

28 September 2021

## Digital Regulation: Driving growth and unlocking innovation

### Royal Society response

#### Introduction

The Royal Society is the National Academy of Science for the UK. It is a Fellowship of many of the world's most distinguished scientists working across a broad range of disciplines in academia and industry. The Society draws on the expertise of its Fellows and Foreign Members to provide independent and authoritative scientific advice to UK, European and international decision makers.

This is the Royal Society's response to DCMS's policy paper *Digital Regulation: Driving Growth and Unlocking Innovation*, which the Royal Society welcomes. It draws from the Royal Society's policy work, in particular its reports and publications relating to data, AI, and digital technologies. A set of overarching observations are made below, followed by specific responses to the questions raised in the consultation.

#### Overarching points:

#### Regulation and innovation

- The Royal Society welcomes the pro-growth responsible innovation messaging in the paper which we regularly promote in our work. In *Machine Learning: the power and promise of computers that learn by example*<sup>1</sup>, the Royal Society argued that ensuring the best possible environment for the safe and rapid deployment of machine learning is essential for enhancing the UK's economic growth, wellbeing, and security, and for unlocking the value of 'big data'.
- The Society agrees that the UK is a leading nation in the responsible development of technology and in shaping regulation for technology and research which balances the need for trust with the value of innovation. This point is made in our recent submission to HMT on the Comprehensive Spending review<sup>2</sup>: "The key tenets of science – rationality, transparency and universality – are an important source of soft power for building constructive international relations. The UK is in strong position to uphold and promote core scientific values such as academic freedom and to also take the lead in developing safe and ambitious regulations that set the global standard."
- Building on existing work by government, including that of the Better Regulation Executive and their work on regulation and standards for the 4<sup>th</sup> industrial revolution, will be essential.

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<sup>1</sup> The Royal Society, (April 2017), *Machine learning: the power and promise of computers that learn by example* (see <https://royalsociety.org/-/media/policy/projects/machine-learning/publications/machine-learning-report.pdf>, accessed 27 September 2021)

<sup>2</sup> The Royal Society, (September 2021), Submission to HM Treasury's 2021 Spending Review (see <https://royalsociety.org/topics-policy/publications/2021/spending-review-2021/>, accessed 27 September 2021)

## The nature of digital regulation

- There are three broad categories of functions that a governance framework for any complex social and technological system undergoing rapid evolution needs to perform, an 'ABC' of governance, and we would argue that digital regulation should be developed with these in mind <sup>3</sup>:
  - Anticipate, monitor and evaluate: considering alternative futures, managing risks, keeping pace with changes, and reflecting on performance.
  - Build practices and set standards: enabling and continuously improving well founded practices that can be spread quickly across relevant sectors and uses.
  - Clarify, enforce and remedy: ensuring sufficient arrangements for evidence gathering, debate and decision-making, and for action in the forms of incentives, permissions, remedies for harm, incentives and penalties.
- Digital regulation should be considered in terms of the broader concept of governance, meaning everything designed to inform the extent of confidence in digital technologies, including standards, codes of practice and societal norms.
- Regulation also needs to be flexible and adaptable. New data-related regulation or voluntary standards should be encouraged to be adaptive in design. This involves making prior commitments to subject them to re-evaluation at a particular trigger point, and then mobilising new fact-based information from organisations undertaking anticipation, monitoring and evaluation functions <sup>4</sup>.
- Finally, regulation should focus not on the technology itself, but the area of application and sector within which it is used. For example, as stated in our Machine Learning report <sup>5</sup>, many of the issues around machine learning algorithms are very context specific, and so, it would be unhelpful to create a general governance framework or governance body for all machine learning applications. Rather, application-specificity is key when considering machine learning: some applications may require regulation to ensure public confidence, while others will be non-controversial. Some may be dealt with adequately via existing mechanisms. Others may need new frameworks, but these should be context specific, rather than being provided by an overarching governance system for machine learning. In our work with the British Academy on *Data Management and Use*, we focused on the need to govern the *use* of data, rather than focusing on the data itself. This outcome-focused approach is likely to apply to digital technology more broadly.

