

UK science: building a more resilient and prosperous future

UK science produces enormous value for our society. We led the world in developing an effective COVID-19 vaccine, building on a strong base in biological sciences that has been cultivated over decades. From the steam engine to artificial intelligence, science and innovation have fuelled productivity, created countless jobs and turbocharged our economy in every part of the country.

Building a thriving R&D landscape fit for the future

Currently our ability to stay at the forefront of critical scientific fields is hampered by the general prevalence of short-termism and stop-start investment in science.

Consistent policy and sustained, real terms public investment in research and development over a longer ten-year time horizon could provide attract private sector investors, boosting productivity while creating the stable conditions needed to retain and attract globally mobile talent to build their careers in the UK. Essential to this will be the confidence that the government's R&D budget will remain steady for the long-term, while keeping pace with other nations looking to build their R&D capabilities.

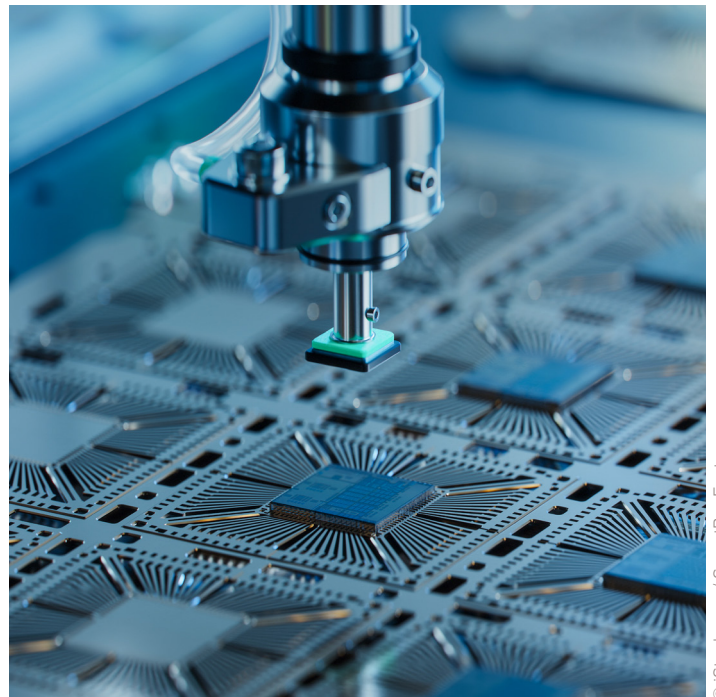
POLICY PROPOSALS

- Develop a long-term plan for UK science, including an effective international science strategy.
- Strive to lead the G7 in R&D investment on R&D as a percentage of GDP.
- Reduce visa costs for researchers in line with other leading science nations.

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In the last decade, the largest growth in jobs in the UK took place in the professional, scientific, and technical activities sector – up 36% to just under 3 million.

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Securing a path to a net zero future

There is a need for rapid and determined action on climate change from decision makers in all levels of government that prioritises the green investment needed now if we are to hit our net zero targets.

Science-led solutions must be placed at the forefront of our net zero response, with an early focus on building the infrastructure to store electricity generated from renewable sources to ensure that we have a sustainable energy supply.

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Current commitments to reduce global emissions under the Paris Agreement put us on a path to levels of warming above 2°C.

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POLICY PROPOSALS

- Develop an evidence-led technology roadmap to guide net zero investment.
- Enable immediate construction of energy storage infrastructure, such as using salt caverns to store the 100 Terawatt-hours of electricity needed by 2050.
- The net zero transition should be data-led, with governance arrangements in place that enable the safe and rapid use of data to support the achievement of the net zero target. Read more in our *Digital technology and the planet* report.

Protecting our natural environment

Over-exploitation of the natural world and widespread landscape change are eroding biodiversity.

Innovations such as precision agriculture, genetically modified crops and indoor farming can help us to grow food more efficiently and lessen our impact on the natural world. Science can also help to shape how we build our cities and infrastructure, inform land use and planning decisions, and help us change how we produce energy.

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Only 14% of priority habitats, 7% of woodland and 25% of peatlands are assessed to be in good condition.

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POLICY PROPOSALS

- Develop and draw on new approaches to recognising and accounting for the true value of biodiversity, including the *Dasgupta Review*.
- Land use decisions should be made on the basis of a multifunctional approach, where land is optimised to deliver multiple functions simultaneously. The four UK countries should develop and coordinate spatially explicit national land use frameworks - which act to join up different areas of land use policy. Read more in our *Multifunctional landscapes* report.

