



A UK tech plan

How the next Government
can use technology to
build a better Britain

June 2023

Contents

Executive summary	05
Eighteen opportunities to build a better Britain through technological innovation	09
The five challenges the UK tech sector faces	13
People	19
<ol style="list-style-type: none"> 1. Improve access to day-to-day digital services, cutting costs for both Central and Local Government as well as improving public services 2. Make the UK one of the most trusted, safe and secure places to be online 3. Plug the digital skills gap to boost pay, opportunity and our national resilience 4. Make sure everyone has access to the online world 	
Society	28
<ol style="list-style-type: none"> 5. Deliver the digital transformation that the NHS and social care system needs 6. Rethink our approach to how technology can support the criminal justice system 7. Regain the UK's reputation as a global leader in Open Data and rank among the five countries on the UN E-Government Index 8. Ensure the UK holds on to its fintech crown 9. Grow tech clusters across the UK 10. Support a thriving digital and AI ethics ecosystem to enable better governance and regulation 	

Economy 38

- 11. Digitise the day-to-day economy helping small businesses get ready for the AI revolution
- 12. Fix the UK's broken scale up economy so British firms have the opportunity to become global champions
- 13. Ensure we have a competitive innovation economy
- 14. Commercialise and deploy the emerging technologies vital to a growing and resilient economy
- 15. Build a smarter approach to foreign and trade policy for the UK in a more complex and less secure world

Planet 51

- 16. Boost the competitiveness of the UK as a green technology hub
- 17. Empower individuals and businesses to better understand and improve their own environmental footprint
- 18. Make tech greener

Delivering a regulatory system ready for the faster pace of technological change 56

- I. Reforming the British approach to tech regulation
- II. Building a system of AI ethics, governance, and regulation that supports public trust and encourages innovation

References 68



Executive summary

As the UK approaches a General Election, there is a strong sense among the public and the business community that we face a series of fundamental challenges that will test the country whoever forms the next Government.

The public will want the next Government to give them confidence over their own and their children's futures, set out solutions to economy-wide challenges such as a lack of business investment and stagnant productivity growth, ensure our public services can survive the challenges that the 21st century will throw at them, and have a plan for how the UK can play its part in combatting climate change.

Doing more with less:

However, the next Government will have fewer resources to tackle these challenges. A series of crises from the 2008 financial crisis, to the pandemic and war in Europe have been compounded by the end of ultra-low interest rates. This means that, in an increasingly complex and demanding world, the next Government will simply have to do more with less.

Despite this difficult context, an enormous opportunity is emerging with the increasing pace and power of technological innovation, offering solutions to the challenges the country faces. This opportunity is recognised right across our economy and society with virtually every business sector and public service seeing digital technology as the engine that will drive business growth or deliver more efficient, better and more resilient public services.

The challenge the next Government will face is how to ensure the opportunity presented by technological innovation is not missed.

Seizing the opportunity:

The UK has established itself as a leading tech economy, with a strong digital sector and globally leading research and start-up ecosystem. The tech sector is one of the UK's modern

economic success stories, with its contribution to the economy rising over 25% between 2010 and 2019, and now adding £150 billion to the economy every year. This makes it one of the country's most valuable economic assets¹ and the leading tech sector in Europe.

However, our success must not breed complacency. There is now a fierce global race over the key technologies that will shape the future: from AI and Quantum to green technologies and semiconductors, competition between governments to attract talent, bring in investment and grow tech clusters is greater than ever. If the next Government does not make the most of the UK's strengths, there is a real risk of it falling behind.

How technology is already helping us meet the challenges we face:

- **Caring for an ageing population:** virtual wards are making it easier to care for people in the community saving the health system up to £2,000 per patient per annum. Additionally, more than four in five NHS workers believe greater technology investment can help to attract new people into the NHS.
- **Growing the economy:** Generative AI is already helping boost productivity with a recent survey showing it can increase productivity by 14% with more junior workers benefiting the most, getting more time back to train and upskill.
- **Reducing the cost of public services:** Digital IDs are reducing the cost and accelerating the delivery of public services with people in Scotland no longer having to travel into council buildings to verify their identity for a range of services. Saving both the public and local authorities time and money.

Managing the risks:

Yet, while technology offers opportunities, it also creates risks and can be utilised by bad actors, from cyber-attacks to spreading harmful content to the misuse of technologies such as AI.

The increasing pace of technological change also means that these risks and threats are less and less predictable, and the wide availability of advanced technology means that countries have no option but to confront them head on.

The consequence is that seizing both the opportunities of technology, while also mitigating the risks, has the same solution: that being, to build a Britain better equipped, more adept and more confident at understanding, harnessing and deploying technological innovation.

This is why techUK has written our UK Tech Plan. Setting out the opportunities to empower the British people to seize the benefits of technology, leverage tech to deliver for our society and public services, completing the digitisation of our economy and using technology to protect the planet.

A tech plan for the next Government:

techUK is the voice of the tech sector, representing almost 1000 companies in the most dynamic sector of the UK economy. This plan sets out how a government committed to seizing the moment could bring the full benefits of technology to the UK, and ensure that we can remain at the global forefront of technological innovation.

techUK consulted broadly with our membership from small and medium enterprises (SMEs) to large international companies with significant investments in the UK.

Despite this wide range of stakeholders, a clear and consistent message came back:

While the UK is a strong and dynamic tech market with ambitious plans to further our position as a technology leader, over recent years we have fallen off the pace and our delivery has faltered. Currently we are at risk of losing our position as a leader in tech and the benefits that this brings.

The feedback fell into four themes:

- **Fundamentals:** the fundamentals of the UK are strong for tech, we are a tech positive society with a high level of internet and smartphone penetration, a flexible labour market, good incentives for innovation and strong and innovative services sectors.
- **Long-term planning:** while the advent of the Department for Science, Innovation and Technology (DSIT) has begun to turn this around, there was a common sense of frustration that across Government and its agencies the UK lacked a comprehensive long-term plan for technology and the digitisation of the economy and public services.
- **Regulation:** despite warm words from the Government on having a light touch and pro-innovation approach to regulation, the regulatory burden and cost of doing business has continued to rise. A confused approach to how we approach EU rules has emerged, in some cases resulting in the UK becoming an expensive and awkward market.
- **Delivery:** the UK has often put out strategies and policy papers with high ambitions, however when it comes to delivery, there has been a failure of follow through, often resulting in a cycle of new strategies being produced and cutting off the enactment of their predecessors.

Our feedback also found five challenges that confront the UK tech sector, from accessing the right talent and scale-up capital, to how the UK is competing as an investment destination, and how we procure technology and access and share data.

In our plan we are honest about these challenges and set out 18 opportunities that will not only allow us to overcome them, but also set out a potential partnership that Government and the UK tech sector could deliver to help build a better future for the British people.

Further, we provide recommendations on how the UK can ensure our model of regulation can keep pace with the fast pace of technological change, including artificial intelligence.

By acting on the opportunities set out in this plan we could:

Secure a £5.69bn pay rise for the British people: by changing our approach to upskilling and retraining through reforms to the apprenticeship levy and a new Digital Skills Toolkit to support lifelong learning. This will also help prepare the population for the increased use of automation and AI.

Ensure the NHS is ready for the future: by better spending the £2.1bn committed to NHS and social care digital transformation to reduce the pressures on hospitals by cutting waiting list, boost care in the community and move to a more preventative health care system.

Reduce the cost of net zero and cut energy bills: by digitising the national grid to cut the costs of reaching net zero by £17.6bn per year and reducing the cost of energy bills by enabling the smart charging of EVs and domestic batteries.

Boost the British economy by £200bn a year: the UK tech sector has the potential to add £200bn to the economy every year by the mid-2020s. By helping 600,000 SMEs invest in productivity boosting technology, delivering digital connectivity and leading a British 'Scale-up Sprint' to remove regulatory barriers and unlock investment into semiconductors, quantum and AI we have the opportunity to deliver that economic boost.

Improve safety and trust in technology: through a cross regulator online safety sandbox, new data sharing initiatives to significantly cut online fraud and developing a system of AI ethics, governance and regulation we can help improve public trust in technology and ensure tech is a force for good.

Eighteen opportunities to build a better Britain through technological innovation:

1.	Improve access to day-to-day digital services, cutting costs for both central and local Government as well as improving public services: update policy to introduce common standards and improve the interoperability of digital public services to cut the costs of administration for local authorities, and help UK companies seize the benefits of the global digital ID market predicted to value \$40.44 billion by 2027.
2.	Make the UK one of the most trusted, safe and secure places to be online: launch a new online safety sandbox to help deliver the aims of the Online Safety Bill, facilitate a new cross sector data and intelligence sharing initiative between the tech, telecoms and financial services industries and publish a 'top 5' priority list of smart data schemes to put consumers back in charge of their data.
3.	Plug the digital skills gap to boost pay, opportunity and our national resilience: help raise British workers' pay by £5.69 billion by making the Apprenticeship Levy more flexible, delivering an Employment Bill, and building an online Digital Skills Toolkit to help individuals and employers identify accredited courses to boost digital skills.
4.	Make sure everyone has access to the online world: through a new future network strategy that could help 1 million people back into the labour market and add £159 billion to the economy by 2035 through the widespread uptake of 5G, and by using satellite and drone technology to help rural and hard-to-reach communities get connected.
5.	Deliver the digital transformation that the NHS and social care system needs: ensure the £2.1 billion allocated in the plan for digital health and social care is committed to digital transformation, so we can better onboard the technologies that will cut waiting times, save staff hours and support more preventative treatment.

6.	<p>Rethink our approach to how technology can support the criminal justice system: enabling the criminal justice system to better leverage digital tools could cut the cost to the public of cyber and fraud related crime in the UK, which amounted to £4.1 billion between April 2022 and May 2023.</p>
7.	<p>Regain the UK's reputation as a global leader in Open Data and rank among the five countries on the UN E-Government Index: enact reforms to open up Government and public data sets to help create a better environment for UK Govtech solutions and improve our approach to public procurement.</p>
8.	<p>Ensure the UK holds on to its fintech crown: facilitate the uptake of new technologies such as AI and machine learning to deliver fintech services, speed up the delivery of a Central Bank Digital Currency and shore up the fundamentals of our fintech system by delivering reforms on Digital ID and Smart Data.</p>
9.	<p>Grow tech clusters across the UK: give local and combined authorities more incentives and confidence to invest in digital projects and review the roles of the British Business Bank and National Infrastructure Bank to accelerate digital transformation across local Government and support tech clusters across the UK.</p>
10.	<p>Support a thriving digital and AI ethics ecosystem to enable better governance and regulation: by establishing emerging tech taskforces under the Centre for Data Ethics and Innovation, promote education and training for digital ethics from the classroom to the boardroom and delivering an approach to Artificial Intelligence underpinned by a system of AI ethics, governance and regulation.</p>
11.	<p>Digitise the day-to-day economy helping small businesses get ready for the AI revolution: deliver a Digital Growth Fund by reallocating money unspent under Help to Grow: Digital which could help 600,000 SMEs adopt new digital technologies such as AI and increase sales by as much as 18% over three years.</p>
12.	<p>Fix the UK's broken scale up economy so British firms have the opportunity to become global champions: give start-ups certainty over existing support schemes and launch a British 'Scale-up Sprint' to identify, within six months, new investment vehicles and regulatory changes that could create new investment opportunities into critical technologies such as green tech, AI, quantum and semiconductors.</p>

13.	Ensure we have a competitive innovation economy: set out a five-year plan for gradual reform of the UK's R&D Tax Credit, bring down the cost and time it takes to get a connection to the national grid and reduce the cost of lab space, to make the UK a more competitive investment destination for highly innovative businesses, helping reach the target of 3.0% of UK GDP being invested in R&D per annum.
14.	Commercialise and deploy the emerging technologies vital to a growing and resilient economy: ensure the next Government builds on existing plans to support the commercialisation and deployment of emerging technologies, from AI and Quantum to semiconductors and autonomous vehicles.
15.	Build a smarter approach to foreign and trade policy for the UK in a more complex and less secure world: focus UK efforts on supporting multilateral systems such as the WTO, take targeted action alongside allies to secure supplies of key technologies such as semiconductors, and update rules on investment screening and how the Government consults on new free trade and digital economy agreements.
16.	Boost the competitiveness of the UK as a green technology hub: to add £13.7bn to the economy by 2030 by enacting reforms to boost investment, changing Environmental Social Governance requirements and leveraging open data.
17.	Empower individuals and businesses to better understand and improve their own environmental footprint: change planning rules so all new homes can support smart tech that can empower people to better manage their energy bills, create standards so home smart tech is interoperable and speed up the rollout of EV charging points.
18.	Make tech greener: deliver a strategy to recycle and re-use the UK's e-waste and critical minerals, reduce our dependence on imports, digitise the grid to reduce the cost of reaching net zero by up to £16.7bn per year, and secure a first-mover advantage in biodiversity reporting.

The five challenges the UK tech sector faces:

The UK has built a strong digital economy in particular, the UK's position as a hub for start-ups, fintechs and as a destination for world-leading research centres in technologies such as AI and quantum. The tech sector's contribution to the UK grew by over 25%² in a decade, in the same period, jobs in the sector have increased by a third, with over 1.7 million people in the UK now working in tech.³ The UK is now host to a tech sector that has a market valuation of \$1 trillion, the third largest in the world behind only China and the USA.⁴ Estimates suggest that if well supported, the UK's digital ecosystems could add an additional £41.5bn to the economy by 2025, creating a further 678,000 jobs.⁵

A strong and growing tech sector means more innovation, more jobs, digital tools and skills that can benefit the rest of our economy and society. Nearly every business sector and public service has a strategy for improvement based on digitisation and the better use of technology. Therefore, we need to see the UK tech sector as the engine of growth and change for our whole society and economy.

Although the UK's tech sector is in a strong position, it faces a number of challenges that, if not confronted, risk holding us back and could see the UK lose ground to other countries eager to boost their own tech sectors.

There are concerns within the sector that we have fallen off the pace and UK policy makers and politicians have developed a bad habit of patting themselves on the back for the UK's successes in one area while failing to recognise our weaknesses in another.

Through discussions with our members, we have identified the five challenges that the UK tech sector faces:

- **The skills and adoption challenge**
- **The scale-up challenge**
- **The investment challenge**
- **The procurement challenge**
- **The data challenge**

Behind each of these commonly identified barriers, is an entrepreneur whose business idea falls short of its potential, a lost major investment that comes at the cost of the benefit of local economies, or a citizen, patient or taxpayer who are experiencing more expensive, but less efficient public services.

The next Government needs to acknowledge these challenges and, through our subsequent recommendations, work with the tech sector to deliver a strategy to overcome these so that the tech sector can play its full part in helping address the challenges the country faces.

The skills and adoption challenge:

The UK has a flexible labour market and an open society that can make attracting and bringing in talent relatively easy compared to our competitors. Despite this, the demand for digital skills continues to massively outstrip supply, and upskilling those already in work for the jobs of tomorrow is a major challenge.

By 2030, 7 million workers could be under-skilled for their job requirements, that is around 20% of the total UK workforce⁶, while participation

in adult learning has not increased significantly since the early 2000's.⁷ Furthermore, UK firms, especially SMEs, are slower at adopting productivity boosting technologies than their peers in the OECD and EU.

Overcoming these skills and adoption challenges will be vital to ensure that our skills base and businesses are positioned to compete and will be ready to take advantage of new technologies such as AI.