## Sustainability and regulation

- Growth in digital technology should be sustainable, reducing the sector's carbon footprint alongside wider supply chain optimisation. To this end, digital regulation should enable a net zero transition, with governance arrangements in place that enable the safe and rapid use of data to

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<sup>3</sup> The British Academy and The Royal Society, (June 2017), *Data management and use: Governance in the 21<sup>st</sup> Century* (see [https://royalsociety.org/-/media/policy/projects/citizen-data-science/Final-2711-Citizen-Data-Science\\_CDS\\_Workshop-report.pdf](https://royalsociety.org/-/media/policy/projects/citizen-data-science/Final-2711-Citizen-Data-Science_CDS_Workshop-report.pdf), accessed 24 September 2021)

<sup>4</sup> The British Academy and The Royal Society, (June 2017), *Data management and use: Governance in the 21<sup>st</sup> Century* (see [https://royalsociety.org/-/media/policy/projects/citizen-data-science/Final-2711-Citizen-Data-Science\\_CDS\\_Workshop-report.pdf](https://royalsociety.org/-/media/policy/projects/citizen-data-science/Final-2711-Citizen-Data-Science_CDS_Workshop-report.pdf), accessed 24 September 2021)

<sup>5</sup> The Royal Society, (April 2017), *Machine learning: the power and promise of computers that learn by example* (see <https://royalsociety.org/-/media/policy/projects/machine-learning/publications/machine-learning-report.pdf>, accessed 27 September 2021)

support the achievement of the net zero target; and that help to limit the carbon footprint of the tech sector<sup>6</sup>.

### **Specific responses:**

#### **1. Do you agree we have identified the three most impactful strategic objectives and relevant outcomes to deliver our vision? Are there any other outcomes we should consider?**

- The Society agrees with the objectives: Promoting competition and innovation; Keeping the UK safe and secure online; Promoting a flourishing, democratic society.
- In terms of **promoting competition and innovation**, the Royal Society is committed to science for the benefit of society and agrees that innovation is essential to that end – as set out in our recent submission to HMT on the Comprehensive Spending Review <sup>7</sup>.
- We strongly agree that **promoting a flourishing, democratic society** should be central to digital regulation. This echoes the Royal Society and British Academy's principles in *Data management and use* <sup>8</sup>, where the overarching principle is that systems of data governance should promote human flourishing. This framing includes concepts such as wellbeing and the need for individuals and communities to thrive, but it is deliberately broad. At moments of contention, the principle should serve to reflect the fundamental tenet that society does not serve data, but that data should be used to serve human communities. It should also ensure that digital regulation is developed in a way that serves all of society, and directly tackles digital exclusion. More specific principles state that systems of governance should:
  - protect individual and collective rights and interests
  - ensure that trade-offs affected by data management and data use are made transparently, accountably, and inclusively
  - seek out good practices and learn from success and failure
  - enhance existing democratic governance
- **Ensure that the UK is building and using the best tools to keep the UK safe online.** The Royal Society's work on trusted digital technologies supports this priority. Digital systems have transformed, and will continue to transform, our world. The benefits have already been substantial, but they remain at risk. Protecting the benefits and minimising the risks requires reliable and robust cybersecurity, underpinned by a strong research and translation system. Trust is essential for growing and maintaining participation in the digital society. Organisations earn trust by acting in a trustworthy manner: building systems that are reliable and secure, treating people, their privacy and their data with respect, and providing credible and comprehensible information to help people understand how secure they are <sup>9</sup>. We see a role for government and regulators to establish and promote rigorous, evidence-based guidance on state-of-the-art cybersecurity principles, standards and practices, accompanied by *certification* marks or

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<sup>6</sup> The Royal Society, (December 2020) *Digital technology and the planet: Harnessing computing to reach net zero* (see <https://royalsociety.org/-/media/policy/projects/digital-technology-and-the-planet/digital-technology-and-the-planet-report.pdf>, accessed 24 September 2021)

<sup>7</sup> The Royal Society, (September 2021), Submission to HM Treasury's 2021 Spending Review (see <https://royalsociety.org/topics-policy/publications/2021/spending-review-2021/>, accessed 27 September 2021)

