Besvarelse fra Teleindustrien 19-05-2023

Section 1. Technological and market developments: impacts on future networks and business models for electronic communications

New generations of mobile communications will require massive investments in fibre and densification of antennas. New performance will enable critical use cases and the connection of objects. The growing requirement for strategic autonomy, security and sovereignty regarding key enabling technologies in the electronic communications area will also have a significant impact on future developments. In particular, the EU's 5G security toolbox[6] puts forward measures including restrictions on high-risk suppliers, some of which are likely to be present in existing networks and may require replacement over time.

Moreover, it is to be recalled that environmentally, information and communications technologies are an important enabler of emission reductions for many sectors in the economy, while at the same time they themselves need to make an effort to reduce their environmental footprint.

It is expected that technology will evolve towards the disaggregation of software and hardware. This is likely to offer possibilities to reconfigure most electronic communications assets, hence leading to an optimisation of the value chain. In turn, hardware facilities will be subject to increasing network shared use between market actors, not only among electronic communications operators but also involving industry sectors. In particular, network slicing will enable new market actors in the sector to operate virtual networks almost as they would operate a proprietary physical network. Overall this could lead to the future network architecture becoming more a platform type of architecture.

European critical entities are more interconnected and interdependent, which makes them stronger and more efficient but also more vulnerable in case of an incident. In this context, the Commission recently proposed a Council Recommendation on a coordinated approach by the Union to strengthen the resilience of critical infrastructure. Furthermore, to respond to the increased exposure to cyber threats due to the increasing degree of digitalisation and interconnectedness of our society and the rising number of cyber malicious activities at global level, the Commission proposed in 2020, a directive introducing updated rules on cybersecurity of network and information systems. The NIS 2 Directive[7] entered into force in January 2023. The increased cyber threat may nevertheless trigger additional needs and increased costs for strengthening the cybersecurity, and the resilience and redundancy of networks.

Network virtualisation and cloudification is expected to have a similar impact on the business model of providers of ECNs as cloud computing has produced on the IT sector, i.e. transforming a large proportion of incremental investment costs into linear operational expenses (shifting CAPEX to OPEX). In this new context, other (specialised) players are likely to concentrate on hardware infrastructure investments (similarly to cloud service platforms at the moment) while a wide diversity of other players, incumbents as well as many new entrants, are likely to address market needs in the upper layers: namely software development, virtual connectivity services, and the actual applications. Already now there are new types of operators and business models (e.g. wholesale-only, independent tower companies ("towercos"), infrastructure sharing, co-investment). New cooperation models or consolidation trends might emerge from business ecosystems. Existing providers of ECNs will likely

need or want to adapt to the new paradigm, possibly not only as connectivity providers but also as infrastructure-as-a-service provider or even innovative software provider.

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[6] Communication from the Commission to the European Parliament, the Council, the European Economic and Social Committee and the Committee of the Regions of 29 January 2020 on Secure 5G deployment in the EU - Implementing the EU toolbox, COM(2020) 50 final, 29.1.2020.
[7] Directive (EU) 2022/2555 of the European Parliament and of the Council of 14 December 2022 on measures for a high common level of cybersecurity across the Union, amending Regulation (EU) No 910/2014 and Directive (EU) 2018/1972, and repealing Directive (EU) 2016/1148 ("NIS 2 Directive"), OJ L333, 27.12.2022, p.80.

Questions

Question

1. Which technological developments do you expect will have the largest impact on the electronic communications sector in the next 10 years? [We plan to report on the top 5 developments]

Ranking Question list with 12 items.

Use drag&drop or the up/down buttons to change the order or accept the initial order.

Initial order is as follows

⠿ Network virtualisation

⠿ Open networks / network disaggregation and cloud RAN

⠿ Edge cloud

⠿ Artificial intelligence

⠿ Terahertz communications (6G)

⠿ Low orbit satellite communications

⠿ Super precise geo-location

⠿ Blockchain technology

⠿ Quantum encryption

⠿ Longer lasting battery technology

⠿ Non cellular technologies[8]

⠿ Other

Question
Please specify “Other”
100 character(s) maximum

Other

0 out of 100 characters used.

Question
Please explain your answer

It is very difficult to predict the development in the electronic communications sector and foresee which technological developments that will have the largest impact the next 10 years. Very likely, it will be a technology, that is not on the list yet.

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[8] Examples of cellular networks are the well-known 2G, 3G, 4G and 5G mobile communication networks. In addition to these networks, other, non-cellular ones, exist in which the service area is not divided in separate and distinct cells. Some examples of these technologies are Wi-Fi and DECT. These non-cellular technologies are already in use for IoT and M2M connectivity (for example LoRa and Sigfox technologies) and are expected to act as predominant enablers of IoT in the future.

Question
2. From a global/strategic perspective, which challenges and opportunities will these technological advances entail for the electronic communications sector?

