

BRIEFING PAPER

MAKING BRITAIN THE BEST PLACE FOR AI INNOVATION

Introduction

How can the UK develop a world-leading Artificial Intelligence (AI) sector? A recent Government report from the independent AI Council has a number of suggestions.¹ They include better access to data for startups, investment in infrastructure, and funding. While these are steps in the right direction, the UK can and should be more ambitious - particularly in light of its upcoming National Artificial Intelligence Strategy.

The Government's recently published '10 Tech Priorities' are commendable but light on details of how these ambitions will be realised.² Over the past few years, we have seen few concrete measurable policy proposals: while initial efforts to address the AI skills shortage are positive, there have since been too many white papers, events, guidance and panel talks with no clear impact. As the House of Lords' latest report on AI puts it, "there is no room for complacency".³ Now is the time to act.

With the bulk of Brexit negotiations and policymaking now behind us, the Government should be empowered to focus on accelerating growth, strengthening the UK's tech sector, and supporting high impact research in emerging technologies. While the UK is a global leader in research, development and talent, the Tortoise Index ranks its Government strategy - defined as financial and procedural investment into AI extracted from government communications - only 13th internationally, which puts it behind Belgium.⁴ Stanford University's newly released Global AI Vibrancy Tool ranks international success across selected metrics such as private investment, skill penetration and patent citations - the UK went from 5th internationally in 2015 to 10th in 2020.⁵

Getting AI policy right will prove incredibly beneficial. AI will have important implications for the environment, productivity and competition.⁶ It has already led to impressive breakthroughs, such as DeepMind's solution to the protein folding problem and OpenAI's groundbreaking DALL-E model.^{7,8} It also has the potential to change the innovation process itself.⁹ But for these benefits to materialise, barriers to entry need to be broken down and competition must flourish.

In this briefing I set out eight recommendations to maintain and strengthen

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1 UK AI Council. (2020). AI Roadmap.

2 DCMS. (2021). Our 10 Tech Priorities.

3 House of Lords. (2020). "AI in the UK: No Room for Complacency" Lords Liaison Committee

4 Tortoise Media (2021). The Global AI Index.

5 Stanford Institute for Human-Centered Artificial Intelligence. (2021). "Who's leading the global AI race?"

6 Snow, J. (2019). How artificial intelligence can tackle climate change. National Geographic, 19.

7 DeepMind (2020). AlphaFold: a solution to a 50-year-old grand challenge in biology.

8 OpenAI (2020). DALL-E: Creating Images from Text.

9 Nesta (2019). AI is reinventing the way we invent.

the UK's position in this highly competitive field, and ensure its widespread adoption across sectors.

Proposal 1: Create a pool of cloud compute credits for the UK R&D ecosystem

Recent breakthroughs in AI are highly demanding in computational power (compute) and therefore dependent on prohibitively expensive hardware necessary for this, making it more difficult for the R&D ecosystem outside the private sector to undertake more ambitious projects. As research from OpenAI has shown, improvements in compute have been a key component of AI progress.¹⁰ The problem is that computationally intensive research is expensive, and so can typically only be undertaken by wealthy firms such as Google or Amazon. However, it would be desirable for these types of experiments to be accessible to academics in universities as well those in the private sector.

Last year, the US introduced the National AI Research Resource Task Force Act, following a recommendation by the National Security Commission on AI submitted to Congress in March. The initiative aims to spur and democratise AI-centred studies and applications by developing a national cloud for scientists and students to use - meaning that typically expensive experiments could be available to a wider range of institutions and researchers than is currently the case.

A national cloud-based infrastructure would provide researchers and students across scientific fields and disciplines with access to compute resources, co-located with publicly-available, AI-ready government and non-government data sets, and a research environment with appropriate educational tools and user support.

