Department for Science, Innovation & Technology

HM Government

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Science & Technology Framework

Update on progress

February 2024

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Foreword from the Secretary of State

The Rt Hon Michelle Donelan MP, Secretary of State for Science, Innovation and Technology

It is just one year since the Prime Minister took the bold decision to create the Department for Science, Innovation and Technology (DSIT) to help unleash the power of UK research and development, helping grow our economy, create better jobs and make bold discoveries which will enable us to live longer, healthier, happier lives.

A thriving UK science and technology system remains critical to our future prosperity, security, and the health of our citizens. The dizzying pace of technological advancement confirms this, whilst it demonstrates the potential of advancement to boost productivity and transform our sectors, it also highlights the importance of making innovation safe, secure, responsible, and trustworthy to fully benefit from the opportunities it brings.

Moving at warp speed, last March I launched the UK's Science and Technology Framework to provide the plan for the UK to bring together activity across government focused on a single mission: to cement the UK as a science and technology superpower. The evolving context makes the goals and vision we set out even more salient and reinforces the need for an enduring approach that takes us through to 2030.

Led by DSIT, with collaborative delivery across government, we have already made substantial gains. We have set the approach for each of our five critical technologies, with significant investment that will build UK capability. Across the wider system we continue to focus on cultivating the right environment for these technologies and our science and technology sectors more generally to flourish:

- Public spending on R&D is at the highest ever level, and we are fulfilling our commitment to spend £20 billion across the next financial year with every £1 of public expenditure leveraging double the amount of private investment.
- We have launched new policy initiatives to support our innovative science and technology companies to grow and scale, including the Mansion House reforms for the pension market to boost returns and improve outcomes for pension fund holders; increase funding liquidity for high-growth science and technology companies; and help companies grow and list in the UK. Our Venture Capital fellowship will inspire a new generation of science and technology venture investors.
- We have demonstrated the UK's global leadership, hosting the first global AI Summit with the next two due to be hosted by the Republic of Korea and France.

We cannot be complacent. The work must continue at pace. Whilst we remain a global leader in many areas, including our five critical technologies, only by continuing to nurture our science and technology system can we build a stronger economy, deliver public benefits, improve healthcare, and defend our country against hostile threats. So, we must stick to the plan and continue to deliver on the vision we have set, working across government, and with our excellent academics, innovative businesses, and international partners to develop our science and technology system. The plan set out within the Science and Technology Framework is working, and so we must keep going.

Foreword from the Government Chief Scientific Adviser and the National Technology Adviser

Dame Angela McLean Government Chief Scientific Adviser (GCSA) and Dr Dave Smith National Technology Adviser (NTA)

The story of how science and technology can change, enrich, and improve our lives is written every day. Game-changing scientific innovations have improved prosperity and wellbeing, whether through advances in engineering biology, increased industrial productivity through artificial intelligence, or simply enhancing our knowledge of the world and our place in it.

The UK's R&D ecosystem is built upon a brilliant foundation of world-class innovators, universities, public sector research establishments, and industrial labs that are fundamental to helping us achieve our science and technology superpower ambition. However, we also need to support the full innovation cycle so that this great science can be turned into commercial technologies, scaled up, and drive growth so that our society can reap the benefits of the resulting products and services.

The Science and Technology Framework is the principal vehicle helping the whole of government deliver this strategic intent. It signals our long-term vision of how funding and policy will support and promote our valued science and technology communities across industry, government, and academia. Through the Science and Technology Framework we will continue to inspire confidence that the UK government is wholly committed to translating science and innovation into products and services that support our growth and prosperity, and that we are willing to invest in and develop this capability.

We have built on our existing routes to support researchers and innovators attract international talent, through the introduction of AI Futures Grant Scheme and simplified business visitor rules. These add to the Global Talent visa and routes for graduates of top universities and skilled workers to make the UK an attractive hub for innovation.

We have also seen the government accept recommendations from the Pro-innovation Regulation of Technologies Review, so that regulation can support key areas of growth, and committed to creating a pro-innovation culture across the UK's public sector through the Public Sector Productivity Review.

We are confident that the ten strands of the Science and Technology Framework continue to be fundamental to delivering our ambitious objectives. It is paramount that government works together to deliver the Framework's objectives and works collaboratively so that all our science and technology levers are used as effectively as possible.

We hope this update will showcase and highlight the excellent progress we have made since the launch of the Science and Technology Framework last year. We are deeply grateful for the wonderful support that the science and technology community has shown in the past year and look forward to engaging during 2024 and beyond.

Introduction

We know that scientific and technological advances drive growth and prosperity, create jobs, ensure our security, and enhance the health and wellbeing of our citizens and our environment. The Science and Technology Framework acknowledges this, placing science and technology at the heart of government ambition and aligning government levers towards cultivating the right environment in our science and technology system for innovation to take place, new businesses to spin out and scale, and our science and technology sectors to flourish.

In recent months, we have seen sustained and rapid technological development and an increase in global competition. The adoption of artificial intelligence (AI) presents a transformative opportunity, but also highlights the need for domestic and global action to ensure safe and responsible use. Semiconductors remain a crucible of fierce competition and we are witnessing huge, state-backed investments, tax incentives, and export restrictions across multiple continents, with far reaching consequences. We also know that social and behavioural science, as well as humanities disciplines such as history and ethics, have an important role to play in the development, deployment, and the adoption of technologies, from responsible innovation to understanding real-world uses and impacts. In this context, achieving strategic advantage through science and technology means building a reputation for safe, trustworthy, and responsible innovation and technology.

Across the past year we have taken significant steps to implement the Science and Technology Framework. This includes developing action plans for each of the ten strands and, spearheaded by the various lead departments, ensuring comprehensive delivery of the plans, supported by government, industry, and academic engagement.

The creation of DSIT has brought together and streamlined our responsibility for our science and research and development (R&D) activities with our support for our technology-enabled sectors. Creating a single department, engaged with the full breadth of the science and technology system, including through UK Research and Innovation (UKRI), has broadened our capabilities, and allowed us to expand our ambition in the delivery of key areas of the Science and Technology Framework.

This update captures the breadth of our progress across the Framework strands highlighting key activities, case studies, and our next steps, as part of a system-wide approach, delivered across and by the whole of government. This is why the vision for each strand remains the same as those set out in the Science and Technology Framework published in 2023.

The Framework is and remains a cross-government framework for science and technology activity delivered through collaboration across departments. For example, our Life Sciences Vision is the result of collaborative work between the Department for Health and Social Care (DHSC) and DSIT. Similarly, the Long-term Investment for Technology and Science (LIFTS) initiative is being delivered by the British Business Bank, following cross-government policy design and market engagement work undertaken by HM Treasury (HMT), the Office for Investment (OfI) and the Department for Business and Trade (DBT).

With this in mind, 'we' in this document represents 'the government', and many of our achievements captured across a year of Framework implementation are the result of inter-departmental collaboration.

We have demonstrated substantial early progress, but our changing context underlines why we must maintain a long-term approach. Looking forwards, we will evaluate our actions to understand our impact across this complex landscape, mitigate risks, and seize opportunities as they emerge. The next 12 months will see us amplifying our early successes. We will continue to view the strands as a connected system of interventions that individually drive progress towards specifics outcomes, but together cement our status as a science and technology superpower. To hold ourselves accountable and provide clarity on our evolving priorities and focus, we will continue regular updates on the progress and impact of the Science and Technology Framework through to 2030.

A Year of Delivery Across the Science and Technology System

February 2023

- **Department for Science Innovation and Technology** created.
- **£18.9 million** investment in Northern Ireland's cyber security industry.
- **£3.5 million** levelling up funding for space grow th projects.

March 2023

- **Science and Technology Framework** launched.
- **National Quantum Strategy** launched, committing **£2.5 billion** to the development of quantum technologies in the UK over a ten-year period.
- **£900 million** funding to bolster **compute capacity**.
- **26 projects** funded through **£7.5 million Innovation Accelerators programme**.
- Published the first **Pro-innovation Regulation of Technologies Review**.
- Announced a **2-year national 'data research cloud' pilot** in partnership with UKRI.
- **UK's International Technology Strategy** launched.
- **Independent Review** of the **Research, Development and Innovation Organisational Landscape published.**
- **AI Regulation White Paper published,** 'A pro-innovation approach to AI regulation'.

April 2023

- Introduced **Digitial Markets, Competition and Consumers Bill.**
- **£100 million** for an expert taskforce to **adopt safe AI**.
- **UK Wireless Infrastructure Strategy** unveiled, including an up to **£150 million** boost for UK **5G and 6G innovation**.
- **UK-India memorandum of understanding** on research and innovation.
- **The DSIT Expert Exchange Programme** launched.

May 2023

- **£75 million** to boost **4G in Scotland**.
- **£103 million** to upgrade UK's research infrastructure.
- **Launched a Cyber Security Playbook** for local authorities.
- Renewed a **UK-Japan science and technology** deal.
- Up to **£1 billion** investment over the next decade announced through the **National Semiconductor Strategy**.
- **£650 million** package for the **life sciences** sector.

June 2023

- **London Tech Week** – 40,000 participants, 3,500 startups and over 850 investors gathered in Central London to discuss technology, innovation and talent.
- **UK-Australia** memorandum of understanding on **diversifying telecoms**.
- **UK-Singapore** memorandum of understanding on **cyber security, connectivity, and AI.**
- **UK-Canada** agreement on **biomanufacturing, quantum, climate change, and alternative protein research.**
- **UK-US Atlantic Declaration action plan agreed** covering leadership on critical and emerging technologies.

July 2023

- Announced the 'Mansion House' reforms which will unlock an **additional £75 billion of financing for growth** and reform the UK's listing rules.
- Launched **£50 million Research Ventures Catalyst** to support cutting-edge research, built on partnerships with private and philanthropic investors.
- Chair appointed for **expert AI safety taskforce**.
- Published the **National Space Strategy in Action** and reinstated the National Space Council.
- **British Business Bank £200 million** fund launched for SMEs in the South West.

August 2023

- **Expert panel appointed for semiconductors** to support semiconductor strategy.
- **£33 million** joint investment to **boost skills, support jobs, and bolster green manufacturing** in the UK life sciences industry.

September 2023

- **New National Technology Adviser** appointed.
- The Diamond Light Source granted **£500 million upgrade.**
- First meeting of the **UK Biosecurity Leadership Council**.
- Announced the new **Green Future Fund Fellowships**, backed by a **£150 million** endowment to the Royal Academy of Engineering.
- **Bristol** announced to host **UK's most powerful supercomputer (Isambard-AI)**, as part of the **£900 million** compute funding put forward in March.
- **The Advanced Research and Invention Agency (ARIA)** announced its founding cohort of **Programme Directors**.

October 2023

- An innovative public-philanthropic consortium worth **£32 million to support UK PubMed Central**, the world's leading biomedical database.
- **£70 million** programme launched to advance domestic next-gen **future telecommunications** through UKRI Technology Missions Fund.
- **Online Safety Act** received royal assent.
- **Launched Global Coalition on Telecommunications (GCOT)** with Australia, Canada, Japan, and US.
- Announced a new **supercomputing facility in Edinburgh**, as part of the **£900 million** compute funding put forward in March.
- **Expert regional hubs** given **£75 million boost** to local research, businesses, and economies across UK.
- **Start-ups** across Britain given access to research, business coaching, and help to secure funding after organisations receive a **boost of up to £250,000**.
- Launched **ChipStart UK**, a new **£1.3 million incubator pilot programme** to support early-stage companies involved in the design of semiconductors.
- **£60 million** Regional Innovation Fund (RIF) to boost support in areas of lower R&D investment.
- New **£100 million** fund to accelerate the use of AI in healthcare.
- **British Business Bank £150 million fund** launched for SMEs in Scotland.

November 2023

- **Hosted the first AI Safety Summit** where and Bletchley Declaration was signed, established the AI Safety Institute, and launched the incubator for Artificial Intelligence (i.AI).
- **Hosted the Global Investment Summit** and announced the creation of three new regulatory sandboxes.
- **£500 million investment in AI** in compute to expand the AI Research Resource.
- **Five Quantum Missions** launched.
- **Venture capital skills fellowship programme** launched.
- Landmark **science and technology deal** with the **Republic of Korea** to boose cooperation in critical technologies.
- **Advanced manufacturing plan** released.
- Invested **£520 million** in **life sciences manufacturing**.
- Published a new vision for an **R&D landscape** that is diverse, resilient and investable.
- Announced the Royal Society Faraday Discovery Fellowships, backed by a **£250 million endowment to the Royal Society**, to attract and secure top R&D talent in the UK.
- Independent review of university spinouts published, with the government response announcing **£20 million to support universities and founders to de-risk technology**.
- **£121 million** invested in new space clusters and infrastructure.
- Published the **Pro-innovation Regulation of Technologies Review:** Cross Cutting and Growth Duty Report, the final report in this series, alongside the government response.
- **British Business Bank £70 million** fund launched for SMEs in Northern Ireland.
- **British Business Bank £130 million** fund launched for SMEs in Wales.

December 2023

- Published our **national vision for engineering biology**, committing **£2 billion of investment over the next 10 years**.
- US venture capital firm **Flagship Pioneering** established its first base outside of the US in London.

January 2024

- **UK Association to Horizon Europe** and **Copernicus** programmes.
- Announced a new **scale-up forum** to bring together leading figures from across the science and technology ecosystem.
- Published update to the **Science Capability Review**.
- Announced the pilot of a new **science and technology scale-up support service**.