Challenges:
Cybersecurity: The risk of cyber attacks and data breaches increases. Providers need to increase investments in infrastructure and security to protect networks and customers.
Rising volumes of data: Connected devices and the growth of data-intensive applications like video and gaming puts significant strain on communications networks. Providers need to invest to handle increased volumes of traffic while maintaining quality of service.
Regulation: Telecom is heavily regulated in the EU, which creates challenges for providers looking to expand into new markets and operate cross border.

Opportunities:
Quantum computing has the potential to revolutionize telecom with more secure data encryption and new applications.
Edge cloud allows for computing resources closer to the user, reducing latency and improving the performance of real-time applications
AI can help providers to better manage their networks, identify and respond to security threats, and improve customer experience.

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Question

3. What are the most urgent problems to address in terms of unleashing the full technological potential of electronic communications and what (structural) impact will the future developments identified in Q.1 have on electronic communications networks? (e.g. on the type/quality of the connectivity, on the networks' architecture/functioning, on the provision model for connectivity, other)

The most important issue is to ensure a regulatory environment that stimulates investments in the digital infrastructure to ensure the roll out of fiber and 5G. Access to broadband is critical for enabling innovation and promoting economic growth, and it is crucial that investors can see a positive business case and get a return on their investments. To ensure this, it is important to avoid excessive and burden full sector specific regulation, and ensure a clear and predictable regulatory framework on e.g. cyber security, AI and other emerging technologies. Sector specific regulation should be limited to areas where it is necessary, justified and proportionate in order to ensure a well-functioning market and at the same time ensure and promote incentives to invest in digital infrastructure.

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Question**4. What impact will the future developments identified in Q.1 have on providers of ECNs or on other infrastructure investors? (e.g. role, business models, investment efforts, transformation/development opportunities)** [Multiple answers possible]

- ☐ Answer
  Role
- ☐ Answer
  Business models
- ☐ Answer
  Investment efforts
- ☐ Answer
  Transformation/development opportunities
- ☐ Answer
  Other

QuestionPlease explain your answer

Rising demands from consumers, increasing data volumes, cyber security, and the need for continuous investments in the digital infrastructure.

Please also see the answer to Q3

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Question

6. What are your views with regard to the evolution of the energy consumption and the respective environmental footprint (notably CO2 emissions) of the main technological blocks of the future networks (copper, fibre, 5G, 6G, edge clouds, etc.), notably in terms of their operation? [Substantiate your answer as much as possible.]

The rising demand for higher capacity and data speeds will lead to a higher energy consumption in the networks.

The challenge is to minimize the energy consumption required to operate broadband networks and 5G as much as possible, to stimulate the transition to green energy, and at the same time the use of communication technology is a precondition in supporting the green transition in other sectors.

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Question

7. Digitalisation is an important enabler of green and sustainable ambition. The increased use of digital technologies is expected to reduce the environmental footprint of many sectors. At the same time, the expected increase in data traffic may increase the environmental footprint of electronic communications. In your view, what will be the overall impact on the environment? [Only one option can be selected]

- Answer
  Significantly positive
- Answer
  Moderately positive
- Answer
  Negative
- Answer
  Significantly negative
- Answer
  Do not know

QuestionPlease explain your answer, and if possible, support your answer with concrete figures and/or measurements

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Question
8. How do you expect ECNs to evolve/transform in the next 10 years and how will this evolution affect your business?
Please explain your answer

Development of strong competition in the market. Further market segmentation between infrastructure companies and service providers. Need for consolidation driven by the need to invest in new technologies and infrastructure (fiber and 5G/6G), which requires significant financial resources.

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Question
9. What are in your view the key future market developments that are likely to significantly impact the electronic communications networks, their architecture and/or their function? [We plan to report on the top 5 developments]

Ranking Question list with 5 items.
Use drag&drop or the up/down buttons to change the order or accept the initial order.
Initial order is as follows

Development of independent infrastructure management companies

Emergence of virtually integrated network management entities (virtual network operators)

Network slicing services

Private local networks

Other

QuestionPlease specify "Other"

Development of strong competition in the market. Further market segmentation between infrastructure companies and service providers. Need for consolidation driven by the need to invest in new technologies and infrastructure, which requires significant financial resources.

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QuestionPlease explain your answer

1000 character(s) maximum

0 out of 1000 characters used.

Question**10. Are there major obstacles to establish standards in relation to network access protocols and application programme interfaces (APIs) in order to support new service models and/or new network architectures?**

- Answer
  Yes
- Answer
  No

QuestionPlease explain your answer

Lack of well-functioning standards for network API. Standards for APIs and processes exists within the GSMA, TM Forum, IEEE, ETSI, BEREC et. al.. However, adherence is highly varied and immature and there is often a lack of speed and progress in developing and implement APIs with commercial potential.

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Question
11. What additional needs compared to today's baseline do you expect will be needed for strengthening cybersecurity / network resilience and the related expected costs (e.g. in terms of CAPEX, other) for the next five years, including as regards replacement of high-risk vendors? [Fill in the table and substantiate your answer as much as possible.]

