

INTRODUCTION

AIRTO, the Association of Innovation, Research & Technology Organisations, on behalf of its members, has prepared this written response to the call for evidence from the Science, Innovation and Technology Select Committee Inquiry: Innovation, growth and the regions.

AIRTO represents the UK's extensive Innovation, Research and Technology (IRT) sector, which employs 57,000 highly skilled people, has a combined annual turnover of [£6.9Bn and contributes £34Bn to UK GDP](#). Organisations in this critical sector work with industry, government and academia to promote and support the introduction of innovation to the full range of industrial sectors, and to provide technical solutions to new challenges and crises. The IRT sector is a key partner for industry in delivering the support needed for innovation driven economic growth.

Via our recent [representation to HM Treasury for the Budget 2024](#) and our recent [response to the Industrial Strategy Green Paper](#), we have been calling for a clear, consistent, innovation-led strategy that will boost growth to address the UK's immediate economic and societal challenges, and in the long-term lead to a strong, growing energy-secure Net Zero economy. Understanding the role that regions have to play in supporting and driving growth through innovation is critical if the Industrial Strategy is to succeed in delivering the government's ambitions.

RESPONSES TO INQUIRY QUESTIONS

1. How does the Government drive research and innovation in our regions?

- **How effective are the government's policies in supporting the innovation ecosystem across the UK's nations and regions, particularly through commercialisation initiatives?**

Government policies are limited in their effectiveness for support of the innovation ecosystem across the UK by a number of factors:

- The complexity of the research and innovation ecosystem, its modus operandi and its constituents. Sir Paul Nurse's [independent review of the UK's research, development and innovation \(RDI\) organisational landscape](#) (2023) emphasised that a better understanding of the UK innovation ecosystem and its constituents is needed to inform robust policy-making. Recognising the role of the Innovation, Research and Technology (IRT) Tech is particularly challenging as it is less obviously visible than the roles played by universities and industry (which is more known to policy makers). The IRT sector which is represented by AIRTO – (the Association of Innovation, Research & Technology Organisations) works closely with universities, but is also strongly connected to industry in providing expertise and capabilities for addressing short-term challenges and long-term opportunities for business growth.
- The public funding for the UK's research and innovation ecosystem is heavily weighted towards academic research (in contrast to competitor nations such as European neighbours and South Korea which have a more balanced spread of deployment across Technology Readiness Levels). This limits the public resource available for exploitation and commercialisation of the results of academic research, and the ability to address market-driven challenges and opportunities.
- The understanding of the roles and responsibilities of national and local government in supporting the research and innovation ecosystem. Some of the most valuable contributions made by regional authorities are in supporting or enabling regional innovation clusters to thrive through supporting inward investment, estate planning, transportation, and championing needs with national government in addition to partnering with other regions.

- The understanding of the existing and potential innovation opportunities and industrial strengths of regions. A recommendation of the 2022 government White Paper on Levelling Up was the creation of a national initiative focusing on local government data (which is very relevant for this current Inquiry).
- These factors combined mean that support for the research and innovation ecosystem across the UK's nations and regions may not always be optimised or evidenced-based, and may be conflicting.

○ **How should devolution be harnessed to support innovation across the regions and nations, and what role should local government play in supporting research and development?**

- Devolution has a key role to play in supporting innovation in the UK regions.
- For this to be effective there needs to be a clear understanding of how the R&D and associated exploitation ecosystem works and of the roles and responsibilities of national and local government, and how these are co-ordinated. It is vital that devolution or regional agendas should not undermine effective national initiatives, or centres such as the national role played by PSREs, Catapults and some independent RTOs. Germany's Fraunhofer-Gesellschaft and Helmholtz institutes offer useful comparators overseas where the structure of the innovation system is better understood.
- As discussed above, a national understanding of the R&D strengths of regions is vital if support is to be effectively co-ordinated. A lesson from the past is the conflicting activities of the Regional Development Agencies (RDAs), where excellence in certain technology areas was claimed by all RDAs, resulting in competing support and inefficient duplication of effort and activities.
- There are recent examples of best practice which should be observed and considered where there is a role for local government in support the research and development needs of businesses. One such example is seen in the success of the [Net Zero Technology Centre](#) based in Aberdeen, created in 2016 and funded by Aberdeen City Region Deal (via HM Treasury). By bringing businesses to the table when describing the challenges they face with technology deployment and adoption for the energy sector, working with NZTC has enabled the industry to get behind technology challenges to support the solutions. Within 8 years of formation NZTC has delivered an increase in GVA £10B - £17B, 59 emerging technologies reaching commercialisation phase, deployed 162 new technologies, co-funded 117 startups, secured £205M in matched funding from industry, created 1,554 new jobs and delivered an abatement potential of 20 MtCO₂e.

