Speech by the Permanent Secretary to the Department for Digital, Culture, Media and Sport, Sarah Healey CB: "The future challenges for digital policy making in HMG"

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Slides referred to in the speech are available at the end of this transcript

Introduction

Thank you for joining the second of two speeches on digital policy making within the UK.

I gave the first of these speeches in July. How very long ago that feels. A time when we thought we might only have one new Prime Minister this year. It focused on the history of digital policy making in the UK and how the civil service shaped itself to respond to the significant effect of new technology on our economy, our society and our lives. I hope some of you listening today were able to join that first speech and I very much enjoyed the questions and discussion that followed it. I have subsequently also dug out the 2005 digital strategy produced by the PM Strategy Unit, my alma mater in government. I highly recommend it, and indeed the whole archive of that unit if you want a tour of familiar policy challenges and how they have been seen over time. They are all available online thanks to another DCMS body, the National Archives.

Today's speech will focus on the future, and particularly the future challenges for the civil service in developing digital policy. Digital transformation required new policy decisions and delivery by public administrations, in the UK and globally. While we may have acted, in my view, initially, too slowly and been insufficiently strategic in engaging with these changes, we now face the future from a better place. Politicians across the Western world are committed to realising the opportunities of technology while also recognising and managing the risks it brings. The UK has an established, complete and coherent digital policy capability in my department, the Department for Digital, Culture, Media and Sport. Digital policy expertise and ambition is more embedded in the strategic decisions the government takes on international relations, growth and innovation, trade and defence. All of this is a strong and necessary foundation for any government of a modern, digital economy and society. There is satisfaction to take from that although we should also recognise the opportunity cost to the UK, and other countries, of not having moved fast enough.

We should - on the basis of history, however - expect the change driven by technology that we have seen to date is likely to be dwarfed by the change we will see in the future. Because it's hard to imagine a different future, our default is to think we have been through the industrial revolution, come out the other side and never again will we see the changes we have so far. You can see this assumption built into policy documents on technology throughout history and certainly in relation to the digital economy and society. Knowing this, we should learn the lessons of the last two decades of work on digital policy to ensure we are not caught unawares.

Moore's Law posited processing powers doubling every 2 years. We are now in a world where AI compute power is doubling every three months. We can't be quite sure what this will mean for the future, but it will mean something and so we should be ready for it.

This speech is not a policy speech. I won't look at questions like whether or not or how we should regulate the Metaverse or what is needed in education policy to ensure children have the skills they need for the future. Those questions are for ministers and Parliament. Rather, I will focus on the strategic, institutional challenges the civil service and public administrations will face in developing digital policy in the future and how we might best overcome them.

My hope is that these speeches shore up institutional memory, stimulate discussion, and offer a moment for reflection on where we need to go next.

Section 1: The categories of challenge

Now, I'm conscious that I am speaking to an audience which includes academics and technologists. People who are predicting the future by creating it. Future prediction is unbelievably hard to get right. It's not a skill civil servants are well known for.

Some of the challenges I discuss this evening may not come to pass, some of the promise of new technologies and the effects of them we are preparing for may never emerge. However, I am pretty sure that other, as yet unforeseen issues will emerge as cutting edge research and application creates changes that we never predicted.

Also, you will note as I go on, the further into the future we get, the less specific my thoughts are as to the shape of our response to those predicted challenges. Better not to focus on those kinds of specific predictions for all of the above reasons. Instead, I focus on the principles and capabilities that will need to define that response, so that we are ready for anything that comes.

I see three categories of challenges for us in digital policy making. The first is those we know we will face. We have already experienced them to varying extents in these early years of policy making in the information age, and they shaped our institutional response as I set out in my first speech. Meeting them requires further improving and embedding skills, responsibilities, tools and partnerships tailored to the known challenges of digital policy making.

I hope those of you who attended or read that speech will forgive a slight recap of them here. As I described then, building a strong digital policy capability in DCMS meant grappling with the pace at which technology was changing and consequently the speed at which we were seeing its impact on our economy and society. It required HMG as a whole to wrap our arms fully around the breadth of impact digital technology and the technology sector was having and its interaction with political objectives. We had to stop looking at economic, societal and security implications of technology in isolation and instead bring them together in our policy analysis and advice on the decisions - and trade offs - that ministers had to make.

Finally, we had to recognise that digital change and new technologies and services were being driven by global companies, the largest and most significant of which were headquartered outside the UK. Consequently, the effect of technology change, and the policy responses to it, were materialising simultaneously in multiple different jurisdictions across the globe. Those three challenges: pace, breadth and global effect will continue.

