TECHNOLOGICAL INNOVATION AND SOCIOECONOMIC INEQUALITY: AN ANALYSIS OF RECENT UK AI AND DIGITAL TECHNOLOGY POLICY

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Abstract

Artificial Intelligence (AI) and digitisation offer significant opportunities, whilst simultaneously raising issues of ethics, responsibility, social acceptability, and inequality. Evidence suggests that digital technologies and data practices are perpetuating social and economic inequalities; and that automation processes are impacting the nature and availability of employment. This project sits at the intersection of policy and ethics, specifically focussing on socioeconomic inequalities influenced by AI and digital innovation. The work involves analysing UK AI and digital technology policy using a framework based on Smallman and Beumer's (Forthcoming) "Equalising, Fair, Pro-Poor" framework adapted from Cozzens (2011). The aim of this project is to contribute to existing research by asking how existing AI policies, such as the National AI Strategy, address, or fail to account for, evolving socioeconomic inequality in the UK. The regulatory narratives that permeate policy, as well as the government's 'pro-innovation' approach to AI regulation, are explored. This thesis finds that the consideration of economic inequality is largely absent from national AI policy, as it has been conceived thus far. It concludes that current government policy does not reach the bare minimum in fulfilling its promise to ensure that AI provides broad social benefit across the UK. Whilst the importance of ensuring equitable benefit of these technologies is highlighted in the analysed policies, few tangible solutions are proposed. This appears to be due to the notion that the economic bounty will diffuse naturally throughout the economy.

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For those left behind as we race towards the future.

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1. Introduction

In its white paper, *Levelling Up the United Kingdom* (*Levelling Up*) (2022), the UK government explicitly acknowledges the state of regional inequality present in the UK. In his foreword, the then Prime Minister stated that while the UK is "without doubt one of the biggest and strongest economies in the world [it is] also one of the most unbalanced…a country in which the place of your birth is one of the clearest determining factors in how you'll get on" (*Levelling Up*, 2022, p. viii). Considering the UK government's intention to address inequality and build a "fairer country" (*Levelling Up*, 2022, p. viii), this research project investigates the extent to which this vision of a more equitable future is formalised in the area of artificial intelligence (AI) and digital technologies by analysing national policy.

This dissertation addresses the following research questions:

- Who benefits from digitisation, digital transformations, and AI?
- How does AI and digital technology policy implementation support the rich, impact the poor, and increase the divide between classes (if at all)?
- How does the UK government conceive of AI? Is economic inequality accounted for in recent policy?

There are various economic impacts from the digital revolution that global societies are collectively undergoing. Although the potential for technology to improve our lives is undeniable, some maintain that we are neglecting to responsibly account for the downsides of developments in digital technology and AI (Eubanks, 2019; O'Neil, 2016). The number of companies focussed on ethical AI has grown considerably over the past few years, with the urgency of responsible policymaking in this area becoming apparent (Raghunathan, 2022). The negative impact of AI and algorithms based on protected characteristics such as race (Buolamwini & Gebru, 2018), gender (Dastin, 2018; Zou & Schiebinger, 2018), and disability (Whittaker, 2019) have been well-documented. Discriminatory outcomes of these technologies on the basis of socioeconomic status and class have been less thoroughly investigated (Eubanks, 2019).

Scholars in the field of Science and Technology Studies (STS) challenge the assumption that technological developments are inevitable (Stilgoe, 2020a). Jasanoff (2016) asks why it is important for us to think about new technologies, proposing two persistent problems that ought to motivate consideration around how we develop and use technology. The first is risk, in that harm can be caused by our technologies; the second is inequality, as technologies tend to benefit the rich more than the poor. Jasanoff (2016) argues that the issue of assessing risk is usually considered in policy, while the related problem of 'who benefits' is frequently neglected. The justifying assumption is often that the benefits of innovation will simply 'trickle down' (Russell & Vinsel, 2017).

This thesis aims to consider how existing AI and digital technology policy is or is not accounting for socioeconomic inequalities at the national level. Importantly, it focusses on assessing how *inequality* is accounted for, rather than *inequity*. There is an important

distinction between these two concepts. Inequality can be defined as an empirical distribution, while inequity is understood as "normative judgment about that distribution, often rooted in particular philosophical theories of justice" (Cozzens & Wetmore, 2011; cited in Smallman & Beumer, Forthcoming). Types of inequalities can further be distinguished as either *vertical* or *horizontal* (Cozzens, 2008). In Cozzens' (2008) formulation, vertical inequalities refer to variables such as household income, whereas horizontal inequalities are those between socially defined groups. Furthermore, inequalities are caused by inequities. For example, income inequalities are a result of social inequities, or unfair social conditions (Gewin, 2022). These definitions are important for their application in policy design.

Concerning policy, it is important that we differentiate between law and 'standards' or, more specifically, hard and soft policy: "soft policies typically include 'moral suasion' and educational campaigns, and more recently behavioural public policy approaches like nudges [whereas] hard policy instruments, such as laws and taxes, restrict choices and alter financial incentives" (Banerjee et al., 2021). For example, the proposed EU Artificial Intelligence Act (AIA) is hard law, whereas national AI strategies and standards are not. Standards are soft laws which do not necessitate action. An example of a standard is Fairtrade coffee. Countries all over the world adhere to the Fairtrade standard, which assures standards such as workers' rights, fair working conditions, and pay, despite this not being enforceable. In this way, standards can be used as a non-statutory regulatory tool by establishing behavioural or procedural norms.

Socioeconomic inequality

It is understood that a person's socioeconomic situation may result in "pervasive discrimination, stigmatisation and negative stereotyping" (United Nations, 2009, p. 11) that can result in refusal of access to equal quality in education and health care. Anti-discrimination law in the UK is outlined in the Equality Act 2010. Although socioeconomic status and class is not included in the nine protected characteristics, the Act explicitly highlights "the desirability of reducing socio-economic inequalities" (UK Government, 2010, p. 1). Section 1 outlines the socio-economic duty for public authorities, aimed specifically at reducing "inequalities of outcome which result from socio-economic disadvantage" (UK Government, 2010, p. 2). Whereas Section 1 came into force in Scotland and Wales in 2018 and 2021 respectively, it is not yet commenced in England, despite action groups having campaigned for its implementation under the banner #1ForEquality (*1ForEquality*, n.d.; *The Equality Trust*, n.d.). This context is significant in assessing how inequality is conceptualised and considered in national policy.

Socioeconomic status is a difficult variable to capture and, as a result, there is a lack of data for studying and assessing socioeconomic inequality. This can be explained by a number of factors, such as difficulties in the collection of data and the development of reliable and precise measurement techniques, as well as limited correlation between measures and issues of categorisation and inaccurate interpretation (Shavers, 2007). Social progress is frequently assessed using metrics such as Gross Domestic Product (GDP). However, GDP is limited in that it is a measure of the size of an economy rather than its distribution, not taking into account

factors such as environmental costs, societal wellbeing, and inequality (Brynjolfsson & McAfee, 2014).

AI ethics landscape

Several evaluations and meta-analyses of the current AI ethics landscape (including ethical frameworks for AI governance) have been conducted (Fjeld et al., 2020; Hagendorff, 2020; Jobin et al., 2019). Mittelstadt (2019) reports that more than 84 initiatives have produced reports intended to guide the development of AI. These indicate that the AI landscape is crowded with guidelines on how governing policy 'should' be designed, and while numerous reports, papers, and ethical guidelines exist, in many cases this advice is yet to be translated into regulation. Some scholars question whether a principles-based approach is suited to the task of AI governance, as well as to directing AI's development and utilisation (Mittelstadt, 2019).

