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Overcoming Europe's connectivity challenges to reclaim global leadership

Executive summary

DIGITALEUROPE welcomes the European Commission's strategic evaluation of the EU's connectivity landscape.¹ Our vision aims to elevate Europe to a Digital Powerhouse, setting ambitious targets for universal gigabit internet and 5G coverage by 2030, necessitating decisive policy actions.²

Europe has long grappled with connectivity challenges compared to global peers. In our 2022 *Mind the Gap* report, we identified inadequate returns on private investment and significant delays in spectrum auctions as key barriers hindering European leadership in fixed and mobile networks, with growing concerns about Europe's position in the forthcoming 6G era.³

To reclaim its technological leadership, Europe must confront these challenges head-on. Our recent analysis of Europe's competitive standing in critical technologies underscores three primary obstacles: market fragmentation and a lack of strategic coherence hindering our companies' scalability; a substantial investment gap relative to global rivals, compounded by insufficient innovation commercialisation; and stringent regulations that disadvantage European businesses, stifling their growth potential domestically.⁴

This assessment is particularly relevant in the realm of connectivity, where despite leading in R&D and network innovation, Europe struggles due to an unfavourable business environment and tepid user demand. Strengthening

¹ COM(2024) 81 final.

² See DIGITALEUROPE, *Europe 2030: a Digital Powerhouse*, November 2023, available at <https://cdn.digitaleurope.org/uploads/2024/04/DIGITAL-EUROPE-MANIFESTO-2024-FULL-FINAL-2024-UPDATE.pdf>.

³ See DIGITALEUROPE, *Mind the Gap: A new Connectivity Act for the Digital Decade*, March 2022, available at <https://www.digitaleurope.org/resources/mind-the-gap-a-new-connectivity-act-for-the-digital-decade/>.

⁴ See DIGITALEUROPE, *The EU's critical tech gap: Rethinking economic security to put Europe back on the map*, June 2024, available at https://cdn.digitaleurope.org/uploads/2024/06/DIGITALEUROPE-EU-CRITICAL-TECH-GAP-REPORT_WEB_UPDATED.pdf.

Europe's competitiveness demands fostering a climate conducive to investment and enhancing returns in the sector.⁵

This paper puts forward the following analysis of the Commission's assessment and proposed actions:

- ▶▶ Network virtualisation and open architectures are pivotal trends that can pave the way for innovative services and applications. Portraying them as obstacles or risks misrepresents their potential, and could undermine confidence and innovation in the market.
- ▶▶ Europe must maintain its leadership in connectivity technologies, such as cloud-native 5G, through advanced research and innovation (R&I) activities. The proposed coordinating role for the Smart Networks and Services Joint Undertaking (SNS JU) should avoid shifting towards commercial deployments, remain telecoms-centric and industry-driven, allocate additional funding for related fields like telecoms-related cloud and AI, and preserve its current governing structure.
- ▶▶ Whilst the objectives of EU telecoms regulation could be broadened to emphasise the role of connectivity in Europe's competitiveness and sustainability goals, current economic and security concerns do not justify a scope expansion to encompass convergence between electronic communications and digital services. Instead, 'levelling the playing field' could be achieved by reducing regulatory burdens on telecoms operators, thereby incentivising the substantial investments required to meet Europe's connectivity objectives.
- ▶▶ We support the proposed measures to accelerate the transition from copper to fibre networks through revised access policies that reduce ex ante regulation whilst allowing national regulatory authorities (NRAs) to maintain oversight under a reverse burden of proof. Transitioning to fibre, 5G fixed wireless access (FWA), and low Earth orbit (LEO) broadband offers substantial advantages.
- ▶▶ Balancing centralised oversight of spectrum management in Europe with Member State flexibility is crucial to accommodate local conditions whilst ensuring coherent implementation essential for launching advanced technologies at scale. We support stronger EU-level coordination to address pricing disparities and auction rules that have been delaying network deployments.
- ▶▶ We support the Commission's push for advancing R&I in quantum cryptography, particularly focusing on post-quantum cryptography (PQC) to bolster communications and data resilience against potential quantum threats. This should be achieved through transparent technical standardisation processes. We also support initiatives to

⁵ Ibid.

secure and bolster the EU's submarine cable infrastructure, but regulatory burdens that could deter investment should be avoided.