<sup>8</sup> The British Academy and The Royal Society, (June 2017), *Data management and use: Governance in the 21<sup>st</sup> Century* (see [https://royalsociety.org/-/media/policy/projects/citizen-data-science/Final-2711-Citizen-Data-Science\\_CDS\\_Workshop-report.pdf](https://royalsociety.org/-/media/policy/projects/citizen-data-science/Final-2711-Citizen-Data-Science_CDS_Workshop-report.pdf), accessed 24 September 2021)

<sup>9</sup> The Royal Society, (July 2016) *Progress and research in cybersecurity* (see <https://royalsociety.org/-/media/policy/projects/cybersecurity-research/cybersecurity-research-report.pdf>, accessed 24 September)

*benchmarks* for digital products and services, focused on improving consumers' protection and understanding. Publicly listed companies and public bodies, including Government departments, should benchmark their adherence against cybersecurity standards, and regularly report on this. The Government and regulators can build on existing initiatives to encourage organisations to report cybersecurity attacks and vulnerabilities to an appropriate coordinating body. In sum, it is essential that digital regulation is used to ensure that digital systems are resilient – to cyber attacks, but also in the face of other risks – in order to build a resilient and robust digital economy.

- Our **Privacy Enhancing Technologies** project highlights certain risks can potentially be mitigated and managed with a set of emerging technologies and approaches often collectively referred to as 'Privacy Enhancing Technologies' (PETs). Whilst cybersecurity is focused on protecting data so that other people cannot access it, PETs, in data analysis, are focusing on enabling the derivation of useful results from data without giving other people access to all the data. This nascent but potentially disruptive set of technologies, combined with changes in wider policy and business frameworks, could enable significantly greater sharing and use of data in a privacy preserving, trustworthy manner. It could create new opportunities to use datasets without creating unacceptable risks. It also offers great potential to reshape the data economy, and to change the trust relationships between citizens, governments, and companies. The field of PETs is rapidly evolving. However, currently, many of the most promising tools, whilst having a rich research heritage, are relatively new to real-world applications<sup>10</sup>. There is an important role for regulators, and the National Cyber Security Centre, to raise awareness further and provide guidelines about how PETs can mitigate privacy risks and ensure that data use is compliant with regulation such as GDPR. We note that the ICO has played a key role in providing guidance in this area and this should be built on as these technologies develop. We are currently carrying out work to understand the role of certification and kitemarks to support user confidence in this area of technology, and the lessons that can be learned from the cyber security sector.
- The Royal Society is currently concluding a project on **Digital Technology and Information** which explores the impact of the internet on the consumption and production of information. The project has a particular focus on online scientific misinformation (e.g., about vaccines) and will make a series of recommendations on how to minimise the risks associated with this. We expect to publish the report in December 2021 and are happy to share it with the Department and meet to discuss its findings – particularly on what steps government should take to support a healthy online information environment.
- In addition to these objectives, we would recommend a further objective for digital regulation: **to consider the positive and negative impact of digital tech on the environment**. Digital technology can play a major role in helping to reach net zero if those technologies are themselves well-governed. There are several ways that regulation or wider governance can play a role in ensuring that is the case. In our *Digital technologies and the planet* project, we argue that<sup>11</sup>:
  - Digital systems should benefit the communities into which they are deployed, including sharing the wider benefits of a digitally enabled net zero transition. A collaborative effort should involve affected communities to develop a shared understanding of the purpose of technologies deployed in the context of net zero and to co-design approaches to navigate

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<sup>10</sup> The Royal Society, (March 2019), *Protecting privacy in practice: The current use, development and limits of Privacy Enhancing Technologies in data analysis* (see <https://royalsociety.org/-/media/policy/projects/privacy-enhancing-technologies/privacy-enhancing-technologies-report.pdf>, accessed 24 September 2021)

<sup>11</sup> The Royal Society, (December 2020), *Digital technology and the planet: Harnessing computing to reach net zero* (see <https://royalsociety.org/-/media/policy/projects/digital-technology-and-the-planet/digital-technology-and-the-planet-report.pdf>, accessed 24 September 2021)

the associated dilemmas. This requires careful design of the interface between people and technology, and consideration of the societal impact of such technologies.