- **Apprentices:** between 2020-22 £2.6bn of levy funds for apprentices expired, that was a sizeable investment that was not made back into businesses and the workforce⁸ due to the conditions placed on how apprenticeship levy funds can be spent.
- **Retraining:** to keep pace with technological change, lifelong learning and retraining will be essential. However, in 2022, 55% of adults had either not engaged in any learning since leaving full time education or had done some post-education learning, but not in the past three years.⁹
- **Provision:** there is significant provision out there for digital skills retraining either through industry sponsored provision or routes such as the Open University. Despite this, 70% of people who had not engaged in learning for the last three years identified barriers to returning to education and training including cost, time and feeling too old.¹⁰
- **Digital adoption:** a quarter of UK SMEs do not use basic digital tools such as e-commerce, accounting and HR software which have been proven to boost growth and resilience. Cost and time have been highlighted as major barriers to SMEs adopting new tech.
- **Education system:** the UK's education system is not meeting the demand for digital skills and business skills across the economy, with 80% of employers believing graduates aren't work-ready when entering the employment market.¹¹
- **The cost of visas:** some techUK members

have reported that it can cost six times more to get a visa for a worker in the UK than it does to get a visa for their offices in a competing EU country.

The scale-up challenge:

The UK has established itself as a strong place to start a tech business. This comes from a combination of factors, such as the ease of setting up and opening a business a strong university and spin-out environment, good access to talent through specialised routes such as the High Potential Individual (HPI) visa and graduate visa, strong business and mentoring networks and a good availability of early-stage venture capital and investment.

This gives tech founders a strong basis to start from and begin the initial growth stages of their business. However, as start-ups grow, the UK's business environment creates barriers to that growth. These include:

- **Access to capital:** under-investment in the tech sector from UK financial institutions, such as pension funds, means in later stage funding rounds start-ups find themselves increasingly tapping into international capital, often from the USA.
- **Listings and initial public offerings (IPO):** the London Stock Exchange undervalues tech businesses when compared to others such as the NASDAQ. Most scaling companies will see that they will get a greater return on a US listing.
- **Uneven spin-out conditions:** sometimes the university will apply harsh conditions on licensing and equity stakes, making the business less attractive to investors.
- **Regulatory barriers:** slow licensing, or a lack of clarity and speed from regulators, can make it difficult to develop prototypes or deploy new services. For example, the Food Standards Agency has been slow at authorising novel foods such as cell cultured

meets and other agri-tech products, hurting the scale-up potential of the industry.

- **Lab costs:** lab space in London, Oxford, and Cambridge is more expensive than in New York or Boston, meaning the UK is a less competitive place to scale up a tech company.¹²

The investment challenge:

When deciding where to build a major global hub, a business will weigh up a number of factors about each potential destination, access to talent, access to markets and the business environment including tax incentives, infrastructure and running costs. Across a range of these factors the UK scores well, with the potential for strong partnerships between the business and the UK's world leading universities, a friendly business environment and well-regarded regulators.

However, while these act as the UK's strengths, there are several underlying barriers to investment which must be addressed if the UK to cement its position, these include:

- **Limited support for inward investment:** establishing a partnership with the UK Government's Department for Business and Trade to deliver a business case for an investment can be difficult. techUK members report that other countries do this more effectively than the UK and that this can often swing the investment decision.
- **Securing sites:** securing access to sites in the UK - particularly for manufacturing - is a long, uncertain and expensive process, especially when it comes to planning permission and securing access to energy and key infrastructure such as digital connectivity.
- **Energy costs:** UK energy costs are as high as our European competitors, and schemes such as the Energy Intensive Industries Scheme (EIIIS) create artificial barriers for some sectors such as data centres and telecoms companies.

- **Policy uncertainty:** a lack of long-term strategies for key sectors, and constant chopping and changing of key incentives such as the UK's R&D tax credit can deter businesses by complicating the long-term investment case.
- **Access to markets:** differences in markings and certification requirements, no mutual recognition of conformity assessments and rules of origin barriers with the EU have reduced the number of markets UK firms can sell into, with recent Free Trade Agreements not making up for trade barriers resulting from the UK-EU Trade and Cooperation Agreement.

The procurement challenge:

The UK has a large procurement budget, with £379 billion spent across the UK on procurement in 2021/22. This budget is essential for delivering public services but can also act as a tool to support the UK's industrial base, particularly in defence and health technology. The UK has some world leading procurement approaches with the creation of G-Cloud, the Digital Marketplace buying platform, new leadership in procurement from the Central Digital and Data Office (CDDO) and sandboxes on financial services and age verification that have helped to open up opportunities for Government to access a wider range of suppliers, as well as creating a more open market for UK businesses including SMEs.

However, while the system has improved, there remain several barriers that mean both Government and UK industry are not getting the most out of public procurement investments. These barriers include:

- **Legacy IT:** across Government, legacy IT remains a serious problem, costing the taxpayer £2.3 billion annually to maintain IT systems that are less capable and secure.
- **Early and pre-market engagement:** across a range of services, from health to defence to

justice and emergency services, Government does not do sufficient early or pre-market engagement to signal the direction of travel and the future technologies public services are expected to need. Doing both is vital to ensuring businesses invest ahead of major contracts being published, improving the quality of and reducing the costs of bids, opening up contracts to a wider range of suppliers and ensuring that emerging technologies can be identified and brought into new services.

- **Fragmentation:** The procurement landscape can be fragmented across a range of services, including local government and the NHS, reducing interoperability and creating siloed solutions. This also makes it difficult for businesses to engage, reduces economies of scale and limits the extent to which SMEs can truly compete equally with larger firms.
- **Buyer experience:** a lack of experience and risk aversion among buyers in Government means that bids for contracts are often given to the 'safe bet', usually large incumbent firms meaning SMEs and start-ups can lose out.
- **Liability:** for some contracts Government still imposes, in effect, unlimited liability on firms. This reduces the incentive to engage, particularly for SMEs, and means a more conservative approach to designing services.
- **A lack of clarity around social value:** social value requirements can create significant uncertainty. Sometimes with a weighting of up to 10% of the overall score which determines a contract they can often be difficult for many firms to meet or unfairly benefit particularly companies. There needs to be greater market engagement around social value elements of contracts so these can reflect the diversity of suppliers when it comes to the final specification.

The data challenge:

Data underpins the entire digital ecosystem, and its availability and shareability determines the extent to which we can truly leverage the benefits of digital technologies. From simple data collection to the development of quantum technologies and advanced AI systems, data enables us to learn from the past, solve challenges in the present, and plan for the future. The use of data was estimated to have added at least £241 billion to the UK economy between 2015 and 2020.¹³ However, despite the benefits of data being widely acknowledged by society, parts of the UK's data ecosystem are underdeveloped, and all types of organisations must overcome unnecessary hurdles to access data or are unable to use it at all.

Globally, it is predicted that 55% of data is dark, meaning it is unknown, underutilised or completely untapped.¹⁴ Although barriers to data have been identified, urgent Government action is required to address them, and the promises of the National Data Strategy have fallen short:

- **Data standards and quality:** in parts of the UK's economy, data standards and quality are poor, meaning it cannot be shared effectively or leveraged by new and advanced technologies such as AI or quantum computing. This starts at the point at which data is collected, such as a nurse recording patient data, up to the system level where technical interfaces across NHS systems must be interoperable.
- **Skills:** compounded by the existing digital skills shortage, there is a significant lack of awareness on the importance of data, the systems used to collect and store data, as well as the skills needed to think about data creatively. For example, workers might not understand why proper data collection is necessary, resulting in fragmented and immature data sets.

- **Ethics and security:** public trust in data use is low, with over half of the population knowing little to nothing about how their data is collected and used in day-to-day life, and many citing the safety and security of personal data as their biggest concern.¹⁵ Alongside this, cybersecurity threats are becoming more sophisticated and advanced, reducing individuals' confidence to use digital products and services safely.
- **Data sharing:** policy interventions are required to incentivise data sharing across the public and private sectors, this includes new data sharing standards, reforms to data protection law and updates in competition policy. While Smart Data is a welcome intervention it is only a start with a long road ahead before it can be operationalised and represent only a very small proportion of valuable data sets.
- **International data flows:** as well as domestic data barriers, seamless international data sharing remains a challenge, and moves made by other jurisdictions in the world to introduce data localisation policies pose a threat to how UK businesses can operate and innovate.



People

Digital technologies have transformed the way people live, work, and interact with one another. From the smartphones in our pockets to advanced medical devices in our hospitals, digital has become an integral part of our daily lives and will continue to shape our future. As technology evolves, people will remain at the heart of its development and application.

People are also the drivers of innovation; we identify, design, and create new technologies that help to solve our most pressing challenges, enable us to learn about and interact with the world, and access new products and services. However, we also have a shared responsibility to ensure that throughout every stage of life, everyone across the UK has the right skills and confidence to not just use technology safely, but feel empowered by it, trust that their interests and digital rights are being upheld and are able to access jobs within the digital economy. Nobody should be left behind by the advance of digital technologies.

This means putting a policy direction in place which puts people at the heart of decisions, clearly sets out what outcomes we should be striving towards and creates the right regulatory environment to achieve them.

Opportunity 1 - Improve access to day-to-day digital services Cutting costs for both Central and Local Government as well as improving public services:

*If deployed right digital public services can provide 24/7 access, reduce admin costs for Central and Local Government and automate processes increasing the speed of public services.*¹⁶ However, ensuring these are deployed and taken-up across the country is a major challenge, with a lack of common standards, poor interoperability, limited secure-ID verification and a lack of skills holding back widespread deployment.

According to the Government's own analysis, it has made limited progress in addressing its own digital challenges that span multiple departments.¹⁷ Furthermore, while 14 million people in the UK are using GOV.UK weekly for information about the UK's Government services, this pales in comparison to world-leaders such as Estonia, where near to 100% of hospital prescriptions and banking transactions are completed online.¹⁸

A starting point for the Government to meet this opportunity is by addressing the long-standing challenges that underpin local public services. These include skills shortages, technical barriers that limited the flow of data between systems,

and a lack of digital leaders in public sector organisations. Without these, systems cannot be built around real user needs, and individual access and usability of digital public services remains difficult.

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, such as fraud. Helping this nascent market grow into a strong tech ecosystem should be a key priority for the coming years in order to help UK companies seize a stake in a global market predicted to value \$40.44 billion by 2027.¹⁹

Actions:

- Review and update the Data Standards Authority Strategy to implement a top-down approach to standards and foster seamless data flows between public sector bodies.
- Introduce Department specific Digital Champion Councils to showcase best practice, share learnings and promote digital and data leadership across Government, which should include multi-stakeholder representation.
- Allow full interoperability between public and private sector digital IDs and change the law where needed to allow digital IDs to have parity with traditional IDs inside the UK.
- Set base standards for data and interoperability within local digital public services and require the Local Digital Unit in the Department for Levelling Up, Housing & Communities to develop new strategies for intervention according to these new standards.
- Establish a cross governmental taskforce, under the leadership of a Minister for Central Government Digital Transformation, to drive the removal of legacy IT across core public services by 2030, upskill Government buyers to improve the quality of procurement, reduce risk aversion and increase early and pre-market engagement.

Case Study | Scottish Improvement Service's partnership with Yoti Digital ID to provide secure access to public services:

In 2014, the Scottish Improvement Service launched myaccount, a single sign-on portal that gives citizens access to different online public sector services with one username and password. Citizens could create an account to do things such as pay council tax, request a parking permit or pay for school meals. However, to carry out services that required a higher level of identity assurance, citizens had to attend an office with ID documents to prove their identity in person.

The Improvement Service wanted a way that citizens could prove their identity from within the myaccount and securely re-authenticate themselves to access services from multiple service providers. With Yoti embedded into the myaccount portal, people no longer need to go into an office to verify their identity in person. Instead, they can prove who they are digitally during the registration process. Using Yoti to sign in to myaccount offers a high level of security that protects accounts with 2FA biometric authentication rather than username and password.

Case Study | Opencast partnership helps DWP user focus on long-term sickness:

Thirteen million UK working-age adults live with a long-term health condition, with 186 million work days lost to the economy in the last year alone. Addressing this challenge is a key priority for the government's Department for Work and Pensions (DWP).

DWP Digital has been supported by technology consultancy Opencast in its creation of a new online service that gives small businesses the tools they need to support disabled employees and those with health conditions. Opencast's DWP work is part of a wider portfolio that has seen it help a range of UK government departments make digital services more accessible and easier to use.

The new DWP service, Support with Employee Health and Disability, has been created on the back of detailed research into what users need, and is expected to help tens of thousands of sick or disabled people get back into work, or stay on in their role.

Adhering closely to government service standards, the new service has been built on the foundations of user-centred design and agile processes – with a sharp focus during creation and delivery on the accessibility needs of people using the service.

Opportunity 2: Make the UK one of the most trusted, safe and secure places to be online.

A large proportion of adults in the UK report feeling vulnerable to online harms, with 45% referencing cyber-attacks, fraud, and scams.²⁰ The UK is no exception: *a recent global survey suggests that trust in the internet is shrinking, with concerns around privacy ranking top.*²¹ *Individual trust in digital technologies is fundamental for its success, and work needs to be done to buck this concerning trend.*

While the UK Government is making significant progress through the Online Safety Bill in designing and reforming our legislative and policy frameworks to keep pace with the risks and harms that can be found in the digital world, there is more to do, and the threats are ever changing.

The next Government must prioritise working closely with the industry and regulators in implementing these new regimes, and ensure they help people feel safer and secure online.

Actions:

- Build a national database of cyber incidents to better identify emerging security threats and vulnerabilities in our digital landscape, which can help the Government develop an agile and sophisticated approach for targeting interventions that will keep us safer online.
- Create a joint regulatory sandbox for online safety to help test new technological solutions to support the implementation of

the Online Safety Bill and Age-Appropriate Design Code (AADC). This will help explore new regulatory and technological solutions that can mitigate online harms, which will be crucial as new technologies such as the Metaverse and Web 3.0 take off.

- Launch a series of pilot programmes seeking to improve the safe and secure use of data for research and development, tackling the risk adverse nature that is often found in personal data processing. Pilots could focus on how the use of AI and synthetic data can support research, new industry standards or new codes of practice.
- Work with the industry to publish a 'top 5' priority list for Smart Data schemes, which can demonstrate a return on investment for businesses and clear benefits for consumers, to be delivered by 2030.
- Fraud accounts for 40% of all crime in the UK, and the tech sector has been committed to proactively tackling this problem.²² Steps already underway have included techUK members only allowing financial advertisements from FCA authorised financial services to be listed on their platforms, a measure which has caused a significant reduction in scam ads across a range of platforms.

However there remain a range of barriers towards building a full system response to fraud that brings in all the key actors, including data sharing and a lack of formal cooperation bodies. To help continue the fight against online fraud, the next Government should create a central cross-sector intelligence sharing hub for reciprocal sharing, analysis and dissemination of fraud intelligence, supporting coordinated action across the law

enforcement and the tech, telecommunications and financial services industries.

Case Study | [LexisNexis Risk Solutions](#) increases large financial institution's detection of money mule accounts by 50%:

LexisNexis Risk Solutions is a part of RELX, a British analytics firm, dedicated to improving information in financial transactions. Money mules are, either knowingly or unknowingly, used by fraudsters to launder money, and accounts are part of large, seemingly unconnected networks of at multiple financial institutions. The usage of money mule accounts makes laundered money very hard to track.