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Connected collaborative computing

The White Paper's concept of a 3C Network of 'connected collaborative computing' presents a comprehensive vision for integrating connectivity and computing infrastructure across Europe. However, by framing convergence as a challenge necessitating regulatory adjustments, it overlooks the potential benefits of leveraging it to enhance digital services and infrastructure resilience.

Network virtualisation and open architectures are pivotal trends that have the potential to significantly advance Europe's high-speed connectivity goals. These technologies enable greater flexibility, scalability and efficiency in network operations, paving the way for innovative services and applications. Portraying these trends as obstacles or risks misrepresents their potential, and could undermine confidence and innovation in the market.

Any future initiatives should adopt a technology-neutral stance and remain open-minded towards all technical solutions. They should not favour or hinder any specific network technologies, but rather create an environment where market forces can drive innovation and adoption based on technological merits and market demand.

Maintaining Europe's leadership in connectivity technologies

Europe must remain at the forefront of developing future connectivity technologies. Cloud-native 5G exemplifies an area where Europe leads, with the potential to supply crucial cloud and communications components globally. The telecoms network, with its distributed architecture and evolution towards cloud edge, presents an opportunity to leverage European strength in providing cloud-native 5G, as further explored in our report on *The EU's critical tech gap*.⁶

Advanced R&I activities are essential to maintaining and expanding Europe's competitive edge. It's critical for Europe to attract and retain leadership in the research, development and standardisation of wireless networking technologies. Falling behind in the race for future network systems would also jeopardise Europe's ability to drive the green and digital transitions.

In this context, distinguishing partnerships based on company headquarters is neither advisable nor feasible. Strengthening global collaboration and ecosystems based on global standards with like-minded partners should be the overarching goal.

The White Paper emphasises the pivotal role of advanced digital infrastructure in enabling transformative applications across various sectors, underscoring

⁶ See DIGITALEUROPE, *The EU's critical tech gap*, particularly the 'Advanced connectivity' chapter at p. 28.

the necessity for robust connectivity and computational capabilities. In this context, it envisages the 3C Network as an ecosystem spanning semiconductors, computational capacity (device, edge and cloud), radio technologies, wireless connectivity, data management and applications.⁷

New technology development should align with user demand, both from consumers and enterprises. With 6G, it's essential to avoid the mistakes made with 5G by embracing business cases and customer demand early in the R&D process. Increasing verticals' engagement in 6G research is crucial to developing technologies that meet industry needs.⁸

The White Paper sets out to enhance coherence within the EU's collaborative connectivity R&D ecosystem through three key initiatives:

- a) Possibly granting the Horizon Europe Smart Networks and Services Joint Undertaking (SNS JU) a coordinating role for related R&D projects;
- b) Considering the launch of a new infrastructure important project of common European interest (IPCEI); and
- c) Launching large-scale pilots.

A coordinating role for the SNS JU

Current R&I activities on future connectivity at the EU and national levels, including 6G, Wi-Fi 7-8 and related domains, suffer from suboptimal coordination, risking duplication of efforts. The SNS JU, if given the coordinating role proposed by the Commission, could unify these efforts effectively. However, its focus must remain on core 6G cellular and related wireless technology research.⁹ Projects on microelectronics, AI, cloud, software and security should align with the central theme of wireless technology.

To ensure the SNS JU's effectiveness and prevent goal dilution, its scope should only be extended with careful consideration, and its funding should be increased accordingly.

⁷ We suggest this term may be too narrow, failing to capture the breadth of the technology and innovation landscape. We suggest renaming it 'connected collaborative capabilities network' to better reflect the technologies that will be integral to future communication systems, including advanced microelectronics, 6G, fibre technologies, Wi-Fi, cloud computing, AI and IoT.