This could take the form of subsidised cloud credits not a misguided top-down attempt to recreate a public AWS.¹¹ It would allow researchers to work on socially beneficial AI applications, scrutinise commercial models, and undertake long-term research that the private sector would not naturally be incentivised to fund. This would also incentivise some researchers to stay in academia and mitigate concerns about a hollowing-out of the talent pool for public interest AI research.¹² This is important because high profile departures from AI faculties have negative effects on students' specialised knowledge, which is a crucial determinant of the success of AI startups.¹³

10 Amodei, D. and Hernandez, D., (2018) AI and Compute. OpenAI.

11 On the shortcomings of the latter approach see Krier, S. (2020). Head in the Clouds. Technologik.

12 Jurowetzki, R., Hain, D., Mateos-Garcia, J., & Stathoulopoulos, K. (2021). The Privatization of AI Research (-ers): Causes and Potential Consequences--From university-industry interaction to public research brain-drain?. arXiv preprint arXiv:2102.01648.

13 Gofman, M., & Jin, Z. (2020). Artificial Intelligence, Education, and Entrepreneurship.

Importantly, subsidising cloud-based credits for researchers can also help further the UK's environmental commitments. In 2018, 89% of computation took place in larger and more well-optimised data centres, whereas in 2010 79% took place in smaller, more inefficient, frequently non-cloud-oriented data centres. Moving to the cloud incentivises more efficient computation, combined with more energy efficient standards for data centre equipment, which can be extremely impactful: using newly available data, a new study observes a large decrease in the energy use of data center infrastructure systems, enough to mostly offset the recent growth in total IT device energy use.¹⁴

The UK should also support efforts to track compute demand and use, for example through the OECD Policy Observatory.¹⁵ This is important since computing power is an essential part of training predictive models - and unlike algorithms and data, this can be measured and therefore used to study things like correlations between compute investments and other economic indicators.

Proposal 2: Upgrade public data infrastructure and open up datasets

Back in 2018, as part of the AI Grand Challenge, the UK government committed to opening up data in a bid to push adoption of AI.¹⁶ However, not much appears to have been achieved since. Without access to good quality data, machine learning based technologies cannot deliver on that promise of smarter and more efficient products and services. The government holds an enormous trove of data, yet a lot of it remains inaccessible, mislabelled, out of date, or not correctly formatted. The Open Government Network recently urged the UK government to improve its open government agenda, further to the country being placed under review by the Open Government Partnership (OGP) for failing to meet the required standards.¹⁷

To be clear, the UK still leads international open data rankings — but this is no reason for the country to rest on its laurels.¹⁸ On the contrary, as global competition intensifies and the implications of Brexit (good and bad) materialise, now is the perfect time for the UK to double down on open data. Given the importance personal data can play in unlocking new innovations, the UK government should explore privacy-preserving mechanisms such as voluntary personal data markets and data commons. When Transport for London opened up its datasets, this allowed a number of start-ups like CityMapper to thrive, and overall added up to £130

14 Masanet, E., Shehabi, A., Lei, N., Smith, S., & Koomey, J. (2020). Recalibrating global data center energy-use estimates. *Science*, 367(6481), 984-986.

15 Johnson, K. (2021) Why the OECD wants to calculate the AI compute needs of national governments. *VentureBeat*

16 Skelton, S.K., (2018). UK government commits to opening up data in bid to push adoption of AI. *ComputerWeekly*.

17 UK Open Government Network. (2021). "Let's take back our place as a global leader in open government."

18 Open Data Barometer.

million a year to London's economy.¹⁹ Initiatives like the Bus Open Data Service, which provides bus timetable, vehicle location and fares data for every local bus service in England, have been instrumental in driving innovation.

In its National Data Strategy published in December 2020, the Government committed to "reviewing open data publication and decision-making processes to ensure their consistency; and support development of interoperable metrics to measure the impact of published data". While positive, this is unlikely to move the dial much. Tom Forth from the Open Data Institute Leeds writes that: "It should be the ambition of central government that all data it collects should be shared openly, as soon as possible."²⁰ The Government should commit to reviewing existing non-public datasets and releasing as many as possible. This would include, for example, administrative data on furlough take-up and pandemic relief related loans, or creating an open address system which would help reduce costs on small businesses, who have to pay every time a user searches an address from a postcode.²¹ This would help the UK catch-up with European rivals and support innovation in digital services within the UK.²²

Additionally, the UK should replicate the US Data Coalition's proposed OPEN Government Data Act, which sets an official presumption that "Government data assets made available by an agency shall be published as machine-readable data...in an open format, and...under open licenses."²³ This would also require departments to maintain, and publish, a comprehensive data inventory of all data assets they own.