Supplier management – critical infrastructure
Surveillance – intrusion detection
Real time data monitoring
Redundant solutions
Electricity back up to handle electricity brown outs / black outs

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Question

12. What are the strengths, weaknesses, opportunities, and threats ("SWOT") for the providers of electronic communications networks that shape their current and future operations?

Please describe Strengths, and explain your answer

Access to a large consumer base
Established nationwide infrastructure and network coverage
Experienced and knowledgeable workforce that understands the complexity of electronic communications networks.

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QuestionPlease describe Weaknesses, and explain your answer

High degree of regulation, which can slow down decision-making and make it difficult to quickly adapt to changing market conditions.
The need for significant capital investments to maintain and upgrade infrastructure and network capabilities.
The potential for a lack of innovation due to a focus on maintaining existing network capabilities and complying with regulation.
Highly fragmented and small players compared to all other parts of value chain due to regulatory constraints on in-market consolidation.

Differences in local legislation hindering cross-border scale opportunities and innovation

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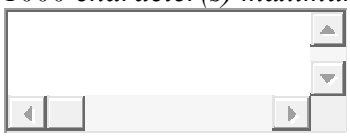

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QuestionPlease describe Opportunities, and explain your answer

Technological developments, such as 5G and the internet of things, can provide new business opportunities for providers of electronic communications networks.
The growing demand for remote work and communication due to the COVID-19 pandemic presents a significant opportunity for electronic communication providers.
The increasing demand for data and bandwidth due to the increasing use of digital solutions
Increasing demand for digital solutions supporting green transition

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QuestionPlease describe Threats, and explain your answer

Inflation and rising costs can make it difficult for providers to maintain profitability and invest in new technology and infrastructure.
Energy prices can impact operating costs and make it difficult to maintain a competitive pricing model.
The threat of cyber-attacks and data breaches is a constant concern for electronic communications providers – drives investments
Unpredictable and excessive regulation can restrict business operations and make it difficult to adapt to changing market conditions – e.g., consolidation and cross border consolidation.

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0 out of 1000 characters used.

Question
13. How could providers of electronic communications networks best adjust to the on-going and future technological and market changes and be able to better compete globally and attract investors? [We plan to report on the top 5 developments]

Ranking Question list with 7 items.
Use drag&drop or the up/down buttons to change the order or accept the initial order.
Initial order is as follows

By delayering / asset reorganisation

By entering new segments across the internet value chain

By entering into cooperation/partnerships with actors from other segments of the internet value chain

By network sharing

By implementing innovative changes to the networks architecture or function

No structural change required

Other

QuestionPlease specify "Other"

100 character(s) maximum

0 out of 100 characters used.

QuestionPlease explain your answer

Embracing technologies: To remain competitive, providers need to invest in networks and explore new technologies (5G/6G, EDGE cloud, AI, IoT ect).
Adapting to changes: Providers need to be flexible and able to adapt to changing market conditions. Monitor customer preferences and market trends.
Predictability in regulation: Providers need certainty and predictability to plan and invest in infrastructure and new technologies – improve services, competitiveness and meet demand for higher broadband speed and data volumes.
Managing costs and inflation: Providers need to review their costs and look for ways to reduce them without sacrificing quality or reliability.
Fostering Innovation: Providers need to encourage innovation, new products and services to improve efficiency and meet competition from OTT providers. Adherence to common standards will support long term innovation and competition in the market.
Consolidating Operations: Lead to improved efficiency and cost savings.

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14. What would be the barriers to achieve the needed transformations [Use the number scale to select the level for each option]

Question Legal /administrative 90

Move the slider or accept the initial position.

Lowest
Highest

50
0
100

Question Economic 100

Move the slider or accept the initial position.

Lowest
Highest

50
0
100

Question Technological 50

Move the slider or accept the initial position.

Lowest
Highest

50
0
100

Question Lack of R&D 70

Move the slider or accept the initial position.

Lowest
Highest

50
0
100

Question Other 80

Move the slider or accept the initial position.

Lowest
Highest

50
0
100

QuestionPlease specify "Other"

Innovation and unpredictability in the market and the technological development

Question
17. What will be the sources of revenues of the electronic communications sector and the ways to monetise the investments in business transformation over the next 10 years?

Please explain your answer

Private consumers: broadband, mobile services, cyber security

Business consumers: private networks/sliced networks, QoS, networks as a service, edge cloud services, cyber security, data network capacity to ensure QoS (two sided markets)
Wholesale consumers: service providers on fiber and 5G

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Question
19. What funding mechanisms do you foresee as being currently able to finance the needed extra investments?

Please explain your answer

The main source of funding will continue to be private investments. Private companies invest in building or upgrading communication networks in order to generate a return on investment. This is the most common funding mechanism for electronic communication networks.
In specific business cases private companies from other sectors (transport, industry, media, agriculture etc.) may contribute to finance the development of digital services, network capacity, security ect.

