Industrial Strategy Green Paper

techUK's response to the UK Government's consultation on the Industrial Strategy Green Paper

November 2024

About techUK

techUK is a membership organisation launched in 2013 to champion the technology sector and prepare and empower the UK for what comes next, delivering a better future for people, society, the economy and the planet.

It is the UK's leading technology membership organisation, with more than 1000 members spread across the UK. We are a network that enables our members to learn from each other and grow in a way which contributes to the country both socially and economically.

By working collaboratively with government and others, we provide expert guidance and insight for our members and stakeholders about how to prepare for the future, anticipate change and realise the positive potential of technology in a fast-moving world.

Executive Summary:

Accelerating the UK's highest potential technology sectors and driving technology adoption across the economy

The tech sector is the United Kingdom's modern economic success story, with the industry's contribution to the UK economy growing by 25% between 2010 and 2019, and now adding over £150bn per year gross value add. Within this techUK's members employ 1.1 million people and had a combined turnover of £329 billion in 2023 with an estimated annual growth rate of 10%.

Beyond its own success the tech sector is a driver of growth and innovation across the entire economy. Virtually every other business sector has a 'growth plan' predicated on greater digitisation and the use of new and emerging technologies like AI and the cloud. Digitisation further enables inclusion and lowers barriers to accessing often critical public and private services for businesses and individuals, flowing through to economic growth. This is not only directly because of investment in digital services, but due to the impact use has on total factor productivity. Raising the rate of digitisation can have significant benefits, the OBR estimates that a faster than expected increase in the use of digital technologies such as AI could raise an extra up to £47bn for the Treasury per year through increased taxes from a better performing economy, and cost savings by reducing in inefficiencies through digitisation.

The Government's Industrial Strategy aims not only to drive growth in the UK's most successful sectors, but also create a more dynamic economy by improving general business conditions and find new ways to increase investment as well as setting a new partnership between business and Government, where both the public and private sectors are pulling in the same direction to renew our economy, raising business investment, growth and living standards by 2035. In our response techUK sets out how supporting the tech sector and driving technology adoption and digitisation across the economy places a critical role in this.

The UK has suffered from a number of stop and start growth plans and industrial strategies. This time it is vital there is ongoing commitment and the Government does not succumb to the temptation to chop and change its approach.

The Government has set out its intention that this time will be different, with a long-term commitment to national renewal. techUK supports this vision and in our response sets out a view from our members on how the Government should construct the strategy.

Members will view this green paper and our response as the start of this conversation and partnership, not the end. To truly make the strategy a success continued engagement with businesses and their representatives will be needed. This will need to continue as the strategy is implemented, reviewed and updated over the next decade.

In our response techUK has divided our answers to the questions in the consultation into five chapters below we provide an overview of each.

Chapter One - The Key Growth Sectors.

techUK and our members support the view of the Government to identify sector deals for a number of high growth business sectors. In selecting these sectors we encourage the Government to consider whether the economic sector in question has:

- the potential to make a material economic impact for the UK,

- whether by supporting the sector in question there would be positive economic spillover effects to other parts of the economy and
- whether the sector in question can be truly globally competitive, so that tax payers money is more likely to receive a sufficient ROI.

While we do not expect to be able to name all the relevant sectors that deserve sector deals, we put forward the following that we believe meet our three tests and warrant specific support.

These include semiconductors, photonics, gaming, Defence technologies, quantum, artificial intelligence, future telecoms, space technologies, cyber security, digital identity, the applications of quantum and AI in life sciences and Digital Accounting and e-commerce. In the response below we outline the case for each of these sectors.

Chapter Two - The pro-Business Environment:

While much of the focus and discussion around the Green Paper will centre on which sectors are to receive specific sector deals, we see the Government's to improve the general business environment in the UK as just as, if not more important than sector by sector deals.

In our response we highlight the areas Government needs to make progress based on survey evidence and feedback from our members. This is most notably on skills, energy costs, infrastructure and regulation. In each of these areas the cost to businesses is high and increasing. Government needs to identify policy action, in partnership with businesses, to help drive these costs down and increase the competitiveness of the UK economy.

Chapter - Three: Place

In this chapter we set out our response to the Government's questions regarding place-based support and how to create dynamic business ecosystems. Here we share the findings of our local digital capital index, providing an analytical framework for assessing the strengths of local digital ecosystems and the steps that could be taken to support the ecosystems across the UK.

Further we seek to place a few select cities and regions into categories. Identifying those that are globally competitive and where the Government needs to take steps to retain that competitiveness against the very best international locations. In addition, we identify other cities and regions where the Government should raise their competitiveness against other locations within the European region as well as identifying cities and regions which need additional support to raise their competitiveness, but where there is clear potential.

Chapter Four – What the strategy is missing

As well as addressing the questions the Government is seeking answers to we also wanted to provide reflections on what we and our members feel the Green Paper could be further developed. In particular we raise the lack of focus on raising technology adoption across the UK's long tail of unproductive SMEs as well as the lack of focus on increasing AI adoption among the UK's highest performing sectors. We see this as a missed opportunity given the correct diagnosis of the strategy on the need to raise overall productivity and the potential for a few high performing sectors to drive a significant proportion of economic growth in the future. It is odd to us, given this analysis, that there is then not a focus on broad based productivity improvements and ensuring that our highest performing economic sectors are readily adopting the newest AI technologies to ensure they remain globally competitive.

In addition to this Chapter Four raises concerns of the lack of focus on cyber security and resilience as well as providing input into how the Government should seek to provide investment support.

Chapter Five - Institutions and working with business

In the fifth chapter we provide reflections on how the Government should structure its engagement with business as the strategy is developed, implemented, monitored and refreshed.

Additionally, we provide our view on the important role Task and Finish Groups could play in helping deliver the strategy over its lifetime.

If got right the new Industrial Strategy has the potential to meet the objectives set out by the Government. However, this will require careful consideration, commitment, engagement with the private sector and the ability to remain adaptable in the face of potential global shocks and changing circumstances.

techUK and our members are committed to working with the Government over the lifetime of the strategy. We look forward to hearing more and playing our part in establishing the new partnership model envisaged by the Government.

Chapter One – Key Growth Sectors

1 How should the UK government identify the most important subsectors for delivering our objectives?

techUK recognises the need for an Industrial Strategy to make choices about the sectors the Government wishes to encourage. Our experience from around the world is that successful I industrial strategies are both ambitious, but also realistic. Focusing support on economic sectors that currently have a strong footprint, with the potential to grow and where they can be globally competitive.

techUK therefore welcomes the Government explicitly setting a high standard of proof for the sub-sectors it will choose to create sector-specific deals for.

In selecting sectors for support we encourage the Government to focus on three criteria:

- **A material economic impact for the UK** – by assessing whether sub-sectors have the potential to materially improve the overall economic performance of the UK or those which have significant regional or ecosystem effect.
- **Spillovers** – identifying sectors that can drive innovation not just in their vertical but that have the potential to deliver positive spillover effects into other sub sectors or whole markets.
- **Global competitiveness** – assessing whether the sub sector in question can be truly globally competitive so that it has the potential to expand to other markets.

It is welcome that the Government has set out a quantitative and qualitative approach to determining which sectors and sub-sectors support, as this will ensure that a sectors' holistic contribution to the economy is fully measured. This is particularly the case with emerging technologies that will be essential to the economy in the future, but which are not yet fully commercialised.

techUK also urges the Government to consider more than just a sub-sector's economic contribution and potential for economic growth, but also a sub-sector's ability to provide positive spillovers to support and enable other sectors. This will better reflect the economy-wide impact that technology can have alongside having strong specific economic subsectors. This does not just include economic support, but strategic support through increasing the resilience of the UK economy.

Similarly, the Government should discern where in an economic sub-sector's supply chain the United Kingdom is likely to hold strengths worth encouraging, and where the UK should seek to work with allies and other countries in the forthcoming trade strategy. This response will set out below where key technology subsectors make significant contributions to other areas of the UK's economic life, and where the UK has strengths in the supply chain that will be worth exploring.

3. How should the UK government incorporate foundational sectors and value chains into this analysis?

A specific technology, such as semiconductors are part of complicated supply chains. For example, semiconductors are present in almost every device we use: From day-to-day consumer electronic devices, vehicles, healthcare and defence technology. They underpin the key technologies vital for the UK's future economic growth. Other similar foundational technologies such as future telecommunications, certain quantum applications, space technologies and AI occupy a similar place in value chains.

Semiconductors, like the technologies and sectors we have outlined as key growth subsectors are representative of all technologies in that each has numerous other supporting technologies in their supply chain and is enmeshed in the supply chains of other technologies. It is best not to think of technologies as having discrete supply chains, top to bottom, but as an interconnected web of inputs and outputs, with each technology enabling and being enabled by other technologies.

techUK would emphasise that businesses are the most familiar with what value chains and sectors are foundational to them. We would therefore welcome the Government engage with Trade Associations and businesses individually to get feedback on how certain sectors and technologies are foundational and cut across the aims of the industrial strategy.

As part of this, techUK would urge the Government to clarify how each of the subsector plans they aim to draw up will accommodate these foundational sectors and technologies, as well how these subsector plans will be updated to reflect changes in the supply chain and technologies involved in certain key sectors.

Currently, the lack of detail makes offering detailed feedback difficult and therefore these is a case for periodic reviews of sector plans and bringing in stakeholder to provide reflections on how technology and their supply chairs are evolving.

4- What are the most important subsectors and technologies that the UK government should focus on and why?

There is an extremely wide range of established and emerging technologies that could be supported by the Government. Below, techUK has listed the several we think best fit the Government's criteria to get a specific subsector deal as well as our own view that these sectors should have a material impact on growth, promote positive spillovers and are globally competitive.

As a minimum, techUK firmly believes the Government must continue support for the Five Technologies outlined in the Science and Technology Framework. These are quantum, AI, semiconductors, engineering biology (as part of life sciences) and future telecoms.

This framework, released in March 2023, has been an important guiding document for the industry. Maintaining continuity is critical to build upon UK strength in these areas, including world-leading research and innovation, while also reducing disruption for significant parts of the sector.

Below we have grouped our sub sectors under the relevant eight sector headings presented in the industrial strategy. Please note these are outlined at a high level here with more detail provided in our response to question 5.

Advanced manufacturing

Semiconductors

- *UK companies dedicated to semiconductors generated £9.6 Billion in revenue in 2022. GVA per employee is estimated to be £460,000 with approximately a third of the UK's Semiconductor workforce employed in manufacturing.*
- *The UK semiconductor industry generates substantial revenue and supports a wide range of downstream industries. The sector is also an integral part of the global supply chain and is crucial for the functioning of modern technologies and critical infrastructure.*
- ***Strengths:** design, intellectual property, compound semiconductor assembly.*

Photonics

- *The UK's photonics industry has demonstrated significant growth and resilience in recent years. As of 2022, the sector's output reached £15.2 billion, marking a 7% increase over two years. Employment in the industry also rose by 3.2%, bringing the total number of employees to 79,100. Notably, profit growth outpaced revenue, achieving a 9% increase over the same period. By 2035 UK photonics will be a £50 billion industry, add an additional 150,000 direct jobs and be one of the top three most productive manufacturing sectors in the UK.*
- ***Strengths:** nanotech, exports, communications infrastructure, biotechnology, emerging technology applications for AI and quantum computing.*

Creative industries

Gaming

- *The UK gaming sector reached a market valuation of £7.82 Billion in 2023, while the global gaming industry generates more revenue than film and sport combined, achieving a valuation of $184 billion in 2022, while the number of gamers is expected to hit 3.8 billion by 2026. In the UK, the video games industry contributes over £6 billion to the economy and supports 76,000 jobs across the supply chain.*
- *As of 2021, the impacts of video game technology 'spillovers' in other sectors of the UK economy included 9,900 jobs and £1.3 billion in economic output.*
- ***Strengths:** design and creation, exports, spillover effects in health, defence and other sectors.*

Defence

- *The UK's wider security and resilience sector makes a significant and growing contribution to economic prosperity. Statistics show that in 2023 the sector generated £12.2bn in value add for the UK economy, created 148,000 direct jobs, and achieved £10.5bn in export sales, with third quarters of those capabilities being digital in nature, driven heavily by the UK's vibrant cyber security sector. This comes against a backdrop of consistent growth, with a 189% increase in turnover between 2013 and 2023.*
- ***Strengths:** data-rich sensor systems (and ready for AI exploitation in defence) including electronic warfare, optical sensing including object recognition, video moving target induction, and Radar.*

Digital and technologies

Quantum

- *The UK has 11% of the world's quantum startups - the largest amount of quantum start-ups in Europe - and 12% of global private equity investment into the technology. This quantum economy employs over 100,000 people and is growing at 7.8% every year.*
- ***Strengths**: startups, R&D, skills, pro-innovation regulation.*

Artificial Intelligence:

- *Artificial Intelligence (AI) businesses contribute £14.3bn GVA to the UK and this contribution is growing quickly. The OBR has also estimated significant growth potential from the fast rollout and take up of digital technologies such as AI and recent research highlights if the UK fully harnesses AI, we could see a £550*

billion GDP growth by 2035, equivalent to raising annual growth rates by 2% a year, while delaying the roll-out of AI over the next half decade could cost the UK £150 billion by 2035.

- ***Strengths**: The UK has strengths in AI science, skills, investment and strong potential markets for AI adoption (health and fintech). Demonstration and AI assurance are also key strengths. AI also has a growing role in defence in which the UK is well positioned.*

Future Telecoms:

- *In our survey of 250 tech leaders, high speed internet connectivity as the second most promising technology subsector.*
- *There would be a £72bn boost to UK productivity by 2030 powered by nationwide rollout of full fibre benefits, continuing to rise after deployment is complete (according to research by CEBR for Openreach in October 2023). Beyond fibre and gigabit capable connectivity, we will soon see an increasing demand for higher speeds and greater reliability, particularly from businesses.*
- *The UK Wireless Infrastructure Strategy suggesting widespread adoption of 5G could see £159bn in productivity benefits by 2035.*
- ***Strengths**: R&D, deployment, satellite, 5G applications, 6G design, future of television.*

Space

- *SA Catapult's 'Size and Health of the UK Space Industry' Survey 2022 (covering 2020/21) shows that the UK space industry income has grown to £17.5 billion (up from £16.6 billion in 2019/20, inflation adjusted). It contributes £7 billion GVA to the UK economy, with 48,800 employed in the industry directly and a further 126,800 across the supply chain.*
- *With Research & Development (R&D) investment of £788 million (down 6% since 2019/20, equivalent to 11% of GVA), the space industry is more than 5 times more R&D intensive than the UK average.*
- ***Strengths:** design, telecoms, research, 5G applications.*

Cyber security

- *In May, the Government estimated that the sector was worth £18.4 billion in GVA, an increase of 13% since the last year. Its growth outstrips the UK's average growth across the ICT sector.*
- *The sector employs approximately 60,689 Full Time Equivalents (FTEs) working in a cyber security related role, an increase of around 2,700 cyber security employee jobs (5%) within the last year. Further, the industry is a source of good jobs across the UK. For instance, there are ~450 cyber security firms in the North West, with an average advertised salary of £56,800.*
- ***Strengths:** Solutions provision and expertise.*

Financial services

Digital ID

- *The widespread adoption and use of Digital ID is estimated to be valued at £800 million per year and creating the conditions for the market to thrive could help*

UK companies seize a stake in a global market predicted to value $40.44B billion by 2027.

- *Imarc estimate that the UK's digital identity market size reached $2.4 Billion in 2024. Looking forward, it is estimated the market will reach $8.7 Billion by 2033, exhibiting a growth rate of 15.70% during 2025-2033.*
- ***Strengths:** design, biometrics, early deployment, Onboarding, Right to Work/ Right to Rent verifications.*

Life sciences

***Please note AI and Quantum technologies have significant applications here and should be considered as foundational technologies as well as key parts of the supply chain in any life sciences sub sector strategies.**

Professional and business services

Digital Accounting and e-commerce

- *Digital accounting and e-commerce software have been found to boost sales by 18%, 11.8% and 7.5% respectively over a 3-year period. Furthermore, Singapore's tax digitisation programme has shown that businesses could achieve time savings of 95% (from 8 hours to 15 minutes) by using accounting software to prepare and file corporation tax returns.*
- ***Strengths:** software as a service provision.*

5- What are the UK's strengths and capabilities in these subsectors?

Semiconductors

In 2021,Government statistics show that the semiconductor industry contributed £12 billion in turnover, hosting 12% of R&D spend in the UK that year. Dedicated Semiconductor companies are estimated to generate £635k in revenue per employee, with over 200 companies across Design, R&D and manufacturing. The sector is also poised for tremendous growth, with 90% of surveyed semiconductor companies expecting to see rapid or moderate growth over the next two years.

IP and Design are a world leading strength for the UK, with the UK being host to 130 design firms. Furthermore, UK leadership in R&D and compound semiconductors are closely entwined with abilities in IP and Design. The importance of expertise in IP and Design will further increase as we move towards exploring new architectures to further the future of compute.

Compound Semiconductors are also a UK strength. This market is projected to grow at a 10-15% rate depending on material. This is compared to the 3-5% of Silicone, highlighting the scale of the opportunity for the UK.

Emerging clusters in Bristol, Cambridge, the Northeast, and Northern Ireland should be supported to develop their specialities. Meanwhile, the South Wales cluster is the world's first compound semiconductor cluster, with a strong record in facilitating collaboration between Government, industry and academia. This close collaboration also extends to skills bodies, R&D labs and manufacturing facilities which allows for the sharing of resources and partnerships.

techUK will outline further how the Government can do this in our updated UK Plan for Chips, which is scheduled for release in January 2025.

Photonics

An area of emerging advantage for the UK is photonics, one of the key strategic and enabling technologies where Government support would be highly impactful. A critical component of the advanced manufacturing sector and a growing global market value now estimated at £2 trillion. Photonics, which involves the generation, control, and detection of light, is fundamental to the present operation and future of industries such as telecommunications, data storage, medical devices, and semiconductors. The UK has a strong foundation in research and innovation in this field, positioning it to become a global leader. Photonics will become a critical dependency for many fields in the future, so encouraging its development and scaling in the UK will be advantageous for the future resilience of the economy.