The second category of challenges flow from those we have already experienced but will require a further expansion of our thinking, our capabilities and our ambition to exploit new opportunities and manage the totality of risk. Our ability to identify these now is itself a positive sign. It shows the digital policy capability we have built is working and that we are looking beyond the immediate issues we need to respond to. But, that will mean finding ways to manage uncertainty and addressing gaps that may remain in both our own and global capability.

Then, finally, we have the challenge I ended my last speech on. Seismic change. What if the next stage of technology revolution has an even greater impact on our economy and our society? What if the Information age is eclipsed very swiftly by an Augmented or Quantum age? How must we respond to the colossal, transformative economic and societal impacts that could have? I will set out some of the principles that would need to guide a potential transformation in our thinking, our structures and our capability.

Section 2: The known challenges

Let me start though with those known challenges.

The American futurist, Alvin Toffler, was one of the first people to characterise the ways in which technology was changing our lives at the end of the 20th century as an Information Revolution. What he saw as the third wave of fundamental transformation following the changes brought first by settled agricultural society and then by industrialisation.

Those earlier revolutions brought massive benefits: longer lifespans, improved living standards, the creation of leisure time and the cultural institutions to spend it in. They also brought new harms and new risks. The Industrial Revolution and its demands for resources resulted in environmental damage as well as exploitative labour practices, particularly against women and children. Standardisation of technology, like rail gauges, civic responses to public good problems like sewerage, the creation of early forms of health and economic welfare as well as labour laws followed as the national government got to grips with the necessary policy response.

In this way, the change wrought by the Information Revolution and the need of government to manage the harms is not new. Society has gone through such upheaval before, the harms have been gradually managed and the opportunities embedded in how we live and work. However, as James Plunkett notes in his recent book End State, the policy response to the impacts of such technological shifts typically lags, sometimes considerably. And what is new with the Information Revolution compared to those earlier revolutions, and which presents particular challenges for digital policy, is the sheer pace of change.

The Industrial Revolution played out over close to a century, and the policy response took at least a further 50 years. The Information Revolution has been much speedier. It has had a massive effect in just a few decades - probably three times faster on its impact and - optimistically - twice as fast on formulating a policy response. So, the consequence of any delay in policy response will also be greater.

On digital policy, we have been quicker, but not yet quick enough to get ahead of the real world impact of technology change. Plunkett likens it to our having to ride a beast; a beast that we slowly mastered while it was shifting from an industrial creature to electric, but which is now morphing faster than ever into something made up of light and pixels. His implication is that while its increased power and speed can bring even greater benefits, we must learn to ride it more quickly than ever before.

He is right. We are seeing the pace of that change around us. Generations of the population have only ever used digital technology. Transformed economies are now dominated by tech companies who are taking decisions at the geopolitical level without legal or democratic boundaries. Military capabilities geared around cyber as well as traditional military attacks. Consequently, we see evidence of uncompetitive markets, damage to mental health, disinformation attacks on the fabric of our society and digital threats to our critical infrastructure. Deep and widespread changes affecting our society.

There is also no indication that pace will slow. We all continue to spend more and more of our time online creating the demand for new digital goods and services. Investment in the tech sector and start ups remains high even amid market volatility. Research and development investment by governments is at a record high while at the time some companies are spending more on R&D individually than the governments of developed economies. In fact, there is an uplift in the number of digital technology related patents being registered across the last 20 years, from the low hundreds in the 2010s to thousands in the last few years across future telecoms, IoT technology and Smart Cities. As an aside, it is notable that a lot of that increased volume in patents is coming from Chinese investment with obvious future implications.

So, how do we respond as policy makers to this pace?

Crucially, we will always lag behind real world change if we can not and do not build the knowledge and skills to better predict the potential impact of technology.

There may be people in the tech and media industry who will say they foresaw the pressures on traditional news publishing from the creation of the internet. Perhaps they did. But it is unlikely that they also predicted the further effects identified by the 2018 Cairncross Review, which showed that as people went online they spent less time engaging with the news, and public interest news especially, and found it more difficult to assess its reliability. And so, beyond press sustainability, a further public policy challenge emerged: managing what this means for our democracies and democratic engagement especially. That is just one example of the challenge for policy makers; to become better at predicting the full range of risks in order to reduce the lag of the full policy response.

This isn't a surprising place to be. As I said at the outset, predicting the future is difficult. We see the winners of it in the private sector, but not the losers. The 2021 Integrated Review of Security, Defence, Development and Foreign Policy concluded that the UK government needs to improve our ability to identify, build and use the UK's strategic science technology capabilities, including through better science and technology horizon scanning. As well as the more sophisticated predictive techniques available to us, this is also about using our imagination better and opening ourselves up to the possibility that all aspects of our current paradigm are open to change.