LexisNexis' Digital Identity Network, which uses anonymised intelligence crowdsourced from millions of worldwide consumer banking interactions, allows fraudsters to be better identified in comparison to regular consumers through establishing trustworthy consumer behaviour. The information provided by LexisNexis Risk Solutions allowed a bank to increase identification of mule accounts by 50% and return \$965,000 to victims of fraud.

Opportunity 3 - Plug the digital skills gap to boost pay, opportunity and our national resilience:

While the opportunities of technological innovation are clear, they will not be attainable if our population doesn't have the skills to grasp

them. Digital skills are not only a necessity to enable individuals see tech as a career for them, but a broad base of digital skills will also boost our economic resilience and allow the UK to capitalise on the change that will be brought on by AI technologies.

The UK has made some progress in increasing access to specialised talent through a number of specific visa routes and incentives for retraining such as Help to Grow: Management. However, these are simply not bold and creative enough to meet the scale of the challenge. Right now *the UK is losing out on £12.8bn in extra growth with British workers earning whole £5.69bn less due to a lack of digital skills.*²³

The next Government must apply a lifelong learning approach to its digital skills policy from the classroom to the boardroom. This should focus on empowering people to develop their digital skills, providing accessible means to do so, attracting talent from across the world, and creating more flexible structures for businesses to take advantage of digital skills initiatives. The UK's employment laws also require an urgent update to meet the twin challenges the UK's labour market faces: those of labour market participation and labour productivity.

Actions:

For the classroom: Review the UK National Curriculum to ensure digital literacy and digital skills are cross-curricular and integrated throughout primary and secondary education. This should include funding to support teachers deliver computing education effectively, and a requirement for every student to undertake a computing qualification by age 16. We should

also incorporate mandatory digital ethics education into the curriculum to encourage the responsible use of digital products and services.

For the individual: End digital poverty by 2040 by creating a National Inclusion target to reach in 10 years, spearheaded by a dedicated Cabinet Office Minister for Digital Inclusion, and a Digital Inclusion Unit in the Department for Science, Innovation and Technology.

Design an accreditation framework for short modular courses and build a 'Digital Skills Toolkit 2.0', based on the current Department for Education Skills Toolkit, backed by an extensive database of materials and courses to support individuals, workers and employers in retraining and upskilling throughout life.²⁴

Reduce costs of the immigration system in line with our closest competitors, such as by allowing upfront costs such as the Immigration Health Surcharge to be paid over time and by becoming an associated third country in the Erasmus+ programme. The Shortage Occupation List must cover key areas of demand within the tech sector, such as in the delivery of telecoms infrastructure.

Case Study | KPMG launches global learning platform to support businesses and employees in the dynamic hybrid working world:

KPMG has launched a digital platform and portfolio of services to help businesses respond to rapid technological disruption and new ways of working. With a focus on enabling productivity improvement, KPMG Learning Services integrates learning into the everyday flow of work, accelerates the

upskilling process, and allows organisations to offer relevant resources and training at the time of need. The platform builds on KPMG’s longstanding commitment to lifelong learning, their ongoing pledge to help unlock a prosperous and inclusive future for all through education, and Microsoft’s vision to create a connected “system of learning”.

Employees and employers can benefit from automated and intelligent features, such as recommendation engines that provide rapid gap assessments and learning suggestions that directly relate to role requirements and everyday tasks. This ability for direct application creates a positive connection between performance and business impact, thus improving retention through positive feelings of productivity, empowerment and achievement. On-demand availability helps to increase productivity and performance through curated learning paths and personalised content that is relevant and meaningful.

- **For the employee:** Introduce a compulsory requirement for a “*right to flexible and remote working*”, where this is reasonable for the job on offer, and create a Single Enforcement Body²⁵ to help employers, employees and their representatives comply with the law.

Review the case for a lifelong learning fund, or bursary, for adults and introduce provisions in a future Employment Bill to better support later in life learning, such as time off to train and reduced time and financial costs to businesses for employee retraining.

The Government should work directly with local and combined authorities and devolved governments, to deliver digital skills programmes to better target solutions to under skilled and under-represented groups and boost local provision of educational and retraining services.

Case Study | FDM pay as you learn retraining:

FDM a leading FTSE 250 strategic talent solutions partner, headquartered in the UK, recognised the need for greater access to digital tech careers beyond conventional degree routes to enable graduates, returners and ex-forces an alternative route to high-value jobs.

FDM offers earn-as-you-learn programmes, accredited by TechSkills, to the same level as university-based courses but with greater flexibility and access to start a career in tech. Over the past 32 years, FDM has enabled well in excess of 15,000 people from varied backgrounds to find high-impact jobs, making a significant contribution to the tech skills shortage in the UK.

- **For the boardroom:** Immediately reform the Apprenticeship Levy to allow high quality training to cascade through supply chains, including increasing the rate of transferable funds from 25% to 80% and the lifetime of funds from two to five years. This can help reinvest up to £2.6bn of unspent levy funds back into our future workforce.

Opportunity 4 - Make sure everyone has access to the online world:

The social and economic turbulence we have experienced over the past several years has shown the fundamental importance of digital connectivity to our economy and society. It has enabled people to learn, work, and access basic services, from healthcare to local council services, when physical distancing was required.

While it is promising to see a 93% increase among rural residents in the UK using online services since 2020²⁶, this progress is not uniform, and approximately one in six people in rural areas still cannot access indoor 4G connections or superfast broadband.²⁷

Next generation networks are also key for driving innovation and economic growth, providing with the high-speed connections needed to start and scale business. It's estimated that the widespread adoption of 5G could add £159 billion in cumulative GVA between now and 2035, while nationwide full-fibre coverage will boost productivity by over £50bn and bring up to 1 million people back into the workforce.²⁸

The barriers to deploying digital infrastructure are both regulatory and financial and require a mixture of different solutions, including supporting non-terrestrial networks delivered by satellites and drones, to enable the provision of new services and improvements in quality.

Actions:

A new future network strategy: while Project Gigabit has delivered good progress, a new strategy is needed to complete the rollout of advanced connectivity across the UK and support the availability of high-speed connectivity across the country. The next Government should work with the telecoms sector to devise a new strategy that includes targets to:

- Achieve 85% full fibre take-up by 2030. 70.5% of all lines to homes and small businesses were either fibre to the cabinet or to the premises in 2022.²⁹
- Encourage the widespread adoption of standalone 5G across businesses.
- Enact significant supply side reforms to remove the remaining barriers to the deployment of fibre and accelerate the nationwide upgrade of mobile infrastructure.
- Review the delivery of the 'social tariff' to improve targeting and communication of the scheme in order to ensure take-up is highest where it is needed most.
- The strategy should also seek to include further pro-competition interventions to support the continued rollout and competitiveness of the sector that will ultimately drive down prices and increase quality.

Deploying Satellite effectively: Ensure that satellite technology is fully embedded in any new strategy. The opportunity will be to enhance integration of both network and business models across various space orbits, drones, High-Altitude Platforms (HAPS) and terrestrial networks, providing increasing resilience and connectivity, especially in rural and hard to reach areas.

Case Study | Securing the UK as a leader in global satellite communication, OneWeb:

Headquartered in West London, OneWeb's satellite constellation is the second largest in the world, reinforcing the UK's place as a leader in global space operations. With approximately 400 staff based in the UK, the majority of which are in STEM roles, the business is making a significant contribution to the upskilling of the UK economy.

OneWeb provides the UK with an extremely valuable sovereign technological capability crucial for delivering the aims of the National Space and Defence Space Strategies, as well as an important component for 'Future Telecommunications'. By working with a range of distribution partners, including industry leaders like BT, OneWeb can help improve the resilience of the UK telecommunications infrastructure, and assist the aim of improving connectivity to 'very hard to reach areas' across the country.



Society

As well as supporting the individuals' interactions with the world, the pandemic demonstrated how digital technology could help us to reimagine the running of key public services, from justice to health and even Parliamentary debates. However, since the end of the pandemic, the pressure on public services has only increased, while the rate at which we are digitising and strengthening these has faltered or in some cases gone backward.

Further the opportunities of digital technologies are typically clustered in our largest cities, and ensuring benefits are spread to every corner of the country remains a challenge. By 2030, it is predicted that 4.5m people (8% of the population) will remain digitally disengaged.³⁰

To rectify this, we need to take a new approach to how we embed digital technologies and its opportunities across our key public services and the country at large. To ensure that this is successful, we also need to ensure that there is trust in technology, as citizen trust in technology is fundamental to its uptake. This trust must be earned by embedding digital ethics into the heart of all innovation, and ensuring we're investing into institutions that can help design a future that is fair, inclusive and safe.

Opportunity 5 - Deliver the digital transformation that the NHS and social care system needs:

By 2030, one in five people in the UK will be aged 65 or over.³¹ For the first time ever, the number of people living with diabetes in the UK has topped five million.³² Despite meaningful progress, waiting lists for NHS treatment in England remain stubbornly high³³ and without major reform, waiting times across a vast range of services are not likely to be reduced.

Furthermore, trying to navigate social care services is both a complicated and confusing task.³⁴ There is an urgent need to ensure health and social care are placed on equal footing³⁵, demanding a shift in mentality whereby the digital transformation of social care is not seen as an afterthought, but rather a key component of supporting overall health and wellbeing.

Not only does poor health impact the ability for an individual to participate in society, but it also comes at a cost to economic growth. Data shows that health-related economic inactivity loses the UK over 130 million working days a year, costing the nation around £180 billion in GDP.³⁶ As we head towards 2030, the number of people economically inactive will rise to 2.4 million, with most of the increase driven by those aged over 65, making it essential that we devise a better health system that can keep our population healthier for longer.³⁷

Doing so means investing to relieve the pressures on hospitals now by improving efficiency through better use of electronic patient records and

triaging systems, moving care into the community through schemes such as virtual wards and in the longer term moving toward a more preventative healthcare system by collecting more information on our population and using medical records and genomic data to provide targeted interventions before diseases emerge and when they do giving the health system more information from which to design treatments.

Case Study | BT Virtual Wards:

BT has partnered with NHS trusts to co-create technology that is specifically developed for the challenges healthcare providers face. Virtual Wards allow NHS patients to get the care they need at home safely and conveniently, rather than being in hospital. These work by utilising smart devices that monitor health conditions like COPD and heart disease, to AI-backed software that enables clinicians to perform virtual ward rounds.

Virtual Wards can deliver a huge range of benefits a survey of NHS employees showed that 74% agree that technology helps to deliver better quality care.[3] One example is the Liverpool 5G trial which monitored people taking their medication via a 4k video link, ensuring the medicines were taken correctly. This led to better health outcomes and cost savings of over £2,000 per annum, per user.[4] The survey also found that further investment in technology could help attract more people into the NHS with more than four in five (83%) of the NHS workforce believing greater technology investment can help to attract a younger workforce.

The use of digital technology is already showing its potential in healthcare, the BadgerNet Maternity Notes App at Gateshead Health NHS Trust has saved the trust more than 400 hours of staff time a year³⁸, sensor-based falls prevention technologies are projected to significantly cut the £4.4bn cost falls have to the NHS while³⁹AI software that predicts missed appointments and then offers new bookings is proving majorly successful potentially allowing 100,000 more patients to be seen each year at one NHS Trust alone.⁴⁰

The Government has committed £2.1bn towards the digital transformation of the NHS and social care. To help deploy this effectively, techUK set out our **Ten Point Plan for Healthtech⁴¹**, which outlines how digital technology must be at the forefront of improving outcomes for citizens nationally. techUK has also released the **Right from the Start⁴²** report, which provides five recommendations on how to ensure digital technology can be used effectively via Integrated Care Systems to deliver better health and social care.

The next Government could take some early steps to implement these recommendations by improving the way the NHS procures and deploys technology, allowing the benefits to be realised faster.

Actions:

- Create a *Lighthouse Network* to celebrate and promote best practice on digital, data and technology innovation across Integrated Care Systems (ICS), driving a digital first culture across health and social care.

- Commit to longer term view and funding for the NHS and social care to provide stability for the supplier community - moving away from one-off prizes and funding pots to focus on real system transformation, incentivising innovation and ring-fencing funding for prevention using technology.
- With all ICSs now having a Shared Care Record, priority should be given to further development, as well as an expansion beyond the boundaries of individual ICSs.

Case Study | Integrated Patient-Controlled Medical Record:

In a joint project with the Luton & Dunstable Hospital and Cambridgeshire Community Services, Patients Know Best (PKB) piloted a patient-controlled medical record for children living with epilepsy. Parents are empowered in their role as care coordinators, and e.

A single point of access through SystmOne was a significant enabler in the onboarding of other settings including schools and community nurses who can also access and add to PKB. This provided a find a solution for the interoperability and governance issues frequently encountered and is not confined to a locality. Many stakeholders found that PKB is the first solution to have built in infrastructure to be scalable and interoperable, with the potential to go beyond epilepsy.

- Empower citizens by giving them control of their health and care data, with a focus on implementing the recommendation on Citizen Health Accounts from the Hewitt Review.⁴³

Ensure that strong public engagement underpins this work, learning from initiatives such as Understanding Patient Data⁴⁴, which is now hosted by the NHS Confederation, and Think Local Act Personal, which set out what is seen as good guiding principles for putting citizens' asks and needs at the heart of service design and delivery.⁴⁵

- Ensure that we are leveraging the use of digital, data and technology to drive improvements in children's services outcomes, with a view to promote long-term social mobility.⁴⁶
- Implement the Data saves lives strategy to facilitate population health management, providing industry with access to Secure Data Environments in a safe and ethical way that enables innovation.

Case Study | Great Ormond Street Hospital for Children builds a 'hospital without walls' using Zoom in the NHS:

Great Ormond Street Hospital for Children NHS Foundation Trust (GOSH) in London was the first purpose-built children's hospital in the U.K. and one of the most digitally able hospitals in Europe. However, at the onset of the pandemic, the hospital quickly realised it would need to completely overhaul how it delivered care to keep patients and staff (who would need to stay away from the hospital isolating for two weeks) safe from Covid-19.

In a partnership with Zoom Within just eight days, GOSH was able to deploy video-visit capabilities to 5,000 hospital staff and fully integrate Zoom into its electronic

patient record (EPR) system – meaning the organisation and all of its stakeholders were prepared ahead of lockdown in March 2020.

Eight weeks later, the hospital had cancelled every in-person appointment and moved the hospital completely online, leveraging the Zoom platform to create ‘a hospital without walls’. A survey of clinicians found that 95% of clinicians were likely to continue to use video visits after the pandemic. That’s why GOSH is exploring how to go beyond its current video visit capabilities and leverage Zoom in more ways to provide safer and better care.

Opportunity 6 - Rethink our approach to how technology can support the criminal justice system:

Tackling and preventing crime will always be one of the public’s highest priorities. However, crime continues to be ever more complex – and borderless - presenting a mix of local and national threats from fraud, cyber-crime to violence against women and girls. *Over a 13 month period, there were 350,000 reports of cyber and fraud related crime in the UK, amounting to £4.1bn cost to the public.*⁴⁷ The demand on policing resources to protect the public has never been higher, yet in parallel trust in policing is at an all-time low.

Focus should be given to developing the much needed (and often promised) digitally enabled end-to-end Criminal Justice System. This will improve the digital experience for the different users of the Criminal Justice system: victims,

witnesses, police officers, the CPS and through to barristers and judges. Doing so will be vital to improving public trust by not only boosting the criminal justice system’s ability to confront crime but also by ensuring the police and other agencies are not being left behind by increasingly digitally capable criminal actors.

