

CaSE written evidence submitted to the House of Lords Science and Technology Committee inquiry on people and skills in UK science, technology, engineering and mathematics

September 2022

The Government's commitment to reach an R&D intensity of 2.4% GDP by 2027 represents a step change in UK R&D capacity of the order of 50% in a 10-year period. It is essential to consider skills as a dimension of this ambition. The Campaign for Science and Engineering (CaSE) is pleased to see that the Committee is investigating the needs and requirements across the skills landscape, and seeking answers from the Government about how it plans to address these needs for this economic transformation. To deliver on the UK's R&D ambitions will require a holistic look at skills policy across Government, and there will need to be a concerted effort to join up skills policy to deliver lasting results.

International talent

The immigration system plays an important role in growing a highly skilled workforce. There have recently been a series of welcome changes to the UK's immigration system designed to attract global talent: from extending post-study work rights and removing the cap on skilled migrants; to reducing the salary threshold for many and introducing the Global Talent Visa. However, a critical question is how the cost of the UK visa system affects the UK's attractiveness to skilled workers. Current UK visa arrangements are among the most expensive in the world for individuals and sponsors.¹ The total average upfront cost for a UK Tier 2 skilled worker visa is £8,419, which is 540% higher than the average cost in other leading scientific nations (£1,316).² In addition, while the cost of visas for senior researchers might be covered by employers, for early career researchers this is often not the case, and they are the ones least likely to be able to afford the cost. We want to be able to attract people at all stages of their careers to the UK. If the UK visa system remains one of the most expensive in the world, this risks deterring global talent and devaluing the Government's historic investment in research.

STEM skills

Creating a high skill and innovative economy is crucial to driving the UK's future economic prosperity, with science, research and innovation central to this. Skills provision is also an essential dimension of the UK Government's 'science superpower' ambition. The UK has long-standing skills gaps in areas of STEM.³ A recent survey published by the Open University and the British Chambers of Commerce highlights the scale of the challenge – in the UK seven out of ten firms across all sizes, sectors and regions are experiencing skills shortages, with the problem worsening. The R&D People and Culture strategy states that

¹ <https://royalsociety.org/-/media/policy/Publications/2019/international-visa-systems-explainer-july-2019.pdf>

² <https://royalsociety.org/-/media/policy/Publications/2019/international-visa-systems-explainer-july-2019.pdf>

³ https://www.engineeringuk.com/media/274342/euk2535_careers_provision_report_lr.pdf

the R&D sector will need at least an additional 150,000 researchers and technicians by 2030 to sustain the UK's target of 2.4% R&D intensity.⁴

In addition to the STEM pipeline, the need for wider skills provision to equip the public to enable participation in a more R&D intensive economy is often overlooked as an area of focus. However, this is an integral part of creating the long-lasting effect and sustainability of a more innovative economy. This can ensure that people develop new skills needed in the face of technological transformation but also foster widespread public support and buy-in for the benefits of R&I.

To deliver lasting results will require a concerted effort to join up skills policy across Government. To support the Government's R&D ambitions will require a look across the skills landscape, from science teaching in schools and STEM careers advice, through to higher and further education, apprenticeships, lifelong learning, and immigration. By identifying some of the challenges and pinch points, we can create a landscape that will enable science and engineering to thrive across the UK and support the UK's ambitions of becoming a leader in these areas. CaSE has recently started a longer-term piece of work investigating the skills needs of an R&D intensive UK and will be happy to share this work with the Committee as it progresses.

Education sector

The UK has long-standing skills gaps in areas of STEM.⁵ Schools and colleges play a vital role in addressing the STEM skills shortage and lack of diversity, including through the careers support they provide.⁶ CaSE has previously argued that the provision of high-quality careers advice can give students an understanding of how they start a career in science or engineering, which can attract more young people to a career in research and innovation.⁷ In addition, there is a growing recognition of the benefits of diversity and inclusion in meeting skills gaps and maximising productivity.⁸ However, there are inequalities both across the UK and between schools that can significantly affect children's experience of, and access to, high-quality science education.⁹ In our policy brief on diversity in STEM, CaSE highlighted that parental knowledge of STEM and STEM-related careers is vital to increasing students' 'science capital', but that this is low for those from under-represented backgrounds.¹⁰ Others have also highlighted the importance of careers provision in encouraging both a greater number and diversity of young people into STEM as a career.¹¹ CaSE has previously recommended that the Government embed diversity and inclusion

4

https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/1004685/r_d-people-culture-strategy.pdf

⁵ https://www.engineeringuk.com/media/274342/euk2535_careers_provision_report_lr.pdf

⁶ https://www.engineeringuk.com/media/274342/euk2535_careers_provision_report_lr.pdf

⁷ <https://www.sciencecampaign.org.uk/news-media/case-comment/inspiring-innovation-school-science.html>

⁸ <https://www.sciencecampaign.org.uk/resource/diversity2018.html>

⁹ <https://www.sciencecampaign.org.uk/news-media/case-comment/inspiring-innovation-school-science.html>

