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The Impact of AI on the Labour Market

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Executive Summary

Technology has a long history of profoundly reshaping the world of work. From the dawn of the agricultural revolution to the digital age, each wave of innovation has redefined the structure, nature and dynamics of labour markets.

Today, the world is on the brink of another technological revolution, enabled by artificial intelligence, that has the potential to reshape the world of work yet again. This coming wave is likely to arrive more quickly than its predecessors, given the pace of technological adoption has been accelerating and because AI itself is advancing so quickly. Policymakers need to prepare now to ensure their workers and labour markets are equipped to ride the coming wave and benefit from it.

In this report we use novel analysis to explore how AI could affect the labour market, with specific reference to the United Kingdom. Although much discussion of AI is currently based around large language models (LLMs), this is part of a broader story about automation, which takes in physical tasks as well as cognitive ones. Our study therefore aims to take a wider view that incorporates a broader definition of AI, including AI-enabled hardware, and that examines three key ways that AI could affect the labour market: through demand, supply and by changing the workplace experience:

Labour demand: We estimate that full and effective adoption of AI by UK firms could save almost a quarter of private-sector workforce time – equivalent to the annual output of 6 million workers.

The potential for AI to save time and boost productivity will vary significantly at the individual-worker level. Our analysis suggests that most of the time savings from AI are likely to come from the use of AI-enabled software that performs cognitive tasks, rather than more costly AI-enabled hardware that focuses on physical work. As a result, occupations and sectors that involve complex manual work such as the skilled trades or construction are likely to be less exposed to AI. By contrast, those workers who perform routine

cognitive tasks, particularly in administrative occupations, and those who work in data-intensive industries where it is easier to train new AI models (such as banking and finance), are likely to be more exposed.

Given the high degree of uncertainty over how quickly, how fully, and how effectively AI could perform existing tasks and save workers' time, we look at a range of scenarios to help assess its potential macroeconomic impact. In all cases, AI is expected to generate some job losses, but this labour-substitution effect is only part of the story of how AI will affect labour demand. AI is also likely to create new demand for labour by boosting economic growth and speeding the development of new products and services that create entirely new jobs. Over history, technology's impact on labour demand has been a tale of the push and pull between these two forces of labour substitution and demand creation, and over the long run they have tended to balance out.

Our analysis tells a similar story. In all our scenarios we expect unemployment to rise initially as some firms choose to bank the time savings from AI and reduce the size of their workforce. Based on historic rates of labour shedding, we estimate 1 to 3 million jobs could ultimately be displaced by AI. Crucially however, these job displacements will not occur all at once, but instead will rise gradually with the pace of AI adoption across the wider economy. On an annual basis, this means job displacements peak at between 60,000 and 275,000 jobs a year, which are relatively modest figures compared with the average number of job losses seen over the past decade in the UK (450,000 per year) and even more so relative to the overall labour force (33 million).

Moreover, the rise in unemployment is likely to be capped and ultimately offset as AI creates new demand for workers, which pulls displaced workers back into the workforce. Our best guess is that AI's peak impact on unemployment is likely to be in the low hundreds of thousands and for the effect to unwind over time. While there is a great deal of uncertainty over all these figures, a common lesson is that AI is likely to increase the dynamism of the labour market by prompting more workers to leave existing jobs and start new ones. As a result, the UK's labour-market infrastructure will need an upgrade to adjust to the AI era.

These potential time savings from AI and associated rise in labour productivity will also boost economic growth. The scale of this effect is highly uncertain, and will depend both on the extent to which AI is adopted across the economy and how cost-effective it is to implement. Our analysis suggests that most kinds of AI have the potential to generate significant cost savings, but this is not guaranteed for all AI types. For example, bespoke AI software tools that are trained on a company's unique data as well as complex AI-enabled hardware are likely to prove prohibitively expensive for most small firms to develop on their own. For small firms to access these novel technologies, the technology will need to be developed at scale by other companies, "platformised" (developed into tools that can be easily implemented across an industry) and then sold as a service (similar to how the market for cloud computing has developed). We explore these different possibilities in our scenario analysis and find that AI could raise UK national income by between 5 per cent and 14 per cent by 2050 with our most likely scenario pointing to a substantial 11 per cent boost, equivalent to more than £300 billion a year in today's terms.

A key question in assessing AI's impact on the economy is judging when its impact will become sufficiently significant to show up in macroeconomic statistics. Predicting the point at which any technology starts to become widely adopted is inherently difficult, so we explore a range of timing assumptions in our analysis. In all cases we expect the impact of AI on the economy to be relatively modest in the near-term – raising GDP by between 0.1 and 1 per cent over the next five years and the level of unemployment by up to 180,000 by 2030. By 2035, the range of outcomes is much broader – with the level of gross domestic product (GDP) 0.6 to 6 per cent higher depending on the scenario. How this plays out in practice will depend not only on the fundamental nature of AI or decisions made by private-sector firms but also policy decisions that have the capacity to accelerate or delay the implementation of AI.

Labour supply: AI has significant potential to improve the supply of labour, by increasing the quantity, quality and effective use of workers in the economy – all of which can add further to growth.

First, we estimate that AI could assist both teachers and students in the

classroom and raise educational attainment by around 6 per cent on average across students over their academic career. Emerging evidence suggests that lower-performing students are likely to experience the biggest boost from AI-enabled education, suggesting it could be a helpful social-levelling tool to equalise access to opportunities. A more educated workforce will be a more productive one, so as AI-educated students gradually enter the workforce they will raise productivity. While this is a slow-burn effect, it could be a substantial one – adding around 6 per cent cumulatively to GDP over the next 60 years.

Second, AI can support a healthier population and hence a healthier workforce, leading to fewer lost workdays, longer and more productive careers, and lower welfare costs. The country is in the foothills of AI applications in health services but already there is enormous potential for AI to speed up medical research, enable a preventative approach to health care, drive more efficient identification, treatment and discharge of people from the health system, and, importantly, spur further assistive technologies that can help disabled people or those with short-term health issues to re-enter the workforce.

Third, there is potential for AI technologies to support better job-matching and improve the effective utilisation of labour – just as the advent of the internet did at the turn of the century. This is an area where design and controls become increasingly important, since bias arising from data patterns could lead to negative recruitment outcomes. One key element to retain is that of workers' agency, so rather than seeing the role of AI as matching passive workers to roles, it helps equip them with strategies and information that allow applicants to present themselves to best effect.

Workplace experience: People's day-to-day experience of the workplace could shift materially as AI tools become more prevalent. AI has the potential to improve job quality by reducing mundane tasks, improving access to the workplace for different types of workers, and helping to improve workplace health and safety. AI thus has the potential to help deliver a more engaging, inclusive and safe working environment. However, our survey of early adopters of AI in professional settings also highlighted that some have concerns that the workplace experience might change in other ways, for

example with extra scrutiny of work leading to a more stressful working day. This means that careful management and communication of how AI is applied in the workplace will be a crucial element of the transition.

Overall, there is emerging evidence that AI is having a transformative impact at the individual and company levels. Our forward-looking analysis suggests these early indicators are likely to be a foretaste of a much bigger transformative change to the world of work in the decades ahead. It would be a mistake to concentrate all policy direction on limiting the disruption that this will bring. Any policies designed to hold back the tide will likely be ineffective and damaging in the long term.

Instead, we propose four key areas which government activity should focus on to maximise the benefits of AI in the workforce for the broadest possible part of society:

A. Encourage the broad adoption of AI across the economy by reducing barriers to AI access and by harnessing its ability to improve education and skills for all. By doing so, governments can help ensure AI delivers on its promise as a social-levelling tool that equalises access to opportunities.

B. Upgrade labour-market infrastructure to cope with the higher rate of churn and more dynamic pace of change that AI is likely to create. This includes equipping workers with knowledge of the coming changes and the support facilities – including financial safety nets, retraining opportunities and job-matching services – to help maximise employment.

C. Harness the ability of AI to improve the quality of jobs, by shining a light on how AI is already being adopted across the economy – to share best practice to speed uptake and identify risk areas where firmer guardrails are needed.

D. Finally, given the high degree of uncertainty around the path of AI and its potential impact, the government should engage in detailed scenario analysis and practical contingency planning to ensure it is prepared for the more radical future that is in prospect.

A summary of detailed recommendations under these four themes is provided in the table below:

Recommendations

A. Encourage broader adoption of AI so that more can benefit from it

1. Futureproof the next generation of UK workers by harnessing AI to boost educational outcomes and refocus the school curriculum to focus on AI-complementary skills. This should include curriculum change, but also rapid innovation in teaching practice to automate elements of lesson planning a personalise the learning experience for students.

2. Incentivise the uptake of AI training assistants in the private sector to help boost the performance of lower-performing workers. Through a combinati of free, open-source products and R&D tax credits to support further innovation, the government can support businesses – and in particular smaller businesses – not to miss out on the boost to productivity.

3. Develop a new AI-pathfinder programme to encourage broad uptake of AI across firms of all sizes. This will involve borrowing from successful scheme in Singapore and Germany, supporting local networks to inspire businesses with examples of best practice and transforming business support throug new AI-powered, personalised service.

4. Incentivise investment in labour-augmenting AI technology by creating national challenge prizes to alleviate labour shortages in key public-service sectors. By rewarding the small-scale innovation already happening in pockets of the public sector, the transformation can be rapidly scaled up and th effects felt quickly further afield.

B. Upgrade the UK's labour-market infrastructure to adjust to the AI-era

5. Create an Early Awareness and Opportunity System that helps workers understand how AI is likely to affect their job and provides them with advice o how their skills could be successfully utilised in other career pathways. This new system would involve a dynamic, real-time analysis of how AI is affec the labour market, including identifying which industries are the fastest source of employment growth, which skills are most in-demand and which training courses are most effective at developing those skills.

6. Auto-enrol workers in a new, voluntary LIFESPAN fund that helps mitigate unemployment shocks. This fund would be structured in a similar way to pension contributions, with workers and employers both contributing to personal LIFESPAN funds each year out of pre-tax income. Unlike pensions, however, this fund would be accessible when a worker experiences a major life event that changes their employment status – providing them with a personal safety net to finance re-employment and helping to ensure the workforce is more resilient to changing working patterns.

7. Revamp the UK's adult-training offer to be more personalised, cost effective and directed at cultivating in-demand AI-era skills. This will require more a better free resources, incentives for businesses to retrain their workforce and expanding the student-loan system to support lifelong learning.

8. Support the development of an AI-powered job-matching portal to better match workers with employers and reduce frictional unemployment. This platform would support both sides: employers looking for the right candidates and applicants who might benefit from assistance in the process of seeking a new role.

C. Maximise the impact of AI to improve job quality

9. Upgrade the information on where and how AI is being used in the workplace. The Office for National Statistics (ONS) should systematically track, monitor and update data on job quality by adapting the existing Transformed Labour Force Survey (TLFS) to inform regulatory and policy development

10. Launch a Taskforce for AI-related Workplace Disclosures (TAWD) that encourages employers to voluntarily disclose how they are adopting AI in the workplace. This would both help identify use cases where additional policy guardrails may be needed and to share best employer practice to encours broader uptake of AI across the economy. Employers can use this as a platform to promote their own cutting-edge use of AI and enhance their emplo brand.

11. Clarify and disseminate guidance on automated decision-making and, if necessary, dynamically adjust worker-protection legislation. If the system car provide greater confidence as to the outlines of compliance, firms can have more confidence to invest, or more rapidly identify where additional legal clarification might be needed.

12. Improve the enforcement capacity of the UK's three regulators responsible for overseeing the impact of AI in the workplace and build their capacity to test and certify regtech tools that help firms navigate the legal landscape. In a novel field, greater coordination and clarity between these bodies, back up by a better understanding of the technology, will be vital for confidence.

D. Prepare for a more radical future

The future is uncertain. Some of the analysis in this report may need revisiting before too long. This will continue to be a dynamic environment in which the technology develops rapidly and its applications evolve in ways that cannot be foreseen.

But only by taking sensible steps now can the country best equip itself for success. For this reason TBI has aimed to develop a set of a dozen "no-regrets" policy recommendations that should bring benefits in a range of scenarios, backed up by a horizon-scanning function in recommendation 13.

Taken together, this analysis and set of recommendations should provide a big step forward in the UK's mission to make the most of AI technology. AI can help everyone become more productive and better off. In doing so, it can support many of the other policy outcomes the government should pursue.

01

Setting the Scene

Context

Artificial intelligence is here today.[1] Its impact is already being felt in the economy, in public life and in day-to-day experiences. Although it's still the very early chapters of the story, the general-purpose nature of the technology and its potential to be adopted quickly make AI hugely consequential.

Nowhere is this more apparent than in the world of work. The history of people working alongside machines, and those machines taking on some or all of the tasks originally carried out by workers, is a long one. There is every reason to believe this will continue – and accelerate. Machines will increasingly take on tasks that are currently the preserve of humans while also spurring innovation that creates new jobs that don't yet exist. This will lead employers to restructure entirely the ways in which workplaces operate, and so the human impact will be apparent and increasingly obvious.

History also tells us that the road to technological adoption is bumpy. Although technological progress is the cornerstone of rising living standards, it can also exacerbate inequality by displacing some jobs, favouring the well-resourced, and widening gaps in education and geography. AI has the potential to cause similar effects, but it also presents a potential tool for social levelling.[2] This needs to be wielded mindfully and shaped judiciously in order to realise a "techno-optimist" future scenario.

The question is how governments should respond to the emergence of AI. Many governments might decide to wait and see, and react to disruption after the event. Others will seek to put safety first and intervene to establish as much control as possible so that change can be managed or minimised.

Each of these approaches is mistaken. The first leaves policymakers at risk of seeming entirely unprepared; the latter is a charter for decline.

The aim for governments should be to adopt a pro-innovation, pro-

technology stance while also being aware of the risks and possible short-term consequences. This is vital not just for reasons of equity and social cohesion, but also to maintain confidence and acceptance in the technology, and to guard against demands for easy-sounding answers that will simply undo the gains.