Actions:

Take a holistic approach to addressing barriers to digital transformation in the criminal justice system. As well as upgrading legacy technologies, address other barriers including (but not limited to) funding, procurement processes, culture, central vs local tensions, political will – all set against the necessity to cope with ever increasing demand.

- Facilitate closer alignment between policy makers and digital/tech in policing and the criminal justice system generally. This will enable digital leaders to “get upstream” to help policy makers better understand tech deliverability opportunities and challenges.
- Update guidance for reforms related to law enforcement data processing in the Data Protection and Digital Information No. 2 Bill, particularly Part 3. Commit to reviewing and evaluating the uptake of the new provisions with a view to using findings to reiterate and improve our data protection laws.
- Explore interoperability as a separately procurable function, not as an optional extra, built into other applications. This element is likely to require funding, as no single operational requirement is likely to justify the cost of establishing an integration platform on its own.

- Allocate funding for training and professional development within Policing and across Criminal Justice agencies from entry-level roles right through to broader strategic and operational leadership in Policing, The Home Office, and Ministry of Justice.
- Rethink the Criminal Justice approach for attracting talent, such as leveraging suppliers' under-utilised capacity, or a national programme to encourage graduates from the sciences to join as "data apprentices".
- Introduce a sandbox to test the applications of new innovative technologies in Justice and Emergency Services, which priorities SME participation and will help to reduce barriers to entry for early-stage innovators.

Opportunity 7: Regain the UK's reputation as a global leader in Open Data and rank among the five countries on the UN E-Government Index:

Once a trailblazer in Open Data, the Government has taken a big step back in its leadership in this space, with many organisations facing unnecessary hurdles or are completely unable to access public sector data for innovation. This has caused the UK to slip down the UN's rankings of top e-government's falling behind countries such as Australia and the United States.⁴⁸

It is widely known that better use of data can create more efficient, transparent, and accountable governance systems, support a better gov tech ecosystem, enable the delivery

of more personalised services, engage citizens more effectively, and become more agile, flexible, and responsive to changing circumstances. Despite the UK having ambitions to open up data for this purpose the UK's National Data Strategy has not met this potential, and long-standing barriers to data persist right across the economy.

Actions:

- As part of work committed to under the Sir Patrick Vallance Review, map out useable government and public sector data sets, and consult with industry to prioritise which data sets should be opened first, to deliver the greatest public benefit. HMRC, DWP and Health data could be early options for pilots.
- Introduce new transparency, accountability and ringfencing requirements for the spending of digital transformation funds, to ensure budgets dedicated to digitisation are not lost or eroded by competing spending commitments.
- Address longstanding problems in the UK's public procurement regime, expanding the scope the UK's procurement regime to include enabling disciplines such as pre-market engagement, contract management, category management and supplier relationship management.
- Work with industry to support the development of a Consortium Portal which centralises the Government's procurement frameworks, and enables SMEs to easily identify appropriate opportunities, express interest in particular tenders, and form partnerships. This platform will encourage SMEs to better engage with public sector opportunities, either as prime applicants

themselves or as a part of a mixed consortium.

- Expand industry to Government and Government to industry secondments to build a greater shared understanding of how to deliver public service transformation and digital projects.

Case Study | Project Gigabit: Delivering broadband to hard-to-reach communities:

The Government's flagship broadband subsidy programme is still in its early stages, however the design of the procurement process has been successful in creating opportunities for the broadest range of suppliers possible, encouraging both SMEs and larger providers to bid for and win contracts. This has been made possible through extensive industry engagement and by creating a multi-faceted programme with different procurement vehicles calibrated for different sizes of business and delivery models. This includes demand-led voucher schemes, along-side gap funded procurement areas of varying sizes.

The ultimate outcome has been a highly competitive and inclusive procurement process. Over 39,000 vouchers were awarded last year alone to a wide range of suppliers, and of the larger procurement areas six different providers have been awarded the first eight contracts. This will connect over 160,000 households in rural communities that would have otherwise missed out, and the remaining programme continues at pace.

Opportunity 8: Ensure the UK holds on to its fintech crown:

The UK is a global leader in fintech with the sector having the potential to raise £7.3bn in capital investment in 2023 and on course to see the number of UK fin-tech businesses double by 2030.⁴⁹

Beyond just economic growth highly innovative approaches including Open Banking and Open Finance, AI and Central Bank Digital Currencies have the possibility to improve the day-to-day financial health of consumers, increase the systemic strength of the financial system and increase financial literacy across society.

However, the UK cannot rest on its laurels when it comes to fin-tech and to secure both the economic and society benefits we need to continue with a strongly pro-innovation approach.

Actions:

Deliver Pro-active, pro-innovation, regulatory regimes: 2022 and 2023 has seen Financial regulators take an increased focus on digital tools from AI and Machine Learning⁵⁰, to cloud computing, cyber security and operational resilience³. To ensure our fintech system can continue to grow and we can continue to see the benefits of Open Banking we need to ensure that regulation is pro-active and pro-innovation allowing financial services companies to work with digital tech Third-Party Providers (TTPs) with a permissive and streamlined approach to regulation.

Cross-stakeholder body tackling transformation of advice services: we need to expand financial advice services and expertise towards all parts of society to improve financial literacy and the

resilience of consumers. The fintech industry is introducing AI technologies into advice services that have the potential to massively expand the availability of financial advice and provide better support to customers. Financial regulators need to support this approach.⁵¹

Deliver a Central Bank Digital Currency

(CBDC): CBDC's have the potential to tackle key challenges including fraud prevention, monetary stability, and faster confirmation and settlement of payments. Whilst progress towards delivering a CBDC has been made policymakers need to move faster and seek to bring in stakeholders such as the tech sector for key technical developments including the project's core ledger, relevant testing beds, sandboxes, and API layers, with regards to cultivating products including digital wallets, cyber security, and digital brokers.

Strengthening the fundamentals of UK fintech:

While the UK fintech sector is one of our great successes supporting its continued growth and the benefits it will bring to our society and economy is a continuous task. The sector needs key reforms to UK law and our skills and funding ecosystem to grow. To shore up the fundamentals of UK fintech taken we need to ensure our financial regulators take a pro-growth pro-competitiveness approach, we ensure Digital IDs can be used across the full suite of financial services activity, the UK pushes ahead with Smart and Open Data schemes, we improve access to public data sets and we support increased digital skills training and fix the UK's broken scale-up economy.

Opportunity 9 - Grow the tech clusters across the UK:

Although digital technology is touching every

element of our lives, there are significant geographical limitations across the UK on how far and pervasive this reach is. *There are stark disparities on how funding, infrastructure and digital adoption is spread across the UK, with London scooping over 80% of venture capital investment into UK tech.*⁵² Other regions across the UK are growing strong clusters from a growing ecosystem of semi-conductor companies in Bristol and South Wales to thriving creative industries in Manchester to strong health and financial technology centres in Leeds and Edinburgh.

The Government needs to ensure that the large amount of investment that comes into UK tech is available to regional tech clusters otherwise the whole country will be held back. To do this we need to change how Combined Authorities and Local Authorities approach tech and digitisation and ensure institutions such as the British Business Bank (BBB) and National Infrastructure Bank (NIB) support our regional ecosystems.

If we do so techUK's **Local Digital Capital Index** shows huge opportunities for growth across the UK.⁵³

Actions:

Review the Local Digital Fund to also include business and challenge led-innovation projects. The delivery of the fund should support early market engagement enabling local government to better understand the innovations that exist and ensure more fit for purpose procurements.

12% of Local Authorities have no digital connectivity strategy and are not developing one,⁵⁴ holding back local digital transformations.

The Government should provide detailed support and guidance for Local Authorities to develop these plans as well as facilitating peer learning networks to share best practices across the country.

Further the next Government should consider making mandatory and standardising digital delivery roles in every Council's Senior Leadership Team, with responsibility for supporting economic growth, improving digital skills and boosting digital adoption.

Review how the British Business Bank and National Infrastructure Bank work with local authorities and combined authorities support local plans to grow their tech ecosystems and invest in digital infrastructure. Investment opportunities available via the BBB and should be clearly signposted and accessible for tech SMEs while local and combined authorities where possible should be given support for NIB bids if there is a strong underlying case.

Opportunity 10 – Support a thriving digital and AI ethics ecosystem to enable better governance and regulation:

The UK is a world-renowned leader in digital ethics and international convenor, home to leading academics, well-resourced think tanks and institutions dedicated exploring the interactions between emerging technologies and society.

However, *as the world becomes more complex the UK can only retain its position as a global leader in digital*

and AI ethics if develops an agile and reactive digital ethics ecosystem that can help Government, regulators and industry navigate the complex questions that technological change will bring.

For example, the proliferation of generative AI, has raised difficult to answer policy questions in the education sector while debates over the trade-offs between competing principles of encryption and privacy and data sharing and competition policy do not have easy answers.

A strong ecosystem of digital and AI ethics will provide policy makers, regulators and businesses with the basis and intellectual underpinning that will allow difficult questions to be tackled head on and solutions found that can ensure the public has confidence in digital services and ensures technology remains a force for good in the modern world.

Actions:

- Under the Centre for Data Ethics and Innovation, set up an Emerging Technologies Taskforce to undertake a horizon scanning responsibilities which anticipate and convenes discussions around potential emerging ethical challenges across emerging technologies and policy debates.
- Develop and promote education and training for digital ethics from the classroom to the boardroom, aiming to create an awareness across the UK population and to upskill the UK's workforce, particularly in product and policy design roles.

- Build an approach to Artificial Intelligence based on a system of ethics, governance, and regulation that enables public trust, innovation and works collaboratively with international partners. Further detail on such an approach can be found in our recommendations on ‘Building a system of AI ethics, governance, and regulation that supports public trust and encourages innovation’.
- Continue to build on digital economy agreements, as well as FTAs, and operationalise them to ensure UK digital ethics are being put into practice. This includes granting **Open General Export Licenses** to countries the UK has signed a bilateral FTA with.

Case Study | How digital ethics can support the UK’s quantum industry - from the techUK Quantum Report:

Responsible innovation is fundamental for quantum technologies because, when adopted, it provides a mechanism through which systems and their creators can earn trust. It does so through a reflective and pragmatic acknowledgement of innovation as being socially embedded – an acknowledgement that technology is not neutral or independent of society, but rather is fundamentally intertwined with social contexts.

Despite ongoing engineering challenges we can already identify impacts, both positive and negative, that quantum technology presents. For example, if applied unethically, quantum sensing technologies could be used to compromise individuals’ privacy and – in more extreme cases – suppress dissent and degrade autonomy. If we can already foresee these types of risks today we can ensure our readiness against them, and, additionally, encourage the development of quantum technologies that guard against these uses.



Economy

The UK has grown a strong tech sector that has achieved high levels of growth over the last decade. However, while the tech sector's contribution to the economy has grown, we have struggled to leverage this into wider digital adoption and productivity increases where UK businesses, especially SMEs, trail their European peers.

Furthermore, while the UK has become the destination to try things for the first time, either to research a critical new technology or to start a tech business, the UK loses out to competitors when it comes to scaling a company or making the case for a major investment. This is due to a lack of scale-up capital, difficulties in finding a manufacturing site, high energy costs and problems accessing talent.

These challenges not only hold the UK back when it comes to our chances of hosting the major tech companies of tomorrow, but also restrict our ability to build a resilient economy with a productive industrial base.

Addressing these challenges will be vital to boosting our productivity, as well as creating jobs and innovation infrastructure across the country.

Opportunity 11 - Digitise the day-to-day economy helping small businesses get ready for the AI revolution:

Tackling our long tail productivity problem remains one of the UK's major challenges. Digital adoption is a vital tool for addressing this, yet the UK lags behind our OECD and European competitors when it comes to our Small and Medium Sized Businesses (SMEs) taking up productivity boosting digital software.

Ensuring that SMEs across the economy can confidently access and use the latest digital services is critical. Currently, a quarter of UK SMEs still do not use basic digital tools, such as such as Customer Relationship Management (CRM) software, Digital Accounting software and E-commerce software, which have been found to boost sales by 18%, 11.8% and 7.5% respectively over 3 years. Other forms of software such as video-enabled customer contact centres can increase sales by as much as 36%.⁵⁵

This is particularly concerning as AI technologies begin to come onstream. *AI will first be deployed through updates to currently in use business software, if UK companies are behind on the adoption of these basic services, then they will also be behind when it comes to the first wave of AI applications.*

This is a core issue of competitiveness, as companies less able to adopt and utilise AI technologies will find they are soon outcompeted by their rivals, who will be able to produce larger volumes of goods and services significantly more cheaply. Generative AI tools have already shown to increase productivity by 14%.⁵⁶

The next Government should therefore take immediate action to stimulate digital adoption across the UK's SME base.

Actions:

- **Introduce a new Digital Growth Fund:** deliver an enhanced deduction of 140% against corporation tax to support the adoption of productivity boosting software for SMEs. This would knock 10% off the cost of most software purchases.

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. Costed analysis suggests the Digital Growth Fund could be run for a year by reallocating the £300 million unspent after the closure of Help to Grow: Digital, with the potential to benefit up to 600,000 SMEs.

Case Study | The importance of Digital Adoption for SME productivity – Sage:

Digital adoption is vital for SMEs to achieve their goals. Due to limited resources SMEs face a cumbersome admin burden. Small businesses struggle to manage their workforce, accounts and marketing. Approximately 5.6% of UK SMEs working time is lost in administration, accounting for an implied loss in productivity of £39.9bn.

Cash flow is also a major challenge for any small business, yet SMEs have faced a long-standing problem getting paid on time. Sage insights of over 100k SMEs shows that digitisation has halved payment times over a decade, yet the average business in our sample was owed approximately £22,000 in late payments at any point in time. Ensuring effective digital adoption of technologies such as the accounting software are key to giving SMEs more time, resource and ultimately control over the future of their business as well as ensuring they are ready for the AI revolution.

- **A roadmap for digital record keeping:** there is a strong relationship between digital reporting requirements and productivity increases. The EU estimates that digital record keeping and reporting is delivering Member States a net annual benefit of £8 billion. The UK has already lost £1.75bn in lost tax due to delays in Making Tax Digital, as well as the benefits a clearer picture of the tax base would bring to Government decision making. The next Government needs to deliver a roadmap that supports digital record keeping across tax, e-invoicing and other forms of record keeping to boost productivity, encourage digital adoption and give Government greater access to information about the economy.

Opportunity 12 - Fix the UK's broken scale up economy so British firms can become global champions:

The UK is recognised as a world-leading destination to innovate and create brand-new technologies. This has enabled us to produce

almost 400 high-growth startups since 2000 (worth more than \$250 million in value), including 144 unicorns - companies with valuations of \$1 billion or more.⁵⁷ We are also an academic heavy-weight, home to the world's leading universities and research institutions that have spun-off over 5,000 start-ups across 125 education providers, employing over 100,000 people.⁵⁸

However, as start-ups begin to scale, they often find no viable route to grow and scale at home with domestic capital becoming scarcer. UK institutional investors such as pension funds have under invested in asset classes that support the tech sector, such as venture capital. In the United States, 9% of pension assets are directed into private equity, Australian pension funds invest 4% however in the UK the figure is 0.3%.⁵⁹

As a result, *the UK has developed a major scale-up gap estimated at around £15bn a year,⁶⁰ representing hundreds of lost high growth businesses who have exited the UK market either via a sale or relocating to secure their growth elsewhere.* To fill this gap the UK must double down on its existing success with start-ups, but also leverage creative solutions to direct more investment to scale-ups.