Driving Growth and Prosperity through Discovery and Innovation

Science, innovation, and technology provide the ideas that businesses transform into new and better products, services, and processes. The path from early scientific and technological development to tangible economic growth is complex, occurring at different rates and stages across the UK and global economy. Through the Science and Technology Framework, we have focused on how we can capitalise on the UK's leading research base and business acumen to bring ideas from discovery through to commercialisation by making the most of the UK's strengths in research, scientific development, and innovation.

We are delivering a broad range of initiatives to encourage investment and unlock growth across the entire economy in technology-enabled sectors such as automotive, healthcare, life sciences, energy, financial services, and space. Our Life Sciences Vision, National Space Strategy in Action, and our Advanced Manufacturing Plan invest in key growth sectors, opening markets and removing obstacles for business.

Support for these sectors is underpinned by our investment in key infrastructure and capabilities. We have announced over £1.5 billion of investment in compute infrastructure across the exascale and AI Research Resource (AIRR) programmes since the publication of the independent Future of Compute Review in March 2023. This will significantly enhance the amount of state-of-the-art compute available to our researchers to drive cutting-edge research and enable the UK to apply AI to enhance public services and drive innovation.

We are providing record levels of funding, including a total of over £600 million this Spending Review, via our strategic partnerships with the four globally prestigious UK National Academies (the Royal Society, the British Academy, the Royal Academy of Engineering, and the Academy of Medical Sciences). This funding supports top researchers across all disciplines and career stages to make breakthrough discoveries and create the innovations our society needs. Additionally, we have announced innovative new research talent funding to the Royal Academy of Engineering and the Royal Society in the form of long-term fellowship endowments worth £400 million, with award calls expected to open in 2024.

We have accelerated translation, commercialisation, and knowledge exchange across the whole of the UK through our Regional Innovation Fund pilot and Connecting Capability Fund, both delivered through UKRI, which support universities across the UK to engage with local economies and businesses. The Connecting Capability Fund led to the development of the Northern Gritstone investment fund, which raised £312 million to invest in spinouts in the North-West of England. We are ensuring innovative companies have the funding and support they need to scale. This includes improving access to scale-up capital for high-growth firms via the Mansion House Compact and £250 million of co-funding through the Long-term Investment for Technology and Science (LIFTS) scheme.

As the technology sector continues to mature, new opportunities for growth and innovation emerge. For example, our pioneering work on online safety is driving innovation and growth in online safety technology, with the sector generating £456 million in 2023, representing a 20% increase from the previous year. Our work to enable the development of secure and trusted digital identity solutions is also helping organisations to innovate cheaper, faster, and more robust business processes. At the moment, the average employer in the UK spends £3,000 and over 27 days on hiring a new employee, but secure and trusted digital identities like those the government is now enabling could reduce the costs associated with manual identity proofing

– which are estimated to be as high as £2 billion per annum – as well as help people get into new jobs faster. We will remain agile to developments like these to make sure the UK is well-positioned to seize new opportunities as they arise.

We want the benefits of innovation – more jobs, opportunities, prosperity – to be felt across the country. So we are strengthening our regions to become globally competitive centres for research and innovation. This includes the £100 million Innovation Accelerators programme in the Glasgow City Region, Greater Manchester, and the West Midlands and UKRI's eight new Launchpads, such as the Bio-based Manufacturing Launchpad in Scotland, the Net Zero Industry Launchpad in Wales, and the Life and Health Sciences Launchpad in Northern Ireland.

We are ensuring that digital entrepreneurs and innovative UK companies can grow and scale to be globally competitive through access to international markets and investment. Working across government departments, including DSIT, the Foreign, Commonwealth and Development Office (FCDO) and DBT, we have helped shape the international environment by being at the forefront of the global conversation at the AI Safety Summit and by shaping multilateral fora on space, internet governance, data, cyber, and digital standards to our advantage. Bilaterally, we have invested heavily in science and technology partnerships including with the US, Japan, and the Republic of Korea, and our successful Horizon renegotiation opens the door to deep research collaborations around the world. Free trade agreements, international standards, and trade missions will also continue to elevate the UK's commercial science and technology presence internationally and highlight the qualities of the UK ecosystem. This will in turn engender further inward investment and stronger growth.

Innovation, investment and growth in life sciences – Applying the Framework to one of the UK's strongest sectors

In July 2021 the government published the Life Sciences Vision. From a focus on financing innovative companies, to investment in R&D and improving regulation and standards, the Vision aligns with and complements the Science and Technology Framework's systems approach.

The continued success of the life sciences sector, with its combined turnover of £108.1 billion in 2021-2022, remains fundamental to achieving our goals of stimulating economic growth, delivering high skilled jobs, and improving health outcomes by bringing new innovative technologies and treatments to market, as well as establishing the UK as a science and technology superpower.

Key outcomes have included:

- Announcements in May 2023 to improve commercial clinical trials, support life sciences manufacturing and increase the capacity of the UK's biological data bank, backed by over £650 million in funding, and a raft of new initiatives and funding in the Autumn Statement including £520 million for manufacturing, which are helping to maintain the UK's competitive advantage in life sciences. This will ensure the UK remains an attractive destination for investment, improving our ability to respond to future health challenges, and ensuring that we have the talent to support the sector and create high-wage, high-skilled jobs across the UK.
- To date these schemes have leveraged almost £332 million private sector investment, and created or safeguarded around 1,400 jobs, with further grant awards due to be announced in the coming months. These investments have a real-world impact. For example, last year, Pharmaron Biologics was granted over £10 million as part of the Life Sciences Innovative Manufacturing Fund, which will substantially expand Pharmaron's existing operations through a new, flexible facility, that can run up to 12 gene therapy projects in parallel.
- US Venture Capital firm Flagship Pioneering announced its strategic commitment to the UK life sciences ecosystem in 2023 and established its first base outside of the US in London. This was marked by the signing of a memorandum of understanding with the UK Government, outlining the UK's offer to life sciences companies and key opportunities for collaboration, with contributions from partners across the UK life sciences ecosystem. This commitment was combined with Flagship's milestone launch of Quotien Therapeutics, the first Flagship-founded company co-anchored in the UK and US.
- There has been over £1 billion in investment from leading global companies since the launch of the Life Sciences Vision. This includes a landmark partnership with Moderna (a Flagship founded company) which will see them build a new innovation and technology centre in the UK, create more than 150 highly skilled jobs, and future-proof the UK against potential pandemics.

Earth Observation Investment Package (EOIP) – Boosting the UK's Space Sector

In November 2023, the government announced up to £47 million to add to the Earth Observation Investment Package (EOIP), which now comprises of almost £247 million of funding released by the UK Government from 2022-2025 to boost activity and innovation across the sector. The EOIP has already swiftly demonstrated its effectiveness in bolstering the UK's earth observation (EO) sector, providing tangible results and driving industry growth. Data from EO satellites delivers vital information to fight climate change, underpin our national security and help manage our environment. More than half of key climate data comes from space.

The EOIP has:

- Funded the UK EO Climate Information Service (EOCIS) which provides actionable data insights for decision makers. For example, Assimila Ltd. have joined with the UK Health Security Agency and Leicester University to use EOCIS land surface temperature datasets to study the health impacts of temperature extremes.
- Funded the EO4Agroclimate programme, which is a prime example of international collaboration championed by the EOIP, uniting UK excellence in EO technology with Australian expertise to address global challenges in agriculture and climate.
- Ensured critical national EO services and datasets have been preserved, safeguarding the sector's pivotal role in providing essential functions, such as the Met Office-led Marine and Climate Advisory service which provides marine forecasting services. This data informs operational Search and Rescue and Marine Pollution Responses, and supports charities and local councils protecting life around coastal waters.
- Funded projects across the EO value chain, from the design and manufacture of satellites, to the services and solutions created by the data. This included funding Telespazio (via the EO DataHub) to develop the Hub Platform, a transformational software infrastructure which will help the sector to build applications which exploit satellite and climate-related data.
- Extended support to develop the next generation of EO experts, with funding allocated for over 20 EO-specific PhD places, contributing to the sector's knowledge base and expertise.
- Funded 14 UK companies to develop new EO technologies and applications (via Innovate UK). Amongst these, Agribot Ltd is using grassland modelling to provide farmers with data to make informed decisions on the status and health of their pasture, raising productivity and revenue.

The EOIP has not only addressed immediate challenges but has set the stage for long-term success within the UK's EO sector, fostering innovation, preserving critical services, and investing in the sector's future experts.

Building Security and Resilience

Success as a science and technology superpower also means protecting our economic prosperity, our national security, and our strategic advantages in technology. Where the Integrated Review Refresh 2023 laid out our ambitions for security, defence, development and foreign policy, including on science and technology, the Science and Technology Framework has provided an overarching approach on how to deliver strategic advantage through science and technology.

Through our cross-government partnerships, we are enabling technological capability across the UK Intelligence Community. The initial £695 million in additional R&D funding for the intelligence and security agencies announced in the Integrated Review 2021 is delivering world-class breakthroughs in cutting-edge technologies, making use of new partnerships across the UK and with allies. We have implemented new legislation on online harms to rapidly take down harmful material and applied new sanctions against Russia which have been integral to our economic security agenda.

The evolution of the Centre for the Protection of National Infrastructure into the National Protective Security Agency, together with the ongoing work of the National Cyber Security Centre and the development of the joint Secure Innovation campaign, has enhanced our focus on protecting the UK's world class science base. The National Security Technology and Innovation Exchange (NSTIx) was also set up to enable the UK government national security community to collaborate on science, technology, and innovation activities. Through the Co-Creation Network NSTIx deliver cross-cutting national security requirements, piloting novel approaches and sharing best practice. The networks focus on themes ranging from behavioural and social science to defence innovation and space.

We are addressing vulnerabilities by diversifying our telecommunications and ensuring that our new Semiconductor Strategy focuses on strengthening resilience against supply chain shocks. As part of the Defending Democracy Taskforce, we are directly tackling disinformation, and counter-state threats, and enhancing our capability to tackle cyber-crime through our work on digital identity. Through the National Security Strategic Investment Fund (NSSIF), the government is accelerating our future national security and deterrence capabilities and the development of the UK's dual-use technology eco-system, including by investing in critical technologies such as quantum technologies.

We are also taking steps to mitigate the risks from emerging technologies and ensuring cyber security is built into our critical technologies from the outset so that their benefits can be realised safely and securely. For example, we are addressing the risks arising from novel biological technologies as part of our commitment to the UK becoming a world leader in responsible innovation by 2030. Through our establishment of the Biosecurity Leadership Council, we continue to identify and develop responsible innovation policy priorities, such as on gene synthesis screening, and the convergence of engineering biology and other emerging technologies (for example, AI, automation and cyberbiosecurity).

1. Developing and Deploying Critical Technologies

Lead Department: Department for Science, Innovation and Technology

Vision: The UK has a track record of defining, pursuing and achieving strategic advantage in prioritised areas of science and technology application to deliver prosperity and security for the UK on our own terms and deliver benefits to global society. The UK's foundational science base is world-leading and broad, giving us the agility to rapidly advance discoveries and technologies as they emerge.

Our five critical technologies of AI, engineering biology, future telecommunications, semiconductors, and quantum technologies were selected for their ability to build strategic advantage, create opportunities for growth, and capitalise on existing UK strengths. We have now published ambitious plans for each, and as a result have amended the title of this strand to reflect our focus moving from identification to the delivery, development, and deployment of these technologies.

In AI, we have announced £1.5 billion of investment in compute in the past year, and shown global leadership through our AI Safety Summit, the launching of the AI Safety Institute, and publishing the AI regulation white paper and consultation response. Over the next 10 years we have committed: £2.5 billion for quantum technologies and announced 5 Quantum Missions to realise the ambitions of our National Quantum Strategy; up to £1 billion on semiconductors; and £2 billion for engineering biology. We have initially committed up to £100 million on future telecommunications by end of financial year 2024/25 and are committed to supporting future telecommunications R&D in the long term.

We are exploring how we maximise our investment within the critical technologies by considering the impact of cross-technology interventions in skills, infrastructure, data access, and regulatory change, as well as investment and shoring up our access to the next generation materials essential for maintaining and growing our strategic advantage. We are also drawing on the UK's world class capability in social and behavioural sciences, as well as the humanities, to help shape how critical technologies are developed and deployed, to strengthen public engagement and protection, and improve our ability to foresee unintended consequences.

To support the commercialisation and deployment of these critical technologies, we have launched the UKRI Technology Missions Fund and continue to take a tailored approach to each technology, working with feedback from industry. We have announced an application focused challenge fund for future telecommunications, a pilot incubator for semiconductor companies, and regulatory sandboxes for engineering biology that will help tackle regulatory challenges and opportunities. There is an enabling role played by technologies like advanced materials and robotics in ensuring the success of our critical technologies. We also work to embed cyber security into these critical technologies, by applying our 'Secure by Design' principles, as set out in the National Cyber Strategy.

We know that some of the most impactful applications are produced when technologies come together. We are already identifying opportunities to address the convergence of technologies, as demonstrated in our recent National Vision for Engineering Biology which recognised the importance of AI and automation in driving growth in engineering biology, including in R&D, infrastructure, and skills. For example, we are already seeing groundbreaking innovations in the intersection of AI and engineering biology, as demonstrated by companies such as Google DeepMind, Automata, and LabGenius.

In March 2023, we committed to reviewing the list of critical technologies annually. Supported by the Government Office for Science, we undertake proactive horizon scanning for the identification and monitoring of technologies of the future. This provides us with an early warning system for emerging technologies and a deep understanding of the risks and opportunities they present for the UK. At this stage, we are retaining the core five critical technologies as areas of ongoing focus and will continue to review this on an annual basis.