⁸ A recent report by Analysys Mason sounds the alarm on the low participation of enterprises in 6G research. It urges for greater industry involvement to steer development towards commercially viable solutions. See Analysys Mason, *6G: emerging industry visions for the next mobile generation*, available at <https://www.analysismason.com/research/content/reports/6g-research-development-rma08/>.

⁹ Similar support should be extended to the European technology platform Photonics21 for gigabit connections. Increasing research support for Photonics21 will accelerate the development of the gigabit connection ecosystem.

A coordinating role for the SNS JU should:

- ▶▶ Maintain the focus on R&I, without shifting towards commercial deployments;
- ▶▶ Ensure the SNS JU remains telecoms technology centric and industry driven;
- ▶▶ Allocate additional funding for related fields like telecoms-related cloud and AI to build EU capabilities and competitiveness; and
- ▶▶ Preserve the current governing structure and avoid counterproductive structural changes, such as transforming the SNS JU into a tripartite JU in the 2025-2027 timeframe.

A new infrastructure IPCEI

A new infrastructure IPCEI is crucial to meet funding needs for 2027–2030. To ensure European competitiveness and leverage existing strengths, it should build on the work of the current IPCEIs on microelectronics and connectivity (IPCEI-ME/CT phase 2) and the IPCEI on next-generation cloud infrastructure and services (IPCEI-CIS).

Despite the administrative complexity and lengthy setup time, the IPCEI model, which combines common governance with company-specific projects, has proven effective. It complements the collaborative nature of Horizon Europe and SNS JU activities.

A new infrastructure IPCEI should focus on:

- ▶▶ Reinforcing European semiconductor capabilities, particularly in wireless networks system-on-a-chip devices;
- ▶▶ Leveraging the existing cloud-native 5G edge infrastructure developed by IPCEI-CIS for a compelling value proposition;
- ▶▶ Driving integration of various layers of the cloud stack and generalising cloud capabilities for different vertical domains; and
- ▶▶ Securing the adoption of cloud-native 5G standalone (SA) and edge infrastructure, focusing on strategic needs like supply chain resilience and mission-critical services.

Large-scale pilots

Europe is lagging in 5G SA network deployment, trailing behind India, China and the US. Accelerating this process, particularly with a focus on edge cloud, is critical. Large-scale pilots can stimulate the timely creation of 5G SA and edge cloud infrastructure in the EU.

Lessons from the Connecting Europe Facility (CEF2 Digital) reveal that its projects are too small, cumbersome and limited in scope. Establishing new

trials and pilots through an IPCEI or other instruments will take 3-4 years post-implementation by a new European Commission. These trials should be market- and industry-led, aligned with current industry roadmaps and business rationales such as return on investment. Future trials will move beyond the 5G/edge-cloud ecosystem to early-stage 6G and advanced wireless networking demonstrations, crucial for Europe's leadership in this field.

Standardising the 3C Network can achieve unified technical architecture, system requirements and service objectives, accelerating uptake and preventing fragmentation. This requires international collaboration and innovation, ensuring fair participation from a wide range of organisations. Limiting innovators to EU entities would fragment the global 3C Network, as evidenced by the 2G era. Therefore, EU partnerships with international stakeholders are essential for the 3C Network's success.

Completing the single market

The White Paper argues that the EU's electronic communications regulatory framework needs to be reviewed in order to keep up with the convergence of these networks with cloud services and to create a more competitive market. It also highlights critical issues in EU radio spectrum management that have hindered rollout of 4G and 5G, and could repeat for 6G. It outlines a plan to modernise Europe's telecoms infrastructure by phasing out copper networks and transitioning to fibre networks. It also proposes lighter regulations to encourage investment.

Expanded regulation?

Scenario 4 envisions the Commission broadening the scope and objectives of the current regulatory framework to address what it describes as a convergence of electronic communications and digital services.