For all these reasons we felt it was important to apply a critical lens to some of the assumptions around the effect of AI on jobs, to explore a range of channels and to generate a set of recommendations for a progressive, ambitious approach.

Definition and Scope

"Artificial intelligence" must be close to the most used – and most flexibly used – phrase in current political discourse. Yet despite the explosion of interest in AI, there is no consensus on what the term means. For the purposes of this project, we use the Organisation for Economic Co-operation and Development (OECD) definition of AI[3] as our foundation: "An AI system is a machine-based system that, for explicit or implicit objectives, infers, from the input it receives, how to generate outputs such as predictions, content, recommendations, or decisions that can influence physical or virtual environments. Different AI systems vary in their levels of autonomy and adaptiveness after deployment."

This definition focuses on the outputs that an AI system generates – for example: content, predictions, recommendations, decisions – and the objectives that these outputs are meant to achieve. It is widely recognised, and a version of it has been adopted by both the European Union[4] and the United States[5] in their AI acts.

AI is not new. The first wave of AI began in the mid-20th century and was called symbolic AI, flourishing from the 1950s until the 1990s. It relied on quantifiable data and strict rule-based procedures with some allowances for uncertainty. Major symbolic AI achievements included one of the first chatbots, ELIZA, and the chess-playing expert system Deep Blue, which in 1997 beat Garry Kasparov, the world champion at the time.

The second (and current) wave of data-driven AI kicked off in the 2000s and accelerated in the 2010s with rapid uptake of the internet, which unlocked one of the key barriers stopping AI from scaling: data. This wave closely mimicked how human brains process information through deep learning and machine learning, and modelled uncertainty, randomness and complexity. It is best reflected in recent AI innovations such as ChatGPT or autonomous drones.

Both these waves constitute "weak" or "narrow" AI in that they are specific and bound by task-based parameters. We've excluded symbolic AI from our analysis under the assumption that any labour-market impacts from this wave have been witnessed and adjusted for already, given the technology's age and prevalence.

AI capabilities, however, are fast evolving. The next wave is expected to be "strong" or "general" AI (AGI). AGI applications will exhibit more autonomy, be able to adapt to different contexts and not be limited to specific tasks – similar to human capability. Beyond this, AI systems smarter than any individual human ("artificial super intelligence") and systems smarter than all humans ("the singularity") are possible further in the future.

For the purposes of this project, we exclude these more advanced versions of AI because their disruptive potential is so great and they are still thought to be some decades away. For example, the Good Judgement Project's "superforecasters", who are particularly skilled at assessing probabilities of future outcomes, estimate there is only a 12 per cent chance of AGI being developed by 2043, 40 per cent by 2070 and 60 per cent by 2100.[6] AI experts are only slightly more optimistic, with half of a recent survey of more than 350 AI professionals estimating there is a 50-50 chance AGI will be developed by 2060.[7]

Our Starting Point

TBI analysed a range of literature from public and industry sources and complemented this with stakeholder engagement in the United States and Europe.[8]

From this review, we can see that experts have come to a broad consensus on several fronts:

- AI is already driving double-digit productivity gains for early adopters on individual tasks.[9] To date, AI has not been implemented widely enough to make a noticeable difference to aggregate productivity statistics, but this is unsurprising – new innovations often take time to be integrated into production processes and fully utilised. The productivity effects of AI are likely to follow a standard J-curve,[10] where initial investment leads to aggregate productivity gains with a lag.
- What singles out AI from previous technological waves is the scale and speed of its potential impact. More than 50 per cent[11] of the US population used ChatGPT within 10 months of its launch – the internet took 17 years to reach the same level. Around 40 per cent of global employment is expected to be affected in one way or another by generative AI according to the International Monetary Fund's (IMF) latest study.[12] AI should therefore be viewed as one of the few technologies with near-universal application, similar in scope to electricity or the internet. But unlike electricity, which took decades to integrate into production processes, much of the basic infrastructure for AI – computers and the internet – already exists, meaning AI's effects are likely to manifest within years, not decades.
- It seems highly likely then that demand for labour will soon be disrupted on a substantial scale. Developed economies, white-collar workers and the services sector are most likely to feel the effects of this change in the short term, reflecting the alignment of their work to generative-AI technologies. However, this same group is also likely to be better able to navigate and leverage the disruptive impact of AI, given higher skill levels and technological readiness.
- Some of the commentary around automation views AI as a risk to human work. It is reasonable to consider this point of view – at this stage it is possible to make projections based only on analysis and it is not a given that AI will result in net job creation. What we can say is that the past 200 years suggest that new technologies tend to create more jobs in the long run than they destroy. It is true that this effect is not automatic and has not been as visible since the 1980s, a period characterised accelerating

automation,[13] but with more limited productivity gains and a lower rate of new task creation –a process known as "so-so automation". Given the large potential productivity gains from AI, it seems unlikely it will follow that pattern – and the outcome of these processes are tractable, in that policy can affect the outcome.

- AI has the potential to increase long-term economic growth by boosting the quality of the labour force both by helping workers attain more skills and by living healthier lives. AI could improve skills by increasing educational attainment and providing tailored on-the-job training. It could improve health by enabling early and predictive diagnoses, expanding health-system capacity and increasing labour-market access for people with different abilities. However, these effects are not guaranteed and will require shrewd governmental policy to cultivate the potential gains.
- AI is already being used to improve labour-market efficiency by better matching workers with employers – similar to how online job boards improved hiring rates.[14] However, there is a risk that AI could also amplify existing biases in recruitment decisions. Policy guardrails will be important – including adding human checkpoints and evaluations of AI recruitment to ensure they work as intended.
- The impact of AI on industrial relations will be complex. Workers already recognise the potential benefits of AI in terms of improving job quality – by automating routine tasks, improving physical safety at work and freeing up more time for more engaging tasks. However, workers also are wary of the risks – fearing job losses, loss of wage-bargaining power, increased intensity and stress, and additional management scrutiny. This suggests a significant role for policy in managing these disparate effects.

AI and the UK

The AI revolution is unlikely to leave any part of the world unaffected. But in this report we focus on the UK. The country has a large economy, is well integrated with global markets, in possession of a skilled workforce, with strong capital markets and a competitive native tech scene – it should be well positioned to take advantage of technological innovations.

The UK also needs new means of making progress: the nation has endured

a long period of slow productivity growth, feeding into disappointing overall economic performance. Successive efforts to address some of these shortcomings, based around infrastructure or skills, have made only limited impact. Something has been missing. At the same time, other countries are poised to surge ahead via technological transformation, leaving any unreformed economies less and less competitive.

In other words, the upside of AI for the UK is substantial, but the downside of a missed or mismanaged adoption of new technology is also significant.

The remainder of the report is structured in two chapters. In “The Potential Impact of AI on Labour Markets” we analyse the ways in which AI could affect the world of work – exploring its potential impact on labour demand, labour supply and the workplace experience. Then in “Policy Solutions” we provide a set of recommendations for the UK to best take advantage of the opportunities of AI and manage any resulting disruption.

02

The Potential Impact of AI on Labour Markets

There are three major ways in which AI might have an impact on the labour market.

- **Demand for labour:** Much of the debate about AI and the future of work has centred on the risk that AI will replace jobs through automation. Some jobs will certainly be replaced by AI, but it is only one of the ways that AI will affect labour demand. AI could also increase the demand for labour and create new jobs through two channels. First, AI could complement workers by making them more productive, which would increase economic growth and hence demand for workers. Second, AI could follow the pattern of previous technological waves and create new products, markets and sectors of the economy that require workers to perform new tasks and jobs – again increasing the demand for workers. The relative strength of these three forces, rather than just the first, will determine the net impact of AI on labour demand.
- **Supply of labour:** AI has the potential to increase the quantity, quality and effective deployment of labour. For example, AI-enabled education could raise educational attainment and productivity growth, while AI-assisted health care could lead to a larger and more economically active labour force. AI also has the potential to improve the functioning of the labour market by more efficiently matching employers with employees, reducing frictional unemployment and helping to reduce the under-utilisation of labour.
- **Workplace experience:** AI has the potential to reshape the environment in which people work by automating repetitive tasks, increasing access to the workplace including for differently abled groups, and enabling better monitoring to safeguard against health-and-safety risks and to help boost productivity. This is not without risks, as any new technology can be used both for good and ill. But careful adoption of AI clearly has the potential to make work more engaging, inclusive and safer, and to make workers more productive.

In this section, we analyse each of these effects in turn – drawing on novel techniques to analyse the first two forces and a new AI-user survey to explore the potential impact of the latter.

FIGURE 1

Channels through which AI might impact the labour market

Labour Demand: How AI Will Change Jobs

In this section, we consider how AI might affect the world of work, both at the individual level, where workers will find that many of their existing tasks can be completed more efficiently using AI tools, and at the macro level, where this increased productivity will create some new jobs, displace others and boost GDP.[15]

Overall, our analysis substantiates what might be expected intuitively about the potential of AI: it has enormous potential to improve productivity and in doing so support economic growth. Its impact will be felt broadly across the economy. There will be variations across sectors and professions, meaning that cost-saving benefits and disruptions will be felt differently in different areas. The size of businesses and their readiness will also play a key part.

The effect for workers might well be substantial. Long-established roles will change or in some circumstances start to dwindle. More people will need to look for new or different roles and many will need to address training and development needs. They will do so in an environment in which the technology will continue to develop, and possibly accelerate. The amount of churn in the labour market will therefore likely increase, with workers forced to change jobs more frequently and potentially move to different occupations and industries. The UK's labour-market infrastructure will therefore need to be upgraded to be able to deal with this change, and workers will need transferable skills or to be retrained in new skills to take advantage of the new opportunities on offer.

THE IMPACT OF AI ON INDIVIDUAL WORKERS

Within this section we build on existing TBI analysis of the potential impact of AI on the public-sector workforce, using the same methodology to provide a necessarily speculative assessment of how various forms of AI might impact private-sector jobs in the future. As in our previous AI work, this paper builds upon approaches developed at the cutting edge of the current literature and utilises AI itself to help augment our own judgements to classify a large number of work tasks and estimating how likely they are to benefit from time savings with AI tools.[16]

Our approach, detailed further in the technical annex, is grounded in the premise that technology will not replace entire jobs, but rather specific tasks within jobs. To explore this, we utilised the O*NET database of nearly 20,000 tasks associated with more than 900 occupations. To assess the ability of AI to perform each of these tasks, we began with a subset of around 200 tasks and used these to fine-tune a version of GPT-4 to give answers that closely matched both our own expert assessments and academic and empirical evidence regarding AI's current automation capabilities. This subset was then used to help improve our model through an iterative process that helped us to design a rubric of prompts that forced GPT-4 to consider various factors that might influence whether or not AI could perform a task, such as ethical considerations or the operating environment. Once trained on this subset we then used this model to analyse the entire set of tasks in the O*NET database, providing estimates of the amount of time that could be saved using AI and the type of AI most likely to be used to achieve these time savings. We then ran several robustness checks on the final outputs from the analysis to confirm that the time-savings figures being generated again corresponded with real world evidence and applications.

Finally, we aggregated these task-level results to the occupation level, using weights that reflect the proportion of total work time spent on each task. These occupation-level data were then merged with UK Labour Force Survey data to estimate the potential time savings from AI across the UK labour force.

The results use a typology of five categories of AI tools that we developed to allow for clearer identification of the kinds and levels of investment that would be required to achieve these time savings.[17]

The first set of categories consist of AI-based software (in cost order):

- **Free AI tools:** These include products such as Google's Gemini, Microsoft's Bing search, ChatGPT and DALL-E, which primarily work by allowing users to access powerful LLMs to answer their prompts.
- **Low-cost AI software tools:** Virtual assistants (Microsoft Copilot, for example), payroll-management systems (the software group IRIS has

recently integrated AI into its payroll and recruitment platforms) and scheduling assistants (examples include the services [18]Motion, Calendly and Clara) can streamline common work tasks.

- **Bespoke or internally trained AI systems:** These include tools that would require training on proprietary data to unlock time savings. At McKinsey a chatbot named Lilli[19] has been trained on internal documents and data to help employees harness internal best-practice knowledge more effectively across the organisation. In retail, Walmart has launched a range of AI tools designed to boost efficiency across the business from route-optimisation software for its delivery drivers[20] to a conversational AI assistant[21] designed to help associates find products on the shop floor.

The second set of categories contains a range of different AI-enabled hardware:

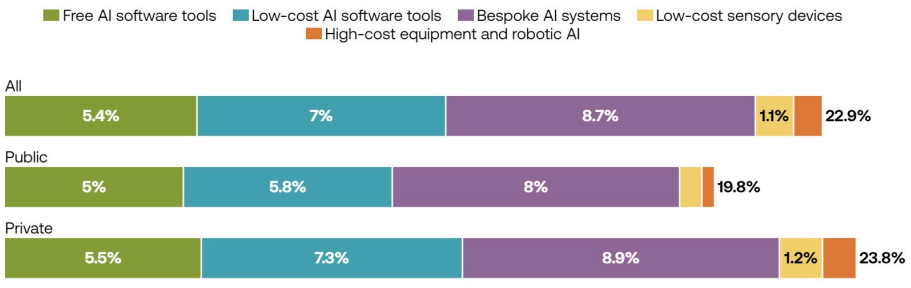
- **Low-cost sensory devices:** Elements such as cameras, thermometers, speakers, microphones and radio-frequency identification (RFID) tags combined with relatively basic AI with these devices – which allow speech to be recorded and directly transcribed, for the status and movement of equipment to be tracked more easily, and for visual inspections to be carried out remotely by AI – can unlock significant time savings. In the food industry, companies have begun to adopt AI-powered thermometers to monitor the temperature of ingredients while across industries the rollout of new AI transcription software has substantially sped up the process of note-taking and has unlocked new capabilities such as live captioning (offered by Verbit).[22]
- **High-cost equipment and robotic AI:** More costly, capital-intensive technologies such as medical scanners, surveillance systems and drones as well as advanced robots can harness AI to replace or aid humans in completing various physical tasks. These could be combined with AI to provide medical diagnoses, monitor environments or aid in the completion of other complex or dangerous tasks. Amazon has rolled out a range of AI-powered robots[23] across its warehouses, deploying more than 750,000 worldwide in efforts to automate physically demanding and repetitive tasks. In manufacturing, viAct[24] is using AI-powered surveillance systems to monitor various aspects of workplace safety and security more accurately and efficiently than humans. We find that many

occupations could benefit at the margin from accessing these technologies, but given the high investment cost, this would not be economically viable unless the tools were being used intensively. In the analysis that follows, we therefore exclude any time savings from these technologies for occupations where the associated time saved is less than 10 per cent.