In rural areas where the digital infrastructure is not available, public-private partnerships will be relevant. This could involve government funding for infrastructure projects, tax incentives for private investment, or a combination of both.

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Question
20. Do you expect vertical industries to contribute significantly to investments in new digital infrastructures (e.g. for automated driving, manufacturing & logistics, health applications)? If so, please describe how this may develop in terms of business/cooperation models. Mention also any obstacles that may exist to the development of such forms of raising financing, and how they could be resolved.

- ○ Answer
  Yes
- ○ Answer
  No

QuestionPlease explain your answer

There is indeed a need for future investments in the digital infrastructure. New business models with investments from other sectors where there is a common interest could be relevant to explore.

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0 out of 1000 characters used.

Section 2. Fairness for consumers

Under the current regulatory framework for electronic communications, the universal service rules ensure that the public sector provides a safety net, set at the Union level, to ensure that at least the minimum electronic communications services (broadband internet access and voice communications) are available to all consumers and at an affordable price. Member States can fund these "**universal service obligations**" using public funds or by setting up a sharing mechanism between providers of electronic communications.

Universal service focuses on the **affordability** to consumers with low income or special social needs. The current rules require Member States to ensure that consumers have access at an affordable price to an available adequate broadband internet access service at a fixed location. Affordability is ensured with support to consumers or with special tariff options or packages. The adequate broadband has been defined in different Member States to correspond to different bandwidths currently up to 30 Mbps for download.

To ensure general coverage, the market has a leading role to play in ensuring the **availability** of broadband. In areas where the market would not deliver, there are Union and national funds available. Universal service is used for the availability of a connection only where neither the market nor public funds have provided a connection and following an end-user request.

According to the 2022 Digital Economy and Society Index ("DESI") report,[9] at least one broadband internet access network is **available** to all households in the EU when considering all major technologies. Coverage of next generation access ("NGA") technologies capable of delivering download speeds of at least 30 Mbps reached 90% in 2021. Fixed very high capacity networks covered 70% of EU homes in 2021. Mobile 4G coverage of populated areas reached 99.8%. Broadband coverage of rural areas remains challenging as 8.5% of households are not covered by any fixed network. The **take-up** of fixed broadband was 78% of EU households in 2021. In 2021, 87% of people used a mobile device to access the internet.

However, some consumers, in particular persons with disabilities, still face barriers to access those networks and technological developments on equal basis with others.
In relation to **affordability**, at EU level, retail prices of fixed and mobile broadband offers became cheaper than previous year among all household baskets in 2021 [10] in each usage/speed category. The price decreases varied between different baskets from around 6.4% to over 13%.

The availability and affordability of broadband to European consumers benefit a wide range of players, including providers of online content, applications and services that also benefit from the opportunities and increased demand.

However, the current economic conjuncture, the rising inflation and cost of energy for the businesses, and some of the technological and market developments indicated in the previous section are likely to lead to upwards pressure on costs for consumers at least in the short term.

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[9] Available at https://digital-strategy.ec.europa.eu/en/policies/desi.

[10] See, the 2022 Digital Economy and Society Index, Connectivity study, "Mobile and Fixed Broadband Prices in Europe 2021", available at https://digital-strategy.ec.europa.eu/en/library/mobile-and-fixed-broadband-prices-europe-2021.

Questions

Question

21. In your opinion and considering the overall economic context, is the access to broadband at an affordable price for consumers likely to evolve in the next 10 years?

	Price	Likely to increase	Likely to remain the same	Likely to
Broadband speed up to 30 Mbps				
Broadband speed between 30 and 100 Mbps				
Broadband speed 1Gbps or above				

QuestionPlease explain your answer

Broadband speeds below 30 Mbps will be less relevant in the market in the coming years.

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Question

22. In your view, has the universal service regime been an efficient and effective tool in protecting consumers with low income or special social needs? [Only one option can be selected]

- Answer Significantly
- Answer Moderately
- Answer Little
- Answer Not at all
- Answer Do not know

QuestionPlease explain your answer

The market and technological development has delivered the needed services and digital infrastructure.

1000 character(s) maximum

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Question

23. In your view, has the universal service regime been an efficient and effective tool to ensure equal access for persons with disabilities, including access to assistive equipment? [Only one option can be selected]

- Answer
  Significantly
- Answer
  Moderately
- Answer
  Little
- Answer
  Not at all
- Answer
  Do not know

QuestionPlease explain your answer

The market and technological development has delivered the needed services and digital infrastructure.

1000 character(s) maximum

0 out of 1000 characters used.

Question**24. In your view, does the universal service regime answer the future connectivity needs that should be ensured for all consumers?** [Only one option can be selected]

- Answer
  Yes
- Answer
  No
- Answer
  Do not know

Question

Please explain your answer. In case of a negative reply, please indicate which are are the possible shortcomings of the universal service regime.

The market and technological development will continue to deliver the needed services and digital infrastructure.