By supporting photonics as a high-potential subsector, the UK can gain a competitive edge in sectors like smart manufacturing, autonomous systems, and high-speed data transmission, which are essential for the digital economy. Photonics technologies also intersect with other critical and growth-driving areas such as AI, quantum computing, 5G communications, and healthcare, enabling innovation across these fields:

- Photon-based technologies, such as photonics integrated circuits (PICs), can significantly enhance data transfer speeds, energy efficiency, and the performance of critical applications across multiple industries.
- This includes enabling breakthroughs in artificial intelligence (AI) through ultra-fast neural networks, in quantum technologies via low-noise, quantum-limited detection systems, and in semiconductors by improving imaging and medical technologies.
- Photonics also plays a key role in telecommunications, enabling faster, more efficient devices, and in biomedicine, particularly through biophotonics, which could revolutionise clinical technologies.

Photonics supports other key sectors identified as high potential, including digital and technologies, life sciences, clean energy industries and advanced manufacturing, it is critical for the government to prioritise this subsector. Looking ahead, the Photonics Leadership Group (PLG) forecasts that the UK photonics industry will grow to over £17 billion by 2024 and is on track to reach £50 billion by 2035. This optimistic outlook is supported by increasing demand across sectors such as agriculture, health, communications, defence, satellites, and manufacturing, as well as the commercialisation of quantum products.

Geographically, the photonics industry is well-distributed across the UK. Eight regions each produce over £1 billion worth of photonics goods and services, with more than 1,500 operational locations nationwide. Ten out of twelve UK regions employ over 4,000 people in photonics, highlighting the sector's extensive reach. Strong regional clusters can be found in Bristol, Northern Ireland, South Yorkshire and the Scottish Central Belt.

Gaming

The UK gaming sector does not just make a significant contribution to UK economic growth, with a majority of the UK's population engaging with video games regularly, but has significant spillovers into the wider UK economy worth £1.3 Billion in a range of fields, from healthcare to film.

The UK has particular strengths in the development and design of games. As of May 2024, the UK games development sector employed 25,419 full-time equivalent (FTE) development roles, reflecting a 4.8% annual growth rate. Including freelancers, the total workforce grew to

28,516. The number of jobs indirectly supported by studios in the supply chain rose to 44,162.

While London and the South-East are the areas with the greatest amount of gaming employment and GVA, providing nearly £2 Billion and 8,366 jobs as of 2016, the industry employs over 1000 people in the Nort West, Scotland, the West Midlands and the East of England, while the North West, Scotland, the West Midlands and North East of England have £100 million in GVA or more from their gaming sectors. This will likely have increased in the years since given the increasing popularity of gaming. Furthermore, advancements in technology, and supportive government policies, such as the Video Games Expenditure Credit, are expected to drive further expansion. A report by TIGA suggests that increasing the rate of VGTR from its current rate of 25% to 32% of qualifying expenditure would create nearly 1,900 additional full-time development jobs over five years.

Gaming itself has significant spillover to the wider economy, for example in healthcare, defence (as shown by the MOD's call for gamers to join a defence unit) or the automotive industry. It further supports both STEM skills and arts skills (STEAM) skills which will be critical for the UK's development of AI and other key technologies, with STEAM skills giving people both the creativity to innovate and the means to put their ideas into practice.

Defence

Please note: The strengths of the UK's defence tech sector are outlined above and key challenges and barriers outlined in our response to the next question. techUK's response to the upcoming Defence Industrial Strategy will contain more detail.

Quantum

The UK should view its commitment to building a thriving quantum sector as one of its key successes since the establishment of the National Quantum Technologies Programme (NQTP) in 2014. This world-pioneering programme has already delivered £1bn investment across quantum technologies. Equally, working together with the Office for Quantum within the Department for Science, Innovation and Technology, they will be critical for investing the £2.5bn set until 2033 from the National Quantum Strategy to secure the UK as a world leading quantum-enabled economy.

The UK's current success should be applauded. The UK has already built a thriving business community, with 11% of the world's quantum start-ups - the largest amount of quantum start-ups in Europe - and 12% of global private equity investment into the technology. This quantum economy employs over 100,000 people and growing at 7.8% every year.

The pioneering research from the academics and businesses building the quantum economy include: The world first commercially deployed quantum network; the first commercial flight trials of advanced quantum-based navigation systems that cannot be jammed or spoofed by hostile actors; and the world's most advanced functional brain scanner based on quantum technology and already used in children's hospitals worldwide to help diagnose juvenile epilepsy.

The UK programmes are engaging with all quantum technologies which establishes the UK as a world leader in not just researching quantum technologies, but also commercialising them. For example, the SparQ programme and NQCC engage with all quantum computing modalities (annealing, gate-model, and quantum-classical hybrid) to ensure there is a greatest inclusivity of the latest quantum computing technologies and training the future workforce to be quantum ready on all technologies.

Artificial Intelligence:

AI is a critical enabling technology, one which will reach across the entire UK economy. Generative AI, a subsector of the total AI sector, is estimated to contribute an additional £16m in UK economic output for every 1,000 additional employees, generating an increase in UK annual GDP of around £2.6bn by 2033. Increased adoption meanwhile could have benefits of up to £20bn annually across all business sectors.

The UK's has immense strengths and capabilities in the AI space. With an AI workforce estimated of over 360,000, the UK's AI sector is a global leader, built on a foundation of world-class research, innovative businesses, and a robust tech ecosystem.

The UK is home to some of the world's leading research institutions, the UK has cultivated a rich academic environment that drives breakthroughs in AI research. Further, the UK has a vibrant start-up ecosystem, with tech clusters across its nations and regions (including in London, Manchester and Edinburgh) emerging as world's leading hubs for AI innovation. Companies across the UK are leveraging AI to address challenges in diverse areas such as healthcare, cyber security and finance, further cementing the UK's status as a centre for cutting-edge AI applications. The UK's AI sector is crucial to driving economic growth, with the IMF predicting that AI could contribute to an increase in growth by as much as 16%, primarily due to improved productivity and greater outputs. AI will also work synergically with other emerging technologies including cloud, quantum computing, and machine learning.

The UK also boasts a strong track record in AI policy, assurance and ethics, which are increasingly critical as AI adoption expands globally. Efforts by the Responsible Technology Adoption Unit (RTA) and the Alan Turing Institute have positioned the UK at the forefront of debates on ethical AI and governance. This leadership in responsible AI development and AI assurance, which a recent DSIT report has suggested could be worth £6.35 billion GVA by 2035 if adequately supported, has enhanced the country's appeal as a destination for both investment and talent, creating an ecosystem that balances innovation with accountability.

This combination of academic excellence, ethical leadership, and collaborative innovation has positioned the UK as a global AI powerhouse. By continuing to invest in foundational technologies, addressing barriers to adoption, and supporting cross-sector collaboration, the UK is well-placed to capitalise on the transformative potential of AI across the economy.

Future Telecoms

Telecoms infrastructure is an essential part of the UK's economy. Without it, there would be no digital economy, and our wider economy would grind to a halt.

The UK has achieved significant success with the rollout of full-fibre connectivity and 4G mobile infrastructure. While the work is not finished yet, Building Digital UK has worked to increase Gigabit-capable broadband coverage from 6% of premises in 2019 to 81% in 2024. This has included Government support for a Europe-leading rollout of Gigabit broadband in 'hard to reach areas' to over one million premises. This is part of an ambition to have nationwide coverage by 2030 and 5G standalone for all populated areas, including in rural areas to prevent a rural-urban 5G digital divide, in the same year. The UK is in the advantageous position of being able to continue this rollout by maintaining stability in current policy, but this also includes Government making sure it doesn't take its foot off the pedal with current levels of support.

The UK has also begun trials of using satellite technology to reach 'very hard to reach areas', notably with trials to connect the island of Papa Stour. The UK Government also has a share in OneWeb, providing satellite connectivity from low-Earth orbit.

Standalone 5G also offers significant opportunities for business through the Internet of Things, extending beyond simply consumer mobile telephony and connectivity. These

include approximately £3.4 billion annually in productivity benefits from the creation of a smart grid; £1 billion annually in cost savings from 5G applications in healthcare; and £2,359 per field of wheat or £7,550 on the average sheep farm in productivity and costs savings to farmers from unmanned aerial vehicles. This is in addition to industry 4.0 applications like asset tracking, remote monitoring, critical IoT, robotics, artificial intelligence, cloud computing, AR, VR, and ultra-low latency connectivity. With the UK ranked 53rd globally for mobile performance by Ookla, accelerating 5G SA coverage is vital to improving digital connectivity and economic growth.

The UK also has strengths preparing for the next generation of telecoms standards, notably 6G. Progress has been made by the UK Government in the Future Telecoms Mission Fund programme, consisting of £70m funding, aims to further the goal of UK as a global leader in Future Telecoms, including 6G. This includes £39m for Future Telecoms Research Hubs and £22m for the Future Telecommunications Challenge. 6G will follow a specific timetable driven by the standards process. It is critical that the UK double down on their efforts to steer the direction and content. This requires research, collaboration with international partners (GCOT) and by participation in standards in particular for security, AI and open interoperable standards.

Space

The UK space sector does not just provide a significant contribution to the UK economy by itself, but plays a critical role in enabling a wide range of current and emerging technologies. GPS, telecoms (including hard to reach areas), Earth Observation are just what is possible now, with space data centres and even manufacturing both possible in the near future. Space is therefore a critical enabling sector for the wider UK economy and an area of UK strength, as the UK space industry's growth (+5.1%) outpaced the growth of the global space industry (+1.6%) and continued throughout the pandemic, and the space industry is more than 5 times more R&D intensive than the UK average.

This growth is taking place across the United Kingdom's nations and regions, with space facilities located from Newquay to Orkney, and everywhere in-between. It reflects the relevance of the space sector across the UK society, building the digital divide by enhancing coverage to very hard to reach areas. The satellite industry also has the potential to contribute to the widespread challenge of reliable connectivity for upcoming demand from sustainable energy sources and traditional sectors, such as agriculture.

It should be remembered as well that space services have significant economic implications as an enabler of the wider UK economy. The growing potential of these solutions cement space as a Critical National Infrastructure, through communications to positioning satellites, as recognised by the previous Government's PNT framework and establishment of the Office for PNT. This further confirms the significant strategic role in UK national security for space, and the importance for UK space applications to have a capacity for 'dual use' between civilian and defence capabilities. Space therefore plays significant roles not just in enabling economic activity but protecting that activity from threats around the world.

Cyber security

The Industrial Strategy should reflect the asset that the UK cyber security sector presents to the UK's role on the world-stage. Indeed, the UN (ITU) report 2024 puts the UK in the top tier ('role modelling) of the global cyber security index, contributing to our global competitiveness.

The UK has long recognised the contribution of its cyber security sector to growth. Successive governments have prioritised policy action and investment as part of their industrial strategies to support the sector's significant contribution to the UK. In opposition,

the Labour Party recognised it as a critical sector for their Industrial Strategy and the UK's future economic success.

While the UK's cybersecurity sector is a significant contributor to growth in its own right, cyber security is cross-cutting and, therefore, integral to the growth and resilience of the rest of the digital economy, as well as critical businesses and public services in any sector. Put simply, it is not just another growth sector: if we get cyber security and resilience wrong, all other sectors will suffer. he UK is recognised as being especially skilled in the provision of cyber security solutions for businesses, with 7/10 businesses involved in the provision of cyber security services.

In the UK, the Government's own research estimates there are 2,091 firms currently active within the UK providing cyber security products and services; approximately 60,689 Full Time Equivalents (FTEs) working in a cybersecurity related role across the cyber security firms; revenue reaching £11.9 billion; and a total GVA for the sector reaching c. £6.5 billion. This is a prime sector for investment, with £271 million being raised across 71 deals within dedicated cyber security firms in 2023. The value of British cybersecurity exports reached over £6 billion in 2022, increasing by 21.8% from 2021.

The UK has a strong public-private partnership when it comes to tackling cyber threats and enhancing digital resilience, for example, industry works with the National Cyber Security Centre to deliver a genuinely whole-of-society response through programmes such as Industry 100. The strength of the UK's cybersecurity industry bolsters the UK's defence and intelligence partnerships with close allies, including through the Five Eyes Combined Digital Leadership Forum, the Five Eyes Secure Innovation cyber security guidance, and the AUKUS pillar 2 workstreams on cyber capabilities and AI.

Digital ID

The development of digital identity technology provides a promising means for people to participate in the digital world with ease and protect themselves from growing online threats, including fraud- which accounts for 40% of all crime.

The global market for Digital ID is estimated to be worth $48.44bn by 2027, and the UK can be home to a large amount of this if Digital ID is given the right support. Digital ID is, like most of the technologies so far outlined, an enabling technology that will increase productivity across the UK economy. This includes an additional £800 million to the UK economy every year according to DSIT.

Digital ID Schemes are already making a positive contribution across the UK, so the Government would be building on proven success. Examples include the UK's Right to Work and Right to Rent checks, as well as initiatives seen in Scotland and Jersey where Digital IDs are reducing the cost and accelerating the delivery of public services. Digital ID at the central Government level, through the single login system, would further ease access to UK Government services.

In Estonia, their Digital ID system is at the heart of the way in which citizens engage with public services from how they vote online to interacting with their doctor. It is estimated that the Estonian government saves 2% of its economic output, and 1407 years of working time every year through this system. In the UK central government departments are due to spend £430.2 billion between 2024 and 2025 on day-to-day public services. A 2% saving could amount to £860 million a year.

Digital Accountancy and e-commerce

The UK has the strongest FinTech sector in Europe and there are significant numbers of solutions available for businesses and directly for consumers. The UK also has a strong network of accountants across the UK, making this a nationwide industry. E-commerce

meanwhile involves a majority of UK consumers, making e-commerce an essential part of the workings of the wider UK economy.

6 - What are the key enablers and barriers to growth in these subsectors and how could the UK government address them?

techUK would urge that the Government remember that for many of these technologies are key enablers of other sectors of the economy. As outlined below, often the key strength of tech is the enabling role it plays for the wider economy, making investment in the tech sector critical for the non-tech economy.

Furthermore, tech is an interconnected web where technologies will enable other technologies. For example, quantum technologies benefit from AI, Cloud and Semiconductor technologies, while AI requires Cloud and Semiconductor policies and can facilitate digital accounting and digital ID. These technologies are thus interrelated to significant degrees. Encouraging one technology will thus have multiplier effects on the others if they are present enough to facilitate the encouraged technology, and this will naturally have significant spillover into the wider UK economy.

techUK has produced several publications which outline how the Government can support the growth of the UK tech sector, including most recently our UK Growth Plan.

The Growth Plan outlines a number of barriers to further growth that apply generally across the UK tech sector. These include:

- Planning system
- Support for R&D
- Support for digital adoption
- Skills
- Support for scaleups
- Join up between different layers of Government

Similarly, a critical barrier to the growth of the tech sector and digital adoption is the relatively high cost of UK energy compared to our peers in Europe. This makes the services and products many tech companies provide, and which businesses and consumers across the UK use regularly, much more expensive. All of the key technology subsectors identified would benefit from cheaper energy prices, which would make further research and commercialisation cheaper and easier.

A further key enabler the Government should consider is the UK's collaboration with partner countries around the world. The UK should look to collaborate with other countries on standards, supply chain resilience, investment, common policy solutions and more to ensure that the UK's growth is resilient and to facilitate the easier flow of technologies, talent and investment across borders. The UK is already a member of several international organisations, such as Horizon Europe, the ITO and NATO, which can do this on a wider basis.

Below is a review of each of the technologies cited above and what the Government should focus on to overcome key challenges in the sector.

Semiconductors

To recognise their integral role in developing new markets, delivering on a greener approach to industrialisation, and supporting the commercialisation of emerging technologies such as quantum and AI, semiconductors need long-term and clearly defined support, as developed in other countries.

The National Semiconductor Strategy marked a step in the right direction in recognising the role of semiconductors as a key technology to support future technology development, and the UK's economic and national security. UK industries have highlighted their strong capabilities in Chip design e.g., Photonics in the North of England and Northern Ireland. Other examples include compound semiconductors in Wales.

The Government need to transform these laudable sentiments and observations into action supporting the sector. This could be achieved through:

- Developing the Leadership to act now
  - *The UK's current leadership in these areas is the result of intelligent policy, supporting innovative ideas to flourish, and building the right infrastructure for these businesses to scale. But, as the recent Institute for Manufacturing Study highlights, there are still critical gaps in underscoring these UK strengths 6. This primarily includes facilitating growth in skills, next-generation manufacturing, and building resilience into the supply chain. The UK Government should take up the mantle of this critical sector to deliver an ambitious and co-ordinated plan of action, enabling the UK semiconductor industry to thrive. Government must act quickly on delivery and utilise the wealth of knowledge, expertise, and potential that the domestic semiconductor industry has.*
- Making it easier to finance a good idea
  - *The sophistication of infrastructure, high cost of failure, reliance on imports creates critical vulnerabilities for the Semiconductor industry. Finding qualified, lead investors within the UK is difficult, with an attendee at techUK's 2024 roundtable on this subject commenting only 5% of their funding originates in the UK7. In fact, the size of Venture Capital investments into UK firms are only 1/10th of what they are in America 8.*
  - *The Government has several successful scaleup support programmes, grants and public investment bodies which have done measurable good in supporting Semiconductor companies. This must be expanded upon, creating more access to R&D tax credits, generating new lead investors through a National Semiconductor Institute and creating a joint scaler fund between the National Infrastructure Bank and the British business Bank. Domestic private investment can also be further unlocked, whether it is through stabilising R&D tax credit schemes, investment incentives or unlocking new capital like pension fund investments. Furthermore, British scaleups frequently see a large proportion of their investment come from overseas, utilising international partnerships to increase this pool should be a priority.*
- Ensuring the UK is irreplaceable in the global supply chain
  - *The Semiconductor supply chain is more interconnected and co-dependent than almost any other industry, with certain countries- and even companies- having market shares unparalleled in the modern world. The UK must reduce vulnerabilities, including bolstering its domestic capabilities in areas like manufacturing. In 2021, chip supply shortages are estimated to have led to 9.5m fewer vehicles produced as a result, a resilient manufacturing base can help insulate the UK from global disruptions 10. This resilience can also be reinforced through protecting key strengths in Intellectual property, in which the UK's IP regime is coveted for its strength. A dedicated Semiconductor IP taskforce can support the competitiveness of UK companies internationally. Ultimately, whether intentional or accidental, disruptions to the global supply*

chains have and will impact the UK's Semiconductor capabilities. What we can control is how stable UK industry can remain in the face of these challenges.