On a more practical level, we need to ensure that the civil service itself is made up of a broader range of perspectives, of expertise. For digital policy, that means making sure we have more officials with a scientific and technical background, who can better understand the nature of new technology and better assess the impact it may have. There are proposals to reform the fast stream to bring in a higher proportion of individuals with science and tech backgrounds to the generalist policy profession. I think that would be extremely valuable. Of course, once we have brought brilliant and technically minded people into the civil service we need to retain them. That means ensuring we have career paths and development offers that recognise and reward their particular expertise.

However, we can't just rely on a small cadre of specialists. We need scientific backgrounds and expertise to be as common among public servants as they are for social science and the humanities. I agree with the Chief Scientific Advisor, Sir Patrick Vallance, who argues that we need the same revolution in scientific capability across the civil service that was previously achieved for economic capability. Ultimately, not all civil servants with scientific backgrounds need to have jobs rooted in science but all must understand how science and technology affects their work and we need the diversity of thought and policy making methodologies that a scientific background brings.

We also need to ensure we have access to the best possible, objective expertise outside the civil service. In the early stages of digital transformation, I think it's fair to say we, and most government's around the world, relied on tech companies to help us understand the nature and impact of the new technologies they were developing. That is important, and close links with industry must remain. But it is a single and partial view. To fully understand the potential impacts, the benefits and risks of new technologies, we need access to a broader range of opinions, of thinkers, of experts and critics. I am really pleased with the work our Chief Scientific Advisor at DCMS, Tom Rodden, has done to create a College of Experts to provide deep, independent, external expertise to DCMS at all stages of the policy making process. The College includes some of the UK's best academics in areas like data science, information security, advanced research computing and digital culture. This gives us, in DCMS, an unprecedented level of access to digital and technology expertise that will help us respond more quickly to technology change and better predict the scale and extent of policy response needed.

Deployed well, this better expertise should help us catch up with the pace of technology change, to stop our policy response lagging behind. There are positive signs of this in our forward thinking work like our AI Strategy, our Future of Compute Review and our work with the research community to look at emerging issues in gaming, like loot boxes.

Pace of change is not just a challenge in terms of how quickly the future arrives, it is also a challenge in how quickly we can respond when it does. The policy making process is slow and legislation is a lengthy process. There are sound reasons for this. Our democracy depends on Parliament being the legislator and having the time it needs to interrogate, amend or decline to pass laws the government proposes. There are also legal duties on the civil service to properly consult on policy before it is implemented and to thoroughly consider its impact on all groups including the most marginal.

It is not for the lawmaking process to be the source of disruption. We need to be mindful of the market and life-changing impact new laws can have and that calls for a thorough and prudent approach to implementation. There is always a risk, especially in emerging and novel areas like digital policy, that government intervention has unintended consequences, imposes inappropriate burdens or even creates new harms.

Meeting these responsibilities for responsible policy-making adds up to months and years in the policy implementation process and there are often months and years before that in developing policy itself and the political design choices for ministers.

Many of you in the room will be familiar with this cycle, but for those that aren't the slide behind me shows snippets of the lifecycle of our work on online safety (Figure 1 at end of transcript). That might roughly be said to have started shortly before the creation of the 2008 Byron report and is concluding an important phase of its policy life with the ongoing passage of the Online Safety Bill, which was introduced 14 years later in 2022 and which will provide the first full regulatory regime for online harms and safety in the UK and, likely, the first comprehensive approach globally.

So, developing good policy does take time. And while we can no doubt improve our speed to an extent, I will not be calling for the end of those legal and democratic checks and balances in this speech. I hope this is a relief. Probably not helpful for a civil servant to make a public speech calling for some form of revolution. Instead, we need to think about how else to mitigate against the risk that the pace of technology change is just too fast for responsible policy-making to keep up.

There are tools to do this. They have their risks as well as providing greater agility and responsiveness. I don't think it is surprising that many pieces of legislation relating to digital policy make use of delegated powers, which allow the government to make certain, future legislative changes through secondary rather than primary legislation. The argument is that the quicker secondary process allows us to better keep up with changes to technology and their impact. For example, to expand the scope of technologies or sectors caught by certain regulations as the impact on them is proven.

Greater responsibility is also being placed on regulators to produce guidance, often statutory codes, in lieu of prescribed detail in legislation. Such tools allow public bodies to respond to changing technology in months rather than years, provided they stay within the broad principles and requirements of the overarching legal regime. That guidance can have as much impact as and be as influential as legislation itself, as shown by the ICO's Age Appropriate Design Code which front ran elements of online safety regulation by placing controls on adult to child messaging and prohibiting ads from targeting children. It can also

be as complex, that Code for instance required much consultation with industry to get the balance needed in it right.

