THE ROYAL SOCIETY

December 2020

Royal Society Submission: Scottish Government consultation on updating the digital strategy for Scotland

1. Introduction

1.1. The Royal Society is the National Academy of science for the UK. Its Fellows include many of the world's most distinguished scientists working across a broad range of disciplines in academia, industry, charities and the public sector. The Society draws on the expertise of the Fellowship to provide independent and authoritative advice to UK, European and international decision makers.

1.2. The Society's fundamental purpose, reflected in its founding Charters of the 1660s, is to recognise, promote, and support excellence in science and to encourage the development and use of science for the benefit of humanity. Our strategic priorities therefore are to promote excellence in science; to support international collaboration; and to demonstrate the importance of science to everyone.

1.3. The Royal Society welcomes the Scottish Government's commitment to delivering an updated digital strategy for Scotland. The Society recently responded to the UK government's National Data Strategy consultation, along with the other UK National Academies. Some of the key points in that response will be relevant to the Scottish Government's implementation of its Digital Strategy, and these are set out below.

1.4. The Digital Strategy for Scotland puts enabling net zero at its heart, and in its report *Digital Technology and the Planet* the Royal Society has published extensive evidence on how data and digital systems can help reach net zero – nearly a third of the 50% carbon emissions reductions the UK needs to make by 2030 could be achieved through existing digital technology. We would be happy to discuss any aspects of the report and its recommendations, and how they relate to Scotland's implementation of its Digital Strategy.

1.5. The Strategy clearly sets out the need for digital skills, and our report *Dynamics of Data Science Skills* sets out the areas for action relating to meeting skills needs across sectors and sets out models and mechanisms that can achieve that.

2. No one left behind

2.1. *An education system that builds digital skills*

- The Royal Society's *Dynamics of Data Science Skills* report shows that over recent years there has been a significant rise in the demand for data science skills in the job market. This report sets out a vision for a system that supports data skills for everyone, and highlights areas for action to ensure that the whole of the UK has the skills to meet this demand. Building foundational skills is important to enabling everyone to benefit from data science skills. Key to this is ensuring that data skills are embedded throughout the primary and secondary curriculum; supporting teachers that teach data skills; and developing curricula fit for the future. The report

highlights models and mechanisms, summarized here, that are examples of good ideas to help develop data skills, from school students to data professionals.

3. Services working for all

3.1. *Transform key public services*

- The discussion document is right to consider how to transform public services in a way that is greener and supports progress to net zero. Digital technologies have a clear role in that, including through the use of digital twins. Our report *Digital Technology and the Planet* sets out a number of ways that digital technologies can be used to reach net zero.

3.2. *Adopt common digital and data standards*

- Common standards are essential to ensuring that data is shareable and appropriately linkable – though both accessing and linking data must be well-governed with checks to ensure that it is in the public interest. Ethics and public trust are also absolutely central to the availability of and access to data.

3.3 Protect and create value from Scotland's data

- Data across all sectors should be considered as critical infrastructure and ensure that there is appropriate investment in maintaining that data and supporting the skills for using it, to ensure that it is used to serve needs across the whole of society.
- As argued in the Royal Society's *Protecting Privacy in Practice* government-led projects can also make use of the technologies that enable secure and privacy-preserving use of data. Privacy-Enhancing Technologies are a way of enabling use of Scotland's data, and realizing its value, while protecting it and the data subjects.

4. A digital and data economy

4.1. *A Data Strategy*

The following priorities were highlighted in our response to the UK's National Data Strategy as key aims for implementing the Strategy. These priorities may help guide the development of a data economy in Scotland as part of its Digital Strategy.

1) Enabling **data access and linkage** across government, on the basis of robust data infrastructure which includes interoperable data standards and architectures, and the use of privacy protections.

2) Embedding a culture of **data responsibility** across government and the wider system, including

- responsibility for data **quality** and accuracy including eliminating bias in data;
- responsibility to use data as a **public good**, for societal benefit;
- responsibility to ensure that its data is used in a socially responsible way with meaningful **public engagement** to build **trust** and trustworthiness.

3) Thereby, building a **trusted system** by embodying **trustworthy** practices. This requires meaningful engagement with the public, including those impacted by the use of data or new data-enabled ways of working, across diverse communities. It involves addressing the harms that can arise from data

collection and use, as well as harnessing the opportunities. From this work, understand how the benefits of data can be maximized in an equitable way, and what behaviours are needed by stakeholders to embody trust across society.

4) **Shifting cultural barriers and risk aversion** to data sharing, especially in the public sector, by demonstrating that through good data standards, APIs and secure systems it can be shared safely.

5) Embedding the concept of **data as infrastructure**, and by that highlighting the need to:

- identify, value and maintain data **assets** and the infrastructures that support their use;
- **invest** in the costs of data collection, management and maintenance to maintain these assets – data curation and engineering is vital and requires skilled people and funding;
- ensure the **security and resilience** of that infrastructure, including using the best privacy-enhancing and security technologies;
- take a **strategic** approach to identifying those assets that may be needed in the future;
- ensuring the that the data infrastructure **serves everyone.**

6) Working to make data open in both the public and private sectors, by encouraging the adoption of a **duty to safely share data** for public benefit – such as in response to national and international emergencies, but also for wider societal benefit and to meet societal and policy challenges.