Photonics

The UK's photonics sector would benefit from greater Government awareness of the sector and its importance, making the attention it receives from this Industrial Strategy critical. This can be achieved by having dedicated Civil Servants in DSIT and DBT to engage with the sector, dedicated staff in InnovateUK to facilitate investment and a sub-sector deal as part of the Industrial Strategy.

Further barriers include regulatory uncertainty, access to talented, high-skilled workers, and limited access to scaling capital and energy costs. Government's recent posture toward crowding-in investment is helpful in this regard, especially where this dovetails with clear visions and plans around energy supply and sustainability. Uncertainty can also arise for multinationals where EU and UK subsidy principles apply to the same sources of R&D support. Addressing these through policy reforms, investment in education, and targeted funding can unlock growth. This includes making incentives and support stable.

The UK government should direct funding, policy support, and skills development towards building photonics clusters and fostering collaboration between academia, industry, and research institutes. Investing in this subsector will help the UK achieve its goals in advanced manufacturing, digital infrastructure, and sustainable economic growth, making it a leader in both current and future global technology landscapes.

Gaming

As with many other sectors, challenges such as talent acquisition, competition from other countries, and the need for infrastructure development must be addressed to sustain this growth. Strategic investments in education, technology, and supportive policies will be crucial in maintaining the UK's competitive edge in these dynamic industries.

Right now, a significant issue is the lack of strategic direction for the gaming sector's development, leaving the full potential benefits of 'spillover' underutilised. As part of a subsector plan, the Government should look to create a Future Gaming & Esports Strategy to set the foundations for long-term UK leadership, support the adoption of AR technologies with a particular focus on gaming and consider including gaming and social gaming as focus areas within a new online safety sandbox.

Gaming will also be enabled by ensuring the UK's rollout of essential digital infrastructure can continue and that other subsectors, such as AI, take full advantage of the opportunities offered by gaming technology.

The Government should work to better understand the Gaming sector, work with how it can best be enabled. More information on this topic can be found in techUK's Gaming and eSports report.

Defence

The most critical barrier that the UK Industrial Strategy could remove to aid the Defence sector is that of an acquisition and procurement system struggling to cope with the rapidly changing nature of digital technologies. techUK would like to see the Ministry of Defence (MOD) acknowledge the risk that being an "unattractive client" has on the UK's sovereign Defence technology capabilities, and how this in turn has a negative impact on the growth of the Defence sector as a whole and on military capability.

There are several major hurdles to be overcome which require changing the culture and institutional structures of the MOD's procurement and innovation ecosystem, as well as the department's overall approach to technology experimentation and exploitation.

Firstly, techUK believes the MOD urgently requires one single authority to oversee architectural coherence, with dedicated funding set aside to enable true integration and interoperability across the Defence enterprise, but with powers to delegate and apply lower thresholds for innovation. This authority, and indeed the MOD generally, should look to invest in companies, facilities and capabilities that can withstand challenges to commercial, financial, technical and operational resilience in the event of an increase in defence needs and, if necessary, a major war.

In addition, techUK would like to see a rationalisation of the numerous innovation units that exist across the MOD's delivery agencies and Front-Line Commands. Each of these units has their own evaluation and procurement processes, resulting in duplication of effort and meaning innovation funding is spread too thinly. This complexity also means that the point of entry into Defence innovation for starts ups, scale ups and SMEs is unclear and inefficient. techUK members shared examples of duplicate work to inform the techUK Strategic Defence Review response, such as the development of the RAF's Nexus programme by the Rapid Capabilities Office, running separate to the Army's Zodiac programme under Commercial X.

Similarly, techUK members welcomed the publication of JSP 936 but expressed concern that despite the establishment of the Defence AI Centre (DAIC), there is no single, recognised authority for providing AI assurance across UK Defence. techUK would like to see the whole Defence enterprise recognise and empower the DAIC as having this responsibility, with a clear process for assurance and approval of AI technologies once acquired.

The MOD should conduct Strategic Supplier Management much more effectively, employing full time, strategic supplier relationship managers as other government departments and the Cabinet Office do. Through constant dialogue, relationship managers would be tasked – and incentivised – to enhance the partnership to ensure that it is working efficiently and effectively for both parties delivering both value for money for the taxpayer and growth for the economy, as well as 'nipping issues in the bud' to the benefit of all parties. Members are confident such roles would quickly pay for themselves if implemented. Similarly, techUK would like to then see Strategic Supplier Managers deploy AI tooling to interrogate existing contracts to examine obligations. Doing so will help identify expensive missing dependencies along with end dates and options to enable timely action to be taken and increase savings by identifying and removing instances of duplication.

These institutional changes also require certain cultural changes to be effective. To become a global pacesetter techUK believes that Defence Digital must acknowledge it cannot do everything, and nor should it, and explicitly embrace a Commercial Off-the-Shelf (COTS) based integration approach by default. techUK members have suggested that the MOD should not be investing in technologies internally where it does not have either the critical mass or skills to develop and exploit them and is simply competing with the private sector.

techUK would also like to see the MOD switch from platform-centric capability development to one that prioritises sensing and data, mirroring a successful approach from the United States' Department of Defence (DOD). The US is already taking steps in this regard which the UK could learn from with the US DOD Software Acquisition Pathway a prime example of this. The platform-centric approach leads to software and data being considered an afterthought, and has meant that the MOD has not prioritised investment in battlefield management systems, communications software, and other digital technologies, all of which are

fundamental to both success in 21st century conflict and the economic growth of the UK Defence sector.

The UK's Security Vetting also requires addressing, as it has been undergoing a problematic transformation for some time. The House of Commons Committee of Public Accounts Inquiry into the Performance of UK Security Vetting back in May of last year, showcased that over the period of the transformation there have been many stoppages and abandonments and a consistent increase in the timescales that it takes to receive security clearance. This has severe knock-on effects across government; whilst not only affecting civil servants but industry too. Vetting is a critical element of national security and public safety and one of the most important critical functions at the heart of government whilst also driving so much recruitment within security-focused organisations. Vetting remains a key process which impacts the whole of government and its supply chain. However, the gap in cohesive modernisation has been very clear while both the world and the threat landscape has changed significantly around it. techUK is prepared to work closely with government stakeholders on an ongoing dialogue to navigate through the challenges vetting poses to industry in order to protect our most critical national security threats.

There also a number of specific barriers to SME Defence technology firms posed by the MOD's current approach to acquisition and procurement. These are, according to techUK's SME members:

1. The need for security clearances to bid for work but being unable to apply for a clearance until a contract is in place.
2. A minimum required turnover set at the value of a potential contract, meaning many SME companies are ruled out of MOD contracts and are unable to grow in the sector. techUK would like to see MOD commercial officers empowered to know when certain contracting requirements are relevant and when they simply hinder business.
3. The usage and number of frameworks utilised by the MOD. Frameworks place a direct barrier between the MoD and SMEs engaging in necessary dialogue, and each framework operates with different joining processes, and terms and conditions. Limited windows for entry mean newer companies are locked out of opportunities and the large number of frameworks means it is not clear which framework the department will use when going to market.
4. Delays in contracting have resulted in smaller companies (either directly contracted or in a supply chain) going bankrupt as they wait for the formal spending review and budget cycle processes to be completed. techUK would like to see training put in place so that MOD commercial officers genuinely understand the impact that this can have on businesses, specifically SMEs who measure their cashflow and runway in months not years.

Quantum

This nascent industry is reliant on both private and public sector investment. techUK members have raised strong concerns around gaps in funding posed by the upcoming spending review, with concerns that current funding of the NQTP will finish before future funding is secured. This is detrimental to the UK's quantum sector – especially as other nations may use enticing funding opportunities to poach UK businesses.

Government should remain committed to the National Quantum Strategy and funding the associated five missions to ensure the commercialisation of all quantum technologies.

The National Quantum Strategy assures a strong decade of UK leadership in quantum technologies. Turning this leadership to commercial success when the time is right will require consistency. This patience could reward the UK with a thriving quantum economy with UK businesses at the centre.

The UK tech sector often struggles to commercialise. The National Quantum Strategy recognises this challenge. To mitigate the commercialisation gap, it identified several levers to support this burgeoning industry. This includes effective Government procurement, and most critically, support for the five quantum missions and firms that work towards implementing these into practical reality. Moreover, in the future, the UK can use international cooperations to enhance commercialisation of quantum technologies including AUKUS and direct bi-lateral quantum cooperation agreement which support academic engagement, support the global supply chain and expedite commercialisation. Further detail on the importance of these can be found in techUK's Commercialising Quantum report.

These missions include enabling activities to support commercialisation, supply chain development, and user adoption across key industries such as healthcare.

The UK has strong leadership in building a pro-innovation approach to regulation of quantum technologies. *The Regulating quantum technology applications: government response to recommendations made by the Regulatory Horizons Council Report* sets out support of a regulation-by-application approach for quantum technologies led by sectoral regulators, with initial convening of a Regulatory Forum for Quantum Technologies to support regulators to become quantum ready. It also supports industry led work such as the Responsible Quantum Industry Forum (RQIF) led by the National Quantum Computing Centre (NQCC) and co-chaired by techUK and UKQuantum. The RQIF has the primary objective of supporting industry in the responsible use and development of quantum technologies, by providing a venue for industry to share best practices and case studies on operationalising co-developed shared principles.

Artificial Intelligence

Artificial intelligence has grown to become a mature sector with applications across virtually every part of the economy. As a general purpose technology with a myriad of applications it's enablers and barriers align closely with that of generally improving digitisation or boosting business investment in innovation. For example, enablers and barriers will include, skills, energy costs, regulation, access to finance etc.

Our focus with AI should be to encourage its adoption and uptake across the economy to unlock the wide range of benefits it can provide to a services based economy such as the UK. While this should include support for AI developers the main focus of the strategy should be on adoption can creating markets for AI applications. techUK has therefore advocated for a new AI Strategy with a focus on the adoption of AI across the economy rather than just taking a specific focus on the technology itself.

Further we do not think the strategy should revisit the broad theory of regulation but instead focus on delivering the approach set out in the AI Whitepaper, as well as seeking to enable AI across the economy. The approach to regulation should involve providing clarity and reducing barriers.

We suggest four potential pillars of an future UK AI Strategy:

- AI for the Day to Day Economy
- AI for Innovation Intensive Business
- AI for the Public Sector
- Frontier/Cutting Edge AI Development.

By focusing on each of these areas, a future AI strategy can help secure the broad benefits that AI can bring to the wider economy and public services as well as continuing to support the UK's leading AI sector.

Additionally, the AI strategy should support a permissive environment for the use of open-source AI. This would work to advance open innovation across the economy and ensure that businesses have a range of offerings as they seek to begin their AI journey.

You can read further details on our AI Strategy in our paper, Seven Tech Priorities for the next Government. A summary of the strategy can be found in the table below.

Four Pillars for an updated AI Strategy			
AI for the Day to Day Economy	**AI for Innovation Intensive Business**	**AI for the Public Sector**	**Frontier/Cutting Edge AI Development**
Enabling agencies Government departments, regulators, business support agencies	**Enabling agencies** Government departments, UKRI, Innovate UK, regulatory sandboxes, British Business Bank and National Infrastructure Bank, Universities	**Enabling agencies** Cabinet Office, GDS, devolved government, local and combined authorities, major public services, e.g. NHS	**Enabling agencies** AI Safety Institute, Government Departmentss, No.10, Universities, ARIA, UKRI and Innovate UK, Foreign Office
Supportive environment Access to affordable compute and cloud services Access to talent, retaining and upskilling support Digital adoption support Proportionate liability for end users	**Supportive environment** Access to super computing/ cloud capacity Availability of high skilled talent R&D incentives and partnerships Access to finance and patient capital Low energy and infrastructure costs	**Supportive environment** Good public IT infrastructure Guidance and support for public servants Digital talent Piloting and public consultation Effective procurement	**Supportive environment** Ability to build and access large scale compute Access to top global talent R&D incentives and partnerships Access to significant patient capital Highly capable oversight body
End Users Broad business community, not for profits, charities, local and central govenment	**End Users** R&D intensive sectors (e.g. digital tech, aerospace, manufacturing, semiconductors, financial services), AI developers, start-ups, scale-ups	**End Users** Central, devolved and local government, key public services, i.e. NHS and criminal justice	**End Users** R&D intensive start-ups and scale-ups, universities, frontier labs, large technology companies, broad business community, public services

Future telecoms

Telecoms are essential to the wider operation of the UK economy, and efforts to support the telecoms sector, and future telecoms, should prioritise best enabling the sector to get on with supporting the wider UK economy and the technologies of the future.

techUK's Telecoms Action Plan outlines the barriers particular to the UK telecoms sectors and the immediate steps the Government could take to begin tackling these barriers. These include:

- Enabling digital infrastructure to be built more quickly with wide-reaching benefits for everyone across the UK by
  - Optimising the planning system to be fit for the delivery of telecoms infrastructure.
  - Ensuring the tax system incentivises further investment.
  - Providing for future spectrum management and a future skills pipeline
  - Making full expensing a permanent future of the tax system and seeing this as a model for other R&D funding.
- Improving telecoms networks economics to deliver full fibre and 5G ambitions by
  - Initiate a Future Connectivity Strategy post 2025 Spending Review to support industry on delivery and uptake of future facing digital infrastructure and connectivity.
  - Prioritise progressing policies held up at consultation stage by confirming them as soon as possible.
  - Establish a pro-telecoms business rates regime to incentivise the deployment of new infrastructure.
  - Maintain stable support for the UK to continue to fixed fibre rollout by 2030
- Maintaining healthy competition and economic security through the right regulation by providing longer term certainty and hold the regulator to account in delivering economic benefits for the UK, sending the right signals to industry and drive forward investment.

Ofcom should also continue their review of Annual Spectrum License Fees further to increase investment in higher-quality networks.

The UK has shown what it can do with the right support for infrastructure, with construction facilitated by investment from telcos and Government as well as a regulatory environment that encourages competition, but with an eye to 2035 the UK Government needs to begin asking what will happen once this rollout is complete.

Similarly, the future of Digital Terrestrial Television beyond the early-2030s is in doubt. This would require all TV to be carried over broadband and would leave a large amount of DTT infrastructure unused.

The Government can continue securing significant telecoms investment if it begins outlining how BDUK will evolve once the rollouts of Standalone 5G and Gigabit-capable broadband are complete. Furthermore, the need to take up the infrastructure, both amongst consumers and businesses, and use it to its full potential is something that must be encouraged. The Government must also remember the importance of the mobile and fixed broadband 'backhaul' networks, which take communications from homes and businesses to the places they need to go.

This requires Government to engage with the telecoms sector proactively and understand how best they can support the future to 2035 and beyond. This requires the Government to take a holistic view of how BUDK can aid in the long-term stability and evolution of the UK's telecoms sectors.

Telcos would also welcome further clarity from Government and regulators about the language surrounding the Telecoms Security Act. Working with the telecoms sector to provide greater clarity will give firms the confidence to invest and innovate without worrying more than is strictly necessary about regulatory compliance. This is something telecoms firms want to work with Government more on, given the importance of a resilient and secure telecoms network to the UK.

Similarly, techUK also recommends, for mobile networks, the successful implementation of the revised ECC: this will be pivotal in transforming the economics of mobile networks, with significant work to do to defeat vested interests and complete the programme of bringing rents in line with intent via lease renewals over the next 5 – 7 years.

Space

According to responses to the UK Space Agency's 'Size & Health of the UK Space Industry 2022 survey, economic uncertainty was the most prevalent obstacle to commercial success (51%) in the next 3 years, followed by limitations on EU programme involvement (49%) and recruiting staff (46%).

A report on the UK space sector from the Council for Geostrategy also cites the 'disorganisation' of the UK space sector as a key barrier to further growth. This is despite strengths in venture capital, regulation and R&D. This is threatening to undermine the UK's position in space, which has strategic as well as economic implications. The UK space sector, therefore, as with the other technologies outlined here, requires a sub-sectoral strategy to better organise and direct the sector in areas where the UK has strength.

Cyber Security

The UK is the third most targeted country in the world, after the US and Ukraine, and half of all UK businesses suffered breaches or attacks in 2023-24. Analysis by Microsoft estimates that these cyber-attacks could be costing the UK economy £87 billion a year.

The UK Government's Cyber security breaches survey in April 2024 identified that half of businesses (50%) and around a third of charities (32%) report having experienced some form of cyber security breach or attack in the last 12 months. This is much higher for medium businesses (70%), large businesses (74%) and high-income charities with £500,000 or more in annual income (66%). Participant interviews highlighted that investment in cyber security is needed - indeed, it is critical if we are to keep pace with evolving threats and, fundamentally, ensure sustainable and resilient growth across all (increasingly digitised) growth sectors.

While board engagement appears to have improved since the dip recorded in government's 2023 Cyber Breaches Survey, there is still a lack of understanding about what constitutes effective risk management. Research from Darktrace has also found that 95% of security professionals surveyed in the UK are not strongly confident in their organisation's defences against AI-powered threats.

Similarly, there is a significant skills gap for cybersecurity professionals in the UK, estimated at 73,500 people. A refreshed approach to developing the nation's cyber skills is needed, combining efforts to create the next generation of cyber professionals with ensuring that everyone has the cyber skills they need to thrive in the digital world.

Given the growing vulnerability and susceptibility to cyber-attacks that has come with increased digitisation across the economy, the Industrial Strategy should recognise that promoting a strong cybersecurity sector is not just a driver of growth and opportunity, but at the bedrock of any advanced economy. Furthermore, the Strategy should recognise that its investment in UK cyber capabilities is crucial in order to maintain good international relations and to unlock international diplomacy, partnerships and industry growth opportunities.

Measures to promote cybersecurity adoption can be found in our answer to Question 30.

Digital ID

Currently, the priority for Digital ID is to implement Digital Identity and Attributes Trust Framework (DIATF) and ensure that legislation allows for digital IDs to be used across all sectors of the economy, as well as enable full interoperability between private sector digital IDs and public services. For example, supporting the Financial Conduct Authority and Joint

Money Laundering Steering Group (JMLSG) to formally incorporate the Digital Identity and Attributes Trust Framework into their guidance.

Digital ID Schemes are already making a positive contribution across the UK, so the Government would be building on proven success.

It is imperative that the Government make sure that Digital ID legislation and wider regulation all encourage the adoption of this key technology. Greater adoption will create a snowball effect of greater use, which will provide effective support to the Digital ID market.

Digital Accountancy and e-commerce

Future details on this are provided in Chapter four of our response as well as in techUK's Small Enterprises, Big Impact Report (available here: https://www.techuk.org/resource/techuk-report-small-enterprises-big-impact.html)

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

techUK conducted a survey of 250 tech business leaders in the UK in February 2024 to understand what they considered to be the greatest barriers to investment in the UK.

