An Coimisiún um
Rialáil Cumarsáide
Commission for
Communications Regulation

ComReg response to the Research and Innovation Strategy Consultation by the Department of the Environment, Climate and Communications

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Question 1: What gaps do you see in the Department's current research and innovation activities? How should we address those gaps in the Department Research and Innovation Strategy?

As indicated in the consultation paper, the Department and its agencies have facilitated a considerable amount of both technological and policy-focused research on the energy and environment sector. Other public bodies such as Science Foundation Ireland also provide a great deal of support to research and innovation on science and engineering aspects of the Department's areas of interest, including communications topics.

In contrast, there are fewer national sources of funding for policy-focused research on communications. This stands out as an area where the Department has a key role to play both in identifying policy-relevant research needs and funding research and innovation activities. The Department's joint research programme with ESRI, co-funded by ComReg, provides one model for research of this kind. It might also be worth considering the introduction of open research calls on policy-relevant communications topics, with a view to developing a more extensive communications policy research and innovation ecosystem akin to the one that has emerged for energy and environment.

A further area where the Department is uniquely well suited to coordinate and stimulate research and innovation is where interactions arise among sectors under its remit and other related sectors. To give a few examples, energy efficiency measures for telecoms networks, the role of telecoms in supporting the energy transition to low carbon technologies and the demands that will be placed on telecoms networks by innovative transport solutions might fall under this heading. This sort of research and innovation might benefit from cooperative arrangements with other departments and agencies such as joint sponsorship and co-funding of research.

Question 3: Are there specific thematic areas relevant to the Department's remit which you would like to see more research and innovation activity in? How can this be achieved?

Climate policy and telecoms

ComReg's report Climate Change and its Effect on Network Resilience published in 2022 considers climate change and its effect on the resilience of telecoms networks and highlights areas for further improvement. This report presents long-term climate projections and associated risks to the communications sector.

Currently there is no specific legislative remit for the oversight of the implementation of climate change related activities by private telecom operators, nor are there powers in place to obtain environmental information regarding environmental impact of telecom operators. This could be an area for DECC to explore if recommended by the appropriate environmental bodies (EPA/CCAC).

Broadband non-adoption, digital divide and effects of the copper switch-off

The benefits of broadband and digital applications to the economy and society depend not only on availability of network services but on how widely and deeply these technologies are adopted by consumers and firms. Moreover, research shows that the economic impact of broadband is mediated by how well users are prepared to absorb these innovations, in the form of education and skills. As Ireland extends the geographical coverage and qualitative capabilities of its high-speed broadband and mobile data networks, finding creative ways to engage digital non-adopters and socioeconomic groups that find themselves excluded from using advanced services due to economic barriers or lack of skills will become relatively more important as a way to ensure that these technologies provide the maximum benefits to Ireland.

Some consumers may also face challenges as traditional services are replaced by higher quality alternatives. Because addressing these challenges may involve a range of policy instruments and parts of government, the Department may need to assist research and innovation activities in such cases. To illustrate this issue, we focus on the upcoming copper switch-off. This will involve mandatory changes to access infrastructure and services for a group of consumers who are not actively interested in upgrading to high-speed broadband services. These consumers have a varied set of reasons for not switching to higher quality service: e.g., use of incompatible legacy services/devices; low ability or willingness to pay for higher quality service; resistance to engineer visits; limited digital skills; lower than average demand for broadband applications or simple inertia. We do not have precise estimates of the size of the affected group, although predictions could be developed using data from areas where fibre has recently been extended. However, responses to survey questions about consumers' likelihood of taking up faster/high speed broadband if it were available in their area indicate that about 14% might not be interested in adopting such services (RedC, 2021).

Operators will probably not fully internalise the costs that the switchover will impose on consumers. There are several reasons for this. Many consumers will ultimately switch to a better quality, higher cost plan. Some of these "movers" will derive net benefits from the switch even if they were not previously aware it would be helpful. Others may suffer some loss of welfare (e.g., those who use only applications requiring low data speeds), but operators will still benefit as the revenue from these users' subscriptions rise. However, another group of consumers may give up access altogether rather than pay higher prices for services they feel are unnecessary. Service providers and network operators will lose producer surplus previously obtained from these consumers, but the losses will be spread across all providers. The relatively small losses from this source will likely be outweighed by greater network efficiency and increased revenue from customers who do switch.

Nevertheless, it is likely that operators will make efforts to retain consumers, partly by educating them about the value of improved services. Such informational flows can take some time; research into the rollout of basic broadband suggested that take-up rates in newly enabled areas took more than three years to catch up with the rates in areas where broadband was previously available (Lyons, 2014). The new generation of broadband services is likely to follow a similar trajectory: initial take-up of connections in areas newly served by the National Broadband Plan is running at over 30% (DECC, 2022). It is possible that applying a transition period will allow time for consumer learning and for operator marketing and government informational efforts to persuade many consumers to upgrade voluntarily. In many countries, incentives are deployed to encourage voluntary change-over. Examples are given in BEREC (2021). However, the

European Commission is considering guidance that could facilitate a shorter transition period (Cullen International, 2023). There are also some aspects of Irish market conditions that could imply acceptance will be more difficult to achieve than elsewhere. For example, next-generation access coverage in Ireland is high compared to most other European countries (EC, 2022). This means the perceived relative benefits of products based on fibre to the home may be less appealing to a significant share of households than they would be if legacy services were of lower quality. The relative benefits of switching to fibre for such households might be less pronounced. Research found that an analogous situation in France led to a “perceived lack of imperative to switch” (Godlovitch and Kroon, 2020).