- Data-driven and digital systems for net zero should be developed to allow people to inspect and challenge their output. There should be a concerted effort to set standards to support contestation: data-driven systems to achieve net zero should be explainable, transparent, and auditable.
- Digital systems for net zero should be secure and resilient. A collaborative effort should set resilience standards for data-driven systems deployed to achieve net zero: they should be able to work on a range of scales, be cybersecure, interoperable, flexible, safe, and robust.
- In addition, it is essential that the carbon footprint of the digital sector itself is managed. Regulators and Government leaders should identify the levers to ensure tech companies share publicly data about the energy consumptions of their digital systems and products, including embodied and use phase emissions, particularly from data centres – this should include Scope 1, 2 and 3 emissions. Regulation should include guidance about the energy proportionality of digital applications. Such guidance could set out key questions to consider when developing or deploying digital technologies. Where there are options to use less energy-intensive approaches, guidance should make this clear. For example, the Financial Conduct Authority should provide guidance on the energy intensity of technologies such as blockchain based applications used in financial systems<sup>12</sup>.

## 2. Do you have views on the three guiding principles for better digital regulation to deliver our vision and objectives?

- **Actively promote innovation:** Governance should enable the safe and rapid uptake of technology for social benefit. Part of this is enabling agile governance beyond regulation. This includes standards and codes of ethics and conduct. These can provide frameworks for technology development while being flexible to allow response to fast moving technology change, and thus data-related regulation or voluntary standards should be encouraged to be adaptive in design. This involves making prior commitments to subject them to re-evaluation at a particular trigger point, and then mobilising new information from organisations undertaking anticipation, monitoring and evaluation functions<sup>13</sup>.
- **Standards are an important element of adaptive regulation:** They are important in ensuring that the digital sector learns from best practice, and to build interoperable technologies and enable international collaboration.
- Also of importance is **the role of professional standards**. As we argued in relation to data science, developing a professional framework for data scientists with shared codes of practice, including appropriate governance of data collection and use and ethics training is an important goal. To that end, and acting on this advice, the Royal Statistical Society, British Computer Society and Operational Research Society are working towards a set of professional standards for the discipline<sup>14</sup>.

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<sup>12</sup> The Royal Society, (December 2020), *Digital technology and the planet: Harnessing computing to reach net zero* (see <https://royalsociety.org/-/media/policy/projects/digital-technology-and-the-planet/digital-technology-and-the-planet-report.pdf>, accessed 24 September 2021)

<sup>13</sup> The British Academy and The Royal Society, (June 2017), *Data management and use: Governance in the 21<sup>st</sup> Century* (see [https://royalsociety.org/-/media/policy/projects/citizen-data-science/Final-2711-Citizen-Data-Science\\_CDS\\_Workshop-report.pdf](https://royalsociety.org/-/media/policy/projects/citizen-data-science/Final-2711-Citizen-Data-Science_CDS_Workshop-report.pdf), accessed 24 September 2021)

<sup>14</sup> Royal Statistical Society, (2020), Professional standards to be set for data science (see <https://rss.org.uk/news-publication/news-publications/2020/general-news/professional-standards-to-be-set-for-data-science/>, accessed 27 September 2021)

- **Achieve forward-looking and coherent outcomes:** Collaboration across regulators is essential. As set out above, regulation should not focus on the technology but the area of application and its outcomes. Work across regulators is needed to identify regulatory gaps that need to be addressed or new uses of technology that do not fall within existing regulation.
- **Exploit opportunities and address challenges in the international arena:** an international approach will be essential and indeed there is the opportunity for international leadership in the development of responsible digital technology <sup>15</sup>.
- In addition to these principles, **transparent and inclusive dialogue** should also be a principle for the development of digital regulation<sup>16</sup>. Enforcement of governance and remedy for failures is also essential to ensure redress for harm, and to build trust – as stated in the ABC for governance in the introduction.

### 3. What other practical steps can we take to improve coherence and coordination across the digital regulatory landscape? What else could meet these aims other than the recommendations of the Digital Regulation Cooperation Forum?

- In addition to establishing coordination between regulators, there may be a role for coordinating across bodies that engage society on digital and data issues. Suggestions for how that might be met are given under point 5 below.
- Supporting the development of standards to learn from best practice and enable interoperability of systems is important. It is important that these standards are developed in an inclusive way – engaging not only industry but all sectors and the wider public.
- As mentioned above, there is a role for professionalisation in the digital sector to support standards and best practice, and it is therefore important to connect with those bodies that develop and support professional standards.