Actions:

- **Getting the basics rights for start-ups:** The next Government should act on calls from the start-up community to provide more certainty to the UK's start-up support schemes by making the Enterprise Investment Scheme (EIS) and Venture Capital Trust (VCT) schemes permanent as well as reforming the Seed Enterprise Investment Scheme

(SEIS) by raising the cap for both investors and start-ups. Additionally, the period under which businesses can claim SEIS should be extended to three years.

The next Government also must ensure the UK maintains an attractive place to make a return on investment. This will mean ensuring we maintain a competitive approach to taxing capital gains, especially where capital gains come from entrepreneurs making business investments and taking risky decisions.

Furthermore, we need to ensure that universities follow best practice when it comes to spin-out rules, ensuring that UK spin-outs are not disadvantaged by difficult equity and IP rules that can damage their ability to raise capital and grow.

A British Scale-up Sprint: The next Government needs to continue to find routes to increase the amount of UK capital that can be used to invest in the tech sector by continuing at pace with planned reforms to the pension charge cap and Solvency II, while also retaining the funding for the Long-Term Investment for Technology & Science (LIFTS) competition.

Further the next Government should the day after the election begin six month 'Scale-up Sprint' bringing together investors, businesses, Government and regulators over a 6-month period to identify potential new investment products and vehicles as well as the regulatory changes that could be used to support them.

This should have a particular focus on driving investment into areas of strategic importance

such as the green-tech, semiconductor, AI, next generation telecoms and quantum sectors. The sprint should review the potential for co-investment from the British Business Bank and UK National Infrastructure Bank, as well as other public investment agencies.

Opportunity 13: Ensure we have a competitive innovation economy:

Digital innovation requires both good incentives to invest in R&D and innovation as well as strong underlying innovation infrastructure from computing power to cloud infrastructure such as data centres, and digital connectivity. To enable the technologies of tomorrow such as AI, the UK needs a competitive set of R&D incentives as well as resilient, secure and future-proof infrastructure.

However, we have become poor at delivering this with a near constant chopping and changing approach to R&D incentives, difficult planning rules, delays in getting connected to National Grid and high energy costs. The next Government therefore needs to take on some of these barriers and ensure the UK has a competitive offer when it comes to major investments in innovation.

Actions:

- **A long-term strategy for R&D incentives:** While the UK has developed a competitive R&D tax credit, repeated changes to the scheme have shaken business confidence and driven some R&D investment abroad. The UK needs a long-term strategy for its R&D incentives that gives business the confidence to invest and helps the UK reach the target of 3% of GDP being invested in R&D.

The R&D tax credit is particularly well supported by industry with it being technology neutral and permanent, allowing businesses to plan long-term projects with the confidence that they will receive support. The next Government should consult on and set out a five-year plan for the future of the R&D tax credit that should focus on improving customer service elements, such as the speed of and clarity around claims, expanding the definition of R&D and aligning it with the globally used OECD Frascati definition, ensuring the rate of the credit remains competitive versus our peers and seeking to better regulate claims to reduce fraud and misuse.

Further to the R&D tax credit, our innovation support agencies such as UKRI, Innovate UK and ARIA must be encouraged to think in the long-term, with a portion of their funding ring fenced for five to ten years. This will allow the agencies to plan ahead and dedicate funding to longer-term projects that are currently not possible. The next Government should consider extending ARIA's funding beyond 2024/25.

- **Reducing the cost of R&D facilities:** Currently, lab space in the UK's major research hubs is uncompetitive, while identifying and building sites for manufacturing advanced technologies is expensive and slow versus our competitors. Lab space in London is more expensive than in New York and Boston, while lab space in Oxford and Cambridge is more expensive than in Singapore, Seattle and San Diego.⁶¹ We need to reduce the costs of lab space in our key hubs as well as across the country.

The Government should seek to improve the planning system so that proposals to build economically important sites carry more weight. The Government should also green light vital infrastructure projects such as the Oxford-Cambridge Arc to deliver greater connectivity. Long-term certainty should also be provided for capital investments into new plants and machinery by making the full expensing tax incentive announced in the March 2023 Budget permanent.

- **Reducing grid connection times:** Right now, it takes too long and is too expensive to get connected to the National Grid, which is reducing or outright preventing investment into the innovation infrastructure we need from data centres and supercomputers to semiconductor fabrication plants to maintaining our telecommunications network. Any business seeking to build new infrastructure is put in a long queue with delivery likely over a decade away. At the moment over 40% of connection agreements sold have delivery dates of 2030 or beyond.⁶² The current model operates on a largely first come-first served basis, meaning that any new planned investment, such as in a semiconductor fabrication plant would likely have to wait more than a decade to get its grid connection, while also paying a high upfront price to do so.

To address this, the next Government needs to work at speed to reform how our grid infrastructure is being upgraded, this should include reforms to Ofgem, to give the regulator a formal duty to achieve net zero by boosting grid capacity and increasing connection speeds. Further, the Government needs to work with Ofgem and the National

Grid to prioritise connections for strategically important projects as well as working with the energy sector to identify and action the near-term high impact upgrades to the national grid. Without improving the speed and reducing the cost of connection times, the UK's future competitiveness will be severely undermined across range of sectors from semiconductors to artificial intelligence.

- **Cutting the cost of investing in new compute power and networks:** Ensuring the UK has access to adequate data centre and network infrastructure will be vital for the future of both the UK tech sector. While the UK has a strong data centre industry and the Government has made a welcome commitment to invest to build a new exascale computer to increase the compute power available for scientific research⁶³, difficulties around finding sites and planning permission for major infrastructure projects as well as high energy costs are undermining our competitiveness.

To address this, the next Government must commit to the full recommendations set out the Independent Future of Compute Review⁶⁴ as well as take action to make it cheaper and more competitive to build digital infrastructure. This includes improving the planning system, reducing the costs of getting access to energy via the National Grid and Redesigning the Energy Intensive Industries Scheme (EISS) to include strategic industries such as data centres, telecoms and compute infrastructure to help reduce high energy costs.

Opportunity 14 – Commercialise and deploy the emerging technologies vital to a growing and resilient economy

The UK is home to world leading science and research. However, we are often too slow to commercialise and deploy the very technologies that have their intellectual roots in the UK. From artificial intelligence to autonomous vehicles and quantum technologies, it is imperative that the UK prioritises turning our world leading academic and scientific research into new market ready, commercial products and services, helping us become a more dynamic and resilient economy.

This will require the right skills, infrastructure, and investment incentives, but also strong market engagement and delivery on forward-looking strategies and regulation. The next Government should build on and accelerate the work already taking place across the key technologies where the UK has a strong competitive advantage.

Actions:

- Ensure the UK remains the European leader in Artificial intelligence technology:** AI promises to be one of the most impactful technologies of our lifetimes, and the UK is well positioned to be one of the leading countries seizing the opportunities of AI. The UK's AI industry is already thriving, employing over 50,000 people and contributing £3.7 billion to the economy in 2022.⁶⁵ We are the clear European leader, and are well placed to seize the benefits from advancing medical research and better healthcare, to finding new solutions to climate change to potentially adding £630bn to the UK economy by 2035.⁶⁶ However, to ensure we both seize the benefits

of AI and guard against its risks, we need to continue to ensure the key fundamentals of the UK's AI ecosystem are strong.

AI start-ups, university research departments and the investments of UK HQ'd and global companies have driven the success of the UK AI industry. To further bolster this, the UK needs to increase access to talent, unleash scale-up funding into the sector, ensure that UK AI companies have access to the infrastructure the sector needs (such as new and advanced semiconductors, computing capability both via the cloud and from an exascale supercomputer) and secure access to cheap energy, lab space and high speed digital connectivity to ensure AI services can be accessed across the UK.

Furthermore, we to ensure we get the right incentives for both small and large businesses to adopt AI technologies as set out in techUK's report [AI Adoption in the UK: Putting AI into Action](#)⁶⁷ and we develop a regulatory framework that enables the use of AI across a wider range of sectors while also supporting public confidence in the technology.

Case Study | AI-powered automation – US Department of Veteran Affairs IBM:

Processing claims was a manual process; the Department needed roughly 200 people to manually organise reams of mail, sort and digitise paper letters by hand and manage data entry. Turnaround time was typically more than seven weeks, and the process was extremely error prone. By adopting a digital

solution, this entire workflow was automated, enabling end-to-end capture to classify and extract data from content, and intelligently automate decisions and subsequent actions with business rules. This reduced their turnaround time by 90%, handling urgent claims in as little as five minutes. Best of all, automating that sift-through process allowed their people spend much more time on the high-value part of their job, which is figuring out how to better serve each veteran.

Case Study | Intuit's AI-backed finance software frees SMEs from the burden of bookkeeping⁶⁸ -

Managing a small business can often include a great degree of administrative work to track income and expenditure, both for tax reasons and to ensure that a business is profitable and financially-healthy. Bookkeeping though is often time-consuming, especially for those without training. Intuit's AI technology provides services to small businesses to make the management of their finances both clearer and easier.

Intuit's TurboTax Live and QuickBooks Live use AI to match customers with tax specialists or bookkeepers most relevant to their field. This gives businesses extra support to guide them through the process, address their unique financial situations and review and discuss documents together. Intuit's AI systems allow small business owners to streamline their finances and spend less time on paperwork, freeing them to spend more time growing their businesses.

- **Establish the UK as the destination to commercialise Quantum technologies:**

Quantum computers have the ability to complete calculations that take the world's largest supercomputer thousands of years in just a few minutes. The broad application of quantum technologies could enable previously unattainable technological advancements across different industries and sectors from drug discovery to carbon capture, to enhanced cyber security. Over the next three to five years, quantum computing could deliver \$5-10 billion of benefits across the world; with this rising to \$450-\$850 billion in the next fifteen to thirty years.⁶⁹

The UK moved early and is thus leading in quantum technologies. The next Government should double down on this advantage, so that the global benefits of quantum are realised here in the UK. Since the establishment of the National Quantum Technologies Programme (NQTP) in 2014, £1bn of investment has been delivered into UK quantum technologies; with a further £2.5bn identified in the National Quantum Strategy now being invested to secure the UK as a world leading quantum-enabled economy by 2033. However, despite this good early work, competition for quantum technologies is increasing and we need to ensure that our investment delivers by ensuring the UK commercialises the technology fast.

[techUK's Quantum Commercialisation report](#) identifies the levers we need to pull to commercialise quantum technology. These include ensuring access to quantum talent, developing quantum skills, improving access to quantum technologies in the

UK and promoting further international collaboration similar to the UK/US joint statement on quantum collaboration.⁷⁰ The UK's National Quantum Strategy⁷¹ begins work on many of these areas, however we could go further to better position the UK as a leading place to commercialise quantum technologies. For example, by developing quantum sandboxes to accelerate the move from research to deployment and commercialisation, working with the industry to define missions that accelerate commercialisation and improving our technology readiness levels, such as via a benchmarking programme to track the progress of quantum technologies and their use in the UK, similar to how the Government measures the uptake of AI technologies by UK businesses.⁷²

Case Study | Applying quantum technology to tackle climate change, Riverlane:

Riverlane is a UK based company which builds operating systems for quantum computers, helping improve access to quantum technology. The company is working with a range of partners to advance research in to tackle climate change with opportunities Battery Materials, Hydrogen Production and carbon capture and storage technologies. Riverlane is currently engaged in research focussing on Lithium-Air batteries, with the ambition to double battery energy density every year.⁷³

- **Position the UK to lead in new semiconductor technologies:** When it comes to semiconductors, the UK needs to be strategic. Investing to secure a domestic supply of

advanced silicon chips would be hugely expensive and a failure to direct resources strategically at a time when allies in the US, EU and Japan are carrying out their own investments. Instead, the UK Government, via its recently published National Semiconductor Strategy,⁷⁴ should seek to buildout the UK's capabilities in design and IP while also supporting R&D into new chip technologies and materials. Further support should be provided to construct new fabrication plans for Compound Semiconductors and other emerging technologies.

However, to truly support the UK chips industry, the next Government will face some difficult choices. As set out in techUK's **UK Plan for Chips**⁷⁵, semiconductor companies need easy access to talent from at home and abroad, the ability to find a site, secure energy at a competitive rate and have access to patient capital to scale, as well as good R&D incentives and good support from Government investment agencies. While the National Semiconductor strategy points to these things, achieving them means politicians having to confront difficult issues around immigration, planning, energy costs, financial market reforms, supporting clusters and improving business support services. This will require action both inside and outside the strategy.

- **Building innovative and secure future telecoms networks:** As well as rolling out full fibre and 5G, the UK needs to start investing and deploying a future telecoms strategy that will boost the economy as well as underpinning our resilience. The recent Wireless Infrastructure Strategy (WIS) made a good start on identifying the problem, but the lack of funding included in the strategy means

there is a gap that needs to be plugged to ensure the UK competes effectively when it comes to future network technologies.

The next decade will see the global telecoms market disrupted with a variety of new ways for delivering connectivity. Full fibre and national mobile networks – delivering standalone 5G – will play a central role, but innovation in new technologies, satellite and drone technologies will give us new ways to increase coverage and build in resilience. Technologies such as AI and Machine Learning, silicon photonics and semiconductors will all have a major role in improving telecoms technology and we should ensure that, as we deliver our AI and semiconductor strategies, these support applications in future networks.

To underpin the resilience of our networks, we also need to ensure that satellite technology is fully embedded in our telecoms strategy. Our future network should include a blend of space technologies, drones, High-Altitude Platforms (HAPs) and advanced terrestrial networks, providing increased resilience and connectivity, especially in very hard to reach areas. Doing so will also be vital to ensure the UK can handle extreme events and emergencies, whether extreme weather, non-natural hazard related risks (e.g. physical sabotage), constrained energy supply and supply chain shocks.

- **Ensuring our investments in new defence technology can support wider economic growth:** Innovation in the tech sector can often start in the defence industry, with technologies such as touchscreens, mobile phones and the internet having some of their foundations in defence research and

procurement.

With science and technology playing a larger role in the UK's Integrated Review of Security, Defence, Development and Foreign Policy⁷⁶ we need to ensure that investments in defence technologies are supported by a strong industrial base and vice-versa. This means not only having the next Government commit to spending 3% of GDP on defence by 2030, but also ensuring the Ministry of Defence's (MoD) research and procurement frameworks draw on the UK's strong science and technology base, and that there are incentives and support for the commercialisation and spinning out of technological advancements from the defence sector into the wider economy. To begin this the MoD should focus investment on space-based capabilities and systems, cyber security, quantum and high-performance computing, quantum key distribution (QKD), AI, machine learning, synthetics and simulation, robotics and autonomous systems, sensors & sensing, and intelligent networking capabilities. All of these will be vital to the UK's future defence capabilities, but also have a range of applications and draw on a strong industrial base. To deliver this effectively and increase the opportunities for spinouts, we need to improve how our defence procurement system works, with better early and pre-market engagement, increased visibility for industry over the long-term pipeline of projects, and better identification of opportunities to support spinouts for applications in the public and private sector.

Case Study | Reaction Engines precooler technology:

Developed for future space launch Reaction Engines' precooler technology is currently being applied in the HVX Programme, in collaboration with Rolls-Royce, the Royal Air Forces' Rapid Capabilities Office (RCO) and the UK Government's Defence Science and Technology Laboratory (Dstl) to deliver significant enhancements to UK defence capabilities through the development of innovative hypersonic technologies.