The key conclusions around barriers to investment were:

- The UK does well against its peers on ease of doing business: when it came to the ease of doing business, only 22% of tech sector leaders felt that it would be easier to do business in other comparable countries in Europe or North America. 38% felt it was neither easier or harder and 36% felt it was easier or much easier to do business in the UK than in comparable countries. When we asked our leaders to rank the UK out of 10 for ease of doing business, with 1 being very difficult and 10 being very easy, 70% gave the UK a score over five. Around a quarter of businesses (24%) gave the UK as score of 9 or 10 out of 10.
- When asked to name the most significant weaknesses for businesses operating in the UK, the tech leaders listed: Energy Costs (41%), Interest rates (33%), Levels of taxation on business (30%), Brexit and the resulting business environment (24%), General regulation on business (21%), and lack of skilled workers (21%).
- When pushed to list the two most important weaknesses, energy costs (24%), tax rates on businesses (23%) and general regulations on businesses (15%) were the most important reasons given.
- Respondents listed energy costs (34%), software costs (25%), the need for skilled workers (25%), hardware costs (22%) and concerns about sustainability of new technology (22%) as the key barriers to further technological adoption. More than half of respondents thought new technology could help improve productivity (54%) or reach new customers (50%), and a large number of respondents thought tech could help them grow revenue (47%), become more competitive (46%) and develop new products (42%).

The Government therefore need to tackle these issues to encourage confidence amongst business that the UK is cognisant of its challenges and is working to address them.

Chapter 5 of this response will go into this in further detail, but it is essential that the Institutions charged with implementing the Industrial Strategy are able to dynamically

assess what is holding back further investment in the UK, from abroad and domestically. The barriers to investment will change over time in terms of scale and perceived importance, and the Industrial Strategy should not just be identifying where the barriers to investment exist now but must be institutionally-capable of doing this throughout the lifetime of the strategy.

The Government's public commitment to competition is critical to driving investment into the market to deliver on new infrastructure that will power the UK's growth.

Skills continues to form a significant barrier to the UK's tech sector and economy more generally. The Global Innovation Index 2024 cites the UK as being particularly weak in labour productivity growth, graduates in science and engineering and the pupil-teacher ratio in Secondary Schools. Tackling the UK's skills gap is therefore of great importance across each of the Strategy subsectors.

Additionally, the UK's investment screening regime through the National Security and Investment Act, has not had a smooth impact. In a January 2024 response to the call for evidence, techUK highlighted the chilling effect it had throughout a variety of industries, with some members noting that the UK had seemed to become a less attractive destination for investment. The NISA regime needs to be pragmatic, practical and streamlined, ensuring that the process of submitting a notification to the Investment Security Unit is effective and in line with other international comparable regimes. It is important that it also identifies transactions of genuine concern to the UK's national security and avoids unnecessary administrative filings that burden businesses both administratively and in the realm of attracting investment to the UK.

Chapter Two – Pro-business Environment

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

The success of the Industrial Strategy rests on ensuring businesses have access to people with the right skills. The UK faces a dual challenge: a growing need for upskilling and reskilling alongside a decreasing pipeline of workers, teachers, and talent entering the tech sector. Skills England identifies digital technologies as one of four critical sectors for economic growth, which cannot happen without a concreted focus on the advanced digital skills needed to support AI and automation.

The UK is losing out on £12.8 billion in extra growth, as well as up to £63 billion per year in lost GDP, and British workers are earning a whole £5.69 billion less due to a lack of digital skills. The skills challenges faced by the UK are significant and it has remained consistently a top growth barrier over many years. Business leaders recognise this as well: a PwC poll from July 2024 found 53% of those surveyed ranked skills education and talent in their 'top three most important components for growth in their sector. The economic returns cannot be understated: PwC estimated that a potential £650 billion uplift to UK GVA could be achieved by 2035 by improving the UK's performance across skills and education, digital transformation infrastructure and planning. The highest priorities for the businesses surveyed – skills and education – would provide a £230 billion uplift.

Skills England's report shows around one third of average annual UK productivity growth between 2001 and 2019 is attributable to an expansion of skills available in the workforce. However, investment in skills development, both from employers, but also from government, has declined over the past 10 years. The Department for Education funded Employer Skills Survey 2022 found that the total investment in skills was £53.6 billion (including trainee labour costs) which was a real terms decrease of 7.7% from the figure in 2017 of £58.1 billion (adjusted for inflation). The adult skills budget in England has also been cut by £1 billion (20%) since 2010 – equal to a 32% cut in per head investment, and the average number of days of workplace training received each year falling by 19% per employee in England since 2011. The tech sector, however, has been actively addressing the need for a skilled workforce through initiatives and will continue to do so. What is needed is government support for SMEs in particular to train their staff.

The UK needs a comprehensive National Skills Strategy that is linked to the Industrial Strategy. The government's forthcoming post-16 education strategy is a welcome step, but one of the most significant barriers to skills investment is the fragmented nature of the UK's skills system, which varies across its four nations and can be difficult for employers to navigate. The lack of a national strategy along with economic uncertainty has caused employers to make short term decisions and prioritise spending in areas other than skills. Strategies to increase employer investment in training needs to take into account the more challenging financial environment that employers are facing following increases to the national minimum wage and employer national insurance contributions. Any national strategy needs to address the structural challenges within the skills system but also foster collaboration with employers, unions, and training providers, and meet employer needs.

techUK's has several recommendations as to how to improve the UK's tech skills base:

- Deliver a reformed 'Growth and Skills Levy' that prioritises flexibility, enabling employees to fund training through routes alongside apprenticeships. The Apprenticeship Levy currently

raises around £3.5 billion a year from large employers in the UK. But our members tell us the Levy is currently not working. The IFS, found that, despite large subsidies, around £550 million of the levy pot is not used to subsidise apprenticeships. The reformed Levy could include high-quality short courses focused on functional and digital skills, enabling existing employees to upskill and retrain. Ensuring that SMEs, scale-ups, and some of the UK's fastest growing companies can benefit from the reformed levy will be key to its success, particularly in tech. Due to the ownership structure of many start-up and scale-up companies they were unable to use the former Apprenticeships Levy and we encourage the Government to consider potentially providing the levy through a voucher system which all companies can utilise. techUK believes that employers need to be able to address their workforce skill needs by allowing them to choose the eligible provision most appropriate to them. Public First has suggested that if employers spent 30% of the estimated Levy funding available for non-apprenticeship training on Higher Technical Qualifications, it could lead to 58,000 more of these courses being taken across the Parliament, with a lifetime economic gain for individuals of £7.8 billion. techUK recommends Skills England to start with a relatively modest amount of flexibility in the Growth and Skills levy and evaluate the impact, making decisions that build on what has gone before and allowing sufficient time to embed before changing the policy.

- Provide a fully-integrated platform for apprenticeships which would support student access and parity of esteem, but also enable careers advisers and teachers to better understand the range of opportunities available to students. This should include pre-apprenticeships to encourage a range of learners to understand routes that are right for them.

- To improve the digital skills of apprentices, techUK believes government should review the Functional Skills Qualification in apprenticeships for relevance to employers, and whether there is a role for digital literacy to become embedded across outcomes.

- Government should reconsider its decision to defund Level 7 apprenticeships, especially in key areas like data, AI, and digital technology. TechSkills and techUK believes by raising the budget for the Growth and Skills Levy in line with the increase in the amount of money raised by the apprenticeship levy, would minimise any restrictions on Level 7 apprenticeships. Before making final decisions, techUK urges the government to undertake consultation with businesses, public services, and educational institutions to understand the full impact of removing Level 7 apprenticeship funding from the Growth and Skills Levy.

- Build on previous success of the Skills Toolkit launched in Spring 2020, to build a 'Digital Skills Toolkit 2.0'. This tool would enable people across all areas of society to understand the digital job opportunities available to them and access training. In turn, making digital opportunities and pathways more transparent and accessible to more people. The Government can get started on this from day one by opening a tender for the construction of the digital skills toolkit platform.

- Skills England should move quickly updating occupational standards to respond to the evolving needs of employers. The current pace of change, where updates to standards can take up to two years, is too slow and risks leaving critical areas like AI out of date.

- Reconsider the policy design of the Lifelong Learning Entitlement to ensure that it is a success, including whether it can be used by employers to support the cost of employee

study on a modular basis. Learners can currently only access the Lifelong Learning Entitlement if they are studying at levels 4 to 6. This approach has severe limitations, risks excluding older people and low/middle income groups and having a negative impact on economic growth and productivity. The Lifelong Loan Entitlement should be a system that meets the funding needs of all students.

- A survey conducted by techUK of parents and guardians working in tech revealed a lack of confidence in the current digital education and curriculum. Only 51% are somewhat confident and 27% are very unconfident that the education system is preparing children for future job markets. A massive 70% of respondents to techUK's survey believe schools are not focusing enough on core competencies like critical thinking and problem-solving—skills that will define success in a world dominated by AI, automation, and data. While technical skills are crucial, 68% of respondents see a mix of soft and technical skills as the ultimate career preparation—an area where education is falling short. Despite this, 59% of children are not pursuing computing qualifications, and just 34% of parents feel schools adequately encourage tech education for all genders. Schools aren't just neglecting future-focused subjects; they're failing to encourage tech education for all genders. Only 34% of respondents are confident that schools promote tech inclusivity, with 25% unconfident in schools' ability to encourage tech education for all genders. techUK recommends that government needs to commit to offering world-leading computing education by continuing to fund the National Centre for Computing Education (NCCE). Continued funding would ensure that the UK offers world leading computing education for every young person, aligning with the Government's ambition of breaking down barriers to opportunity. The offer would allow schools in England to continue to support our teachers in preparing the future workforce for technological realities, with the potential of being expanded to support the growing need for digital skills and AI.

- Engage in a review into the current cyber security skills gap with a specific focus on the challenges and opportunities to encourage diversity. Necessary cyber security skills are essential for the protection and growth of the UK's digital economy, with the global economy needing 3.4 million cybersecurity experts to support today's economy. But the current gap in cyber security professionals poses a threat to the UK's increasing reliance on digital infrastructure, and the UK's economic stability, security and growth. Plugging this skills gap can be supported by more effective dissemination of the National Cyber Security Centre (NCSC) Cyber toolkit and inclusion of cyber security and risks in higher education/MBA courses. These should be based on international standards and ensure the UK is able to take advantage of an internationally-skilled cyber security base.

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

See answer to question 8

Infrastructure

14 - Where you identified barriers in response to Question 7 which relate to planning, infrastructure, and transport, what UK government policy

solutions could best address these in addition to existing reforms? How can this best support regional growth?

The construction of digital infrastructure is an essential underpinning of modern life, with this consultation being rendered impossible without telecoms and data centres infrastructure. Similarly, digital transformation plans drawn up by businesses in the wider UK economy will be rendered impossible without the digital infrastructure necessary to support them.

However, the current planning system is not fit for purpose and is throttling UK growth. Since 2012, the average time it takes to get consent for national-infrastructure projects has increased by 65 per cent, rising to 4.2 years from 2.6 years. Planning departments have also faced significant cuts which have made them less effective, with a 16% fall in planning funding in England, 50% fall in Wales and 38% fall in Scotland since 2010, alongside declining numbers of lower-paid planning officers. Planning departments are in great need of not just more planning officers to combat the backlog of applications, but also more highly skilled planning officers able to deal with the technically-complex applications often submitted by the tech sector.

Similarly, there has been a lack of progress in removing barriers to building in key infrastructure areas, especially telecoms, with one barrier that could be removed being the introduction of flexi-permitting for the fixed broadband sector.

Advanced compute is a critical enabling infrastructure for the wider tech sector. The UK already does not have a supercomputer within the top 500 global systems and hosts only 1.3% of global computing power, so the UK cannot afford to fall further behind on this. Furthermore, the global market for supercomputers, valued at around $12 billion in early 2023, is expected to see annual growth of 9 per cent annually over the next five years, making this a useful growth sector.

For emerging technologies, such as quantum, compound semiconductor manufacturing, and photonics, building infrastructure to support the emerging supply chain is critical. For example, quantum commercialisation will require extensive prototyping, testing, and demonstrating. The resource and infrastructure required is extensive and beyond what is economically feasible for DeepTech SMEs. Government intervention in helping develop the right infrastructure and supply chain is therefore critical to secure the UK's leadership position and strategic advantage in fields of high national interest. Without government intervention there is a high risk of losing ground to countries making major infrastructural investments in quantum. Overlapping strengths, such as quantum and compound semiconductors, or quantum and silicon photonics, means the UK could develop robust leadership through moderate strategic investments into industry-facing open access facilities that complement existing capability.

This resource is not just essential for testing and development, but for the delivery of advanced technology use cases to business across the UK. AI applications, for example, will rely significantly on cloud services, and digital transformation through the cloud. The cloud relies on construction and maintenance of effective and ubiquitous telecoms coverage and the development of data centres. Put simply, the UK will not be able to develop or fully take advantage of advanced technology if the digital infrastructure underpinning these technologies is not present or does not keep up with demand.

15 - How can investment into infrastructure support the Industrial Strategy? What can the UK government do to better support this and

facilitate co-investment? How does this differ across infrastructure classes?

techUK supports recent proposals by the Ministry of Housing, Communities and Local Government to reform the National Planning Policy Framework. This includes the explicit mention and encourage data centre construction as essential national infrastructure, as well as the freeing up of 'grey belt' land for further development. You can find our full response on our website.

As part of this, techUK would welcome further explicit reference to telecoms infrastructure as essential infrastructure, and the movement of monopoles for the deployment of 5G to the Permitted Development Rights regime as the UK Wireless Infrastructure Strategy suggests widespread adoption of 5G (enabled by the deployment of Standalone 5G) could see £159bn in productivity benefits by 2035.

The Government though must also go further on planning in several areas. techUK has drafted several planning principles that should be the rock upon which future planning policy should be built:

1. Clarity of definitions: planning policies should be precise about what key terms refer to reduce subsequent litigation and increase business certainty. This will get developments off of the ground more quickly.
2. Comprehensiveness of Approach: Planning policy should take account of the supporting infrastructure required for development, such as water, energy and internet connectivity (including mobile), and consult with those who provide it to ensure that supporting infrastructure is readied alongside developments.
3. Minimum standard of service: There should be confidence that developers get the same level of service across the entire UK from local authorities, who require well-resourced and expert planning teams, and should be conscious of the location requirements of digital infrastructure.
4. Flexibility: New planning policy should expand the range of possible options for developers. One door opening should not cause another to close. Companies should be able to choose the route that best suits their application.
5. Pro-growth: Rebalancing decisions towards legitimate construction will reduce costs, speed up the timeline from planning conception to completion of development and help economic growth.

The Government should further encourage the construction of premises, including labs, to reduce costs for businesses of accessing essential premises. In 2020, lab space in London was more expensive than in New York and Boston, while lab space in Oxford and Cambridge was more expensive that in Singapore, Seattle and San Diego. The UK needs to ensure this cost is brought down so business can devote more money to investment.

The Government should also tackle the cuts afflicting the UK's planning services. While recognising Local Authorities are under significant budgetary strain, the Government needs to ensure those using the planning system get a value for money form the service they pay for, and techUK would recommend ringfencing planning funds for planning purposes as a first step to tackling the planning system.

In terms of investment into infrastructure, the Government must be mindful of the strategy behind public subsidy to ensure that this does not hinder private investment. For example, the Building Digital UK urban voucher scheme runs the risk of encouraging overbuild – particularly if the scheme also applies to businesses. These urban areas are likely to already

have a highly competitive advanced connectivity market – it is critical that consideration is given to how the leased line and wholesale local access markets intersect.

techUK would also recommend that the Government reconsider its decision to cancel investment in advanced compute. In order to support the UK's compute power, techUK would recommend the Government re-commit to implementing the recommendations of the 2023 Future of Compute review by reversing recent cuts to key compute development programmes and to establish international partnerships to pool compute resource. An early step could be for the UK to associate to the European High-Performance Computing Joint Undertaking (Euro HPC). Association is available to Horizon Europe members, of which the UK is one, and provides access to new funds to invest in high end compute.

Resilience

The importance of digital infrastructure to the wider resilience of the UK economy, as well as its general future, cannot be overlooked. Telecoms infrastructure and data centres in particular already underpin the UK's economy and our current way of life. The Industrial Strategy must bear in mind the importance of these sectors to our national resilience.

Full-fibre broadband already plays a significant role in the UK's economic resilience, yet this role is set to expand even further throughout the lifetime of the Industrial Strategy. This includes through the switch-off of the copper-based Public Switch Telephone Network (PSTN) and the switchover to all-IP telephony. This will not only mean that broadband will underpin our phone network, but that all the devices that previously used the PSTN, such as telecare devices, will come to rely on broadband as well.

Mobile too plays a key role in UK resilience, with a number of devices, such as smart meters, operating on the soon to be switched-off 3G and 2G networks. The 2G network in particular underpins digital voice calling and is an essential service when no other network is available. These networks, like the PSTN, have been superseded by modern technology that is more energy efficient, and the equipment used to maintain them is increasingly expensive to produce and use. However, while the switch off makes great sense, the rollout of 4G and 5G Standalone across the entire UK is therefore not just a question of promoting growth and application, but of ensuring that people across the UK can still access emergency support when needed and communicate in case of an emergency, such as with the UK emergency alert system introduced by the last Government.

The implementation of the entirety of PSTI is crucial to creating an environment where we can deliver the telecommunications infrastructure that will power much of the innovation described elsewhere in this submission. Specifically, the final provisions of the Product Security and Telecommunications Infrastructure (PSTI) Act 2022 remain unimplemented, creating a significant barrier to efficient network rollout and upgrades. In order that improved connectivity can be delivered across the UK, it is critical that the provisions in the PSTI Act are implemented as a matter of urgency.

The Government must bear in mind the importance of these networks throughout the implementation of the Industrial Strategy. Our telecoms networks are, quite simply, not an optional extra and the resilience of the UK as an economy and society requires it be kept supported and secure. This can include using a range of infrastructure types, from mobile to satellite and full-fibre, to ensure that people across the UK can continue to have access to communications in case of an emergency, and that the UK Government support this essential infrastructure throughout the implementation of the Industrial Strategy by incentivising further adoption and ensuring competition and resilience go hand in hand.