1000 character(s) maximum

0 out of 1000 characters used.

Question

25. In your view, what do the expected market and technological developments described in Section 1 mean for the universal service regime? [Only one option can be selected]

- Answer
  The current universal service regime should be maintained
- Answer
  The universal service regime should evolve
- Answer
  The universal service regime will not be needed
- Answer
  Do not know

Question

Please explain your response. In case of a positive reply, please indicate why the universal service should be maintained or in what ways the universal service regime should evolve? (e.g. its scope, its purpose, the contributors to its financing, the users that benefit from it, etc.)

The market and technological development will continue to deliver the needed services and digital infrastructure.

1000 character(s) maximum

0 out of 1000 characters used.

Question

26. The current source for financing the universal service in electronic communications is public general budget and/or financing from providers of electronic communications networks and services. What should be in your view the appropriate way for financing the universal service in electronic communications in the next 10 years? [Multiple options can be selected]

- Answer
  Public general budget (as currently)
- Answer
  Providers of electronic communications networks and services (as currently)
- Answer
  Widen the range of providers to include online digital players or data generators that benefit from connectivity or only a set of them
- Answer

Other ways of financing

QuestionPlease explain your answer

1000 character(s) maximum

0 out of 1000 characters used.

Question

28. Outside universal service, could other means of support to consumers to ensure their affordable access to broadband be envisaged? [Only one option can be selected]

- Answer
  Yes
- Answer
  No
- Answer
  No opinion

QuestionPlease explain your answer; if you reply yes, please explain which other means of support could be envisaged.

In rural areas where the digital infrastructure is not available, public-private partnerships will be relevant. This could involve government funding for infrastructure projects, tax incentives for private investment, or a combination of both.

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Question

29. Would a dedicated EU-wide fund be useful? [Only one option can be selected]

- Answer
  Yes, it would be useful for support to ensure that consumers have affordable access to broadband in general
- Answer
  Yes, it would be useful for support to ensure that consumers have affordable access to broadband only in specific crisis circumstances to address acute but temporary difficulties
- Answer
  Yes, it would be useful for network deployment, especially in rural areas
- Answer
  No, it would not be useful

Question

Please explain your answer; If you reply yes, please explain whether a distinction should be made between all consumers and those with low income or special social needs.

There are very different needs in different member states, and there is a clear risk that the administrative burden and cost to manage a EU-fund would be excessive.

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Question

31. From an affordability perspective, what is your view regarding the retail price cap on intra-EU communications (i.e. EUR 0.19 per minute for calls and EUR 0.06 per SMS message, both excluding VAT) introduced by an amendment to the Open Internet Regulation, and which is set to expire on 14 May 2024?

- Answer
  No need for retail price regulation in the future
- Answer
  The current retail price regulation should be extended for some years
- Answer
  The current retail price regulation should be maintained and adjusted
- Answer
  Other

QuestionPlease explain your answer

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Section 3. Barriers to the Single Market

Regulatory intervention has so far been quite successful in lifting barriers to market entry in electronic communications fixed networks. The emergence of competition after regulatory intervention made it possible to reduce the number of markets that national regulators need to assess ex-ante from 18 retail and wholesale markets in the 2003 Recommendation to two fixed wholesale markets currently identified in the 2020 Recommendation. Still, some barriers persist in the fixed markets. As regards mobile markets, the ex-ante regulation of termination markets is no longer recommended due to the introduction of single Union-wide termination rates.

Looking at on-going and future developments, such as, Machine to Machine services, internet of things (IoT) deployment, virtualisation of networks, etc., the case for a full integration of the single market for electronic communications appears to be stronger. However, despite the Commission's aim to promote the EU single market, EU electronic communications markets remain essentially national, which prevents certain economies of scale from being achieved.

Roaming policy, an important step in lowering barriers to the EU single market, reflects the existence of separate national markets by allowing "roam like at home" to address periodic travel needs. The Roaming Regulation provides for safeguards to prevent abusive or anomalous use of roaming services abroad at domestic prices (such as permanent roaming); this is because, in the absence of a full integrated telecoms single market, such practices might put at risk the financial sustainability of such calls.

In addition, radio spectrum policy is a key element to boost EU competitiveness and innovation. Without pre-empting the need for a thorough analysis of the radio spectrum market in the EU, the question emerges to what extent the potential development of a more coherent radio spectrum market in the EU as opposed to the current fragmented national radio spectrum management practices (including e.g. concerning satellite communications and vertical use cases), can lead to more favourable investment conditions. Furthermore, in the context of a challenging geopolitical climate, the question arises whether it is necessary to update the existing spectrum governance framework so as to strengthen the EU strategic autonomy and reduce precarious dependencies.

Questions

Question

32. What future developments in terms of technological developments, new applications, network architecture or functioning (or other) could further promote the development of the digital single market?