Efforts to define values and frameworks for developing AI in an ethical way appear to converge upon "high-level ethical principles" (Mittelstadt, 2019, p. 501). Significant commonalities exist between many sets of AI ethics principles, which are identified by some as being built upon five core principles (Floridi & Cowls, 2021); a normative core of eight key themes (Fjeld et al., 2020); or a framework of seven ethical and instrumental principles and values (Loi et al., 2021). Floridi et al. (2018) claim that these converge upon a set of principles similar to the four principles of medical ethics, namely, non-maleficence, justice, beneficence and autonomy.

This convergence appears promising at first sight, but Mittelstadt (2019) argues this can ultimately distract from political and normative disagreement surrounding notions of fairness and privacy. This 'distraction' perhaps represents one of the reasons for the slow pace of regulatory policy. It has become increasingly common for independent bodies and private companies to produce their own policies and ethical guidelines (Crawford et al., 2019). This leads us to another potential cause for the slow pace of regulation: the practise of codifying AI ethics using high-level principles and guidelines, particularly by organisations invested in AI's development, which can underplay the need for regulation (Mittelstadt, 2019).

Digitisation and economic inequality

The benefits of economic growth are not by necessity evenly distributed. In fact, it is by now established that a pronounced rise in income inequality has occurred in recent decades (Piketty, 2014). Even though average income is rising, many people are economically worse-off. Brynjolfsson and McAfee use the term "spread" to describe the "large and growing differences among people in income, wealth, and other important circumstances of life" (Brynjolfsson & McAfee, 2014, p. 127). Digitisation is affording unprecedented wealth creation, but in our current economic model this new wealth is not evenly distributed. Unlike in the past, the common idea that technological progress benefits everyone (putting to one side the fear of automation) through increased income is no longer inevitable. Writing in the US context:

> "*For almost two hundred years, wages did increase alongside productivity. This created a sense of inevitability that technology helped (almost) everyone. But more*

recently, median wages have stopped tracking productivity, underscoring the fact that such decoupling is not only a theoretical possibility but also an empirical fact in our current economy" (Brynjolfsson & McAfee, 2014, p. 128).

Technology has been found to play a significant role in the phenomenon of rising inequality (Aghion et al., 2019; Gaskell, 2019). For example, quantitative research has demonstrated a correlation between computerisation and the relative skill level of workers. Autor et al. (1998) analysed the wage share of skilled workers from 1940 to 1996 and found a statistical correlation with the uptake of new technologies such as computers. In the labour market there was a shift in demand during this period favouring workers with a higher level of education (Autor et al., 1998). Some economists explain this phenomenon as 'skill-biased technical change', which has the overall effect of reducing demand for low-skilled labour and increasing demand for high-skilled labour, thus favouring workers with greater human capital (Brynjolfsson & McAfee, 2014). Skill-biased technical change can be defined as "technical progress that shifts demand toward more highly skilled workers relative to the less skilled" (Bresnahan et al., 2002, p. 340). Autor et al. (1998) investigated the effect of skill-biased technical change on educational wage in the US, showing that demand for college graduates with specialist skills grew continuously throughout the preceding decades, with especially high growth in computer industries. Thus, the demand for higher-educated workers has increased in parallel with the adoption of computers. In particular, the shift in demand towards high-skilled labour accelerated in the 1980s and 90s, matching increased reward for jobs "requiring exceptional talent, training, autonomy, or management ability" (Bresnahan et al., 2002, p. 339).

Computer systems granted capacity for automating numerous white-collar tasks: repetitive, routinised tasks that are easy to automate. Clerical, administrative, and production processes are much more easily substituted for by computers than are comparatively complex roles such as management (Autor et al., 1998). One widely cited analysis concluded that 47 percent of US employment is 'at risk' from automation (Frey & Osborne, 2013). However, this study was controversial, as its interpretation frequently conflated the probability that a given job *could* be automated with the likelihood that it *will* be automated (Kucera, 2017). Scholarly consensus is that while mass unemployment due to automation is unlikely, automation does risk widening income inequality, with unskilled workers being most disadvantaged (Finkin, 2019; Finkin et al., 2020; Sartori & Theodorou, 2022). Cozzens (2008) showcased that high tech industries are hollowing out labour markets, reducing what are otherwise widely accessible middle-class jobs. After this hollowing, what is left are very highly paid jobs and very lowly paid jobs. There is an imbalance in the kind of jobs that tech is producing, which benefit the higher-class while stifling lower-class labour opportunities.

It has been shown that the spread of computer technologies is one cause of the changing demand in labour favouring those with higher skills and more human capital. It will now be argued that in the existing economic system, the distribution of wealth is being heavily influenced by the digital revolution in a way that exacerbates economic inequality.

Concentrated wealth

Increasingly, the economic benefits of technological progress are being felt by a smaller subset of society, and are disproportionately awarded to those who are highly skilled (Bresnahan et al., 2002; Brynjolfsson & McAfee, 2014). Our digital technologies appear to amplify inequalities rooted in social inequities. More generally, it is argued by Cozzens (2008, p. 3) that our systems of technology are frequently structured such that they "reproduce and even amplify inequalities". In essence, whilst technology is instrumental in economic and social progress, it can simultaneously fuel inequalities. Put another way, "new technoscientific capacities introduced into a non-egalitarian society tend disproportionately to benefit the affluent and powerful" (Woodhouse & Sarewitz, 2007, p. 139).

Brynjolfsson and McAfee (2014) refer to the ultra-top-end earners as the *'superstars'*, who garner an overwhelming portion of wealth increase. However, for earners in the middle of the wage hierarchy income change is relatively flat, and for those at the bottom it is even worse with incomes even decreasing in some cases. Therefore, without even considering algorithmic bias and discriminatory models, it is clear that we inhabit an economic system that increasingly benefits those at the top of the income ladder, and leaves those at the bottom behind, with an ever-widening gap between them. This effect, a number of economists argue, can largely be attributed to technological change and in particular the development of digital technologies (Aghion et al., 2019; Brynjolfsson & McAfee, 2014). The new economy of the information age and era of digitisation, governed increasingly by winner-take-all markets, is characterised to a much greater degree by Shumpeterian 'creative destruction' than its industrial predecessor (Brynjolfsson & McAfee, 2014). The distribution of the traditional economy, in which income paralleled effort and ability, is swiftly being replaced by a power law distribution wherein disproportionate financial rewards are enjoyed by a relatively small portion of people, increasing income inequality.

It is vital we question who is going to benefit from advances in AI. This is particularly prudent as disproportionate power is increasingly held by a handful of organisations who have disproportionate access to and control of data (Stilgoe, 2020b). The case will now be made that AI technologies have the potential to directly worsen socioeconomic inequalities through algorithmic bias and the reinforcement of centralised power.

Algorithmic inequality

The idea that 'technology is neutral' is frequently peddled. However, the tools we use are not neutral, rather they are the product of implicit and explicit choices in their design (Eubanks, 2019). Technological somnambulism is a concept used when talking about the philosophy of technology. The term was introduced by Langdon Winner (2014) in his 1983 essay *Technologies as Forms of Life* to refer to the idea that, as a society, we are frequently in a state akin to sleepwalking with respect to our perceptions and acceptance of technology. In his piece, Winner attributes technological somnambulism to three distinct causes. One of these is the information gap between creators and users. There is a distinct information gap between the creators and users of data. There is a danger that this, when combined with the assumption that AI is neutral, leads to failed intervention in harmful systems, further entrenching the status quo, and disadvantaging marginalised communities through the perpetuation of bias at scale

(Birhane et al., 2021; Kalluri, 2020). The black-box nature of AI systems complicates regulators' ability to intervene, and lends a perceived legitimacy to the outputs of these systems. The opacity of AI systems has prompted a shift in focus towards transparent and 'explainable' AI (Sartori & Theodorou, 2022).

