

The Institution of Engineering and Technology response to the Call for Evidence: Financing and Scaling UK Science and Technology

About the IET

The IET is a trusted adviser of independent, impartial, evidence-based engineering and technology expertise. We are a registered charity and one of the world's leading professional societies for the engineering and technology community with over 155,000 members worldwide in 148 countries. Our strength is in working collaboratively with government, industry and academia to engineer solutions for our greatest societal challenges. We believe that professional guidance, especially in highly technological areas, is critical to good policy making. For further details on the evidence submitted, please contact policy@theiet.org.

Executive Summary

The IET welcomes the opportunity to comment on Financing and Scaling UK Science and Technology: Innovation, Investment, Industry.

Innovation is one of the key pillars of the UK economy, making it a cornerstone of any industrial strategy. The UK's innovation and entrepreneurship landscape, however, is complex and instead of seeing growth, we are seeing a decreasing number of companies seeking investment for growth¹. This is a trend seen globally, as there has been a sharp downturn in global funding activity for 2024 when compared to 2023², for the UK to continue being a world leader in innovation, this needs to be addressed.

Unclear pathways and a lack of multi-sector support exacerbates financial and communicational disconnects, further hindering growth. While incubators, accelerators, government schemes, and regional initiatives can provide crucial support, more is needed to streamline the process of bringing innovative ideas to market and supporting them through their journey.

Access to resources, including investment remains a key challenge to small and medium enterprises (SMEs) progressing their ideas. By supporting the most promising SME's can ensure the scaling up of more startups especially due to their potential to grow the economy. Providing more SMEs with the opportunities and ecosystem to grow into scaleups could present a huge boost for the UK economy, with a sustained positive impact on jobs, local economies and skills development. Launching more SMEs on the path to scaleup will create a knock-on positive effect for smaller companies striking out on the entrepreneurial journey.

Recommendations

- **Investment:** Government should take a pragmatic approach that allows for high-risk investment while being particularly conscious of additional funding if the original cost do not include additional overhead costs or incidentals. It is important that there is transparency and accountability within the process, including not continuing with projects that are not viable. In order to improve this, funding should have greater oversight, with clear metrics for success.

¹ [Small Business Barometer, Q4 2023](#), Enterprise Nation

² [The Global Investment Report 2024: A deep dive into global funding activity](#), Vestd

- **Incentives to avoid “brain drain”:** Government should incentivise those who do leave the UK, including UK residents, international students in STEM and investors to return. There are a number of levers to do this, including tax relief to make the UK more attractive to those who may leave, or who are expatriates (expats).
- **Scaleup pathways:** Government, Innovate UK and venture capitalists (VCs) should develop pathways for scaleup that are suitable for a variety of sized businesses to support the entrepreneurial journey. There are resources available through Innovate UK, however these need to be built on key milestones and be intertwined with knowledge sharing, showcasing success, connecting with commercial opportunities, promoting networking opportunities and establishing mentorship programmes.
- **Collaboration:** Academia, industry, and government entities must have more joined up collaboration in order to provide entrepreneurs with access to cutting-edge research, technological advancements, and a highly skilled workforce. It is important to build a cohesive infrastructure that enables SMEs to overcome the barriers of scaling up. Building on Business Connect is key to this, but the offering needs to be strengthened to appropriate levels of entry and communicating what is available more clearly.
- **Taxation:** Government should consider the tax regime for SMEs to avoid challenges faced by other countries, who have high levels of entrepreneurship, but whose tax laws run the risk of losing those innovators and VCs.

Scaling UK science and technology

Israel is one of the best, per capita, in the world at scaling up³. It has adopted the United States (U.S.) model in both funding and ecosystem. In Israel, the defence sector is also very prominent in the innovation ecosystem with a significant number of spinouts coming from there.