Overall, we estimate that the full implementation of AI could lead to aggregate time savings across the whole economy worth up to 22.9 per cent of total workforce time (Figure 2). For the private sector, we estimate that around half of all tasks could be assisted by AI in some capacity but very few could be fully replaced, which implies 23.8 per cent of total private-sector time could be saved by AI. This proportion is slightly higher than our estimate of the amount of time that could be saved in the public sector, in part due to the greater prevalence of roles where the use of AI would not be ethically appropriate, for example in replacing judges or the large number of caring roles within the health sector.[25]

FIGURE 2

Potential time savings from deploying AI across the UK economy and within the public and private sectors



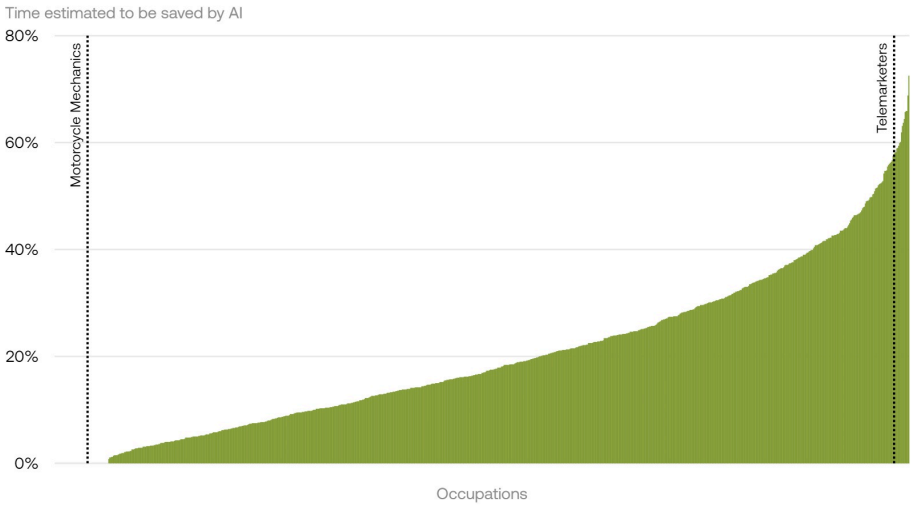
Source: TBI analysis using LFS and O*NET data

Our results suggest that most time is saved through AI-enabled software rather than more costly robotics or other high-cost equipment. This suggests that overall productivity gains are likely to be sizeable since expensive labour can be replaced with cheaper forms of capital without the need for costly investments in hardware.

The amount of time that AI could save varies significantly across occupations. Figure 3 shows the estimated time saving from full deployment of AI across the more than 900 different occupations contained with the O*NET database. Drawing a few examples from the data we find that negligible time could be saved by motorcycle mechanics as their roles involve undertaking complex physical tasks often in uncontrolled or changing environments.[26] At the other end of the scale, we estimate that AI could save telemarketers nearly 60 per cent of their time because of its ability to automate routine cognitive tasks.

FIGURE 3

The range of potential time savings from deploying AI for more than 900 different occupations

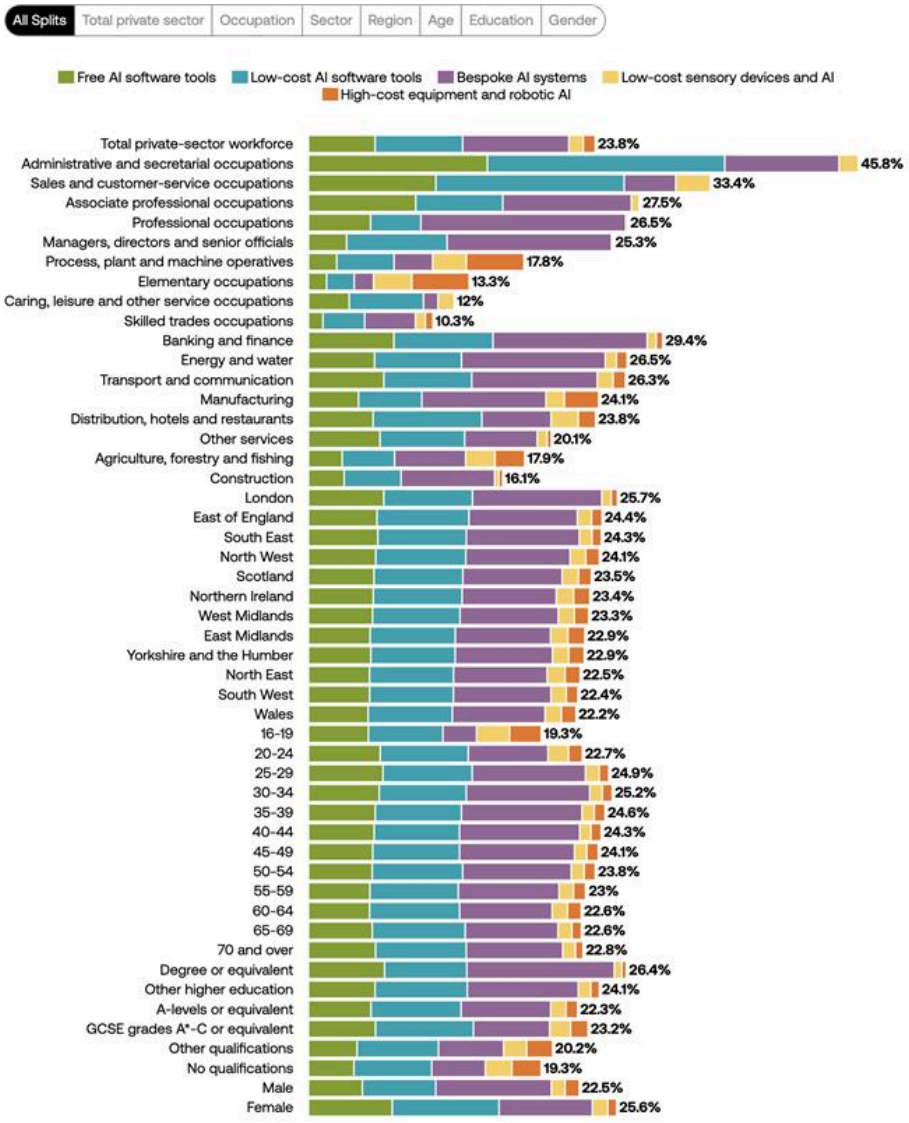


Source: TBI analysis using O*NET data

Although the exact time-savings figure for each occupation is interesting, presented alone they are less useful for understanding the job characteristics that determine the potential impact of AI. To help understand the kinds of people and jobs most likely to be impacted by AI we also present time savings by occupational, sectoral, regional, age, educational-attainment and gender groups in Figure 4.

FIGURE 4

Potential time savings from deploying AI split by worker characteristics



Source: TBI analysis using LFS and O*NET data

- **Occupational groups:** The current capabilities of AI mean that

occupations involving a significant amount of routine cognitive tasks are particularly exposed – this is why we see the largest potential time savings for those in administrative and sales occupations (46 per cent and 33.4 per cent, respectively). Our estimates suggest AI could save more than one-quarter of time in professional occupations, with slightly less time saved for those in more senior roles, which also require more complex, bespoke AI software. For occupations involving a greater share of manual physical tasks, the predicted time savings from AI are much lower, with those in skilled trades predicted to be the least exposed to AI-driven time savings. These trends reflect the relatively limited ability of AI to automate complex physical tasks in a cost-effective way.

- **Sectoral groups:** Workers in banking and finance are particularly exposed to time savings from AI with an estimated potential for nearly 30 per cent time savings. This is likely because these are data-driven industries with high potential to train and use bespoke AI systems to automate or assist with a range of more routine cognitive tasks. This contrasts with construction, where total AI time savings are predicted to amount to only 16 per cent of working time due to the complex nature of many of the manual tasks involved in construction roles. Our results reflect the differential capabilities of AI in performing manual tasks with estimated time savings within the manufacturing sector, where manual tasks are more likely to be routine and occur in stable work environments, estimated to be much higher. Nearly one-quarter of manufacturing workers' time could potentially be saved by AI, including nearly 3 per cent through AI-enabled equipment and robotics.
- **Regions:** Our results suggest that regional variation in AI exposure is relatively limited, reflecting the fact that UK regions tend to have diversified economies with a range of sectors and occupational groups. That said, the impact of AI is estimated to be more significant in areas of the UK where service sectors are most dominant, predominantly London, the South East and East of England. Wales is predicted to be the part of the UK that is least affected by the introduction of AI, reflecting the relatively high proportion of private-sector workers in manufacturing (more than 13 per cent versus less than 4 per cent in London) and in construction (10 per cent versus 7 per cent in London) where time savings from AI are predicted to be relatively low.[27]

- **Age groups**: Across age groups, differences in levels of exposure to AI are relatively limited. Those aged 16 to 19 are least exposed to AI, as this group is more likely to be employed in lower skilled manual work, which is less susceptible to AI replacement. Thereafter, AI exposure levels increase with age until peaking at 25.2 per cent for those aged 30 to 34. This pattern partly reflects the changing nature of the labour force, with workers of these ages more likely to be highly educated and working in cognitive roles than workers in older cohorts. The widespread impact of AI across age groups suggests that adult training and reskilling will need to become a broader feature of the labour market in the future to ensure resilience against potential technological unemployment. Older people are projected to be slightly less exposed to AI than middle-aged workers. However, given concerns that these workers may find it more difficult to adapt to new technologies this may in practice mean that targeted responses around training and skills are necessary.
- **Educational-attainment groups:** Our results suggest that differences in exposure by education level are perhaps the starkest of all our groupings, with highly educated workers much more exposed to AI than those with lower or no qualifications. These differences reflect a reversal in the historic trend of tech disruption, where lower- and middle-skilled jobs have tended to be more impacted by automation. AI technologies are estimated to have a much greater impact on the predominantly cognitive roles undertaken by those with higher education levels. The economist David Autor has previously noted the potential for AI to act as a social leveller.[28]
- **Gender:** Our analysis suggests some differences in AI exposure by gender, with women employed in private-sector roles exposed to roughly 3 per cent more time savings from AI than men. These differences seem to be primarily driven by men significantly outnumbering women in more manual professions that are less exposed to AI, with men outnumbering women by six to one in private-sector construction jobs and by more than two to one in manufacturing and transport.[29] By contrast, differences in employment within highly exposed occupational categories are more limited, with roughly similar numbers of men and women categorised as working within administrative and support services. However, in the public sector, women are less exposed to AI than men

because they account for a higher share of employment in occupations such as education, health and social work that have more limited exposure to AI.

THE MACROECONOMIC IMPACT OF AI ON LABOUR DEMAND

There are several ways in which the time savings from AI could affect the wider economy:

- **Job displacement:** Headlines about AI and the workplace tend to focus on the number of jobs technology might replace. A reduction in the time it takes to perform tasks at a cost-effective, satisfactory standard is likely to lead to a reduction in the number of workers required at some firms to produce the same output. Some firms may therefore choose to bank these time and productivity savings and to reduce the size of their workforce.
- **Retention of more productive workers:** AI also makes workers more productive, which makes them more valuable to employers. Some firms will therefore choose to retain their workforce or redeploy displaced workers to enable them to grow their business more quickly. The choice of whether firms choose to shed their workers or retain them is not predetermined and will have a key bearing on how AI will affect the labour market.
- **Higher economic growth and higher demand for labour:** AI is likely to boost economic growth and hence demand for labour through two channels:
  - **Higher productivity:** If AI is relatively cheap to implement and leads to significant cost savings it should mean that the price of some goods and services in the economy will decline. At the same time, if AI makes workers more productive, they will tend to be paid more. These two effects – lower prices and higher wages – should increase aggregate demand in the economy, which will also boost demand for labour and lead to some displaced workers being re-employed.
  - **Faster innovation and new jobs:** Periods of rapid technological progress are often associated with new products, sectors and markets being created that result in new tasks for workers to do. Historically,

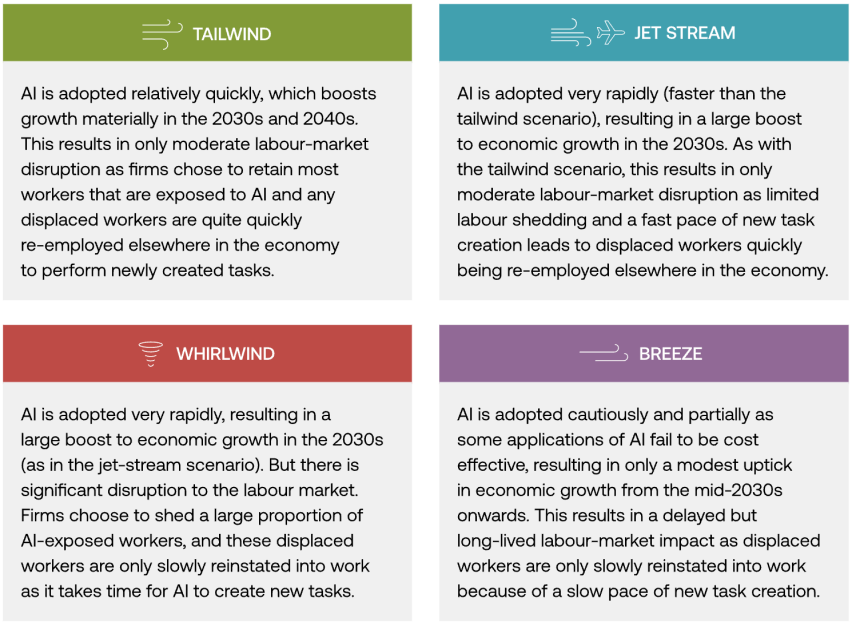
> the growth of new tasks has tended to lag increases in labour productivity, but in the long run this effect has tended to balance out any impact from technological unemployment. Therefore, a key question in judging the impact of AI on labour demand is the lag between the adoption of AI that causes labour shedding and new tasks and jobs being created that bring displaced workers back into work.