Artificial Intelligence

Vision: The UK government is a global AI leader. We will be at the forefront of understanding and stimulating technological development, harness the potential of AI to enhance our lives. We will be a thought leader and convenor on safety, foster the talent and skills in the UK needed to support our aims, and drive adoption of AI, including in the public sector, to enable better policy making and productivity growth.

The progress in commercial AI technologies since late 2022 is presenting worldwide opportunities and challenges. Standing at the forefront of global collaboration, we hosted the first global AI Safety Summit in November 2023, to drive efforts to harness and enable safe and innovative development and use of AI.

Implementation of the National AI Strategy puts innovation at the heart of our approach to AI public sector innovation and the UK's wider approach to AI governance.

We have:

- Convened a globally representative group of country leaders and cross-sector experts at the world's first AI Safety Summit. This set a global agenda and built consensus on the opportunities and risks of AI, as well as the need for collaborative action on frontier AI safety, codified in the landmark Bletchley Declaration on AI Safety.
- Launched the world's first AI Safety Institute (AISI) which will conduct fundamental safety research at the frontier of AI.
- Published a white paper on the regulation of AI in March 2023, which sets out a pro-innovation approach to AI regulation and proposes five cross-cutting principles for AI regulation. These principles outline what outcomes AI systems must achieve, while tools for trustworthy AI help to define how to operationalise and implement these principles in practice.
- Published the government's response to this white paper's consultation in February 2024. This set out how the government is delivering on its pro-innovation approach by establishing a central function and boosting regulator capabilities. The response also set out the case for future binding requirements on the developers of highly capable general-purpose models.
- Announced £80 million of UKRI funding into AI hubs, bringing together multidisciplinary teams across academia, industry, and other stakeholders to address real world use cases across areas of the UK economy including AI for scientific and engineering research, AI for real world data, and the fundamental building blocks of new AI technologies.
- Published, along with 21 international partners, the Guidelines for Secure AI System Development, which provides advice to support developers in making informed cyber security decisions throughout the AI development lifecycle. We have also published the Emerging Processes for Frontier AI Safety to provide an overview of emerging safety processes focused on frontier AI to set out what good safety policies may look like.

- Announced over £1.5 billion of investment in compute infrastructure across the exascale and AI Research Resource (AIRR) programmes since the publication of the independent Future of Compute Review in March 2023. For the AIRR, this includes the Isambard-AI and Dawn clusters in Bristol and Cambridge respectively, as well as the subsequent Autumn Statement announcement of a £500 million expansion of the AIRR, with competition for sites launched in January 2024. Through this, we are building the technical capability to drive innovation and innovative uses for AI.
- Established a Central AI Risk Function (CAIRF), bringing together government departments to identify, assess, and report on AI-related risks, linking into the UK National Risk Register.
- Invested £110 million through the UKRI Technology Missions Fund over 2023-2026 to develop new approaches to responsible and trustworthy AI, deliver research into trusted AI approaches in complex healthcare settings and to reduce greenhouse emissions in highly emitting sectors, and to improve productivity in sectors with low AI adoption rates.
- Confirmed a further £8.1 million of government funding for scholarships to improve the diversity of students entering data science and AI.
- Launched the UKRI Responsible AI UK consortium, an open, multidisciplinary network which brings together researchers from across the UK to understand how we should shape the development of AI to benefit people, communities and society.
- Delivered additional funding through the UKRI 'Bridging Responsible AI Divides (BRAID) programme, bringing together policy and practice through collaborative research to ensure responsible design, development, deployment, and on going audit of AI in industry.
- Awarded £117 million investment through UKRI to 12 UKRI Centres for Doctoral Training, which will train the next generation of AI researchers from across the UK.
- Launched the Manchester Prize, an annual £1 million prize rewarding top innovations in AI which tackle some of society's biggest challenges.
- Launched the UKRI BridgeAI programme to accelerate the adoption of AI in agrifood, construction, transport, and creative industries.
- Published the first draft of the AI Skills for Business Competency Framework in partnership with DSIT and the Alan Turing Institute, British Standards Institution, Digital Catapult and the Hartree Centre. We will continue to deliver £65 million industry projects through this programme until 31 March 2025 and a further £35 million on supporting the ecosystem until 31 March 2026.
- Published the Generative AI Framework for the government which provides practical guidance on using generative AI safely and securely for civil servants and people working in government organisations.

Over the next 12 months, we will:

- Drive AI adoption and AI-enabled productivity in the UK through the newly created AI Opportunity Forum, a collaboration between leading business and technology companies, overseen by the Secretary of State for DSIT and the Prime Minister's Special Adviser on Business and Investment.
- Work to prepare for the potential rapid and unexpected advances in AI on the UK and humanity. The AI Safety Institute will work towards this by developing the sociotechnical infrastructure needed to understand the risks of advanced AI and support its governance.
- Continue to develop our domestic regulatory framework for AI by engaging with a range of experts on interventions for highly capable AI systems and publishing an update on this work by the end of the year. We will work closely with the AI Safety Institute, which will provide foundational insights into our AI risk assessment activities and inform our approach to AI regulation.
- Support regulators to implement our regulatory approach, including by launching a £10 million package to boost regulators' AI capabilities, establishing a steering committee to support regulator coordination, iterating and expanding our initial cross-sectoral guidance on the implementation of the principles, and asking key regulators to publish updates on their strategic approach to AI by April 2024.
- Encourage AI adoption and support industry innovators across all sectors, including by launching the pilot AI and Digital Hub with the Digital Regulation Cooperation Forum (DRCF) in March 2024, publishing an introduction to AI Assurance, and preparing to publish our full AI Skills for Business Competency Framework in the spring.
- Continue to build on responsible public sector adoption of AI to drive innovation internally to deliver better services for the country. This includes developing data analysis technologies, driving programmes such as the GovTech Innovation Challenge, and ensuring we are driving the growth of AI technology for good.
- Consult on a first version of an AI Risk Register, developed by the Central AI Risk Function (CAIRF) in collaboration with lead government departments.
- Continue to build on the momentum we have developed through the success of the AI Safety Summit on the critical issue of the international response to frontier AI risks and AI for Good. To unlock AI's transformative potential, we will continue to work with partners to progress these issues at the forthcoming summits hosted by the Republic of Korea and France.

AI Safety Summit – Leading the global conversation on responsible AI

In November 2023, the UK hosted the first global AI Safety Summit at Bletchley Park, bringing together leading AI nations, technology companies, researchers, and civil society groups to turbocharge action on the safe and responsible development of frontier AI.

The UK-led Summit delivered a world-leading effort to address the risks posed by advanced AI, helping to ensure security and resilience for UK citizens. Key outcomes included:

- Agreeing on risks posed by frontier AI and the need for action in the Bletchley Declaration – 28 countries, including those from Africa, the Middle East, and Asia, as well as the European Union (EU), agreed a shared understanding on AI safety, recognising the urgent need to understand and collectively manage potential risks through a new joint global effort.
- Agreeing a forward process for international collaboration on frontier AI safety, including how best to support national and international frameworks – World leaders and those developing frontier AI systems recognised the need to collaborate on testing the next generation of AI models against a range of critical national security, safety, and societal risks.
- Agreeing collaboration on a new report – Countries represented at Bletchley Park agreed to support the development of a 'State of the Science' report that will help to build international consensus on the capabilities and risks of frontier AI.
- Launching the UK AI Safety Institute – To build public sector capability to conduct and advance AI safety testing and research.
- Ensuring AI firms outline their safety policies – Leading AI companies published their safety policies.

The Summit allowed the UK to exhibit its position as a world-leading science and technology nation. It demonstrated UK leadership at the forefront of technological development and will contribute to attracting investment, companies, and jobs. This will help drive economic growth and innovation to improve the lives of our citizens.

The Summit was the start of this urgent international conversation on frontier AI safety, but that conversation will need to continue. Due to its success, participants have agreed to return to discuss these issues in forthcoming AI Safety Summits, with the next two due to be hosted by the Republic of Korea and France. The UK looks forward to building on the positive momentum generated by the Summit in driving forward the outcomes and supporting plans for future Summits.

Engineering Biology

Vision: The UK has a broad, rich engineering biology ecosystem which can develop and commercialise the many opportunities to come from the technology and the underlying science. We will capture as much economic value, security, resilience and preparedness as possible from our hard-won strengths and ensure these create real benefits for the public.

Engineering biology is the design, scaling and commercialisation of biology-derived products and services that can transform sectors or produce existing products more sustainably. It draws on the tools of synthetic biology to create the next wave of innovation in the bioeconomy. Engineering biology presents an opportunity to drive advances across health, agriculture, chemicals, materials and energy. We have already seen exciting examples of applications of engineering biology including novel biofuels produced from food waste, biological alternatives to harmful chemical dyes in the fashion industry, and new therapeutic medicines.

We have:

- Run a public call for evidence to gather critical insights from the sector on the opportunities and challenges facing engineering biology in the UK.
- Published the National Vision for Engineering Biology in December 2023, with a commitment to invest £2 billion in Engineering Biology over the next ten years.
- Set out our approach, in the Vision, to maximise opportunities with a focus on six key themes: world leading R&D, infrastructure, talent and skills, regulation and standards, engineering biology in the economy, and responsible and trustworthy innovation.
- Invested £100 million in engineering biology missions, hubs and awards, to develop an integrated research and innovation programme to deliver UK research, capacity and capability, drive technology development and uptake, and stimulate innovation to tackle major challenges through a mission focus.
- Hosted a showcase of cutting-edge UK engineering biology firms at No.10 Downing Street.
- Held ministerially chaired roundtables with industry and academics to understand the opportunities and challenges of engineering biology.
- Created the Engineering Biology Regulators Network and announced an investment of £5 million into engineering biology regulatory sandboxes in November 2023.
- Renewed the UK Biological Security Strategy and established the Biosecurity Leadership Council to ensure that the UK is resilient to a spectrum of biological threats and a world leader in responsible innovation.
- Identified early priorities for responsible innovation, including gene synthesis screening, convergence of engineering biology and emerging technologies (e.g. AI, automation and cyberbiosecurity), the culture of safe innovation, biodata security, and horizon scanning.

Over the next 12 months, we will:

- Establish the new Engineering Biology Steering Group to support delivery of the National Vision for Engineering Biology.
- Continue to develop plans to direct our £2 billion investment commitment.
- Work through the Engineering Biology Regulators Network to map the UK regulatory landscape, including working with the Network to deliver sandboxes.
- Create a plan to bolster infrastructure for UK engineering biology.
- Host a roadshow of engineering biology companies to bring together investors, small and medium-sized enterprises, and large companies across a variety of sectors.

Future Telecommunications

Vision: The UK has a strong and globally competitive domestic academic and industrial ecosystem in future telecommunications technologies, with UK firms playing leading roles in high-value niches of the future telecommunications supply market. As a consequence, the UK plays a leading role in shaping the communications technologies, networks, and standards of the future and is a globally recognised hub for telecommunications innovation.

Future generations of telecommunications technologies will underpin virtually every aspect of our digital society, public services and economy, and enable other critical technologies including AI and quantum. In addition to providing world-class connectivity now through Project Gigabit and other programmes, the UK has a strong research and innovation base, capable of playing a leading role in the next generation of networks, including 6G. We will protect our position in an increasingly competitive global economy, help secure our critical national infrastructure, and ensure our connected future works for citizens and businesses in all parts of the country.

We have:

- Published an ambitious Wireless Infrastructure Strategy in April 2023, setting out how we will ensure the whole of the UK has the wireless connectivity needed to unlock growth and prosperity. This includes our nationwide ambition to deliver high-quality, standalone 5G to all populated areas by 2030. To support this ambition, we appointed Simon Fell MP as Government Rural Connectivity Champion and are investing up to £40 million to create 5G Innovation Regions across the UK.
- Set out the UK's 6G vision (in the Wireless Infrastructure Strategy) which details our high-level objectives for the next generation of telecommunications, including security, interoperability, and sustainability.
- Ensured that key international agreements setting the direction for future telecommunications, such as the Global 6G Framework published by the International Telecommunications Union and the future allocation of spectrum agreed at the World Radio Conference 2023, are aligned with the UK's 6G vision and spectrum policy. This will therefore help enable next generation networks to deliver benefits for UK consumers, businesses, science and national security.
- Launched the first £70 million of the UKRI Future Telecoms Technology Missions Fund in October 2023, which will support critical early-stage research, helping to shape the standards that will underpin 6G technologies, and UK businesses seeking to play a part in delivering future connectivity to innovate and commercialise.
- Announced the Connectivity in Low Earth Orbit (LEO) Programme offering up to £160 million of government grant funding to strengthen UK R&D capability in satellite communication technologies. This will support UK-based companies in pursuing significant commercial opportunities in the satellite communications market, including any arising from Eutelsat OneWeb's plans to develop its LEO constellation.
- Launched trials to explore how Low Earth Orbit satellites can provide broadband to Very Hard to Reach premises.

- Announced £88 million of funding awarded to 19 consortia from the Open Networks R&D fund to support the development and deployment of open interface telecommunications architectures, such as Open RAN, which should allow a more diverse supply chain, and make it easier for companies to enter the future telecommunications market.
- Funded the creation of the UK Telecoms Innovation Network, a new voice for the telecommunications ecosystem, bringing together large companies, small and medium sized enterprises, and academics to increase collaboration and stimulate innovation. The Network will also support UK companies to participate in global standards organisations – a critical part of the telecommunications development cycle – including representing small and medium sized enterprises through a Standards Champion.
- Launched a new multilateral grouping, the Global Coalition on Telecommunications (GCOT) in October 2023, with representatives from the UK, US, Australia, Canada and Japan. This will be an important informal forum for collaboration on future telecommunications issues. DSIT will chair the Steering Group in the first year and lead a workstream on 6G and future telecommunications.