These legislative and regulatory tools are not unique to digital policy, but the turbulent impact of rapid tech change makes them more necessary and so more likely to be used than in traditional, more stable policy environments. But, the cost for this agility is less Parliamentary and government involvement in decisions and so, critics might say, less democratic accountability. So, if they are used more often, it is important we understand the options ministers have to manage those risks.

There is long list of options available to ministers and Parliament to provide safeguards for the use of regulation-making powers. Greater use of the affirmative rather than negative laying procedure, which grants Parliament an automatic say; enhanced Parliamentary scrutiny procedures, similar to primary pre-legislative scrutiny; consultation requirements and obligations to lay supporting evidence before Parliament. And, of course, simply ensuring the powers are as narrowly and specifically defined as possible from the start.

The balance for greater regulatory empowerment can be robust regulatory governance, enshrined in statute. This is illustrated in the Data Protection and Digital Identity Bill which was introduced earlier this year. While that Bill's passage is currently paused it includes examples of these governance tools, namely: the ability of the ICO to create statutory codes is balanced by stronger regulatory accountability requirements, the Bill includes clear regulatory outcomes to guide decision making and it sets new requirements on the ICO to consult with relevant experts and to produce regulatory impact assessments.

Of course, such tools only get us so far. They have the potential to make traditional policy interventions like legislation more agile. But what if our policy interventions could better shape technology as it was developed, reducing the need for us to predict uncertain futures or respond as best we can after the event?

This doesn't always mean new powers.

It has long been best practice for governments to encourage development of technology to design out problems in society as well as to work voluntarily with industry to address potential risks and harms. We deploy these, of course, working with international partners on issues like the development of Privacy Enhancing Technology.

We have also been active in working with regulators to make sure they apply existing powers and processes to the new issues created by technology. Indeed, with the Digital Regulators Cooperation Form, the ICO, CMA, FCA and Ofcom have pooled expertise to enhance collective regulatory capability and cooperation on digital issues.

But the unique nature of how technology is developed creates new opportunities.

For example, one area where we are increasing our efforts is in working with industry and international partners to shape the digital standards on which new technologies are based. If you're not familiar with this world, examples include ISO standards for addressing unwanted bias in AI systems. The DCMS-initiated AI Standards Hub, launched in October 2022 and

run by the Alan Turing Institute, National Physical Laboratory and British Standards Institution, brings together industry, government and academia, and creates a vehicle for UK thought-leadership on AI across the world.

The right technical standards can embed the values we want technology to reflect, protecting the privacy and security of users, embedding transparency and accountability, and minimising energy use. Working with multi-lateral stakeholders, if we get this right, we can make the regulation of new technology more efficient and less burdensome. In some cases, we may remove the need for regulation at all while also embedding our values - fairness, openness, freedom - in technology as it is created.

So, a response to the pace of technology change will be felt in the expertise we apply to digital policy making, where we intervene in the tech development cycle and in the design of digital policy legislation and regulation. At its best, this approach will help us get ahead of the curve of tech change and, where we have to respond to events, can ensure we are future-proofing our interventions. It represents a necessary evolution in our policy making capabilities in a digital age.

Pace of change was my first challenge. Breadth is the next.

In my first speech, I explained that one of the learning points as we built our digital policy capability was that we couldn't isolate the economic, societal and security impacts of digital change and respond to them separately. Strengthening privacy rights risks damaging digital competition, boosting connectivity and digital adoption introduced new security threats. It's an issue that's neatly illustrated in the changed nature of our digital policy responsibilities and structures in DCMS.

The slide behind me shows in a couple of example areas how we expanded digital policy capability as it came into the department and in order to tackle all elements of technology change and its impact (Figure 2 at end of transcript).

Our first digital and tech policy team was purely economically focused. We built the capability with what was then BIS, and HMG's view then of tech policy was how do we grow the sector, attract more jobs and investment to the UK. As our expertise grew the team's responsibilities broadened, taking on digital regulation, digital competition as well as managing both the growth and the risks of the UK's leading AI capability.

Similarly, data policy moved to us as a rights issue from MoJ. Now, our data policy team also leads on the economic and productivity potential of data access, data's importance to scientific development as well as the security risks that come with datas' economic criticality.

The need to reflect that complex and broad impact in our structure, responsibilities and skills is not just relevant to DCMS. The impact of technology change has significant implications for how the government as a whole and individual departments respond.