Leveraging spin-off technology into commercial markets, Reaction Engines is delivering world-leading heat transfer capabilities across diverse industries. From making aircraft more efficient and sustainable, to improving performance in motorsport, right across to converting waste energy into renewable energy. An example of this is the collaborative effort led by Cranfield Aerospace Solutions, towards net zero through Project Fresson. The project aims to accelerate the journey to net zero emissions through using hydrogen fuel cell technology. Reaction Engines has taken their expertise in the development of hypersonic propulsion to develop a ultra-low drag heat rejection system, using their expertise, technology and intellectual property to drive change.

- **Establish the UK as a leader in autonomous vehicles and future transport systems:** Technology adoption in transport is a major opportunity to reduce carbon emissions and grow the economy: 24% of total UK greenhouse gas emissions in 2020 were from transport. Supporting future transport

systems through increasing the usage of autonomous vehicles⁷⁷, improving our rail network and supporting multimodal transport solutions could reduce greenhouse gas emissions while boosting the economy, with the Connected and Automated Vehicles industry predicted to be worth £41.7bn to the UK economy by 2035.⁷⁸ However, the delivery of innovative future low carbon systems transport is being held back by regulatory uncertainty and a lack of key enabling legislation and regulation.

Moving quickly to implement these enabling frameworks could unlock significant private investment into the UK, as well as well as helping improve both public and private transport. The next Government should therefore act quickly to introduce a regulatory framework to support the safe commercial deployment of Connected and Automated Vehicles by 2025, regulate micro-mobility by creating a new class of light zero emission vehicles / devices, and legislate for the creation of Great British Railways as the "guiding mind" for decarbonising and improving rail services through innovation.

Opportunity 15 - Build a smarter approach to foreign and trade policy for the UK in a more complex and less secure world:

In a more complex and less secure world, the UK tech sector is exposed to risks in global supply chains. Technology products need vast quantities of diverse raw materials and minerals that often come from unstable places. Meanwhile, manufacturing is heavily located in East Asia, and companies rely on sea routes to deliver these goods to markets across the globe.

In a world of heightened geopolitical tensions, these elements are more vulnerable to disruption. This is increasingly recognised across the West with new policies focused around 'economic security'. However, these policies, such as the United States of America's CHIPS Act and the Inflation Reduction Act, and the responses from the EU with the Net-Zero Industry Act, demonstrate a lack of coordination and result in potentially costly competition between allies.

In our recent report, *Open and Secure: Charting a path for UK tech in a world of resurgent strategic competition*⁷⁹, techUK set out a number of recommendations for the UK Government to follow. These included:

Actions:

- **Remain committed to multilateralism, including the WTO as a cornerstone of international policy:** Despite the numerous and well documented problems afflicting the WTO, it remains the only global forum for setting the rules of trade. As a middle-sized power, the UK would be especially vulnerable to a complete breakdown of the multilateral trading system, and its replacement by a world where the largest powers truly do have free reign to set global trade rules. The UK must also ensure it takes a strategic approach to influence the development of international standards and accredited conformity assessments by working with organisations such as the British Standards Institution (BSI) and the United Kingdom Accreditation Service (UKAS).

Building on this, the UK should be a convenor and leader on existential issues that require true multilateral cooperation to address, such as climate change, cyber security and AI-

powered weapons systems. 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.

- **Support industry in securing supply chains in cooperation with international partners:** Take a proactive role in communicating the strategic direction of policy for businesses (i.e. the prioritisation of resilience over efficiency), engage with the tech sector to understand their needs, concerns, and opportunities, and provide them with tangible support and clear guidance to assist them as they transition to more resilient supply chains. Additionally, the UK should aim to coordinate business support and investments with like-minded international partners, to avoid unnecessary duplication and competition, and seek guarantees of reciprocal behavior. It is also crucial that the UK continues to support and drive initiatives, such as Digital Security Design, to transform technology and improve our resilience.

Case Study | Automotive supply chain crash from CSA Catapult:

The UK automotive industry reported a 41% downturn in production in 2021.⁸⁰ This was partly caused by the availability of mainstream silicon semiconductors, with one UK manufacturer citing a lead time of over 24 months for a silicon chip known as a CAN Bus Controller. Although this chip is valued at a few pounds, it is not possible to

complete production of a vehicle valued at £30k without it. The prevalence of 'just in time' supply chains, to minimise the value of stock in warehouses, meant there was little buffer stock to absorb supply chain shocks.

The COVID pandemic increased demand for consumer electronics, as society was urged to work from home; this drove the demand for high-margin silicon chips used in tablets and laptops at the expense of low-margin silicon chips such as CAN Bus Controllers. This caused massive disruptions to automotive supply chain. The chips industry is hugely complex and specialised and can create bottlenecks with one or a few companies manufacturing large shares of a particular kind of chip. These bottlenecks need to be overcome by working with allies to diversify the supplies of chips from high end silicon to new technologies such as compound semiconductors which will play a vital role as the electric vehicle industry grows.

- **Review investment screening rules:** Review the first year of implementation of the National Security and Investment (NSI) Act. A lack of clarity on key definitions, broad scope and a black box approach from officials to screening investments struck the wrong balance between security and economic growth, hurting investment into the UK's key sectors. The regime was implemented so poorly a policy re-think was announced less than one year into its life. The Government failed to take business concerns onboard at the outset of the policy process, and greater

weight should be given to industry views as the NSI Act is reviewed.

- **Improve how we consult on trade policy:** Although imperfect, the Strategic Trade Advisory Group and the various sectoral and cross-cutting Trade Advisory Group and Trade Working Groups were a medium of regular engagement with Government. Since those have gone under review, and nothing has replaced them, industry is often given one-hour virtual updates on the various stages of various negotiations, without an actual mechanism for discussing policy choices when those are still open. Confidentiality requirements are extreme and especially difficult for membership organisations that require members expert input and feedback. This system is not fit for purpose and undermines the quality of input, and ultimately the negotiating position of the UK, when it comes to Free Trade Agreements.

The next Government should consider the creation of a formal structure of engagement, following the review of the STAG/TAGs/TWGs, that would enable regular and meaningful engagement at both political and departmental officials' levels. Where appropriate, these engagements should include sight of negotiating texts, under confidentiality requirements. The new system should include a wide range of stakeholders and be regularly reviewed to make sure it works as intended for both sides.



Planet

Many impacts of climate change are already locked-in, and more are on the horizon which will directly threaten the UK's resilience, supply chain security, public health and economic stability. By 2040, it is estimated that the cost of climate change to the UK could be up to 1% of GDP per annum.⁸¹ Securing our planet's future is the biggest challenge facing humanity in the 21st century, and it requires a joint effort to rise to the task.

In that joint effort, the tech sector has a crucial role to play, with research suggesting that digital tech can reduce global emissions by 15-20%.⁸² Further investment in green technologies can also drive economic growth. The UK secured 3.6% of global climate tech investment in 2021 and we are home to 9 climate tech unicorns, with more in the pipeline.

To ensure we meet our climate ambitions while also boosting economic growth we need to ensure our green tech sector is competitive, that we empower individuals and business to use tech to go green and we ensure that the tech sector itself is a model of green growth.

Opportunity 16 - Boost the competitiveness of the UK as a green technology hub

If we are not to pursue a subsidy race, we must find more creative solutions to make the UK an attractive place to invest in and set up a green

tech company.⁸³ Making the UK an attractive place to invest in green tech has the potential to add £13.7bn GVA to the UK by 2030⁸⁴ as well as helping us play our part in fighting climate change.

While techUK welcomed the findings of Chris Skidmore's Independent Review of Net Zero, the lack of ambition in the Government's response was disappointing. The next Government should focus on delivering ambitious and informed policies for digital uptake that would help grow UK PLC and cut carbon across the economy.

- Reform the electricity grid, planning system and deliver a British 'Scale-up Sprint' to both reduce barriers to green tech deployment as well as increasing the availability of capital for green tech investment. This will help provide support for a range of projects from electricity generation to increasing the availability of sites and capital to invest in gigafactories.
- Reform the UK's ESG requirements to align with global standards. This would better support suppliers and the adoption of due diligence rules for UK based Multi-National Companies, helping businesses develop stronger investment cases for environmentally friendly projects and facilitating the growth of UK-based climate compliance and accounting solutions internationally.

- Move towards a more open data environment to allow the scale of the net zero challenge to be easily broken down and addressed through private sector initiatives. An example being of the Geospatial Commission's efforts to standardise and open up access to Government data sets. By prioritising the integration of geolocation data companies operating within the public sector can help design more integrated and resilient infrastructure, that can be further leveraged by innovators, adding further value to the UK economy.
- management systems and explore energy usage as a potential future Smart Data scheme.
- Incentivise greater uptake of 'smart' technologies within homes and businesses through targeted financial support schemes to empower households to make more environmentally sustainable decisions. Smart home and business devices should also maintain minimum standards of interoperability with everyday consumer tech (smart phones, laptops), to make it easy for the everyday user to monitor and control their energy while reducing barriers to switching.

Opportunity 17 - Empower individuals and businesses to better understand and improve their own environmental footprint:

Climate change continues to be a priority for the public with three-quarters of adults worried about its impact.⁸⁵ However, to drive behaviour change, consumers must be empowered through access to products and services that can help them to better understand their impact on the planet and act to live more sustainable lives.

For businesses, more needs to be done to introduce the correct financial incentives to decarbonise and help us to meet net zero. Through introducing measures to improve energy efficiency (EPC) and investing in smart tech, the Government can help companies maintain a competitive advantage, drive operational efficiencies and embed a culture of good corporate citizenship in UK industry as a whole.

Actions:

- Reform planning permission rules to require all new-build homes to include smart home technologies such as smart energy

Case Study | Cisco's deployment of green tech in schools:

Cisco is looking to support schools by providing technology that can help them decarbonise their estates at the same time as creating new educational platforms to enrich teaching on climate change. Cisco's Meraki operates the industry's largest-scale cloud networking device. Using Meraki technology, schools can use wireless access points to combine environmental data with physical monitoring, to indicate when carbon emissions have reached a high level.

The technology will also record and monitor data on the environmental impact of a school, in order to allow school staff to actively be involved in monitoring the carbon emissions of their environments. The smart device will also act as a learning platform, where teachers will be encouraged to use the device and the readings it gives, to teach their students about the impacts of their school's environmental footprint. The Government can use effective partnerships

with the private sector to introduce advanced technology into the school system, which can help schools contribute to net zero targets and become safer learning environments that foster understanding about the importance of sustainability in the next generation.

- Give people confidence to switch to an electric vehicle (EV) through rapidly accelerating the rollout of charging points. *Ensuring we meet the Government's target of 300,000 public charging points by 2035 will help overcome "range anxiety", one the biggest factors preventing greater uptake of these vehicles.*

Case Study | Arqiva and water monitoring:

The Environment Agency estimates an additional 4 billion litres of water a day will be needed in England for public water supplies by 2050. Due to climate change and population growth, various areas are expected to contend with water deficits. At the same time, there's an opportunity to reduce water demand or use. Currently, every day in England and Wales, an estimated 3 billion litres of potable water is lost through leaks. Per person water demand could also reduce if households have greater awareness and insight into how much water they consume (currently average per person per day water consumption in England and Wales is 143 litres a day, this compares to 126 litres a day in Germany, as an example).

Smart water metering provides the data and insight needed to reduce water demand. The solution Arqiva provides – called Advanced Metering Infrastructure (AMI) – delivers hourly data points on water consumption at a property over a communications network to the water company supplying that property.

As a result, AMI delivers far greater benefits in leakage and water demand reduction than other metering types – including Automated Meter Reading (AMR) meters, which involve a device in a vehicle being driven past to obtain meters reads; or manual meters. It is important that smart metering policy includes a focus on delivering the most advanced technology type providing data most frequently, to maximise the benefits that metering can deliver to reducing water demand (which also reduces the amount of water processed by water companies, reducing carbon emissions).

Opportunity 18: Make tech greener:

Green growth involves making sure we help support the natural world whilst delivering for businesses and communities. The UK currently lacks a strategy to deal with the 467,517 metric tons of household e-waste collected in the UK in 2022.⁸⁶ If we want tech hardware manufacturing to have a future in the UK, particularly high value manufacturing including semiconductors, we must consider a circular approach to resourcing to drive down costs and improve the environmental performance of these industries.

Further we are not making the most of our energy system, with a smart and digitized grid having the potential to cut household and business bills as well as reducing the overall cost of reaching net zero.

Actions:

- **Boost the recycling processing sector by implementing a clear strategy to promote stable and sufficient supply of raw materials:**

the Government must consider how their approach to supply chains and tech manufacturing growth supports the natural world. Onshoring electronic waste recycling capacity will keep valuable resources (3TG, Gold, Lithium) in the UK, making our manufacturers resilient to shocks to the global pricing of such commodities, with an important added benefit of keeping virgin materials in the ground abroad.

- **Digitise the energy grid to cut household bills and business bills:** Ensuring the flexibility and adaptability of our energy system is a priority and one that will not be achieved without full digitalisation of the grid. Full digitalisation has the potential to massively reduce the need for new capital investment and gas demand.

Analysis by the Carbon Trust and Imperial College shows that a fully flexible and digital energy system could cut the cost of reaching net zero by up to £16.7 billion a year by 2050⁸⁷ with additional benefits for businesses and consumers.

There is potential to replace the need for fossil fuels through a more flexible energy system that can charge electric vehicles, heat homes and businesses, and charge domestic and commercial batteries intelligently. The next Government must work with the industry to ensure the Future Systems Operator is established by 2024 at the very latest and that it can immediately begin its work with sufficient resources and support from Government and the regulator.

- **Get ahead with Biodiversity Reporting:** UK should leverage its first-mover advantage in biodiversity reporting requirements by bedding these in early before they become mandatory. This will help the UK to lead the international debate on how these reporting standards operate and allow UK firms to export reporting and compliance services as biodiversity reporting becomes widespread practice.

Case Study | Benefits of a fully integrated, digitalised energy system:

Energy providers will be incentivised to innovate and provide new and more accurate services to consumers. Some incentives today include the Energy System Flexibility work led by Ofgem's Retail Market Reform (REMA). In the market today we can already see how we can utilise smart energy systems and design precise data driven models to provide consumers with the right price signals that accommodate different lifestyles. More work on new homes will also support the roadmap to net zero.

Down the line, homes which have incorporated battery storage, solar panels, and electric heating could benefit from using cutting-edge tech to optimise the household's consumption and energy export in exchange for a zero bill. PwC estimate that a place-based approach to the energy transition could unlock £108 billion of savings on consumer bills for an investment of £58 billion.⁸⁸



Delivering a regulatory system ready for the faster pace of technological change

The importance of regulation:

As digital services have become ubiquitous to the way we live our lives, regulation of the tech sector and digital activities has grown. The 2020s is a major turning point for this with new rules on competition, data protection, online safety, artificial intelligence and telecommunications being introduced in the UK and around the world. These rules don't just affect the tech sector but have enormous cross-cutting economic and social impacts.

The tech sector is becoming more like the financial services and pharmaceutical sectors where regulation is a central part of the business case.

From AI to social media to telecoms 96% of tech sector output and 81% of exports is in services, where regulation is vital for the research, development and then deployment of products.

This has meant the importance of the UK's regulatory environment and the attitudes of its regulators has grown for techUK members, with the decisions made by regulators now sending powerful signals to the market that can often be the deciding factor for investment decisions.