DIGITALEUROPE represents a diverse range of players in the digital ecosystem, from telecoms equipment vendors to handset manufacturers and content and application providers (CAPs). Any regulatory changes of this magnitude require a thorough economic assessment and an inclusive dialogue with all stakeholders before pursuing reforms. They should address clear market failures, be evidence-based and refrain from covering issues already addressed by other existing legislation.¹⁰

Whilst the Code's objectives could be broadened to reflect the key enabling role of connectivity and advanced wireless networking in Europe's competitive edge and net zero ambitions, at present we see no specific economic or

¹⁰ The White Paper's commentary on IP interconnection highlights the need for evidence-based policymaking. Whilst the White Paper recognises that the current market 'functions well,' it nevertheless still envisions interventions or forced dispute resolutions.

security concerns that justify expanding the current regulatory framework's scope.

The cloud and telecommunications sectors, whilst complementary, remain fundamentally distinct and play different roles in the internet ecosystem. Cloud infrastructure providers offer a wide range of services across various industries, not just to telecoms operators. The cloudification process in the telecoms sector does not materially differ from its adoption in other industries. Existing EU regulations such as the Data Act, the NIS2 Directive and the Digital Markets Act already address current or potential risks associated with cloud services.¹¹

Expanding the European Electronic Communications Code (EECC) to 'all actors and end-users of digital networks where appropriate' would exacerbate regulatory barriers to innovation and investment, contrary to the Commission's Digital Decade goals. Including cloud providers, operators of private networks such as banks or government departments, and possibly even end-users within the EECC's scope would represent a massive increase in regulation originally intended for electronic communication services (ECS).¹²

The White Paper notes that telecoms sector profitability depends on the uptake of enhanced fixed and mobile networks, linked to the development of data-intensive applications and use cases. Disincentivising such development through new regulations on a wide range of digital players and users will not help the telecoms sector.

As the White Paper notes, whilst the single market has delivered on prices, it has not achieved the mass deployment of advanced wireless infrastructure and services like 5G SA, leaving the EU's wireless connectivity infrastructure unprepared for current and future data-driven society and economy challenges.

In this context, 'levelling the playing field' can be achieved by reducing regulation on telecoms operators, rather than increasing regulation on others. The ongoing strategic review provides an opportunity to assess whether the existing framework reflects today's market realities and incentivises the scale investments needed to bridge Europe's connectivity gap.

Europe's challenge is that regulation has driven artificial deflation and market entry at the cost of scale and innovation, with an average of 4.4 million subscribers per operator compared to 95 million in the US, 300 million in India and 400 million in China.¹³ This limits operators' earning potential and ability to

¹¹ Regulation (EU) 2023/2854, Directive (EU) 2022/2555 and Regulation (EU) 2022/1925, respectively.

¹² We note that the White Paper's Section 3.2.8, although not explicitly, suggests that this expansion could also include financing for universal service obligations from non-ECS providers.

¹³ See Mobilise Global, 'Europe's looming mobile crisis – a call to action for survival,' available at <https://www.mobiliseglobal.com/europes-looming-mobile-crisis-a-call-to-action-for-survival/>.

invest in deploying 5G, new technologies, cybersecurity and sustainable solutions.

To promote pan-European operators and develop the telecoms single market, telecoms operators must operate at scale nationally, requiring in-market consolidation without negative outcomes for competition.

Competition remains key to stimulating investment and innovation. However, remedies imposed on approved mergers often dampen expected efficiency gains. In other regions, like Australia, India and the US, merger control has created a pro-investment competitive dynamic.¹⁴ European authorities should focus on stimulating investment, innovation and benefits for EU businesses and consumers, emphasising 5G SA buildout, investment and deployment to drive scale.

Net neutrality must be respected when considering any changes. The Connectivity Toolbox outlines several recommendations and best practices, notably on spectrum and rapid very high-capacity networks (VHCN) deployment.¹⁵ Policy can play a key role in making digital investment more effective and unlocking further investment needed for digital transformation. Existing funding tools like Recovery and Resilience Facility (RRF) and CEF should be optimised to contribute to achieving connectivity targets.