○ **How do factors such as the tax system, regulatory frameworks and standards influence the success of start-ups, spin-outs and other innovations-driven businesses?**

The key to supporting such businesses is simplicity, timeliness, and providing support and advice both on a regional and national basis. Again, the division between regional and national responsibilities needs to be clearly defined.

- For new technologies, the association between the progress in exploiting the technology and the development of regulatory frameworks and standards is crucial to optimise and will vary from one technology domain to another. Controls are needed as a technology and its exploitation progress, but there is a need for these controls not to restrict the exploitation of emerging technologies.
- For most technology domains, exploitation (and associated regulatory affairs) is likely to be a national rather than a regional activity.
- Missing or inappropriate regulation, standards and legal frameworks create uncertainty for investors and unwanted effort and costs for developing companies, slowing down innovation and stifling investment. This results in a loss of competitiveness relative to competing international

organisations. Failure to keep pace with developing market opportunities can also lead to hazardous products becoming available from unregulated suppliers, putting at risk both consumers and whole areas of new technological application.

- Differing uses of standards and practices between devolved and/or regional authorities can pose confusion and impose additional costs for suppliers trying to address markets on a national basis. An example would be difficulties for suppliers attempting to bring innovative products and solutions into the NHS.

○ **What challenges do innovation-focused researchers and business face in spinning-out or scaling-up, such as accessing venture capital, infrastructure and intellectual property rights?**

- These factors are all concerns for new and expanding companies, and advisory support offered at a national or regional level can be hugely beneficial.

- There are likely to be differences in the type and level of support needed between new companies (especially those focused on development of new technologies) and established technology-based companies which tend to have a more secure future (and which comprise the majority of UK technology-based businesses). New companies which tend to be smaller, and may not have in-house expertise that they are able to draw upon in areas such as intellectual property, public procurement etc. They often will not have some of the technical infrastructure that they require and are in particular need of being able to access the right support in an efficient and affordable way. In certain situations, support is available through IRT sector organisations which may offer opportunities for advice or partnership. One particularly helpful scheme is the long-running [Innovate UK Analysis for Innovators](#) programme which offers help to individual companies to solve tricky and, perhaps, long running technical problems affecting existing processes, products or services. It is aimed at boosting a company's productivity or competitiveness by enabling leading scientists (from a range of IRT sector organisations) to deploy world-class facilities, to work with companies to address problems in innovative ways.

2. How does research and innovation in our regions drive growth and prosperity in those regions?

○ **How effective are regional innovation hubs and clusters in supporting regional growth and prosperity for local communities?**

- There are a wide range of regional innovation hubs and clusters in the UK. These have grown both 'organically' and with direct systematic public support. Some have been and continue to be very effective, while other have not been so successful. Examples highlighting the spectrum of success include biotech and other technology areas in Cambridge and the East of England, and the Harwell Campus in Oxfordshire. Such successful activity attracts companies and organisations from overseas into the local area.

- There is a significant body of analyses and publications relating to innovation hubs and clusters, and summarising this work into an overall national report would be highly beneficial for national and regional government in developing a co-ordinated strategy.

○ **How regional Cluster growth can be best measured, mapped, and monitored to help inform local leadership and evidence-based policy making in Whitehall?**

- See above for summarising existing data on regional clusters.

