

People – talent pipeline for an R&D intensive economy

Introduction

Central to the UK Government's Industrial Strategy White Paper, published in 2017, is the target to increase the UK's spend on research and development (R&D) to 2.4% of GDP by 2027. UK Research and Innovation (UKRI) has organised a series of workshops with our stakeholders, to explore the biggest questions for UKRI and the UK research and innovation landscape more broadly over the coming years. Workshop outputs are being used to develop our evidence base and inform our policy and analysis work.

On 15 October 2018, Sir John Kingman chaired a workshop, hosted by the Wellcome Trust, which gathered experts from across research, business, and thought leadership, to explore a series of questions on the talent pipeline required to achieve the 2.4% target. Annex A contains a full delegate list. The discussion covered a wealth of topics, including the skills pipeline, immigration, entrepreneurship, and equality, diversity and inclusion.

Background

A thriving, productive and internationally competitive knowledge base is vital for the UK, and this means we need to attract, maintain and develop talent. Reaching the 2.4% target will require a substantial increase in the number of researchers, innovators and technicians to be producing and utilising R&D in the UK, in the private and public sectors. We need to equip both new and existing researchers with the skills needed to generate economic growth in the future throughout the pipeline, and ensure we stay globally competitive to attract international talent. We need to build strong research careers, ensuring that equality, diversity and inclusion is embedded within the UK R&D environment. And we need to support flexible careers, where individuals can move between business and research and drive further innovation as we move towards the target.

Summary of discussion

Education and talent pipeline

Delegates emphasised that the size of the whole STEM pipeline would need to be increased, with many pathways to R&D careers that would need to be part of the plan towards 2.4%. Attention was required across the pipeline to ensure individuals can thrive. Attitudes towards science are set at a young age, and the need to better understand 'what works' in terms of inspiring young people to choose further STEM study or careers was emphasised. In addition, it was noted that there is a need to consider how we bring back into the pipeline those who have left R&D.

Stakeholders highlighted STEM teacher recruitment and retention as a critical issue, especially in the state system. Delegates noted that STEM-qualified individuals are highly sought after outside teaching with non-pay factors (especially workload) contributing significantly to low retention rates, although it was acknowledged that teacher pay was also a factor. It was recognised that delivering high-quality, subject specific CPD both boosts retention rates and improves teaching quality. Short termism in accountability systems also contributes to pressure in schools, despite some easing of year-to-year accountability. A major shift in culture is needed.

Attendees highlighted a lack of dedicated careers advice in schools, leading to low awareness of the diversity of STEM careers available (especially for underrepresented groups), with the breadth of opportunities within the life sciences sector highlighted as just one example. The lack of cultural value around these roles was also pinpointed – how do we make teaching and R&D roles sought-after professions?

Attendees noted that in some areas of current skills shortages, such as data science and artificial intelligence, a high level of competence could be obtained in a year through targeted master's or conversion courses.

Immigration

Noting that the UK Government is operating in a constrained space with regards to immigration, discussion focussed on the key drivers of making the case for openness. Delegates emphasised the importance of post-study work, in the context of an increasingly competitive market for international students. There was concern that EU exit would heavily impact the research landscape, both through the potentially negative impact of EU exit on the research workforce and in the absence of new ways to make the UK attractive for EU students without home fee status.

UK visa regimes were felt to be very expensive and lacking agility. There was concern that salary was often a poor proxy for skills in R&D-related roles and that the current system doesn't allow for an atypical workforce, such as entrepreneurs in low capital startups or where shares are included as part of a salary package. Delegates agreed that messaging (including from Government) about the UK being open for, and welcoming to, skilled migration often does not reach those it is referring to. It also conflicts with difficulties experienced by R&D-active individuals during the visa application process.

Entrepreneurship and skills within the research base

Whilst there has been significant investment related to professional development for doctoral students to transition into wider sectors, delegates considered whether more could be done. Early career researchers have multiple transferable skills, but struggle to recognise these due to bifurcation of language inside and outside of academia. Delegates agreed that funders had a real role in exposing students to possibilities, and developing the skills required, in relation to the next stages of their careers, but that the form this takes should not be too prescriptive. Some funders are experimenting with follow on funding to allow other career options to be explored.

It was agreed that the REF drives behaviours seen in the current system, including relationships between supervisors and their students or postdoctoral researchers, which are not guided by career development of individuals. A system which emphasised individual people as well as research outputs, such as putting value on impact achieved through career destinations, could alter this.

