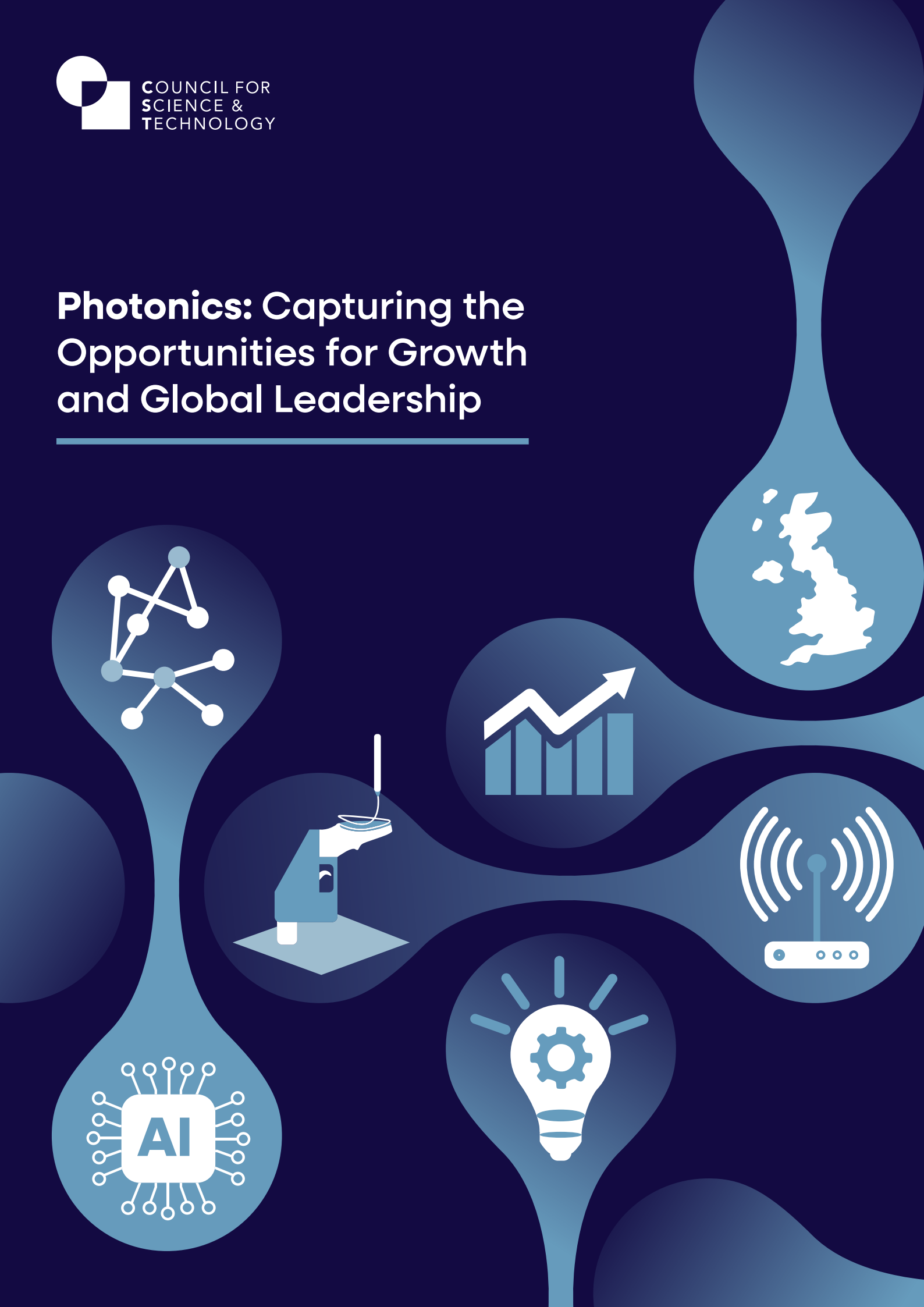
COUNCIL FOR SCIENCE & TECHNOLOGY

Photonics: Capturing the Opportunities for Growth and Global Leadership



COUNCIL FOR SCIENCE & TECHNOLOGY

Prime Minister
10 Downing Street
London SW1A 2AA
Sent by email only

100 Parliament Street
London SW1A 2BQ

19 February 2026

Dear Prime Minister,

Photonics: Capturing the Opportunities for Growth and Global Leadership

We were pleased to meet with your special advisers to discuss how the UK can seize growth opportunities in specific technology areas. Given the UK's relative global strengths in science and technology, developing and maintaining specific technology niches should be a national priority.