- For measuring, mapping and monitoring of current and future cluster activity, to be effective, this has to be carried out in a co-ordinated way between regional and national government. This will be a continuing, significant task, but will be of great value in developing an evidence-based strategy at national and regional levels, especially if a quantified measure of companies moving into and moving on from a cluster could be developed, and the numbers of jobs created/people employed could be captured.
 - **Would unlocking investment at scale for innovative science and technology companies support regional growth, and how could this be done?**
 - Investment at scale for innovative science and technology companies will provide significant local growth.
 - This could be directly with industry, or via IRT sector organisations to provide technical support to companies in the region, particularly with cross-cutting technologies.
 - Such support programmes have been successfully delivered by IRT sector organisations, with audited, impressive results. However, these have been delivered regionally and nationally on an ad hoc basis, and a more co-ordinated programme would have significant benefits to regional growth and national prosperity.
 - A concern for regional support for innovation is whether the local government have the skills and knowledge to make informed decision regarding investment. This can be addressed by providing support from national government and its agencies, but also from the IRT sector where there is a deep understanding of both technology and industry.
 - **Should there be regional specific innovation and growth policies, and what should local government's role be in this?**
 - Yes. Regional specific innovation and growth policies will be hugely beneficial, if they are evidence-based and co-ordinated with the national strategy.
 - Local government's role should be to develop regional policies in co-ordination with the national strategy, and also to take responsibility for the delivery of the planned activities in alignment with the policies.
 - As discussed above, local government may need support in developing the skills and knowledge need to form these policies and delivering the associated planned activities.
 - Regional policies will have a range of factors to consider, from existing industry and skills, knowledge resources, potential investment, and geographical advantages. This will play an important role in developing the evidence base.
- 3. How is research and innovation diffused or supported to drive productivity and growth in the regions, wherever it may come from?**
- **What more can be done to ensure that innovation investments deliver tangible outcomes for both local and national economies, in terms of productivity and growth, and how should this be assessed?**

By enabling problem solving support (from IRT sector organisations) to the companies seeking to adopt new developments (both technological and other). This support may be obtained in part from local universities. However, IRT sector may frequently be able to offer more appropriate expertise beyond that available from universities in areas such as productionisation, quality control, regulatory compliance, process management and other support that is required beyond

R&D capabilities. This is exemplified by [the Innovate UK Analysis for Innovators](#) programme referenced our response to Question 1).

○ **To what extent do Catapults support technology diffusion, and drive both national and regional growth?**

- The Catapults play an important role in technology diffusion, but it is important to recognise that they are one part of the UK's IRT sector infrastructure. They represent an estimated 10% of the total UK's research and innovation ecosystem capacity.
- The IRT sector in the UK operates on a regional, national and international basis, and provides support for local technology clusters and is frequently instrumental in the establishment and evolution of such clusters.
- The IRT sector plays a wide role in supporting industry from developing new technologies through applied research, development and demonstration to make them valid for commercial exploitation, to addressing industry/market driven problems and developments. This range of activities is hugely important to the development of regional companies and cluster.
- Catapults are involved in incubating and supporting the spin-out of technological innovations, by virtue of their positioning. The government's drive to extend technology diffusion for growth (as part of the evolving Industrial Strategy) could be boosted by supporting other IRT sector organisations to offer additional services to support start ups and spin-outs.
- This type of activity has been largely ad hoc to date, but the IRT sector would welcome involvement from government in the development of national and regional strategy and policies to enhance the role it plays in increasing national prosperity and efficiency.

○ **How well are universities and businesses coordinating efforts to develop and commercialise research, including the role of spin-outs and collaborative R&D projects?**