Proposal 3: Explore innovation-friendly regulatory markets

There have been many calls over the years to regulate AI. The UK wisely avoided initial calls to create an AI regulator and has since taken a cautious approach to regulation. As the EU is finding out, designing regulations for AI is no easy task. While the desire to foster the responsible and ethical development of AI is laudable, achieving this aim without imposing onerous regulatory costs on the ecosystem is not an easy feat. Excessive red tape can lead to important welfare losses: in France, the requirement for companies to create a 'works council' when they employ 50 or more workers has led to a 5.4% decrease in innovation at the macro level.²⁴ Poor regulation can also push AI developments to other markets with friendlier ecosystems.

Instead of the overly prescriptive approach favoured by countries like

“ While the desire to foster the responsible and ethical development of AI is laudable, achieving this aim without imposing onerous regulatory costs on the ecosystem is not an easy feat.”

19 TFL. (2017). TfL's free open data boosts London's economy

20 Forth, T. (2020). National Data Strategy Consultation Response. ODI Leeds

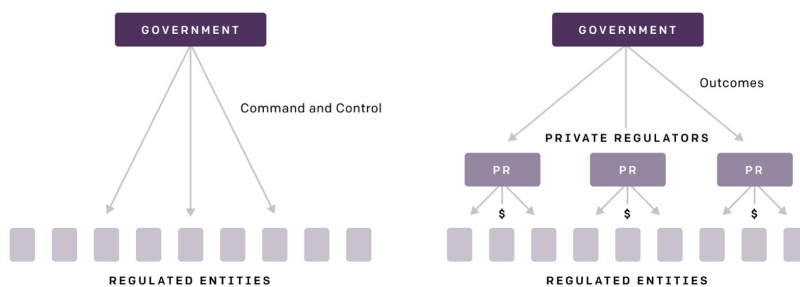
21 Boswarva, O. (2018). UK address data: a primer and bibliography.

22 For example, ODI Leeds, who developed a bin collection app, had to pay a small fee whenever they made a postcode search.

23 Data Coalition (2017). OPEN Government Data Act.

24 Aghion, P., Bergeaud, A., & Van Reenen, J. (2021). The impact of regulation on innovation (No. w28381). National Bureau of Economic Research.

Germany, the UK should adopt a more innovative approach to regulation.²⁵ A paper published by Jack Clark (formerly of OpenAI, now at the OECD) and Gillian Hadfield (University of Toronto) proposes a model that leverages both the advantages of markets and the legitimacy of the state.²⁶ In this model, the government would create a market for regulation in which private sector organisations compete to achieve regulatory outcomes set by a government regulator.²⁷



This approach presents a number of advantages: the government only needs to establish the goals of regulation, rather than the methods of achieving them. This gets around the fact that governments are not equipped to make highly technical and prescriptive requirements in such a rapidly changing field. Congressional hearings in the US following the Cambridge Analytica allegations, and the UK Parliament inviting a pre-programmed robot to testify on AI, illustrate well how little some legislators and policymakers understand technology, let alone machine learning. As the paper explains, policymakers are mostly trained in the humanities and social sciences with limited computational expertise or knowledge of technology.²⁸

Second, outcome focused regulation also provides industry with the flexibility to achieve its outcomes through whatever means necessary, as long as they can credibly demonstrate that the outcomes are met.²⁹ For example, a regulation might require a model to adequately safeguard user privacy in certain circumstances; whether this is done through differential privacy techniques or cryptographic methods is up to the company so long as the outcome is satisfactorily met. This approach already exists in other markets: in the UK, lawyers are bound by an outcomes-focused Code of Conduct.³⁰ This approach specifies targets that must be met by solicitors

25 Chivot, E. (2020). Germany Wants EU to Double Down on Idea That Would Hinder the AI Economy. Centre for Data Innovation.