The U.S. is ahead of the UK as it has an infrastructure that supports growth and development of startups. For example, Massachusetts Institute of Technology (MIT), not only produces cutting-edge research and innovation, but also provides a steady stream of graduates who go on to become successful entrepreneurs, who contribute to a growing economy, creating two-thirds of new jobs and contribute to 44% of U.S. economic activity⁴. This is achieved through collaboration between academia, industry, and government entities, which provide entrepreneurs with access to cutting-edge research, technological advancements, and a highly skilled workforce. This meeting of intellectual capital creates an ecosystem where innovative ideas can flourish and shape the future. There is also a risk-taking culture in the U.S., which significantly contributes to the success of their entrepreneurial ecosystem. This culture enables entrepreneurs to celebrate success stories, whilst seeing failure as a learning opportunity.

Singapore is another country that is successful in scaling up, this is likely due to their government strategically investing in innovation. Government leads on co-ordinating academia, industry and investment. However, as it is a much smaller country than the UK, this is easier to achieve.

³ Israeli Technological Eco-System, Deloitte, 2023

⁴ [Small Businesses Generate 44 Percent of U.S. Economic Activity](#), U.S. Small Business Administration, 2019

The UK's attitude to risk is conservative. Investment should take a pragmatic approach that allows for high-risk investment but also stop funding projects that are not working or failing to provide the benefits and economic returns initially expected. Government should take the lead in changing perceptions of entrepreneurialism so that if initiatives and interventions are stopped, paused or terminated, they are not seen as failures but a step on the pathway to success, such views and perceptions hinder the implementation of future initiatives.

UK startups are attractive to overseas investors, however this usually means that when these companies scale up, they will leave the UK, to open head offices in places like Silicon Valley⁵. This is a sign of success, however, there needs to be incentives, for these companies to remain and grow in the UK. One way this can be done is through tax regulation.

Government should incentivise those who do leave the UK, including UK residents, international students in STEM and investors to return. There are a number of levers to do this, including tax relief to make the UK more attractive to those who may leave, or who are expatriates (expats). The Portuguese government has proposed a 10-year income tax break for young adults, including expats. Workers under the age of 35, with those earning up to €28,000 a year will pay no income tax at all during their first year of work, following this a certain percentage of earnings will be exempt from income tax up to 10 years e.g. 75% of income tax will be exempt from income tax between 2-4 years of work in Portugal⁶. This type of initiative can be expanded to include all who may be able to contribute to STEM industries, the focus does not necessarily have to be solely on young adults. This type of initiative, or other similar tax incentives, should be extended beyond young people to ensure they are more suitable to a range of ages and financial backgrounds.

Strategic priorities for UK science and technology in a changing world

Artificial Intelligence (AI)

AI is represented in many aspects of our daily lives. However, evaluating the final product to ensure it is safe, effective and fit for purpose remains a key challenge preventing the progress of AI. There are standards recommending how products should be developed and how they should be handed over to the end user, but there is little standardisation that documents an assessment of the efficacy and safety of the product.

AI regulation also needs to look beyond the immediate risks of AI development to the much broader impact it has on our environment. This includes disaggregating the impacts of AI from data centres, recognising that current models are unsustainable without greener infrastructure. This should be coupled with the commitment to ensuring our workforce has the digital skills to harness the potential of new technologies. Currently, one in three employers regard AI as 'important for growth by 2027', but only half of these employers have the right skills to utilise it⁷.

Quantum

The UK already has a strong background in systems engineering and is a global leader in developing quantum technologies (ranked 2nd for number of quantum companies). In the future, the UK can stand out globally in the future by harnessing its strength in bringing both quantum and systems engineering together. There needs to be greater quantum literacy within industry – particularly at c-suite level.

⁵ UK Innovation Update – Q1 2025, Dealroom

⁶ [5 countries rolling out the red carpet to expats](#), Smart Currency Exchange

⁷ Skills for a Digital Future Survey, IET, 2023

There is an opportunity for the UK to take a leadership position in global regulation and standards for quantum technology. Government and regulators should expand on the 2024 Regulation of Quantum Technology Applications report by the Regulatory Horizons Council to focus on the systems element of regulation in this field.