The overall impact of AI on the labour market will therefore depend on a range of factors, including how quickly AI is adopted by firms, the extent of productivity benefits that are realised whether firms choose to shed labour or retain their workforce, and how much and how quickly AI boosts demand for labour through higher output and task creation.

Since the strength of each of these effects is uncertain, we explore the potential impact of AI on the labour market through four illustrative scenarios. A full description of the methodology and rationale behind the assumptions used in these scenarios can be found in the technical annex.

FIGURE 5

Descriptions of labour-demand scenarios



Scenario 1: Tailwind

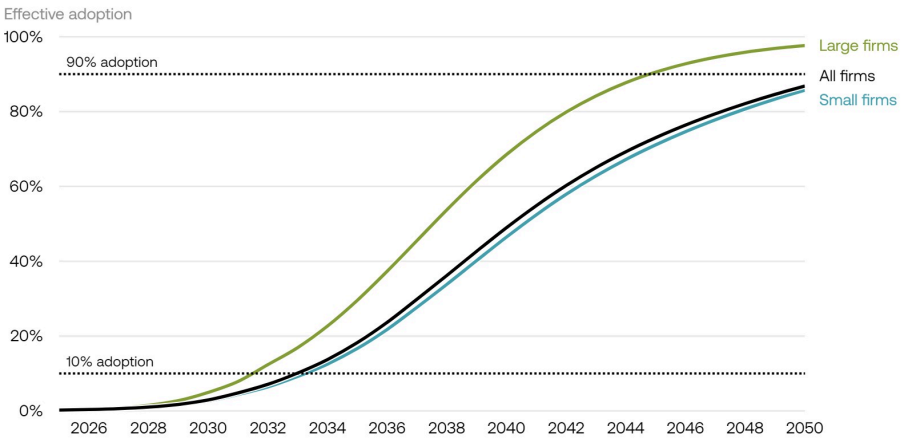
In our first scenario, which we view as most likely, AI is adopted quickly across the economy with 10 per cent of UK firms making effective use of the technology by the early 2030s and 90 per cent by 2050. This relatively quick uptake is partly enabled by permissive government policy designed to enable AI tools to be deployed quickly but in a considered way to manage the risk of unfettered adoption creating a backlash against the technology. This pace of adoption is a little faster than the last general-purpose technology – the internet – on the grounds that much of the enabling digital infrastructure for firms to deploy software-based AI already exists and because uptake of new technologies has been speeding up over time. As with previous technological waves, the pace of adoption is assumed to vary

depending on firm size and the cost of the technology involved.

Larger firms (those with more than 500 employees) lead the way in adopting AI in this scenario, as they have the resources to experiment, hone and invest in the technology to make earliest productive use of it.[30] We assume these firms adopt different types of AI at slightly different rates, with uptake of free AI tools happening earliest given their minimal cost, followed by investment in subscription software and low-cost AI-enabled hardware, and then a slightly slower uptake of more costly bespoke AI software and high-cost AI-enabled hardware given the time and investment needed to develop those technologies. Aggregating across AI technology types, the "tailwind" scenario sees 10 per cent of large firms deploy AI effectively by 2030 and 90 per cent by the early 2040s.

FIGURE 6

Timeline for time savings to be achieved in the tailwind scenario



Source: TBI analysis using LFS and O*NET data

Smaller firms also reap the rewards from AI fairly quickly in this scenario, albeit lagging behind larger firms by a few years, with 10 per cent of small

firms deploying AI effectively by the mid-2030s and close to 90 per cent by 2050. The biggest delays in adoption among small firms relate to bespoke AI software and high-cost AI enabled equipment as it takes time for these technologies to be "platformised" (that is, for specialist AI firms to develop tools that can be easily implemented across an industry rather than each firm having to develop its own tool), and 90 per cent rollout of these tools would not be realised until the late 2050s.

In this scenario there is relatively little labour-market disruption because firms retain most workers that are exposed to AI to either expand output or develop new products and services made possible by AI. Only one-quarter of time savings result in labour shedding, which is in line with other studies that have examined the labour-market impacts of AI[31] and firms' historical responses to falling demand for their products during recessions.[32] This implies that nearly 1.5 million workers lose their jobs as a result of AI, but crucially these redundancies do not occur all at once. Rather, they occur gradually in line with the pace that AI is rolled out across the economy. As the pace of rollout is at its fastest around 2040, this is the time when the peak impact occurs, with close to 100,000 additional redundancies occurring each year in this period. To put that figure in context, there are nearly 25 million private-sector workers and there have been an average of 450,000 redundancies each year over the past decade, so even at AI's peak of disruption, the risk of redundancy increases by scarcely one-fifth above its baseline level.[33]

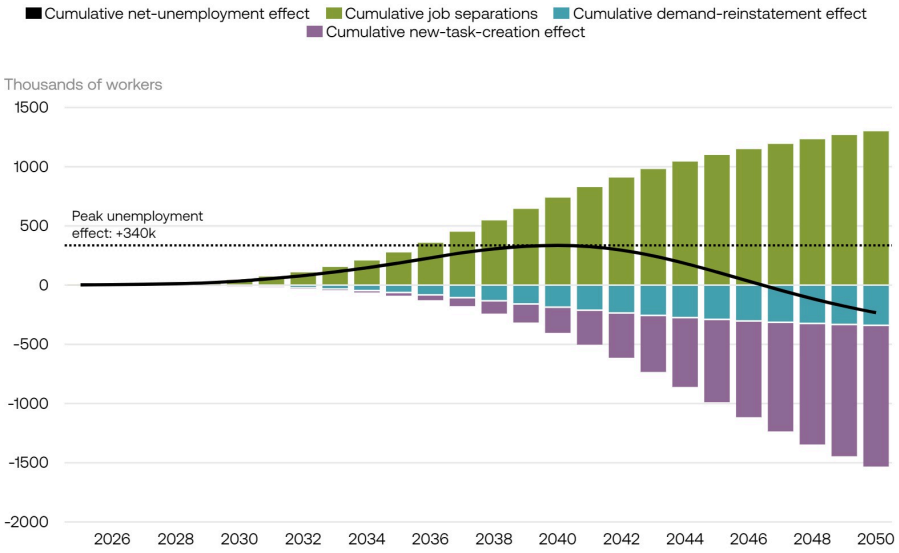
Moreover, these displaced workers are expected to be reabsorbed into the labour force relatively quickly. Higher productivity raises worker incomes, which leads to higher economic growth and higher demand for labour.[34] Meanwhile, AI accelerates the development of new products and services for which more workers are required. In past waves of technological improvement the pace of new task creation has occurred with a lag of around ten years, but given the progressively faster rollout of general-purpose technologies over time, we assume this would occur within five years in this scenario.

Overall, the net impact of AI on unemployment is relatively modest in the tailwind scenario – with a peak increase of 340,000 in 2040 that is fully

unwound over the following five years (Figure 7).

FIGURE 7

The impact of AI on unemployment in a tailwind scenario



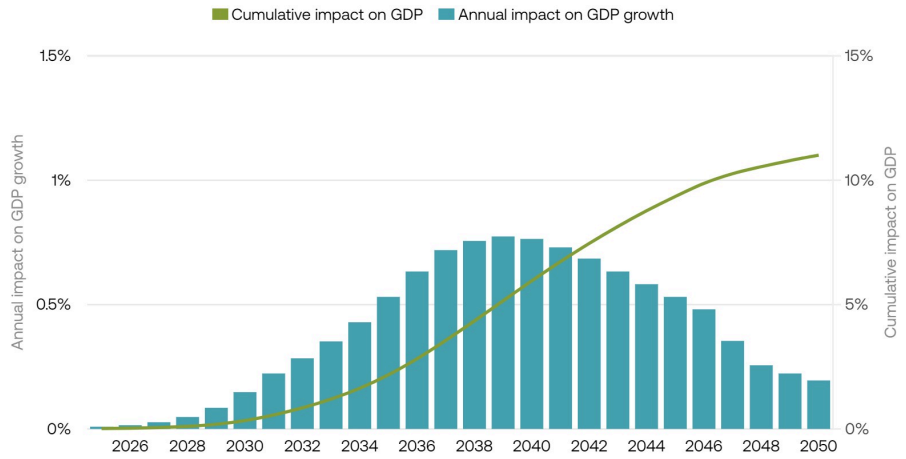
Source: TBI analysis using LFS and O*NET data

In this scenario, AI is relatively cheap to deploy, resulting in average cost savings of around 70 per cent compared with the equivalent cost of labour (with larger savings for free AI tools, subscription-based AI software and low-cost AI-enabled hardware, and lower savings for bespoke AI systems and high-cost AI-enabled equipment). These time and cost savings lead to a significant boost to productivity, which increases by 8 per cent. Higher productivity also spurs greater business investment, leading to a higher capital stock and a further 3 per cent boost to GDP. Overall, then, GDP is around 11 per cent larger by the middle of the century and annual GDP growth is boosted significantly over the next two decades, with a peak impact of around 0.7 percentage points per year during the late 2030s – a

significant boost to the meagre 1.2 per cent growth rate the UK has averaged since 2007.[35]

FIGURE 8

The impact of AI on GDP in the tailwind scenario



Source: TBI analysis using LFS and O*NET data

Scenario 2: Jet Stream

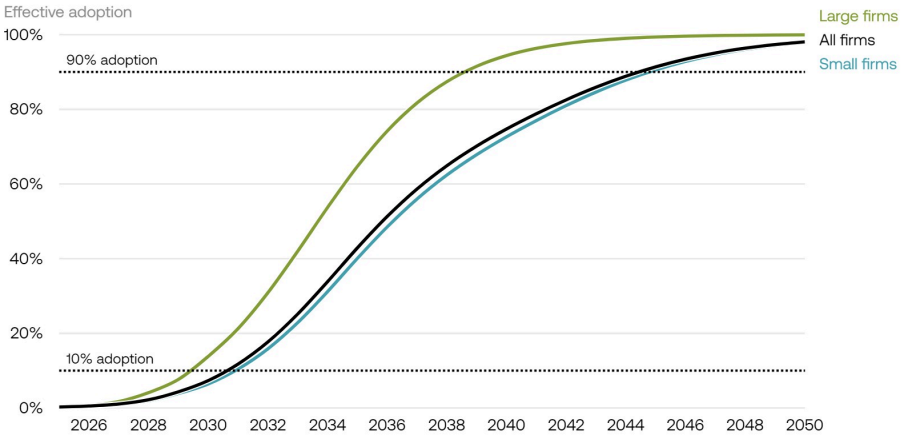
In our most optimistic scenario – "jet stream" – the world's leading tech firms double down on their existing investments in AI and compute capacity, leading to lower cost, and more efficient and accurate AI tools being developed that assuage doubters and spur rapid uptake of AI – even faster than in the tailwind scenario. This is partly enabled by supportive government policy including early adoption of AI in the public sector, which acts to demonstrate its value to firms in the wider economy.

Large firms again lead the way in making effective use of AI tools, with 10 per cent of them doing so by 2030. Such is the competitive advantage that AI bestows on early adopters that other companies quickly follow suit, with 90 per cent of large firms making effective use of the technology before the

end of the 2030s and almost total rollout achieved by the mid-2040s (Figure 9. As in all our scenarios, small firms are slightly slower to adopt the technology, but in the jet-stream scenario the lag between large and small firms is shortened thanks to the rapid platformisation of bespoke AI software tools and complex AI-enabled hardware. As a result, 90 per cent of small firms are making effective use of the technology by the mid-2040s with close to full adoption by the middle of the century.

FIGURE 9

Timeline for time savings to be achieved in the jet-stream scenario



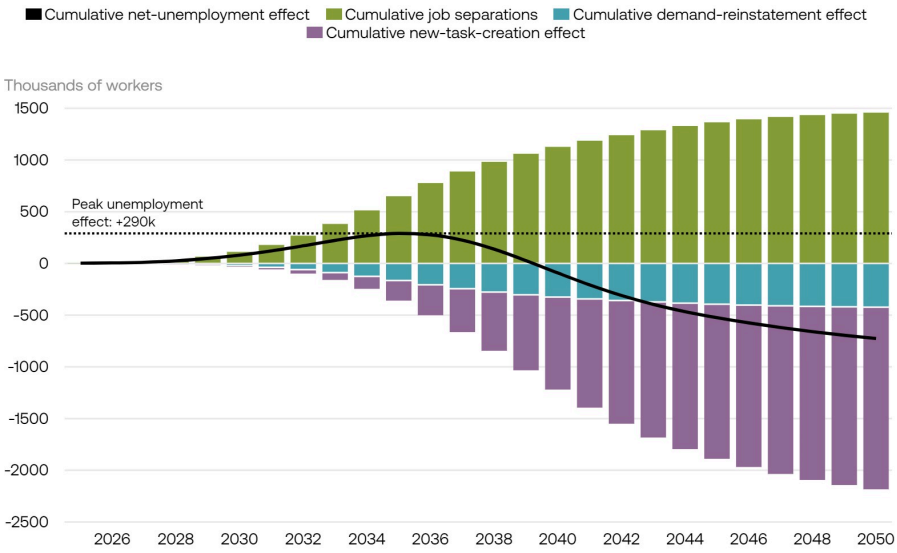
Source: TBI analysis using LFS and O*NET data

Despite the rapid pace of AI uptake, this scenario results in a benign impact on the labour market. As in the tailwind scenario, a total of 1.5 million jobs are displaced in aggregate, but these redundancies are spread out over several years, with a peak of 137,000 redundancies per year in the mid-2030s. However, in this scenario, rapid adoption of AI also spurs greater competition and innovation, which leads to the rapid creation of new products, markets and sectors that create new tasks for displaced workers to do. Unlike in the tailwind scenario – where the lag between AI adoption

and new task creation is five years – in this scenario the lag is just three years, reflecting the more innovative environment. As a result, strong re-employment effects quickly limit the cumulative rise in technological unemployment, with unemployment peaking at 290,000 in 2035 before rapidly falling (Figure 10).