26 Clark, J., & Hadfield, G. K. (2019). Regulatory Markets for AI Safety. arXiv preprint arXiv:2001.00078.

27 Graph reproduced with permission from authors.

28 An additional way to address this would be to set up a TechCongress-style scheme, allowing the UK Government, the civil service, Parliament and the judiciary to gain access to both technical and non-technical AI expertise from the private sector.

29 Armstrong, H., & Rae, J. (2017). A working model for anticipatory regulation. London: Nesta.

30 Clyde & Co (2016). The growth of outcomes-based regulation? Transatlantic developments.

whilst acknowledging that there might be a variety of ways to achieve those targets.

Third, an outcome focused approach would be more conducive to international standardisation and interoperability. Public sector regulation is currently organised primarily on a nation-state basis, and this doesn't work when supply chains and markets operate across borders. Such a model would facilitate coordination between regulators in like-minded countries. Because AI by definition involves companies, labour and data located in different countries, having a harmonised yet flexible set of rules will facilitate a coordinated approach to things like surveillance and security.

Lastly, the approach would ensure that there is actual competition at the regulatory level and genuine market incentives for talented individuals to build tools, frameworks, and methods for AI safety. Talented graduates will have real incentives to create start-ups specialised in AI safety, privacy and governance tools to achieve specific AI regulatory goals. Not only does this avoid harming regulation, it also incentivises more of it, in line with the Government's commitments in the Regulation for the Fourth Industrial Revolution White Paper.³¹ Since AI safety is a fast-growing and global market, becoming a leader in this space will encourage the export of UK services and tools across the world. Importantly, it will also give the UK more leverage to shape the path of AI development and counter authoritarian strategies which seek to help repressive regimes to quash mass protests, monitor political opponents, and discourage dissent.

Proposal 4: Work closely with the EU to review and improve GDPR

It is undoubtedly desirable to have some regulations protecting privacy, security, and more responsible data governance. However the EU's GDPR, while effective in some respects, has come with undeniable costs. And as DIGITAL EUROPE notes, fragmentation remains a key obstacle, ultimately contradicting the harmonisation aim of the Regulation.³²

A recent study on the short-run effects of GDPR on technology venture investment found that it had an immediate, pronounced, and negative effect on investment.³³ Its effect is particularly pronounced for young (0–3 year old) EU ventures, where an average reduction of 19% in the number of deals was observed. This was also observed by the European Parliament's Research Service.³⁴

GDPR has also strengthened market concentration of large vendors such

31 Department for Business, Energy & Industrial Strategy. (2019). Regulation for the Fourth Industrial Revolution.

32 DIGITALEUROPE. (2020). Two years of GDPR: A report from the digital industry

33 Jia, J., Jin, G. Z., & Wagman, L. (2018). The short-run effects of GDPR on technology venture investment (No. w25248). National Bureau of Economic Research.

34 Panel for the Future of Science and Technology (2020). The impact of the General Data Protection Regulation (GDPR) on artificial intelligence. European Parliamentary Research Service.

as Facebook and Google. In fact, the week after the GDPR's enforcement, major websites in the EU reduced their reliance on small vendors by 15%.³⁵ This was confirmed by another more recent study, which found that the privacy regulations have functioned as important nonpecuniary barriers to trade.³⁶

Unilateral divergence is neither likely nor desirable. The Trade and Cooperation Agreement between the UK and the EU specifically states that both the UK and the EU “affirm their commitment to ensuring a high level of personal data protection” and a willingness “to work together to promote high international standards”. This is positive, and means that the UK should continue to respect key GDPR provisions post-Brexit in order to maintain data adequacy with the EU. However, as the law firm Fieldfisher notes, “the Agreement also provides for the UK and the EU to supplement its provisions with further agreements, opening the door for wide-ranging collaboration.”³⁷

The Center for Data Innovation predicts that absent the EU changing its regulatory system to be more innovation-friendly, it will likely remain behind both the US and China.³⁸ In light of this, the UK could commission an expert panel to review the Data Protection Act 2018 and explore working with the EU to strike the appropriate balance between privacy and innovation while strengthening harmonisation. This would be mutually beneficial - in fact, Axel Voss, one of the fathers of GDPR, also appears to support an update to the regulation.³⁹ Safeguarding privacy is an important societal goal, as many recent scandals have highlighted. But this has to be done in a way that is smart, effective, and proportional.