16- What are the barriers to competitive industrial activity and increased electrification, beyond those set out in response to the UK government's recent Call for Evidence on industrial electrification?

Energy

In techUK's survey of 250 tech leaders about what were the greatest barriers to investment, the high cost of UK energy came first amongst reasons given for both investing int he UK generally and investing in new technologies. This is a result of the UK having amongst the most expensive energy prices per KwH in Europe, including real terms price increases since 2004.

Energy is an essential operational expense for most digital infrastructure, most notably data centres. Data centres and compute infrastructure, which are essential throughout the tech supply chain from research to offering commercial products, are forced to either absorb or pass on the high energy costs they are facing to their customers, making essential digital adoption more expensive. This does not just hold back our most innovative AI and compute products, but given that, according to PwC, 78% of businesses use some kind of cloud software, the high costs of energy are effectively being paid businesses across the UK twice over. Costs for software are very high already in the UK, and in our survey of tech leaders this was the second most important barrier to adopting new technologies after energy costs.

Energy costs are therefore making digital adoption more expensive, which is a significant extra cost for businesses using digital services and is deterring further adoption through contributing to high software prices.

Similarly, the UK suffers from significant delays in getting essential infrastructure connected to the National Grid. In 2023, over 40% of connection agreements sold have delivery dates of 2030 or beyond, which makes the flexible and swift delivery necessary to ensure digital infrastructure keeps up with demand impossible.

In order to take full advantage of advanced technologies such as AI in both the private and public sectors, the high cost of energy must come down. The Government urgently need to find ways to reduce energy costs to save businesses money directly and reduce the price of essential digital adoption that will boost business productivity.

techUK's Growth Plan outlines how that digitisation of the National Grid will boost visibility of the entire Grid and will enable and support the creation of Strategic National and Regional Spatial Energy Plans. By doing this, Strategic Spatial Energy Plans will provide oversight on what needs to be built, where and when, to achieve net zero. In turn, providing more certainty and clarity for investors and wider industry.

17- What examples of international best practice to support businesses on energy, for example Purchase Power Agreements, would you recommend to increase investment and growth?

As above.

18- Where you identified barriers in response to Question 7 which relate to competition, what evidence can you share to illustrate their impact and what solutions could best address them?

Regulation

There has been a significant increase in the regulation of the tech sector in the last 5 years, more in the EU than the UK but it has an indirect impact on investment decisions and growth potential in the UK; compliance with regulation is now a significant operational expense for companies. This complexity is compounded by additional regulatory regimes abroad, which the UK must remain aware of.

With this in mind, the launch of the Regulatory Innovation Office (RIO) with a promise to "reduce the burden of red tape on innovation and help kickstart economic growth" is an important step in the right direction when it comes to ensuring that cutting edge technologies are able to be deployed commercially.

It also follows the now Minister Sir Patrick Vallance's Pro-innovation reviews in 2023. The fact that the RIO office will be, in-part, replicating this important review on a rolling basis will help to ensure that the remit of the RIO remains relevant, timely, and targeted to deliver maximum benefits to both businesses and consumers.

We know too that regulators themselves have sometimes struggled to grapple with the speed of technological advancement. A new office signposting areas of specific focus and detailed review, designed to speed up approvals and encourage cross-regulator collaboration, will be a welcome new voice to have at the table. The ability for experts to work with regulators to update their books is an important one, and the RIO will be an important port of call for future regulatory engagement across multiple sectors.

This is because techUK sees good, responsive and pro-innovation regulation as being of benefit to the UK. The importance of competition and a supportive regulatory environment in telecoms has been critical in delivering the UK's rapid roll out of digital infrastructure. A pro-competition regulatory regime has ensured that billions in private and foreign investment has poured into the sector.

The benefits the market is bringing to bringing to previously underserved areas - at little cost to the public purse - are only made possible through the competitive landscape in the telecommunications industry. In the longer-term, it is vital that while competition is still emerging regulators continue to ensure effective oversight of the industry to ensure that consumers are both protected and be served well into the future - not only in terms of price, but also in the provision of innovative products and services. The UK government must continue to advocate for this pro-competition approach to digital infrastructure.

19- How can regulatory and competition institutions best drive market dynamism to boost economic activity and growth?

Innovation and regulation are not mutually exclusive. With clear direction, a proportionate approach and the right guidance and support businesses can innovate in a responsible way that delivers growth and better outcomes for consumers and businesses. techUK is therefore pleased to see the Government has given a growth duty to regulators in the Industrial Strategy, which is something techUK has long called for.

We welcome the general approach to regulation where Government sets principles-based regulatory objectives at a high-level, and then delegates the delivery of these regimes to the UK's regulatory agencies to work with business to implement. This allows UK regulation to support economic growth and innovation while providing more flexibility in rule making and guidance to account for technological change.

However, this relies on providing clear directions to regulators, ensuring regulators are effectively resourced and encouraging regulators to take a solution and innovation-oriented approach to regulation. This can be done in the following ways:

- Making legislation clear about its aims and technology neutral: Government legislation and direction must remain principles focused, founded on strong evidence to justify market intervention, centred around the outcomes we want to achieve for both consumer protection and economic growth. The Digital Regulation Plan should continue to guide UK digital policy here.
- Government needs to take an enhanced role in promoting better regulation. This should include the more consistent use of strategic directions from Ministers, exchanges of letters and the setting out of cross-cutting regulatory objectives such as in the Plan for Digital Regulation, each of these should be underpinned by both industry and consumer consultation and aim to provide more clarity and predictability over the trajectory of UK regulation. DSIT should also be charged with responsibility for better regulation principles.
- Regulators must be well resourced and expert as without the right resourcing or expertise regulators could struggle to find sufficient resources to allocate to secondary duties, with implications for work on AI or pro-innovation schemes like sandboxes and business support services. To meet this additional funding will inevitably need to be found while regulators will also need greater flexibility to determine the pay scales needed to attract talent in the industries they regulate and there should be an active programme across all regulators of facilitating secondments between regulators, academia and industry.
- The regulators and the industry should have a clear route to seek a policy statement from government in scenarios where regulatory duties conflict, a regulators decision appears to run contrary to the Government's policy objectives or a goal for economic growth is undermined.
- Regulators should be supporting businesses to comply (via guidance) and establishing a policy of no enforcement without guidance first; the strategy should recognise the factors that impact growth and investment by type and size of company.
- An extension of the growth duty to the prioritisation of work in addition to strategic decision-making, can ensure that regulators are fully aligned with this agenda.

The greater role of the regulators to deliver Government policy also means we need enhanced Government and Parliamentary scrutiny of regulator decisions. Clear direction and objectives from Government in Parliament will help with this, but Government should also seek to introduce more accountability mechanisms.

By keeping accountability to the way principles decided by Parliament have been enacted, and the effects they have in that context the accountability of regulators decisions can increase to a level warranted by their considerable power but without compromising the essential independence that contributes to sound regulation.

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

The Government should recognise its role in aligning wider policy with the Industrial Strategy, with the experience to date resulting in conflicting policies that impact digital businesses (For example the HFSS ad ban's conflict with the DMCCA which aims to open markets to smaller competitors); concrete steps should be taken to better coordinate

Government policy and assess the anticipated impact of new policy and/or regulation on growth and investment.

This is already occurring with RIO, and techUK looks forward to working with the Government on ensuring RIO is a success, but this should encourage the Government to go further and not simply 'wait and see' how RIO unfolds. The Government could address this by recommitting to the Digital Regulation Plan (DRP) and ensuring the Industrial Strategy states that future regulation will be developed in line with the DRP.

The Government should also ensure that each sector is able to benefit from public procurement by ensuring all procurement is aligned with the National Public Procurement Policy Statement (NPPS), which promotes procurement practices that deliver wider social, economic, and environmental benefits. For example, public sector demand for low-carbon technologies, renewable energy solutions, and socially responsible supply chains can accelerate progress towards net-zero carbon targets, and the public sector can be a key anchor tenant for 5G technologies to incentivise their wider private sector adoption. In addition, the Government should look to leverage public sector procurement systems (and the NPPS) to encourage cyber security and resilience in the supply chain.

Chapter Three – Place

International

24. How can international partnerships (government-to-government or government-to- business) support the Industrial Strategy?

techUK would recommend the UK Government negotiate more Digital Economy Agreements with priority markets, building on the model of the UK-Singapore DEA. This type of agreement is adaptable to new technologies and new innovations and provides for regular stakeholder input in improving and modernising the trading relationship. An example of this working in practice, the UK-Singapore Digital Economy Agreement (DEA) aims to capitalise on the UK's strengths as a major services and digital exporter, fostering a new era of modern goods and services trade between the UK, Singapore, and the broader region.

The UK should also deliver a response on the design and delivery of UK CBAM, ensuring a level playing field for UK tech firms. Similarly, Government must work to avoid any further delays in adopting the International Sustainability Standards Board (ISSB) framework and ensure that the UK Sustainability Reporting Standards (SRS) are finalised by the first quarter of 2025. Originally scheduled for July 2024, the endorsement of the ISSB framework has been postponed to Q1 2025 by the previous Government. The tech industry is eager for this to be completed, especially given the increase in regulations in other jurisdictions, such as the EU. Further delays also pose a risk to the UK's competitiveness.

The UK also needs to make better use of collaboration networks opened up by Horizon Europe, ESA and NATO, which will allow the UK to better co-ordinate R&D with partners internationally. Similarly, as suggested in our fifth chapter, the Government should work with regional and national trade associations to efficiently communicate with the private sector, as these trade associations know their sectors and their regions better than virtually another body available. This co-ordination can help UK firms of all sizes to 'grow globally' from day one, reducing reliance on the domestic UK market.

25. Which international markets do you see as the greatest opportunity for the growth-driving sectors and how does it differ by sector?

The tech sector is able to export across the world, being a combination of goods and services. The UK can therefore best support its key growth sectors by maintaining a vigorous support for multilateralism and the WTO as a cornerstone of its international policy. The UK must make the most use of its international reputation and influence to advance high priority and high impact issues with key partners and the UK should prioritise the fight against data protectionism by leading the conversation on cross-border data flows at the G7 and as part of the World Trade Organization's ongoing Joint Statement Initiative on e-commerce to help build a critical mass of countries willing to adopt common language. This means the UK will be able to retain flexibility in choosing the international markets to focus on while not being boxed in to certain markets or areas by a breakdown of free trade.

With this in mind, techUK's polling from Q1 2024 asked 250 tech leaders which markets they would expand to if they had to expand their business. The top five were:

- United States
- Western Europe, such as France, Germany, and Belgium
- North America (not US), Canada and Mexico
- Australia and Oceania, such as Australia and New Zealand
- Middle East, such as Saudi Arabia and the United Arab Emirates (joint fifth)

- Northern Europe, such Sweden, Norway, and Finland (joint fifth)

These, therefore, should be the markets the UK seeks to make a special effort to reduce barriers with.

Trade barriers and uncertainty with critical partners such as Ireland and other EU member states undermine confidence in long-term investments. Signalling not only close cooperation with these trading partners but also long-term stability in trading relations will help restore confidence and strengthen resilience in technology development and supply chains. Harmonisation may be beneficial in certain cases.

techUK meanwhile wish to remind Government that the Industrial Strategy must go hand in hand with a trade strategy, and techUK looks forward to expanding on the importance of digital trade further in our response to the expected Government consultation on the trade strategy.

Place

26. Do you agree with this characterisation of clusters? Are there any additional characteristics of dimensions of cluster definition and strength we should consider, such as the difference between services clusters and manufacturing clusters?

techUK supports the definition of clusters outlined in the Industrial Strategy. techUK also welcomes the Industrial Strategy being focused upon supporting existing clusters, as this makes the duplication of efforts far less likely and clusters that are more established are more likely to prove strong partners for the Government and those institutions which are charged with implementing the Industrial Strategy. Clusters' ability to impact the UK-wide economy from a regional basis should also be recognised. The task and finish groups referenced in Chapter 5 would be an ideal mechanism for creating cross-cluster collaboration and teamwork to tackle specific challenges facing the UK economy.

Clusters themselves are 'ecosystems', as much forged by mutual trust and reciprocal co-operation between institutions and companies as by geographical proximity. These should be seen as places of strength that can be advertised to for investors, both foreign and domestic.

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

Establish a new Investment Committee to work across Government, proposing improvements to the UK business environment based on investor feedback.

As mentioned in the Harrington Review of Foreign Direct Investment, the Government must deliver on industry and local government's request for greater stability and visibility of changes to the strategic direction of investment priorities.

Anecdotally, techUK members outline that investments can have a 10-20- year time horizon and Government should look to plan ahead in this way. This permanent part of cross-government machinery would support in driving a strategic approach to investments and enable the fast-tracking of decision making when needed. For instance, building on recent action from the Chancellor to re-open the planning process for two previously rejected data centres – reviewing their potential gain for regional and national economies.

Similarly, the Government needs to support the growth of clusters and support firms with high-growth potentials, being agnostic about their size.

techUK recommend the Government follow the steer of the Harrington Review and recommend this should be chaired by the Chancellor with the Business Secretary as deputy Chair, and include Cabinet Office, Number 10 and other relevant Secretaries of State.

The Government should also look to take advantage of existing business networks in the Nations and Regions when seeking to increase tech adoption and the diffusion of new technologies. An example of this is the network of accountants and bookkeepers throughout the UK. Utilising this network with the rollout of schemes such as Making Tax Digital and e-invoicing would help increase trust in digitisation in smaller UK businesses through being introduced to the scheme by friendly members of the local business community.

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

techUK's yearly assessment of Local Digital Capital provides a ranking how areas of the UK perform against one another in tech capital. This is broken down into skills, adoption, infrastructure, finance & investment, research & development and trade. techUK is keen the Government use this data to make focused policy interventions that give areas the support they need.

techUK's 2024 Local Digital Index *will be launched on 3 December, but members of the Government can read it now at this link. (https://techuk-digital-index.thedatacity.com/about/)*

It includes a list of recommendations that the Government could undertake to support and empower the nations and regions of the United Kingdom.

The index provides a comprehensive ranking of the locations we were able to gather sufficient data. For example, the overall 5th ranked Gloucestershire, Wiltshire and Bath/Bristol area ranks 22 for infrastructure, suggesting this is where the Government should focus efforts in this region.

For a more strategic overview we suggest the Government could divide cities and regions into three broad categories.

- **Category one –** Cities and regions of the UK which rank among the best globally for technology business and investment and therefore are globally competitive.
- **Category two -** Cities and regions of the UK which have strong tech ecosystems and are competitive within the European region, generally competing against their peers in the same region and with the ability to grow to become globally competitive.
- **Category three** – Cities and regions of the UK which have weaker tech ecosystems, but with the right support could become more competitive.

Category One cities and areas we have identified are focused on London and the South East. These benefit from world-class universities, London's status as a world financial centre, proximity to Government and to other tech founders, a strong digital skills base and infrastructure. These areas can sometimes suffer the symptoms of success. Lab space in London, Oxford and Cambridge, for example, costs more per square meter than in New York or Boston.

Category Two areas techUK has identified tend to score well in one or two areas but are let down in one or two important areas. For example, Bristol and the surrounding areas score

well in R&D and investment but poorly in digital infrastructure. These areas should see targeted efforts to tackle these areas of weakness.

Category Three areas tend to have significant potential to do better. Most areas are home to well-regarded universities and established clusters. These clusters need the right support to capitalise on the potential of these clusters.

There are a number of areas which fall outside of these clusters. However, these are still areas that can engage in the digital economy, and the potential of especially the human capital in these areas should not be forgotten.

Tackling the specific problems of each category of place requires a long-term plan to make best use of available resources and to build the relationships with devolved government necessary. Here will be no one size fits all approach to solving the problems of the

It is important to emphasise though that most tech ecosystems across the UK are facing similar challenges including access to capital, infrastructure and talent. Similarly, the amount of innovative companies and companies receiving InnovateUK funding is broadly equal outside of London and the South East, showing the UK tech sector's extensive presence across the United Kingdom, making it ideally suited to supporting growth across the country.

The below uses data from a variety of sources, from techUK's Local Digital Capital Index, The Global Innovation Index and mapping by the Department of Science, Innovation and Technology's mapping of innovation clusters.

Category one

London

- The Global Innovation Index 2024 cites London as the most valuable innovation cluster in the UK. DSIT has also identified that London has 54 of the top-3 clusters in 43 sectors are in London, the most of any UK region.

Cambridge

- The Global Innovation Index 2024 has Cambridge, along with San Jose in California, as one of the two most intensively innovative places for science and technology in the world. The wider East of England has 5 top-3 clusters according to DSIT

Oxford

- The Global Innovation Index 2024 has Oxford in the top ten cities for innovation intensity. The wider South East has 10 top-3 clusters according to DSIT, with the largest clusters in Space Energy and Geospatial Economy.

Category two

West Midlands

- The 2023 Local Digital Capital Index identifies strengths in digital infrastructure and research and development, and is the highest ranking outside London, the South East and East of England. DSIT claim the West Midlands holds 36 top-3 clusters, with arts, machinery, electronic devices, life sciences, advanced manufacturing and advanced materials the largest clusters. Birmingham also serves as a key anchor of a large West Midlands series of clusters, and is identified by DSIT as a 'knowledge hub'

Edinburgh

- The 2023 Local Digital Capital Index sees Edinburgh and Eastern Scotland score well across skills, digital adoption, finance, infrastructure R&D and trade, but not exceptionally in any category. Scotland has 20 top-3 clusters according to SIT, with the largest in software and IT

Berkshire, Buckinghamshire and Oxfordshire

- Scores second in the 2023 edition of techUK's Local Digital Capital Index of regions in the UK. See the South East in DSIT's Innovation Report.

Gloucester, Wiltshire, Bristol/Bath area

- The 2023 Local Digital Capital Index highlights strength in skills, finance and R&D but a weakness in digital infrastructure. DSIT records that the South West as a whole has 11 top-3 clusters. Bristol is also cited by DSIT as a 'knowledge hub'. highlights strength in skills, finance and R&D but a weakness in digital infrastructure

Manchester

- Identified in polling of 250 tech leaders as the most attractive investment prospect in the UK after London. Strong clusters in the wider North East according to DSIT include the largest clusters of higher education, accountancy, bioscience, food tech and omics. These are part of the 39 Clusters in the North East, with Manchester cited by DSIT as a key Cluster centre and as a 'knowledge hub', and is the centre of a Digital Creativity cluster with Liverpool.