Much of human capital is developed through work experience and education, which are increasingly impacted by selection processes involving hiring and admissions algorithms (O'Neil, 2016). These hiring algorithms have been shown to introduce bias in hiring practices in the UK (Milmo, 2022). The role of data in perpetuating inequalities is often associated with problems of measurement. If we measure the wrong things, or measure inaccurately, we will make poor decisions due to corrupt or limited data. For example, O'Neil (2016) makes a case for how metrics used in assessing higher education in the United States, particularly in ranking universities and colleges, create incentives that run contrary to the ideals of education (ideals such as learning and student wellbeing). Scholars have argued that technology adds efficiency and scale to systems, magnifying the benefits of good systems, while multiplying the downsides when they are flawed (O'Neil, 2016). This fixation with quantifying (often focussing on easily measured metrics that fail to capture the full picture) can bolster institutions that are already elite and wealthy.

The problem of biased data runs deeper. Data of a population are invariably shaped by historical patterns, which reflect society as it is, and how it has been in the past. Thus, when these data are used to train AI systems, such as classification algorithms, the outcomes of these systems act to perpetuate and amplify existing societal inequalities and stereotypes (Crawford, 2021). Therefore, policymakers have a responsibility to involve marginalised communities more forthrightly in the process of shaping AI (Kalluri, 2020). In sum: "The choice to design a system optimised for neutrality and objectivity is a choice to support the status quo. To build instead a world of justice and abundance, we will need to design for equity" (Eubanks, 2019, pp. 223–224).

2. Methods

It was decided to examine the policy approaches that the UK currently has, in part considering the recent exit of the UK from the EU, to investigate how they do or do not account for socioeconomic inequalities. The policies selected represent the significant national strategies and regulatory policies concerning AI and digital technology produced by central government since 2019. This timeframe was selected based on the UK government cabinet under Prime Minister Boris Johnson, such that the policy documents reflect the agenda of the most recent government regarding AI. While these national policies do not encompass all the ways that AI and digital technologies intersect with socioeconomic inequalities, they do indicate the official government position. The five policy documents chosen (see Table 1) were selected because they comprise national strategy regarding AI, digital technologies, and data, in addition to the government's current approach to regulating these. AI and digital technologies are fundamentally tied to data, hence the relevance of the UK's *National Data Strategy* to this assessment.

Table 1. List of UK AI policy documents studied

2020	National Data Strategy
2021	Digital Regulation: Driving growth and unlocking innovation (Plan for Digital Regulation)
2021	National AI Strategy
2022	Digital Strategy
2022	Establishing a pro-innovation approach to regulating AI (AI Regulation Policy Paper)

The documents were coded manually, utilising an analytical framework based on Smallman and Beumer's (Forthcoming) "Equalising, Fair, Pro-Poor" framework, originally adapted from the work of Susan Cozzens (2011) (see Appendix). Coding is a qualitative data analysis tool in grounded theory, used to identify themes that are then analysed in the context of theory (Clark et al., 2021). The codes identified are listed in Table 2. These were then analysed through the lens of the "Equalising, Fair, Pro-Poor" framework. The framework was originally used to evaluate whether inequality was accounted for in science, technology and innovation policy, and aimed to consider the full array of ways economic inequality can be conceptualised. Here 'equalising' refers to *vertical inequalities* (such as household income), 'fair' refers to *horizontal inequalities* (those between socially defined groups), and 'pro-poor' refers to deliberate measures aimed at aiding the poor.

To tailor this framework towards AI policy more specifically, the Asilomar AI principles and recommendations regarding jobs, workforce automation, and economic inequality (principles 14, 15 and 16) were incorporated. The *Asilomar AI Principles* are 23 governance principles developed as part of the 2017 Asilomar conference (Future of Life Institute, 2017). In adapting this framework beyond Smallman and Beumer's original formulation, its application is narrowed from science, technology and innovation policy in general, to AI and digital technology in particular. The three parts of the evaluative framework are the same as Smallman and Beumer's: equalising, fairness, and pro-poor. The sub questions include adapted questions from the original, alongside tailored questions based on the three Asilomar AI principles and recommendations mentioned. For example, the principle of Shared Prosperity informed the additional question of 'Are the economic benefits of this policy or strategy concentrated in pockets/centralised, or shared broadly?'. This is important because, as has been shown, digital technologies are widening economic inequalities by disproportionately benefiting those at the top of the earning ladder. In kind, the principle of Shared Benefit requires that AI be a tool of empowerment for all people. This stimulated the addition of 'How does the policy aim to empower people to interact with and use AI systems effectively?'. This modified framework is helpful because it offers an extensive tool for

evaluating the vertical, horizontal, and pro-poor aspects of socioeconomic inequality in AI and digital technology policy.

The results are organised under three sections titled 'Equalising', 'Fairness', and 'Pro-poor' in accordance with the framework. A summary table is presented in each section for clarity. These summary tables indicate whether the key points delineated in the framework are addressed (for questions where a binary 'yes' or 'no' is appropriate). For example, to the question 'Are contractions of old industries considered?' a '✓' is given for the *National AI Strategy*, which does acknowledge the possible contraction of old industries, albeit implicitly, while a '**X**' is given for the *Digital Strategy*, because it does not consider any contraction of old industries.

Table 2. List of codes identified

Role of government
New high-skilled jobs
Need for education and training programmes
Businesses as beneficiaries
Diversity as untapped labour
Geopolitical dominance as an incentive for encouraging innovation
UK as an established AI and science superpower
Algorithmic bias
Brexit conferring regulatory freedom
Innovation for driving growth
Pro-innovation approach
Principles-based approach to AI governance
Flexible and light-touch regulatory regime
Commercialisation of universities
Minimising risk
Public trust

3. Results

3.1 Equalising

Table 3. Summary of 'Equalising' evaluation

	National AI Strategy	AI Regulation Policy Paper	Digital Strategy	Plan for Digital Regulation	National Data Strategy
Does the policy prioritise reducing unemployment?	x	x	x	x	x
Does the policy explicitly aim to reduce economic inequalities?	x	x	x	x	x
Does the policy prioritise creating jobs for less advantaged communities?	x	x	x	x	x
Does the policy produce mid wage jobs?	x	x	x	x	x
Are skills considered?	✓	x	✓	x	✓
Are contractions of old industries considered?	✓	x	x	x	x
Do conditions for foreign investment include local employment requirements?	x	x	x	x	x
Are any models of shared ownership proposed?	x	x	x	x	x
Are open source or reciprocal licenses mentioned?	x	x	x	x	x
Is the policy guided by high-level principles?	✓	✓	x	✓	✓
Does the policy indicate how shared economic benefit will be achieved?	x	x	x	x	x

3.1.1 Role of government: Active investor, passive regulator

The national strategies broadly conceive of an active role of government; however, this role is dominantly centred on realising the economic benefits of these technologies, and incentivising growth through investment. This is paired with a fundamentally passive role of government in terms of regulation, with the aim of encouraging 'light-touch' approaches, standards, and soft law, whilst minimising compliance requirements that may obstruct innovation.

The *National AI* Strategy (2021) appears to envisage an active role for government in encouraging the social and economic benefits of AI, as well as in constructing a 'pro-innovation' regulatory framework to ensure the UK is "the best place to live and work with Al" (p. 11). However, the responsibility for managing this regulatory framework in practise is given to the regulators themselves. The *National AI* Strategy (2021) claims that "the UK public sector will lead the way" (p. 50) in deploying safe and ethical AI. In this way the government perceives itself as playing the role of exemplar in AI development and adoption. The active

role of government is demonstrated by the its intention to incentivise innovation through challenges, or 'Innovation Missions', as outlined in the *UK Innovation Strategy* (2021). The government further intends to support the responsible procurement of AI technologies by the public sector "for the benefit of citizens" (*National Al Strategy*, 2021, p. 47), but does not specify how citizens will benefit. Overall, the role of government in AI is motivated by economic goals:

> "The government has a clear role to play. In stimulating and applying Al innovation to priority applications and wider strategic goals, the government can help incentivise a group of different actors to harness innovation for improving lives, simultaneously reinforcing the innovation cycle that can drive wider economic benefits" (*National Al Strategy*, 2021, p. 43).

