

**BEREC Report on the outcome of the Public
consultation on the draft BEREC Report on
challenges and benefits of impact of Artificial
Intelligence (AI) solutions in the
telecommunications sector (including use
cases)**

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Executive Summary

During its 53th Plenary Meeting (8-9 December 2022) BEREC approved for public consultation the draft BEREC Report on challenges and benefits of impact of Artificial Intelligence (AI) solutions in the telecommunications sector (including use cases). The role of the public consultation is to increase transparency and to provide BEREC with valuable feedback from all interested parties.

In accordance with BEREC's policy on public consultations, the current report is a summary of how stakeholders' views have been considered. In addition, BEREC also publishes all individual contributions on its website, taking into account stakeholders' requests for confidentiality. The public consultation was open until 03 February 2023.

This document summarises the responses received to the public consultation and presents BEREC's position with regard to suggestions and proposals put forward in those responses, as relevant. In total 3 responses were received (GSMA-ETNO, Microsoft and Ericsson), none of them considered as confidential based on the request of the respective respondents. The contributions received within the consultation procedure have been published on the BEREC website.

1. General Comments

The **GSMA and ETNO** welcome the publication of the BEREC report on the impact of AI solutions in the telecommunications sector. GSMA and ETNO support the ambition to ensure the development of human-centric AI systems in Europe and agree that these developments are promising for the sector, particularly regarding network planning, traffic management, resilience, security and upgrades to fraud detection and prevention.

Microsoft notes the AI-enabled resource allocation potential to improve the sustainability of 5G and BeyondG services, which will be increasingly important as users and IoT devices increase.

Microsoft believes that AI solutions can be best delivered through the cloud to enable CSPs to automate network operations and service assurance, cutting costs, increasing agility and boosting subscriber experience. For instance, integration of AI/ML into ORAN deployments should be strongly encouraged for large scale networks. For smaller providers, AI as a service will be a viable option that should be considered.

Microsoft notes that AI is also being worked on in the standards for 6G, with some work being done in 5G as well, specifically to enhance the existing air-interface and network functions. 6G will be AI native, meaning that it will provide the integration of AI from the get to, will be integrated in the design of all network components, including the radio layers, and interfacing with data collection frameworks, enabling all the benefits described above. According to Microsoft, other Service Providers benefits that should be considered are customer lifetime

value, churn prevention, predicting customer experience, detecting fraud, service fulfilment and revenue management.

Microsoft considers that BEREC can play a critical role in encouraging a greater uptake of AI-applications across the telecommunications sector, in a way that addresses the challenges and multiplies the benefits that AI systems can offer.

Ericsson welcomes the BEREC report on Artificial Intelligence as the report tries quite well to cover a very complex topic, the challenges, opportunities and use cases.

BEREC's response:

The respondents share BEREC's views on the importance of AI for the telecommunications sector and its potential benefits, like the AI-enabled resource allocation potential to improve the sustainability of 5G and BeyondG services. Along with the identified challenges related to the use of AI, BEREC recognises the need to keep monitoring the developments of the use of AI. Although the technology is not in its infancy, rapid developments are to be expected in the coming years.

Current work in the BEREC work programme will indirectly touch upon AI, as it is strongly interrelated with i.a. cloudification and IoT. BEREC has commissioned a study on trends and policy/regulatory challenges of cloudification, virtualisation and softwarisation in telecommunication. The report is expected by the end of 2023. Related to that, BEREC is also conducting a report on cloud services and edge computing. Finally, having in mind the relation with 6G and AI, BEREC will organise a workshop on IoT in the third quarter of 2023.

2. Legal Framework

The **GSMA and ETNO** note that BEREC's report observes that co-legislators are currently debating the inclusion of critical digital infrastructure (or some formulation thereof) in the final text but notes that this issue is not within the scope of the present report. As such GSMA and ETNO will not present further arguments in the context of this report but claims that the information in BEREC's report could be very helpful to its members as further evidence of how its' members are using AI and why they believe these systems should not as a rule be categorised as high risk under the AI Act.

The **GSMA and ETNO** believe that before considering any regulatory intervention, it should also be considered that AI tools in the telecommunication sector are already fully covered by the provisions of the sectoral regulations especially concerning security and integrity of networks and that the AI Act will also apply. Moreover, AI system may not be fully in the control of telecommunications providers as they may be embedded in the network hardware, as stated in the report. Finally, the processes that frame the exploitation of AI tools in the telecom sector very often include operational interventions under human supervision. In further

releases of BEREC's report GSMA and ETNO suggest including processes before suggesting any specific policy intervention.

Microsoft welcomes BEREC's approach in developing a report that builds on the EU's Artificial Intelligence Act (AIA), ensuring that AI systems are in line with EU law and provide legal certainty to facilitate investment and innovation in AI. Microsoft also welcomes Europe's proposed AI Act and share BEREC's goal to ensure that the vast potential of AI in the telco sector can be realized by all in ways that are safe, respectful of fundamental rights, and aligned with European values.