Lighter regulation for fibre transition

Scenario 5 proposes the introduction of measures to accelerate copper switch-off and support the transition to fibre. This would include a revision of access policies that would limit ex ante regulation, whilst maintaining a safety net for NRAs to still apply regulation under a reverse burden of proof.

DIGITALEUROPE supports these goals. Phasing out copper networks and legacy mobile standards will lead not only to improved broadband speeds but also to significant energy savings.

Replacing copper networks with fibre, 5G FWA, and LEO broadband offers significant benefits. Fibre is the most effective technology for high-capacity networks in densely populated areas, providing superior performance and energy efficiency. However, technologies like hybrid-fibre-coaxial (HFC), FWA and LEO satellite broadband are crucial complements to fibre, with comparable quality of experience for consumers especially in hard-to-reach areas.

FWA is a viable complement to fibre, offering broadband access to households with quick deployment. It uses existing mobile network sites, minimising the need for extensive civil works, and is especially effective in rural and suburban

¹⁴ See, for example, the merger of equals TPG Telecoms and Vodafone Hutchison Australia, completed in 2020.

¹⁵ See *Common Union toolbox for connectivity*, pursuant to Commission Recommendation (EU) 2020/1307.

areas. Presently, 78 per cent of service providers globally offer LTE or 5G FWA services, with 50 per cent on 5G FWA. In Europe, FWA availability is even higher, with 96 per cent in Western Europe and 82 per cent in Central and Eastern Europe. The deployment of 5G FWA is growing, representing 73 per cent and 41 per cent of offerings in Western and Central and Eastern Europe, respectively.¹⁶

LEO satellite broadband is another crucial technology complementing fibre, providing broadband access in remote areas. It offers affordable, low-latency connectivity with download speeds up to 400 Mbps for residential customers and up to 1 Gbps for enterprises. LEO satellites can cover large areas, reaching places where terrestrial networks are unavailable. The social and economic benefits of satellite broadband are projected to double to \$52 billion by 2030.¹⁷

To achieve the target of 80 per cent fibre coverage by 2028 and 100 per cent by 2030, several practical strategies must be implemented. These include incentivising demand through measures like vouchers, increasing subsidies and low-interest loans for fibre-to-the-home (FTTH) construction in rural areas to stimulate operator interest, and granting operators free pricing rights to ensure profitability and encourage FTTH deployment.

Efficiency in FTTH service provisioning can be improved by simplifying the right of way approval process, leveraging new technologies to reduce costs, and strengthening legislation to mandate fibre deployment in buildings and indoors.

Policies to accelerate copper switch-off should mandate timely decommissioning in fibre-covered areas and restrict upgrades to legacy copper devices, thereby boosting VHCN adoption. The expansion of fibre networks in Europe has progressed well in recent years. However, due to limited planning and construction capacities and varying technology choices across Member States, a complete switch-off of the copper network by 2030 is unrealistic. Any mandatory switch-off deadline is unsuitable for the current transition from copper to fibre. The decision to switch off copper networks should remain with the network owner. Instead of a binding deadline, policymakers should support fibre rollout as a prerequisite for copper switch-off.

Additionally, protecting vulnerable whilst expanding network coverage involves guaranteeing gigabit bandwidth, establishing unified network experience standards and complaint mechanisms, and developing evaluation methods to enhance network quality and operator engagement.

Streamlining spectrum management

Scenario 6 proposes enhancing the European Commission's role in spectrum management to foster market scale and boost investment capabilities for pan-

¹⁶ *Ericsson Mobility Report Business Review 2024.*

¹⁷ Global Satellite Operators Association (GSOA), *The socio-economic value of satellite communications.*

EU operators. This could involve greater harmonisation of spectrum authorisation processes, aligned authorisation and selection conditions, and a 'country of origin' principle for activities less tied to consumer retail markets and local access networks.