Particle Accelerator technology

Particle Accelerator technology research is fundamentally important to two of the Governments 'growth-driving sectors', specifically 'Advanced Manufacturing' and 'Clean Energy Industries'. For example, within Advanced Manufacturing, particle accelerator technology is the core of medical linear accelerators used in radiotherapy for the treatment of cancer. Within Clean Energy Industries, the fundamental research conducted at the Rutherford Appleton Laboratory, Boulby Underground Laboratory, and other research centres across the UK is advancing the development of nuclear fusion technology – offering the potential for revolutionary benefits for the clean energy industry. Namely, nuclear fusion has an effectively inexhaustible fuel source, baseload power which does not depend on external factors, and high fuel efficiency produces more energy per gram of fuel than any other process⁸. Particle accelerator technology should be explicitly mentioned within the Industrial Strategy and supported through appropriate policy measures.

Semi-Conductors

The National Semiconductor Strategy and advisory panel are positive steps in this economic sector that will grow in significance over the coming years. Resilience and security in the supply of semi-conductor chips is a key consideration which is leading to the likes of the U.S. to huge investment in re-establishing semi-conductor manufacturing capability. However, the UK is far behind its main competitors in this sector in terms of the scale and scope of its industry and geopolitical circumstances may impact the security of supply chains. As such, the Government, through the advisory panel, needs to carefully identify areas where it can compete effectively and then commit itself to channelling significant long-term resources, so as to build up technological innovations, the skills supply, investment and the supply chain infrastructure, working with key national/international partners to give industry the optimum opportunity for commercial success, enabling economic growth and job creation in the process. Considerations for Government should include:

- Significantly increased research and development (R&D) investment to support the development of new, high-cost semiconductor technologies and lead times, and encourage semiconductor companies to invest in world-class manufacturing facilities. A new UK incubator programme should be piloted, enabling design toolchains to be developed at a price point that allows new semiconductor start-ups to compete.
- Investment in skills programmes, linking academia-and industry at different levels will improve UK agility and commercial competitiveness, and build native capability. However, the UK currently falls behind other countries so this will take a generation to achieve.
- Measure taken to secure the semiconductor supply chain from disruptions and to protect IPR.
- Streamlined regulation, planning, and infrastructure without compromising safety and security. Industry experts should be consulted whenever regulations are amended to ensure that there are no unintended negative consequences from changes.

⁸ [Towards Fusion Energy Strategy](#), GOV.UK, 2023

Other technology that can support the five technologies that are being prioritised in the Science and Technology Framework should be considered too. One example is digital twins (DTs), which can be a key asset to achieving net-zero, for example, modelling the consumption of electricity. DTs can also help to ensure that the UK remains internationally competitive and also support greater safety in industry. The Government should make use of best practice in DT technology to help support changes to national infrastructure, healthcare, new housing and energy targets and other sectors to ensure taxpayers money is used optimally and the final product is efficient and resilient.

DTs have huge potential to promise more effective asset design, project execution and asset operations by dynamically integrating data and information throughout the asset lifecycle to achieve short and long-term efficiency and productivity gains. It's a data resource that can improve the design of a new asset or understanding of existing asset condition. This has the potential to vastly reduce errors and discontinuities present in more traditional methods of information management. However, there's a lack of clarity over what comprises a DT, a continuum between simulation/CAD to more advanced models. This affects the investment decision process. Much of the problem lies with software sellers labelling DT models incorrectly, which leads to varied definition. We recommend that the Government should champion standardisation in this area through the industrial strategy.

The global market valuation of DTs is expected to increase by \$32bn from the years 2019 – 2025, and it is predicted that half of all large companies will use some form of Digital Twin by 2021 – resulting in a 10% improvement in effectiveness⁹.

Funding environment

With regards to the current scientific incentive structure, around funding, peer review, and publications, reward high-impact science and technology Innovate UK has been running for approximately eighteen years and has continued to evaluate its impact. It is important that the data collection and analysis is robust in order to show economic impact that its funded R&D programmes and projects have.