Over the next 12 months, we will:

- Continue to support UK researchers and companies to shape future network technologies as the UKRI Future Telecoms Technology Missions Fund projects get underway.
- Set out a UK vision for future telecommunications technologies which has been tested with industry partners and considers priorities such as: areas of strength and opportunity for UK leadership; creating the right conditions for increased investment in telecommunications-related R&D; improving the level of commercialisation by enhancing the translation of early-stage research to standards, patents, and exports; and overcoming barriers to innovation and maximising the potential of this technology.
- Deepen and build new international partnerships, both bilaterally and through the Global Coalition on Telecommunications as the Coalition looks to deepen its work.
- Anticipate and strengthen the emerging interactions of future telecoms with other technology areas, covering other critical technologies as well as sectors of existing UK capability and ambition. This includes satellite communications and the integration of terrestrial and non-terrestrial networks to improve the UK's national connectivity, delivery of public services, and resilience.

Project Gigabit – Levelling up the UK's communications infrastructure

Throughout 2023, we continued our mission to roll out world-class digital infrastructure across the UK, ensuring that the benefits of science and technology remain accessible to all driving economic growth across the country and paving the way for future telecommunications activities.

Core to this mission is Project Gigabit – the government's £5 billion programme to bring lightning-fast, reliable broadband to hard-to-reach communities across the UK. In an ever-more connected world, fast, reliable access to the internet allows people the freedom to live and work more flexibly, helps businesses increase their productivity, and ensures that our vital public services can thrive. Key achievements to date include:

- Connecting over 900,000 premises to gigabit-capable broadband, mostly in hard-to-reach communities across the UK.
- Awarding over 20 contracts to deploy gigabit-capable broadband in hard-to-reach parts of the country, which combined with our live procurements, represents over £2 billion of investment.
- Reaching the milestone of 80% of UK premises being able to access a gigabit-capable connection – on track to meet our target of 85% coverage by the end of 2025.

Semiconductors

Vision: The UK will secure areas of world leading capabilities in the semiconductor technologies of the future by focusing on our strengths in research and development (R&D), design and Intellectual Property (IP), and compound semiconductors. This will facilitate technological innovation, boost growth and job creation, bolster our international position to improve supply chain resilience, and protect our security.

Semiconductors are the core component of all electronic devices, and underpin our economy, national security, and modern way of life. They are also essential to advancing other technologies, including AI and quantum technologies, and are therefore fundamental to our broader strategic advantage in science and technology.

We have:

- Announced the government's first National Semiconductor Strategy to grow the sector, increase resilience, improve the resilience of semiconductor supply chains, and protect us from national security threats. This includes investment of up to £200 million over the years 2023-2025 and up to £1 billion in the next decade.
- Launched the Semiconductor Advisory Panel, comprised of leading names in the sector, which is working closely with the government to shape and deliver our Strategy.
- Launched a new £1.3 million incubator pilot programme, ChipStart UK, which will nurture 20 early-stage semiconductor companies to scale by providing the technical and business support they need to bring products to market.
- Announced ambitious international partnership agreements with the US, Japan, and the Republic of Korea. These agreements will enable our world class researchers to collaborate internationally at the cutting edge of semiconductor technologies, support our companies to do new business, and improve the resilience of our supply chains.
- Led the first-ever UK semiconductors business delegation to Taiwan, consisting of 19 high-growth, innovative British businesses.
- Concluded a study, conducted by a consortium of industry experts and academics, that explores proposals to improve access to infrastructure to boost UK commercial innovation for startups and small and medium sized enterprises within the sector.
- Invested, through UKRI, £4 million supporting 11 industrially focused skills projects addressing a wide range of semiconductor technology areas across a range of skill levels from school, through further and higher education and university stages and beyond into the upskilling and reskilling of the workforce, with a further £1.2 million supporting feasibility studies for innovations in semiconductor manufacturing.
- Supported and funded the Digital Security by Design programme, leveraging the UK's strategic advantage in chip design and integration to transform digital technology and create a more resilient digital infrastructure.

Over the next 12 months, we will:

- Improve access to commercial research infrastructure, to help UK companies to innovate and compete globally.
- Review the scale-up finance offer across advanced manufacturing, including semiconductors, as part of the Advanced Manufacturing Plan.
- Utilise the existing government-backed financing landscape to unlock more private investment into the sector, including working with the UK Infrastructure Bank.
- Deliver more international partnerships and deepen our collaboration with existing international partners, including multilaterally through the G7 and the Organisation for Economic Co-operation and Development (OECD).
- Develop semiconductor resilience guidance to improve the sector's existing understanding of the potential risks to semiconductor supply chains and the steps they can take to better prepare for future disruption.
- Publish updated guidance regarding the elements of the sector we consider to be more sensitive for investment security, to provide greater transparency to industry and investors on our approach by being clear on what we are seeking to protect.
- Drive forward our wider skills agenda, including by continuing and enhancing support for Centres for Doctoral Training in semiconductor related fields to produce the next generation of internationally recognised doctoral researchers.
- Continue to invest £21 million, through UKRI, across a number of Innovation Knowledge Centres for semiconductor technologies.

Quantum Technologies

Vision: For the UK to be a leading quantum-enabled economy, with a world-leading sector, and where quantum technologies are an integral part of the UK's future digital infrastructure and advanced manufacturing base, driving growth and helping to build a thriving and resilient economy and society.

Quantum technologies promise enormous benefits to the UK economy, society, and the way we can protect our planet. The UK has been an early leader, with the £1 billion National Quantum Technologies Programme running since 2014. Today, we have quantum computer applications which promise to develop new products and medicines; quantum-enhanced imaging devices for more accurate and speedier diagnosis of tumours; more sensitive quantum sensors for scanning brains and detecting underground infrastructure, and quantum communication networks which enable faster and more efficient transfers of information.

We have:

- Published a National Quantum Strategy, laying out the UK's path to becoming a world-leading, quantum-enabled economy by investing £2.5 billion over 10 years from 2024, whilst generating at least a further £1 billion of private investment.
- Announced five Quantum Missions covering healthcare, computing, sensing, timing, and communications.
- Invested £70 million through the UKRI Technology Missions Fund over 2023-2026 to develop quantum computing and positioning, navigation, and timing technologies, including £30 million to procure testbeds for the National Quantum Computing Centre (NQCC) to provide quantum computing infrastructure to UK businesses.
- Accelerated the development of quantum network technologies by running two competitions through UKRI worth £20 million in funding over 2023-2026.
- Launched a £15 million Quantum Catalyst Fund, through UKRI over 2023-2024 to accelerate the adoption of quantum technologies in the public sector across health, transport, security, and net zero.
- Announced £14 million, through UKRI for a new round of quantum fellowships over 2024-2029.
- Committed £14 million over 2023-2026, delivered by UKRI, to strengthen collaborative research and development through US-UK and Canada-UK partnerships and signed cooperation agreements with Canada, Australia, and the Netherlands.
- Supported 6 new multilateral research collaborative projects to start in early 2024 through the QuantERA programme, connecting UK academics with researchers in 10 other countries.
- Launched a Quantum Skills Taskforce to report on the skills need of the sector and commissioned a review to further understand the infrastructure needs and opportunities for investment in quantum technologies.

- Launched a UK Quantum Standards Network Pilot to ensure that the UK is at the forefront of establishing global standards for quantum.
- Hosted 27 companies and organisations from eight countries (Australia, Canada, Germany, Israel, Japan, New Zealand, Republic of Korea, and the US) at the National Quantum Technology Showcase, promoting investment and purchasing opportunities in the UK quantum sector.

Over the next 12 months, we will:

- Develop programmes of work to deliver our £2.5 billion strategy, including the five quantum missions, working closely with industry, academia, and investors.
- Announce the recipients of up to £100 million investment, through UKRI, to develop research hubs for quantum computing, quantum networks and engineering quantum technology devices and components for sensing, imaging and positioning and timing over 2024-2029.
- Publish the Royal Academy of Engineering's review of UK quantum infrastructure.
- Invest in quantum fellowships and doctoral training, including announcing new Centres for Doctoral Training.
- Develop a quantum skills action plan in response to the Quantum Skills Taskforce's findings, including increasing funding for quantum skills programmes to put us on a path to fund 1,000 PhD studentships over the next 10 years, commit £14 million for a new round of quantum fellowships and create a pilot Science and Technology Facilities Council quantum apprenticeship programme to increase pathways into the quantum workforce.
- Raise ambitions on government procurement through new phases of the Quantum Catalyst Fund and Government User-Group which launched in 2023.
- Outline a pro-innovation regulatory approach for quantum technologies through the Government response to a Regulatory Horizons Council review.
- Officially open the National Quantum Computing Centre's main facility and support the pathway to quantum readiness through the NQCC's Spark programme by building knowledge and expertise in applications discovery and developing the UK quantum computing user community.
- Sign further agreements with international partners and co-develop work programmes under existing agreements.

2. Signalling UK Strengths and Ambitions

Lead Department: Department for Science, Innovation and Technology

Vision: Domestic and international recognition of the UK's strengths and ambitions in science and technology ensures that all stakeholders have the confidence to invest their time, money and effort supporting our science and technology vision. There is a sense of shared common goals, and citizens trust that science and technology can improve their lives.

Building on the publication of the Science and Technology Framework, we have ensured that our communications clearly, credibly, and consistently articulate the UK's strengths and priorities – providing stakeholders with the confidence to invest in the UK.

The creation of DSIT has provided a major opportunity to strengthen the UK's science and technology story, to meet our 2030 ambitions. This in turn supports building a sense of shared success, giving the public the confidence to utilise advances in science and technology, and promoting the strength of the UK's science and technology system internationally.

We have:

- Utilised key communications moments to promote the UK's science and technology abilities. This includes launching critical technology strategies such as the National Semiconductor Strategy and hosting the UK's second Global Investment Summit, which resulted in £29.5 billion of new investment in the UK.
- Successfully communicated the outcomes of the world's first AI Safety Summit last November, with significant worldwide interest – helping the UK lead the global conversation on AI safety.
- Established a clear understanding of UK science and technology strengths so these can be communicated effectively. This includes leading government communications at London Tech Week in June 2023. This featured a wide range of government representation at the highest levels including the Prime Minister and all DSIT Ministers – underlining the government's support for the technology sector to help give businesses the confidence to invest.
- Launched phase two of the GREAT Tech and GREAT R&D campaigns to attract foreign direct investment into the UK science and technology sectors and improve perceptions of the UK's technology ecosystem.
- Brought together cross-government policies and campaigns that promote skills options and change behaviour through the Skills for Life campaign to motivate target audiences to consider training, with a focus on priority sectors including advanced manufacturing, creative industries, digital technology, green industries, and life sciences.

- Begun our campaign to drive up applications to the Horizon Europe programme, particularly among R&D-intensive UK firms. Researchers, academics, and businesses of all sizes can bid for a share of the more than £80 billion available through the programme.
- Publicised some of the great successes that have resulted from publicly funded research and development, underlining how and why R&D makes a critical contribution to society and the economy.

Over the next 12 months, we will:

- Increase participation in Horizon Europe, including by highlighting the benefits of the programme to R&D-intensive small and medium-sized enterprises.
- Continue to signal our strengths and achievements by using key moments to promote the UK's journey to becoming a science and technology superpower, such as London Tech Week and the upcoming AI Safety Summits hosted by the Republic of Korea and France.
- Use the next phase of the GREAT Talent campaign to attract highly talented individuals to work in our critical technologies, bringing their skills to the UK science and technology sectors to support growing the economy.

A Signal of Success – Attracting international investment with the Unicorn Kingdom campaign

In March 2023, the GREAT Britain and Northern Ireland campaign launched 'Unicorn Kingdom', a targeted marketing initiative aimed at improving perceptions of the UK and attracting international investment.

Recognising a gap in investor awareness of the UK's technology ecosystem, this targeted campaign empowers stakeholders, improves perceptions, and fuels investment, ultimately securing the UK's future as a global science and technology leader.

Unicorn Kingdom embodies the Science and Technology Framework vision, delivering a clear narrative of the UK's technology capabilities, fostering a shared sense of ambition, and showcasing our world class ecosystem to the world.

Since launching, the campaign has targeted:

- Venture capitalists and decision makers on the West Coast of the US through paid media activity, including out-of-home and targeted social media advertising.
- Content partnerships, such as with TechCrunch.
- Events with the Chancellor to the Exchequer, Chief Secretary to the Treasury, and leading investors, representing over $500 billion of assets under management.
- London Tech Week, where the Prime Minister also hosted a Unicorn Kingdom reception.
- Our international networks across the world, which have begun to roll-out the campaign at relevant events, including in South America and Europe.
- Three key sectors (AI, fintech and biotech), utilising messaging around the UK having the third largest technology sector in the world, world-class talent, an agile and regulatory environment, and cutting-edge R&D.

All campaign activity drives people to the Unicorn Kingdom hub on the GREAT website, which profiles UK technology companies and leads out to investment opportunities and a talent-focused guide on moving to and working in the UK.

The campaign has been received very positively by the investor community in the US, with several leading venture capital funds and technology companies actively considering opening UK offices as a result of engagement with the campaign.

Global Investment Summit – Showcasing the UK's world-leading R&D on the global stage

In November 2023, the government hosted the Global Investment Summit (GIS), its flagship investment event and a key focal point for the government's engagement with investors.