The agenda appears to have shifted somewhat since the publication of the *National Data Strategy* (2020). The *National Data Strategy* placed a stronger emphasis on the societal benefits of data and digital technologies, whereas the document *Digital Regulation: Driving growth and unlocking innovation* (*Plan for Digital Regulation*) (2021), and subsequent digital and AI national strategies, have a more singular focus on driving economic growth and 'unlocking' innovation. This shift in emphasis towards 'agile regulation' was partly stimulated by the (deregulatory) *Taskforce on Innovation, Growth and Regulatory Reform Independent Report* (*TIGRR Report*) (2021), published shortly before the *Plan for Digital Regulation*:

> "We should build on our comparative advantage by further embedding and disseminating an agile and adaptive approach to regulation. The UK needs regulatory regimes that are proportionate, forward-looking, outcome-focussed, collaborative, experimental, and responsive." (*TIGRR Report*, 2021, p. 15).

While extensive investment plans are outlined in the policies on digital and data, these are not necessarily directed in ways that mitigate socioeconomic inequality. Rather, these initiatives are primarily focussed on investment in research and development (R&D), tax-reliefs for R&D, and the commercialisation of university-based research. However, the policies do conceive of an active role of government in encouraging investment through schemes that contribute to economic growth by filling the "digital skills gap" (*Digital Strategy*, 2022, p. 36).

3.1.2 AI skills, employment, and concentrated benefits

Does the policy consider whether the relevant skills are in place? The dearth of appropriately skilled workers is a prevalent theme throughout these policy documents. The lack of labour availability is principally framed as a hindrance to economic growth. In the case of AI, it is acknowledged that "multiple skills are required to develop, validate and deploy AI systems" (*National Al Strategy*, 2021, p. 16) and that the commercialisation of these technologies usually begins with R&D, but the necessary skills are not specified. The UK's *Digital Strategy* clearly indicates that the driving motivation for improving workers' skills, and access to talent, is to unlock latent economic benefit:

> "The digital skills gap is estimated to cost the UK economy £63 billion per year in lost potential gross domestic product (GDP) and is expected to widen…Improving the availability of digital skills not only unlocks the full economic potential of businesses, it helps individuals and opens up careers in interesting, sustainable, and well-paid jobs" (*Digital Strategy*, 2022, p. 36).

Are these high-quality, high-pay jobs broadly accessible? No evidence was found for the prioritisation of jobs aimed at less-advantaged communities. Nor was there any explicit indication that the policies aim to reduce economic inequalities. Moreover, the focus regarding employment was exclusively on job creation, and at no point was unemployment mentioned. The policies claim that the UK tech sector is important because it creates jobs. It is emphasised, however, that these will be "high-skilled, high-paid new jobs right across the UK" with a focus on "cutting edge research" (*Digital Strategy*, 2022, pp. 4, 32), rather than on producing mid-wage jobs.

The example of the Belfast Region City Deal £1 billion investment package is given. While it claims it is aimed at developing the region, the emphasised goals are to "accelerate economic growth" and create a "world-class space for academia" (*Digital Strategy*, 2022, p. 31). To further the latter point, the *National AI Strategy* explains that "the government affirms our commitment to empowering distinguished academics" (p. 25). Hence, rather than focussing on creating jobs tailored to the broader workforce, these measures arguably achieve the opposite, instead further supporting those already advantaged. Moreover, the *National Data Strategy* explains that "as businesses embrace technology, data creates jobs, opens up whole new markets and drives demand for a highly skilled workforce". This implies that the jobs created through the broad adoption of AI and digital technologies are biased towards those with advanced skills. As has been argued, this phenomenon of 'skill-biased technical change' is causally related to worsening economic inequalities.

While the policies do support training for the AI sector, this is primarily through postgraduate education pathways – a strategy with limited benefit for less advantaged communities. Furthermore, the policies explicitly aim to attract international top-talent via new visa pathways. Overseas talent is framed as "complementing" (*Digital Strategy*, 2022, p. 46) the domestic supply of digital skills. Fast-track visa pathways are outlined to attract global talent, with six immigration routes defined for the tech sector. These are aimed at "potential leaders in AI" and "applicants who have graduated from a top global university" (*National Al Strategy*, 2021, p. 26). A "revitalised Innovator route" allows overseas entrepreneurs to "start and operate a business in the UK…creating jobs for UK workers and boosting growth" (*National Al Strategy*, 2021, p. 26). While this makes the requirement that the venture provide the UK with value, it does not specify how the venture must create jobs for UK workers. It offers no indication as to whether these jobs will be inclusive, providing opportunity to those from a range of backgrounds. The *Plan for Digital Regulation* states that "the UK attracted more international venture capital investment into technology businesses in 2020 than France and Germany combined". No requirements are mentioned for supporting local employment.

Whilst AI is considered a disruptive technology "comparable to the combustion engine, the car, the computer, and the internet" (*National Al Strategy*, 2021, p. 17), no contraction of old industries are mentioned. Rather than conceding that existing industries may be impacted,

the policies focus on the steps that need to be taken to encourage businesses to adopt digital tools. The model of ownership conceived in these documents is that of businesses, companies, and private enterprises. A shared assets approach is only discussed in the context of *data*, as a decentralised data ecosystem is seen as providing maximum benefit. Intellectual property (IP) is framed as playing an important role in the reward mechanism that incentivises innovation and private enterprise, but little is specified beyond this. IP is "at the heart of innovation which feeds digital business" (*Digital Strategy*, 2022, p. 5).

Concerning benefits being concentrated in localised pockets of the economy, the need to ensure the benefits are shared is a repeated sentiment throughout these documents. This is primarily framed in terms of benefits to business, large and small, across the country. The *Digital Strategy* outlines ambitious plans with substantial budgets for investing in UK businesses, and emphasises the sentiment that "no one, and no place, should be left behind" (p. 7). Examples are given such as the Northern Powerhouse Investment Fund's investment of £500 million into small- and medium-sized businesses in northern England, and £1.6 billion in support of small businesses being provided through the British Business Bank. However, these seem to be primarily focussed on supporting local digital businesses, and the extent to which these efforts will support local employment is not clear. While the *National AI Strategy* acknowledges that "action will be required" (p. 7) to ensure the benefits of AI are shared broadly across the UK, no measures are outlined, or actions specified, as to how these benefits will be shared broadly. Rather, the *National AI Strategy* aims to ensure broad benefit across regions and sectors through promoting the adoption of AI technologies. These policies assume that if businesses adopt AI and digital tools this will support a growing economy, the benefits of which will (presumably) diffuse throughout the economy and benefit society broadly.

3.1.3 High-level principles approach for AI

The government's position on AI regulation, as outlined in *Establishing a pro-innovation approach to regulating AI* (*AI Regulation Policy Paper*) (2022), published in advance of the forthcoming white paper, is almost wholly reliant on high-level principles. The document makes unambiguously clear that specific recommendations are the responsibility of regulators themselves, although these should be guided according to the sector-specific interpretation of the government's set of six non-statutory "cross-sectoral principles" (*AI Regulation Policy Paper*, 2022, p.16). In contrast, while the *National Data Strategy* and *Plan for Digital Regulation* are primarily shaped by high-level principles, it seems these were formalised as specific recommendations in the later-published *Digital Strategy*. These recommendations are shaped by the overall goal of driving economic growth and filling the 'digital skills gap' to unlock latent economic value.

3.2 Fairness

Overall, the policy documents perceive the main beneficiaries of AI and digital technologies to be businesses, entrepreneurs, and the economy as a whole. While examples such as the application of AI in healthcare are given to demonstrate societal benefit, wider benefits primarily rely on the implicit notion that the benefits of innovation will diffuse to all parts of the UK.