Developing skills fit for the future economy

Education is the most powerful policy lever a government has at its disposal to improve society. It provides future skills for the economy, offers fulfilling job opportunities for all young people and strengthens engagement with wider society. Yet with technology and society rapidly changing, our education system is playing catch-up.

The problem-solvers of tomorrow will need a foundation in science, digital and data skills alongside knowledge of the humanities and creative arts. Currently students are presented with an 'illusion of choice', where many are forced to abandon studying for a wide range of skills post-16. The next government should introduce a broader range of study that would offer educational experience equivalent to counterparts in other high-performing economies.

POLICY PROPOSALS

- Reimagine the secondary education system, introducing a broader and more balanced range of study.
- Reform study of mathematical and data education from early years to school leaving age.
- Ensure schools across the country have the funding necessary to offer Core Maths Qualifications that maintain academic rigour alongside developing everyday skills.
- Restore teacher agency and professional self-esteem, including through high-quality subject-specific Continuing Professional Development for STEM teachers.



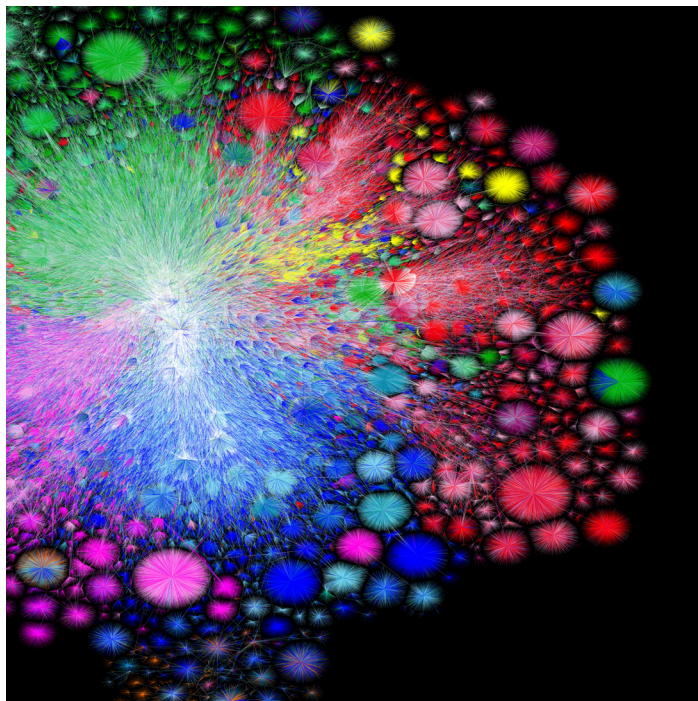
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49% of the labour force in England has a level of numeracy equivalent to the expected level of children at the end of primary school.
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Creating safe and effective governance of AI and data-enabled technologies

Artificial intelligence and data-enabled technologies have huge potential to transform our lives and society as a whole. Ensuring they are used safely and effectively is essential for the UK's wellbeing, security and economic growth.

Many of us now interact with a form of AI every day through search engines, social media and voice recognition software. As the field develops, it is likely to percolate into our lives in ever more surprising ways, so it will be important to build new governance structures to ensure it is used fairly and transparently.



Above: *Visualisation of the Internet 1997 – 2021*, by Barrett Lyon as part of the Opte Project, featured in the Royal Society report, *From privacy to partnership*. © Barrett Lyon / The Opte Project.

Access to data, such as health data, is crucial for a lot of scientific research. Moves to make it easier and simpler for scientists to access and use data from government and private companies are vital, provided the right safeguards are in place.

The global AI market is worth approximately £106.99 billion (as of 2022).

POLICY PROPOSALS

- Pursue an outcomes & risk-based approach to regulation (rather than tech based) that are adaptable as technologies evolve (i.e. smart regulation).
- Develop a National Privacy Enhancing Technologies (PETs) strategy, alongside advocating for the establishment of international standards on PETs. PETs are a suite of tools that can help the use of data by reducing risks inherent to data use.
- Improve access to essential AI infrastructures (eg code, data, and computing power), along with actions to enhance access to AI infrastructures and tools. Read more in our *Science in the Age of AI* report.
- Invest in lifelong information literacy initiatives (e.g. education on how to assess URLs, how to reverse image search, and how to identify AI-generated content).
- Data adequacy with the EU should be retained. Losing adequacy would be damaging for scientific research, creating new costs and barriers for UK-EU collaborations.

A manifesto for science: building a more resilient and prosperous future

The Royal Society's manifesto for science sets out clear proposals for how the government can build a more resilient and prosperous future. **Scan the QR code to find out more, or visit royalsociety.org**



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