- The co-ordination of effort between universities and businesses is very varied between institutions, and between departments within individual institutes.
- As well as the variation between universities and departments, the relationship between universities and industry does depend on the industry sector in which they are operating. For example, the pharmaceutical industry has a much more direct type of relationships and co-ordination than other manufacturing industries.
- Some universities are working successfully in partnership together and/or with third parties to shape the support they offer for entrepreneurship and emerging businesses in their regions. The [Setsquared Partnership](#) (involving the universities of Bath, Bristol, Cardiff, Exeter, Southampton and Surrey) is one such example.
- Considering the primary roles of universities to undertake teaching and curiosity- driven research (largely concerning lower TRLs), the principal support for commercialisation activities is targeted towards the development of technologies that are still in early-stage development (including those channelled towards spin-out companies).
- In contrast to this, large technology-based industrial companies have the resources to access expertise of universities for developing their technologies, often by collaborating on programmes for lower TRL activities or engaging in contract research activities.
- The role of universities and the IRT sector in supporting business are largely complementary, with universities providing more fundamental research, and the IRT sector providing applied research and demonstration. Both roles are important, but the IRT sector plays a role that is often more relevant to the short and medium term needs of business and may be more relevant for regional clusters.

In addition, the Committee welcomes submissions on the following points:

- **What is the relationship between investment in innovation and economic growth, both regionally and nationally?**
- **Is the £20.4 billion research and development budget delivering value for money and economic growth, and what metrics should be used to evaluate its effectiveness?**

Overall, the R&D budget delivers good value when the UK is compared to other nations in terms of the outputs e.g., as measured by publications, (which, for example, is reflected in the UK's universities performance in many of the global league tables and in the Global Innovation Index.

The following factors could be considered, amongst many others, to ascertain the effectiveness of the £20.4 billion research and development budget:

- Publication of research in reputable, peer-reviewed journals (to measure scientific achievement and endeavour).
- Patents (to ascertain possible inventions).
- Societal impact and tackling of global challenges and improve prosperity and quality of life (e.g., contributions to public health, tackling the climate emergency etc).
- Driving innovation: Number and types of new techniques, technologies, or methods that enhance business opportunities and enable new beneficial products or services.
- Economic output - Gross Value Added (GVA)
- Private investment unlocked
- Number of global businesses anchored in the UK
- High-quality jobs and careers created/harboured
- Measures of social mobility
- Number of enduring businesses or social enterprises created with local and/or national reach
- End-of journey metrics (exit value obtained, licence fees obtained, disposal/release without value)

However, a major area of activity for the IRT sector operations is research, development, innovation and demonstration in the mid Technology Readiness Level (TRL), where public investment has a 'multiplier effect' due to the generic nature of the activity and its relevance across whole sectors and industries. Appropriate public funding is also significantly multiplied by industrial investment both directly and through the IRT sector. This is reinforced by the IRT sector's commitment to the transfer of knowledge to industry and its deployment for innovative activity. As discussed above, AIRTO advocates for the government to re-balance public funding for research, development and innovation to provide more mid-technology readiness level support (e.g., demonstrators) for key sectors and industries, and reduce the cost and time to translate technologies to market (as discussed in [AIRTO's representation to HM Treasury for the Budget 2024](#)). The IRT sector can play a crucial role in ensuring the nation reaps the full benefit from public investment in RD&I. To achieve this, there are changes needed in the government's support for the IRT sector, as recommended in Sir Paul Nurse's Independent review of the research, development and innovation (RDI) organisational landscape. This will involve investment in the RD&I physical and digital infrastructure and skills, providing the necessary resources and capabilities to create a catalytic effect that further attracts private industrial funding, with its associated economic benefits. This also involves creating the right balance/distribution of funding across the TRLs as described in AIRTO's Position Statement ([More D!](#)).

○ **How are funding bodies such as UKRI and ARIA contributing to the UK's innovation ecosystem and delivering the government's growth missions?**

- These funding bodies are essential in supporting the UK's research and innovation ecosystem, and ensuring that the UK plays a leading role in global scientific and technological advancements. Funding is a major aspect of this support and UKRI, in particular, plays a critical role in leading and shaping the overarching strategic direction of the UK's research and innovation activities.

- UKRI and ARIA have very different roles to play in the UK's innovation ecosystem. Their impact should be separately evaluated.

- UKRI's (UK Research and Innovation) strategy is aligned with the government's ambitions for growth and is focussed on transforming the UK into a global leader for science and innovation. The strategy to achieve these ambitions, as UKRI works to deploy public resources, involves enhancing diversity, connectivity, resilience, and engagement across the research and innovation system in the UK to create opportunities and benefits. UKRI, through the Research Councils supports important academic, curiosity-driven research. It also has the role of supporting more applied research and innovation for business through Innovate UK.