Table 4. Summary of 'Fairness' evaluation

	National AI Strategy	AI Regulation Policy Paper	Digital Strategy	Plan for Digital Regulation	National Data Strategy
Is anyone acknowledged as possibly losing from emerging technologies?	X	X	X	X	X
Are any downsides of digital innovation acknowledged?	X	X	X	X	X
Are measures proposed for sharing risks?	X	X	X	X	X
Is inequality/equality/ fairness mentioned?	✓	✓	X	X	✓
Does the policy combine AI deployment with improved worker safety and job quality?	X	X	X	X	X
Does the policy advance inclusion of underrepresented groups?	✓	X	✓	X	✓
Is a strategy proposed for supporting workers displaced by AI/automation?	X	X	X	X	X
Are 'training programmes' mentioned?	✓	X	✓	X	✓
Does the policy highlight a lack of legislation and protection for persons of low socioeconomic status?	X	X	X	X	X

3.2.1 Consideration of algorithmic bias in decision-making

Are the downsides of digital innovation acknowledged? Overall, there is only an abstract acknowledgement of risks, with few, if any, examples given of the downsides associated with these technologies. The *National AI Strategy* explains that "AI technologies will impact the whole economy, all of society and us as individuals" (p. 16) but it does not portray this negatively, rather it merely implies that things will change. However, the policies do all acknowledge, explicitly or implicitly, the downside of AI in terms of the risk of bias or unfair discrimination, such as through decision-making algorithms that utilise poor-quality or non-representative data, or where the algorithm is poorly designed. This particular risk, or disadvantage, is by no means central to the policies, but it is consistently acknowledged. This may be mentioned as a means of addressing a growing concern around the use of algorithms (Sartori & Theodorou, 2022). This practise is significant as it risks encoding "human prejudice, misunderstanding, and bias into software systems that increasingly manage our lives" (O'Neil, 2016, p. 3). The *AI Regulation Policy Paper* acknowledges the impact of AI in decision-making processes that affect people's lives, highlighting concerns of AI amplifying "wider systemic and societal risks [such as] AI's impact on public debate and democracy" (p. 7). Nevertheless, this issue was discussed only in terms of *bias* and *risk*, with no mention of

inequality. No measures were proposed to share the risks and downsides of AI and digital technologies equally.

While such risks are highlighted throughout the documents, the *National Data Strategy* explains that the government fundamentally sees data use as presenting "opportunities to be embraced, rather than threats against which to be guarded". The focus is overwhelmingly on the 'opportunities' that digital technologies present. Furthermore, the job market shift favouring high-skilled workers is framed as digital technologies "transforming" jobs.

3.2.2 Automation, jobs, and training programmes

Bias in decision-making algorithms appears to be the only social risk considered in this policy. Automation, potential job-losses, and unemployment are totally absent considerations. No reference is made to automation negatively impacting jobs. Automation is only referred to in the context of the benefits it affords in terms of efficiency. Technology is framed as a power that 'transforms' jobs and careers.

The policy documents acknowledge the need to ensure that education "rises to the challenge" (*National Data Strategy*, 2020) of addressing the demand for digital skills at school-level, university-level, and for the existing workforce. This is being done through programmes such as the new post-16 T-Levels, scholarships, university modules, and training programmes. Numerous measures are outlined to invest in education and training programmes in AI and digital technology. Training programs and education programs are considered at numerous levels, including proposed digital aspects in school and undergraduate curricula. However, much of this aim involves training *new* talent at school and university level to fill the skills gap that loses the economy £63 billion annually. Consequently, the Department for Education is investing "an additional £750m over the next three financial years (2022-23 to 2024-25) to support high quality teaching and facilities in higher education" (*Digital Strategy*, 2022, p. 38).

Beyond training via school and university-level education, the *Digital Strategy* also outlines plans for "reskilling the existing workforce" (p. 41) which it deems "crucial" (p. 41) for resolving the skill shortage and to tap into latent economic growth. The Department for Education is offering training in digital skills for adults, which include the new "Essential Digital Skills Qualifications (EDSQs). Moreover, "as part of Skills for Life, the Government has launched Skills Bootcamps in England, which offer free, flexible courses lasting up to 16 weeks" (*Digital Strategy*, 2022, p. 42). This program is being scaled in the coming year with further funding up to £150 million. Additionally, the government is providing fully funded level 3 courses for adults in computer science, digital, and cyber skills via the 'free courses for jobs' scheme. Hence, substantial support is being offered for adults to "retrain in in-demand subjects such as digital" (p. 42). These measures are motivated by the need to meet demand for skills in the digital economy. There is demand from industry for training programmes, but a shortage of suitable courses available. Consequently, the government aims to support the development of skills in AI, machine learning, and data science for adults via free 'Skills Bootcamps' to develop skills that improve job prospects. There are also new digital training programs being offered to civil servants.

A significant focus is placed on data science training, but this is largely aimed at meeting the demand in an economy with changing needs as opposed to being focussed on

lifting the poor out of poverty. For example: "We will work with schools, universities, further education providers, and businesses to deliver the digital skills that the real economy actually needs" (*Digital Strategy*, 2022, p. 6). Digital skills are a central focus, but their role is foremost in helping realise national economic goals. Nowhere do the policies acknowledge the lack of legislation and protection for persons of low socioeconomic status.

The government prioritises supporting "top talent, PhDs, and Masters levels" (*National Al Strategy*, 2021, p. 24). While AI and digital education is considered a worthy investment in these, it ought to be questioned whether this approach is in fact inclusive. It may be that prioritising educational programmes at this level may detract from socioeconomic inclusion. Instead of ensuring a fair transition for workers at every level, this approach may simply be a means of utilising 'talent' in AI to achieve national economic and strategic goals.

3.2.3 Diversity and inclusion for supporting growth

The policies outline several means by which individuals from historically disadvantaged groups are being supported in the AI and digital technology sector. While the documents recognise that diversity is needed, this is framed as being economically advantageous because it will contribute to securing the best talent from a wider pool.

The *National AI Strategy* acknowledges the "moral imperative to ensure people from all backgrounds and parts of the UK are able to participate and thrive in this new Al economy" (p. 17). The government is funding scholarships for AI and data science conversion courses aimed at building diversity and inclusivity. These included "1,000 scholarships for people from underrepresented groups" in 2019, and will include "a further 2,000 scholarships to be delivered between 2023 and 2025" (*Digital Strategy*, 2022, pp. 39–40). The government also intends on funding 1,000 new PhD programmes in AI.

The UK aims to develop the "most diverse workforce [in AI]" (*National Al Strategy*, 2021, p. 22). Primarily, this is to be achieved via postgraduate conversion courses in data science and AI. However, postgraduate-level schemes may be unsuited for supporting certain demographics, such as those from low-income backgrounds who are less likely to be able to access postgraduate-level education. So far, these conversion courses consist of 40% women, 25% black, and 15% disabled. The policy further specifies that 70% of the students enrolled in these conversion courses are based outside of London and the South-East – implicitly highlighting how socioeconomic position is strongly coupled to geography in the UK.

The *Digital Strategy* explicitly promotes "inclusive recruitment and retention practices…to ensure that people from a wide range of ethnic and socioeconomic backgrounds are encouraged into digital roles" (p. 46). However, this is motivated by the recognition that a "lack of diversity in the UK's digital workforce is hampering digital growth by excluding potential workers and consumers from the sector's development" (p. 46). Thus, the underlying, and overriding objective remains one of economic growth, even when considering the lack of diversity and societal representation in the digital sector.