Spending on defence can significantly fuel innovation, particularly through investments in R&D. A report looking into the long-term effects of Government spending by the American Economic Review¹⁰ found that defence spending continues to fuel private-sector investment and technological progress long after the initial investment. It also found the mechanism behind this: defence spending shifts the composition of public spending towards R&D. This then boosts innovation and private investment in the medium-term and increases productivity and GDP.

Financing investment in UK science and technology

The UK research and innovation landscape

It is important to ensure that funding allocations are spent as efficiently as possible, especially as projects can incur incidental or overhead costs. It is important that there is transparency and accountability within the process, including not continuing with projects that are not viable. In order to improve this, funding should have greater oversight, with clear metrics for success.

⁹ [Digital Twins for the built environment](#), IET, 2019

¹⁰ [The Long-Run Effects of Government Spending - American Economic Association](#), March 2024

Running a successful business requires training and knowledge that extends beyond the technical. Entrepreneurs need to be able to identify markets, make sales pitches and manage finances. Scaleups and potential scaleups need specialist managerial, sectoral and technical skills and knowledge, but this needs to be applied within a larger business knowledge framework and combined with a much deeper and better understanding of client challenges and issues¹¹. It may also be the case that entrepreneurs and managers don't recognise that they need training.

Peer-to-peer mentoring, local networking and showcasing innovation can all lead to strengthened partnerships across all sectors of the UK economy. It is key to ensure that activities are embedded into a coherent ecosystem. Innovate UK has set up the [Business Connect](#) that can help entrepreneurs find project partners and hold funding-specific webinars and events. Government, alongside Innovate UK and other funding bodies, should aim to strengthen the offering to appropriate levels of entry and communicating what is available more clearly. This can be achieved by putting together an in-depth repository of videos and other educational resources to guide entrepreneurs and innovators to creating successful startups that can be scaled up. Innovate UK has a wide reach, but it only captures a certain number of entrepreneurs, there needs to be more collaboration with academia, industry, and government to access a wider pool of applicants.

Access to good mentors, with in-depth knowledge of business environments across a range of sectors, is critical for any innovative SME. Having a mentor provides emotional and strategic support, crucial to overcoming setbacks. Mentoring schemes need to be carefully managed and assessed to ensure consistency, for example matching experienced entrepreneurs with early-stage founders. There is a role for wider industry, larger companies, academia, government, catapults and VCs to facilitate these mentorship schemes in order to share knowledge, successful ventures and best practices. It can be achieved as part of Innovate UK's platform by providing a digital offer to match entrepreneurs with mentors. This can be either through an app or forum, which will provide ready access to mentors with the right expertise depending on the needs of the applicant.

It is important to showcase successful ventures, but more importantly the challenges of the beginning of these ventures and the failures that come before these successes. Risk-taking is an important part of innovation, this needs to be an accepted part of the culture in the UK, so that entrepreneurs will learn from these setbacks as well as the successes and continue to innovate. Bringing together cohorts of founders in similar geographic regions and/or technical area can achieve this as a support system.

Building a cohesive infrastructure, that enables even just a small proportion of SMEs to overcome the barriers of scaling up, will result in a swift and measurable positive impact on the UK economy. The measures that will transform SMEs into scaleups can also be used to launch existing scaleups into the next stages of success. There is huge value to be derived from developing local networks of like-minded SMEs with similar technologies or supply chains to build links between businesses, as well as supporting the sharing of knowledge and expertise. Beyond this, it is vital for SMEs with innovative products to network with the wider industry, larger companies, academia, government and VCs.

There is huge value to be derived from developing local networks of like-minded SMEs with similar technologies or supply chains to build links between businesses, as well as supporting the sharing of knowledge and expertise. It is vital for SMEs with innovative products to network with the wider industry, larger companies, academia, government, and VCs.

¹¹ [Bridging the innovation gaps](#), IET, 2018

Academia has a crucial role in supporting more spinouts and startups. Universities have the right environment for innovation, having scalability and business sustainability built into university curriculums is important. More collaboration between academia, industry and government entities will ensure they can embed scalability and business sustainability into university curriculums can provide entrepreneurs the key skills and knowledge across subject areas that would cultivate entrepreneurship in the future.