It remains important that we have a coherent digital policy capability in a single department, DCMS. This means we can take a more strategic, a more national response to digital issues. But, the impacts of technology change impact every facet of our society. To have an effective

public policy response in the future, it is not sufficient to have an expert digital policy capability only in DCMS. We must mainstream tech and digital policy expertise in all policy departments, reflecting the way digital technology has permeated all aspects of modern life. For example DfE harnessing the opportunities offered by ed tech while managing the policy risks. The Treasury examining the role cryptocurrencies in our financial system and the fact finance companies and tech companies are increasingly the same thing. A combination of departments managing the implications for our democracy when the internet is changing how people engage with politics and elections. I could go on. All departments are affected. And that requires the same investment in digital policy skills, knowledge and network building in those departments that DCMS is already making.

DCMS does, of course, have a role to play in this. The digital policy capability we have built means we can improve collaboration and coordination across government as a whole, on those digital policy issues which require cross-sectoral responses and where multi-disciplined teams are needed to solve problems. As digital policy lead DCMS works closely with BEIS on tech and innovation investment and skills, with the NCSC, and wider GCHQ, on the security of our critical digital infrastructure and ensuring the market has security obligations built in upstream in the digital economy. We bring expertise to bear to support DIT on digital trade and FCDO on global digital policy debates.

But we also have a dependency on those departments and the system as a whole, for the right STEM skills, for instance. To create a coherent, stable regulatory environment requires global regulatory diplomacy and our strong information services export industry needs novel and ambitious trade agreements to increase access to markets, remove barriers and combat tech protectionism. The accelerated rollout of higher speed internet access was in part dependent on the government system working together to tackle planning barriers, and not simply putting more money into the system.

Going forward, digital change is only going to burrow itself more deeply into the fabric of our society as new digital services emerge and more and more industries adopt a tech-led approach. To provide a coherent policy response we must continue to invest in digital policy expertise across the whole of government and learn how to pull it together. Creating cross-departmental, multi-disciplinary teams to solve complex and long-term digital policy questions should, as the declaration on government reform set out, become routine. We must also ensure that governance and decision-making at the highest levels takes account of the role technology plays in the biggest problems and the biggest opportunities the country and the world is facing. The Office for Science and Technology and National Science and Technology Council, chaired by the PM, is critical to driving this approach top down. It won't surprise you to hear that I think DCMS expertise is critical discussions that determine our national approach on growth, on security and on the preservation of our democracy.

Breadth and depth in our digital policy capability is therefore key to tackling the breadth and depth of technology's impact.

The final issue in this category of challenges we can reasonably expect to continue is the global nature of digital change. Global in three ways; firstly, the change itself is happening in multiple jurisdictions, driven by global companies. Secondly, governments, including the UK, are creating their national policy responses in multiple jurisdictions at once. And thirdly, and

perhaps most importantly, the internet, the vector for digital change, is to all extents and purposes borderless so technology has little regard for sovereignty in its impact.

Initially, global, homogenous digital transformation at the start of the 21st century made policy makers wonder where governments even could respond to technologies' staggering impact on our societies and economies. We learnt that we could, and that we had to. But to date, we have largely responded unilaterally. This has resulted in a fragmented global landscape of regulations, trade agreements, international treaties and MoUs on digital policy. There are hundreds of data protection regimes globally, the UK and the EU are simultaneously designing their own digital competition and online safety regimes, first-of-their-kind agreements like the UK-Singapore Digital Economy Agreement are being struck to take advantage of the opportunities of digital cooperation.

It used to be common to describe the internet as a wild west, yet to be commonly civilised through regulation and commercial best practice. Given what I have just described, there's an argument that the global digital policy landscape has a similar wildness to it. Global regulatory fragmentation is creating burdens for organisations that have to comply with multiple, inconsistent digital regulation regimes. Extraterritoriality of laws designed to deal with the internet's limited respect for borders raises complications of legal sovereignty and enforceability that haven't yet been fully tested in the courts. Competing values between countries pitch states against each other; do we most care about free trade or privacy protection, competition or safety, surety of national security or access to investment.

Ultimately, what we are seeing is intense Great Power competition as digital policy intersects with more traditional foreign, economic and national security diplomacy. And this is a different kind of competitiveness challenge from the ones of the past - about strategic dominance of states which already has a deeper and more fundamental reach than it ever has before and the potential for even greater reach, with the consequent impact on our national security.

Progress is being made to confront this challenge. At the political level, the G7 and G20 are increasingly agreeing the principles needed to create a common view of democratic economies' collective goals for the digital economy. Organisations like the WTO and the OECD are starting to create common practical baselines and expectations for what concepts like free trade and fair economies mean in a digital age.