Proposal 5: Lower barriers to immigration and attract foreign talent

In a recent report, Microsoft finds that the UK is facing an AI skills shortage: only 17% of UK employees are being re-skilled for AI, compared to 38%.⁴⁰ One of the most effective ways to address the AI talent shortage is to make the UK more attractive to foreign talent. The UK should reform its immigration policy to draw in more international students, entrepreneurs, and high-skilled workers, and the innovative ideas they provide. It is of course worth investing more in the domestic STEM/AI pipeline as well, but this could take decades to pay off, whereas immigration reform leads to positive results immediately.

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35 Johnson, G., Shriver, S., & Goldberg, S. (2019). Privacy & market concentration: Intended & unintended consequences of the GDPR.

36 Caffarra, C., Etro, F., Latham, O., Morton, F. S., Tomiura, E., Ito, B., & Wagman, L. Regulatory export and spillovers: How GDPR affects global markets for data. VoxEU

37 Duhs, E. (2020). EU-UK data flows, adequacy and regulatory changes from 1 January 2021. Fieldfisher.

38 Castro, D., & McLaughlin, M., (2021). Who Is Winning the AI Race: China, The EU, or the United States? — 2021 Update. Centre for Data Innovation.

39 Espinoza, J. (2021) EU must overhaul flagship data protection laws, says a ‘father’ of policy. Financial Times

40 Microsoft. (2020). AI Skills in the UK report.

The impact of immigration on growth and innovation is hard to overstate. In the UK, while just 14% of UK residents are foreign-born, 49% of the UK's fastest-growing startups have at least one foreign-born co-founder.⁴¹ Across the pond, the majority of AI PhD grads are from abroad, and of these, 81.8% stayed in the US.⁴² A recent study found that immigration has a positive impact on innovation, measured by patenting of local firms, and various measures of local dynamism.⁴³

Various changes have been implemented by No 10 seeking to widen the pathway for highly educated students to stay in the UK after graduation. The Graduate Immigration Route, launching in summer 2021, will allow successful applicants to be able to stay and work, or look for work, in the UK at any skill level for a period of two years. The new Global Talent visa seeks to attract leaders or potential leaders in various fields including digital technology. The recently revamped visa system is a welcome first step: the new 'scaleup' stream and the proposed changes to the Innovator visa will no doubt help strengthen the sector, particularly the more established FinTech side. This is laudable and policymakers should ensure they are designed to attract a wide range of profiles. They should also be efficient: long forms, high visa fees, bureaucratic processes and excessive red-tape will otherwise discourage aspiring academics. It remains to be seen how (and when) the above changes take effect and whether this will offset the losses in migration stemming from the UK's exit from the EU.

But more can be done: the Center for Security and Emerging Technology observes that the UK's entrepreneur visas have been heavily criticised "because of the suboptimal endorsement system and the difficulty of transitioning to permanent residence".⁴⁴ And as both Dr Anton Howes and Caleb Watney argue, the Government should reward people and firms who proactively identify foreign talent and then facilitate their immigration. It could also hire them directly.⁴⁵ This could be achieved by turning the new Office for Talent into a Department of Promigration,⁴⁶ whose sole goal is to identify talented workers from abroad and proactively recruit them to the UK with an offer of permanent residency or even citizenship.⁴⁷

One way to do this would be by incentivising the best and brightest international students to study in the UK through scholarships. A recent study finds that the United States success in attracting top talent has been

41 Dumitriu, S., & Stewart, A., [2019] Job Creators. The Entrepreneurs Network.

42 Zhang D., Mishra S., Brynjolfsson E., Etchemendy J., Ganguli D., Grosz B., Lyons T., Manyika J., Niebles J.C., Sellitto M., Shoham Y., Clark J., and Perrault R. (2021). The AI Index 2021 Annual Report. AI Index Steering Committee, Human-Centered AI Institute, Stanford University.

43 Burchardi, K. B., Chaney, T., Hassan, T. A., Tarquinio, L., & Terry, S. J. (2020). Immigration, Innovation, and Growth (No. w27075). National Bureau of Economic Research.

