

Campaign for Science and Engineering (CaSE) response to Industrial Strategy green paper consultation

About CaSE

The Campaign for Science and Engineering (CaSE) is the UK's leading independent advocate for science and engineering. We represent over 100 scientific organisations including businesses, universities, professional bodies, 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 around £32.2bn a year globally in R&D.

Q7. What are the most significant barriers to investment? Do they vary across the growth-driving sectors? What evidence can you share to illustrate this?

The most recent ONS business enterprise research and development (BERD) data shows that total UK business expenditure on research and development (R&D) has stagnated since 2018 (ONS, 2022. Business enterprise research and development, UK). Ensuring business R&D investment continues to rise is vital if the UK is to achieve its growth ambitions. CaSE's report <u>Backing Business R&D</u> sets out some of the most significant barriers that UK businesses face when investing in R&D.

R&D investment

There is extensive evidence that public investment in R&D provides significant economic returns, with a time lag (). Investment in public R&D increases private sector output and productivity, leading to significant rates of return, likely in the range of 20-30% (CaSE, 2022. How R&D Investment Drives Economic Growth). Public investment in R&D also crowds in significant levels of private sector investment in R&D. Recent estimates show that in the UK, each £1 of public R&D stimulates between £0.60 to £1.10 of private R&D investment in the short term, and between £3.09 to £4.02 in the long term (NCUB, 2024, Unlocking growth: The impact of public R&D spending on private sector investment in the UK). The commitment by the Government to spend £20.4bn on R&D in 2025-26 is very welcome. The Government should continue to commit to ambitious, long-term, and sustainable investment in R&D to ensure that the UK is a leader within the G7 on R&D investment.



While there have been welcome increases in public sector commitments to invest in R&D, to maximise the returns on public R&D investment, it is crucial that the UK policy environment has the measures needed to encourage further business investment.

Lack of stability and predictability within the policy landscape

The Government's decision-making acts as a signal to globally mobile businesses looking to invest in R&D. A stable and predictable policy environment is vital to enable effective long-term planning and investment by businesses in R&D. While some flexibility is needed to allow for periodic updates to policy to ensure it remains fit for purpose, what matters for businesses is predictability through clear signalling of intent and direction of travel. Outlining priority areas of focus can help provide a signal to industry that there will be stability, without 'picking winners', allowing businesses to invest in those research areas. It is welcome that the Industrial Strategy green paper recognises the importance of building long term stability to provide businesses with the certainty they need to invest.

R&D tax credits

R&D tax reliefs play a vital role in supporting innovative companies in the UK. R&D tax credits have recently suffered from instability due to a series of changes, which has been unhelpful. Recent successive policy changes to R&D tax credits, including the level at which they are set, has led to a lack of clarity and certainty for businesses. It is welcome that the Government recognises the importance of predictability and stability within the tax system, with the publication of the Corporate Tax Roadmap and a commitment to maintain the UK's R&D tax reliefs offer. To avoid continued misunderstanding in future, there needs to be a statement of intent from the Government on the purpose and focus of R&D tax reliefs. This should include clarifying the level at which they are set to provide certainty for businesses.

Lack of support for R&D intensive start-ups and scale-ups

Financial support for scale-up businesses

CaSE members and wider stakeholders have told us that support for R&D intensive businesses at the scale-up stage is a particular issue. The ability to access the right type of finance at each stage of development is critical to enable R&D focussed businesses to scale and grow. It is welcome that the Government has committed to making it easier for start-ups and scale-ups to access external sources of financial support.

Lack of access to infrastructure



There are challenges around access to the R&D infrastructure that supports businesses to scale and grow. Of particular concern is the shortage of specialised space for early-stage businesses that require larger spaces as they scale-up. Access to available scale up facilities can also be prohibitively expensive for businesses.

Lack of agility and capacity in the regulatory system

A forward-looking regulatory environment sends a powerful signal to businesses and investors about the attractiveness of the UK environment. We have also heard from CaSE members and businesses that regulation is necessary to ensure consumer confidence in businesses. There must, therefore, be a balance between not stifling first mover advantage while having sufficient regulatory oversight.

In several sectors, the UK regulatory system is already innovative and creative. Regulatory sandboxes are an example of this, with the Financial Conduct Authority and Information Commissioner's Office in particular offering successful sandboxes.