Private sector investors, companies, and capital markets

High-income tax rates and inefficient tax structures can discourage innovation and encourage entrepreneurs to move to areas with lower tax rates. Norway is currently facing a departure of innovators and entrepreneurs due to high taxation on unrealised gains on assets such as shares if their net worth exceeds one billion Norwegian kroner (~£7.2 million), preferring countries such as Switzerland that have lower tax rates¹². Income tax rates are shown to affect the quality of innovative ideas, the number of startup businesses and patent applications, and where entrepreneurs decide to locate¹³.

Government should consider the tax regime for SMEs, to avoid the issues of countries who have high levels of success in entrepreneurship, but whose tax laws run the risk of losing those innovators and VCs. A way to achieve this is through personalising taxes this will make the UK a more attractive place to remain when startups scale up or spin out. The UK Technology Stock Market needs to be revitalised ensuring that those who attract international investment will keep their base in the UK.

In the UK there are a number of VC schemes that can help SMEs grow by attracting investment as well as offering tax relief to individuals who buy and hold new shares, bonds or assets for a specific period of time¹⁴. However, these schemes, such as Enterprise Investment Scheme (EIS), come with a raise limit that can hinder startups, rather than help them. Government should consider the tax regime for SMEs, in order to not fall into the same traps that other countries, who have high levels of entrepreneurship, but their tax laws run the risk of losing those innovators and VCs. Further to this after three years those who invested through the EIS can sell their share without paying capital gains. This allows the opportunity for foreign investors who may value these shares higher than UK investors to buy these out and this allows for scaleups to move out of the UK.

Public sector late-stage investors

In the UK, entrepreneurs are a key source of innovation, establishing new and successful SME startups through innovative ideas. These enterprises are responsible for most new, marketable ideas and have created an innovation pipeline with the potential to drive strong economic expansion and create high-value employment. However, there may be a lack of adequate support for entrepreneurs and SMEs as they begin to reach scaleup stage.

For investors to invest, they need to see a return. The current system of Seed Enterprise Investment Scheme (SEIS) and EIS, whilst attractive, does not encourage continued investment: investors will typically seek to realise their benefits within the regulation timelines, e.g. five years. There are many levers that can achieve this, for example, companies that receive R&D grant funding (e.g. from Innovate UK) could automatically receive R&D tax credits based upon reduced criteria. Another example is for the Government to have an equity stake in companies that receive funding. The latter should not be seen as

¹² [What is behind Norway's wealth tax exodus?](#), Tax Natives, 2025

¹³ [How Do Taxes Affect Entrepreneurship, Innovation, and Productivity?](#), The Centre for Growth and Opportunity, 2019

¹⁴ [Use a venture capital scheme to raise money for your company](#), GOV.UK, 2023

the Government taking control of a company, but rather as a way for the company to stay within the UK and to provide future returns to the UK taxpayer when successful.

Government policy levers to support scale-up of science and technology

Scaleup businesses drive significant economic growth. They generate twice the turnover per head compared to the UK average, and the UK has one of the highest rates of business startups in the world – nearly 660,000 companies were established in 2016¹⁵. However, this groundswell of startups is not translating into scaleups. When compared with international peers, in terms of the numbers of jobs created by scaleups, the UK is fourth globally, behind the United States (US), France and Brazil¹⁶.

Government, Innovate UK and VCs should develop pathways for scaleup that are suitable for a variety of sized businesses to support the entrepreneurial journey. There are resources available through Innovate UK, however these need to be built on key milestones and be intertwined with knowledge sharing, showcasing success, connecting with commercial opportunities, promoting networking opportunities and establishing mentorship programmes.

¹⁵ 2016 Breaks Business Formation Records, Centre for Entrepreneurs

¹⁶ [Annual Review Highlights 2024](#), ScaleUp Institute