3.3 Pro-poor

Table 3. Summary of 'Pro-poor' evaluation

	National AI Strategy	AI Regulation Policy Paper	Digital Strategy	Plan for Digital Regulation	National Data Strategy
Is research and innovation targeted specifically to the needs of poor households and communities?	X	X	X	X	X
Is there any discussion of improving living standards or health in disadvantaged communities?	X	X	X	X	X
Does the policy outline a strategy for democratic input in directing the development of AI?	X	X	X	X	X

3.3.1 Geopolitical dominance: The UK as an AI superpower

While the foremost reason for funding AI and digital innovation is economic growth, this is nested within a broader vision of geopolitical dominance in the field of science and technology. For example, the *Digital Strategy* outlines "a roadmap we will follow to strengthen our global position as a Science and Tech Superpower" (p. 9) and considers the UK as being "at the forefront of global regulation on technology, cyber, digital and data" (p. 74). Similarly, this vision is repeated on numerous occasions in the *National AI Strategy*, which aims "to consolidate [the UK's] position as a science and AI superpower" (p. 44) and "to maximise [the UK's] strategic advantage" (p. 46) to "remain an AI and science superpower fit for the next decade" (p. 14).

The assumption is that the UK already has a solid footing as an established leader in AI, innovation, and R&D. Hence the strategic goals are to maintain the UK's position as a leader in AI, further develop the UK's dominance, and prepare for inevitable challenges of global competition for talent, data, and computational and financial resources. The *National AI Strategy* indicates that AI will likely cause "a shift in the nature and distribution of global power" (p. 11); specifically noting the role of AI in the shifting dominance in science and technology between the US and China while referring to "transnational challenges" to "global security and prosperity" (p. 11). In this way, some of the chief benefits of investment in AI and digital technologies are framed as being benefits to the nation, and its position in the international sphere, rather than in furthering societal goals and equity. Incentives around AI investment appear skewed towards geopolitical dominance and security, rather than potential domestic benefits.

3.3.2 Lack of consideration of the poor

No evidence was found in these documents of initiatives targeted specifically at the needs of poor households and communities. Consideration of the poor was absent in both the

distribution of benefits of AI and digital technology, and in the process of informing a government approach. The documents were primarily focussed on protecting businesses and consumers, rather than distributing benefits. If benefits are distributed, it is though supporting businesses across different regions in adopting digital tools and AI. Ultimately, the focus is on growth, innovation, and minimising risks (rather than encouraging benefits). The purpose is one of "unlocking the enormous benefits of digital technologies, while minimising the risks they present" (*Plan for Digital Regulation*, 2021).

Who are seen as the beneficiaries, and how are the benefits conceived? The dominant focus is benefits to business. The consumer is also seen to benefit, with the assumption that people benefit from products, and that this will fuel economic growth. The *National AI Strategy* perceives the beneficiaries as "everyone" (p. 5). However, it is relatively non-specific concerning these societal benefits, promising "hundreds of unforeseen benefits…to improve everyday life" (p. 11).

How have the policy objectives been developed? The *National AI Strategy* signals the intention to involve diverse societal viewpoints to achieve its goals, but gives no indication that diverse societal viewpoints were consulted as part of its development. Rather, the strategy was informed by the AI Council (an independent advisory committee of experts in industry, academia, and the public sector), in addition to a survey conducted with The Alan Turing Institute. This survey included over 400 respondents, but these were constrained to the "views of the AI ecosystem (those researching, developing, working with, or using Al technologies)" (UK AI Council, 2021, p. 3). Hence this does not reflect input from a broad range of social groups, or from less-advantaged communities. The *National Data Strategy*, in contrast, emphasises its inclusive and broad evidence base. The strategy utilised "a range of evidence sources, including desk research covering both case studies and published academic/sector research", in addition to stakeholder engagement programmes, as well as roundtables and workshops having "representatives from over 250 organisations across business, the third sector and local government". Furthermore, the document explicitly asks for views of readers to be provided as feedback to guide future measures. Questions are posed throughout the document to stimulate feedback: "This consultation is on a UK-wide basis: we welcome responses from organisations and individuals across the UK". Furthermore, how the objectives were developed in the *Digital Strategy* are not clearly indicated.

How do the policies empower people to interact with AI and digital technologies? This is to be achieved primarily through training programmes for developing digital skills, and educational programs for adults, as well as at the school- and university-level. The policies encourage improvements to digital skills education and training, citing benefits for job prospects as well as everyday life. The *National AI Strategy* aims to encourage broader consideration of careers within AI by "engaging the public and inspiring the leaders of the future" (p. 28). This is to be done largely by 'inspiring' all areas of society, for example through "programmes that engage children with AI concepts [that are] accessible and reach the widest demographic" (p. 27) such as through the National Centre for Computing Education (NCCE).

4. Discussion

These UK strategies mostly only pay token gesture to the goal of ensuring AI provides broad social benefit, offering little in the way of specific recommendations for addressing socioeconomic inequality. The overwhelming focus is supporting business and economic growth. Moreover, the UK has adopted a broader, more general approach to defining AI than the EU, in the interest of supporting innovation through flexible regulation. However, this may make it more difficult to achieve a cohesive regulatory environment for AI.

Deregulation & leaving the EU

Brexit, the UK's exit from the EU, is the context in which the UK is searching for opportunities. Brexit is, in part, about reducing regulation, and this 'small state, less government' paradigm is reflected in the regulatory policies analysed. This 'hands off' approach is noticeable in regulation concerning AI and digital technologies. The UK is taking a "deregulatory approach overall, whilst safeguarding consumer protections" (*Plan for Digital Regulation*, 2021). The *Digital Strategy* criticises the "heavy-handed approach" (p. 21) of EU regulation concerning innovation (using GMO technology as an example of the EU's failure to support innovation) and explains that the UK intends to use the "freedoms conferred by Brexit to implement a light-touch, pro-growth regulatory regime" (p. 5). This is the same approach as that being taken for regulating AI. The focus on "eliminating burdensome or excessive administrative compliance obligations" (*Plan for Digital Regulation*, 2021, p. 11) is a common theme. The *Plan for Digital Regulation* attempts to outline a consistent regulatory approach focussed on growth and innovation: "Innovation is at the heart of this Plan. We want to encourage it wherever we can, so that we can use tech as an engine for growth."

In a recent article from the Oxford Internet Institute, Roberts et al. (2022) reviewed the UK government's 'pro-innovation approach' outlined in the *AI Regulation Policy Paper*. They concluded that the UK's current position regarding AI governance is precarious. Whilst the 'sector-led approach' might promote "novel solutions" (Roberts et al., 2022, p. 8), the deregulatory line underpinning much of the innovation-focussed policy is liable to result in "significantly less consideration of ethical due diligence and human rights compliance" (Roberts et al., 2022, p. 6).

Policy narratives in the UK context

One of the key issues in AI regulation is the lack of consensus around 'how much' regulation is optimal. The reigning narrative in the UK government is that government policy hinders innovation (and, crucially, the economic benefits it brings). This is demonstrated by government currently proposing policies and legislation based on a 'pro-innovation' agenda. However, the narrative that regulation encumbers innovation is arguably false. Firm regulation can in fact help innovation if it means that companies know where they stand with respect to the law and what the legal boundaries are. Legally binding codes of practice that set clear expectations of responsibilities and appropriate safeguards provide clarity to organisations involved in AI's development, allowing companies to innovate with confidence (Ryder QC, 2022). This is particularly important considering the UK's recent exit from the EU, which

affords the government with a substantial opportunity to redefine its approaches to regulation in many sectors. The UK has made clear that it aims to be a world leader in science and technology, including AI. One of the 'three pillars of investment' outlined in the UK's plan for growth rests on the assumption that "innovation drives economic growth and creates jobs" (*Build Back Better: Our Plan for Growth*, 2021, p. 9). However, the policies analysed do not indicate that these will be broadly accessible jobs, failing to specify the kinds of jobs that will be created, and who will be qualified for these. Rather, the plan underscores that the UK priority is to create a world-class ecosystem for starting and growing businesses, stressing the strength of the UK in a range of sectors including AI.

