs and relevant administrative overheads. Access to physical infrastructure becomes very important in this context. Regulatory frameworks such as the Gigabit Infrastructure Act but also access regulation can contribute to this direction.

**"Fair Share"**

As regards broadening the scope of the regulatory framework, namely considering the players that provide services or networks closely related to electronic communication services/networks), BEREC plans two relevant reports:

1. "BEREC Report on the entry of large content and application providers into the markets for electronic communications networks and services", which has been recently published for consultation and which will finally approved in December 2024.
2. "BEREC Report on the IP interconnection ecosystem" which will be published for consultation in June 2024 and will be finally approved in December 2024.