After slow 5G rollout, Europe risks a repeat scenario with 6G unless regulatory improvements foster private sector investments in network upgrades. Fragmentation across Member States due to varying spectrum auction timelines and high costs has been inhibiting market integration and investment.

DIGITALEUROPE believes that spectrum management and authorisation procedures should remain the responsibility of Member States, whilst ensuring and strengthening coordination at EU level.

Currently, EU spectrum harmonisation involves diverse stakeholders ensuring balanced and well-informed policies through bodies like CEPT, the Radio Spectrum Committee (RSC), the Radio Spectrum Policy Group (RSPG) and the European Telecommunications Standards Institute (ETSI).¹⁸

Whilst there is effective collaboration amongst these organisations, DIGITALEUROPE believes stronger coordination is necessary to address issues like spectrum pricing disparities and auction rules that hinder timely network deployments in the EU.¹⁹

Balancing centralised EU oversight with Member State flexibility is crucial, as local conditions and priorities influence spectrum management decisions, and too centralised an approach could risk achieving the lowest common denominator. Whilst spectrum policies remain within Member States' jurisdiction, enhanced EU coordination is necessary to ensure coherent implementation and to leverage economies of scale essential for launching advanced technologies like 5G and future 6G networks.

Future reforms could propose an EU-wide approach to licensing and spectrum release timelines in justified cases. Vertical use cases and satellite communications are examples where common EU strategies could accelerate technological advancements and market efficiencies.

There's a need to secure fair and efficient auction processes across Member States, with low reserve prices and transparent rules to prevent artificial spectrum scarcity and excessive financial burdens on operators. This crucial to

¹⁸ RSC and RSPG provide essential policy guidance to the European Commission on spectrum-related issues, with RSC focusing on technical aspects and RSPG addressing broader policy implications. These bodies play a critical role in developing harmonised spectrum policies that align with the EU's overarching goals and objectives. CEPT serves as a collaborative platform for European countries in spectrum management, facilitating discussions, agreements and the development of unified approaches to spectrum allocation and usage across borders. ETSI develops technical standards crucial for interoperability and efficient spectrum utilisation, leveraging expertise from industry, academia and regulatory bodies to inform spectrum policy decisions within CEPT and its associated groups.

¹⁹ See European Court of Auditors Special Report 03/2022, *5G roll-out in the EU: delays in deployment of networks with security issues remaining unresolved*.

incentivising investments in network infrastructure and supporting widespread adoption of new technologies.

Greener telecoms networks

Scenario 7 proposes that the European Commission explores ways to accelerate the transition to greener digital networks. In addition to promoting the timely phase-out of copper networks in favour of full-fibre environments, the scenario focuses on codecs to enhance network efficiency across the EU.

DIGITALEUROPE supports the Commission's focus on integrating environmental sustainability into the digital transformation, particularly within the telecoms sector through ongoing initiatives like the development of a Code of Conduct for sustainable electronic communications networks, aiming to foster greener practices across the value chain from product design to connectivity infrastructure.

Contrary to past projections, recent studies indicate that energy usage in fixed and mobile networks across Europe has remained relatively stable despite a significant increase in data traffic and infrastructure expansion over the last decade.²⁰ Many DIGITALEUROPE members have committed to ambitious net-zero goals and contribute to sustainability by integrating clean energy sources into their operations.²¹ DIGITALEUROPE also participates in the European Green Digital Coalition to harness digital solutions for emission reduction across various sectors, including transport, manufacturing and energy.²²

In the realm of content delivery, CAPs have played a key role in optimising video codecs to deliver high-quality content efficiently and sustainably. CAPs employ advanced compression technologies and adaptive bitrate strategies to minimise data volumes whilst maintaining service quality, collaborating closely with internet service providers and leveraging content delivery networks (CDNs) for efficient distribution. Innovations in UHD encoding, multicast technology, and deeper content caching further enhance service quality whilst reducing bandwidth consumption and energy usage.