The UK and DCMS have been a leader on making further progress here. Our chairing of the G7 in 2021 included a dedicated 'digital' track. The UK also started many of these conversations at the global level through our Future Tech Forum. But they are conversations that must continue and global coordination is a challenge we are only at the foothills of confronting and I will return to this issue as we get further into the future in this speech.

Let me pause for a moment. That whole section was, I appreciate, quite techy. For those less intrigued by legislative processes and the structure of government responsibilities, I hope you will find the next section more engaging. I promised to try and make some prediction of the likely challenges we have not yet experienced, but which are likely to require us to expand our capabilities and our approach. Let me turn to those.

Section 3:'Expansionary challenges'

The first of these challenges is rooted in how technology is reshaping our economy. There is now every indication that a nation's future economic competitiveness and growth is going to be dependent on their access to and creation of new digital technology. Indeed, the World Economic Foundation estimates that 70% of value created in the economy in the next ten years will be digitally enabled. This realisation is already driving the industrial strategies of our global economic competitors, China, Europe, Japan and the US.

There are also arguments that societal wellbeing as a whole will depend on new types of digital infrastructure that provides fair access to the benefits that digital innovation brings and the resources that drive it.

This requires us to expand how we think about the enablers of growth and societal wellbeing. We must try to predict what technology ecosystem is needed for the decades ahead. Some elements of that future ecosystem are clear and have been over generations of economic change: a suitably skilled workforce, stable regulatory environments, a thriving R&D environment and financial capital access. But where I expect we are likely to see a difference is in the infrastructure needs of the future digital economy. And the challenge is avoiding the mistakes of history whereby investment in new digital infrastructure lagged behind need or that only served commercial interest at the expense of public good.

So, in order to ensure our status as a world-leading economy in 10, 20 years time, the UK will need to make long term bets on its future digital infrastructure needs to retain competitiveness and create a fair society. And, given the winner-takes-all nature of the digital economy, first move advantage will be key if we want to be creators and shapers of the next wave of innovation, rather than just consumers.

This is not a new problem for governments. For centuries we have invested in traditional brick and mortar infrastructure, making predictions for future need based on population and economic growth. During the Industrial Revolution, we invested in canals, railways and sewage systems. Across the decades, our focus changed to electricity networks, roads and rail. And it is fair to see we are already thinking about the future. DCMS is investing billions in gigabit connectivity, replacing decades old technology, in recognition of how dependent our economy has become on high-speed connectivity while also building ahead for our future needs.

However, the infrastructure of the future will not be the same as the infrastructure of the past. Particularly, the boundary between infrastructure and innovation, and what drives growth and productivity, is blurring. Yes, our society, our industry will continue to need the fungible infrastructure that has traditionally and literally 'kept the lights on' and enabled new growth. That is why industry strongly supports investment now in rail, roads and air infrastructure and why recent governments have been clear improving such infrastructure is a priority for growth. Yet, in the future, growth and economic competitiveness as well as general societal progress may also be dependent on access to new types of digital infrastructure and knowledge assets. These will look very different to traditional infrastructure - created from technology systems, new legal frameworks and cutting edge knowledge and applications.

As our economy grows ever more digitally connected and dependent, the next generation of industry may become less concerned about further improved rail and air links than they are about access to that future, digital, infrastructure. A high growth and high innovation economy may require access to common data sets and architecture to deploy AI. The existence of digital identities across the population may be a prerequisite to support rapid deployment of more efficient and productive digital services. The availability to scientists of supercompute technology and shared research clouds may be critical to yielding insights more quickly than their competitors and so maintaining scientific leadership.

Inevitably, given the pace of technology change, such new, digital infrastructure will also be needed more rapidly than government is used to making its investment cases and delivery plans. The challenge of pace again.

And, beyond the economy, delivering the best and fairest outcomes to our citizens may, to borrow a phrase used by others, be dependent on creating new types of 'civic digital infrastructure'. Infrastructure that ensures society as a whole benefits from future technology and the digital knowledge assets, like data, that our societies create. For example, what societal model do we want to create for Smart cities when the data points of how we live becomes a new economic asset capable of transforming outcomes on planning, mobility and health.

This raises questions for the role of government: Will the market provide this infrastructure itself? What should government do to ensure public good as well as commercial benefits are realised? Are states going to provide sufficient sources of innovation infrastructure funding in a time when industry R&D spending outpaces civic investment? Will the supply chains that underpin this growth-driving infrastructure be sufficiently secure and resilient?

It is our ministers that will answer these questions, but the civil service must be able to provide quality advice to help them do so.