We are writing specifically on **photonics**, a branch of optics that involves generating, controlling, and detecting light (photons). Photonics is a platform technology core to modern communications networks, smart display screens, biomedical imaging, and precision cameras. Photonics underpins 13% of global innovation output and critical sectors within the UK's Modern Industrial Strategy depend on photonics, including AI, quantum, defence, clean energy, and healthcare.

The UK has a history of strength in photonics, dating back to James Clerk Maxwell's 1865 theory of electromagnetism. Today, the UK photonics industry represents one of the UK's most economically productive sectors, achieving £18.5 billion turnover in 2024 (up 20% over two years) and contributing £8.6 billion to the UK economy.[1]

The growth opportunity

By 2035 more than 60% of the UK economy will directly depend on photonics to keep it competitive.[2] Building and sustaining the UK's leadership in photonics will determine how effectively the UK competes in AI, quantum, autonomous vehicles and digital infrastructure over the coming decades. It will also impact how well the UK can achieve strategic advantage in emerging sectors such as optical computing, where the global market is projected to grow from $954 million (2024) to $17.4 billion (2035).[3]

To capitalise on the investment the UK has already made in photonics and build technological leadership, government will need to act now to translate current research capabilities into significant economic and social impact, or risk losing momentum to international competitors within the next 3-5 years. The USA, China, Taiwan and Singapore have identified the strategic importance of photonics.

[1] Photonics Leadership Group (2025). Photonics 2025: The Hidden Economic Engine. Available at: **UK_Photonics_2025_The_Hidden_Economic_Engine_online.pdf**
[2] Photonics Leadership Group (2021). UK Photonics 2035: The Vision. Available at: **UK Photonics 2035: The Vision - UK Photonics Leadership Group**
[3] Yole Group (2025) Quantum Technologies 2025. Available at: **Yole Group - Follow the latest trend news in the Semiconductor Industry**

The UK's overall aim should be to create a long-term, sustainable environment which accelerates the scale up and adoption of photonics. This should take advantage of and bring together the UK's well-established strengths in AI, quantum, and semiconductors and support existing UK clusters to scale and integrate more effectively into UK supply chains. A national photonics roadmap and targeted investment could help achieve £50 billion sector value by 2035, with up to 150,000 additional jobs.[2]

Recommendation 1: Government should develop a national photonics roadmap by April 2026 to better coordinate funding, leverage existing clusters and build on technological strengths.

The UK has a strong industrial base and significant clusters of photonics research and start-up activity distributed across the country, including at the Universities of Southampton, Sheffield, Aston, Strathclyde, Glasgow, Heriot-Watt, and Queen's University Belfast. These clusters have developed into ecosystems outside of the 'golden triangle' around specific technologies such as optical fibres, quantum photonics, optoelectronics, and lasers.[4,5,6]

However, the photonics sector currently lacks coordinated government oversight, which is impacting the coordination of policy, funding and skills planning. Resources are also spread thinly across related sectors, for example funding for quantum applications through the National Quantum Technologies Programme and support for silicon photonics through the UK Semiconductor Centre.

Building on the National Quantum Strategy and Semiconductor Strategy, government should work at pace with industry, funding bodies and academia to develop a national photonics roadmap to support existing UK photonics clusters with targeted support for skills, funding, scale-up infrastructure, manufacturing and collaboration.

On skills, a national roadmap should include specific, time-bound steps on how government, the Global Talent Taskforce, UK Research and Innovation (UKRI) and Skills England will identify, attract and retain talent to enable the UK to build and maintain strategic advantage in photonics. Simplifying visa processes for international specialists, supporting re-skilling programs for mid-career engineers (e.g., bootcamps and conversion courses), and ensuring photonics is represented in national skills strategies would all contribute to a more sustainable workforce.[7] There are gaps in post-16 and undergraduate provision of photonics training and career guidance, particularly for interdisciplinary skills. As new fields like quantum photonics and AI-driven optical computing emerge, the need for interdisciplinary talent will be even greater.

A roadmap should also improve coordination with UKRI, Innovate UK, the British Business Bank and the National Wealth Fund to identify the funding needed to de-risk innovation and enable promising photonics SMEs to bridge the gap to commercialisation and scale up.