This year's Summit came shortly after the AI Safety Summit and the Autumn Statement, and emphasised how the government is putting science and technology front and centre with a celebration of 'British Ideas – Past, Present and Future', from the steam train to quantum computing.

The Summit attracted 200 of the world's most prominent investors and technology CEOs to Hampton Court. As well as panel events on critical technologies featuring the likes of Alphabet and Arm, the Summit provided the opportunity to showcase the UK's strategy for science and technology. This included measures announced in the Autumn Statement that were likely to be of greatest interest to investors, such as the funding for compute capacity and incentive schemes like the full expensing allowance.

Key outcomes and announcements included:

- Oxford Quantum Circuits unveiled it was raising over £80 million for R&D projects, the UK's largest ever Series B round in quantum computing. The company also showcased its technology at the Summit.
- Microsoft announced it will invest £2.5 billion in critical AI infrastructure and next generation data centres.
- Dutch company, Yondr, announced a £1 billion commitment to a new 100MW data centre in Slough.
- BioNTech outlined plans for a £1 billion investment in R&D activities with a new Cambridge laboratory and an AI centre for expertise in London.

The above announcements were part of the £29.5 billion of investment announced at the Summit, which is expected to create more than 12,000 jobs.

3. Investment in Research and Development

Lead Department: Department for Science, Innovation, and Technology

Vision: The UK's R&D investment matches the scale of the science and technology superpower ambition, and the private sector takes a leading role in delivering this. Delivery under the Science and Technology Framework catalyses private sector R&D and boosts the innovation activity of firms, leading to UK economic growth.

In the past year we have targeted record levels of R&D investment, aimed at improving lives, creating jobs, and driving growth. This investment is building and maintaining a more effective research system to deliver for our national priorities. We have taken action to support our 2030 objectives of reducing bureaucracy and to set out our vision of how to foster a UK research, development and innovation organisational landscape that is diverse, resilient, and attractive to investment. We are now focused on making this vision a reality.

We have:

- Maintained our commitment to progress towards total government investment in R&D reaching £20 billion per annum financial year 2024/25, the largest ever increase over a Spending Review period.
- Agreed the UK's association to Horizon Europe and Copernicus, meaning UK researchers and businesses can participate confidently in the world's largest programme of research cooperation, worth more than £80 billion. We also supported over 3,000 UK researchers and innovators with over £1.5 billion of funding through the Horizon Europe Guarantee scheme ensuring the UK could continue to participate in the world's largest research and innovation programme.
- Increased funding for core Innovate UK programmes by 66% to £1.1 billion in 2024-2025, which will help innovative UK companies connect to the capital, skills, and networks they need to grow.
- Raised domestic public investment in R&D outside the Greater South East by funding the £100 million Innovation Accelerators programme, delivered through UKRI, in the Glasgow City Region, Greater Manchester and the West Midlands; UKRI establishing eight dynamic innovation Launchpads in regional clusters across the UK, a £75 million investment supporting high-growth small and medium-sized enterprises (SMEs); and creating a £60 million pilot Regional Innovation Fund in 2023-24 to support universities across the UK to engage with their local economy to drive business engagement and growth.
- Launched the Advanced Research and Invention Agency's (ARIA) first grant funding call in January 2024, having announced its founding cohort of Programme Directors in September 2023. ARIA is designed to fund high-risk, high-reward scientific research with unique organisational freedoms empowering extraordinary scientists and engineers who have a radical vision for change.

- UKRI published its declaration to support businesses to grow and scale. They will simplify and expand their support for innovative firms, with Innovate UK aiming to reach a million innovators by the end of the year and halve the average time it takes companies to go from application to receiving grant funding. They will further develop the Innovation Hub, our 'one-stop shop' for innovative businesses to streamline access to funding and launch a new digital guide to help businesses, investors and researchers make the most of UKRI products and services.
- Published an interactive map of the UK's innovation clusters. This experimental tool will help policymakers, investors and many others to better understand, engage with and invest in the UK's innovation ecosystem.
- Secured more philanthropic investment for UK R&D with £32 million via an innovative public-philanthropic consortium to support UK Biobank, the world's leading biomedical database. This includes £16 million coming from philanthropic investors Eric Schmidt and Ken Griffin and match funded by the government. This builds on the hundreds of millions already pledged by the government, including this week's transformative £21m investment for a state-of-the-art robotic freezer that will store and retrieve the 20 million biological samples Biobank holds.
- Launched the Research Ventures Catalyst programme to support new ways of performing research and stimulating deeper public-private partnerships. 12 proposals have been shortlisted to receive up to £100,000 seed corn funding to develop their full technical plans for their novel venture.
- Set out in the Government's Response to the Independent Review of the UK's Research, Development and Innovation Organisational Landscape our vision for a research, development, and innovation organisational landscape, which is diverse, resilient, and attractive to investment. This includes maximising the impact of our world-leading public sector research, development and innovation organisations and infrastructure by optimising their role in meeting national science and technology needs.
- Established a new joint DSIT and UKRI metascience unit, funded with an initial commitment of £10 million, to enable us to take an evidence-based, data-driven approach to the future evolution of our R&D landscape.
- Announced the new Green Future Fellowships backed by a £150 million endowment to the Royal Academy of Engineering and the Faraday Discovery Fellowships backed by a £250 million endowment to the Royal Society, with award calls expected to open in 2024 to attract and secure top R&D talent in the UK.
- Published the government response to Professor Adam Tickell's independent review of research bureaucracy. The response sets out clear actions to significantly reduce bureaucracy in the research system and actions funders, institutions and the sector are already taking to achieve this. For example, UKRI is delivering a funding service based on a new digital platform, underpinned by streamlined policies, process and support and the National Institute for Health and Care Research is currently developing a new single awards management system for launch this year which will streamline processes and reduce the amount of information requested.

Over the next 12 months, we will:

- Work to drive overseas investment into key UK R&D sectors.
- Deliver the commitments made in the Levelling Up White Paper for domestic public investment in R&D outside the Greater South East to increase by at least one third over the spending review.
- Deliver the commitments made in the Government's Response to the Independent Review of the UK's Research, Development and Innovation Organisational Landscape, building a more diverse, resilient, and investable research, development, and innovation landscape.
- Consolidate UKRI's work to improve the simplicity, integration, harmonisation, and agility of its systems - implementing the recommendations from the Independent Review of UKRI. This includes the new UKRI Funding Service and consolidating the number of UKRI funding types from over 200 to fewer than 10.
- Deliver the Research Ventures Catalyst programme, exploring the creation of at least one new research organisation. Successful ventures may ultimately receive up to £25 million of government funding, alongside additional co-investment from non-public sources, to launch a new research organisation.

Horizon Europe – Unlocking funding and collaboration for UK researchers

On 7 September 2023, we secured a new deal with the EU for the UK to associate to the Horizon and Copernicus programmes, one of the R&D sector's top asks of government. This followed a period of intensive negotiations to reach a bespoke deal in the UK's national interest.

Our association to Horizon means that:

- UK researchers and businesses can participate confidently in the world's largest programme of research cooperation, worth over £80 billion, alongside their EU, Norwegian, New Zealand, Canadian and Israeli colleagues – and over 142 countries in total participating.
- UK researchers can fully participate in the Horizon programme on the same terms as researchers from other associated countries, including leading consortia, from the 2024 Work Programmes and onwards.
- We can strengthen UK science leadership – 25% of Horizon 2020 projects that the UK was involved in were coordinated or led by UK entities.
- We are boosting economic growth – Horizon Europe aims to create 300,000 new jobs across Europe by 2040, 40% of which are in highly skilled fields.

The UK government Horizon guarantee, delivered by UKRI, also remains active and covers all remaining Horizon grant calls up to and including work programme 2023. The guarantee has provided comprehensive support to UK researchers and businesses. As of 31 December 2023, UKRI had issued 2,894 Grant Offer Letters for awards of £1.51 billion.

Under the previous Horizon programme (Horizon 2020), the UK established over 200,000 collaborative links across the world, and we can now play a leading role collaborating on AI, Data, and Robotics Partnerships worth over £2 billion, or the Cancer Mission aiming to help more than 3 million people by 2030.

The UK is also participating in the EU Copernicus programme meaning access to unique earth observation data, providing early warning of floods and fires, and enabling the UK's world leading sector to bid for contracts worth hundreds of millions.

4. Talent and Skills

Lead Department: Department for Education

Vision: The UK has a large, varied base of skilled, technical, and entrepreneurial talent which is agile and quickly responds to the needs of industry, academia, and government. This includes talent in STEM, digital and data, commercialisation, and national security.

Technological breakthroughs are driven by human endeavour. We have focused on establishing the bodies, institutes, and long-term domestic and international approaches critical to meeting our 2030 ambitions. These organisations and approaches span the breadth of school to high-level doctoral and professional training, including enabling an agile skills system by articulating skill gaps; supporting the recruitment and retention of school teachers in STEM subjects; and creating opportunities for people to train, retrain, and upskill to respond to changing needs.

We are working with industry to understand the requirements for the workforce of the future and developing an approach to skills that supports each of the critical technologies. Underpinning this, we will take forward the Advanced British Standard, a new qualification framework combining A levels and T Levels that will see core maths education continued to 18.

We have:

- Announced the Advanced British Standard, a new qualification framework for 16 to 18 year olds bringing together A levels and T Levels, through which all students will continue studying maths up to the age of 18.
- Confirmed initial funding of £600 million over the next two years to improve recruitment and retention of teachers in key STEM and technical shortage subjects, support students who do not pass maths and English GCSE at 16 and improve the quality of maths teaching.
- Established the Digital and Computing Skills Education Taskforce (DCSET) which is working across government to develop the pipeline of individuals entering the computing and digital priority sectors. It is on course to report on its recommendations in Spring 2024.
- Opened 19 of a planned 21 employer led Institutes of Technology (IoTs) which are delivering higher level technical courses in STEM subjects relating to skills needs in priority sectors, widening participation and access to well-paid jobs in these sectors across England.
- Continued to roll out the successful AI and Data Science Conversion Course programme. A further £8 million of government funding was unlocked to fund scholarships for the 2024/25 academic year, building on the £22 million invested already to develop master's level AI or data science courses suitable for non-STEM students and fund 2,600 scholarships for students from backgrounds underrepresented in the technology industry.

- Delivered in January 2024 an expansion to the UK's Business Visitor visa that broadens and clarifies the activities that can be undertaken including in an intra-corporate setting, following commitments provided in the 2023 Spring Budget and Autumn Statement. These changes also provide greater flexibility to businesses including in the science, research and innovation sector. They allow scientists and researchers to undertake research as part of their employment overseas.
- Announced a new Government Authorised Exchange visa scheme, also opening 2024, that will support innovative businesses to bring in talented AI researchers on internships and placements.
- Announced an expansion of new and existing Youth Mobility Schemes so that the next generation of talent have more opportunities to live, work, and travel abroad. From 2024, this includes a further 9,100 places in Japan and the Republic of Korea.
- Continued to take action with the wider R&D sector to implement recommendations of the R&D People and Culture Strategy, including publishing insights from the first ever UK-wide research and innovation survey – providing, for the first time, a comprehensive picture of our research and innovation workforce, to support work to ensure we attract and retain top researchers and innovators to the UK.
- Continued to develop a competitive, attractive, and sustainable research and innovation environment through the government's R&D People and Culture Strategy, to include a strong offer for postgraduate research students through commitments set out in UKRI's 'New Deal for Postgraduate Research'. UKRI have also delivered a significant 20% increase to their minimum stipend to postgraduate researchers in cash terms between academic years 2021/22 and 2023/24, and invested in order to develop and share best practice in doctoral training including, supervisory practice, widening participation and supporting students' mental health and wellbeing.
- Commissioned and published the 2023 Space Sector Skills Survey to provide an up-to-date picture of the skills issues experienced by the space sector. These findings provided more detail and insight than any previous surveys and a level of insight nearly-unmatched in international circles, highlighting the UK's commitment to identifying challenges and building the workforce of the future.
- Introduced an Innovation Skills Framework to ensure innovation can be nurtured through training and learning programmes. Developed by UKRI and the Institute for Apprenticeships and Technical Education (IfATE), the framework ensures innovation is a key consideration in apprenticeships and higher technical qualifications, with the potential to be applied more broadly.

Over the next 12 months, we will:

- Launch a Department for Education (DfE) Skills Dashboard to monitor the supply and demand of science and technology skills for critical technologies.
- Develop a white paper on delivering the Advanced British Standard. This will be informed by a consultation which asks education providers, students, parents, and other stakeholders for their views on how best to design and implement the Advanced British Standard.
- Accelerate the growth of higher and degree apprenticeships and encourage higher education providers to expand their existing offers or develop new ones and increase access.
- Launch the Modular Acceleration Programme (MAP), which will accelerate the supply of and support the delivery of individual modules of Higher Technical Qualifications (HTQs) ahead of the launch of the Lifelong Learning Entitlement (LLE) in 2025.
- Engage industry groups across the critical technologies and science and technology growth sectors, to understand employers' skills needs and assess labour market demand. This will build on outputs from ongoing industry engagement, for example, the recently established Quantum Skills Taskforce, UK Semiconductor Advisory Panel, Space Skills Advisory Panel and Digital Skills Council.
- Support the new AI Futures Grant Scheme, opening 2024, which will help attract exceptional early to mid-career AI researchers, engineers, and entrepreneurs from around the world to the UK by supporting universities, SMEs and research organisations in meeting the relocation costs of exceptional AI researchers and engineers.
- Deliver on the commitments set out in UKRI's 'People and Teams: UKRI action plan' and 'A New Deal for Postgraduate Research', including an evidence-based review of the financial and wider support provided for UKRI funded doctoral students, particularly those with disabilities and caring responsibilities.
- Publish a Space Workforce Action Plan with industry and academia, addressing the importance of growing a strong UK skills base. This includes skills for using AI and data, as well as developing highly specialised space talents, for example in spacecraft operations.