FIGURE 10

The impact of AI on unemployment in the jet-stream scenario



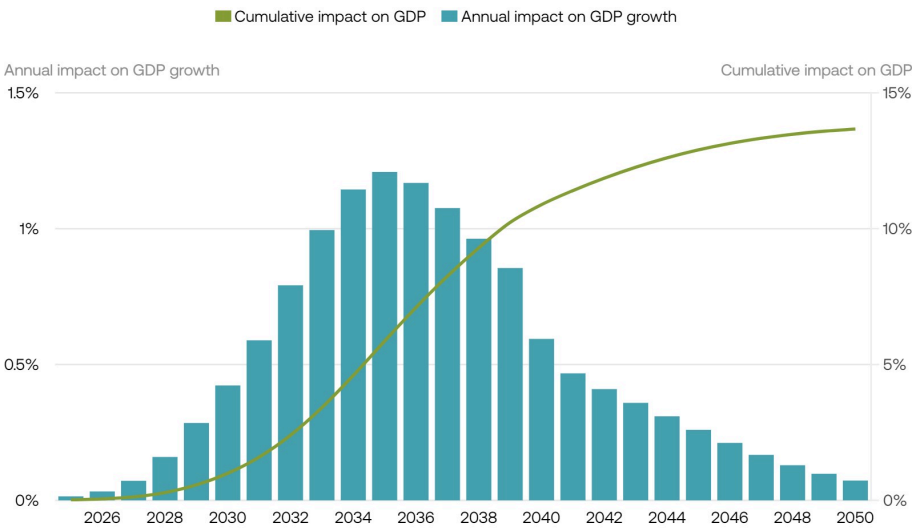
Source: TBI analysis using LFS and O*NET data

The lower cost of deploying AI in this scenario and faster rate of deployment leads to a decade of very strong growth, with GDP nearly 14 per cent higher by the middle of the century than a scenario without AI-enabled growth. Moreover, annual GDP growth is around 1 percentage point higher on average through the 2030s (Figure 11). These growth impacts may seem large, but they are broadly in line with projections from Goldman Sachs[36] and the IMF,[37] which both predict AI could add up to 1.5 percentage points

to annual growth rates for a decade and raise GDP by up to 16 per cent in aggregate.

FIGURE 11

The impact of AI on GDP in the jet-stream scenario



Source: TBI analysis using LFS and O*NET data

Scenario 3: Whirlwind

In our disruptive "whirlwind" scenario, the productivity gains from AI and the pace of rollout mimic the rapid rate seen in the jet-stream scenario (see Figure 9) but in this case the impact on the labour market is much more marked.

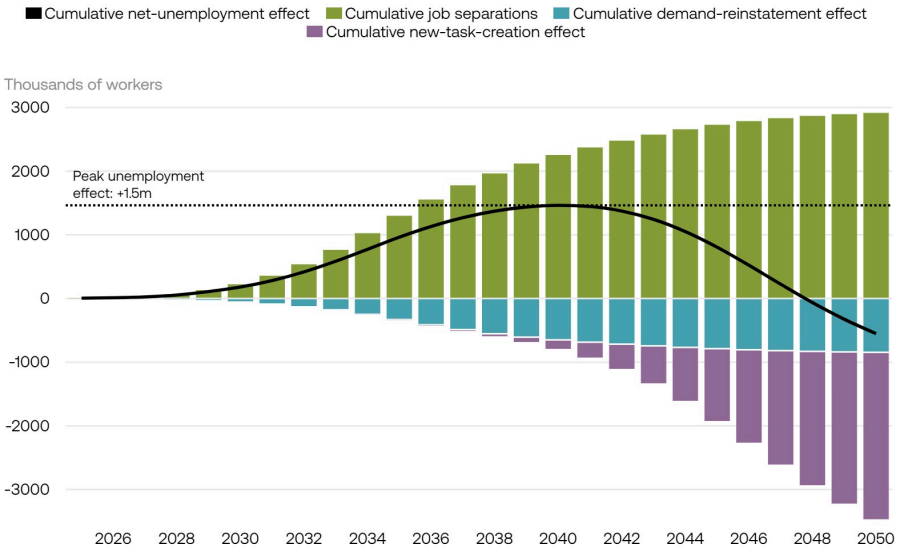
In this scenario, there is a significant, 10-year lag between AI being adopted and new tasks being created, which means it takes far longer for displaced workers to be re-employed. This lag matches past waves of technological disruption, either reflecting a natural lag between the development of new products and those products being sold en masse or reflecting overly

restrictive or inefficient regulation that delays products coming to market and hence delays the re-employment effect.

In this scenario, productivity gains are as large as in the jet-stream scenario, so firms are still keen to exploit the gains from AI rapidly, but because there is less of an immediate need to redeploy labour to perform new tasks, firms opt to shed a much higher share of their workforce exposed to AI. In aggregate, this results in 3 million jobs being displaced, albeit with the effect spread out over many years. Annual redundancies peak at 274,000 in the mid-2030s, which adds materially to unemployment during the 2030s. Unemployment is more than 1 million higher by 2035 with a peak impact of 1.5 million around 2040, before re-employment effects kick in. The 2030s would thus be characterised by rising unemployment, while the 2040s would see this effect quickly unwound (Figure 12).

FIGURE 12

The impact of AI on unemployment in the whirlwind scenario

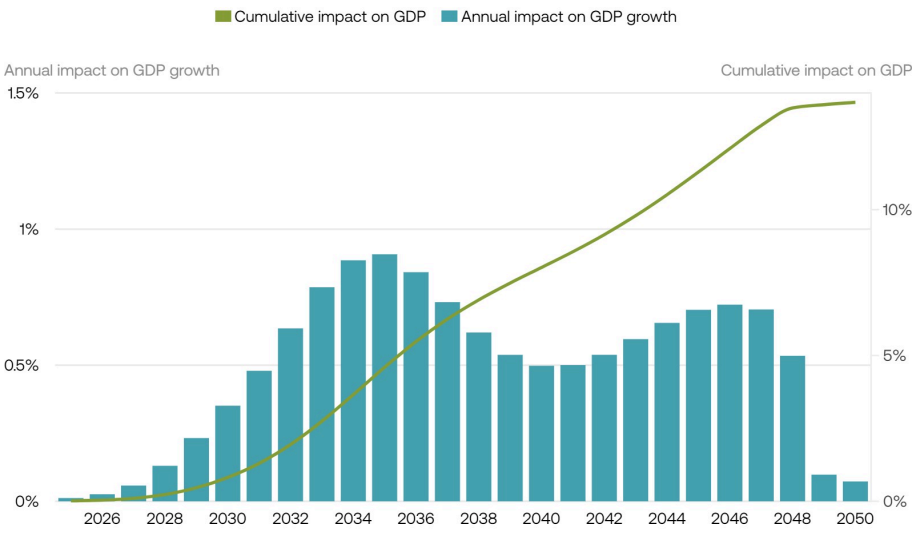


Source: TBI analysis using LFS and O*NET data

As in the jet-stream scenario, AI boosts GDP by 14 per cent by 2050 in the whirlwind scenario, but the pattern of growth is less smooth on account of the disruption in the labour market. There is a twin-peak-shaped trend in annual growth rates, with an initial burst coming from the initial adoption of AI in the 2030s followed by another period of higher growth in the 2040s when new task creation kicks in, leading to displaced workers being re-employed and unemployment falling back to its natural rate (Figure 13).

FIGURE 13

The impact of AI on GDP in the whirlwind scenario



Source: TBI analysis using LFS and O*NET data

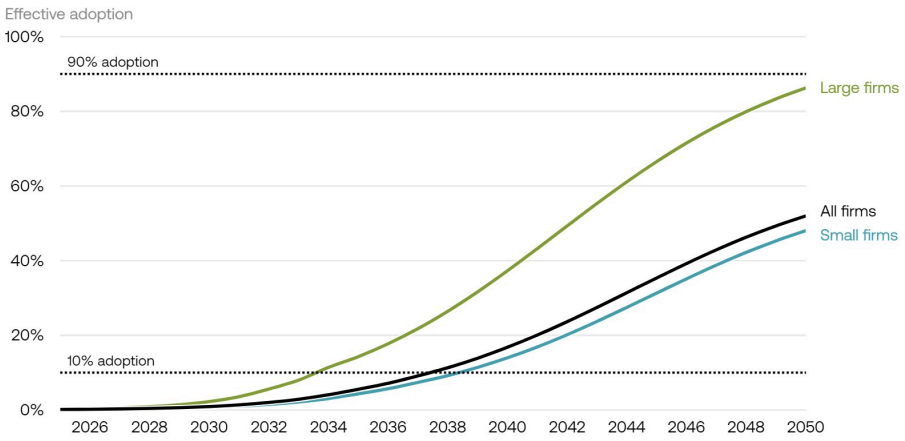
Scenario 4: Breeze

In our underwhelming "breeze" scenario, the gains from AI are much more limited and take longer to materialise. In this scenario, uncertainty over the effectiveness of AI and fears of a hype cycle deter potential early adopters from rolling out the technology and policy fails to provide a boost, with regulatory barriers hindering uptake.

In this scenario, the cost of rolling out AI is higher than in other scenarios, partly because of the slow pace of uptake (which limits the pace at which costs fall) and partly because some early investments in AI fail to bear fruit. Ultimately, it proves impossible for platformisation to make it cost-effective for smaller firms to adopt bespoke AI technology that requires training on proprietary data and high-cost equipment enabled by AI. This reduces the aggregate time savings across the private sector from 23.8 per cent of workers' time to 15.8 per cent.[38] Adoption of AI technologies is persistently much lower than in our other scenarios, with adoption only just breaching 50 per cent by 2050 (Figure 14).

FIGURE 14

Timeline for time savings to be achieved in the breeze scenario



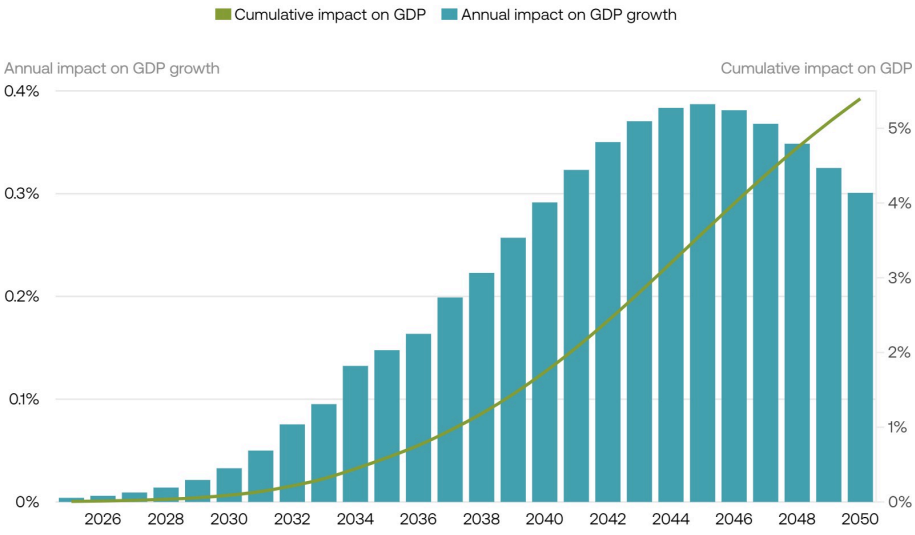
Source: TBI analysis using LFS and O*NET data

Note: The figures in this chart show the level of AI adoption compared to the potential economy-wide time savings of 23.8 per cent referenced in all other scenarios. Since AI adoption in the breeze scenario is only partial for small firms due to the failure of platformisation to deliver cost-effective bespoke AI software and high-cost AI-enabled hardware, the small-firm-adoption line reaches a maximum adoption level of only 60 per cent in the second half of the 21st century.

In the breeze scenario the higher cost of AI, slower pace of rollout and partial rate of adoption all result in a much more limited impact on economic growth. By 2035, AI increases GDP by only around 0.6 percent, which is closely aligned with the more pessimistic predictions of Acemoglu.[39] After 2035, AI adoption begins to accelerate, which boosts growth by 0.2 to 0.4 percentage points a year between then and 2050 and leaves GDP around 5 per cent higher by the middle of the century (Figure 15). This is a non-trivial effect but occurs much later than in other scenarios.