AI automate business processes, create new products/services and improve user experience
5G deliver cross border high data speeds, low latency, and increased capacity
Fiber faster and more reliable internet connections – cross border business
Cloud scalable and cost-effective computing resources, SaaS, PaaS and IaaS
IoT new services, valuable data insights for business, help improve their operations and create new revenue streams
Adherence to common standards can help ensure compatibility between products and services, seamless communication and interoperability. A common regulatory framework provides a level playing field

across EU, ensuring competition and protecting consumers. With interoperability systems and devices can communicate with each other, enabling the full potential of digital single market to be realized. Regulation should be limited to where it is necessary, justified and proportionate to ensure a well-functioning market and at the same time promote incentives to invest in digital infrastructure

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Question

33. In your view, are there obstacles to the full integration of the single market for electronic communications? If so, please explain what, from your point of view those obstacles are (do they relate to the rules governing the general authorisation, the application of the country of origin/country of destination principle with respect to supervisory rules, the bodies in charge of monitoring and enforcement, etc.)? If you consider no obstacles to the full integration of the single market exist, what would be in your view the reasons why providers of ECNs generally do not offer their services EU-wide?

Variation in regulation/standardization: Despite the effort to create harmonized regulation there are still variation across the EU, variation in standardization and need for interoperability e.g. the rules governing the provision of communication services, licensing, spectrum allocation, and network access. Variation in regulation can create obstacles to the creation of a level playing field for electronic communications providers across the EU. Adherence to common standards and the EU regulatory framework can help ensure compatibility between different products and services
Furthermore, there are different market situations and variation in costs for roll-out
Different spectrum regulation: The allocation and regulation of spectrum for electronic communications vary across EU, with different member states using different spectrum bands for different purposes. This is a challenges for providers who operate cross border, as they may need to comply with different spectrum regulations in each country.

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Question

34. Are there identifiable/expected cost savings or other efficiencies that could arise from the EU-wide deployment of infrastructure and/or provision of services by providers of ECNs? If so, please describe the type/category of cost savings (e.g. in terms of network management, service provision, regulatory cost savings, administrative burdens, etc.).

[Fill in the table and substantiate your answer as much as possible.]

QuestionPlease explain your answer and provide a quantification, if possible.

Consolidation in the market can lead to greater economies of scale, which means that companies can produce and distribute goods or services more efficiently. This can lead to lower costs, better quality, and faster delivery times, which will benefit consumers.

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Question

35. In your view, do obstacles exist to cross-border consolidation of electronic communications providers in the EU? If you consider that obstacles exist, please describe the type/category of obstacles and indicate what steps/actions could be taken to remove these. What opportunities for cost savings could result from cross-border consolidation if those obstacles were removed?

There are different obstacles to cross border consolidation; including differences in national regulation, different market situations and different technical barriers (spectrum). Please also see the answer to Q33.

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Question

36. In your view, could there be benefits from a (more) integrated radio spectrum market in the EU? If yes, please explain what those benefits would be and, as far as possible, quantify those benefits. What steps/actions could be taken to promote a more integrated radio spectrum market in the EU?

A more integrated radio spectrum market in the EU would make it easier to deploy cross border services. Further harmonization across the EU regarding spectrum allocation would be a benefit for operators. However it is still preferred by operators, that the specific allocation of spectrum is handled on a national level in order to avoid further administrative costs at EU level and taking the different national challenges and different market situations into consideration.

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0 out of 1000 characters used.

Question

37. In your view and without prejudging any policy direction, what would be the added value, risk and cost of implementing a common EU-level licensing/authorisation scheme for spectrum use in well justified cases (e.g. cross-border reach of infrastructure/service, significant added value of an EU joint authorisation scheme compared to individual Member State authorisations)? Please indicate the areas in which such a scheme would be most useful (e.g. in cases of satellite communications and/or vertical use cases).

Common EU-level licensing cross-border in nature would be justified in situations where the use of the service is i.a. in aircrafts and vessels. The decision should be taken on a case-by-case basis.

1000 character(s) maximum

0 out of 1000 characters used.

Question

38. Do you consider the participation of non-EU countries or entities in technical preparatory work for EU decisions on spectrum harmonisation or international negotiation matters on spectrum (such as e.g. within the European Conference of Postal and Telecommunications Administrations (CEPT)) as a potential issue of concern for EU sovereignty, resilience or security? If yes, to what extent is it a concern? Please indicate what institutional structures or mechanisms would be best suited to allow the EU to monitor spectrum policy matters in international organisations, and to undertake the technical preparations concerning the Union's decision-making process including before and during international negotiations concerning spectrum policy matters?

No. There is support to the existing system and CEPT.

1000 character(s) maximum

0 out of 1000 characters used.

Question

39. In your view, what would be the added value, risk and cost of addressing cases of radio frequency interference in EU Member States from third countries (notably those that may potentially have serious effects on more than one Member State) only at EU level (i.e. whereby the EU acts in unity) instead of at the level of each affected Member State (acting individually)?

The present system is fine.