However, in certain sectors, regulation is failing to keep pace with new and emerging developments in technology. For example, in the construction sector greener cement alternative materials do not conform with existing regulation and so cannot be adopted. In addition, the intersection of technologies, for example artificial intelligence (AI) with life sciences, makes it particularly difficult to meet the requirements of the regulatory system. Regulators themselves often do not know how a new technology would fit within existing regulatory requirements, since a new and emerging technology is ahead of what a regulator has seen before.

Another area that requires urgent attention is how regulators are resourced to carry out their functions. Challenges around regulatory capacity have been further compounded by the UK leaving the European Union, which has led to additional workflow for regulators across multiple sectors. Lack of regulatory capacity can lead to costly delays for businesses, which is a particular issue for small and medium sized businesses (SMEs). It could also have an impact on business confidence in the UK regulatory environment.

Insufficient public procurement processes

Adopting innovation through public procurement provides wide ranging benefits to the public sector, enabling the delivery of improved products, processes, and services. Our evidence shows that the Government tends to signal its interest quite late compared to other countries' governments.



We also heard that procurement strategies continue to be insufficient to support a thriving R&D business environment. A culture of risk aversion and the focus of procurement policy on achieving the lowest cost or narrowly defined value for money can hinder access to innovative solutions. These constraints within procurement processes can present a barrier for R&D intensive businesses that do not operate in established markets and may deter businesses from applying in the first place, therefore risking public procurement being closed off to new ideas and approaches. It is welcome that the Procurement Act 2023 will take steps to support smaller businesses.

Skills shortages and regional mismatches with employer needs

The availability of skilled workers has a major influence on business R&D investment decisions. A lack of skilled applicants to fill R&D roles is one of the key barriers to investing in innovation.

The R&D workplace is rapidly evolving due to a range of factors, such as digital advancements and pro-sustainability agendas, which are changing the types of skills that employers need. Proximity to universities can be a strong selling point for business locations, yet the specific skills shortages that businesses face are not always communicated effectively to the education institutions that train the local graduate talent pool.

Visa costs

The 2021 People and Culture Strategy estimated that the R&D sector will need at least an additional 150,000 researchers and technicians by 2030 to sustain the UK's ambitions for R&D. In addition to domestic talent, international talent is needed to fill skill gaps and importantly R&D is a global endeavour that relies on international collaboration.

Over the last year the UK immigration and visa system has seen changes that have increased upfront costs and restricted eligibility criteria for overseas workers and their dependents. The total upfront costs of visas are substantially higher in the UK compared to other R&D intensive countries, such as the US, Canada, France and Germany. This may reduce the attractiveness of the UK as a destination for international applicants bearing the burden of these costs.

Furthermore, recruitment of international talent is burdensome for UK employers. Navigating the UK visa system often requires considerable resources and expertise. Businesses covering visa charges also face greater hiring costs and risk losses if sponsored applicants withdraw. Repeated changes to the visa system make an already



difficult to navigate process harder to access, particularly for SMEs who lack the administrative capacity to keep pace with opaque, changing requirements. This administrative burden can also introduce delays to research projects, as issues with recruitment and visa processes increases the time taken to recruit into R&D roles.

Financial sustainability of universities

The UK's universities are a national asset and play a pivotal role in the R&D and innovation landscape through their teaching, research and knowledge exchange activities. They bring a range of diverse benefits to the UK's R&D landscape and to society more broadly (CaSE, 2024, Universities: A crucial component of UK R&D). They have a central role in bringing together industry and others to create local partnerships that drive cutting-edge R&D in world class facilities.

One issue that has come under renewed focus is the significant financial pressures facing UK universities (OfS, 2024, Increased pressure on higher education finances). They have substantial gaps in their current R&D funds, stemming from short falls in the UK's current research funding model, including both public and charitable funding provisions. The financial sustainability of the research system is vital to the future success of research and innovation in the UK. To deliver their role in the R&D ecosystem effectively, universities must be supported to achieve a sustainable financial model across both their teaching and research activities.

CaSE members have told us that companies and service providers that rely on the supply of R&D and innovations universities provide will simply go and find it elsewhere rather than stay in the region, or even in the country, and lose it.