44 Huang, T., & Arnold, Z. (2020). Immigration Policy and the Global Competition for AI Talent. Center for Security and Emerging Technology.

45 Howes, A. (2020). Finding the Next Brunel. The Entrepreneurs Network.

46 Promigration refers to actively recruiting global talent, as opposed to merely removing barriers to entry.

47 Watney, C. (2021). The Egghead Gap. *The New Atlantis*, (63), 85-93.

largely predicated on the targeted strategies of a few universities, such as MIT, of actively recruiting top foreign talent with funded admission offers.⁴⁸ Additional funding could be provided to leading research universities to fund postgraduate scholarships in AI-related fields.

Proposal 6: Shun protectionism and proactively lead global AI governance efforts

A recent paper by Ó hÉigeartaigh et al observes that “A key outstanding challenge for AI ethics and governance is identifying those areas where cross-cultural agreement on norms, standards, or regulation is crucial, and where different interpretations and approaches are acceptable or even desirable.”⁴⁹

Back in 2019, techUK correctly wrote that “The UK has always been a strong defender of the importance of reducing barriers to trade, and in digital trade the UK has a great opportunity as one the world’s major digital economies to play a positive role in shaping the rules of the global economy.”⁵⁰ This remains relevant today. As global fora and states debate how to deal with data governance and AI, the UK should resist efforts to force data localisation and policies that require the mandatory transfer of source codes, algorithms, or encryption keys as a condition of market access.

AI solutions are the product of global supply chains and rely on the exchange of data, talent, and hardware. The UK should resist the temptation to give in to digital protectionism. There are fears, both in Europe and in the UK, to “cede sovereignty to Silicon Valley” when it comes to using technology. This was apparent, for example, with the initial reluctance of the NHSX to use the Google/Apple contact tracing app.

Policies advocating for preferential treatment, attempts to bypass state aid rules, unequal access to data and state-grown champions should be resisted. Recently a number of commentators have been calling for the state to build its own telecoms company: but such ideas have little economic justification, and will likely fail. The EU was not able to build its own search engine, and it would not be surprising if France’s state-grown rival to AirBnb also faced difficulties. The UK should not fall into the same trap and attempt to create its own AWS; instead, it should be more ambitious and ensure it remains an attractive place for entrepreneurs, innovators and creatives from around the world.

The UK should also actively engage with the EU, the US, as well as other countries and multilateral organisations to promote more open trade, better

48 Agarwal, R., Ganguli, I., Gaule, P., & Smith, G. (2021). Why US Immigration Barriers Matter for the Global Advancement of Science.

49 Ó hÉigeartaigh, S. S., Whittlestone, J., Liu, Y., Zeng, Y., & Liu, Z. (2020). Overcoming barriers to cross-cultural cooperation in AI ethics and governance. *Philosophy & Technology*, 33(4), 571-593.

50 TechUK. (2019). Looking ahead to 2020, what is the future for UK Digital Trade?

data flows, and technical standards based on openness, interoperability, and competition. The importance of standards is difficult to overstate: while previously seen as non-political, they are now important conduits of economic power (as they often consist of patented technologies), legal dominance (through their inclusion in trade law), and political choices (e.g. geographical lock-in and bifurcation).⁵¹

Regulatory cooperation is crucial, whether through the Global Partnership on AI, the newly proposed T-12 alliance, or on an ad hoc basis. This includes collaborating with allies to pool technological resources, defend against digital authoritarianism, and advocate for inclusive growth, human rights, and democratic values — as recommended by the Center for Security and Emerging Technology.⁵² In particular, the UK should follow the recommendations of the Center for Strategic and International studies and work closely with the US to build affirmative alternatives to digital authoritarianism, especially for countries currently forced to decide between no growth and stability, or growth and stability but with authoritarian strings.⁵³

Proposal 7: Foster public trust in the public sector use of AI

AI can play an important role in supporting policymaking and government decisions, increasing efficiency, accuracy and effectiveness. Unfortunately, over half (53%) of UK adults have no faith in any organisation to use algorithms when making judgements about them, in issues ranging from education to welfare decisions, according to a poll for BCS, The Chartered Institute for IT.⁵⁴ Indeed, a Review by the Committee on Standards in Public Life found that “the UK’s regulatory and governance framework for AI in the public sector remains a work in progress and deficiencies are notable.”⁵⁵ In addition to the above regulatory markets proposal, there are three other ways this could be mitigated.