Nevertheless, the report acknowledges that whilst London and the South-East of England have experienced growing prosperity during the past several decades, this has not been the case across the rest of the UK, emphasising that "the primary objective of this government is to change that, ensuring no region is left behind as we achieve greater economic prosperity" (*Build Back Better*, 2021, p.12). Does proposed policy for regulating AI reflect this intention to ensure the benefits of a growing economy are felt in all regions of the UK? Moreover, does a 'pro-innovation' approach actually mean creating a "smart and stable regulatory framework" (*Build Back Better*, 2021, p. 9), or is 'deregulation' closer to reality (to make the UK an attractive destination for investors)? Workers need to be supported through technological transformations. As such, effective policy is needed to ensure that the opportunities and economic benefits of future transformations are felt by everyone (Autor et al., 2021).

Regulation helps versus Regulation hinders

It is a neoliberal dichotomy between innovation and regulation that sees one as the enemy of the other. Instead, we could draw upon insights from innovation policy that describe how innovation can help steer and shape innovation towards social goals. In the case of AI, does deregulation in fact support economic opportunity? Or do companies really want standards and regulations, and to know what the rules are?

There is an argument for companies wanting certainty regarding standards and best practise. This allows businesses to know exactly what the law and codes of conduct are, so they can work within these constraints with assurance. This view is in fact reflected in parts of these documents. For example, the *National Data Strategy* claims that "businesses need certainty to thrive". Similarly, The *Plan for Digital Regulation* puts this:

> "well-designed regulation can have a powerful effect on driving growth and shaping a thriving digital economy and society, whereas poorly-designed or restrictive regulation can dampen innovation…the right rules can help people trust the products and services they're using, which in turn can drive take-up and further consumption, investment and innovation."

The UK government's view regarding broad regulation on AI is that it is not appropriate, and that, instead, "existing sector-specific regulators are best placed to consider the impact on their sector of any subsequent regulation which may be needed" (*National Al Strategy*, 2021, p. 52). This reflects the general trend of the UK government to shift responsibility for developing new regulatory approaches onto sectoral regulators themselves, and thus avoid developing firm legislation on AI technologies. This could reflect a lack of

direction or consensus within government, or possibly the desire to keep the regulatory landscape open and undefined such that it encourages innovation, following the implicit idea that regulation inhibits innovation (despite the *National AI Strategy* recognising that "well-designed regulation can have a powerful effect on driving growth", and acknowledging that "poorly-designed or restrictive regulation can dampen innovation" (p. 51)). The notion that a sector-led approach "simplifies things for innovators" (p. 52) is inconsistent with the idea that clear regulation helps innovation, and likely complicates the regulatory landscape.

The UK could be involved in standard setting and regulation, and this may be the best way of encouraging the Al industry. However, the regulatory approach, particularly in the case of AI, is confused and contradictory. Does it reflect any inconsistencies or incompatible priorities? The lack of specificity and clarity might indicate that the government does not have a clear direction for AI. A further criticism of the *National AI Strategy* is that it does not in fact reflect a strategy, due to its lack of specific recommendations.

The UK government's unwillingness to commit to cross-sectoral regulatory legislation is presented as a 'simplifying sector-led approach' the 'enables and empowers' individual regulators. Presumably, this is motivated by the wish to avoid obstructing innovation, and because the risks of AI are perceived to be "highly complex" and "hard to unpick" (*National AI Strategy*, p. 52). The UK's position on AI regulation is to create an approach that supports growth and benefits society in equal part. However, it could be that neither outcome is realised if policy is poorly designed, or where there is a hesitancy to legislate where statutory control in needed.

Use of language and rhetoric

The language used in these policies is significant. It frames technology as though it is a latent power, ready to be released, rather than it being something that can be encouraged in particular ways or shaped. In the national context, technology is portrayed as a natural force of 'opportunity' which can establish the UK as a 'science superpower'. The *National AI* Strategy describes these as opportunities to "supercharge" (p. 4) the position of the UK, "capture the benefits of innovation" (p. 4), and "unlock the power" (p. 5) that AI represents.

The *Digital Strategy* claims that the government's pro-innovation regulatory approach aims to "unleash the power of the digital economy" (p. 20). This charged language is common throughout the documents. For example, the *Plan for Digital Regulation* refers to "unlocking the enormous benefits of digital technologies". Similarly, the *National Data Strategy* is to play a key role in helping the UK "harness the power of data".

A market-oriented and self-regulation-promoting approach

Djeffal et al. (2022) proposed four heuristic regimes for state governance of AI based on two dimensions. The first being a proactive versus passive role of government in the *development* of AI (strong vs. weak state intervention); the second being the prioritisation of *regulation* and mitigation of risks versus prioritisation of AI deployment ('enclosure-and-control' vs. 'stimulation' approach). In this framing, the four (non-mutually exclusive) regimes are "(i) the entrepreneurial state, (ii) the market-oriented state, (iii) the regulatory state, and (iv) the self-regulation-promoting state" (Djeffal et al., 2022, p. 3). Following this framing for assessing types of AI governance regimes, the UK's current policy strategy for AI indicates it is *self-*

regulation-promoting, facilitating self-regulation mechanisms and "soft-regulatory instruments" (Djeffal et al., 2022, p. 5) such as behavioural codes and technical standards; and *market-oriented*, in line with the small-state attitude that perceives "state-led regulations…as inhibiting innovation" (Djeffal et al., 2022, p. 4) reflected in the government's 'pro-innovation' approach to governing AI and digital technology.

Hype and technological determinism

Much of the *National AI Strategy* buys into the hype around AI, for example by defining AI as a "general purpose technology" (p. 16). This definition is contestable, and only makes sense within a very particular view, and is an especially unhelpful definition for regulators. In contrast, the regulation on digital policy tends to be more specific.

The *National Data Strategy* highlights that jobs increasingly require data skills, but it makes no reference to the contraction of existing industries, or to job losses due to automation. Underlying this is a technological determinism perspective. Principle 16 of the Asilomar AI principles (Future of Life Institute, 2017; see Appendix) state that humans have the right to choose how and when decisions should be delegated to AI systems, and to choose which tasks are automated. While the *National Data Strategy* is concerned with data and digital technologies more generally, rather than AI, it does reflect that the government approaches these issues from a technological determinist paradigm, presuming that workers must play catch-up by developing new skills to stay relevant in an economy evolving under its own momentum.

When reviewing policies that are only concerned with the digital, it is possible to forget that substantial thinking has already been applied to the issue of technology and inequality. For example, Schumacher (1976) criticised the unsustainability of mainstream economics and made a case for the value of smaller enterprises and policies that are suited to society's needs, in place of an obsessive emphasis on growth. Often these theories are not considered relevant to AI, as if AI is a technology quite apart from everything that has gone before. This is a dangerous line of thinking if it sets limits around our will to regulate AI that becomes a norm. The government's regulatory paradigm is 'pro-innovation', but those in innovation policy may probe further to ask 'pro-what-sort-of-innovation?'. Who are the beneficiaries of this approach? Current government policy does not reach the bare minimum in addressing socioeconomic inequality.

We might question why such focus is placed on AI ethics, and concepts such as AI alignment. These essentially presume that the issue is 'how can we write algorithms for values?', rather than 'how can we actually regulate AI (as we would regulate any other technology)?'. One of the findings of this study is that the subject of economic inequality is largely absent from these policies as they have been conceived thus far. Since socioeconomic inequality is not a protected characteristic, it is incredibly difficult to research and measure, and does not easily fit into the 'ethics and rights'-based framework that has become the dominant way of thinking about AI.

It may be that individual companies having independent guidelines is counterproductive to the goal of establishing appropriate governance of AI, if it instead establishes a deterrent that undermines the need for regulation. The slow work of regulators affords more time for companies and organisations, whose practices frequently disregard

commitments made to AI ethics principles (Crawford et al., 2019). Often organisations implement AI ethics guidelines that are too vague, with little focus on their practical application and deployment nor, indeed, on the efficacy of these recommendations for directing policy (Hao, 2019). These tools often fail to address the question of which body is responsible for implementing these guidelines. This is the trap of ethics-washing, where "genuine action gets replaced by superficial promises" (Hao, 2019). Encouraging soft regulation (or self-regulation) may facilitate a culture of virtue-signalling that disguises the lack of substantial regulation that is needed. There is no lack of effort in *generating* AI ethics statements, yet they frequently fail to address questions of execution, accountability, relevant metrics, and the administration with regards to compliance (Crawford et al., 2019).