Q8. Where you identified barriers in response to Question 7 which relate to people and skills (including issues such as delivery of employment support, careers, and skills provision), what UK government policy solutions could best address these?

Support and coordinate a more integrated skills system across Government

In CaSE's report <u>The Skills Opportunity</u>, we recommended that the Government must support and coordinate a more integrated skills system across Government and should set out a clear plan for people and skills that aligns with its priorities for science and technology. It is encouraging to see the Government has already taken steps to tackle some of these issues, including by establishing Skills England.

Align local education provision with changing employer skills requirements



Efforts to grow regional R&D capacity will require close collaboration with local industry stakeholders alongside strengthening local skills policy and provision pipelines. It is important to ensure that businesses are involved in the design and development of Local Skills Improvement Plans. Sponsorships from local businesses to provide training and building partnerships between regional industry and education providers to produce joint curricula could help to bring in employer input.

Reduce the upfront costs of visas

It is critical that the immigration and visa system, and associated costs, do not act as a barrier to attracting skilled researchers. The upfront cost of UK visas needs to be reduced in line with international competitors.

Support businesses to navigate the visa system

The Home Office should develop support with clear signposting to help applicants and businesses navigate the visa system, particularly for SMEs.

Q9. What more could be done to achieve a step change in employer investment in training in the growth-driving sectors?

While there is interest among employers to provide opportunities for training at work or take on apprentices, we heard that employers often lack the resources and broader incentives to support employees to take part in training at work. It would therefore be helpful to explore a range of support and broader incentives that could be put in place for employers to provide workplace training as well as apprenticeships. These types of incentives could help to reduce the burden and perceived risk around return on investment to the employer. It is encouraging to see the establishment of the new Growth and Skills Levy, which aims to provide employers with increased flexibility and accessibility around the provision of apprenticeships and training programmes.

Streamline the regulatory framework for apprenticeships

The Department for Education should streamline the delivery and regulatory aspects of apprenticeships. This includes streamlining the different standards required, as well as the administrative requirements through the different regulators. New standards for apprenticeships should only be introduced where there is a clear need and not just small variations on existing standards. This will help avoid a large proliferation of standards that are only used for small numbers of apprenticeships.

Formalise the network of intermediary support



The UK Government should formalise the network of intermediary support that has developed in England to establish a national network of high-quality intermediary support for smaller employers to access apprenticeships. Intermediary organisations, which assist in the provision, coordination and support of an apprenticeship, could be better leveraged to ensure smaller businesses are able to access high-quality support. This would help smaller employers who have less resources to support learners in the workplace.

Q10. Where you identified barriers in response to Question 7 which relate to RDI and technology adoption and diffusion, what policy solutions could best address these?

Scaling up is a challenge for R&D intensive SMEs in the UK, with a major issue being around the adoption and uptake of innovation in the public sector.

CaSE heard from our members that a particular challenge is the level of bureaucracy and culture of risk aversion within public services which acts as a barrier to the implementation of innovation. This for example relates to complex regulatory and public procurement processes, amongst others, which are not always commensurate with R&D projects. There is a need to ensure a more proportionate level of bureaucracy to support the implementation of innovation in public services.

The digital and green transitions and emerging technologies such as AI are changing the global skills landscape. Therefore, there needs to be consideration on how to prepare the future workforce for the types of skills that will be needed. Investment in skills is needed alongside the development of innovations to ensure people stay updated with technology. However, the shortage of STEM skills in the UK is an ongoing problem and has been estimated to cost the UK economy £1.5bn per year. The Institution of Engineering and Technology (IET) has estimated a shortfall of over 173,000 workers in the STEM sector, an average of 10 unfilled roles per business in the UK (IET, 2021, Addressing the STEM skills shortage challenge). In addition, the IET's Skills Survey published in 2021 identified that half (49%) of engineering businesses are experiencing difficulties in the skills available to them when trying to recruit (IET, 2021, Skills and demand in industry).

Recommendations

Extend the use of regulatory sandboxes

Regulatory sandboxes provide the ability to pilot innovations at a smaller scale, which reduces the risk to innovators. In several sectors, the UK regulatory system is already



innovative and creative, and the Financial Conduct Authority and Information Commissioner's Office in particular offer successful sandboxes.