The first two are to reform, and perhaps merge, both the Centre for Data Ethics and Innovation (CDEI) and the Office for Artificial Intelligence. While the CDEI has published some interesting research such as the AI Barometer, a lot of its work is already undertaken by civil society and academic groups such as the Ada Lovelace Institute.⁵⁶ To avoid duplication, it should instead focus more on scrutinising the Government’s use of data and AI. This would include working closely with the newly-announced

“Over half (53%) of UK adults have no faith in any organisation to use algorithms when making judgements about them.”

51 Rühlig, T. (2021). China, Europe and the New Power Competition over Technical Standards. Swedish Institute of International Affairs.

52 Centre for Security and Emerging Technology (2020). CSET Publishes AI Policy Recommendations for the Next Administration.

53 Yayboke, E., & Brannen, S. (2020). Promote and Build. Center for Strategic and International studies

54 BCS, The Chartered Institute for IT. (2020). The public don’t trust computer algorithms to make decisions about them, survey finds.

55 Committee on Standards in Public Life. (2020) Artificial Intelligence and Public Standards.

56 Centre for Data Ethics and Innovation. (2020). AI Barometer.

Autonomy Development Centre to ensure ethics and safety are not overlooked in the military - something the US is, encouragingly, already exploring.⁵⁷ To be effective, it would benefit from more proactive public engagement research with both qualitative and quantitative researchers, to ensure its projects benefit from public trust.

The CDEI would also likely benefit from becoming truly independent (which it currently isn't, as its Board is heavily interconnected with other parts of Government) and ensuring that public sector use of AI is both technically sound and ethically responsible. Such an oversight function and independence would help prevent scandals such as the A-levels grading fiasco and the Home Office's visa-sorting algorithm. Indeed, the Assurances project under way should explore ways to test the robustness and safety of algorithmic decision-making in the public sector specifically, and supporting a competitive market in this space. This should be designed so as to be effective without unduly restricting innovation, experimentation and agility.⁵⁸

The Office for AI also needs some reform. In her testimony to the House of Lords, Professor Wendy Hall stressed that "It is really important that the Office for Artificial Intelligence is strengthened and works across government."⁵⁹ So far the body works mostly to communicate industry and academic achievements externally, as well as some intra-government coordination work, but remains shy of undertaking public-facing policy analysis and decision-making. Ideally it should be reformed to mimic the US OSTP's mandate.⁶⁰ The Biden administration recently nominated Eric Lander as its director, a renowned biology professor at MIT and Harvard. This position is also to be elevated to a Cabinet-level position. The Office for AI would benefit from similar elevation, a larger budget (which appears unchanged since the AI Sector Deal), a clearer mandate, and leadership through the appointment of a Government Chief Technology and Data Officer. It should be able to hire more freely, open a Machine Learning Garage to test projects and innovation challenges, and undertake more ambitious goals. These should include developing policy positions, overseeing the UK's involvement in standard-setting activities, improving the technical and forecasting capacities of government, and evaluating the quality and effectiveness of government science and technology efforts.

The government should also explore the use of AI registers for algorithms that meet a certain minimum threshold of impact and risk.⁶¹ These describe what, where, and how AI applications are being used; which datasets were

“The government should also explore the use of AI registers for algorithms that meet a certain minimum threshold of impact and risk.

57 Joint Artificial Intelligence Center. (2021). The AI Ethics Journey Will Hit New Heights in 2021. US Department of Defense.

58 Bancroft, J. (2020). Testing new approaches to responsible innovation. Centre for Data Ethics and Innovation Blog

59 Ibid.

60 Sargent, J. F., & Shea, D. A. (2017). Office of Science and Technology Policy (OSTP): History and Overview. Congressional Research Service.