That means DCMS and the wider civil service must have the skills and the confidence to lean into the challenge of predicting the future infrastructure needs of an increasingly digital and tech enabled country. We did this on telecoms, but we need to go beyond that.

It means we also need to be able to understand and frame the novel political choices for ministers in designing digital infrastructure and its role in society - the democratic choices at the heart of how technology interacts with citizens. For example, who should control data? Is it protected intellectual property, is it each individual citizen's, is it a collective public good? Public attitudes to technology and data use will determine how much is possible here and need to be well understood and also shaped.

These are all things I am confident we can achieve but require a further expansion of our digital policy thinking into that future.

The long term nature of how technology's impact will unfold also requires us to confront a second challenge for the future. There is a need to expand on how we develop investment cases so that we can better judge and advise Ministers on the case for investing now in these novel enablers for economic growth - scientific leadership, technology security, access

to the tools and systems that allow new digital innovation. There has been good progress with the creation of ARIA for instance, but we will need to expand our capability beyond innovation case-making to be able to determine the case for new types of digital infrastructure. That requires similar long term bets, which will need to be justified alongside investment in traditional infrastructure, and its 'smart' variants.

That means, we either need to develop as robust evidence to accurately decide the balance of investment between proven physical infrastructure and new digital infrastructure. Or we need to be more comfortable taking multi-decade bets that may not all pay off. Accepting higher risk in face of the potential colossal returns. The OECD has estimated better access to data alone could add 4% to the GDP of developed countries. Other research, from PWC, predicts a 10% rise in GDP by 2030 from adoption of AI, and related technologies.

This may, as the economist Diane Coyle argues, require a paradigm shift in the type of economics we apply to digital policy. Coyle makes the case for government adopting types of economic analysis which can better take account of the complexity and multi-agent nature of our digital economies. A similar conundrum lies in how we value the contribution of knowledge assets, like data, within our societies.

And behind the scenes, being wonky about it, we need to put the right processes in place to ensure investment decisions to support long term economic growth take full account of the likely importance of technology and digital infrastructure to our future economic success, the UK's competitiveness and the strength of our society.

There are already examples of this around the world. The European Union is creating data spaces to drive better healthcare delivery, to enable innovation in energy and green technologies, to create better finance and mobility services. The South Korean government is investing in the data sets and technical assets to accelerate their domestic AI capability. The Chinese are building digital free ports that consolidate cutting edge telecoms, data and tech labs to create a competitive edge in future technology development. We as civil servants should have the expertise we need in understanding what is happening elsewhere so that we can advise Ministers in how best to learn from it.

This is a reminder of the importance of a global outlook. Particularly, whether we are able to have the right discussions and take the right action at the global level to meet global digital policy issues.

Earlier in my speech I highlighted the work of the WTO and the OECD as well as the increased focus the G7, G20 and other global forums are placing on digital policy. This is positive and necessary. The multi-lateral institutional landscape will need in future to be able to match the global digital policy challenges it may face in scope, in speed and in expertise.

There are challenges in even like-minded states agreeing common positions given competing domestic values and the concentration of the biggest tech companies within a few countries. Tech protectionism has emerged as an economic outlier as particularly developing countries seek to boost domestic industry against well established US or Chinese firms.

Compounding these is the risk that digital policy issues go beyond the traditional wheelhouse of existing multi-lateral fora, who can resolve such issues, and their focus on trade, economic development or security, with a single institution rarely looking at more than one of those issues. An approach we know does not work for digital policy.

While the status quo may be the right approach for certain types of bodies, like standards institutions, this global challenge has led some to call for a Bretton-Woods Conference equivalent for aspects of digital policy, like international data flows. Commentators, including the former UK Information Commissioner, Liz Denham, argue that the same radical and visionary thinking that was applied to global financial and monetary policy in the forties is needed for the big, global policy questions being thrown up by technology change. And, tellingly, Bretton Woods also resulted in the creation of new mullti-lateral bodies to fill institutional gaps at the global level; the IMF and the early components of what came to be the World Bank. Regardless of how we do it, I think there is a need to look at well established international governance models, like for financial stability, monetary policy interoperability and the facilitation of financial capital flows, and ask what capability might similarly be needed to enable a global response to issues like digital competition, data access and the safe and trusted use of AI and to ensure that response is guided by democratic values.

Of course, as well as ensuring we have the structures for engaging with digital policy at the global level, we also need to ensure we are truly engaging with digital policy as a global issue. Particularly, we need to expand the discussions we are having internationally to recognise and confront the global digital divide.