¹⁰ <https://www.sciencecampaign.org.uk/static/uploaded/f3c01267-0a43-40a5-8014124b27ffb052.pdf>

¹¹ https://www.engineeringuk.com/media/274342/euk2535_careers_provision_report_lr.pdf

within a joined-up national careers strategy and do more to encourage flexible working practices and career pathways.¹²

It is vital that young people can receive a far-reaching and well-rounded science education in school. Crucial to this is a confident and empowered teaching workforce. Our report, Inspiring Innovation, found that attracting and retaining science teachers remains a significant issue.¹³ It is particularly difficult to attract maths and physics graduates to teaching as they can often command higher salaries outside of teaching. This can have a negative impact on uptake of these subjects, where quality of teaching is a major factor in students' likelihood to continue with these. Evidence shows that these challenges are exacerbated in the most disadvantaged areas, where schools find it particularly difficult to recruit teachers with the right skills.

CaSE found that being able to provide opportunities for teachers to further their careers and develop their skills is central to retaining skilled and passionate teachers.¹⁴ Continuing Professional Development (CPD) has been shown to have a significant impact on retention of teachers, particularly those in their first few years of teaching. CaSE therefore welcomed the introduction of the Early Career Framework in England to provide funding for newly qualified teachers to access high-quality CPD within the first two years.

The announcement that England will increase starting salaries to £30,000 by 2022-23 is a welcome development.¹⁵ However, in our Inspiring Innovation report we also stressed that although some financial incentives have been shown to have positive but limited impacts, it is important to provide wider support to teachers working in disadvantaged areas than higher salaries alone.¹⁶ This includes, for example, reduced timetables, offer of a substantial promotion and the opportunity to work with a talented teacher who they could learn from.¹⁷ We therefore recommended that the Government should explore how wider measures can help with recruitment of teachers in disadvantaged areas.

As highlighted earlier, to deliver lasting change in STEM skills will require a concerted effort to join up skills policy across Government. The creation of the National Science and Technology Council and the Office for Science and Technology Strategy (OSTS) represent a welcome step and opportunity to channel cross-departmental action to address the requirements of wider government policy aims for science and technology. CaSE has previously argued that a new Prime Minister should enhance and expand the role of OSTS as a co-ordinating centre, charging it with ensuring policy making across Government is aligned to deliver a more research-intensive UK. OSTS and the Government Office for Science can also support departments and their Chief Scientific Advisers in showing what R&D can do to improve the efficiency of public services, and its role in solving the big policy challenges ahead.

¹² https://www.engineeringuk.com/media/274342/euk2535_careers_provision_report_lr.pdf

¹³ <https://www.sciencecampaign.org.uk/news-media/case-comment/inspiring-innovation-school-science.html>

¹⁴ <https://www.sciencecampaign.org.uk/news-media/case-comment/inspiring-innovation-school-science.html>

¹⁵ <https://www.gov.uk/government/news/30000-starting-salaries-proposed-for-teachers>

¹⁶ <https://www.sciencecampaign.org.uk/news-media/case-comment/inspiring-innovation-school-science.html>

¹⁷ <https://www.sciencecampaign.org.uk/news-media/case-comment/inspiring-innovation-school-science.html>

Quality of academic careers

Addressing the lack of diversity in the R&D workforce by increasing the participation of under-represented groups will help address the need for more skilled researchers to reach the 2.4% target by growing the available talent pool. The R&D People and Culture strategy recognises the importance of ensuring that careers in research and innovation are made more secure and more attractive to a more diverse range of people.

In our policy review on diversity, CaSE provided two main recommendations for Government to improve diversity and inclusion in science and engineering.¹⁸ We argued that the Government should embed diversity and inclusion through a joined-up national careers strategy, and do more to encourage flexible working practices and career pathways. We also recommended the Government should lead the way with national statistics and coordinate central analysis and monitoring to understand causes of under-representation, ensuring evidence can inform action taken by Government and other organisations. Data collection and analysis can support the correct diagnosis of issues, prioritising interventions and development of policies and programmes. It is therefore welcome that UKRI has taken measures to publish data from across all research councils looking at various protected characteristics across applicants and awardees for UKRI funding – next it will be important to comprehensively monitor this data to understand where disadvantages are caused by the current funding system and steps that could be made to address such issues.

About CaSE

The Campaign for Science and Engineering (CaSE) works to put science and engineering at the heart of the UK's future. By offering responsive and non-partisan solutions, we aim to help research and innovation thrive in a way that improves people's lives and livelihoods. We are an independent, membership body representing over 115 scientific organisations including businesses, universities, learned societies, and research charities as well as individual scientists and engineers. Collectively our [members](#) employ over 336,000 people in the UK, and our industry and charity members invest over £32bn a year globally in R&D.

¹⁸ <https://www.sciencecampaign.org.uk/resource/diversity2018.html>