A dedicated photonics team should deliver the roadmap and should be responsible for tracking progress and ensuring joined-up governance with existing quantum and semiconductor resource across government.

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[4] Technology Scotland (2025). Photonics in Scotland 2025 Report. Available at: **Photonics-in-Scotland-2025.pdf.**
[5] TechUK (2025) Unlocking Photonics Potential in Northern Ireland. Available at: **Unlocking Photonics Potential in Northern Ireland.**
[6] University of Southampton (2025). Optoelectronics Research Centre. Available at: **Optoelectronics Research Centre | University of Southampton.**
[7] TechUK (2025). Lighting the Way: Building the photonics skills and talent pipeline. **Lighting the Way: Building the UK's photonics skills and talent pipeline.**

Recommendation 2: Government should use public procurement to support domestic industries and reduce reliance on global supply chains to build sovereign capabilities.

We have advised extensively on the use of public procurement to stimulate innovation and how government can drive adoption of innovative technologies.[8] We therefore welcome the measures announced in the 2025 Autumn Budget to leverage government procurement to shape markets and drive innovation. Photonics can enhance UK security, technology resilience, sustainability, and economic growth, but companies need stable demand to invest and grow.

We recommend public procurement be used specifically to create a stable demand for photonics defence and national security applications (e.g., directed energy, quantum navigation, sensors). A procurement commitment from government as a strategic buyer over 5 years would help to de-risk private investment, support the resilience of our industrial base and build sovereign capability in critical defence technologies. Beyond defence and national security, a public sector early adoption pilot for optical computing could accelerate technology maturation and create reference customers.

Global competitors are investing heavily in silicon photonics, which will be critical for AI acceleration and developing the next generation of more sustainable, efficient data centres and communications networks. However, the UK is currently dependent on overseas semiconductor foundries, even for prototyping.[9] This limits our ability to innovate rapidly.

Government should mitigate UK reliance on global supply chains by establishing a National Photonic Integrated Circuit (PIC) Foundry for prototyping and low-volume production. Government should build on UK strengths in chip prototyping and leverage existing infrastructure in Southampton and Sheffield for example, working with commercial partners. Establishing a national PIC foundry would also support the UK's leadership in optical computing.

Recommendation 3: Government should expand international partnerships and export activities to support growth.

UK photonics companies attract significant foreign direct investment and are already globally focussed – over half of companies export more than 75% of their output.[1] The Department for Business and Trade and Office for Investment should create a dedicated UK Photonics Export Support Programme to further signpost UK companies to investors and customers, facilitate trade missions, assist with IP protection and guarantee export finance.

The UK can gain additional trade and investment benefits from expanding collaboration with international partners (such as Taiwan, Japan, Singapore and South Korea) on joint R&D, standards development, talent exchange and supply chain resilience. There are also opportunities to foster links with European hubs, building on the recent UK-Netherlands Innovation Partnership. We are happy to provide further advice on the international partnerships required for rapid growth.

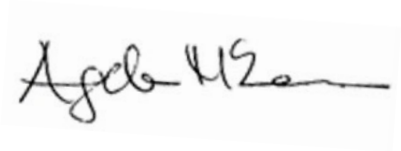
[8] Council for Science and Technology (2022). Delivering national priorities through public procurement. Available at: **Advice on delivering national priorities through public procurement - GOV.UK**
[9] TechUK (2025). UK Plan for Chips – A new techUK blueprint. Available at: **UK-plan-for-chips-FINAL.pdf**

Photonics is already a UK success story. By developing a national roadmap to improve coordination, investing for UK security, and developing trusted partnerships we can capitalise on our comparative advantage.

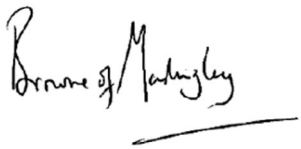
We will continue to advise on how the UK can seize growth opportunities in specific technology areas and would welcome the opportunity to meet with you to discuss our advice.

We are grateful to Council member Paul Taylor for leading this advice, with support from Saul Klein, Professor Lynn Gladden, Professor Nick McKeown, and Dave Smith.

Yours sincerely,



Dame Angela McLean
Co-chair



Lord Browne of Madingley
Co-chair

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Government Office for Science