Use public procurement to establish and strengthen markets for new technologies

Clear signalling of Government intent to act as early adopter through public procurement will enable businesses to develop strong route to market strategies, increasing the confidence of sectors to invest in targeted R&D. This requires strong leadership to promote cultural change in attitudes to risk and trade-offs in opening up public procurement to a more diverse supply base.

Establish more flexible and adaptable procurement pathways to support smaller businesses

Introduce a procurement process for early-stage, research-intensive businesses with an alternative system of checks that reflect their unique situation as pioneers operating in unestablished markets.

Identify and support future skills needs

Support non-traditional routes into jobs alongside PhD training, including for example apprenticeships and bootcamp style training opportunities. The Entrepreneurs in Residence programme is an example of a programme of learning by teaching that has been helpful in bringing in role models and is highly replicable across sectors.

Q11. What are the barriers to R&D commercialisation that the UK government should be considering?

For R&D to contribute to economic growth, and the missions more generally, it is necessary to support translation and commercialisation into innovation as well as uptake and diffusion across public services. When supporting the R&D pipeline, it will be important to consider the R&D system as a whole and avoid developing solutions that resolves issues for part, but not all, of the system.

Ensure breadth and continuity of funding

Providing continuity of funding has been identified as vital in supporting the commercialisation journey beyond the 'valley of death'. Long-term funding can support longer-term collaboration between industry and academia, and sustain capacity, skills, collaborations and culture shifts that have been built up over the course of a project or programme. Bringing together sectors can also help to share best practice, knowledge



and skills, which is helpful in the face of new and emerging developments in R&D. Providing a stable research community and collaboration network can also unlock short term opportunities, allowing UK R&D to be agile and responsive.

CaSE heard from our members that within a framework of long-term funding and stability, flexibility is needed to be able to change focus and direction in response to new developments. Similarly, continuity need not be seen as a guarantee of future funding, rather adopted as a form of continuous 'stewardship' of a project by funders, increasing bid efficiency and streamlining future funding rounds, even if funding is still applied for in tranches.

Lack of access to scale up infrastructure

Of particular concern is the shortage of specialised space for early-stage businesses that require larger spaces as they scale-up. This lack of space is well documented in the biotech industry. This is a particular issue in the Golden Triangle (Cambridge – Oxford – London), with a critical shortage of specialist laboratory space for life sciences businesses. It is positive that the Government has taken steps to address this through proposed changes to the National Planning Policy Framework to make it easier to build R&D facilities, including laboratories.

A further missing scale-up infrastructure capability is the intense competition for space in the final production stage of product development, which can lead to smaller enterprises taking their economically valuable production activity abroad.

Access to the right infrastructure at the right time can be costly for businesses. The example was given of the Centre for Process Innovation (CPI), a scale up facility with nine sites across the UK. It supports the journey from research to commercialisation by providing expertise, support and kit for businesses and researchers. However, access to these facilities can be prohibitively expensive for businesses.

Q14. Where you identified barriers in response to Question 7 which relate to planning, infrastructure and transport, what UK government policy solutions could best address these in addition to existing reforms? How can this best support regional growth?

There are challenges around access to R&D infrastructure that supports businesses to scale and grow (see responses to Q7 and Q11).

Support access to scale up infrastructure



The Government should consider how access to infrastructure could be subsidised or develop ways of bringing in joint funding with industry to reduce the upfront cost. Access to the right infrastructure at the right time can be costly for businesses. Access to the right infrastructure at the right time can be costly for businesses, as discussed in Q11 regarding access to CPI facilities.

Prioritise and incentivise R&D facility development projects

Establish local taskforces to coordinate and drive the delivery of new R&D facility planning proposals across the UK. Including capital R&D investments, such as laboratory space, as an eligible cost for R&D tax relief would be a further way of incentivising investment in R&D facilities.

Support R&D infrastructure through wider infrastructure improvements

R&D infrastructure cannot be considered in isolation and must be considered in a wider context of investment across Government in other aspects of regional infrastructure and other policy considerations such as planning processes, housing, transport, and utility supply.

Q20. Do you have suggestions on where regulation can be reformed or introduced to encourage growth and innovation, including addressing any barriers you identified in Question 7?