Glasgow

- The 2023 Local Digital Capital Index highlights strength in skills, finance, and digital adoption but falls down on infrastructure. See Edinburgh for wider Scotland data highlights strength in skills, finance, and digital adoption but falls down on infrastructure

Category three

Belfast

- Northern Ireland generally ranks 2nd in trade in the 2023 Local Digital Capital Index, has had a great amount of investment and has had a highly successful rollout of Gigabit-capable broadband to 85% of premises, but suffers greatly from a low rate of digital adoption, mobile infrastructure and R&D. Belfast has strong clusters in creative sectors, cyber security and nanotechnology, and Northern Ireland has 8 top-3 clusters according to DSIT. Belfast has strong clusters in creative sectors and cyber security

Liverpool

- Merseyside in the 2023 Local Digital Capital Index highlights strength in digital infrastructure and F&I but struggles on skills and wider tech adoption. highlights strength in digital infrastructure and F&I but suffers in skills and adoption. See Manchester for data on the North West.

Cardiff

- South Wales generally in the 2023 Local Digital Capital Index has strong clusters in technologies such as compound semiconductors, but Wales generally scores

poorly in infrastructure and finance. Wales hosts 3 top-3 clusters according to DSIT.

South Yorkshire

- The 2023 Local Digital Capital Index highlights strength in R&D and digital infrastructure but falls behind in skills, digital adoption, trade and R&D. Yorkshire as a whole has 18 top-3 clusters, including strengths in metal products and clean tech., trade and R&D

Newcastle

- The 2023 Local Digital Capital Index highlights strength in infrastructure but a significant weakness in skills. Tees Valley nearby also has a significant weakness in F&I. The wider North East hosts 14 top-3 clusters, with the largest in engineering, healthcare and electricity. highlights strength in infrastructure but a significant weakness in skills. Tees Valley nearby also has a significant weakness in F&I.

29. How should the Industrial Strategy align with devolved government economic strategies and support the sectoral strengths of Scotland, Wales, and Northern Ireland?

Representatives of devolved governments and the local economies of the Nations and Regions must be part of the policy-making process in the task and finish groups outlined in Chapter 5 of this response. This will allow these groups to understand directly how those economic strengths of the regions can best be used to fulfil the goals of the Industrial Strategy.

As part of this, techUK believes that the Industrial Strategy must combat the misguided notion that the UK's nations and regions should be competing with each other. Instead of fighting for larger parts of the UK's economic 'pie', a spirit of co-operation is needed to grow that pie's total size to benefit all. As was recognised in a regional conference organised by the CBI in Birmingham in 2024, a region cannot be a world-leader or national-leader in every sector. There must also be a recognition amongst the Governments both national and devolved that their main competitors are not each other but other countries around the world, and that intra-UK 'beggar-thy-neighbour' policies will be bad for the UK as a whole in that global competition. Instead, the United Kingdom's nations and regions must take better advantage of the fact that they are part of one country, and should see co-operation as a way not of 'losing' opportunities and potential strengths to other areas, but as a way to bolster those comparative advantages they already possess. The Government must use the structures of the Industrial Strategy to attempt to foster intra-UK co-operation through involving the nations and regions in areas where they possess strength and bringing those strengths together when creating sub-sector deals and pursuing task and finish goals.

It is critical as well that the Local Growth Plans written and adopted by local government are considered to prevent policy confusion and ensure that all levels of Government are pulling in the same direction.

Similarly, the Government must recognise that the UK's patchwork quilt of devolutionary settlements means different areas have different capacities to advocate for themselves, and this is not something the Government can fix overnight. For example, Paula Gill, chief executive of the North West Aerospace Alliance, has outlined how "Lancashire has the biggest capability and number of businesses and employees per square mile in aerospace

and defence across Europe, not just the UK," but has no devolved mayor at the table. Even if Lancashire was given a mayor tomorrow, they would still be at a disadvantage compared to Greater Manchester when advocating for their regional economic capabilities, given the amount of time it takes to build trust in the mayoralty and the connections a mayors office requires to understand their local area fully. Other areas lacking mayors include Oxford, Edinburgh, Glasgow and Cardiff.

The Government should also recognise that clusters may not map neatly onto administrative boundaries. For example, DSIT has identified a 'Digital Creative Industries' cluster which stretches across Manchester, Liverpool, Lancashire and Cheshire. Combined with DSIT's other finding that clusters tend to work with other clusters near one another geographically, and it should be apparent how important it is to ensure that administrative boundaries do not lead to clusters being forgotten or not fully represented, and devolved Government should be encouraged to co-operate to promote these clusters and ensure their potential is fully realised.

The Government must therefore be willing to find bodies of 'de facto devolution', organisations which local businesses, councils and academic institutions have reposed trust and organisational powers into in the absence of a local mayor or other form of powerful devolved government. These can include regional trade associations and cluster partnerships. Ensuring that a strong devolved mayor is not seen as the key to the Industrial Strategy table will not just create the opportunity for more inclusive growth but will ensure that the Industrial Strategy takes best account of the United Kingdom's capabilities and resources wherever they may be found.

As part of this, techUK recommends the funding of dedicated 'government-funded Digital Champions' in every local authority. These roles would be specifically tasked with working closely with industry to unlock local delivery barriers, enable easier access to public assets, and help facilitate the deployment of essential connectivity infrastructure. Digital Champions would play a pivotal role in supporting local communities, driving business growth, enabling digital public services, and fostering local regeneration

Northern Ireland:

techUK would also emphasise that Northern Ireland has a unique constitutional and trading position inside the UK. The Windsor Framework is a strategic advantage, providing stable access to both the EU and UK internal markets. However, while there has been a lot of focus on the movement of physical goods across the Irish Sea and on the Island of Ireland, there has been less of a focus on trade in services in general and digital in particular. Working with the Northern Irish Executive to clarify and capitalise on this.There are some specific considerations that should be given to Northern Ireland as a result.

Northern Ireland's Special Position vs. Wider GB in Trade: Northern Ireland (NI) holds a distinctive position regarding goods trade with the EU market, differentiating it from Great Britain (GB). This is largely due to its unique trading relationships, absent in services, which do not benefit from special considerations like the Windsor Framework, unless linked with goods manufacturing. Despite competition for talent with entities in the Republic of Ireland (RoI), facilitated by hybrid working dynamics and geographical proximity, reliable data on impacts are scarce. Furthermore, NI competes with RoI on Corporation Tax, indicating a strategic leverage point for industrial growth, crucial in shaping its economic role within the UK.

Implementation Strategy in UK Nations: There is ongoing debate regarding the accountability of strategic implementations across UK nations. This discussion often revolves around whether funds and support should flow through devolved authorities or directly from the UK Government (UKG). A key consideration is aligning UKG strategies with the NI Executive's priorities, while ensuring equitable distribution for the collective UK

benefit. Effective examples include the Shared Prosperity Fund and calls for Enhanced Investment Zones. Successful strategy implementations necessitate synchronization between UK-wide levers like regulation and localized initiatives such as semi-devolved procurement.

Software Sector's Strategic Importance: The strategy highlights significant potential for fostering business success, yet concerns remain about the sequencing of deliverables. Software is foundational, it supports various sectors and contrasts with digital assets, though is underrepresented in strategic documents. Recognizing software's foundational role could amplify its prominence in policy documents. NI, identified as a priority for software, could benefit from UKG's efforts to alleviate existing constraints, driving an environment conducive to maximizing its software potential.

Chapter Four – What the Strategy is missing

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

Digital Adoption among SMEs:

techUK does not think the Industrial Strategy sufficiently prioritises the basic digitisation of UK businesses. This goes beyond the commercialisation of cutting-edge technologies, such as AI and quantum, but in the adoption of the building blocks of company digitisation, including (but not limited to) CRM systems to digital accounting.

Attention is urgently required to promote widespread digital adoption, especially given the previous UK Government's lack of a Digital Adoption Strategy and the specific failure of Help to Grow: Digital. Under the last Government the UK failed to make good progress in addressing the UK's 'long-tail' productivity problem where the gap between the least and most productive firms in the UK is much bigger compared to other advanced economies.

techUK's paper *Small Enterprises Big Impact* outlines the productivity-boosting effects of digital adoption amongst small and medium-sized enterprises (SMEs), which is now of vital importance given the international race to leverage technologies like AI for businesses, as if UK companies are behind on basic digital adoption, they will soon be behind on AI adoption as well.

This is something many businesses recognise: virtually every other business sector has a 'growth plan' predicated on greater digitisation and the use of new and emerging technologies such as AI and the cloud. Digitisation further enables inclusion and lowers barriers to accessing often critical public services for businesses and individuals, flowing through to economic growth. This is not only directly because of investment in digital services, but due to the impact use has on total factor productivity.

Analysis has shown that if UK SMEs were to better utilise digital adoption, this could add an estimated £232 billion to the economy. Furthermore, the widespread adoption of AI this would enable raising productivity by half a percentage point by 2028/29, giving the Exchequer an extra £39.9 Billion in revenues while reducing costs by £6.2 Billion. Furthermore, according to the ONS, the use of any combination of enterprise resource planning, customer relationship management and supply chain management technologies are associated with a productivity premium of around 25% through reducing the costs of operational expenditure. This productivity premium comes alongside greater visibility of processes and supply chains, allowing firms to make their supply chains more sustainable.

This adoption of essential digital systems and operation will enable and embolden businesses across the UK to further adopt more complex digital systems that can boost productivity, such as IoT technology and advanced AI systems.

This can be achieved by following the following steps:

- Government must develop a Digital Adoption Plan, with clear targets by 2030, and a focus on the right underpinning infrastructure and regulation.
- Identifying a single Minister with responsibility for driving digitalisation across the economy and delivering on the recommendations to tackle digital adoption challenges.
- Committing to digital adoption growth opportunities for SMEs by supporting the next stages of Open Banking's evolution into Open Finance and SMEs carbon reporting for net zero.

- Introducing a tax incentive to encourage new investment in digital technology, allowing SMEs to claim an additional 140% deduction against their corporation tax bill for any net new digital products, services, software, and advice. If a cap on claims were set at £50,000, this would allow SMEs to receive a tax saving of up to £5000 and be a vital boost for smaller businesses preparing to adopt new AI technologies, all while being paid for from the £300m set aside from Help to Grow: Digital.
- Expanding the Made Smarter Adoption Programme to target small and micro businesses (typically employs fewer than 10 people and generates less than $250,000 in revenue annually) to plug the UK's so-called 'long tail' productivity problem.

The Government also needs to reform the Public Sector to increase the amount of interaction between the state and firms that can be done digitally to encourage further adoption. These include:

- Complete Making Tax Digital (MTD) for Income Tax by 2026 to reduce the tax gap and support SMEs to embark on their digitisation journey. Already in place, and with delays threatening innovation, completion of HMRC's flagship Making Tax Digital Programme will ensure SMEs embark on digitisation and will create additional tax revenue for the Government. The delayed roll out of Making Tax Digital for self-assessed taxpayers cost HM Treasury £1.75 billion in lost revenue according to the House of Commons Public Accounts Committee.
- Alongside the introduction of Making Tax Digital, Government should work to implement e-invoicing for business-to-business transactions to support small business productivity, create more efficient invoicing and payment processes, support international trade, boost revenue for Governments and enable real time visibility of the state of the economy. France is set to gain €4.5 billion through e-invoicing as a result of productivity gains and reducing administrative burdens, and in Italy, e-invoicing has led to a significant reduction in unreported or unpaid VAT from the year of introduction in 2019, amounting €4.5 billion euros in 2020.

AI Adoption in the UK's high growth sectors:

The Green Paper overlooks a crucial aspect of technology adoption, particularly in relation to emerging technologies like AI, automation, and broader digital transformation. These advancements are vital for enhancing productivity and boosting the global competitiveness of the UK's highest growth and most R&D-intensive sectors.

For instance, sectors such as IT, telecommunications, and legal services are leading in AI adoption across the UK according to DSIT. However, other industries with immense potential, such as healthcare and retail, lag behind, with the lowest AI adoption rates. Further, the Green Paper should recognise that AI is more than another sector within the UK economy. It represents what some economists have referred to as a 'general-purpose technology' (GPT), comparable to transformative innovations like electricity or the printing press. GPTs are known for their ability to revolutionise industries, drive productivity, and open up entirely new markets. Similarly, AI is poised to enhance efficiency and innovation across the economy, unlocking substantial opportunities in both well-established and emerging sectors.

By not acknowledging this gap, there is a clear missed opportunity, as AI can play a transformative role in optimising processes, improving decision-making, and driving innovation in these sectors. In other sectors, such as manufacturing, automation alone has the potential to increase productivity by up to 30%. The Green Paper should address the

integration of emerging technologies in sectors with low adoption, which, if successfully integrated, would constitute a significant growth lever for the UK to use. An emphasis on this could draw attention to the need to enhance the global competitiveness of these industries and bring broader benefits to the UK economy as a whole.

Furthermore, in the pharmaceutical sector, AI-driven drug discovery can accelerate research, cutting the development time of new treatments by years, while also reducing costs. Estimates suggest that AI could boost UK GDP by £550 billion by 2035, an equivalent to raising annual growth rates by 2% a year, with many benefits concentrated in sectors that heavily rely on R&D. However, in order to seize the potential of AI to significantly drive UK economic growth, decisive action is required now. Hindering AI adoption would prove to be costly, with estimates suggesting that delayed widespread AI adoption by just five years could reduce AI's economic impact by over £150 billion. By not sufficiently emphasising the urgent need for AI and digital adoption, the green paper falls short in preparing the UK economy for future global competition.

Benefits of digital and AI adoption

Digital and AI adoption brings substantial benefits, including improved efficiency, cost reductions, and enhanced innovation capacity. Frontier economics has estimated that doubling the proportion of businesses currently using AI in the UK could yield productivity gains of around £20bn per year and spread across all business sectors.

For example, AI in manufacturing could increase efficiency by reducing downtime through predictive maintenance, allowing for more flexible production systems. AI in healthcare could optimise patient management and diagnostics, while in financial services, it could streamline operations and improve risk assessment models. By enhancing productivity, AI can free up resources for more strategic, high-value work, thereby driving innovation and growth in key sectors.

Horizontal measures to encourage AI and wider digital technology uptake

The current UK state of AI adoption shows that while progress has been to adopt AI into at least one business function within organisations, more work is required to ensure that organisations can maximise the adoption opportunities internally, by deploying AI across multiple business functions. Research suggests that company size has an impact on AI adoption rates. 90% of large private sector organisations are more likely to have adopted AI, or have plans to do so, which contrasts with 48% for SMEs. Moreover, according to McKinsey's global survey for 2023, the percentage of organisations adopting AI tools remains steady since 2022 and is concentrated within a small number of business functions. As concentration within one function can limit the potential for cross-functional collaboration and innovation, and hinders an organisation's ability to fully leverage AI benefit's across teams and workstreams within an organisation the issue of how organisations are adoption AI within their businesses is one that techUK believes warrants further discussion, exploration, consideration and discussion to ensure that organisations are gaining the full benefits and value that AI has to offer.

techUK's 2023 *Putting AI into Action* report found five barriers to adoption. These are: inconsistent data quality and accessibility, lack of trust in AI, limiting organisations cultures and understanding, insufficient compute infrastructure and the AI skills gap. While it is true that these barriers are still relevant in 2024, we are looking into barriers once again, in 2024, while some progress has been made, prevalent blockers to AI use and deployment remain, across sectors.

To address these barriers, horizontal measures are needed to encourage widespread AI adoption across UK sectors. These policies would ensure that AI uptake is not limited to a

few high-tech companies but is embraced across the economy, providing a competitive edge to the UK.

Potential policy measures include:

1. **Incentives for R&D investment in digital technologies**, for example, targeted incentives, such as tax credits, grants, and low-interest loans, to encourage businesses to invest in research and development for digital technologies, particularly AI. These financial incentives would not only make it easier for companies to integrate AI into their operations but also drive innovation by lowering the barriers to entry for small and medium-sized enterprises. Additionally, structuring these incentives around measurable milestones could ensure sustained commitment to technological advancement across industries.
2. **Collaborations between public and private sectors**, by creating robust partnerships between government entities, private sector companies, and academic institutions to foster innovation in AI and expedite its adoption across critical industries, such as healthcare, manufacturing, and finance. By leveraging the strengths of each sector, public funding and oversight, private sector agility, and academic research, collaborations can drive practical and scalable AI solutions. Programs that support joint research, data-sharing initiatives, and AI skill-building can further enhance the development of ethical, cutting-edge AI technologies and accelerate their deployment to benefit both businesses and society.
3. **Awareness, education and upskilling programs** to ensure the workforce is prepared for AI integration, with a focus on digital literacy and AI-specific competencies. In order to ensure streamlined AI and technological adoption, awareness and education programs that are tailored to employee's roles will best position individuals to understand how AI and technology can augment workplace activities. By adopting this approach, training can be developed in a way that is suitable for various learning styles and paces.
4. **Support business leaders,** by providing dedicated support to business leaders who are working to communicate the strategic importance of AI within their organisations and to develop comprehensive AI strategies that align with key business objectives. This support should extend beyond strategy development to include fostering trust, transparency, and accountability, which are essential for sustainable AI integration. By empowering leaders to clearly convey AI's value and ensure ethical implementation, organisations can build a solid foundation for AI-driven innovation that aligns with stakeholder expectations and regulatory standards.

Barriers to adoption and sector-specific challenges

Data compiled by the Office for National Statistics (the ONS) in 2023 shows that some of the sectors identified by the Green Paper are some of the UK's highest performing in terms of economic output. These include manufacturing (9.9% GVA), finance (including insurance) (8.8%), health and social care (8.3%). All of these sectors are ripe for AI adoption.