What is the UK's approach?:

Following its exit from the EU the UK is aiming to define its own path between global trading giants like the EU and the USA.

As the UK charts its approach to regulating the digital economy what we are seeing is a third way between the more laissez-faire approach of the USA and a comparatively proscriptive approach from the EU.

The UK model is following a principles-based approach with Government setting regulatory objectives at a high level via legislation and statements, such as trying to make the UK the safest place to be online or creating a pro-innovation approach to AI regulation. The delivery of these regimes is then delegated to the UK's regulators through detailed guidance, generally in the form of codes of conduct or standards for the industry, however these are backed up by significant regulatory powers to intervene if needed.

This approach seeks to leverage the UK's well-regarded regulators to work with industry to implement significant social and economic policy, with the objective of creating a fleet of foot regulatory system that can strike a balance between mitigating harms, supporting economic growth and innovation and providing more flexibility in rule making and guidance to account for technological change.

The challenges the UK approach faces:

While the UK's overall approach to digital regulation has been broadly welcomed it faces number of core challenges.

- **How to ensure regulation supports innovation and a good business environment:**

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. The UK's Fintech Sandbox was an early pioneer of this kind of innovation-enabling regulatory approach. However, given the increasing scale and importance of the rule making powers being delegated to regulators, as well as the speed and complexity of technological change effective resourcing, expertise, a clear duty to focus on growth and innovation as well as effective competition regulation will be central to underpinning a strong business environment.

- **How does the UK navigate increasingly globalised regulation:** the regulation of the tech sector often has a significant extra-territorial effect, for example the EU GDPR has an extra territorial effect meaning organisations outside the EU have to comply with those laws when processing EU citizens data or they can face regulatory action from EU authorities. Competition, AI and other forms of digital regulation are also likely to have both extra territorial effects while countries will seek to converge around key principles for regulation to reduce where possible duplication between different national regimes.

When developing regulation, the UK Government and regulators will both have to be mindful of existing global norms as well as seeking to actively shape new consensus when it comes to emerging regulatory regimes, such as on AI.

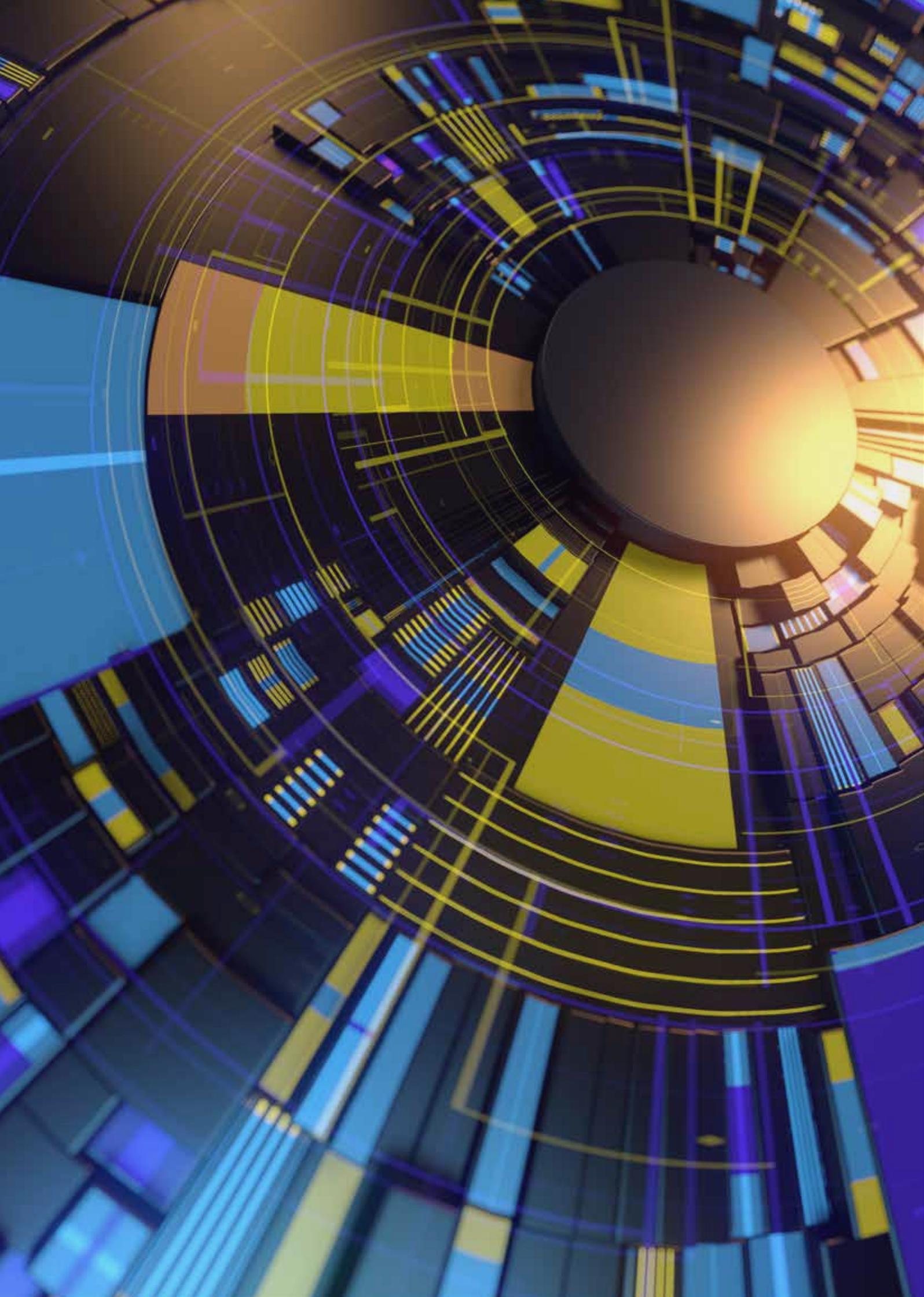
- **The challenge of regulating the use of Artificial Intelligence:** AI is a cross cutting and general purpose technology that will pose regulatory challenges in every sector of the economy. As the regulatory challenges of AI emerge the UK's system of regulators will come under enormous pressure to cope with a new and complex case load of demands. Ensuring we can meet these challenges while also ensuring our regulators support and enable the use and growth of AI technologies will require us to go beyond just regulation and seek to build a system of AI ethics, governance, and regulation that supports public trust and encourages innovation.

If we get this right the UK's regulatory system can provide quick context specific decisions that are well informed and built with a strong understanding of the technologies and business models they regulate.

However, if got wrong it can lead to a confusing and slow approach that could disincentivise business investment while at the same time failing to effectively tackle harms due to a lack of understanding of both technology and markets.

To ensure we support our regulatory system to meet the challenges that it will face techUK sets out a number of recommendations for

- **Reforming the British approach to tech regulation** based around providing clear directions to regulators, ensuring regulators are effectively resourced and encouraging regulators to take a solution and innovation-oriented approach.
- **Further the UK needs to begin building a** system of AI ethics, governance, and regulation that can enable public trust and support innovation.



Reforming the British approach to tech regulation:

Giving clear direction to regulators and ensuring accountability:

- Legislation needs to be clear about its aims and be 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.⁸⁹ Necessary regulation should be proportionate (i.e. the least intrusive approach to achieve the policy goal), problem specific, and both business and technology neutral.
 - Government needs to take an enhanced role in promoting better regulation:** with greater power and a wider scope in the remits being granted to the regulators the 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,⁹⁰ 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. Further there should be a clear lead department with responsibility for better regulation principles. Following the latest departmental changes this responsibility
- should sit within the Department for Science, Innovation and Technology (DSIT).
- Accountability:** 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. Parliament must also play a role in scrutinising how regulators are performing against strategic steers and their own annual plans. 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.
 - A global strategy:** both Government and regulators need to be aware of the competing regulatory responsibilities firms have in the modern economy. Given our proximity and interrelationship the UK needs to take particular note of EU regulation and standards.
- The UK should not choose a strategy based on either presumptive alignment or divergence from*

EU regulations. Instead, the UK should take an approach based on divergence for advantage and compatibility for convenience.

Such an approach affords companies regulatory advantages for UK based activities but seeks to smooth barriers to trade as they scale and become global. Inspiration should be taken from the Data Protection and Digital Information Bill that seeks to create a more flexible and innovation enabling approach to data protection but also where the legislation also seeks to minimise friction when companies seek to move to a more globalised compliance posture.

Where it makes sense to align, such as in product regulations the UK should seek to agree mutual recognition agreements for conformity assessment to avoid duplication of certification or testing, and remove administrative procedures, documentation and product markings where these are not really needed, such as over CE marking. Doing so would cut costs for businesses as well as increasing the flow of goods between the UK and EU.

Effective resourcing, expertise and focus:

- **Regulators must be well resourced and expert:** As well as their day-to-day activities, the workload placed on regulators by new general purpose technologies will be significant. This is already reflected in policy such as the AI White Paper, which proposes each regulator setting rules for AI deployment in their sphere. 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 guard against this regulators need to be well resourced and have the expertise they need. 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.

Further regulators should be encouraged to create a shared pool of experts in emerging technologies, such as AI to avoid competition for skills that are short in supply and ensure a clear and consistent understanding of the basics of the technology.

- **Creating a mechanism for Government to give a policy statement:** overlaps between the objectives of the online safety, data protection, competition and financial services regimes are manifold while AI poses to create multiple other new overlaps and tensions between regimes. While much of this work can be done via strategic steers or resolved in forums such as the Digital Regulation Cooperation Forum (DRCF), not all scenarios will be covered. 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.

This would most likely be used over knotty, cross-cutting and difficult issues such as those that have emerged around intellectual

property rights and text and data mining. Such an escalation process could come either directly from the regulators themselves or via a submission from industry. Importantly such a mechanism should only be available in relation to guidance and policy making, not as a mechanism to try and apply pressure on a regulator to overturn a decision or fine. This would likely compromise the independence of the regulator.

- **Regulator remits:** Over the years some regulators have taken on additional responsibilities, resulting in their scope ballooning to cover a wide range of issues. None more so that Ofcom whose remit spans from spectrum and telecoms regulation to media to online harms. This broad scope can sometimes be too challenging for any one organisation to handle, and the Government should consider reviewing the remits of regulators to ensure they have a clear and coherent structure that is fit for purpose.

Solution and innovation orientated regulators:

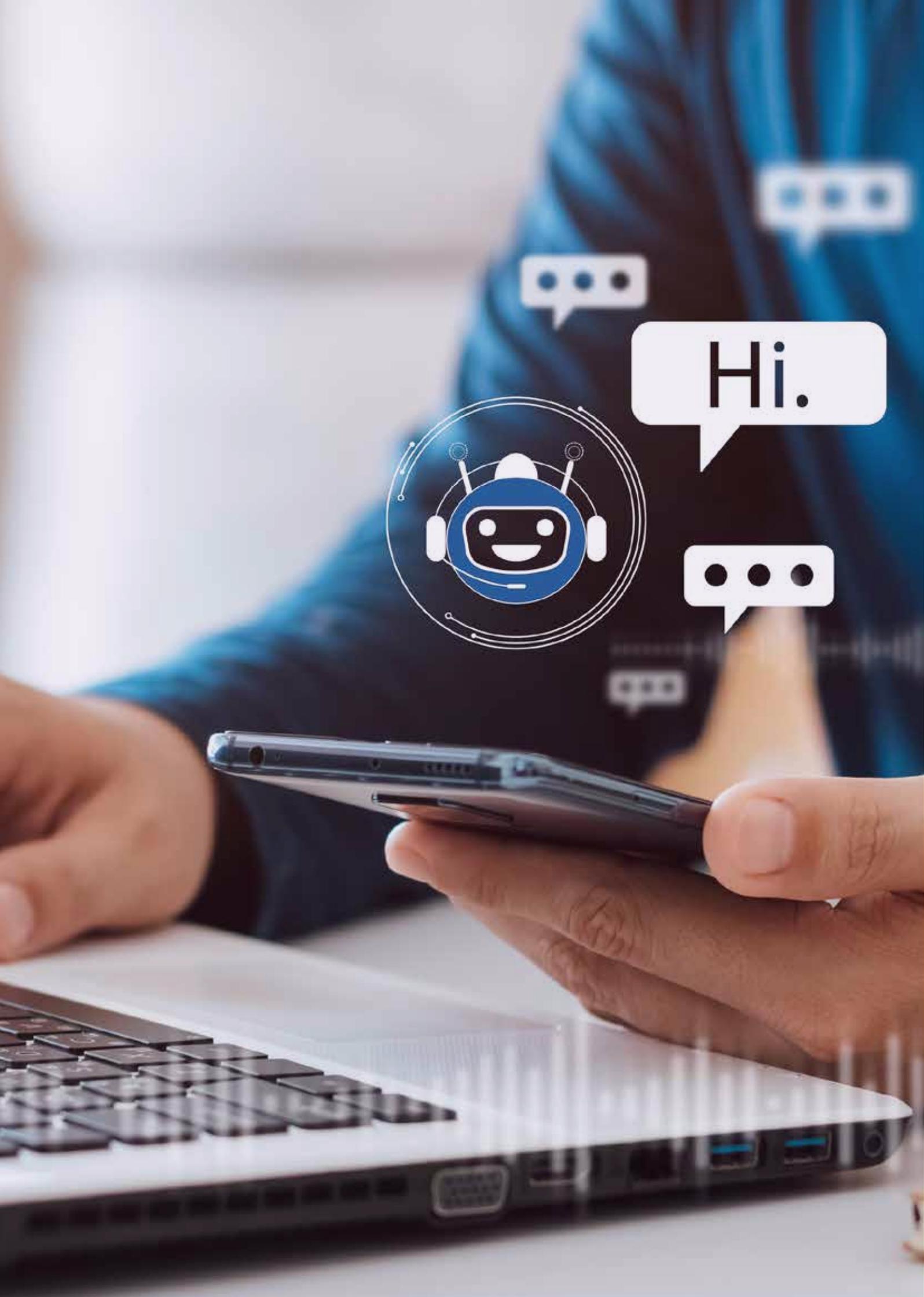
- **Ensure the enforcement of the 'Growth duty' across all regulators:** statutory guidance exists requiring regulators to have due regard to economic growth in the discharge of their functions. This 'growth duty' requires regulators to consider how their "approach to delivering regulation can assist in creating a more dynamic business environment, supporting innovation." However, the growth duty does not apply to all regulators and reporting requirements and implementation has not been followed through.

As regulators gain more power over economic and social policy Government should take extra steps to ensure that the growth duty

applies to all regulators, requesting updates on reporting and implementation as part of strategic steers and examining whether there is an enhanced role for the National Audit Office to sign off impact assessments conducted by regulators.

- **Task and finish groups:** often regulators will be tasked with exploring difficult or cross-cutting issues, such as the overlap between privacy, security and competition policy, or online safety and private messaging. To address these as they arise regulators should be encouraged to form task and finish groups composed of industry, academia and Government to explore difficult issues or the tensions behind competing objectives. These groups should focus on finding market-based or technological solutions such as via product innovation or industry codes before the considering regulatory action. The Government should also have a role here and be able to request regulators initiate task and finish groups via letters and strategic steers.
- **Sandboxes:** sandboxes can be effective tool to boost innovation and explore both regulatory as well as technological options for creating new markets or solving existing problems. However, sandboxes can be resource intensive and therefore should be selected strategically, focused on the areas of potential highest value creation or impact. Sandboxes should not be seen as a solution to problems that could be solved more quickly by clearer political direction or a task and finish group. Areas for new and future sandboxes could include high impact and cross cutting technologies such as the already planned AI sandbox as well as potential quantum and Digital ID sandboxes.