Regulatory gaps and uncertainty can be challenging for both businesses and investors to navigate. Therefore, ensuring that regulation is adaptive and flexible to keep pace with innovation is important. We also heard from CaSE members that looking for efficiencies in the process rather than scaling back regulation would be helpful to support innovation.

It is encouraging that the Government has recognised the importance of adaptive regulation to support innovation. CaSE was pleased to see the Government's announcement of a new Regulatory Innovation Office (RIO) to support regulators, provide regulatory certainty and reduce delays around new and emerging technologies, which aligns with the recommendations in our report Backing Business R&D. It is also positive that the new RIO will ensure greater join up between Government departments to address the cross-cutting nature of emerging technologies, something which we also called for.

Recommendations



Implement the recommendations of the Pro-Innovation Review of Technologies and Closing the Gap series

The Science and Technology Framework, the Pro-innovation Regulation of Technologies Review and the Regulatory Horizon Council's Closing the Gap series of reports all make recommendations for how the UK can better regulate emerging technologies in critical sectors. These provide good principles on what is needed to improve the regulatory landscape across sectors. What is needed now is delivery and implementation, which will require central coordination by the Regulatory Innovation Office.

Support regulatory capacity

An area that requires urgent attention is how regulators are resourced to carry out their functions. Challenges around regulatory capacity have been further compounded by the UK leaving the European Union, which has led to additional workflow for regulators across multiple sectors. Lack of regulatory capacity can lead to costly delays for businesses, which is a particular issue for small and medium sized businesses (SMEs). It could also have an impact on business confidence in the UK regulatory environment.

Use the expertise of cross-sector groups of external experts to support resourcing of regulatory capacity

This could be via leveraging the expertise of business schools in the university sector or cross sector groups made up of academics or industry experts to complement regulatory teams. External experts are well placed to diagnose the health of their own sectors and propose solutions.

Support the development of standards

Support the development of standards to drive the development and commercialisation of new and emerging technologies. Standards can help provide an initial framework and guidance, which can then lead to more proportionate regulation further down the line. The Government, together with the British Standards Institution, should extend collaborative networks to develop standards across multiple sectors.

Ensure alignment of UK regulation with international counterparts

The UK is a small market, and therefore many companies look to sell products of innovation on the global stage, with exports contributing to UK economic growth. Therefore, ensuring clarity and certainty around the alignment of UK regulation with international regulation, such as US and EU, is vital in encouraging businesses to set up and conduct their R&D in the UK.



Q22. What are the main barriers faced by companies who are seeking finance to scale up in the UK or by investors who are seeking to deploy capital, and do those barriers vary for the growth-driving sectors? How can addressing these barriers enable more global players in the UK?

Evidence from CaSE's report <u>Backing Business R&D</u> shows that financial support for scale-up businesses is a particular issue. It is welcome that the Government has committed to making it easier for start-ups and scale-ups to access external sources of financial support.

Medium sized R&D-led businesses, which form a large part of business-driven R&D activity in the UK, often lack the necessary support. Series B funding was reported to be a significant challenge in the UK – while there are many funding pots, these are often not large enough. There are also sector-specific challenges related to this, for example for deep-tech companies there are often no 'price setters' who know how to value a deeptech company post-Series A funding. The lack of financial support at these stages of development means that the UK often fails to keep many medium sized businesses.

A related challenge is the investment thresholds for UK Government venture capital schemes. There are three schemes, Enterprise Investment Scheme (EIS), Seed Enterprise Investment Scheme (SEIS), and Venture Capital Trust (VCT), that are designed to encourage investment in higher-risk, early-stage innovative businesses. The amounts that venture capital trusts can invest using the schemes are based on thresholds that can limit the amounts available within Series B rounds of funding for businesses. Although the schemes provide a good incentive, in practice there is a need to update the thresholds regularly to ensure they remain relevant to the current investment landscape. It is welcome that the Government has committed to extending the Enterprise Investment Scheme and Venture Capital Trust schemes to 2035.

Q27. What public and private sector interventions are needed to make strategic industrial sites 'investment-ready'? How should we determine which sites across the UK are most critical for unlocking this investment?

It is welcome to see the Industrial Strategy recognise the role of R&D in driving local and regional innovation ecosystems and economic growth in city regions and clusters. It is positive to see the extension of the Innovation Accelerators programme, which our



evidence shows has been successful in providing regions with the funding and the freedom to enact effective policies at a local level.