Equality, diversity and inclusion (EDI)

There was consensus that to achieve the 2.4% goal the UK will need a diverse R&D workforce, including in terms of gender, socio-economic background and ethnicity. The importance of visible role models, from similar backgrounds and at a career level that seemed obtainable, was emphasised, but also the effectiveness of simple approaches (e.g. avoiding comments on the relative difficulty of subjects). Communicating the importance of individuals subjects for future choice is also key, talent pools are limited by early decisions to drop maths. Delegates noted that school students in the UK specialise at an early stage, suggesting that a broader system requiring the study of mathematics and science until 18 (such as in the European Baccalaureate system) had the potential to increase the diversity of students, especially female, in STEM subjects.

It was noted that several billion pounds were spent on access initiatives each year across the UK, but this was entirely focussed on undergraduate admissions with nothing aimed at attracting diversity in graduate student populations. In addition, the lack of funding for master's level degrees creates socioeconomic divisions further through the pipeline. Delegates also noted that particular

groups of people are more likely to be internationally mobile; immigration is not a neutral topic but should also be considered through the lens of EDI.

The need to transform the R&D environment was discussed. A high proportion of women make conscious decisions to move out of research due to the culture and we should ensure we are not bringing large numbers of people into the current, not inclusive, environment.

What is required in the talent pipeline to achieve the 2.4% target?

It is clear that to reach 2.4% of GDP investment in R&D requires a significant focus on people, not just increases in public and private spending. Delegates proposed a number of ideas, across talent pathways, that could help us meet this target:

- impactfully engage children with STEM and research careers at the earliest possible stage, across the full diversity of potential pathways;
- understand how we can address issues around teacher recruitment and retention and ensure quality STEM provision across the state sector, such as through addressing workload issues, pay differentiation, and introducing a requirement for continued professional development (CPD);
- increase awareness of the full range of R&D opportunities available through pursuing STEM subjects, for example through specific careers education and advice provision for schools;
- consider funding targeted master's and conversion courses, both to address skills shortages and to tackle socioeconomic barriers to postgraduate education;
- expand placement options and examine the potential of follow-on funding for PhD students to explore the full range of career options;
- allow postdoctoral researchers 20% of their time for CPD;
- emphasise the importance of post-study work options for international students;
- understand what an optimal immigration system for R&D would look like, including for an atypical workforce;
- consider what UKRI could do to build and collate the evidence base across government to inform funding, policy and initiative decisions around increasing the diversity of the UK's R&D workforce;
- embed inclusion across all courses, and consider experimenting with prerequisites to increase diversity;
- consider how we can work with partners to increase our reach and bring people back into the STEM pathway;
- invest in capturing data and 'what works' research to understand what effective policy looks like in relation to R&D pathways; and
- examine how to transform the culture of R&D as a whole, so we are bringing the individuals required for an R&D-intense economy into an inclusive environment.

In summary, Sir John Kingman emphasised that the workshop conversation was just a starting point. UKRI has a responsibility to rise to the opportunity, and challenge, of the target to increase the UK's investment in R&D to 2.4% of GDP by 2027, and 3% in the longer term, improving productivity and economic growth across the UK.

Annex A – delegate list

| Name | Organisation |
|----------------------|------------------------------------|
| John Kingman (Chair) | UK Research and Innovation |
| Sarah Casemore | Wellcome Trust |
| Hilary Coles | Janssen Global Clinical Operations |
| Anne-Marie Coriat | Wellcome Trust |
| Amelia Dearman | Wellcome Trust |
| Rebecca Endean | UK Research and Innovation |
| David Gavaghan | University of Oxford |
| Chris Hale | Universities UK |
| Linda Holliday | UK Research and Innovation - MRC |
| Bethan Hughes | Wellcome Trust |
| Mark Jones | OneHE |
| Paul Kett | Department for Education |
| Hilary Leever | Wellcome Trust |
| Katherine Mathieson | British Science Association |
| Janet Metcalfe | Vitae |
| Kiera Newmark | Department for Education |
| Jennifer Rubin | UK Research and Innovation - ESRC |
| Jeremy Tavare | University of Bristol |
| Iain Thomas | Cambridge Enterprise |
| Anna Vignoles | University of Cambridge |
| Naomi Weir | CaSE |