61 Floridi, L. (2020). Artificial Intelligence as a Public Service: Learning from Amsterdam and Helsinki. *Philosophy & Technology*, 33(4), 541-546.

used for training purposes; how algorithms were assessed for potential risks; and how humans use the AI services. These are already being trialled by cities such as Helsinki and Amsterdam, and have the benefit of demonstrating transparency while ensuring the public and civil society more generally are aware of which public sector systems are automated. As the Tony Blair Institute for Global Change writes, “Where they [Governments] use algorithms, there should be transparency about where and how the algorithms are used, how they are designed and the data they are using, as well as ensuring there is accountability and mechanisms for challenge.”^{62, 63}

Proposal 8: Ensure the UK’s intellectual property regime is fit for AI

Training AI systems requires high quality data input. It is therefore crucial for AI developers to have the widest possible access to data. Not only can this widen the supply of AI services and products, but more access to representative datasets can in many cases also help attenuate certain types of bias. The Chinese AI strategy, for example, promises to provide “massive data resources” and a “public data resource library”.⁶⁴ However, presently the legal landscape in the UK would not permit many uses of text and data mining.

In a recent report, Dr Anton Howes recommended extending the exemption from copyright for text-and-data mining to for-profit uses.⁶⁵ Indeed, this is currently only possible for non-profits. Adopting a clear exemption for profitable uses of text and data mining would likely enable the UK to become more competitive in the creation of such technologies, rather than being a late adopter.

This has been noted elsewhere as well: the leading IP law firm Bird & Bird noted that “the UK is not implementing the EU Digital Copyright Directive, and the more permissive fair use and TDM-specific exceptions available in many countries may mean that the UK becomes less appealing to companies undertaking AI research.”⁶⁶ Since the Government appears to want to implement at least some parts of the directive, it should prioritise those that make it easier for companies to mine and use public data freely.⁶⁷

62 Innes, K., & Beacon, R., (2021). *Government by Algorithm: The Myths, Challenges and Opportunities*. Institute for Global Change.

63 It’s important to note that while research in explainable AI is progressing fast, not all ML model outputs can be easily reverse-engineered and explained: this means careful thought needs to be given about the contexts in which they are used. Policymakers should also note that algorithms are sometimes applied in situations where bias will exist independently of their use (and, of course, algorithms cannot decide on a ‘fair’ outcome when humans cannot agree on what ‘fair’ looks like): we, collectively, need to get better at identifying and explaining these too.

64 Notice of the State Council Issuing the New Generation of Artificial Intelligence Development Plan. State Council Document [2017] No. 35. Translated by Foundation for Law and International Affairs.

65 Howes, A. (2021). *Fixing Copyright*. The Entrepreneurs Network.

66 Bird & Bird LLP. (2020). *IPO seeks views on AI and IP*. Lexology.

67 Bird & Bird LLP. (2020). *UK Government “has no plans” to implement the Copyright Directive*. Lexology

As Dr Howes notes, “the law as it currently stands incentivises many companies to be reticent about sharing any details of how they train their algorithms. They rightly fear that revealing any details of how they have trained the AI may open them to copyright infringement suits — whether justified, accidental, or spurious.” Therefore another important benefit is that such reform would allow firms to be more transparent about the algorithms they use, benefitting in particular start-ups and smaller companies.

Conclusion

The UK is well positioned to deliver impactful and growth-friendly AI policies. It is already a global leader in the development and commercialisation of AI, hosting leading companies such as DeepMind and BenevolentAI. There have been positive moves in this direction, most notably the creation of the Advanced Research and Invention Agency, which was recently announced. But as Professor Wendy Hall testified to the House of Lords earlier this year, “The biggest risk to us is that we [the UK] do not keep up the impetus.”

The UK can bolster its position by undertaking ambitious and innovative policies, which will strengthen the country’s general infrastructure, its research ecosystem, the private sector’s dynamism, and public sector accountability. Amidst a global retreat towards digital nationalism and protectionism, the UK should push for an open and global technology ecosystem without compromising on safety and security. A lot remains to be done, but the above recommendations will ensure that post-Brexit UK remains a leading AI player internationally.

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