1000 character(s) maximum

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Section 4. Fair contribution by all digital players

The amount of data exchanged – and harvested – is larger than ever and will increase, as the global consumer internet traffic has grown with 34.4 % CAGR since 2015.[11] The metaverses and virtual worlds, the rapid move towards cloud, the use of innovative technologies online are making this even more evident. However, there also seems to be a paradox between increasing volumes of data on the infrastructures and alleged decreasing returns and appetite to invest in network infrastructure. Some electronic communications operators, notably the incumbents, call for the need to establish rules to oblige those content and application providers ("CAPs") or digital players in general who generate enormous volumes of traffic to contribute to the electronic communications network deployment costs. In their view, such contribution would be "fair" as those CAPs and digital players would take advantage of the high-quality networks but would not bear the cost of their roll-out.

Conversely, CAPs and other digital players argue that any payments for accessing networks to deliver content or for the amount of traffic transmitted would not only be unjustified, as the traffic is requested by end-users and costs are not necessarily traffic sensitive (notably in fixed networks), but would also endanger the way the internet works and likely breach net neutrality rules.

Other stakeholders caution against rushed regulatory intervention. Some stakeholders argue that an accurate management of data traffic could have a positive impact on the environmental footprint of data traffic. This discussion has to be seen also in light of the European Declaration on Digital Rights and Principles,[12] which includes a statement according to which all market actors benefiting from the digital transformation should assume their social responsibilities and make a fair and proportionate contribution to the costs of public goods, services and infrastructures, for the benefit of all people living in the EU. In the European Declaration on Digital Rights and Principles, emphasis is also put on the protection of a neutral and open internet where content, services, and applications are not unjustifiably blocked or degraded, which is already enshrined in the Open Internet Access Regulation.

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[11] GSMA: The Internet Value Chain 2022 – May 2022.
[12] Chapter II, 2(c) of the European Declaration on Digital Rights and Principles for the Digital Decade, available online at: https://ec.europa.eu/newsroom/dae/redirection/document/92399.

Questions

Question

40. Quantify (in EUR million), as in the format below, your direct investments in network infrastructure and/or other digital infrastructure capable of optimizing network traffic within or relevant for the EU Member States for every year between 2017 and 2021. Please provide separate figures for each infrastructure category, both in absolute terms and as percentage of the revenues generated within the EU each year (here "network infrastructure" is to be understood in broad terms, e.g. at several different network layers, core, distribution and access network, including even undersea cables; "other digital infrastructure" is also to be interpreted broadly, e.g.

hosting, data transport, data centres, CDNs, etc.)

Question

Total direct investment in network infrastructure and/or other digital infrastructure made in 2021 capable of optimizing network traffic in EUR million within or relevant for the EU Member States.

million EUR

Question

In 2021, as a percentage to the revenues generated within EU Member States:

- Answer 0-5%
- Answer 6-10%
- Answer 11-15%
- Answer 16-20%
- Answer Over 20%

QuestionPlease explain your answer

The telecom industry i Denmark invested in total more than 1.400 million EUR in the digital infrastructure in Denmark – primarily in fiber and 5G. This is 24 pct. of the total revenue generated in the telecom sector in 2021.

1000 character(s) maximum

0 out of 1000 characters used.

Question

41. What are your total planned future investments in network infrastructure and/or other digital infrastructure capable of optimizing network traffic from today until 2030 within or relevant for the EU Member States? Please specify both in absolute terms (in EUR million) as well as percentage increase compared to previous years.

Total direct investment in network infrastructure in million EUR within or relevant for the EU Member States in 2022

EUR million 1.400 EUR [expected for the whole telecom sector]

Question

Planned future total direct investment in network infrastructure in million EUR within or relevant for the EU Member States in 2023

million EUR 1.400 EUR [expected for the whole telecom sector]

Question

In 2023, as a percentage to the revenues generated within EU Member States:

- Answer
  0-5%
- Answer
  6-10%
- Answer
  11-15%
- Answer
  16-20%
- Answer
  Over 20%

Question

Please explain your answer, and upload proof of data justifying it (e.g. official presentations to financial investors, board of directors, etc.)

Prediction based on historical economic statistical data for the Danish Telecom Sector https://sdfi.dk/Media/637937424394797907/Faktaark_Datagrundlag%20og%20Definitioner%20-%20'%C3%98konomiske%20N%C3%B8gletal%20for%20Telebranchen%20-%202021'.xlsx

Question

45. In your view, what is the future outlook in terms of annual peak time traffic growth until 2030?

- Answer
  No change
- Answer
  Compound Annual Growth Rate (CAGR) up to 10 %
- Answer
  CAGR 11-20 %
- Answer
  CAGR 21-30 %
- Answer
  CAGR 31-40 %
- Answer
  Over 40% CAGR

QuestionPlease explain your answer

Over a five-year period from 2018 to 2022 the total amount of data traffic in fixed networks in Denmark have grown 110 pct. The average yearly growth rate for data traffic in fixed networks in Denmark over the past five years is 21 pct.