FIGURE 15

The impact of AI on GDP in the breeze scenario



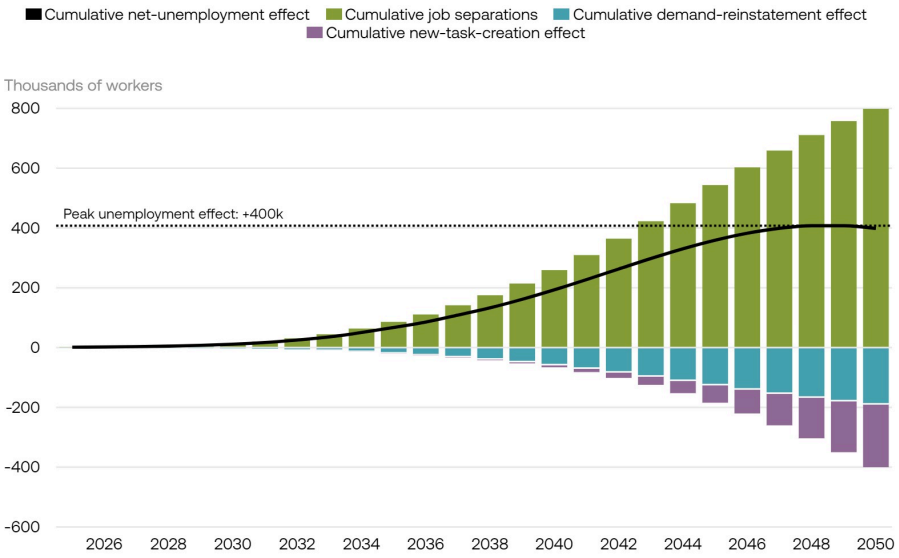
Source: TBI analysis using LFS and O*NET data

Given the more limited productivity gains from AI in this scenario, fewer workers are displaced by the technology, with 800,000 redundancies spread over several decades. The slow pace of AI adoption means that annual redundancies from AI are manageably low and far in the future, peaking at around 60,000 a year in the mid-2040s. However, in this scenario

– as in the whirlwind scenario – there is a delay of 10 years between AI adoption and new tasks being created, so it takes time for displaced workers to return to the labour market. As a result, the increase in unemployment in this scenario is more persistent, peaking at 400,000 in the late 2040s before falling only gradually thereafter (Figure 16).

FIGURE 16

The impact of AI on unemployment in the breeze scenario



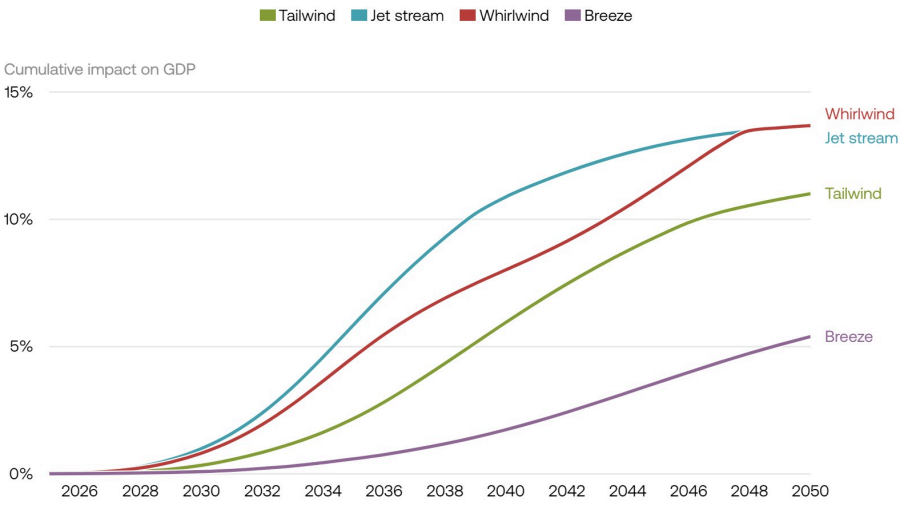
Source: TBI analysis using LFS and O*NET data

SUMMARY

These four scenarios illustrate the uncertainty that remains about the impact of AI on the economy and the labour market. The impact on GDP by 2050 could range from 5 to 14 per cent (Figure 17) and unemployment could rise by as little as 290,000 or by as much as 1.5 million (Figure 18).

FIGURE 17

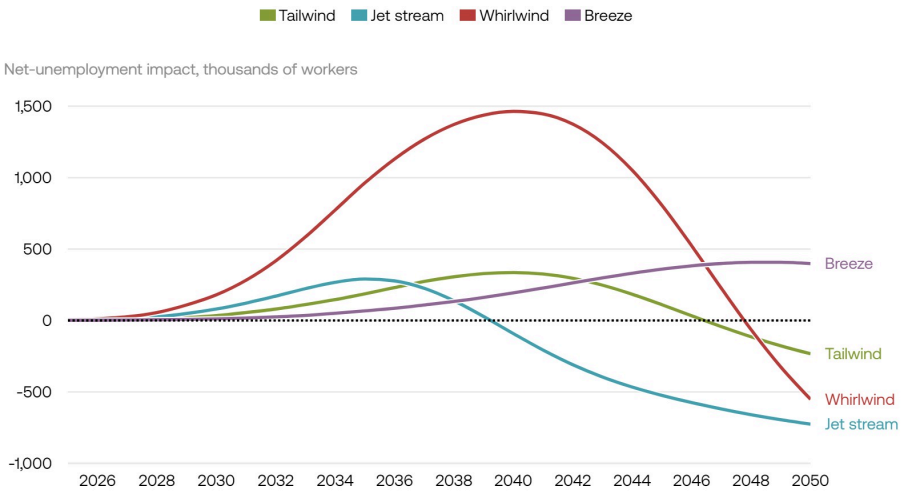
The cumulative impact of AI on GDP across all four scenarios



Source: TBI analysis using LFS and O*NET data

FIGURE 18

The impact of AI on unemployment across all four scenarios



Source: TBI analysis using LFS and O*NET data

In all our scenarios, off-the-shelf AI software solutions are implemented sooner and more quickly than those that require bespoke training on proprietary data or high-cost equipment. Disruption is therefore likely to be most quickly felt by those in administrative and sales professions where these tools can achieve the greatest time savings, whereas those in managerial and professional occupations for whom bespoke AI tools achieve the greatest time savings are likely to only see disruption occur later. Since these professions are dominated by women, this also implies that women are on average likely to experience labour-market disruption earlier than men.

There is considerable uncertainty over when the impact of AI will first show up in macroeconomic statistics. Predicting the lift-off point of a technological s-curve is inherently difficult, but in all our scenarios the impact on the economy is relatively modest in the near term, raising GDP by between 0.1 and 1 per cent over the next five years and the level of

unemployment by up to 180,000 by 2030. This means the current government has an important window during this parliament to put in place the plans needed to steer AI to its most productive use.

The tailwind scenario represents our best guess as to the likely impact of AI given our current state of knowledge. In this case, AI would raise GDP by less than 0.5 per cent by 2030, around 2 per cent by 2035 and a substantial 11 per cent by 2050. This scenario would also produce only a moderate degree of labour-market disruption, with unemployment rising by around 30,000 by 2030 and 340,000 at its peak in 2040 before quickly subsiding. This relatively benign scenario relies on several key assumptions: i) all the theoretical gains from AI become economically viable to implement in practice, ii) some of these gains take 20 years to materialise as a process of platformisation is required for advanced AI technology to become economically viable for small firms, and iii) AI generates new products and services that require workers to produce in relatively short order. As we have seen, adjustments to each of these elements lead to quite a different story.

If, as in our breeze scenario, AI falls short of our current estimation of its potential capabilities and cannot be economically implemented in some instances, its impact on the economy will be far smaller, with only a modest boost to annual GDP growth over several decades. Equally, if – as in the jet-stream scenario – the gains from AI are larger than we currently imagine and firms are keen to exploit it even more quickly, the 2030s could be a decade of very strong economic growth for the UK.

However, there is a risk that if AI creates a significant GDP boost, it does so by replacing workers in their current roles without generating new tasks for workers to perform until much later. This is demonstrated in our whirlwind scenario where the unemployment level doubles from its current rate of 1.4 million to almost 3 million by 2040 – a level we have not seen since the recession of the early 1990s. However, we do not consider this scenario particularly likely as it relies on AI being very good at replacing workers in their current jobs but not creating any new products or services. Nevertheless, policymakers should bear this risk in mind when considering how to respond to the impact that AI will have on the labour market.

Indeed, what comes next and which of these scenarios turns out to be closest to the emerging reality will not only depend on the fundamental capabilities of or the decisions made by private-sector firms, but also on decisions made by policymakers themselves. Regulatory decisions could accelerate the rollout of AI, inhibit its adoption or even lead to a backlash against the technology that ultimately delays its rollout if it is implemented prematurely in key sectors. In the chapter on policy solutions below we discuss a range of no-regrets policies the government should pursue to help manage these effects.

Labour Supply: How AI Can Improve the Quality, Quantity and Effective Use of Workers

One of the vital but less explored elements of understanding AI's impact on the labour market is its potential to improve labour supply, including through deploying AI in the public sector to improve public-service provision. In this section we highlight how AI could improve: the quality of labour by improving the UK's educational offer; the quantity of labour by improving health care; and the effective use of labour through better job matching.

AI-ENABLED EDUCATION

Education is ripe for its own technological revolution. Deploying AI in the classroom could significantly improve students' education attainment, raise the productivity of the UK's future workforce and add to economic growth. AI could boost students' educational attainment in at least three ways:

- It could enhance the quality of teaching through AI co-pilots for teachers, which could help with lesson planning, student assessment and data analysis. For example, AI-powered platforms for schools, such as CENTURY, already analyse student data to help teachers address student weaknesses in a more targeted way.[40]
- It could free up teacher time to focus on more interactive learning by automating repetitive tasks such as grading assignments and tracking attendance. In schools that use edtech, teachers are already beginning to use AI algorithms to grade students' work faster.[41]

- It could increase students' ability to absorb lesson content through AI tutor bots, which could tailor personalised content and provide real-time feedback. AI edtech startups have been at the forefront of building chatbot-style learning in which an AI tutor imitates a human teacher. It prompts questions, provides on-demand support and gives instant formative assessments. Some edtech developers have created and integrated AI speech recognition for tutoring students in their edtech tools.[42]

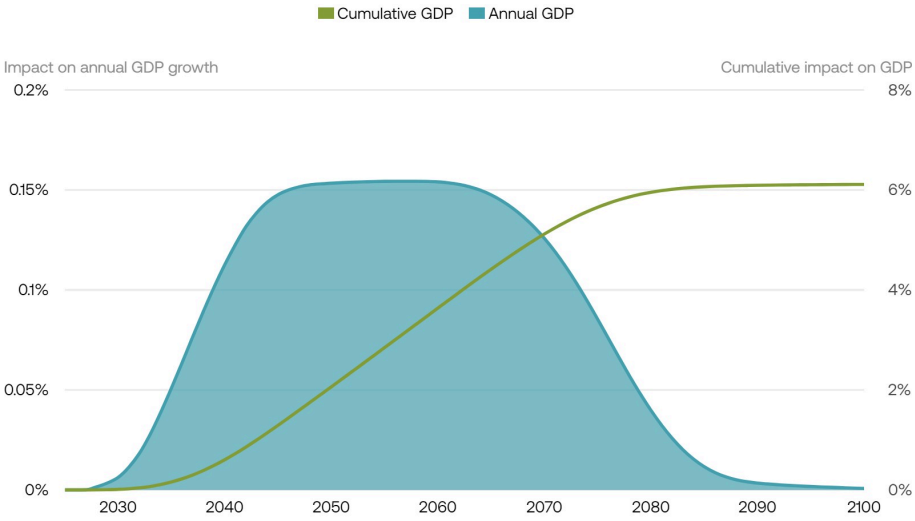
Since AI learning tools remain relatively new, there is a dearth of in-depth academic studies and long-running, large-scale pilot programmes to quantify their potential impact on learners and the wider economy. TBI has endeavoured to begin to bridge this evidential gap in the paper *The Economic Case for AI-Enabled Education*.

Our analysis suggests AI could boost educational attainment levels by around 6 per cent on average over their academic career through a combination of improved attainment of individual students and by enabling more students to progress to higher levels of education. Importantly, the benefits from AI tend to be bigger for lower-performing students, suggesting that AI-enabled education could help improve equality of opportunity in the UK.

By boosting the productivity of the future workforce, we estimate AI-enabled education could raise GDP by around 6 per cent in the long run and add more than 0.1 per cent to growth per year for more than 40 years (Figure 19).

FIGURE 19

The impact of AI-enabled education on UK GDP



Source: TBI analysis (2024) using ONS population statistics and UK LFS

Clearly these changes will not emerge overnight. The full effect of AI-enabled education will emerge with a considerable lag because of the time it will take to instal the technology in the nation's 26,500 schools, along with the requisite training and support for teachers to make the most of it. Employee engagement, including through teaching unions, will be an important part of the story; managing the transition will be a complex project, but one we believe teachers can be fully involved in, and that many will welcome.

Beyond the initial implementation phase there will naturally be a period in which students work through the system and then begin to filter into the workforce. It will be a multi-generational process for the whole workforce to consist of those who have experienced the benefits of AI-enabled education.

The above figures are based on an assessment of AI's capabilities as they are today, but the technology is not static. If instead we assume the technology continues to improve so that it raises educational attainment by 10 per cent (versus 6 per cent in the base case) then AI could boost GDP by a further 4 per cent in the long term. This upside scenario is by no means implausible and highlights both the upside potential of investing in AI-enabled education now and the importance of designing the programme in a way that it can continually incorporate improvements in AI over time.

AI-ENABLED HEALTH CARE

One challenge for policymakers looking to boost economic performance is that as the workforce ages and as the incidence of preventable diseases such as obesity continues to rise, the number of days of work lost to ill health increases. This reduces the quantity of labour available and diverts scarce public funds to higher health and welfare costs, which slows growth.