The Green Paper should be improved to identify and address the barriers to technology adoption, particularly in some of the UK's highest-performing sectors. For example:

- In the **manufacturing sector**, while a small number of organisations are beginning to successfully adopt AI, more needs to be done to ensure more streamlined adoption across the sector. The main barriers to adoption in manufacturing include a shortage of skilled workers with both AI and manufacturing expertise, challenging system integrations, poor data quality, vulnerability to unplanned downtime, and concerns about quality assurance and regulatory compliance. Moreover, a shortage in skills and talent, means that few professionals are both skilled in AI and interested in factory settings. Integrating AI with legacy manufacturing equipment is often costly and complex due to a lack of interoperability. Data limitations also pose issues, as AI depends on accurate and well-maintained data pools, which many factories lack. Finally, AI systems are not always equipped to handle unexpected downtime, making factories hesitant to fully rely on them.
- In the **health and social care sector** (including the life sciences, health and social care and pharmaceuticals), the barriers to AI adoption include end-user confidence and trust, healthcare system's capacity and capability to implement AI, and clear governance around AI. This includes defining standards for evaluation, reimbursement, regulation, and accountability. Additionally, building an infrastructure that is prepared for seamless AI integration is essential to support effective adoption across health and social care settings.
- In **financial services**, AI adoption is highest in back-office functions, particularly fraud detection, risk modelling, and Know Your Customer (KYC) compliance. Predictive AI is widely deployed in these areas due to its more established technology and well-understood risk profile. Generative AI, however, remains largely in the proof of concept and pilot stages, especially in front-office and client-facing applications where its benefits and business case are still being tested. However, significant barriers to AI adoption in financial services do exist. These include data availability and quality issues, technical limitations, and regulatory uncertainty. For Generative AI, additional challenges arise around hallucinations (incorrect outputs), privacy concerns, and the complexity of integrating AI within existing frameworks. Financial institutions are cautious due to the evolving regulatory landscape and are working to align AI applications with compliance requirements to manage risks effectively
- In the **creative industries**, AI is transforming the creative industries by enhancing artistic processes, automating tasks, and generating content in areas like music, visual arts, and writing. For instance, it enables rapid prototyping, personalised marketing, and deep analysis of consumer preferences, which can guide creative direction. However, several barriers to adoption still exist. Key challenges include legal uncertainties around intellectual property (IP) for AI-generated works, concerns over job displacement, and the potential for AI to reinforce existing biases within creative content. Additionally, there is hesitancy within the industry regarding creative authenticity and the ethical implications of using AI to replicate human creativity.
- The **retail sector**, although not singled out by the green paper, amounts to 9.9% of GVA. The primary barriers to AI adoption in retail include data complexity, expertise gaps, executive support, and data availability. Preparing retail data for AI is challenging due to fragmented and inconsistent data spread across multiple systems, with many retailers citing this as a significant obstacle. Additionally, retailers often struggle with a lack of in-house AI and machine learning expertise, which is critical for implementing and managing AI projects. Limited executive

support further hinders adoption, as AI initiatives often lack the funding and strategic alignment needed for successful implementation. Another challenge is the scarcity of historical data, which is vital for building predictive models, as many retailers do not consistently track inventory across channels.

The Government is currently engaged in a cross Government Review of Technology adoption. We would encourage that the review focus specifically on the question of how to encourage the adoption of AI technologies across the UK's highest growth sectors. This could work across the proposed sub-sector deals. The Government should aim to complete this review and outline policy options for increasing uptake of AI across high growth sectors at the Spending Review.

Successful UK's scheme such as Made Smarter and international examples such as Signapore's Go Digital Programme and the work of the Singaporean Infocomm Media Development Authority (IMDA) should be reviewed as examples for driving technology uptake in selected sectors.

Cyber security and cyber resilience

It is also essential that UK firms adopt cyber security measures, and improve their cyber resilience, as part of any digital adoption programme, as if cyber security in the UK is ignored then all other parts of the economy will suffer. Cyber security measures are therefore not optional.

Like general digital adoption, cyber resilience underpins activity for all organisations and citizens; and it is a foundation of the UK's National Security as well as the economy. Half of businesses (50%) and around a third of charities (32%) report having experienced some form of cyber security breach or attack in the last 12 months, and so the importance of cyber resilience is only increasing. As Dr Melanie Garson of the Tony Blair Institute for Global Change recently stated: "cyber resilience must sit within the UK's larger industrial strategy, ensuring that those industries which have been identified as highly strategic are protected and that there remains a home-grown pool of UK cyber capability that can be accessed by government and critical infrastructure alike."

The main challenges to improving cyber-resilience in the UK can be, essentially, put into two categories. Firstly, there is still a complacency around cyber-resilience, which can be due to a lack of understanding or the misconception that it's a technical inconvenience rather than a business imperative. Secondly, there's a lack of means and skills to improve cyber resilience, as there is often a lack of understanding of the importance of data security, or there is a perception of cyber security 'in a box' – that is, it is a technical issue that needs to be taken care of, rather than something for which everyone across an organisation has a part to play

While progress has been made in both areas, ultimately there is more the Government can do with industry to encourage security-aware company cultures, provide greater incentives for adoption, share information and best practice and tackle the skills gap in this field. Government must take the lead as cyber security is not a low-cost business.

The Department for Science, Innovation and Technology should continue to lead with setting standards – for example, as it did with the Product Security and Telecommunications Infrastructure Act; and industry will play a key role by providing an expert practical lens through which to develop and assess any new standards, rules or regulations. Importantly, in order to meet the government's cyber resilience targets by 2025, we are pleased to see that the updates to the NIS regulatory framework are being prioritised through the Cyber Security & Resilience Bill. Essential measures include:

- Establishing a national cyber security threat register to properly understand and combat cyber threats to the UK, to help with understanding and wargaming threats. Through the Cyber Security and Resilience Bill, require organisations to adopt state-of-the-art cyber defences to best tackle advanced and AI-enabled attacks, supported by updated guidance in the Cyber Assurance Framework to embed proactive and preventative AI cyber defence measures to manage cyber risks.
- Extending the NIS regulations to capture appropriate Managed Service Providers, Managed Security Service Providers and data centres; as well as to economic sectors which have become further digitized since 2018, including advanced manufacturing, space, autonomous vehicles, food supply and distribution, and critical medical devices, products and R&D; and to their critical supply chains.
- Introducing targeted reporting requirements to ensure that regulators have all the information they need to determine whether the cyber threats facing the UK are being appropriately managed. Efforts should also be made to collate and disseminate incident data (on an anonymised basis), allowing Government to measure the efficacy of policy interventions to national cyber resilience over time.
- Requiring large businesses, including UK listed companies, to appoint a responsible director for cyber security to ensure due regard is given to cyber security risk management alongside those responsibilities where company directors hold personal liability, like health and safety and online safety requirements.
- Introducing the previously-consulted-on measures for listed companies to report on their security risk management and extend these to other large private-held companies in order to protect their customers and employees (who are already required to share their corporate governance arrangements under the Companies (Miscellaneous Reporting) Regulations 2018).

Furthermore, the forthcoming Cyber Security and Resilience Bill could be enhanced to address gaps and inconsistencies in product and software security regulation. At present, there are several overlapping Codes of Practices and regulations governing product and software security, as well as an overreliance on voluntary schemes. A consistent, risk-based and proportionate framework is needed, using existing international standards that represent the agreed consensus on best practice, promoting “secure by default” practices and identifying the most high-risk products and technologies for enhanced oversight. Such an approach would remove, as far as possible, user responsibility for their cyber security online, providing a safety net for SMEs and more readily enabling them to confidently participate in digital society and adopt new technologies.

Government should also ensure that wider cyber laws, such as the UK Computer Misuse Act 1990, are updated to reflect the evolving threat and technological landscape.

techUK’s members would also like some clarity on whether the National Cyber Strategy and its underlying approach remains valid. If it is to be refreshed, the current version should be considered while establishing roles and responsibilities for cyber security; identifying where current gaps in laws, regulations and policies are and what steps are required to address them; and, at the same time, ensuring the continued growth and development of innovation in the UK’s thriving cyber sector.

Regulation, of course, only raises the baseline and, in this space, we must continue to have much higher ambitions. Essential measures include:

- Develop a new Cyber Charter with the aim of building resilience and recovery into supply chains, in particular for SMEs. This will also act to promote sharing of

cyber expertise across the supply chain and with third party critical suppliers. This would be an opportunity to build on existing initiatives such as Cyber Essentials.

- Embed cyber security awareness into the beginning of setting up a company in the UK. The Government can do this by ensuring Companies House and GOV.UK provide information and guidance on 'how to be cyber secure' for any new UK company. Beginning with a pilot scheme could ensure that guidance is clear and delivers on awareness raising.
- Introduce a greater emphasis on 'resilience by design' which assumes failures will happen and prepares for these inevitabilities with backup systems and other ways of containing disruptions and minimising their impact.
- Ensure wider cyber laws, such as the UK Computer Misuse Act 1990, are updated to reflect the evolving threat and technological landscape.

It is important to note that schemes and practices used in cyber security assurance, particularly practices such as 'red teaming' and the Cyber toolkit, are well-regarded enough to serve as models for other sectors, namely AI and AI assurance, and should therefore be seen as proven schemes for the UK Government to support.

National Security

National security and the general resilience of the wider UK economy does not receive the necessary attention from Government.

It is vital for any Government Industrial Strategy to consider national security risks and their alignment with long-term business growth strategies. The new Government must examine not only the security aspects of the sectors vital to the success of the growth mission but also how placing work with UK-based industry can boost the resilience of innovation ecosystems and industrial supply chains in the UK's National Technology and Industrial Capability (NTIC).

UK security suppliers work daily with a wide range of stakeholders to mitigate emerging risks and responding to new drivers of threat. Closer collaboration with the relevant stakeholders within national security and businesses in the private sector would provide industry with unique insights on emerging national security and resilience threats, which can add value to government understanding of the threat landscape by melding open-source and classified assessments.

Contrary to the days of the Cold War, most technology development is now done in the civil business sector where it benefits from being exposed to commercial pressures in terms of pace and efficiency; and in turn boosts economic growth and individual prosperity. Consequently, governmental efforts to strengthen the UK's response to current and future threats is highly dependent on the provision of industrially developed capabilities and the configuration of private sector investment decisions. Deeper and systematic public-private cooperation is therefore needed for any form of comprehensive response by the UK to address the strategic risks facing the country.

With that in mind, there needs to be a clearer indication of alignment between Whitehall departments - Home Office on UK domestic security policy, Cabinet Office for central policy relating to wider security interests, FCO on foreign affairs and DBT on economic security policy. This poses the question of 'how effective are our security institutions in responding to the growing threat? - also referring to institutions such as the National Security Council and Intelligence and Security Committee in Parliament. Achieving economic growth whilst mitigating national security threats requires the UK to have a clear strategy, which is forward thinking rather than reactive, joined up and utilises a 'whole-of-government' approach.

Standards

The Industrial Strategy green paper does not make full use of the role standards can play in generating economic growth.

A 2022 study by the Centre for Economics and Business Research (CEBR) and an associated survey found that:

- The value of standards to the UK economy per year (over a 10-year period) is £8.8bn.
- Standards have boosted the UK's GDP by £161bn since 2000, with 23% of all UK GDP growth and 38% of all UK productivity growth over the same period attributable to standards.
- £5.4bn of additional UK exports per year can be attributed to standards (after five years), with 60% of SMEs and 77% of larger companies reporting that standards have increased their capacity to export.
- Firms of all sizes identify more benefits than costs from the use of standards: between 55% and 85% see standards as net beneficial. 81% of firms see standards as providing an ongoing boost to productivity.

Standards define common vocabularies, establish essential characteristics of a product or service, and identify the best practice that will deliver successful outcomes. Standardization alongside accreditation, metrology and conformity assessment (testing, inspection and certification) supports businesses to innovate and enables research to be commercialized. In addition, the UK has an opportunity to proactively set international standards for innovation and tech. This will give the UK "first mover" advantage and provide an opportunity for UK businesses to gain global competitiveness in trade. The role of standards in technology growth, and the UK's role as a leader, has been recognised in the Government's Science and Technology Framework and the International Tech Strategy.

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

techUK's Growth Plan contains several recommendations for boosting access to R&D tax credit relief, which small tech businesses are disproportionately reliant upon especially in parts of the tech sector that are R&D intensive. The Growth Plan outlines that for every £1 of tax forgone through R&D tax relief results in up to £2.70 of additional investment in R&D by UK companies. For the corresponding research into the SME scheme, this showed an additionality ratio of £0.75 to £1.28.

Recommendations include:

- Use the 'R&D tax reliefs: Expert Advisory Panel' announced in Spring 2024 to inform recommendations around HMRC's administration, operation and delivery the R&D tax credit. Doing this will encourage applications through speedy customer service and prevent the regulatory regime to deter fraud from deterring legitimate applicants though volume compliance and save money through reducing operational costs.
- Re-introduce geography specific expert teams within HMRC, creating sector specialists due to the clustered nature of R&D investments. This would also support regional incentives and advisory services to help businesses in underserved regions access and benefit from R&D tax credit.
- Introduce a de minimis qualifying R&D expenditure threshold for the R&D tax credits scheme, with the purpose of reducing HMRC caseload and removing

wholly non-compliant claims. Analysis has found introducing a £30,000 de minimis R&D threshold for the R&D tax credits scheme would reduce HMRC caseload by up to 25% and remove nearly half of wholly noncompliant claims, generating significant savings.

- Extend the qualifying categories for the R&D tax credits scheme to include capital expenditure, such as plant and machinery, used solely for R&D purposes. techUK believes that capital expenditure, such as plant and machinery, play a vital role in advancing innovative projects and activities. It is clear the UK must have an internationally-competitive tax regime in this area. Currently the R&D activity and exploitation are incentivised, but the facilities credit would provide a clear incentive for investors both current and prospective to fund the refurbishment of existing facilities or the creation of new ones in the UK rather than overseas. This would boost the UK's R&D skills base, increasing the productivity and competitiveness of the UK as a global leader in R&D excellence.
- Ensure continued support for SME innovation by expanding ERIS (Enhanced Research and Development intensive support) to include profitable SMEs and revisit the scheme to improve clarity around subcontracted R&D. Currently, the scheme only allows loss-making R&D intensive SMEs to deduct an extra 86% of their qualifying costs in calculating their adjusted trading loss and surrender corresponding losses for a payable tax credit at 14.5%. Acting on this would help to address the cliff edge in the current scheme, where the amount of relief available reduces dramatically when a business commercialises its R&D.

Get started on a longer-term five-year plan for the delivery of R&D tax reliefs to restore confidence and stability following a series of changes. At the heart of providing confidence for the tech sector is longer-term policy certainty. We know this is a priority of this Government, and our members stand behind this ambition. We'd recommend providing this stability by revisiting the policy objectives of the R&D tax relief scheme with inward investment and UK competitiveness at the heart of this and setting a new target for R&D spend as a percentage of GDP, with updated research from HMRC on additionality and spillover benefits.

The Government's pre-election industrial strategy referred to using public procurement to support UK scaleups. techUK's Growth Plan has ideas for how to reform public procurement to further drive social value and support the UK's scale-ups:

- Better transparency of tenders, pipeline and spend data .
- Clearer framework to support SMEs to define social value commitments.
- Consultation with the tech sector.

Scale-ups are often missed out on public procurement frameworks. Anecdotally, techUK members have outlined that the procurement system often acts as a sign-off procedure rather than a formative part of the decision-making or selection process. A scale up category would help the Government engage with UK scale ups and allow them to bid for public contracts on a level playing field.

Data

12- How can the UK government best use data to support the delivery of the Industrial Strategy?

techUK advocates for Government to modernise the UK data protection framework to support research and innovation, and encourage more effective public services, whilst ensuring the UK retains its data adequacy agreement with the EU. To do this, we recommend:

- Clarifying how data can be better used to support scientific research and technology development in both the public and private sectors, including enabling safe and secure AI training and development.
- Providing legal certainty around the use of legitimate interests as a lawful basis for processing data, particularly for strong public interest reasons such as combating crime and safeguarding children.
- Removing consent requirements for non-intrusive uses of cookies and other identifiers.
- Updating the law to reflect the common, widespread use of low-risk automated decision-making.
- Creating a more flexible international data transfers regime that will allow the UK to better manage data flows with other countries, which are critical for economic growth.
- Supporting an effective and modernised ICO, bringing it in line with other UK regulators, and allowing it to better focus on responsible innovation and sustainable economic growth, in addition to its other regulatory functions.
- Enabling legislation for Smart Data Schemes to be introduced in appropriate sectors, such as finance, transport, and home buying, giving British consumers access to more products and services.
- Encouraging both public sector and companies to contribute to upstream open-source projects to accelerate UK's open innovation (10% increase in upstream contribution increases GDP by 0.4% - 0.6%).

Such actions many of which are contained in the Government's Data (Access and Use) Bill will help streamline regulations on business and encourage the regulator to focus its efforts on helping promote responsible innovation. Already, there are estimates that the average company affected by GDPR has suffered an 8.1% drop in profits and a 2.2% decline in sales. Address this by rebalancing the regulation can help alleviate some of this effect while also retaining strong privacy protections.

Further by taking action as recommended in this response to support Digital ID the Government can help build a more secure environment for the access and sharing of data. There should be an ambition to ensure that digital ID or verification schemes can be rolled out across the economy.

The Government should also bring forward plans for consultation on a National Data Library to help improve access to data for a wide range of firms. The Library should have ambitious targets to open a range of data sets including from HMRC and health data. Expanding access to data will be most beneficial immediately to smaller firms. Beyond creating an environment to share public data the Library should also consider how it can support the sharing of private sector data, where this is appropriate.

Beyond the Data Library and as part of the Cross Government Review of Technology Adoption the Government should explore data access challenges for the UK's high growth sectors and review how to incentivise greater access to data in sectors where the UK has high potential and where it can be globally economically competitive.

13- What challenges or barriers to sharing or accessing data could the UK government remove to help improve business operations and decision making?

See the answer to question 12.

21 - What are the main factors that influence businesses' investment decisions? Do these differ for the growth-driving sectors and based on the nature of the investment (e.g. buildings, machinery & equipment, vehicles, software, RDI, workforce skills) and types of firms (large, small, domestic, international, across different regions)?

Investment

techUK surveyed 250 UK Tech Leaders in February 2024 to ask them what the most significant barriers were to doing business in the UK. The top six reasons, in descending order, were:

- Energy costs.
- Current interest rates.
- Current tax rates.
- Brexit.
- The general amount of business regulation.
- Skills shortages.

While there was general agreement between companies of all sizes across the UK, SMEs (companies under 250 employees) were more likely to emphasise Brexit than large companies, while large companies were more likely to emphasise current tax rates. Large business responders also placed skills shortages and visa issues above business regulation in importance, but as 1% did this this is therefore within the margin of error.

In essence, these are the most pressing challenges for the Government to deal with when considering the tech sector generally. Individually, some parts of the tech sector may face greater obstacles to investment than others (as covered elsewhere in this document).

techUK members broadly welcomed the findings of the Harrinton Review of Foreign Direct Investment. In addition to its focus on FDI members also highlighted the need for the Government to ensure its investment support services also take into account existing domestic investment and the ability of the Government to help scale and grow domestic providers, rather than in some instances defaulting to seeing new sources of foreign capital.