Microsoft raises caution about the proposed addition of "digital infrastructure" to Annex III of the AI Act which could overlap with existing resilience obligations in the digital and telecommunications area and thereby create legal confusion potentially discouraging digital infrastructure providers from using AI systems that may in fact make their infrastructure more, rather than less, resilient. Microsoft believes it is critical that the right guardrails accompany the development and deployment of AI, and that Europe continues to foster AI driven innovation. In that sense, Microsoft believes BEREC can play a critical role in encouraging a greater uptake of AI-applications across the telecommunications sector, in a way that addresses the challenges and multiplies the benefits that AI systems can offer.

According to **GSMA and ETNO** the report acknowledges that the definition of artificial intelligence remains under decision by legislators and therefore subject to change. However, GSMA and ETNO suggest updating the AI definition in this report to the current working definition, which is significantly different from the original one currently copied in the report. GSMA and ETNO appreciate the disclaimer in the report about the original definition, but think it is better to update this, whilst maintaining the disclaimer.

Ericsson notes that digital infrastructure is indeed essential for the functioning of a modern society. That does not, however, mean that all AI systems used in networks are "high-risk" (for safety and fundamental rights). Simplified, the 5G infrastructure could be described as a "bit-pipe". The infrastructure cannot on its own pose a risk to fundamental rights or safety. Ericsson thinks that any potential risks to safety or fundamental rights would derive from the applications. And these applications are already classified as 'high-risk' in the proposed Regulation. AI is just another technology in this context.

BEREC's response

BEREC takes note of the comments received regarding the AI Act. As explained in the report, BEREC acknowledges the importance of the AI Act and the debates around the definition and classification of AI systems. Nevertheless, BEREC does not aim to take a position on the definition of AI with this report.

The report highlights the fact that, at the moment of drafting it, the legal text had not been finalized and the definitions are subject to amendments by the co-legislators. The report is sufficiently clear on this point and there is no room for misunderstandings.

3. Artificial Intelligence risks

Liability in case of error and vendor/telecommunication providers relations

The **GSMA and ETNO** note that it is important that users can effectively assess the compliance, complexity and fairness of an AI Model provided by an external vendor. In the current situation there is a risk that this assessment cannot take place in good order. For example, AI systems cannot be tested properly by the user before deployment when a release calendar is not in control of the user and new updates are pushed by the vendor.

Furthermore, **GSMA and ETNO** add that there is a general concern that due to possible asymmetrical relations between vendors and users, users are dependent on the willingness of vendors to provide insights in the inner workings of a model. This is however needed for an effective risk assessment. This of course can possibly result in liability discussions.

Ericsson states that all systems can fail, regardless if AI is used or not. The impact of system failure is handled for all critical parts using failover mechanism, graceful restart, geo-redundancy and other mechanisms. This is not a question of AI, but of design and test of robustness and resilience of all networks.

According to **Ericsson** AI is just another piece of software. What differentiates it from traditional programming is the fact that it is driven by data. It is important that correct safety mechanisms are introduced when using this software in critical environments (like live networks), as in the case of any other type of software used for the same task. Ericsson notes that there are network safety fallback mechanisms that the machine-learning system will use in case of undesired behaviour. These mechanisms are usually put in place when dealing with a 'critical' system. This practically means that whenever the AI algorithm is unsure of the action it deploys, it uses some hard-coded rules on how to behave.

Ericsson notes that simulated and emulated environments to test potentially unsafe actions of the system before any AI is used in the network. This way Ericsson is able to test a potentially unsafe action in a digital representation of the network, rather than the actual network and according to the results deploy it, or not, to the live network. Human oversight is another mechanism that reduces uncertainties with AI systems. In short, the AI system escalates critical decision points to humans to make sure no risk behaviour is allowed. Negligible decision points are allowed to be automated.

Ericsson notes that the nature of healthy competitive forces is that they drive market players to develop different products with the objective of attracting customers. In that sense, Ericsson has not yet seen proof of vendor lock-in as such.

According to **Ericsson** its AI systems used for managing the networks are vendor agnostic and work independent of the vendor used. The AI systems offered by Ericsson work as fine

tuning pieces on top of the network. Furthermore, in the radio-units where AI is embedded, the AI applications (rApps) are meant to work as an open platform for external parties. They can be used in any network - the network of Ericsson's competitors or Ericsson's own. Customers have a choice and can choose Ericsson or another network equipment manufacturer based on their needs, performance of the equipment, their strategy and costs to name a few. Much like any other customer service provider, they can swap equipment and choose at any point to go with another – the nature of competitive market forces.