Institutes of Technology – Building local talent and skills pipelines

Throughout 2023, the government has continued to establish and invest in our Institutes of Technology (IoT) – business-led institutes that offer higher level technical education to help close skills gaps in key STEM areas.

IoTs bring education and industry closer together, encouraging collaboration between colleges, universities, and business, to create unique partnerships which deliver world class technical education. They offer a wide range of training from level 3 (T levels) to level 7 (master's degrees), but specialise in Higher Technical Qualifications (HTQs), across sectors such as.

- Engineering and manufacturing
- Digital
- Construction
- Health
- Agri-tech
- Media

IoTs help business to develop the skilled workforce it needs. They offer learners a route into higher paying jobs and increased career opportunities. They bring together businesses and education providers to support technical skills needs in their local areas.

Involving businesses in the design and delivery of training helps shape the curriculum to fulfil their needs, ensuring they have access to a local technically skilled recruitment pool.

IoTs offer flexible and affordable qualifications to people of all ages and backgrounds to equip them for rewarding and valuable technical roles. Each IoT has a specific target to increase the participation of underrepresented groups in science and technology.

IoTs use the latest applied research to anticipate future skills needs in the workplace enabling students to harness new and emerging technologies and rapidly integrate industry trends into the training environment.

Hear from graduate Hok Yu, who studied Digital Technologies at South Central Institute of Technology:

'The course taught me software development skills, including programming, networking, data analysis, which you need for this industry. I had a lot of fun and was taught well. I now work for WAAM3D as a software developer, and it's been a very interesting experience.'

Following his successful completion of the course, Hok secured an apprenticeship and now enjoys working on a software team programming specialist robots used in wire arc additive manufacturing (WAAM).

5. Financing Innovative Science and Technology Companies

Lead Department: HM Treasury

Vision: There is sufficient supply of capital at all stages with increased participation from domestic investors, and an environment to grow and scale large globally competitive science and technology companies that drive growth in the economy and high-skilled employment opportunities for citizens.

We have made bold changes to narrow the financing gap for science and technology companies by ensuring our companies can access the finance they need to grow and scale in the UK, at all stages of their growth, from seed stage through to listing.

We have made significant progress on our 2030 outcome of increasing the supply of institutional investment to deepen the pool of domestic capital. The Mansion House Reforms, announced in July 2023 and continued at Autumn Statement, are designed to boost returns, and improve outcomes for pension fund holders; increase funding liquidity for high-growth science and technology companies; and help companies grow and list in the UK.

We are now working at pace to implement these reforms, as well as developing a wider finance ecosystem so that it is capably of nurturing the next generation of science and technology companies, for example through increasing investor skills and supporting spinouts.

We have:

- Encouraged pension scheme investment in UK science and technology companies through: supporting the signing of the Mansion House Compact and the British Private Equity and Venture Capital Association's (BVCA) Venture Capital Investment Compact; introducing new disclose and explain data regulations for pension schemes; amending the pension charge cap to allow the exemption of well-designed performance fees; and announcing £250 million for two successful bidders under the Long-term Investment for Technology and Science (LIFTS) competition to create new investment vehicles tailored to the needs of pension schemes, which will generate more than £1 billion of investment to support the UK's most promising science and technology businesses.
- Expanded the Seed Enterprise Investment Scheme to help more UK start-ups raise higher levels of finance and legislated to extend the sunset clause for the Enterprise Investment Scheme and Venture Capital Trusts to 2035.
- Extended British Patient Capital to 2034, providing an additional £3 billion in equity financing for R&D intensive companies.
- Published the Government Response to the Independent Review of University Spin-outs and accepted all the recommendations.

- Provided at least £50 million additional funding for the British Business Bank's Future Fund Breakthrough programme to continue investing into R&D intensive companies from 2024/25.
- Delivered activity through Barclays Eagle Labs under the £12 million Digital Growth Grant to scale up UK technology businesses, including specialised funding readiness programmes.
- Welcomed 115 investor partners to the Innovate UK Investor Partnerships programme, which has so far unlocked more than £980 million in private investment. Innovate UK is investing over £110 million together with private investors to drive vital growth capital into scaling UK businesses that are delivering game-changing R&D projects tackling some of the world's most pressing challenges, from climate change to healthcare.
- Boosted dedicated funding for business growth service Innovate UK EDGE to £45 million in financial year 2023/24, increasing the propensity of scaling track SMEs to raise game changing capital, including through an expansion of its Scaleup Programme and Investability investment readiness pathway.
- Provided new funding for advanced manufacturing, including £960 million for the Green Industries Growth Accelerator and £520 million to support transformational manufacturing investments in life sciences. The funding will be available from 2025 for five years, providing industry with longer term certainty about their investments.
- Launched new regions and nations funds from the British Business Bank in Scotland (£150 million), Wales (£130 million), Northern Ireland (£70 million) and the South West (£200 million) to drive sustainable economic growth by supporting innovation and creating local opportunity for new and growing businesses across the UK.
- Laid legislation to fundamentally overhaul the UK's Prospectus Regime, making it easier for innovative companies to raise capital in UK public markets.

Over the next 12 months, we will:

- Implement the Mansion House reforms, including setting an ambition for Local Government Pension Funds to double the existing allocation in private equity to 10% in support of high growth companies, which could unlock around £30 billion by 2030.
- Introduce a new £20 million cross-disciplinary proof-of-concept research funding pot, delivered by UKRI, as part of the response to the Independent Review of University Spin-outs.
- Merge the existing R&D Expenditure Credit and Small and Medium Enterprise Scheme from April 2024 into a single R&D tax relief scheme.
- Finalise the Private Investment Framework for Space, which will establish the processes by which the government assesses the most suitable areas in the space sector for private investment. This will be finalised as part of the Space Industrial Plan, and assessments will begin from the launch of the Plan.
- Engage UK corporates to encourage them to set up corporate venture arms.
- Establish a Growth Fund within the British Business Bank to support pension scheme investment into high-growth companies in the UK via the British Business Bank's pipeline of opportunities.

- Launch a new £3 million Science and Technology Venture Capital Fellowship scheme that will accelerate the development of UK venture capital investors.
- Continue to deliver the next generation of nations and regions funds from the British Business Bank, including the launch of the £400 million Midlands Engine Investment Fund II, and the £660 million Northern Powerhouse Investment Fund II.
- Engage stakeholders on the recommendations of Rachel Kent's Investment Research Review.
- Establish the regulatory framework for a Private Intermittent Securities and Capital Exchange System (PISCES) by the end of 2024. This will be a new type of venue to improve private companies' access to capital markets by allowing the trading of their shares on an intermittent basis.
- Issue a Call for Evidence, and establish an industry forum, on access to finance for the advanced manufacturing sector.
- Establish a new scale up forum, which will capitalise on the government's power to bring together leading figures from across the science and technology ecosystem.
- Pilot a new science and technology scale-up support service, to provide some of the UK's most important science and technology companies with bespoke support.
- Respond to the Independent Regulatory Horizons Council recommendations on the role of regulation in supporting scaling up

Financing the future – How the Mansion House Compact will unlock billions for UK science and technology companies

In July 2023, the government supported the City of London Corporation to launch the Mansion House Compact – an agreement between 11 of the UK's largest defined contribution pension providers on working towards the objective of allocating at least 5% of their default funds to unlisted equities by 2030.

This reform directly addresses the UK's venture capital financing gap relative to the US. British Business Bank research suggests that this gap is over £5 billion per annum, despite UK venture capital funds making similar returns to their US counterparts. At the same time, UK pension schemes allocate significantly less to high-growth companies than their international counterparts, meaning UK pension savers are failing to benefit from the growth of these companies.

The landmark agreement demonstrates the important partnership between the government and industry in delivering pension market reform to benefit savers and boost economic growth, allows pension savers to benefit from greater exposure to an asset class with the potential for generating higher returns over the longer term, and helps the government meet its ambition to close the funding gap for UK companies scaling up.

To ensure that pension providers can meet their commitments, the government is creating new investment vehicles tailored to pension schemes, including establishing a new Growth Fund within the British Business Bank and providing £250 million for two successful bidders through the Long-Term Investment for Technology and Science (LIFTS) competition, subject to contract.

6. Procurement

Lead Department: Cabinet Office

Vision: Government departments create a demand for innovation that can catalyse their buying power into economic growth. Departments clearly articulate their technology needs through long-term strategies to give businesses confidence to invest and shape markets, with a proportion of departmental spend dedicated to procurement supporting innovation.

We know that public procurement is a powerful lever to drive innovation nationally and nurture creativity and growth in local business communities.

Our ambition is to optimise the commercial environment by articulating the government's innovation needs and challenges so that it is easier for businesses of all sizes to apply for public funding. The Procurement Act 2023 is a foundational first step in bringing about a cultural change that will make this a reality. It will build capability to connect government and industry, allowing us to form partnerships with innovative high-growth firms as well as strategically pulling through current and future innovations.

We have:

- Received Royal Assent of the Procurement Act 2023, which will: require larger contracting authorities to publish future procurement 'pipelines' and needs, so that suppliers of all sizes, particularly start-ups, scale-ups and small businesses, can prepare bids either individually or in consortia; and require contracting authorities consider and respond to the barriers for SMEs, to attract science and technology businesses to bid and enter public sector markets.
- Published the 'Innovation Ambition', setting out how the Act empowers public bodies to procure innovative solutions, including the Competitive Flexible Procedure which gives contracting authorities more freedom to achieve the best fit between requirements and market offers.
- Launched the phased implementation programme to upskill public sector commercial teams to use the full effect of the Act and supporting businesses', including science and technology firms' understanding of the new regime.
- Awarded £41 million to accelerate solving strategic public sector challenges that will lead to adoption of quantum technologies through three procurement competitions delivered by the Small Business Research Initiative.

Over the next 12 months, we will:

- Implement the Procurement Act 2023 to embed a culture change in departments through a comprehensive learning and development programme, that makes it simpler, quicker, and cheaper for suppliers, including science and technology SMEs, to bid for public sector contracts.
- Identify an appropriate number of pilot departments and a narrow range of technologies to trial initiatives. We will use this testbed for evidence-gathering and baselining to assess which approaches could be scaled across government.
- Set out Innovate UK's approach to drive greater uptake of their existing programmes for procurement of innovation and deliver system changes in the public sector.
- The Government Office for Science will convene an Innovation and Venture Capital Day in February 2024 to foster closer collaboration between government and the venture Capital Community on innovative solutions for the public sector. This aims to build commercial science capabilities in government departments and enable strategic partnerships with venture capital firms to access innovative technology to meet government science and technology needs.
- Continue to support improvements in the overall quality of the UK's AI supply chain through the development of our supplier-facing self-assessment 'AI Management Essentials' tool, working to embed this in public sector procurement to demonstrate best practice for private sector suppliers.

Commercial X – Good ideas acquired at pace

In October 2022, the Ministry of Defence (MoD) launched Commercial X – an innovative commercial team designed to operate in the face of a complex global threat landscape, a fast-paced digital marketplace, and the growing need to provide digital and innovation solutions that adapt to modern warfare operations. It was developed to not only tackle bureaucracy in policy and process, but to challenge the cultural issues that influence ways of working and appetite to risk.

To date, Commercial X has:

- Launched more than 30 initiatives to reduce the effort and time to complete commercial acquisitions, including through early collaboration, challenge to local policy, and the adoption of an increased risk posture.
- Enabled changes to R&D exemptions to ensure procurement timelines could be shortened to get innovative solutions on contract and reduced barriers for SME engagement.
- Co-created new terms and conditions with industry, simplifying the procurement process specifically for SMEs and for innovation and technology products.
- Launched the Neutral Vendor Framework for innovation tender in November 2023, a pioneer cross-government delivery route to market for innovation micro and SMEs.

Plans for 2024 will focus on embedding these new ways of working across commercial teams so that change can be sustained; using automation to underpin the developing skills of our people, increase efficiency and drive a consistent approach; and improving the acquisition process.

7. International Opportunities

Lead Department: Foreign, Commonwealth and Development Office

Vision: The UK is confident and upfront about its science and technology strengths and enjoys international partnerships which support critical technologies and the growth of our sectors. International relationships with governments, industry and academia make a meaningful contribution to the UK's science and technology capabilities. We are influential in shaping the global landscape, embedding our values into technology, and protecting our security interests.

In the past year, the UK has affirmed its place as a global leader in how it addresses some of science and technology's biggest opportunities and challenges. We have successfully been strengthening our international network and relationships with other countries on science and technology to drive progress towards our 2030 outcomes and have built on the vision and principles set out in our International Technology Strategy.

We have enhanced the technical capability of our overseas network and taken a multistakeholder approach to engage industry partners and world-renowned academic institutions to champion the UK's science and technology sector. This coordinated approach to international science and technology activity, and multilateral engagement, has allowed the UK to continue to build meaningful partnerships, drive innovation to tackle significant global challenges, and shape the global landscape and conversation on science and technology.