Targeted research and innovation activities can help address non-adoption of digital networks and services, ensure that access to the benefits of broadband is spread equitably and coordinate education and skills interventions with investments in broadband infrastructure. Research may also assist in anticipating and alleviating the potential problems arising from innovation such as the copper switch-off, developing better ways to engage and inform consumers about the upcoming changes, identifying consumers who need to be protected or assisted and avoiding unnecessary surprises and consumer detriment.

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Question 4. Have you views on the impact of disruptive technologies such as AI, Quantum and 6G as part of the digital transformation agenda and the implications of these technologies for the Department?

Recent developments in artificial intelligence are likely to have very broad effects, extending to areas handled by a range of government departments (e.g., DETI, DTCAGSM). Here we focus on infrastructural impacts that are likely to be of particular relevance to DECC.

The integration of cloud technology into network operations has significantly bolstered the potential of data analytics and artificial intelligence (AI) within the Business Support System (BSS) domain. Notably, specialised companies have surfaced, offering analytics solutions, machine learning algorithms and AI models explicitly designed for telecom operators' BSS data. These providers aim to assist operators to extract valuable insights, forecast customer behaviour, optimise pricing strategies, and improve revenue management. As cloud services continue to evolve, the capabilities of AI are likely to grow. The new capabilities of AI are poised to bring about significant changes in electronic network services and electronic network communication. AI can assist in optimising network performance by predicting and proactively resolving issues that could lead to downtime or service disruptions. It should enable more efficient load balancing, bandwidth allocation and network routing, resulting in better overall performance and reliability. AI-powered security solutions will become more sophisticated, allowing networks to detect and respond to cyber threats in real-time. These systems can analyse vast amounts of data to identify patterns indicative of potential attacks, thus bolstering network defences and reducing vulnerabilities.

Cloud-based AI systems can enable network management to become more dynamic and adaptive. Networks will be able to reconfigure themselves automatically based on traffic patterns and user demands, optimising resource allocation and helping ensure seamless user experiences. As 5G networks continue to roll out and beyond, AI can be used to optimise network performance to meet the demands of low-latency, high-bandwidth applications. AI will help manage the complexity of these advanced networks efficiently. AI and cloud services can integrate with edge computing to bring AI capabilities closer to the end-users and devices. Such integration should enable faster data processing, reduced latency, and improved real-time decision-making for critical applications. AI-driven network slicing can assist service providers to create virtual network instances tailored to specific use cases or customer needs. This type of flexibility can enhance resource utilisation and enable the coexistence of various services on the same infrastructure.

In summary, the combination of cloud services and AI is likely to reshape electronic network services and electronic network communication in the future. The increased intelligence and automation should facilitate more efficient, secure, and personalised network experiences for users, enabling a wide range of innovative applications and services across industries.

Quantum computing and quantum networks also offer a mixture of potential for new capabilities and for significant disruption to existing technologies and markets. It might be worth considering research into the risks posed to existing infrastructure in Ireland by quantum computing innovations. This research area overlaps with that of cybersecurity, where research to anticipate the nature and impact of future threats is likely to be needed on an ongoing basis.

Given very limited business cases to date for 5G specific aspects (network slicing), it's still early for 6G. Other European countries have begun to research 6G, including Finland (https://www.traficom.fi/en/news/finland-strongly-involved-european-6g-spectrum-work) and Sweden (https://www.government.se/articles/2023/06/towards-a-green-transatlantic-marketplace/).

Question 7. How can the Department engage more effectively with all stakeholders in the national research and innovation system? If you are responding on behalf of an organisation, please state how the Department could

more effectively engage with your organisation.

Research and innovation on climate/sustainability and on telecoms policy increasingly operates across disciplinary boundaries and involves overlapping sets of stakeholders. As this convergence proceeds, more coordination will likely be needed across internal teams within DECC that are concerned with research and innovation, for example the Telecoms policy team, the team dealing with Adaptation/Climate and teams working on Energy. If such topics are dealt with in isolation, this would run the risk of constricting the effectiveness of stakeholder engagement on cross-cutting issues.

Question 9. Are there examples internationally of Government strategies on research and innovation in climate, communications / digital, circular economy, cyber security, energy or environment that we should examine? If so, can you provide details?

In August 2020, the Ministry for the Ecological Transition and the Ministry for the Economy, Finance and the Recovery assigned ADEME and Arcep with a joint 18-month task, to measure the digital environmental footprint in France and identify levers of action and best practices for reducing it. In January 2022, the two organisations submitted their study's first two reports to the Government: https://en.arcep.fr/news/press-releases/view/n/the-environment-190122.html.