Moreover, advancements in network virtualisation and open architectures contribute to energy efficiency improvements in telecoms infrastructure. Modern technologies like 5G with massive multiple-input and multiple-output (MIMO) significantly enhance energy efficiency compared to previous generations, illustrating a shift towards more sustainable mobile technologies.

²⁰ See Lundén et al., 'Electricity consumption and operational carbon emissions of European telecoms network operators,' *Sustainability* 2022, 14(5), 2637.

²¹ See the Joint Research Centre's (JRC) Broadband Communication Equipment Codes of Conduct, available at <https://e3p.jrc.ec.europa.eu/communities/ict-code-conduct-energy-consumption-broadband-communication-equipment>.

²² <https://www.greendigitalcoalition.eu/>.

DIGITALEUROPE supports the Commission's objectives to promote 'green ICT.' We encourage further alignment with global standards to facilitate the construction of greener digital networks, promoting sustainability goals across the EU and globally.²³

Securing our digital infrastructure

The White Paper emphasises Europe's strategic focus on both physical security of backbone infrastructure and end-to-end data transmission integrity. It underscores the imperative for a quantum-safe digital infrastructure, it highlights initiatives in post-quantum cryptography (PQC) and quantum key distribution (QKD) as pivotal steps towards achieving robust cybersecurity resilience. Additionally, it advocates for strengthened security measures in submarine cable infrastructure to preserve European digital autonomy and resilience against global risks.

Quantum

DIGITALEUROPE supports the Commission's emphasis on advancing R&I related to quantum cryptography.²⁴ The Commission's focus on PQC is crucial for enhancing the resilience of communications and data against potential quantum threats, leveraging mathematical complexities that quantum computers struggle to solve. This software-based solution allows for swift implementation without the need for specialised hardware, ensuring broader compatibility and lower costs compared to alternatives like QKD, which remains less mature and hardware-intensive.

We welcome the Commission's proposal to recommend measures that promote interoperability across borders, preventing fragmentation and varying levels of protection in the transition to PQC. We stress that international policy coordination is necessary to achieve secure and harmonised PQC solutions globally. The EU-US Trade and Technology Council (TTC) is particularly important in this respect.

The Commission should aim to maximise existing funding mechanisms, such as the European Quantum Communication Infrastructure (EuroQCI) initiative and the Quantum Technologies Flagship, including projects like Horizon 2020

²³ Notably Recommendation ITU-T L.1333 on network carbon intensity energy (NCIe) and Recommendation ITU-T L.1480 on enabling the Net Zero transition.

²⁴ We note that whilst Scenario 8 mentions 'new fibre and cable technologies,' the White Paper's Section 3.3.1 focuses solely on challenges related to securing data transmission in the era of quantum computing. It's ambiguous whether the Commission's proposal for 'advanced R&I activities' encompasses broader aspects of fibre and cable technologies, such as optical research or transmission protocols, or if it exclusively addresses cryptography challenges in the quantum era. Further consultation with stakeholders will be necessary once detailed proposals are available to assess the potential impact of such activities comprehensively.

OPENQKD.²⁵ Coordinated efforts with diverse stakeholders are needed, including industry players from like-minded countries beyond the EU, to ensure comprehensive engagement and effective deployment of quantum-resistant technologies.

Technical standardisation must be conducted in an open, multi-stakeholder environment to ensure high-quality outcomes endorsed by industry and the technical community, and to maximise the adoption and benefits of standardised PQC solutions for users globally.

Submarine cables

The White Paper emphasises the importance of securing and enhancing the resilience of the EU's submarine cable infrastructure, pointing towards structural measures such as the reinforcement of advanced R&I activities, particularly in new fibre and cable technologies.

The White Paper proposes establishing a list and labelling system for strategic Cable Projects of European Interest (CPEIs).²⁶ It suggests pooling EU and Member State funding, leveraging financial instruments and potentially creating equity funds to derisk private investments. It envisages a joint EU governance system for submarine cable infrastructure. Additionally, it recommends harmonising security requirements through a dedicated EU certification scheme.