Over a five-year period from 2018 to 2022 the total amount of data traffic in mobile networks in Denmark have grown 175 pct. The average yearly growth rate for data traffic in mobile networks in Denmark over the past five years is 29 pct.

The growing volumes of data traffic in networks leds to a growing need for investments in capacity in the networks – especially in backbone networks.

Source: telecom statistics https://sdfi.dk/digital-infrastruktur/tal-paa-teleomraadet

Question

52. Are there any obstacles preventing providers of ECNs from charging digital players for increased data traffic through their networks? [Only one option can be selected]

- Answer
  No
- Answer
  Yes
- Answer
  I do not know

QuestionPlease explain your answer. In particular, if you reply is yes, please explain the reasons (e.g. legal, regulatory, other)

In an EU context, there may be several obstacles preventing ECN providers from charging large digital players (LTG) for data traffic through networks, especially when dealing with digital players with SMP. ECN providers have reduced bargaining power towards large digital players, and it will have significant consequences if content from large digital providers is not available in the networks
Asymmetry in traffic can be a large challenge for providers since they must invest in expanding network capacity to accommodate the increased traffic demands from consumers and large digital players without receiving cost coverage. This can result in a financial burden for the ECN providers
Furthermore, large digital players may lack incentives to reduce traffic volumes (compression) and/or distribute data effectively if increase in traffic has no economic consequences. This will potentially lead to excessive congestion of data and increase the need for further investments in capacity in the network infrastructure

1000 character(s) maximum

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Question

53. What could be the effect on the environmental footprint of the services provided over electronic communications networks of a potential mechanism whereby the largest generators of traffic would contribute to network deployment, and/or would be subject to obligations regarding data delivery mode?

If data could be distributed in effective ways in cooperation between large content providers and providers of electronic communications networks it would reduce the costs and energy consumption, and as such reduce the environmental footprint of the services.

Please explain your answer

1000 character(s) maximum

0 out of 1000 characters used.

Question

54. The European Declaration on Digital Rights and Principles states that all digital players benefiting from the digital transformation should contribute in a fair and proportionate manner to the costs of public goods, services and infrastructures to the benefit of all people living in the EU. Some stakeholders have suggested a mandatory mechanism of direct payments from CAPs/LTGs to contribute to finance network deployment. Do you support such suggestion and if so why? If no, why not? [Only one option can be selected]

- Answer
  No
- Answer
  Yes
- Answer
  I do not know

QuestionPlease explain your answer

Peering agreements are typically established between providers that have a roughly equal amount of traffic flowing between their networks. However, in the relation between large content providers (large traffic generators) and providers of electronic communications networks, the exchange of traffic is asymmetric.

It is therefore important, that agreements between large content providers and providers of electronic communications networks are negotiated commercially in order to agree on peering and ensure that data is distributed and exchanged in the most effective ways.

The basic principle should be, that potential payment/remuneration for the exchange of traffic between the parties is based on commercial negotiated agreements, and it might be relevant and justified that the parties are obliged to enter into such negotiations. If the parties are not able to agree on the terms on how to exchange traffic, some kind of arbitration mechanism could be considered.

Regenerate response

1000 character(s) maximum

0 out of 1000 characters used.

Question

58. Do you see any possible risks of a contribution to finance network deployment in the form of direct payments and if so, which? Please substantiate your answer, including with data.

Ranking Question list with 7 items.

Use drag&drop or the up/down buttons to change the order or accept the initial order.

Initial order is as follows

⠿ Negative effects on the incentives for innovation

⠿ Sustainability within the internet ecosystem

⠿ Negative consequences for consumers

⠿ Negative consequences on medium/small traffic generators

⠿ Negative consequences on the competition between large and small providers of ECNs

⠿ Other

⠿ I do not know

QuestionPlease specify “Other”

Please see the answer to Q54.

100 character(s) maximum

0 out of 100 characters used.

QuestionPlease explain yur answer

1000 character(s) maximum

0 out of 1000 characters used.

Question

59. What mitigating measures could be put in place to avoid the risks indicated in Q58? [Multiple answers are possible]

- ☐ Answer
  Excluding medium/small traffic generators
- ☐ Answer
  Mandatory ratio into green (lower energy consumption) investment
- ☐ Answer
  Other
- ☐ Answer
  I do not know

QuestionPlease explain your answer

Please see the answer to Q54.

1000 character(s) maximum

0 out of 1000 characters used.

Question

60. The European Declaration on Digital Rights and Principles states that all digital players benefiting from the digital transformation should contribute in a fair and proportionate manner to the costs of public goods, services and infrastructures to the benefit of all people living in the EU. To achieve this, some stakeholders have suggested to introduce a mechanism consisting of a EU/national digital contribution or fund. Do you support such suggestion and if so why? If not, why not? [Only one option can be selected]

- ○ Answer
  No
- ○ Answer

Yes

Answer

I do not know

QuestionPlease explain your answer

Please see the answer to Q54.