7) Urgently investing in the **skills** needed in the public and private sectors, across the UK, to enable the use of data.
8) Investment in and appropriate use of **digital twins** alongside other valuable data assets.

4.2. *Increase the digital skills talent pool*

- The discussion document is right to focus on skills, with demand for data skills rocketing – as evidenced by the Royal Society report *Dynamics of Data Science Skills*. There is a chronic shortage of data skills in the workforce, including within government. A people strategy is vital in achieving the other objectives aimed at.

- As the potential of data science continues to be realised it is clear that work on and with data requires not just skill in statistics and computing but also analytical skills, communication skills, and domain-specific knowledge across all subject areas to understand where and how data science techniques can be applied.

- Where skills gaps exist, universities with good industry links have a key role to play in developing appropriate professional training. Employers have a role in upskilling the workforce by training existing employees, particularly those at risk of losing their jobs through automation, and can work with universities to co-produce training.

- By working in collaboration with employers, universities can potentially address regional skills gaps and address productivity needs. This could involve working across professional disciplines to understand the type and level of data science skills that will be needed by professionals in fields such as law, healthcare, and finance.

- There is a clear role for organisations such as Innovate UK to support collaboration between universities and businesses to grow skills. Examples can be learned from the collaborative

upskilling projects undertaken with SMEs and regional businesses by the National Innovation Centre for Data.

4.3. *Use Scotland's data capabilities to address climate change targets*

- The Royal Society's report on *Digital technology and the planet* highlights that data can help reduce emissions and achieve net zero by underpinning applications and services across sectors. Several studies showed that existing digital tech applied across sectors could contribute nearly a third of the 50% reduction in emissions necessary by 2030.

- In addition to reducing carbon consumption, digital technologies also have a role to play in improving operations and research. Data will also increasingly play a role in enabling low-carbon and resilient infrastructure systems and in the transition to the future energy system, as highlighted in the National Engineering Policy Centre's paper *Beyond COVID-19: Laying the Foundations for a net-zero recovery*.

5. A vibrant tech sector

5.1. *An Innovation Ecosystem*

- SMEs cannot always compete for talent with larger companies. They also have very short timescales for a return on investment in skills. A positive approach is pairing SMEs with data scientists based in universities to solve their problems collaboratively – pairing data scientists with domain experts that 'own' the data and benefit from its use. Innovate UK has a role in supporting collaborations between SMEs and universities to support this knowledge sharing.

5.2. *Expanding training*

- Employers have a role in upskilling the workforce by training existing employees, particularly those at risk of losing their jobs through automation, and can work with universities to co-produce training. By working in collaboration with employers, universities can potentially address regional skills gaps and address productivity needs. This could involve working across professional disciplines to understand the type and level of data science skills that will be needed by professionals in fields such as law, healthcare, and finance. There is a clear role for organisations such as Innovate UK to support collaboration between universities and businesses to grow skills across the UK. Examples can be learned from the collaborative upskilling projects undertaken with SMEs and regional businesses by the National Innovation Centre for Data.

5.3. *Promote Scotland as a European centre for Green Data Centres*

- As argued in the Royal Society's *Digital Technology and the Planet,* Governments have a role in ensuring tech companies share publicly data about the energy consumptions of their digital systems and products, including embodied and use phase emissions, in particular from data centres.
- The report argues that tech companies should further promote the use of renewable energy for computing activities, for example by scheduling these activities, where appropriate, for times that maximise the use of intermittent renewable energy sources.

6. An ethical digital nation

6.1. *Set out a vision for an ethical digital nation*

- The Royal Society and British Academy set out an approach to ensure data use is ethical and well-governed in *Data Management and Use: Governance for the 21st Century*. The principles for data governance can help to guide Scotland's important focus on being an ethical digital nation.

- Technology has a role as part of the governance toolbox, and the Royal Society's *Protecting privacy in practice* report outlined how a set of emerging technologies, PETs, can help use and share data while protecting sensitive information. These technologies can provide new ways to address the goals of data protection regulations, such as the need for appropriate safeguards - although this should not detract from the need for legal frameworks and for assessing whether a given use of data is ethical in the first place.

- *Protecting privacy in practice* identified a need to support organisations to become intelligent users of PETs. It recommended that Government, public bodies and regulators raise awareness further and provide guidelines about how PETs can mitigate privacy risks and address regulations such as GDPR.

6.2. *Making more of our data available openly*

- The priorities for the UK National Data Strategy, listed above, can be used to inform how Scottish Government enables use of its data for societal benefit.

6.3. *Digital Rights*

- The British Academy and Royal Society highlighted the importance of thinking beyond data 'ownership' and considering the rights and controls that are needed to protect individuals, communities and wider society, in its workshop with techUK on *Data Ownership, Rights and Controls*.

For more information please contact public.affairs@royalsociety.org