Ericsson believes that ownership of the model and all other relevant elements (how the data is used for example) relating to the product are negotiated through commercial agreements based on market economics. Currently Ericsson does not see any market failures or risk thus far or potentially in the future. Hence, issues around ownership are more appropriately dealt with in the realm of business agreements and contracting, thus making it less in scope of any regulatory initiatives.

Ericsson trains its AI products on information from the particular network in question and “tune” the model before each new application in a novel network. This is done in collaboration with Ericsson's customers because every network operator they work with has different KPIs, requirements and level of AI integration which they need to meet. As such no two networks are alike and require this AI “tuning” from Ericsson to deliver efficient, effective and relevant results for each specific case. The amount of sensitive data carried over from one network to another when using the same trained model therefore seems limited.

Availability of unbiased and reliable data

The **GSMA and ETNO** note that the report describes situations where stakeholders other than traditional operators may be involved in networks roll-out explaining that for example in the case of fiber optics networks roll-out municipalities may benefit of having access to telecom operators' data and models to achieve similar savings. The AI report also considers the sharing of data with other telecommunication providers as a remedy for the lack of access to sufficient amounts of reliable data in relation to the use case 'Networks and Capacity Planning and Upgrades'. AI tools are very specific and can only act in the environment in which they have been trained. The GSMA and ETNO recommend to further assess the efficacy of such a measure before any regulatory intervention.

Regarding data availability, **Microsoft** recommends the use of data collection and management systems that enable the effective gathering, processing, and analysis of network data. In the United States, Microsoft is currently discussing this issue within its FCC work with CSRIC, to see if the service providers could share the information in such a way that no privacy or competitive issues are raised.

To address challenges related to computational capacity, **Microsoft** believes cloud-based AI-solutions may reduce intensity and the number of computational capabilities.

Ericsson notes that BEREC's report does not elaborate on how to validate the data handled by the model. Ericsson points to the existing ways of actually validating the data.

Privacy

In addressing data privacy and security concerns, **Microsoft** believes that the implementation of privacy-enhancing technologies and data protection policies, as well as the use of secure, encrypted data storage and transmission systems, will be critical in addressing these concerns.

Other challenges

The report observes that the development and deployment of AI systems is very resource intensive if not properly managed. As responsible operators, the **GSMA and ETNO** members will rely only upon those AI technologies that really contribute to reduce the cost of deployments and carbon emissions and we understand the need to monitor AI resources intensiveness. Therefore, GSMA and ETNO do not see need for a regulatory intervention as inefficient tools do not have an economic rationale.

BEREC's response

BEREC welcomes the comments received on the aspects described in the Report about the benefits and challenges related to AI systems. In the draft Report, BEREC identifies the undetected data bias, the lack of reliable data and liability of stakeholders as the main areas of concern for market experts regarding AI technology applied to telecommunication networks. Although at this point in time AI benefits seem to overtake the impact of those risks, the growing variety of use cases where AI can be applied motivates the monitoring and further knowledge of the mechanisms and operation of AI-based systems by NRAs.

BEREC acknowledges that the AI ecosystem is complex and relies on a multitude of stakeholders beyond traditional ECN/S providers, as noted by some stakeholders. As pointed out in the draft Report, AI systems may or may not be fully under the control of ECN/S providers. The varying degrees of control which stakeholders at different parts of the value chain may have and the competitive dynamics between different parts of this ecosystem are not part of the scope of this draft Report. Nevertheless, BEREC notices the different perspectives shown by the respondents and appreciates the detailed comments received on this subject and that the report offers a platform for the dialogue between different stakeholders.

BEREC agrees with the importance of testing, especially in the context of complex, large-scale systems such as telecommunications networks, and that the use of digital twins could offer a suitable environment for simulations. In this sense, the development of digital twin simulations

of the changes triggered by AI in the networks was also mentioned by survey respondents as a future challenge for the full adoption of AI in the operational procedures of every CSP.

As pointed out by one of the respondents, it may be necessary to assess the efficacy of data sharing practices in relation to AI systems prior to any regulatory intervention. While this comment was related particularly to the potential of supporting alternative and community networks in rural areas, BEREC will continue its engagement with the role of data in the digital sector, for instance in the scope of its work on the Data Act. As explained by another respondent, cloud services can play a significant role in the management of data within the context of AI systems. BEREC is actively engaging with these issues and fully agrees with the stakeholders' comments underlining the wider importance and the interrelations between these topics.

BEREC welcomes the comments received by stakeholders regarding the responsible use of AI systems in particular as regards the environment. These comments are vital as they point to the availability of data on the environmental impact of AI systems in the telecommunications sector, and BEREC invites stakeholders to provide more details on these aspects in its ongoing work related to environmental sustainability, for instance related to its draft Report on Sustainability Indicators for Electronic Communications Networks and Services.