### 4. What challenges have you experienced in the current approach to digital regulation?

- The Covid pandemic showed that there is a need for capacity building in well-governed management of and access to data. Regulation should enable data use by allowing the safe and appropriate navigation of often legitimate barriers to data availability, including in an emergency. This point is made in the joint National Academies response to the National Data Strategy.<sup>17</sup>

### 5. How can government better utilise expertise from industry and civil society to design and implement pro-innovation regulation for digital technologies?

- The consultation states that ‘the pace of emerging technology development has created opportunities for frontrunners — both states and non-state actors such as large technology firms — to shape the norms of digital technologies’. These norms must also be shaped by wider society, transparently, accountably, and inclusively. This means that a broader public and

<sup>15</sup> The Royal Society (June 2019), Flourishing in a Data-enabled Society (see <https://rss.org.uk/news-publication/news-publications/2020/general-news/professional-standards-to-be-set-for-data-science/>, accessed 27 September 2021)

<sup>16</sup> The British Academy and The Royal Society, (June 2017), *Data management and use: Governance in the 21<sup>st</sup> Century* (see [https://royalsociety.org/-/media/policy/projects/citizen-data-science/Final-2711-Citizen-Data-Science\\_CDS\\_Workshop-report.pdf](https://royalsociety.org/-/media/policy/projects/citizen-data-science/Final-2711-Citizen-Data-Science_CDS_Workshop-report.pdf), accessed 24 September 2021)

<sup>17</sup> [National academies response to the National Data Strategy \(royalsociety.org\)](https://royalsociety.org/policy/projects/national-data-strategy/)



stakeholder engagement on digital regulation is essential to enabling all those affected to have effective opportunities to participate, and that this will need to be diverse across demographics, disciplines, geographies, and occupations where possible <sup>18</sup>.

- The Royal Society and Centre for Data Ethics and Innovation convened a workshop on public dialogue methods for data and digital technology (2020). In that, it was pointed out that for many people, data policy questions in the abstract do not resonate. They become engaging and accessible when rooted in daily life, or in scenarios that help make the future more tangible, showing how data and digital technologies can influence daily life. Further work is needed to develop creative approaches to thinking about the future. This might involve creating future visions for the deployment of technology as the basis for dialogue or finding ways of supporting communities to articulate their own visions or desires from technology development <sup>19</sup>.
- A key point made in those discussions was the need to implement a *sustained infrastructure* to enable ongoing public dialogue and consultation on technology. That 'infrastructure' is important to enable learning from and building on past activities, avoiding the need to build new systems for engagement from scratch on a regular basis. It should draw from and join together:
  - processes that listen to public conversations to better understand the landscape of issues already being debated;
  - individual dialogue exercises that follow best practice in bringing diverse publics to develop their views and in so doing influence policy outcomes;
  - bottom-up initiatives that create new forms of agency in the governance environment;
  - incentive structures that encourage researchers, government departments, and civil society to invest in engagement; and
  - networks of stakeholders and civil society actors that coordinate engagement efforts, identifying gaps or opportunities for further action.
- The resulting infrastructure would support both discrete exercises in deliberative democracy while also allowing a more distributed dialogue, embedding engagement at multiple points in the policymaking and governance process. Ongoing and sustained support for such an infrastructure, in terms of funding and organisational capacity, would be needed for it to be effective.

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<sup>18</sup> The British Academy and The Royal Society, (June 2017), *Data management and use: Governance in the 21<sup>st</sup> Century* (see [https://royalsociety.org/-/media/policy/projects/citizen-data-science/Final-2711-Citizen-Data-Science\\_CDS\\_Workshop-report.pdf](https://royalsociety.org/-/media/policy/projects/citizen-data-science/Final-2711-Citizen-Data-Science_CDS_Workshop-report.pdf), accessed 24 September 2021)

<sup>19</sup> The Royal Society and Centre for Data Ethics and Innovation, (February 2020), *Engagement as mode of operation* (see <https://royalsociety.org/-/media/policy/projects/ai-and-society/RS-CDEI-Roundtable---Note-of-Discussions.pdf?la=en-GB&hash=77B3238C023D4240B12277865A119F33>, accessed 24 September 2021)