A comprehensive set of policies for the AI era should consider the new opportunities AI offers to support a healthy workforce and help manage health at a workplace level. A full examination of the potential for AI to support this effort is beyond the scope of this paper,[43] but in brief, there are several areas where AI has strong potential to improve the health of the workforce, extend longevity of workers, and reduce the burden on state support and health-care systems:

- AI could help accelerate the pace of medical research, leading to faster discovery of novel treatments at lower cost. For example, the leap in knowledge made by DeepMind's AlphaFold team – ushering in a 10,000-fold increase in coverage of protein structures for researchers to study and build on[44] – has completely transformed early-stage biological research and sparked an AI renaissance in modelling biological systems, with real-world implications for medicine and biotech.
- AI-enabled diagnostics can help identify those at higher risk of disease, allowing earlier intervention, more targeted treatments and ultimately better outcomes. For example, the TRICORDER programme, an AI-enabled smart stethoscope that is being trialled in 100 GP clinics in the UK, can immediately diagnose heart failure with more than 90 per cent

accuracy and much more quickly than a conventional blood test. It could save the health system £2,400 per heart-failure patient by eliminating the need for a visit to an accident and emergency department.[45]

- AI could improve the efficiency and capacity of the health service. For example, Faculty's Frontier AI tool has been deployed in four hospitals in Wales to accurately predict when patients will be ready to leave hospital, helping to speed up discharges and save up to 3,000 bed days a year.[46] Similarly, the Somerset NHS Foundation Trust built a digital virtual assistant to manage patient appointments and automate workflows, which saved staff 24 hours of time every week over a six-month period.[47]
- AI-enabled prosthetics and other assistive technologies can support those with disabilities or short-term health conditions to re-enter the workplace. For example, researchers at Newcastle University have developed a robotic hand with a small camera that uses AI to analyse images as they come into view and respond automatically.[48]

The macroeconomic impact of these medical advances could be significant. Recent analysis commissioned by TBI highlighted how a 20 per cent reduction in the incidence of six long-term conditions could provide a permanent uplift of 1 per cent to the UK's GDP within a decade and result in more than 400,000 more people in work[49] (see *Prosperity Through Health: The Macroeconomic Case for Investing in Preventative Health Care in the UK*). AI has the potential to help deliver these gains, including by enabling better screening to detect preventable conditions, fuelling medical research to develop novel treatments to manage them and improving patient access to them.

AI-ENABLED JOB MATCHING

AI systems can reduce both unemployment and under-employment by better matching workers with jobs that utilise their skillset. We have seen this effect before in previous waves of digital technology. For example, the use of online recruitment in Norway led to 9 per cent shorter vacancy times, 13 per cent fewer unsuccessful hiring attempts, increased job-finding rates for unemployed workers, 6 per cent higher starting wages for previously unemployed workers, and a reduction in steady-state unemployment by one-seventh. Another study from the US found that online job search

reduced unemployment durations by 25 per cent.[50]

AI could double down on the gains made through the internet. One of the main drivers of improved matching in Norway was better search technology – and there is ample evidence that greater machine learning is already being built into commonly used job-search tools. AI-driven personalised job recommendations can reduce traditional job-search frictions for both recruiters and candidates.

To get a sense of the importance of this effect, we ran a simple simulation in which AI-powered job matching reduces the length of unemployment spells in the UK by a conservative estimate of 10 per cent. This would help both reduce frictional short-term unemployment and the risk of longer-term unemployment. The latter is particularly damaging from an economic point of view as the longer an individual is unemployed the less likely they are to re-enter the workforce. Overall, our scenario suggests that AI-enabled job matching could raise employment by 0.4 per cent, equivalent to around 130,000 more people in work.[51]

This conventional form of job matching is not the only way that AI could support worker placement. As part of our work, we also conducted a small study of early AI adopters to explore other areas where workers needed more recruitment and job-matching support.[52] Workers in our survey flagged the need for more assistance with job transitions, including: predictive tools that notify them if their job was likely to be at risk or if other opportunities become available that better match their skills; advice on how their skills could be redeployed in other roles; and advice on what types of training may make them more competitive in the labour market. They were especially keen to access free tools that help with CV writing, interview preparation and identifying relevant opportunities – all functions that AI could help deliver.

AI also has the potential to streamline and improve the recruitment process from an employer's perspective by helping to screen applicants or automate parts of the process. There is even potential for AI to help correct some of the flaws inherent in human-led systems, including recruitment biases. However, AI-enabled recruitment systems need to be very carefully

designed because failure to anticipate negative effects may exacerbate the very biases that they are trying to overcome. Indeed, one study found that Facebook ads for supermarket cashier positions were shown to an audience of 85 per cent women and taxi jobs to an audience of 75 per cent black people.[53] There is also a risk that AI tools could screen out candidates who require accommodations for different abilities[54] or employ personality tests that may filter out candidates with depression or anxiety. The same tools could also make decisions based on a candidate's likelihood of accepting an offered salary based on markers. This could further lock in historically inequitable pay.

Some of these concerns can be avoided through careful system design, and there are examples of AI tools enhancing recruiters' work without major issues. For example, IBM launched a suite of tools as long ago as 2018 that uses AI to automate human resources, including job matches from candidate history, leading to enhanced conversion and greater net promoter scores. But all these tools require careful monitoring – ideally using diverse teams – and guardrails that might need to be adjusted from time to time. Our AI-user survey indicated that HR representatives used human oversight of automated recruitment tools as a check for bias and inaccuracies. According to one HR analyst, "While there are efficiencies with saving time, it does mean that I have to spend time proofreading." Another HR worker acknowledged the need to train their team to spot inaccuracies in AI outputs.

How AI Could Change the Workplace Experience

As with previous forms of technology, AI has a multi-faceted effect on workers' relationships with their employers and management. As part of our AI-user survey, we explored workers' experiences, hopes and concerns around the introduction of AI tools. Our view is that, overall, the effect should be positive for employment relations, but there are sensitivities that might need to be addressed, primarily at an individual workplace level but potentially through national policy as well.

First, AI can perform mundane and repetitive tasks like data entry to free up

worker time and increase their share of intellectually stimulating tasks. In turn, this can increase job satisfaction, autonomy and engagement as workers perform more diverse tasks and, potentially, contribute to more strategic decision-making. For example, a UK financial-services firm[55] used an AI-powered chatbot to handle basic customer queries, increasing the variety and complexity of questions that human agents fielded. Our AI-user survey, conducted in the UK, found evidence that managers tended to turn to AI tools to help cope with an overwhelming backlog of work. Blue-collar workers were also able to spend less time and effort on manual tasks, leading to increased job satisfaction.

However, moving to this more productive mode requires an adjustment for those who find comfort in mundane tasks, or have concerns around increased monitoring. One blue-collar worker in our survey stated, "If the work you usually do is done more efficiently than when you do it, then you feel useless, you can't keep up the rate." In the same UK financial-services firm described above, the customer-service chatbot functioned by monitoring human agents, which led to fears of this data being used to determine pay and performance.

Second, AI can augment workers' capabilities and increase access to work for differently abled workers and other marginalised groups. This could reduce inequality by ensuring a more meritocratic division of opportunities. Our AI-user survey indicated that workers tend to look at AI as an opportunity to upskill and improve job security and advancement. A fulfilment-centre supervisor who worked in the retail industry said that automated robots displaced some roles but overall led him to learn new technological skills and enjoy his job much more because, "I feel more valued; before … I felt that I was the robot." AI tools also enable differently abled workers to gain access to workplaces that may otherwise have been inaccessible. For example, tools like Zammo,[56] a conversational software platform, improve accessibility to interfaces like online job boards through providing a voice interface, for instance, helping firms build a more neurodiverse workforce.

Maximising these opportunities relies on equitable distribution of AI itself. Successive waves of digitisation and modernisation have shown that smaller

firms can often be in the long tail of slower tech adoption, and there is already some evidence of this with respect to AI; a Gartner poll[57] of executives indicated that large firms are likely to be among the earliest adopters and largest investors in advanced-AI capabilities. At company level, this means that the benefits of AI tools should not be restricted to management but should be equitably distributed across the workforce. Our AI-user survey suggested managers might in fact welcome this bottom-up experimentation.

Third, AI can improve supervisory capabilities by increasing managerial capacity to perform oversight. Quality of management has long been recognised as a challenge in driving UK productivity growth, and new tools applied well can assist managers in assessing performance and intervening where necessary to support teams that need it. At the same time, AI tools can improve workplace health and safety, especially for roles that are exposed to danger, such as physical labour.

There are two key channels[58] for this. The first is preventative, whereby smart equipment and personalised wearables can be used to assess threats to workers in real time – for example by monitoring surroundings for hazardous conditions like radiation exposure, or by replacing human workers performing dangerous tasks. For example, a Canadian manufacturer[59] used AI to allow workers to remotely operate a metal-cutting machine, which reduced worker injuries. Firms are also commissioning tools like Sleepio,[60] an AI training programme that has been proven to improve sleep and mental health.

The second channel is remedial, whereby AI is used to respond to, address and investigate workplace lapses. Smart drones can assist in search-and-rescue operations in difficult terrain like mines; smart glasses may use computer vision to provide response suggestions; and digital accident data concerning the location and nature of incidents can help improve future response times.

Inevitably, managers will need to exercise sensitivity around introducing additional oversight. A steel labourer who worked in construction said in our AI-user survey, “With more drones around the sites, I feel monitored, like I

can't take as many breaks, and the environment is less comfortable." To avoid ill sentiment, managers will need to communicate their workplace policies and the guardrails around them in order to not undermine the benefits through a general sense of surveillance.

Overall, this evidence indicates that AI tools can be used – and indeed are already being used – to improve the workplace experience, and that the benefits can be maximised if firms take steps to manage deployment carefully. Our AI-user survey indicated that offering training can overcome resistance from workers who are sceptical of or unfamiliar with the technology. Sharing best practices between teams and engaging workers in the testing, training and adoption process is key to successful AI transitions.

Again, few of these developments are entirely new. Many represent a continuation or development of trends that have been building for many years. As with previous technological developments, AI deployment may need additional safeguards, like manual checks, in highly regulated sectors such as legal services, or applications with ethical implications like recruitment screening. If successfully managed, there is significant upside to the workplace experience.

03

Policy Solutions

Based on the above analysis, we have developed a set of "no-regrets" policies that government should focus on to maximise the benefits of AI in the workforce for the broadest possible part of society. These are grouped into four broad themes:

A. Encourage broad AI adoption to help equalise opportunity.

B. Upgrade the UK's labour-market infrastructure to help workers deal with the more dynamic pace of change that AI is likely to create.

C. Harness the ability of AI to improve job quality by shining a light on how AI is being adopted across the economy.

D. Engage in thoughtful scenario analysis and contingency planning to prepare for a more radical future that AI could create.

The next section expands on each of these four themes, with specific policy recommendations:

A) Encouraging Broad Adoption of AI So That More Can Benefit From It

The first objective of policymakers should be to ensure the benefits of AI reach every corner of the economy. This can be done by helping to reduce barriers to AI access and by harnessing its ability to improve education and skills for all.

Historically, tech adoption has often exacerbated inequality by displacing workers, favouring the well resourced, and widening gaps in education and geography. But several leading economists – including David Autor,[61] Erik Brynjolfsson and Gabriel Unger[62] – have highlighted the potential for AI to reduce inequality and act as a tool for social levelling.[63] By enabling everyone to access more and better tools, and by optimising technology to

raise the skills and productivity of the least effective workers, AI has the potential to create more opportunities for all.

Policymakers need to seize the opportunity to act urgently, to ensure that the gains from AI are widely shared, by accelerating adoption, and developing skills and capabilities in the right areas. As noted above, because we anticipate relatively little variation in impact between regions of the UK, all our recommendations are pitched at the national level. It might be that the need for some specific targeted policy initiatives emerges, but at this stage, an overly granular approach is, if anything, likely to be inefficient.

Recommendation 1: Futureproof the next generation of UK workers by harnessing AI to boost educational outcomes and by refocusing the school curriculum to focus on AI-complementary skills.

When governments come to think about supporting future AI success, the most impactful interventions are likely to be the earliest. Investing in the right changes to the education system could have the biggest payoff in the medium and long term, because a generation of AI-savvy workers will emerge, already familiar with the new tools on offer.

There are other strong reasons to treat education – where policy is very directly linked to workplace experience – as a priority case for AI transformation. Teachers, who work extremely hard at their vocation and are often stretched by the demands of the role, deserve support to enable them to deliver more of the things that matter. Technology can augment their efforts, cut their admin time and minimise duplicated effort. In turn, this can lead towards an education system which is more engaging, accessible and inclusive for students.

As a first step, the government should:

- Harness the power of AI to improve educational attainment and employability. AI tools, bolstered by a sustained effort to upskill teachers and support their professional development, can free up teacher time, provide data-driven insights on learning effectiveness and offer personalised, adaptive solutions for diverse learners. The Department for

Education (DfE) should spearhead the rapid rollout of AI-enabled learning and teaching aids across UK schools, by first funding pilot studies in underperforming schools to establish robust evidence of their efficacy, identify best practice and then scale uptake.

- Adapt the curriculum to provide future workers with a robust and resilient set of AI-complementary skills with more focus on the "4Cs" (collaboration, communication, critical thinking and creativity), outlined in previous TBI paper *Ending the Big Squeeze on Skills: How to Futureproof Education in England*. By placing a stronger emphasis on a multi-modal curriculum and assessment, the DfE can enhance the overall curriculum with "soft skills" that are highly valued by employers and where current AI tools lack proficiency. In addition, the government should develop mechanisms to create a more dynamic curriculum that responds to the shifting demands of the labour market (including leveraging the new labour-market infrastructure in recommendations 5 and 8).

Recommendation 2: Incentivise the uptake of AI training assistants in the private sector to help improve the productivity of lower-performing workers.

Any policy response to AI needs to recognise the potential of the workers of today, not just those of tomorrow. Current working-age people – a very large proportion of society – could face rapid change and disruption in the coming years. It can be harder to effect change in this cohort, but the government must pay attention to its needs.

Historically, information technology has contributed to income inequality by automating away routine middle-income jobs, polarising the labour force[64] into high-income and low-income workers. AI has the potential to follow this pattern, but it also has the potential to do the opposite. As demonstrated in a nascent but growing number of studies, generative AI tends to boost the productivity of lower-skilled, lower-expertise workers by more than their higher-performing peers – helping them to catch up. One study[65] found that novice and low-skilled customer-service agents can use generative AI to achieve a 34 per cent productivity boost, compared with 14 per cent for agents overall.