CaSE's report <u>Backing Business R&D</u> provides recommendations to further strengthen local innovation ecosystems to improve R&D investment opportunities across the UK. Our work emphasised that it is important to connect and scale innovation capacity in regions to ensure they are ready and prepared to benefit from innovation support, such as the Investment Zones and Freeports, which provide tax and customs incentives and a range of other support in locations across the UK.

Not all regions benefit from the presence of existing R&D and innovation infrastructure able to support all stages of the pathway to commercialisation or the civic leadership structures to drive forward on the innovation agenda. While many places have strong universities, they can lack a translational research institute that can fill a gap in the translation pathway.

Recommendations

Map the R&D and innovation landscape

The Industrial Strategy should build on existing national R&D capability, including knowledge, skills and infrastructure. This requires developing a better understanding of the UK's existing R&D and innovation capability and infrastructure. CaSE members have suggested that a more comprehensive mapping of the R&D and innovation landscape could help to identify any gaps as well as encourage greater connectivity between different parts of the system.

Provide continuity of R&D funding

Continuity of R&D funding is needed to sustain regional capacity building. A lack of long-term funding means that capacity, skills, collaborations and culture shifts that have been built up over the course of a project or programme are not sustained when funding runs out. Long term regional funding can also allow local authorities to incentivise international businesses to establish sites in their region and, ultimately, conduct growth-stimulating production activity there, benefitting the regional and UK economy.

Support regions in building a 'brand'

Support regions to market their strengths and capabilities in order to attract inward investment. Foreign direct investors require a better understanding of different localities and their strengths and capabilities to navigate an ecosystem and make R&D



investment decisions. The presence of a strong brand internationally can help to provide certainty to businesses. This could be coordinated through the Office for Investment as recommended in the Harrington Review.

Q28. How should the Industrial Strategy accelerate growth in city regions and clusters of growth sectors across the UK through Local Growth Plans and other policy mechanisms?

In CaSE's report <u>Backing Business R&D</u>, we recommended that while the UK Government needs an overarching national strategy, it is important to provide regions with the funding and the freedom to enact effective policies at a local level, including about local innovation programmes. Local authorities should be empowered to make their own decisions about innovation investment and to drive things forward without excessive oversight from central Government. It is therefore welcome to see that the Government has committed to expanding the Innovation Accelerators programme.

We heard from CaSE members and regional authorities that concentrating efforts on city regions and clusters with existing potential that can be 'unlocked' will be crucial to promote growth in both those areas themselves and ultimately national prosperity more broadly. However, it was cautioned that having a narrow view of 'clusters' as places with lots of activity in exclusively the same sector risks overlooking the areas with strong potential for innovation that arises from the clustering of different, complementary sectors that enable innovative cross-disciplinary coordination within that region.

Recommendations

Support collaboration and promotion of collective R&D strengths

It is important to create an environment that is collaborative rather than competitive between regions. This could include supporting collections of places with related strengths to work together and explore collaborative opportunities to attract investment for a region. Place-based collaborative networks between different types of organisations could support longer-term planning in a region and support collaborative opportunities in R&D. These partnerships have brought together relevant stakeholders and helped to support longer-term planning for their regions.

It is important to design large scale inter-regional collaboration into national strategic planning and funding calls, rather than encouraging competition between regions. Inviting multiple regions to bid for the same pot can invite competition where regions may naturally complement each other. By engaging with different regions or clusters



early and establishing how they might use their regional strengths to work together, within a fixed funding allowance, it would avoid the need for regions to retrofit collaboration into competitively acquired project funding.

Align local education provision with changing employer skills requirements

The UK and devolved Governments should develop mechanisms to promote future skills training that aligns with changing labour market demands. Sponsorships from local businesses to provide training and building partnerships between regional industry and education providers to produce joint curricula could help to bring in employer input. Local Skills Improvement Plans need to involve businesses in the plans' design and development.

Consider other enablers around R&D

It is also important to consider the other enablers around R&D that are required, such as changes to planning law, infrastructure and skills capacity. If the UK wants to become more innovative, it needs a strategy to better link regions and drive the dispersal of innovation activity, for example through investing in better connecting towns and cities, institutions and people.