- **Increasing funding for the Regulators Pioneer fund:** The fund currently supports regulators through grants to test new approaches to regulation aimed at encouraging business innovation and investment. The fund has been successful but is oversubscribed. Further the single competition window per funding round limits the ability for longer term, higher impact projects that could help drive innovation, automation and stronger business services from regulators. The fund should therefore be given budgets that stretch over the course of a Parliament (5 years) and the value of the fund should be quadrupled to £60 million with half of the fund earmarked for regulators. This will be vital given the increasing demands likely over the next decade.



Hi.



Building a system of AI ethics, governance, and regulation that supports public trust and encourages innovation:

Artificial intelligence technologies present an amazing opportunity for our economy and society, from delivering previously unthinkable advances in scientific research to providing virtual assistants and tools that vastly improve the productivity of everyday tasks.

A general-purpose technology:

The public can see the benefits that AI will bring but are understandably anxious about what could happen if AI systems and tools are built or used in ways that are unethical.

The power and speed at which the technology is advancing is creating challenges for businesses, Government and regulators to ensure that as the technology is deployed we are able to seize the opportunities as well as guarding against the risks.

AI is a general-purpose technology that will lead to a broad range of economic and societal changes. Concerns about its impact vary from near-term minor disruptions to hypothetical long-term existential risks, and a huge amount in between.

This has led to quite a confused public debate over recent months. In reality, the short and long-term impact of AI will be shaped by the decisions we make now. Fortunately, a great deal of work has been done in recent years to develop a solid

ethical framework for the development and use of AI technology that can underpin the development of AI governance and regulation.

Accelerating the work of the AI Whitepaper:

The UK has the potential to lead in AI governance and regulation not least because of its long-standing, deep-rooted expertise on AI ethics. Over recent years the UK has built significant capabilities in understanding many of the ethical and governance challenges in AI. We now need to build on and accelerate this work to develop a governance and regulatory framework that can shape the future of AI technology in a way that reflects the needs, values, and ethics of our society.

This will require a quick, agile, and iterative approach that is able to reflect and respond to rapid technological change, avoiding a repeat of the long-drawn-out process of legislating for online safety.

The current Government's AI White Paper provides a good basis to build on, that recognises the need for an agile, risk-based approach that can keep pace with rapid innovation. Where risks are low, the regulatory approach should be proportionate, but where there are significant risks then clear regulatory guard rails need to be built.

Building a system of AI ethics, governance, and regulation:

Given that AI is a general-purpose technology that will be used in many different contexts, no single regulator will be able to govern the use of AI alone. Instead, we need a system of AI ethics, governance and regulation that has the capability and capacity to tackle the big questions that AI raises, set out key principles for governance and deliver effective regulation for an AI-enabled world. This is the approach set out in the AI White Paper. The challenge now is to accelerate implementation to demonstrate that it can work.

The UK has already led the world in developing thinking on AI standards and is building a market for algorithmic auditing. Beyond this however we need to ensure the governance and regulation of AI is up to the task.

This is a long term project and we are only at the beginning, however there are some immediate steps that must be taken to ensure that we can build a system of AI ethics, governance, and regulation that supports public trust while also encouraging innovation:

- **Increase the capacity and capability of the UK's regulators:** Following the publication of the UK's AI whitepaper and the new roles and responsibilities placed on UK regulators, Government must commit to providing additional financial resources now to rapidly build the capability and capacity of regulators. UK regulators must also be able to make the most of their resources by being able to pool and share expertise, have the ability to establish task and finish groups and ask for policy statements from Government where regulators are unable or not best placed to resolve an issue. Additional funding such as

from the Regulators Pioneer Fund could also be used to build tools that can help support the delivery of effective AI regulation and support services for businesses.

- **Put the UK at the forefront of international debates on AI:** From the role that AI could play in distorting and disrupting elections to new rules to govern the use of AI weapon systems, Government will need to lead international discussions and help set global rules on how to manage the risks.

Agreeing on a set of a common, trustworthy, international set of AI standards across different jurisdictions is an important next step for promoting the responsible development of AI. Through the creation of an international AI taskforce, the UK would be well-positioned to lead and drive forward this critical piece of work.

- **Map the AI Governance landscape:** Technical standards and ethical practices will need to become commonplace across industry. These approaches should be proportionate and risk-based, enabling low-risk AI to flourish.

There is a range of initiatives that currently exist, but many companies, especially SMEs, feel overwhelmed by the number of existing policies, guidance, standards, and regulation related to AI governance. Government has a role to play in clearly mapping out these existing initiatives, how they interact, identifying current overlaps and gaps, and providing clarity for companies trying to navigate what is currently a complex governance landscape.

This is a task that could be undertaken by the Central Function proposed in the AI whitepaper and will provide clarity and certainty for businesses, academics and the public who want to understand the right approach to responsible innovation.

- **Understand, engage and inform the public:** Public questions, concerns, and views about AI and its impacts need to be understood, heard and addressed. It will be vital that we find ways to help the public and businesses understand the diversity of AI systems, their uses and associated benefits as well as potential risks.

The next Government should continue to support initiatives that help us understand the public's attitudes towards AI such as the detailed tracker surveys run by the CDEI⁹¹ as well as creating a forum that enables a considered and sustained public debate on new and evolving issues related to AI. This forum would help to gain a better understanding of public attitudes to AI and address any emerging areas of concern.

Regulators should be encouraged to understand how their stakeholders and the public's attitudes towards AI in the sector's they regulate. The ICO has previously run Public Awareness Studies while Ofcom's Media Nations reports⁹² help build a picture of the viewing and media consumption habits of the UK population. Similar survey's and studies should be conducted to inform AI regulation.

- **Monitor changes in the Labour Market:** Generative AI tools are already bringing huge productivity advancements to every-day tasks, such as software development. Much like the

advent of personal computer and the internet these new technological tools are likely to bring profound changes to the workplace over time. However, while there has been much speculation on the impacts on jobs and the labour market, we do not know yet what the precise impacts will be.

*A recent study by the National Bureau for economic research found that access to generative AI tools increases productivity by 14% with the greatest productivity increases for novice and low-skilled workers, a finding that runs contrary to the usual assumption that low skilled work will be automated away by AI not enhanced.*⁹³

Overall, we expect that AI technology will augment rather than replace the work people do. However, the next government will need to deepen its understanding of the changes that do take place in the labour market and then align this with its skills training and education policy so that we continue to provide people with routes into good high value jobs.

References

1. [DCMS Economic Estimates 2019](#)
2. [DCMS Economic Estimates 2019](#)
3. [DCMS Sector National Economic Estimates: 2011 to 2020](#)
4. [DCMS UK tech sector retains #1 spot in Europe and #3 in world as sector resilience brings continued growth, 2022](#)
5. [Department for Digital, Culture, Media & Sport: Assessing the UK's Regional Digital Ecosystems - 2021](#)
6. [UK Skills Mismatch in 2030 – Industrial Strategy Council, 2019](#)
7. [Adult Participation in Learning Survey – Learning and Work Institute 2022](#)
8. [Written Parliamentary Question, UIN HL1896, tabled on 19 July 2022](#)
9. [Adult Participation in Learning Survey – Learning and Work Institute 2022](#)
10. [Adult Participation in Learning Survey – Learning and Work Institute 2022](#)
11. [Are graduates ready for work? Chartered Management Institute – 2021](#)
12. [Average monthly rent of laboratory and life sciences space in the leading science cities worldwide in 2020, by city - Statista](#)
13. [CEBR - Value of big data and the Internet of Things \(sas.com\)](#)
14. [The State of Dark Data | Splunk](#)
15. [Public attitudes to data and AI: Tracker survey - GOV.UK \(www.gov.uk\)](#)
16. [Digital public services: How to achieve fast transformation at scale – McKinsey and Company 2020](#)
17. [Government Digital Service: updates on our 2021-2024 strategy - Government Digital Service \(blog.gov.uk\)](#)
18. [Facts & figures - e-Estonia](#)
19. [Unlocking UK Digital Identity in 2022 – techUK](#)
20. [Public attitudes to digital regulation: tracker survey - GOV.UK \(www.gov.uk\)](#)
21. [Internet users' trust in the Internet has dropped significantly since 2019 | Ipsos](#)
22. [Fraud and the Justice System - Justice Committee \(parliament.uk\)](#)

23. [Digitals skills shortage costs the UK economy and workers £12.8 billion as Brits grapple with higher bills during the cost-of-living crisis – Virgin Media O2 with research from Cebr 2022](#)
24. [Digital skills: Establishing a digital learning pathway – techUK and Deloitte](#)
25. [Good work plan: establishing a new single enforcement body for employment rights, consultation outcome, July 2019](#)
26. <https://stl.tech/blog/bridging-the-digital-divide-in-the-uk/>
27. <https://stl.tech/blog/bridging-the-digital-divide-in-the-uk/>
28. [Full Fibre Could Bring 1 Million UK People Back into Workforce – ISP Review 2021](#)
29. <https://www.ofcom.org.uk/research-and-data/telecoms-research/data-updates/q4-2022>
30. [UK Consumer Digital Index 2022 | Lloyds Bank](#)
31. [Microsoft Word - FINAL MAY LLFS.docx \(ageuk.org.uk\)](#)
32. [Number of people living with diabetes in the UK tops 5 million for the first time](#)
33. [NHS backlog data analysis \(bma.org.uk\)](#)
34. [The decline of publicly funded social care for older adults | Nuffield Trust](#)
35. [Debate on the value of social care at the heart of local communities, House of Commons, 24 November 2022 | Local Government Association](#)
36. [Boosting workforce health can help the UK achieve economic growth ambitions, says CBI | CBI](#)
37. [UK Economic Outlook April 2023 - PwC UK](#)
38. [Digital Transformation – NHS](#)
39. [Falls: applying All Our Health – Office for Health Improvement and Disabilities 2022](#)
40. [NHS pilots artificial intelligence software to cut missed hospital appointments – NHS England 2023](#)
41. [techUK ten point plan for healthtech – techUK 2021](#)
42. [Digital, data, and technology key to getting Integrated Care Systems right from the start, claims new techUK report – techUK 2022](#)
43. [Hewitt Review: an independent review of integrated care systems - GOV.UK \(www.gov.uk\)](#)
44. [About us | Understanding patient data](#)
45. [Wellbeing and independence - Six themes of Making it Real - About - Making it Real - Think Local Act Personal](#)
46. [Data saves lives: reshaping health and social care with data - GOV.UK \(www.gov.uk\)](#)
47. [NFIB Dashboard \(Public\) \(arcgis.com\)](#)

48. [UN E-Government Index – United Nations](#)
49. [FT Adviser: Why is the UK so successful in fintech?](#)
50. [techUK: Financial Regulators' Proposed Policymaking Approach to AI/ML | techUK Response.](#)
51. [techUK: Financial Services Policy Explainer | Closing the Advice Gap | CP22/24.](#)
52. [Q2 2022 Venture Pulse Report – UK - KPMG United Kingdom](#)
53. [techUK Local Digital Capital Index 2022](#)
54. [FarrPoint Digital Connectivity Survey 2023](#)
55. [Better Together: Why Unified Communications + Contact Center Drive Improved Business Outcomes - Metrigy 2022](#)
56. [Generative AI at Work, National Bureau of Economic Research - 2023](#)
57. [UK tech sector retains #1 spot in Europe and #3 in world as sector resilience brings continued growth - GOV.UK \(www.gov.uk\)](#)
58. [UK university spin-out companies now employing 100,000 people | Times Higher Education \(THE\)](#)
59. [techUK responds to DWP's consultation on enabling investment in productive finance – techUK 2022](#)
60. Budget submission
61. [Average monthly rent of laboratory and life sciences space in the leading science cities worldwide in 2020, by city - Statista](#)
62. [Open letter on future reform to the electricity connections process – Ofgem 2023](#)
63. [Spring Budget 2023, HM Treasury](#)
64. [Independent Future of Compute Review, Department of Science, Innovation and Technology 2023](#)
65. [UK unveils world leading approach to innovation in first artificial intelligence white paper to turbocharge growth – DSIT 2023](#)
66. [Growing the artificial intelligence industry in the UK – Independent report by Dame Wendy Hall 2017](#)
67. [AI Adoption in the UK: Putting AI into Action – techUK 2023](#)
68. <https://www.techuk.org/resource/ai-adoption-in-the-uk-putting-ai-into-action.html>
69. [National Quantum Strategy – Department for Science Research and Innovation 2023](#)
70. [Joint statement between UK and US to strengthen quantum collaboration, Department for Business Energy and Industrial Strategy 2021](#)
71. [National Quantum Strategy – Department for Science Research and Innovation 2023](#)

72. [AI activity in UK businesses: Executive Summary – Office for AI 2022](#)
73. [Taking a Quantum Leap to Tackle Climate Change – Riverlane techUK blog 2021](#)
74. [UK National Semiconductor Strategy – DSIT 2023](#)
75. [A UK Plan for Chips – techUK 2023](#)
76. <https://www.gov.uk/government/publications/integrated-review-refresh-2023-responding-to-a-more-contested-and-volatile-world>
77. [Transport and environment statistics 2022 - Department for Transport](#)
78. [Connected Places Catapult Market Forecast](#)
79. [Open and Secure: Charting a path for UK tech in a world of resurgent strategic competition – techUK 2023](#)
80. [UK car production down -41.4% in October - SMMT 2021](#)
81. 3 COACCH (2020). Macro-economic costs of climate change. CO-designing the Assessment of Climate CHange costs. <https://www.coacch.eu/>
82. [Digital technology can cut global emissions by 15%. Here's how | World Economic Forum \(weforum.org\)](#)
83. [Pro-Innovation Regulation of Green Technologies | BCG UK](#)
84. [Report: Making the UK a digital clean tech leader \(techuk.org\)](#)
85. [Three-quarters of adults in Great Britain worry about climate change - Office for National Statistics \(ons.gov.uk\)](#)
86. <https://www.gov.uk/government/statistical-data-sets/waste-electrical-and-electronic-equipment-weee-in-the-uk>
87. [Groundbreaking analysis reveals a fully flexible energy system could cut the cost of reaching net zero by up to £16.7bn a year in 2050 – Carbon Trust 2021](#)
88. [Accelerating Net Zero Delivery Unlocking the benefits of climate action in UK city-regions – URKI and PWC March 2022 UK](#)
89. [Digital Regulation: Driving growth and unlocking innovation, The Plan for Digital Regulation – DCMS 2021](#)
90. [Digital Regulation: Driving growth and unlocking innovation, The Plan for Digital Regulation – DCMS 2021](#)
91. [Public attitudes to data and AI: Tracker survey – CDEI 2022](#)
92. [Ofcom Media Nations 2022 – Ofcom](#)
93. [Generative AI at Work, National Bureau of Economic Research - 2023](#)

About techUK

techUK is a membership organisation that brings together people, companies and organisations to realise the positive outcomes of what digital technology can achieve. We collaborate across business, Government and stakeholders to fulfil the potential of technology to deliver a stronger society and more sustainable future. By providing expertise and insight, we support our members, partners and stakeholders as they prepare the UK for what comes next in a constantly changing world.



[linkedin.com/company/techuk](https://www.linkedin.com/company/techuk)



[@techUK](https://twitter.com/techUK)



[youtube.com/user/techUKViews](https://www.youtube.com/user/techUKViews)



info@techuk.org