Furthermore, acknowledging that the topic is much broader than the six use cases discussed in the Report, BEREC encourages stakeholders to provide additional insights on their experience with the adoption and implementation of AI-based solutions. In BEREC's view, comments from stakeholders which provide or benefit from different AI solutions are particularly useful for assessing the impact of AI across the digital ecosystem, including the changes it brings about in the operativity of ECN/ECS.

4. Selected Artificial Intelligence Use Case Areas

The **GSMA and ETNO** consider that the six use cases described in the report are well chosen, pertinent and specific to the telecoms sector. What is evident from this overview is the fundamentally low risk nature of the use cases at hand, whereby network operators are not deploying AI in a manner which executes or influences decision making in a manner likely to impinge on the fundamental rights of EU citizens or undermine their safety or wellbeing.

According to **GSMA and ETNO** the use cases outlined in the report primarily deal with the optimisation of network performance which reflects the current situation. In these cases, there is no risk for users' safety nor for fundamental rights, as operators validate overall networks QoS parameters without impacts on users' privacy and often relying on embedded solutions, therefore not having an active role.

Microsoft believes that in addition to the six uses cases, AI/ML will play an important role in improving reliability. AI can dramatically speed up and increase the efficiency of returning lost coverage to subscribers by drawing from surrounding cells, proven to be useful on a daily

basis and in response to unexpected situations such as natural disasters. Similar benefits can be obtained through AI-enabled dynamic spectrum sharing; channel modelling, prediction and propagation; and reducing service failures.

Microsoft notes that AI can be used to improve the performance, and efficiency of networks by performing various functions such as network optimization, predictive maintenance, traffic management, self-healing networks, and resource allocation. Network optimization uses AI to analyse network data and make real-time adjustments to parameters, resulting in better performance. Predictive maintenance utilizes AI to predict equipment failures, allowing for proactive maintenance and reducing downtime. Traffic management with AI dynamically manages network traffic, giving priority to critical services. AI enables self-healing networks by detecting and correcting problems before they cause interruptions. Lastly, resource allocation is optimized with AI, leading to improved network capacity and lower cost of upgrades.

BEREC's response:

BEREC notes that the responses received confirm the relevance of the case uses selected in the report and welcomes additional suggestions of other use cases for the provision of ECN/S enabled by AI or where AI play a relevant role or may play it in the future. The report has been amended to acknowledge these additional use cases.

BEREC has not assessed the nature of risk of AI applications nor their relationship with the AI categorization of the AI systems. Therefore, there is no indication in the report (neither in favour, nor against) regarding the classification of the described use cases as low risk.

Dynamic Spectrum Sharing

The **GSMA and ETNO** believe that it is important to consider the realistic services, use cases, their demands for spectrum, and sharing approaches that are feasible for them. While GSMA and ETNO agree that various technical components are needed to enable more efficient spectrum use and sharing, GSMA and ETNO do not agree with the BEREC conclusion on “the realization of dynamic spectrum access with cognitive radio largely depends on the willingness of the regulators to open the spectrum for unlicensed access”.

The GSMA and ETNO highlight that mobile operators already have implemented various spectrum sharing approaches and are continuously looking for possibilities to use the scarce resources efficiently. Dynamic Spectrum Sharing (DSS) feature is in use for 4G/5G in-band sharing, for providing both 4G and 5G services in the same frequency band based on the actual traffic demand. In addition, network sharing between operators, various roaming agreements, MVNOs, and network slicing are also about sharing spectrum and network resources and using them more efficiently.

Microsoft agrees with BEREC that AI techniques are a well-suited technology to foster a more dynamic approach to spectrum management that will be necessary to meet future demand in shared bands.

BEREC's response:

BEREC takes note of already existing market practices regarding spectrum sharing that seek to increase efficiency usage and will include them in the report.

BEREC also welcomes that Microsoft agrees on the importance of AI to foster a more dynamic approach to spectrum management.

Fraud Detection and Prevention

Microsoft predicts that AI solutions for security optimization, threat detection, and fraud detection and prevention will bring great value to the consumer. The telecommunication sector is undergoing rapid digital transformation. More than ever, operators are seeking to deploy high-quality, cost-minded networks without sacrificing security and resilience to protect critical infrastructure. Today's communication networks need to adapt to architectures based on new security principles and capabilities, involving a model of shared responsibility. This is a consequence of increasing network complexity (e.g., 5G Edge sites) leading to a broader attack surface and undermining traditional "Hard Shell" principles in favor of a modern Zero Trust security strategy. As network complexity grows, this will require more AI security capabilities to defend critical components of telecommunications.

BEREC's response:

BEREC fully shares Microsoft views regarding the increased complexity of the networks and emerging security threats. BEREC also agrees with Microsoft that AI solutions, together with other security measures, seem promising to tackle those risks.