This should see the Government look at the 'net gain' from new investments across foreign and domestic sources when considering how to raise overall business investment.

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

techUK's Growth Plan includes specific recommendations help address the UK's scale-up funding gap. Currently, the main barriers to tech scale ups include navigating the support and funding available for scale ups.

To address this, the Growth Plan recommends establishing a scale up support service and leveraging existing schemes to boost support for scale-ups and R&D intensive businesses with access to necessary capital.

Leveraging existing schemes

The UK has a thriving ecosystem to grow a business. Interventions such as the Seed Enterprise Investment Scheme (SEIS), Enterprise Investment Scheme (EIS) and Venture Capital Trusts (VCT) scheme are world leading and have supported firms to start and then scale in the UK. The EIS alone has raised £41 billion since 1994.

With the EIS and VCT schemes now extended until 2035, there is an opportunity for the scheme to better support smaller scale-ups and R&D intensive scale-ups. This includes the size of enterprises in which investments can be made to get relief. For instance, for VCT and EIS, there is a cap before investment on gross assets of £15m and 250 fulltime employees. For SEIS, the period under which businesses can claim is currently two years. techUK believes that the Government should consult on ways to bolster the scheme.

This comes considering recent inflationary pressures for scaling firms for smaller scale-ups (with a value between £20m and £40m). The Patient Capital Review provides further suggestions, such as extending the EIS and VCT to focus on Knowledge Intensive Companies (KICs), that could be explored.

Scale Up support service

Government should look to create to develop a scale-up support service to directly support in addressing regulatory or policy challenges, as well as inform scale ups of how changes may impact their business.

For the Government, such a support service would also help to develop stronger evidence bases when designing systems-wide policy interventions. This would also support in understanding barriers to growth scale-ups are facing and facilitate cross-Departmental connections.

Once piloted, embedding a wider support service into the Department for Science, Innovation and Technology should be a priority, ensuring that the service can have the greatest impact possible to support science and tech firms to scale and stay in the UK. We believe this approach should be expanded to the broader scaleup ecosystem, including government and educational institutions, to support the UK's growing scaleup business community.

Alongside this, a ‘one-stop shop’ homepage to share the relevant grant and support out there to help scaling firms navigate the support already out there. An example of this includes Start-Up Estonia programme run by the Estonian Business and Innovation Agency since 2022.

Monitoring the effects of the Budget

There is a possibility that investor behaviour will change as a result of the tax rises announced. Closely monitoring the impact this is having on scale-ups, and in particular infrastructure companies, will be important. For example, the cap on AIM-list companies Business Relief as well as raising the level of tax for unlisted companies may affect burgeoning businesses, especially those that require patient capital. If this happens, then the support service and further intervention will become critical.

Labour's Start-Up, Scale-Up review highlighted the UK’s late-stage funding gap for scale-ups, driven by a risk-averse investment culture and limited institutional funding. This gap is pronounced for tech and science scale-ups, as UK pension funds contribute less to VC than international peers. This is despite pension funds being a key global source of patient capital.

techUK therefore welcomed the Chancellor’s announcement during the Mansion House speech that the Government will build on last year’s Mansion House reforms and look to pool assets from 86 separate Local Government Pension Schemes (LGPS) in England and

Wales into eight 'megafunds' through a Pension Bill next year. The Chancellor also announced plans to consolidate smaller defined contribution schemes across the UK from private businesses into pools of £25 billion to £50 billion.

This sees the Government seeking to replicate likes of Australia and Canada schemes by consolidating public sector pension schemes into larger, professionally managed funds. These larger funds can invest more significantly in riskier, long-term assets such as infrastructure, start-ups, and private equity.

techUK called for the Government to unlock more capital into scaling firms in our Growth Plan, further enabling them to scale and stay in the UK, so this was a welcome move from the Chancellor. techUK also signed a joint letter alongside Startup Coalition, BioIndustry Association (BIA),The Entrepreneurs Network, UK Business Angels Association, Tech Nation, UK Day One Project and Founders Forum Group supporting reform of the pensions system.

techUK would urge the Government to introduce and pass the proposed Pension Bill as soon as possible, to continue to build on these pension reforms and to support funding for businesses and scaleups in particular, especially with the tax rises on business announced in the Autumn Budget.

23. The UK government currently seeks to support growth through a range of financial instruments including grants, loans, guarantees and equity. Are there additional instruments of which you have experience in other jurisdictions, which could encourage strategic investment?

While this response has referenced the importance of public procurement throughout, the Government should also ensure that each sector is able to benefit from the state's ability to support technology through procurement. The Industrial Strategy produced by the Labour Party recognised procurement was a powerful tool for supporting UK businesses, and this is something the Government's Industrial Strategy should bear in mind.

This can be done by ensuring all procurement is aligned with the National Public Procurement Policy Statement (NPPS), which promotes procurement practices that deliver wider social, economic, and environmental benefits. For example, public sector demand for low-carbon technologies, renewable energy solutions, and socially responsible supply chains can accelerate progress towards net-zero carbon targets. In addition government should look to leverage public sector procurement systems (and the NPPS) to encourage cyber security and resilience in the supply chain.

The Government needs to recognise the role business taxes play in influencing investment decisions. The punitive nature of turnover taxes applied to gross revenue like the Digital Services Tax particularly on smaller, competing firms; the Apprenticeship Levy can have a similar effect, especially in its current form. The Government will need to think pragmatically about the potential impact of retaining a DST after the OECD moratorium expires on 31 Dec vs the potential impact of trade retaliation from the US against British exports.

Chapter Five – Partnership and Implementation

2- How should the UK government account for emerging sectors and technologies for which conventional data sources are less appropriate?

techUK would stress the importance of direct discussion with businesses involved in these sectors and technologies, as well as their customers, to get a direct sense of their potential and current utility. It is important to take each of these on a case-by-case basis, as the Government proposes to do.

For this purpose, techUK is eager to partner with the Government to consult these emerging sectors. techUK has established working groups and councils for emerging sectors and technologies such as quantum and digital ID, and these pre-existing institutional structures provide ready-made points of contact between the Government and the sector.

The Regulatory Innovation Office (RIO) should also be involved in discussions with how the UK Government can learn more about emerging sectors and promote the commercialisation of new technologies. In our Growth Plan, techUK called for a Commercialisation of Tech Taskforce to be set up in the RIO to identify and resolve fundamental barriers to commercialisation within the regulatory system. This can be done with joint business and Government task and finish groups and could work to commercialise key emerging technologies.

30. How can the Industrial Strategy Council best support the UK government to deliver and monitor the Industrial Strategy?

techUK would urge the Industrial Strategy Council to retain a focus on establishing strategic tasks that should be fulfilled as part of the Industrial Strategy, as this will prevent the Council from becoming bogged down in detail and thus allow it to retain its capacity for strategic oversight.

We welcome the recently unveiled model of the UK Regulatory Innovation Office, which has established key questions and goals that it will seek to work towards, as providing a model for how this should be administered.

The Industrial Strategy Council though must be responsible for the overall implementation of the strategy. Ensuring that policy ideas and recommendations are translated into impactful reality should be seen as fundamental to the strategy's success.

Critically, the Industrial Strategy will not be delivered by the UK Government alone. Any implementation will require the private sector to work willingly with the Government on designing and implementing policy, including sub-sector strategies. techUK believes that industry bodies and individual companies need to be involved throughout the lifetime of policy recommendations, from idea to implementation, to ensure the buy in necessary to make them work. This bottom-up policymaking, recommended by the Institute for Innovation and Public Purpose at UCL, will also mean the Industrial Strategy does not require Government to spend time imposing anything on an unwilling private sector and instead will allow more time and political capital to be spent on actual implementation.

The Council should be able to establish less permanent bodies to tackle key questions and goals arising from the strategy, chaired by a member of the Industrial Strategy Council, modelled on the Task and Finish Groups that have worked well for regulators and Government Departments who have turned their attention to specific policy questions or problems, for example such as Online Fraud.

techUK has called for the greater use of these Task and Finish Groups across Govrnment. For example, the Council should be able to establish a temporary body to answer a question such as 'how do we eliminate the long-tail of productivity in the UK?' which will then have a membership of trade bodies, companies, unions, Government Departments (notably the

Treasury) and bodies such as the Regulatory Innovation Office, and academia tasked with devising solutions. These bottom-up suggestions will then be far more likely to have buy in from the actors required to implement them. They can also assess the outcomes of interventions made and progress made towards the goals assigned to them. It is likely that such Task and Finish Groups run under the Council could also be aligned with the 'Missions for Government and Mission led approach set out in the Government's election manifesto.

These bodies should also be charged with assessing the wider supply chains that the UK is operating in. Tech supply chains are especially complex and intricate, and it is unlikely the United Kingdom will be a world leader across a supply chain but will instead have pockets of strength. Task and finish groups should identify where the UK has strengths in a supply chain and where the UK relies on other countries. Similarly, these groups should identify where in the UK's nations and regions existing capability exists to fulfil policy goals and that policy recommendations build on existing infrastructure and success instead of recreating activity elsewhere. Involving regional trade associations and representative organisations, alongside Combined Authorities, would ensure those areas without Combined Authority representation will still be able to participate and have their economic strengths represented.

The Industrial Strategy Council should also make sure to constantly evaluate its successes and failures. This is a key part of industrial policy in South Korea, where assessment of learnings from specific strategy groups is a key part of shaping future policy.

techUK would also recommend trade associations play a spportive role on the Industrial Strategy Council itself, given trade associations have memberships that range across large sectors of the economy. techUK for example has a membership that encompasses telecoms, healthcare, emerging technologies, financial technology, AI, public sector services and more.

Government should clarify how the Industrial Strategy Council will operate should give thought to the inclusion of trade bodies to provide input into the strategic direction of the Council and provide information on the mood of the various parts of the private sector they represent. To reiterate, it will be much easier to deliver the Industrial Strategy if the public and private sectors are pulling in the same direction from the earliest opportunity.

In this vein, the Government need to clarify that it will launch further consultations and opportunities for partnership based on the exact nature of the sector deals for the eight key growth sectors and the outlined subsectors. These consultations need to provide further opportunity for Government and the private sector to examine what each of the identified sectors and subsectors need and their importance to the wider economy, as the Industrial Strategy period has not provided respondents with adequate time to do this.

We would recommend that this strategic council provide yearly reporting upon activities related to the Industrial Strategy, to be submitted to Parliament to ensure there is still democratic oversight in how UK economic policy is being made. This should include a breakdown of regulatory and legislative changes that may need to be made to fulfil the recommendations of the various task and finish groups established by the Industrial Strategy Council for implementation purposes.

techUK welcomes the Industrial Strategy Council being put on a statutory footing as a way to establish its permanence. The benefits of retaining the Industrial Strategy Council need to become a point of consensus between the major parties at Westminster, as this will contribute to providing the long-term certainty necessary for the Industrial Strategy to take

longer time frames when assessing the state of the UK's economy. This will also allow actions taken by the Council and its task and finish groups to be considered over a longer investment timeline of 5-10 years, matching those of the private sector.

The Industrial Strategy Council should also seek to drive a strategic focus on growth and resilience – particularly of the underlying connectivity infrastructure that will underpin our economy and all tech adoption. Resilience is a critical component of the creation of a stable economy. It is important to not overlook this element, particularly for infrastructure. A hyper-focus on the growth agenda as well as underlying resilience will enable prioritisation on the interventions that will drive forward the UK economy. The pre-election Labour Industrial Strategy recognised this role of resilience thoroughly, so it is important that there is no tunnel-visioned focus on growth but that this growth should remain stable.

31. How should the Industrial Strategy Council interact with key non-government institutions and organisations?

The Industrial Strategy Council will be charged with translating the UK's economic priorities into reality, but the Council will not be effective if it imposes policy on an unwilling private sector. This does not mean the Council cannot set ambitious challenges the private sector will contribute to solving, but it does mean that the Council should ensure those challenges serve the goals of both the public and private sectors. The Industrial Strategy Council must be just as much 'of' the private sector as it is of the public sector and should view engagement with non-government institutions and organisations as essential, rather than a luxury.

In this light, the Industrial Strategy Council and any related bodies should take advantage of those institutions that already exist in the private sector as far as possible. Trade associations maintain significant infrastructure for seeking the views of their memberships, and this ready-made infrastructure should be utilised by the Industrial Strategy Council to quickly gain useful feedback on a wide variety of issues. They also serve as useful bodies for the distillation of consensus amongst the sectors they represent.

This kind of engagement is something the Government does already. To take two examples, the Government supports the UK Spectrum Policy Forum, an organisation that is part of techUK, to aid communication between spectrum-utilising sector and the Government on spectrum-relating issues. The Forum has spurred Ofcom to review policy regarding use of the 3.8-4.2 GhZ, and the Government on Spectrum Annual License Fees. techUK also hosts a regular forum on implementing the Telecoms Security Act, providing the Government and Ofcom with regular opportunities to communicate with business on how implementation of the Act is progressing.

The Council needs to be able to effectively sort through a large amount of information and set directions based on the information they receive, so should focus on this and allow the private sector to maintain the apparatus of consultation and consensus-building that already exists and that trade associations will be more than willing to utilise to help with devising and implementing recommendations.

Similarly, the Council should look to involve civil society to help with creating inclusive growth through addressing the specific and unique challenges of marginalised and underrepresented groups.

32. How can the UK government improve the interface between the Industrial Strategy Council and government, business, local leaders and trade unions?

There should be regular meetings between the Industrial Strategy Council and relevant trade associations to ensure a regular and productive dialogue.

The Industrial Strategy Council must have a dedicated secretariat that can directly and regularly communicate with relevant stakeholders. This secretariat should be focused upon facilitating engagement with necessary stakeholders and not with the devising of policy itself, allowing it to be smaller and to prevent another large bureaucracy being formed.

As mentioned above, the Industrial Strategy Council should look to consult with the private sector to ensure that the strategic direction being established is one with active buy in from companies and trade associations. When it comes to more targeted implementation, smaller task and finish groups set around particular goals should gather relevant members of the Government, business, local leaders and trade unions on the group to ensure policies have buy in from those charged with implementation.

As also mentioned above, the institutions charged with administering the Industrial Strategy needs to see themselves as being a partnership of the private and public sector and must be proactive and willing in providing a bridge between the Government and the private sector.

33. How could the analytical framework (e.g. identifying intermediate outcomes) for the Industrial Strategy be strengthened?

techUK is keen that the Government work with business to ensure there is constant feedback and assessment of the progress made in implementing the Industrial Strategy. This is an essential part of creating a holistic evidence base for assessing progress.

techUK would also recommend the Government be open with the intermediate goals and identify a range of metrics suitable for the overall task. If, for example, the Government wanted to grow the domestic market for a product, the Government may collect data on domestic sales from relevant firms, exports to ensure that domestic purchases don't come at the expense of exports, the size and number of UK firms making that product and more to show how the market is evolving.

techUK would urge the Government not to rely only on shorter term Benefit-Cost Ratio analyses as this prevents the Government supporting promising, but riskier, industries and technologies.

34. What are the key risks and assumptions we should embed in the logical model underpinning the Theory of Change?

The United Kingdom's status as an open economy means that the force of international events are an essential consideration for any industrial strategy, especially on that seeks to crowd in investment from abroad.

Previous British industrial policies and plans, notably Edward Heath's Dash for Growth in 1972-3, have been severely disrupted by the force of international events and circumstances outside of Britain's control. Recent developments in Europe and the United States that the UK has had no part in influencing will nevertheless have significant repercussions for the

UK's economy in general and will alter the course of any Industrial Strategy and the wider UK economy. The potential for the UK to suffer the force of wider political and economic shocks must therefore be taken into full account.

Likewise, the Theory of Change must account for what the UK can work to influence abroad through organisations such as NATO, AUKUS, GCAP the European Space Agency, the ITO, Horizon Europe and more. The Theory of Change should take account of the changing power and influence of these organisations.

Technological development and capability have further enmeshed the UK in the global economy. In no key technology sector could the UK develop a fully-sovereign supply chain. The UK Government has recognised this mutual interdependence and has even attempted to turn it into a strength by utilising and reinforcing the expertise and capabilities of our allies, for example in defence through the AUKUS Advanced Capabilities Industry Forum.

Complex and interdependent tech supply chains have the potential to affect the wider UK economy. During Covid, a disruption in the production of semiconductors in Taiwan led to significant disruption of the automotive sector, which lacked necessary semiconductors for vehicle operating systems.

In order to encourage the growth of the UK's tech sector, and to make that growth as resilient as possible, the Government must recognise that trade and taking a global approach are essential. It is necessary for the Government to assess the geopolitical risks to complex tech supply chains in partnership with the tech sector to ensure that the UK can continue to have stable access to essential supplies in preparation for disruption.

techUK would also urge the Government to consider the impact of confidence in key technologies and institutions. Success in the economic sphere must create greater confidence in the ability of the UK economy to grow and embolden those who would make our economy more dynamic and take risks to commercialise their ideas. Similarly, unpredictable events may severely undermine confidence in technologies and institutions. Somewhat paradoxically, the logical theory of change must attempt to take account of the emotional, 'animal spirits' that are just as essential for economic growth as frameworks and strategies conducive to economic growth. The most notable example here for the UK tech sector is the culture of the UK when it comes to taking investments, with UK investors, including pension funds, seen as culturally less risk acceptant and less likely to invest in new and novel technology markets. This cultural impact, alongside the incentives and structures of our capital markets has left the UK as a relative under investor in innovative new technology start-ups an scale-ups.

35. How would you monitor and evaluate the Industrial Strategy, including metrics?

techUK would support measuring and evaluating the Industrial Strategy through using qualitative as well as quantitative results. This will allow better assessment of the overall changes to the business environment as effected by the measures deriving from the Industrial Strategy. Purely quantitative targets may also lead to a lack of focus on the wider business environment, and lead to excessive focus on what can be counted.

We would also remind the Government that the measures of the Industrial Strategy may need to be considered over the whole of the ten-year timeframe, and that therefore the assessment of particular successes and failures of the Industrial Strategy must take account of the time that it may take to bring certain outcomes to fruition.

Another consideration techUK would ask the Government to account for is whether the notion of 'success' or 'failure' is the appropriate way of assessing the Strategy. Instead, it

may be better to assess whether any actions taken as part of pursuing the goals of the Strategy had the expected outcomes, and whether there were any unintended consequences.

Doing so could reveal problems, or potentially unexpected benefits and spillovers, that the Industrial Strategy Council may wish to reform its approach to prioritise.