We have:

- Published the International Technology Strategy, which sets out the UK's approach for technology leadership on the global stage. It describes our core principles for technology – open, responsible, secure, and resilient – which inform our international engagement on technology, and our pursuit of strategic advantage.
- Launched the £337 million International Science Partnerships Fund (ISPF), which gives UK researchers and innovators access to global talent, large-scale facilities, and research ecosystems. The fund invested in the £61 million Global Centres for clean energy programme with the US, Canada, and Australia, and a UK-Japan partnership to develop new technology for nuclear waste disposal.
- Increased technology-focused capability and capacity in our overseas network by leveraging external expertise, developing and deploying a new Technology Curriculum and piloting secondment schemes into the technology industry for UK diplomats.
- Demonstrated global leadership by the UK Foreign Secretary chairing the first ever United Nations (UN) Security Council briefing session on AI in July 2023; convening the AI Safety Summit; and hosting the UK's second Global Investment Summit.

- Deepened our bilateral relationships, for example with Brazil through a flagship climate science project in the Amazon region led by UKRI; with Japan by unlocking new partnerships on semiconductors and innovation; and with Ghana, where the Foreign Secretary launched the UK-Ghana Science, Technology and Innovation Strategy in Accra.
- Launched the 'Global Forum on Technology' at the OECD initially focusing on quantum technologies, engineering biology and immersive technology, with £2 million of UK funding over three years.
- Started a two-year mandate on the Global Partnership on Artificial Intelligence (GPAI) Steering Committee following successful election, providing opportunity to strengthen GPAI's impact and inclusivity under India's 2024 chairmanship.
- Signed a landmark science, research and innovation agreement at the UK-India Science and Innovation Council in Parliament, enabling quicker, deeper collaboration that will drive economic growth, create jobs, and improve lives in the UK, India, and worldwide.
- Launched the inception phase of a new Official Development Assistance (ODA) funded UK Technology Centre of Expertise to support developing countries to transform their own ecosystems and increase participation in multilateral fora, delivered via the UK's diplomatic and development network overseas.
- Delivered the UK-US privacy enhancing technologies (PETs) prize challenge, awarding £1.3 million to researchers and SMEs in the UK and US to develop innovative, privacy-preserving AI solutions for tackling global challenges in public health and financial crime.
- Established a UK-US data bridge to facilitate the flow of personal data with a major trading partner. The data bridge upholds and strengthens UK individuals' rights, facilitates responsible innovation, and reduces the compliance burdens on businesses.
- Announced Associate Membership to the Global Cross Border Privacy Rules (CBPR) Forum, with the UK the first country to be granted Associate status.
- Published the International Development White Paper with a focus on harnessing science, research, technology and digital to accelerate progress on the Sustainable Development Goals.
- Announced up to £295 million ODA funding for international health R&D partnerships, to respond to disease outbreaks, help administer drugs in the world's remotest areas, and focus on curing the most dangerous infectious diseases.
- Announced a package of cutting-edge ODA funded research at the UK's Food Security Summit, including the launch of a new UK- Consultative Group on International Agricultural Research (CGIAR) science centre. Our long-term agriculture and food security research has already pioneered the development of 59 new varieties of climate-resilient nutritious crops which are deployed worldwide and consumed by over 100 million people. This includes a Vitamin A sweet potato with a 20% higher vitamin content than previous varieties.
- Announced the first projects under the £110 million Climate Adaptation and Resilience research programme at the Africa Climate Summit and UN High Level Political Forum, delivering ground-breaking research in 26 African and Indo-Pacific Countries.

Over the next 12 months, we will:

- Strengthen and expand our existing science and technology bilateral partnerships with leading science and technology nations by implementing agreements such the US-UK Atlantic Declaration, the Hiroshima Accord agreed with Japan, and the Downing Street Accord agreed with the Republic of Korea; and establishing ambitious new science and technology partnerships.
- Fund safe and responsible AI projects for development around the world, beginning in Africa, with a UK contribution of £38 million.
- Deliver the International Science Partnerships Fund by developing a comprehensive and long-term set of international research and innovation partnerships to address four shared priority areas: Resilient Planet; Healthy People, Animals and Plants; Transformative Technologies; and Tomorrow's Talent. This will include the £12 million Sustainable and Resilient Agriculture Systems in Southeast Asia, and the continuation of Global Vaccine Networks tackling infections around the world.

UK – Republic of Korea – A new landmark partnership on science and technology

During the Korean State Visit in November 2023, the Prime Minister and President Yoon signed a landmark bilateral accord which elevated our bilateral relationship across science and technology. As two of the world's most innovative economies, the UK and the Republic of Korea (ROK) are natural partners, with both countries placing in the top five of the Global Innovation Index.

The accord contained a number of ambitious new commitments, including:

- A new Implementation Arrangement, which updates and reboots a science and technology cooperation agreement from 1985, to modernise the two countries' science and technology partnerships.
- A broad and ambitious digital partnership, boosting joint work in priority areas such as data, telecommunications and AI.
- A new Memorandum of Understanding (MoU) on Space Cooperation, which will increase business-to-business dialogue, and deepen cooperation in space sustainability, earth observation and space infrastructure. The MoU explicitly references trade and investment opportunities, promoting greater business-business dialogue, and opening commercial doors for the UK Space Sector to a rapidly growing Korean space market.
- A Framework for Semiconductor Cooperation, which will tackle both countries' skills gaps, deepen collaboration in semiconductor research and development, improve links between industry and academia, bolster trade, and improve supply-chain resilience.
- As well as these new government-to-government partnerships, a new £4.5 million fund was announced, the UK-ROK International Collaboration Awards - to create joint research and innovation partnerships.
  - These awards provide a platform for emerging UK and Korean research leaders to develop collaborative partnerships – while building on the recent international progress on safe, responsible AI development achieved at the AI Safety Summit, the next edition of which will be co-hosted by the Republic of Korea and the UK.
  - The fund harnesses the potential of critical technologies like AI, quantum, and semiconductors to create jobs and unlock economic growth.
- Additionally, a new MoU signed between Innovate UK and the Korea Institute for Advancement of Technology will unlock closer collaboration between both countries' industries and researchers in key areas such as semiconductors.

These agreements will open new opportunities for trade, innovation, and investment in both countries – ultimately helping to grow the economy, one of the Prime Minister's five priorities.

8. Access to Physical and Digital Infrastructure

Lead Department: Department for Science, Innovation and Technology

Vision: Accessibility and coordination of infrastructure attracts talent and investment, establishes anchors for innovation clusters and enables companies to scale. The UK has diverse, agile and resilient facilities to support its technology choices and works with partners globally to deliver major science and technology projects.

R&D infrastructure is critical for enabling our world-class R&D base to test their ideas, develop new materials and technologies, and understand how the universe works, all of which are important to achieving our 2030 ambitions and delivering impact for the UK. Work over the past year has focused on upgrading and expanding our R&D infrastructure, setting out strategic advice to partners on government priorities, maximising UK benefits from our international infrastructure investments, and developing our long-term domestic and international approaches.

The rise in prominence of AI has highlighted the need for a more integrated view of physical and digital infrastructures from government. This integrated view where physical infrastructure, compute infrastructure and data policy are considered together will increase the UK's ability to create new knowledge and intellectual property from our R&D base. Key sectors of the UK's economy such as aerospace, life sciences, materials, and the energy sector (fusion, smart homes, and cities) have already seen the benefits of increased compute and data utilisation.

Beyond R&D infrastructure, the government has also been improving the wider digital infrastructure landscape for UK citizens, as seen by our progress towards our future telecommunications objectives and access to broadband (section 10).

We have:

- Announced a game-changing supercomputer in Edinburgh and the AI Research Resource (AIRR) in Bristol and Cambridge as part of an investment package worth over £1.5 billion to upgrade the UK's next-generation compute capacity, fuelling growth and transforming the future of UK science and technology.
- Announced investments in step-change upgrades to the UK's existing world-class infrastructure, including £500 million for the UK's national synchrotron, Diamond Light Source, £85 million for the world's most powerful laser Vulcan 20-20, and £128 million for new UK Biobank infrastructure in Manchester.
- Published the UK Strategy for Engagement with The European Organization for Nuclear Research (CERN), with a vision to unlock the full potential of our investment and remain central to CERN's continued success, leading scientific discoveries and benefitting UK industry.

- Set a new strategic approach to decision making on research infrastructure investment by piloting a policy framework that provides strategic guidance on government priorities on large investment allocation for infrastructure; and worked with Innovate UK and others to better understand the innovation landscape and the R&D infrastructure required for the commercialisation of emerging and transformational technologies.
- Responded to the consultation on Cyber-Physical Infrastructure (CPI) and funded the National CPI Ecosystem, boosting UK collaboration and innovation.
- Funded £5 million across four pilot projects with UKRI for a national research data cloud.
- Launched the government's Integrated Data Service (IDS) for analytical and research communities. The cloud native service, currently in BETA, successfully achieved accreditation status as a trusted research environment. This transformative service is able to securely host and provide access to government data for research and analysis.
- Delivered £[illegible] million funding for R&D infrastructure investments to support Public Sector Research Establishments (PSREs), followed by a further £25 million fund for research and innovation organisations this year.
- Launched a consultation in December 2023, proposing a statutory framework for UK data storage and processing infrastructure, to increase resilience and mitigate security threats, such as cyber and physical attacks.
- Invested in a cutting-edge telecommunications laboratory, the UK Telecommunications Lab (UKTL), to raise telecommunications cyber security standards and support supply-chain diversification with advanced cybersecurity testing and research. The UKTL is a national asset to support the telecommunications industry and is designed to make the UK a world-leading centre of telecommunications security testing and research.
- Following the announcement of UK Association to Horizon Europe in September, we have re-joined the European Strategy Forum on Research Infrastructures (ESFRI), facilitating collaboration on the development of research infrastructures at a regional and international level.
- Announced plans to address the lack of laboratory space in key places, such as Cambridge. In July 2023, the Levelling Up Secretary set out an ambition to develop Cambridge as Europe's science capital and expand its current research base as a leader in life sciences and technology innovation by improving access to R&D infrastructure, as well as creating a long-term vision for housing.

Over the next 12 months, we will:

- Deliver a long-term national plan for R&D infrastructure, working with the research community, key stakeholders and across government to establish our domestic and international strategic priorities for investment. This will reflect on the needs of all sectors, including our critical technologies, and further support innovation launchpads and innovation zones. The plan will address challenges in accessing R&D infrastructure and aim to foster greater participation and collaboration across different users in the landscape.
- Set the foundations to deliver on the long-term national plan for the next 10 years to provide resilience in the landscape, support our critical technologies, and provide long-term confidence to the research community, industry, and business that access to infrastructure is not a barrier to innovation or scientific and technological discovery.
- Pursue opportunities to host new international R&D infrastructure in the UK, benefiting from inward investment, talent exchange, and reaffirming the UK as a global R&D infrastructure leader.
- Implement the five goals of the UK Strategy for Engagement with CERN which include research excellence, skills, commercial impact and innovation, international leadership, and inspiring the public. The UK has long derived scientific benefits from involvement in CERN, and by taking a holistic view of our participation we will unlock the full potential of our membership for UK taxpayers.
- Broaden out secure access to data through the Integrated Data Service to drive greater use and insights from government data to enhance government decision making. We will also work with UKRI to extract learnings about data sharing from the research data cloud pilot.
- Make better use of data on infrastructure performance and impact, to ensure evidence-based decision making maximises the value of our investments, so that UK taxpayers continue to see the benefits to UK investment in this area, whilst also recognising the complex ecosystem that is required for innovating in highly technical areas of research and development.
- Deliver on ambitions around further investment in compute capabilities to meet the UK's ambition in the AI space. Work is being scoped on site selections for further investment as well as the supporting ecosystem to extract maximum value from these investments.
- Ensure the research and innovation ecosystem can fully utilise the investments that government is making in compute by ensuring the access models meet the needs of communities that will need to use them.

Research and Innovation Organisations (RIO) Infrastructure Fund – Bolstering the UK's research infrastructure

In 2023, a £31 million pilot competition was held to fund small and medium-scale research infrastructure in Public Sector Research Establishments (PSREs). Research and innovation infrastructure also underpin critical capabilities in our PSREs, other public sector research and innovation organisations, and the wider system.

Successful bids included:

- High performance compute capability for Bioinformatics Scotland.
- High-end laboratory equipment, such as mass spectrometers for the Royal Botanical Gardens Kew.
- Equipment to assist the digitisation of collections at the Natural History Museum.

In November 2023, we launched another round of this fund, extending the pilot to innovation bodies which can also have difficulties delivering mid-range investments in renewing assets and building new capabilities.

Interest was strong with nearly 100 applications received – a significant increase from the applications in the previous round. We will work to understand the impact and strengthen the case for further rounds of this funding and explore how to make this a permanent feature of the funding landscape.

9. Regulation and Standards

Lead Department: Department for Science, Innovation and Technology

Vision: The UK leverages post-Brexit freedoms and is at the frontier of setting technical standards and shaping international regulations. Regulation is pro-innovation, stimulates demand for science and technology and attracts investment while representing UK values and safeguarding citizens. The government leverages its science and technology strengths and international relationships to secure influence over regulations and technical standards.

We are delivering an effective programme of work to stimulate a pro-innovation approach to regulation and standards, which plays a critical role in encouraging and translating R&D investment into real-world, marketable products and services. Our wider regulatory work is also helping keep the UK's citizens safer, for example through the Online Safety Act.

In the past year, we have focused on identifying the changes that are needed and establishing effective mechanisms to coordinate work across government departments, which is crucial to realising the UK's regulation and standards vision. Progress has already been made towards our 2030 vision of leading international efforts to shape standards and regulations for our critical technologies.