5. Conclusion

This research project assessed UK AI and digital technology policy using the "Equalising, Fair, Pro-poor" framework adapted from Smallman and Beumer (Forthcoming). The aim was to provide policymakers with insights for shaping more inclusive policies. It did so by investigating the UK government's strategy for AI and digital technologies, the narratives currently shaping regulation, and the extent to which economic inequality is considered. The analysis focussed on evaluating how socioeconomic inequality is accounted for in national policy. Its conclusion is that AI policy does not reach the bare minimum in its consideration of socioeconomic inequality, and digital technology policy does not go much further.

In terms of claimed intent, government strategy aims to ensure that the benefits of AI and digital technology are felt in all sectors and regions of the UK. For AI, few, if any, specific recommendations are made in the documents studied that indicate how shared benefit will be achieved. Rather, this vision rests on the assumption that innovation in AI and digital technology, and the economic rewards they bring, will diffuse naturally throughout society and the economy. The documents pertaining to digital technology, in contrast, do offer more in terms of specific measures for achieving the government's vision of 'levelling up' and promoting broad prosperity throughout the country. However, in all these documents, the overwhelming focus is on promoting innovation and economic growth, with the benefits largely aimed towards businesses. In terms of regulation, government policy clearly emphasises a wait-and-see approach to AI innovation, with the notion that 'regulation stifles innovation' being apparent throughout. This differs from digital innovation more broadly, for which there are numerous initiatives, retraining- and education-programmes being funded by the public sector. The UK's 'pro-innovation' approach to regulating AI and digital technologies, using light-touch measures and a flexible framework, outlines measures for mitigating social inequalities only in specific cases, and makes no attempt to address economic inequalities whatsoever. The national priorities reflected in the AI policies are economic and reputational, but not domestic. There is a fine line between a regulatory framework that 'keeps pace' with AI, and no consequential regulatory framework at all. It remains ambiguous at best as to how the UK government's approach will provide the social benefit it promises in its *National AI Strategy*.

Further research is needed to ascertain the impact of these policies in practise. If this project were to be extended, interview data could be used to inform further analysis. This could incorporate peoples' 'lived experience', amplify marginalised voices, and lead to broader inclusion and representation of human difference in future policy. A better understanding of how narratives drive AI's development is needed. Narratives play a central role in organising our societies and shaping inequalities (Sartori & Theodorou, 2022). Regarding automation, studies might examine the efficacy of re-training programmes for providing workers with skills valuable to the new economy. Bias in AI remains a central issue. Similar to decision-making algorithms, language models may be embedding class biases, as word-use and language is utilised differently across classes (Weidinger et al., 2021). An additional issue concerns labour rights and labour value chains, and how these play out in global south contexts. The development of AI frequently involves outsourcing labour to poor countries (Graham & Anwar, 2020). Ultimately, policy solutions are key in addressing these problems. As such, critical appraisal and amalgamation of existing and emerging governance frameworks are needed for guiding policy aimed at mitigating discriminatory socioeconomic outcomes of new technologies.

We are not so much in a 'race to regulate AI', as we are in a race to define the culture and values we wish to be reflected in our technology. The economic benefits of AI and digital technologies are tempting, as this study has shown. However, a precedent in inclusive policy and regulation is needed to protect civil liberties and ensure that the benefits of AI and digital technologies are shared equitably. The alternative risks escalating the effects of a culture that prioritises the economic benefits of new technologies – an approach that turns a blind eye to those who bear the burden of this shift.

In summary, this dissertation assessed the extent to which socioeconomic inequality is considered in national AI and digital technology policies. The analysis has provided convincing evidence that the question of who benefits from these technologies, especially AI, is not being addressed. Consequently, achieving the government's vision of a fairer future may necessitate a more proactive approach to regulation than is currently being considered.

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Appendix

Policy documents

UK Policy documents on AI:

- UK National AI Strategy (September 2021)
- Establishing a pro-innovation approach to regulating AI (AI Regulation Policy Paper) (July 2022)

UK Policy documents on data/digital:

- UK National Data Strategy (September 2020)
- Digital Regulation: Driving growth and unlocking innovation (Plan for Digital Regulation) (July 2021)
- UK Digital Strategy (July 2022)

Asilomar AI Principles

The *Asilomar AI Principles* are 23 governance principles developed as part of the 2017 Asilomar conference. They are intended to guide the development of AI such that it offers "amazing opportunities to help and empower people in the decades and centuries ahead" (Future of Life Institute, 2017). The principles and recommendations regarding jobs, workforce automation, and economic inequality (principles 14, 15 and 16) are:

- Shared Benefit: AI technologies should benefit and empower as many people as possible.
- Shared Prosperity: The economic prosperity created by AI should be shared broadly, to benefit all of humanity.
- Human Control: Humans should choose how and whether to delegate decisions to AI systems, to accomplish human-chosen objectives.

Framework

(*Adapted from Smallman and Beumer* (*Forthcoming*); *originally based on Cozzens* (2011).)

1. Equalising: Does the policy seek to change socioeconomic structures in ways that reduce rather than increase income inequality?
    - Does the policy prioritise reducing unemployment (rather than simply creating jobs)?
    - Does the policy explicitly aim to reduce economic inequalities?
    - Does the policy prioritise creating jobs for less advantaged communities?
    - Does the policy produce mid wage jobs?

- Does the policy consider whether the relevant skills are in place to produce the technologies?
- Are possible contractions of old industries as a result of technological innovation considered?
- Do conditions for foreign investment include local employment requirements?
- What models of ownership are conceived in the policy? Are there any measures to share assets?
- How is IP dealt with? Are any ideas proposed relating to open source or reciprocal licenses (copyleft)?
- Does the policy conceive of an active or passive role for government?
- Are specific recommendations made? Or are they merely high-level guiding principles?
- Are the economic benefits of this policy or strategy concentrated in pockets/centralised, or shared broadly?

2. Fairness: What opportunities does it offer for individuals from historically disadvantaged groups to rise out of poverty?
    - Who does the policy see as the main beneficiaries of AI?
    - Is anyone acknowledged as possibly losing from emerging technologies?
    - Are the downsides of digital innovation acknowledged? If so, how? How are they described? Does this policy indicate how the downsides should be dealt with?
    - Are measures put forward to share the risks and downsides of technological innovation equally?
    - Is inequality/equality/fairness mentioned in the policy? If so, how is it conceived? Are any measures proposed to address any imbalance?
    - How does the policy aim to combine AI deployment with improved worker safety and job quality?
    - Does the policy advance inclusion of underrepresented groups? How does the policy account for existing socioeconomic inequality?
    - Is a strategy proposed for supporting workers displaced by AI/automation?
    - What steps are proposed to ensure a fair transition for workers?
    - Are 'training programmes' mentioned? If so, in what context? What budgets are proposed, if any, for these or equivalent programmes?
    - Does the policy highlight a lack of legislation and protection for persons of low socioeconomic status, or from lower income communities?
    - Does the policy highlight the importance of having a more egalitarian society for encouraging equitable distribution of the economic benefits of AI?

3. Pro-poor: Targeting research and technology development specifically to the needs of poor households and communities.
    - What is the purpose of funding AI and digital innovation?
    - How are the benefits of AI and digital innovation conceived? Are they named or mentioned explicitly?

- How have the objectives/understanding of benefits been developed?
- Who are seen as the beneficiaries of the products of AI and digital innovation?
- Is there any discussion of improving living standards/health in disadvantaged communities/creating conditions for education and employment to take hold?
- How does the policy aim to empower people to interact with and use AI systems effectively?
- Does the policy outline a strategy for democratic input in directing the development of AI?