- ARIA (Advanced Research and Invention Agency) was established to fund high-risk, high-reward scientific research (modelled on the US ARPA organisation) and unlock scientific and technological breakthroughs that could drive significant social and economic prosperity. The agency focuses on ambitious projects that are too speculative or interdisciplinary for traditional funding mechanisms (such as those offered by UKRI). ARIA's programmes involve fundamental research and invention, but ultimately any commercial exploitation opportunities (or other widespread adoption for public good) will be taken forward by business. In generic terms, when this stage is reached in its programmes, there should be a consideration of how/where in the UK's growth mission is best served to exploit the technology. However, ARIA programmes involve relevant partnerships with industrial companies when a technology is in the early-stages development, and frequently may have already addressed the target destination for ongoing development.

○ **How does the UK's innovation ecosystem compare to those of other countries, and what lessons can the UK learn from international models in terms of commercialising research and development to benefit both regional and national economies?**

- Government support for the UK's innovation ecosystem is strongly biased to academic/university research when compared to other countries.

- This is a consequence of the balance of public funding in the UK (with approx. 80% deployed towards early-stage research vs. approx. 20% deployed to applied research, development and demonstration activities) compared with an approximate 50%/50% split in comparator countries such as European neighbours and South Korea.

- The UK's innovation ecosystem is highly complex and fragmented, and consequently it is not easily understood by politicians and civil servants in the UK, where the default assumption is a bilateral ecosystem prevails comprised of universities and industry. This situation contrasts sharply with countries such as France and Germany, where all aspects of the innovation ecosystem are recognised and are an integral part of national and regional R&D strategy. This situation is aided by a more uniform approach to the constitution of some of the components of the national ecosystem in countries such as Germany (which have structures such as the Fraunhofer-Gesellschaft and Helmholtz institutes providing a collective identity large groups of IRT organisations).

- The 'third' part of the UK's innovation ecosystem is the IRT sector, covering research and technology organisations (RTOs) including the Catapult Centres, Public Sector Research Establishments (PSREs), Research Council laboratories, and private sector research organisations,

which may be 'not for profit'. The UK's network of Catapult Centres, and a number of Public Sector Research Establishments ('PSREs') which carry a 'National Laboratory' function are similar in government recognition to the comparator structures seen in countries such as Germany, but the UK also has a plethora of independent Research & Technology Organisations, 'RTOs' which constitute a key part of the ecosystem (many of which were established by government initially and some of which remain non-profit distributing).

- These organisations are often more appropriate for helping industry regionally, nationally, and internationally than universities because they are able to offer more industry orientated research facilities and late-stage capabilities for the work needed at higher 'Technology Readiness Levels, TRLs' such as commercial demonstration capabilities.

- Such organisations do play a role in regional growth and clusters, but this could be greatly enhanced by national and local government recognition and partnership, as is seen in competitor nations.

- As recommended in the Nurse review, a first step in exploiting this under-utilised resource is to develop a better understanding of all the components of the UK's innovation ecosystem, their current roles and modus operandi, and how this can be enhanced with national and regional government partnership and support.

Other points of consideration

Whilst the call for evidence refers to the role of *'the UK's innovation ecosystem in achieving the Government's mission to kickstart economic growth across the country'*, it does not explicitly reference two other themes which are pertinent to the relationship between research, development and innovation with the Industrial Strategy, nationally and regionally. These include:

- The critical importance of public procurement, with Government as first customer to drive growth and scale-up. There are roles for central government and for local government and other public sector agencies etc. in this, and the need for support and optimisation of processes to enable fledgling businesses to win contracts.
- The role of RTOs/IRT organisations and others in the ecosystem, including academia, in driving the development of the skills base in regions and thereby attracting and anchoring companies as part of the formation of clusters (either organically or intentionally) – ultimately creating opportunities and jobs.

For further information, please contact:

Dr Jane Gate, Executive Director, AIRTO Ltd: enquiries@airto.co.uk