Our efforts aim to improve and uphold the integrity of the regulation and standards landscape, supporting innovation in science and technology whilst ensuring it is safe and secure.

We have:

- Published the reports and responses to the GCSA's Pro-innovation Regulation of Technologies review. Initiatives are underway to enhance the regulatory landscape for creative industries, life sciences, digital technologies, green industries, and advanced manufacturing sectors.
- Collaborated with regulators, industry, and international partners in global standards development organisations. In partnership with Ofcom, we represented the UK on the Council of the International Telecommunication Union. We have also promoted UK positions in other bodies such as the European Telecommunications Standards Institute (ETSI), the 3rd Generation Partnership Project (3GPP) and the Internet Engineering Task Force (IETF). We have been one of the leading nations engaging in the International Telecommunication Union Radiocommunication Sector (ITU-R) International Mobile Telecommunications 2030 work for 6G and in particular have been at the centre of work on sustainability.
- Worked closely with France and Germany to engage with ETSI and the European Commission and get a balanced outcome of the operation of the European Union (EU) standardisation strategy in ways that work for the UK and industry in general.

- Delivered the Online Safety Act 2023 which received royal assent in October 2023, putting rules in place to make the UK the safest place in the world to be online.
- Throughout 2023, the Data Protection and Digital information (DPDI) Bill has remained a key focus in DSIT and has been delivering on the post-Brexit opportunity to create a UK data protection regime that maintains high data protection standards whilst harnessing the benefits of secure data use for science and technology.
- Developed the Digital Markets and Consumer Competition Bill, currently progressing through Parliament, which will establish new, faster, more effective tools to address the unique barriers to competition in digital markets; promote innovation; and open opportunities for innovative start-ups in the UK to compete with the most powerful firms.
- Published a white paper on the regulation of AI, which sets out a pro-innovation approach to AI regulation and proposes five cross-cutting principles for AI regulation. The government set out its next steps in delivering the pro-innovation approach in its response to the consultation on the white paper on 6 February 2024, including key commitments to working with regulators and across government to ensure our regulatory approach can adapt and evolve as AI continues to develop at pace.
- Successfully piloted the AI Standards Hub, as shown by an independent evaluation report published in October 2023. This pilot has laid the groundwork for the Hub to enhance the UK's influence in AI standards development. DSIT is also undertaking further work to understand the international standards landscape to improve the cyber security of AI as well as wider emerging technologies.
- Supported implementation of the proposed 'fairness' regulatory principle, by launching the Fairness Innovation Challenge alongside Innovate UK, UK regulators, the Equalities and Human Rights Commission (EHRC), and the Information Commissioner's Office (ICO). This is a grant challenge, where organisations can apply for up to £400,000 of government funding, to support the development of novel sociotechnical solutions to address bias and discrimination in AI systems.
- Appointed Dr Lucy Mason and Dr Graeme Malcolm OBE to the Regulatory Horizons Council (RHC) and published reports on the regulation of hydrogen propulsion in maritime vessels, robotics in agriculture, and the role of regulation in supporting scaling up.
- Continued developing new pro-innovation regulation approaches, for example by starting the 12-18 month Regulators' Pioneer Fund Round 3 projects in September 2023 and announcing regulatory sandboxes for telecommunications spectrum sharing, engineering biology, and space.
- Introduced the Product Security and Telecommunications Infrastructure Regulations in September 2023, which will become enforceable law in April 2024. The legislation introduces new security requirements for domestic 'smart' products – like watches, speakers, TVs, doorbells, and baby monitors – meaning consumers will benefit from world-leading security protections from the threat of cyber crime.
- Supported innovators and regulators as we are harnessing new autonomous vehicle capabilities on land, in the air, and at sea. The government and industry led Future of Flight Industry Group has been established, and will soon publish a Future of Flight Action Plan setting out the UK vision and ambition for the integration of future of flight technologies

(including drones and Advanced Air Mobility) into UK airspace. A cross-sector public user group is developing a common approach to regulation, standards, and ethics for the shared challenges they face in adoption of robotics and AI.

- Launched and funded UKRI's 'UK Regulatory Science and Innovation Networks' programme to create agile regulatory pathways for emerging technologies.

Over the next 12 months, we will:

- Implement the recommendations from the GCSA's Pro-Innovation Regulation of Technologies reviews. This includes prioritising and driving pro-innovation regulation across government, fostering innovation among regulators, and ensuring effective collaboration between government and regulatory bodies.
- Publish independent reports on the regulation of quantum technologies, space, and engineering biology sectors through the Regulatory Horizons Council (RHC). The RHC is also adding to the Closing the Gap Series by developing insights into instilling a 'growth mindset' culture within regulators and policymakers.
- Develop a regulatory support service specifically designed to help science and technology companies navigate rules and regulations.
- Increase domestic and international stakeholder engagement and capacity building to promote UK leadership in the development of digital standards, including through a Digital Standards Showcase event to set out the UK's policy approach to digital technical standards.
- Publish our updated guidance on the responsible use of AI and data-driven tools in the human resources (HR) and recruitment sectors, to incorporate recent policy developments, including the government's pro-innovation approach to AI regulation, and policy development around tools for trustworthy AI.
- Develop a translation tool for trustworthy AI, which will define and translate between key AI assurance terminology used in the UK and other countries. This will support international interoperability and trade by helping industry and assurance service providers to navigate taxonomies across different jurisdictions, fostering international collaboration on trustworthy AI.
- Pass the Data Protection and Digital Information (DPDI) Bill and work with our stakeholders to ensure that the Bill is successfully implemented; continue to work closely with the Competition and Markets Authority (CMA) to ensure the digital markets regime is operational as soon as possible after the Digital Markets Competition and Consumers (DMCC) Bill receives royal assent; and work with Ofcom to implement the key child safety and illegal harms duties under the Online Safety Act.

Civil Aviation Authority – Crash protected containers to carry dangerous goods in drones

In 2021-22, funded by the Regulators' Pioneer Fund, the Civil Aviation Authority (CAA) worked in collaboration with the Vehicle Certification Agency (VCA), Medicines and Healthcare products Regulatory Agency (MHRA), and industry to develop the world's first guidance for testing special 'crash protected' containers. These containers allowed drones to carry a wide range of sensitive and dangerous goods, such as patient samples, medical products and other articles and substances.

CAA guidance and a report sharing learnings was published in July 2023 based on these findings. This means the UK is one of the first in the world to introduce a regime for the testing and approval of such containers, setting a global standard and creating new opportunities for global trade in equipment services and skills.

Furthermore, the CAA developed a market study to provide key insights for the sector and to help develop future policy roadmaps.

As a result of this:

- The use of drones has been made more accessible for end users such as the UK National Health Service (NHS) and remote and disconnected communities across the UK.
- The industry is more likely to be able to provide safe and compliant drone services by being more informed of the associated risks.
- The project could catalyse the creation of a new market in the UK and internationally for safe and compliant crash-protected containers.

The Automated Vehicles Bill – Driving the future of the UK's transport regulation

The Automated Vehicles Bill was announced in the King's Speech in November 2023. This Bill will create the regulatory framework that will allow self-driving vehicles on to public roads and support wider policy on self-driving vehicles, such as how government can support UK firms in developing new technologies. The importance of this legislation was highlighted in the GCSA Pro-Innovation Regulation of Technologies Review in March 2023.

Technology, ranging from novel sensors to artificial intelligence, is fundamental to the move beyond driver assist technologies to vehicles which fully drive themselves. The regulatory framework will enable two broad types of use vehicles, with a 'user in charge' feature, and vehicles with no user in charge. In the former case, this might be a car which is largely the same as a current car, but which drives itself, through a new legal actor – the Authorised Self-Driving Entity – in specific and defined circumstances. A 'no user in charge' feature would be a vehicle where a human driver is never expected to take control.

The UK has real strengths in this technology with a number of notable success stories. Oxa, a self-driving vehicle company based out of Oxford is focusing on developing passenger shuttles on fixed routes as well as off-road use cases such as mining and logistics. Wayve, a start-up based in London has been leading a new approach to self-driving based on generative AI. Government trial funding has helped the UK deliver the world's first self-driving bus – CAVForth in Scotland.

The Data Protection and Digital Information (DPDI) Bill – Empowering UK researchers through modern regulatory reforms

The DPDI Bill reduces burdens by introducing less prescriptive compliance rules; modernises the Information Commissioner's Office to become an even more engaged regulator that proactively supports innovative uses of personal data; and will benefit scientific research particularly through bringing greater legal certainty for those engaged in science and technology regarding how they can use personal data. The DPDI Bill reforms include providing a legal definition of 'scientific research' on the face of the data protection legislation, empowering researchers to take advantage of research's privileged position in our data protection framework.

Examples of where these reforms' clarification of what constitutes scientific research will have positive, real-world impact include:

- UK Biobank – a large-scale biomedical database that has enabled a range of medical breakthroughs – have said that the reform will speed up the process of approving new research projects, making it simpler for researchers to access data that is essential to carrying out this life-saving research.
- Digital Surgery – a UK-based MedTech company which uses inter-body videos to improve the surgery process and aid surgeons in prevention and care – have said that the reform will make the process by which hospitals securely share data with the company far easier and clearer, which will help them to roll out their tool in the medical field, improving health outcomes for patients.

10. Innovative Public Sector

Lead Department: Department for Science, Innovation and Technology and Cabinet Office

Vision: The public sector has a pro-innovation culture, with a system that adequately supports and rewards innovation while unblocking systemic barriers. This is supported by strong internal STEM capability. Civil servants have the resources they need to test and develop ideas for delivering services more effectively. There is an appetite for appropriate risk-taking, minimal bureaucracy and the agility to work with business and support strategically important sectors.

We have undertaken a wide range of actions, making progress across our 2030 outcomes on our STEM skills and literacy, improving talent and resource sharing within and outside government, and developing a culture that supports innovation. This includes work to embed an innovative culture across the Civil Service, to develop digital infrastructure in the public sector to allow for innovation in the delivery of public services, and to upskill public servants to provide them with digital and data confidence. There are huge gains available, for example the potential productivity benefits from adopting the latest AI tools.

We have:

- Announced the establishment of the Incubator for AI (i.AI), a team of highly-skilled, visionary AI experts whose mission is to help departments harness the potential of AI to improve lives and the delivery of public services.
- Run a range of initiatives to explore the uses of AI across the public sector, including a two-day hackathon with teachers and school leaders to explore how AI could supercharge education; establishing 'Evidence House' to radically upskill civil servants in data science and AI; and creating a second cohort of the Innovation Fellowship to bring world-class technical talent into government.
- Established an Innovation Working Group, of senior leaders and innovation champions from the Civil Service to share best practice and identify scalable initiatives.
- Supported over 50 organisations in the UK public sector to unlock the potential of their Knowledge Assets (including intellectual property and data), through the Government Office for Technology Transfer's (GOTT) provision of expert support and funding, to help improve public sector services and drive economic innovation and growth.
- Published a database of Areas of Research Interest (ARI) from UK governmental bodies, making it easier for researchers to understand the science questions which government is interested in and use their research to provide innovative solutions to problems and inform government policy.

- Established 'STEM Futures', a partnership of organisations across industry, academia, and the public sector which provides opportunities to exchange and promote STEM knowledge, including shadowing, mentoring, placements, and secondments.
- Published an update to the 2019 Science Capability Review, which provides a qualitative evaluation of the work carried out since 2019 to deliver improvements in science capability in government. Five of the 15 recommendations are now complete, and progress is being made against all the others.
- Sought to ensure that all civil servants undertake at least one full day's worth of data training through the 'One Big Thing' programme in 2023 (an annual initiative for civil servants to take a shared action each year around a government reform priority).
- Identified and baselined performance of the government's top 75 public services and committed to 50 services reaching a 'Great' standard by 2025, meaning they are usable, efficient, and compliant with accessibility standards. From an initial eight 'Great' services at baselining, 19 are now 'Great' following continuous support and targeted intervention, including innovative solutions utilising emerging technologies.
- Developed the Digital Readiness Check, a set of key principles and questions to work through when developing policy or legislation. This is to help teams work collaboratively to develop digitally deliverable policy.
- Launched a new digital apprenticeship programme for both civil servants and new entrants to be recruited into the most in demand data and technology roles, as well as a new Digital Secondments Programme to bring some of the best technical minds from industry to work on the country's biggest challenges.

Over the next 12 months, we will:

- Utilise the new i.AI team to design, test and scale projects for AI based productivity improvements in public services, including looking at data and AI infrastructure, and working with departments to co-design projects to drive public sector efficiency.
- Build on the significant progress we have made towards achieving our target to upskill 90% of Senior Civil Servants with the digital and data confidence they need to lead government in a digital age, through the Digital Excellence Programme.
- Host a Government Science and Engineering (GSE) Profession Conference, to celebrate the achievements of government scientists and engineers, increase connectedness between professionals in these areas, and raise awareness of the GSE profession offer.
- Promote transparency to build public trust and support for innovative and data-driven technologies by reviewing and updating the Algorithmic Transparency Recording Standard, which creates a standardised way for public sector organisations to proactively publish information about how and why algorithmic methods are used in decision-making.
- Progress a range of innovation initiatives as one of the 5 reform missions of the wider 'Modern Civil Service' programme to build a culture which recognises and rewards innovation.
- Develop a Government Data Marketplace, which will provide a front door to discover, access, and share government data in a legal, ethical, and trusted way.

- Work towards recruiting 2,500 ambitious technology talents into digital roles by June 2025, through new apprenticeship and early talent programmes, to support a new government target for 6% of the Civil Service workforce to be members of the digital and data profession.