Earlier in this speech I spoke about the tensions that exist simply between the leading digital economies. Those tensions often dominate our international discourse yet many countries' priority is securing cheap, reliable internet access for their citizens, not focusing only on theoretical questions of digital governance. The same World Economic Forum research I cited earlier on growth also estimates that nearly half of the world's population is not connected to the internet. This was a point we heard strongly from many African and Asian delegates to our Future Tech Forum as they encouraged us to focus on more than just the issues that concern the most developed digital nations.

As digital policy continues to develop, this global digital divide will require us to expand the scope of the global conversation on technology change. Only confronting the digital policy issues that are a priority for digitally-developed states leaves significant gaps in coordination. This has major security as well as economic dimensions. There will be a premium on ensuring that the digital dividend is experienced globally - in ensuring that the future actually is distributed evenly. That may mean ensuring access to technology as well as those novel digital infrastructures I spoke of. Making a positive case for sharing our vision for a digital world, as well as measures to tackle situations where our values on issues like free trade and privacy are not followed will be significant. If we don't, others, who do not share our values, will fill this gap with their own vision and their own offers to less developed countries.

Section 4: Seismic change

That brings me to the final section of this speech, and the biggest 'what if' future challenge we may face. What if all of the change we have seen to date from technology change pales in comparison with the change to come. What if artificial intelligence makes our economy unrecognisable, as whole industries and sectors are transformed by fundamentally different means of operation? What if quantum technology leads to such a step change in computational productivity that previously impossible innovation becomes possible? What if the automation of vast swathes of production re-define our concept of the labour force? What if new augmented and virtual realities change the very nature of our society and how we interact as humans?

The UK and all governments around the world must be able to respond to these scenarios. It may be that expansion or evolution of our structures and capabilities are not sufficient in the face of the change, but that a significant transformation is needed to confront the scale and scope of policy repercussions. It would be foolhardy to try and predict how we might do that in detail. But there are some principles we can draw from our work on digital policy to date that I think we can apply:

Most importantly, we should not assume in the face of monumental change that a policy response is impossible. As we have learnt, governments can and should shape the impact of transformative new technologies on our citizens.

In developing that policy response we must recognise that this change is not a technology issue, but a societal one. The whole of government must collectively play a role to predict the impacts and implement a coherent, strategic response.

We should be hard-headed in assessing the opportunity cost of not acting speedily enough, using that as the driver to ensure difficult decisions for how we must respond as an institution are not delayed.

We should act unilaterally where we can but we must also quickly build a framework to cooperate globally on those problems that will inevitably need global solutions. We should invest early in creating the multi-lateral institutional capacity to develop and implement them, and closely monitor their efficacy.

And, finally, to do all this we must continue the improvements we have made and are making now to enhance government's technology expertise, to improve our horizon scanning and to maintain a core digital policy capability in DCMS and across government.

I am optimistic about that future. Technology has brought incredible benefits to our society in these last 20 years. And while we have historically moved slower than we might have liked, we have shown that public administrations can step up to manage the harms than come with those benefits. We are more clear eyed about the future challenges we might face. We are absolutely more prepared to confront them.

End and thanks

Thank you. That brings me to the end of this speech. My last speech was rooted in history. You may have argued with some of my interpretations but the nuts and bolts of how the UK's

digital policy capability developed is based in fact. This speech, being focused on the unknown future, is much more speculation and, indeed, imagination. As such I hope you will have strong views of your own on it - so I look forward to your questions. I think.

Before I turn back to John. I want to once again thank the Strand Group for facilitating tonight's event. It is a pleasure to have been invited back for this second speech. I also want to thank our sponsors, Amazon Web Services and Workday for allowing it to happen.

Thank you.

Slides referred to in speech

Figure 1.

Development of Online Safety policy

- **2008** The Byron review "Safer Children in a Digital World" prepared for the Department for Children, Schools and Families
- **2011** Internet Service Providers introduce voluntary code of practice on parental controls
- **2017** Digital Economy Act requirement for a statutory code of practice on bullying for social media companies
- **2019** DCMS and the Home Office publish the Online Harms White Paper
- **2020** The government's interim response (February) and full response (December) to the Online Harms White Paper consultation
- **2020** ICO's Age Appropriate Design Code comes into force
- **2022** Online Safety Bill introduced to the House of Commons and is currently mid-passage

Figure 2.

Examples: unpacking the extent of digital policy

From BIS: "Digital economy"

From MoJ: "Data protection"

Digital and Tech Policy

Data Policy

Digital Strategy

Digital Regulation and Artificial Intelligence

Tech Sector Growth

Digital Markets

Data Access

Data Rights

Data Flows

Data Security & Infrastructure Resilience