To ensure strong and secure connectivity, a regime that promotes investment in submarine cable infrastructure and enhances maintenance and repair capacity is essential. The European Commission's approach to submarine connectivity is timely, given increased attention to its security and resilience.

It is important to stress that the robust and resilient internet backbone we have today is largely due to significant investments by network operators, both European and non-European. This market-led approach has resulted in a well-connected network that benefits consumers. Whilst some infrastructure may lack commercial viability and need support, the market generally meets the needs for backbone cable infrastructure.

Given the dynamic nature of the submarine and backbone cable market, it is crucial to avoid additional regulatory burdens that might discourage investment. This is particularly the case with respect to the NIS2 treatment of undersea communications cables.²⁷

²⁵ <https://openqkd.eu/>

²⁶ We note that C(2024) 1181 final already proposes the Submarine Cable Infrastructure Expert Group create a list of potential new CPEIs. This recommendation also outlines several criteria for inclusion, addressing the concerns highlighted in Section 3.3.2 of the White Paper.

²⁷ Art. 7(1)(d) NIS2.

DIGITALEUROPE welcomes a review of existing instruments, including grants, to support CPEIs. Understanding the current market and identifying investment bottlenecks is vital. Reinforcing maintenance and repair capacity at EU level is crucial to mitigate sabotage risks.²⁸ A thorough consultation with system owners and the marine maintenance industry should be carried out to assess current solutions and future needs. Grants or financial incentives should ensure transparent access to the resulting infrastructure. Whilst not opposing a new equity instrument, we recommend a full impact assessment of existing funds to avoid duplication and ensure compliance with EU state aid rules.²⁹

Finally, when harmonising security requirements in international fora, the focus should be on creating minimum obligations for cooperation amongst Member States on the physical security of cables, in close cooperation with NATO. This could deter potential adversaries and reduce protection costs.

²⁸ DIGITALEUROPE recognises the shortage of maintenance and repair vessels and the skilled labour needed to operate them within the EU. The primary marine maintenance arrangements – APMA (ASN), ACMA, and MECMA – are facing financial challenges in updating their ageing fleets. Building and upgrading vessels require significant time, investment and specialised skills, making it a complex issue. Maintenance and repair should be considered holistically, covering existing and planned subsea cables, EU landing locations, and both private and state-funded cables. All submarine digital infrastructure should benefit from an EU-funded fleet for maintenance and repair to support Europe’s connectivity needs.

²⁹ We note that the CEF has already funded numerous backbone cable projects, including 30 under ‘Digital Global Gateways’ and 3 under ‘Backbone networks for pan-European cloud federations,’ with a budget of €489 million until 2027. See https://hadea.ec.europa.eu/programmes/connecting-europe-facility/about/backbone-connectivity-digital-global-gateways_en and https://hadea.ec.europa.eu/programmes/connecting-europe-facility/about/backbone-networks-pan-european-cloud-federations_en, respectively.

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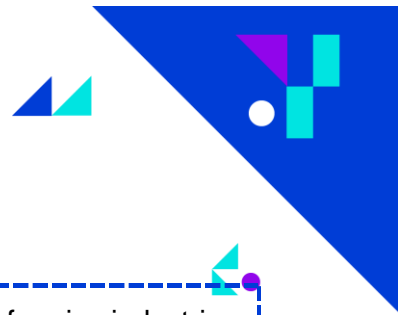
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About DIGITALEUROPE

DIGITALEUROPE is the leading trade association representing digitally transforming industries in Europe. We stand for a regulatory environment that enables European businesses and citizens to prosper from digital technologies. We wish Europe to grow, attract, and sustain the world's best digital talents and technology companies. Together with our members, we shape the industry policy positions on all relevant legislative matters and contribute to the development and implementation of relevant EU policies. Our membership represents over 45,000 businesses that operate and invest in Europe. It includes 108 corporations that are global leaders in their field of activity, as well as 41 national trade associations from across Europe.