To harness these benefits, the government should:

- Develop an open-sourced AI assistant that draws on a broad range of free and publicly available skills-based courses[66] (such as project management or coding). This co-pilot, developed in partnership with businesses, would be made available free of charge to all employers to ensure uptake for employees across firms of all sizes. The co-pilot should be released under an open-source licence, so that businesses can build on top of it to include their proprietary training data for more bespoke features and content. The training tool should be funded and developed through a mixture of central government grants, sponsorship and partnerships with educational institutions, government agencies and tech companies. Contributions from the open-source community should be encouraged to continuously improve the co-pilot.
- Introduce R&D tax credits to incentivise private-sector firms to develop their own AI training co-pilots aimed at helping new and less-skilled workers quickly become more proficient. The UK's R&D tax credits have previously had a major impact in helping UK startups cover R&D costs, including salaries, software upgrades and development of prototypes. [67] The government should expand on current tax credits to ensure they apply to a wide array of firms.

Recommendation 3: Develop a new AI-pathfinder programme to encourage broad uptake of AI across firms of all sizes.

One of the sources of the UK's productivity problem is inadequate diffusion of productivity-enhancing practices between firms.[68] This challenge is made harder by the significant regional variation in productivity. Despite the potential for AI in sectors like manufacturing, and in improving productivity and decision-making, the latest research[69] shows that AI adoption is not top of mind.

The barriers here are not just a lack of resources but also organisational capability and expertise. Our AI-user survey highlighted that a lack of clear governance within a company on how to use AI responsibly led to slower uptake, and in some cases, a prohibition on its use. HR managers in the AI-user survey highlighted that companies, especially smaller ones, often do

not have the necessary expertise or resources to effectively implement and benefit from AI technologies.

To overcome these barriers to adoption, and to avoid the risk that only the largest firms with the deepest financial reserves can tap its potential, the government needs a targeted plan on how to encourage a country-wide uptake of the technology. Our AI-user survey also echoed the need for the government to collaborate with companies new to AI to provide expert guidance and support (financial or otherwise) in navigating the complexities of AI adoption.

That plan should involve developing an AI-pathfinder programme. This pathfinder programme should:

- Fund a series of **AI innovation sandboxes** (like Singapore's Trailblazer programme[70]) to encourage small and medium-sized enterprises (SMEs) to adopt AI in a safe experimental environment, and to identify best-practice techniques of how to apply AI in both general and sector-specific settings (as with Germany's Green-AI Hub Mittelstand[71] and Singapore's AI Centre of Excellence for the Manufacturing Sector).[72]
- Set up a programme involving regional and local governments, tech providers and tech-advanced companies across different sectors to **demonstrate how AI is deployed in cutting-edge firms**, and support experiments in smaller businesses, including via advice on how to change work processes and workflows. Even at an anecdotal level, these examples can start to show the way for businesses in lower-productivity sectors, so they can access enabling technologies and tools with which to experiment, and develop use cases for their businesses. The sort of example the programme might spotlight is the US retail chain Sam's Club,[73] which uses AI-powered smart floor scrubbers to pull double duty by cleaning warehouse floors while also assessing stock inventory, raising employee productivity by 15 per cent.
- Make better use of existing data from other government programmes (for example, the Help to Grow scheme) and trade association data to help train a series of **AI business-advisor bots**. Existing business-advice programmes rely on one-to-one contact and in-person events, so are expensive to scale and often inefficient. Instead, the public sector could

make better use of AI technology to provide personalised, on-demand advice on a range of issues including exporting, compliance and management. By providing support to stay on the right side of legal requirements, this service would give companies more confidence to invest and innovate, supporting high-quality practices. The scheme would be funded by re-allocating funding from existing business-support schemes (for example, the UK trade advisor programme and Local Enterprise Partnerships) in targeted regions. It would then be promoted by the government, trade associations and relevant networks to encourage further uptake.

It is worth pointing out that the public sector's track record in outreach and support to smaller firms has been patchy for a long time. Part of the difficulty has been the sheer profusion of new approaches and abandoned strategies. Even where the outreach has been more sustained, the value of general, one-off advice has been limited, and the impact debatable. We do not underestimate the challenges these well-intentioned efforts faced. TBI's proposal is to use the technology to go beyond the limits of personnel availability and massively expand the utility of the advice. Once implemented, the service would be more sustainable and less prone to radical rethinks.

Recommendation 4: Incentivise investment in public-sector labour-augmenting AI technology by creating national challenge prizes focused on alleviating labour shortages.

In the UK, 2.3 million[74] public-sector workers are in professions that face severe staff shortages and which typically involve large amounts of unpaid overtime (this includes teachers of maths, science and languages, doctors, nurses and care workers). Incentivising AI development in these shortage sectors is more likely to complement workers by alleviating heavy workloads instead of causing worker displacement. There are already pockets of excellence and innovative thinking throughout the public sector in trying to bridge this gap, but little incentive for the overall system to fund, support and promote their experiments. A challenge fund can create the means for safe trials of new ways of working.

Since it is hard to know in advance whether a technology will complement or substitute labour, governments should focus on incentivising "labour-augmentation outcomes" instead of being prescriptive about the types of technology they encourage businesses to create. In our AI-user survey, there were concerns that human interaction at work is dwindling, and the participants welcomed ways of incentivising the design of AI systems that include humans in the loop. To achieve this, the government should:

- Establish outcome-oriented **national challenge prizes**, to incentivise the development of worker-complementary tech solutions for stretched sectors. There are already examples of small-scale work in this area and the government should extend its work with innovation agencies such as Innovate UK (with its UKRI Challenge Fund on AI and the data economy[75]) and Nesta (with its CareerTech challenge[76]). The UK government should also tap insights from similar US-based challenges such as the $5 million XPRIZE for Rapid Reskilling[77] and the $12 million Future of Work Grand Challenge.[78]
- Engage stakeholders (including trusts and foundations, venture capitalists, tech companies, researchers and workers themselves) in the prize design and evaluation process, providing support and mentoring where relevant.

B) Upgrading the UK's Labour-Market Infrastructure to Adjust to the AI Era

The rapid pace of AI-driven change indicates that labour-market churn – movement of workers out of existing roles and into new ones – is likely to occur at a faster rate. This is a sign of dynamism in the labour market and should stimulate growth. However, the UK will need to upgrade its labour-market infrastructure to cope with this pace of change. To successfully adapt to AI, the infrastructure must be agile, responsive and dynamic.

Recommendation 5: Create an Early Awareness and Opportunity System for workers to make informed decisions about career pathways.

As we have already discussed, governments confronted with tech-induced

change in labour markets can attempt to hold back that change and protect various professions from its impact. To do so would be economically damaging and likely futile. It would also let down the people it seeks to support: our research found that blue-collar workers favoured help to prepare for change over attempts to prevent it.

The story of technological change is not a new one: 60 per cent[79] of job titles in 2018 did not exist in 1940. But the likely pace of change as a result of the AI revolution demands a new pace of response. What the UK needs is an upgrade in its labour-market infrastructure.

Part of the story, naturally, is supporting the conditions for a dynamic labour market where workers have the ease to move between roles and firms, and the ability to switch resources to where they are needed. This is an area where AI tools can be used to respond to the challenges posed by AI.

Traditional support for workers who need to shift career has focused on those already affected – those recently made redundant or at risk of it happening soon. But given many people may have uncertainties about how their role is likely to be affected, there is a good case for bringing that support forward. There are enough data to provide good-quality information about the likely impacts of AI on different professional pathways.

According to the International Labour Organization,[80] worker-adjustment programmes are most successful when they begin in advance of expected displacements. Furthermore, our AI-user survey found that workers, often white-collar ones, underestimate their risk of AI displacement, thus delaying application of preventative measures such as retraining.

This will be especially important in the UK, where our analysis indicates that more than half of private-sector tasks are exposed to some level of AI automation, but the majority of exposure is in high-complementarity roles such as professionals and managers (i.e., very few roles can be fully replaced by AI). This indicates that the UK can gain significant productivity impacts if it moves early to secure a successful workforce transition.

The prize therefore appears substantial. In designing a new labour-market

infrastructure, inspiration can be drawn from the credit industry. Consumers already benefit from access to information about their credit scores, and understand they can affect their future chances of accessing finance by following the advice of credit agencies, which have recognised patterns in consumers' personal data.

The government should therefore:

- Establish an **Early Awareness and Opportunity System**, managed by the Department for Work and Pensions, which uses AI to predict the risk of displacement at least one year in advance. This system would expand the scope and functionality of the existing Jobcentre Plus Rapid Response Service,[81] which is reactive and based on redundancy notifications. Instead, it would provide a new public service for citizens to check their personalised risk of displacement on demand. It would also offer workers tailored information on opportunities to use existing skills to retrain and progress in their current pathways, or adopt another career pathway.

This system would be built on foundational data from a number of sources: 1) existing UK macroeconomic and microeconomic data (for example, from the Transformed Labour Force Survey, HMRC company tax returns and the Insolvency Service); 2) international labour-market data from comparable countries at the frontier of AI adoption; and 3) novel data on AI uptake across the UK economy. The latter could be sourced partly from private-sector data on AI sales volumes from company filings plus more formal survey data from an upgraded version of the UK's existing Digital Economy Survey,[82] an annual survey of how UK businesses use information and communication technology. The aim should be to expand the quality of these data, collect them more frequently and apply them more swiftly.

Armed with these data, the system could then create an individualised risk and opportunity assessment for every worker in the UK. Occupations would be analysed at a task level to assess vulnerability to AI using O*NET data and then extrapolated to region, sector and occupation levels using the UK's labour-market data (using a similar approach to the analysis included in this report). The system would also, with permission, combine data on each worker's unique characteristics to identify what sort of retraining courses

and jobs the worker should target in areas that build on their existing skillset and where labour demand is growing.

Citizens would interact with the Early Awareness and Opportunity System voluntarily online via a digital interface, where they can access generic assessments or choose to customise them by inputting additional data or consenting to more granular data collection (web-scraping information or accessing educational records from their digital IDs). These personalised assessments would flag factors that contribute to the worker's risk profile (the sector and profession they work in, for example), offering customised opportunities to mitigate that risk and/or transition to a higher-opportunity field. Individuals could also opt in to be notified if their risk assessment changes, in a similar way to how credit-scoring systems work in the United States.

Recommendation 6: Auto-enrol workers in a new, voluntary LIFESPAN fund that mitigates unemployment shocks and finances re-employment efforts.

Even with support to train the workers of the future, upskill the existing workforce, support opportunities in companies and aid workers' adjustment to changing labour markets, the coming phase might still bring a higher level of friction as workers find themselves between roles. Government policy can play its part in ensuring this does not result in further undesirable outcomes such as temporary poverty, unsustainable credit use and housing insecurity.

The UK has the third-lowest level of unemployment benefit[83] among OECD countries (measured as a share of previous income after six months of unemployment). Unemployment benefits are not just low, they also have strict eligibility criteria, meaning that most workers do not have a substantial safety net if made redundant. Given the tight fiscal situation in the UK, this is unlikely to change soon.

Additionally, UK households have low savings rates and underinvest in emergency funds which could be used to smooth income during a shock. In 2022, UK households saved about two per cent[84] of their disposable income, roughly one-third that of their European Union counterparts. Our AI-

user survey indicates that workers tend to be unaware of how AI could potentially change their jobs and the investment required to navigate a successful transition.

To address this, the Treasury should:

- Establish individual LIFESPAN funds – "Lifetime Income Flexibility and Employment Savings Programme for Adaptive Needs" – to provide an income buffer for unemployment. As with the current pensions model, workers would, by being voluntarily enrolled in a LIFESPAN fund, pay a fixed proportion of income into the fund.

Workers could be incentivised to save because it is tax efficient to do so and because their employer would match a proportion of those contributions. Unlike pensions, individuals could draw down their LIFESPAN fund before reaching retirement age in the event of a major life event (redundancy, parental leave, retraining) where they are temporarily out of the workforce. Any unused funds at retirement age would automatically transfer into the individual's pensions account.

The key features of the LIFESPAN fund include:

- **Automatic enrolment of workers** in individual LIFESPAN accounts with a voluntary opt-out feature. This same "nudge" technique for pensions[85] saw a tenfold increase in membership of defined-contribution occupational schemes.
- **A bipartite contributions model**, where the employee contributes a minimum of one per cent of pre-tax gross salary which the employer matches. The employee can then choose to top up their contributions above this level and still benefit from tax-efficient savings, but without employer matching.
- **Early withdrawal allowances** to provide significant temporary income support while workers retrain or seek new employment. Employees would be able to draw down their LIFESPAN fund when they transition from employment to unemployment (for instance, voluntarily due to parental leave or involuntarily due to redundancies). This early withdrawal feature would be accessible to employees that have worked for at least two

years, at which point they would be able to withdraw up to two-thirds of their previous year's annual income for up to two years. This feature is crucial to buy workers time and avoid the risk of taking a job poorly matched to their skills. Any withdrawn income would be taxed at the usual rate of income tax – as pensions are now.

Recommendation 7: Revamp the UK's adult-training offer to be more personalised, cost-effective and directed at cultivating in-demand AI-era skills.

Having alerted workers to likely changes in the employment market and assisted them in the transition, it seems sensible to assess the supply of training available to them. The government should therefore:

- Invest in a revamped adult-training strategy to deal with the challenges of this new era, either through existing agencies such as the DfE, or through a new centralised workforce-development body like the proposed Skills England.[86] Once again, part of the answer here lies in the application of AI tools. For example, AI can be used to identify relevant course content and personalise it to workers' training needs. The curriculum should also include a guide to using AI tools, particularly software-enabled ones like generative AI. Our AI-user survey highlighted that the introduction of AI tools required an adjustment period, which was either inefficient (trial and error) or resource-intensive (it diverted managerial attention to train staff and correct mistakes).

To address the cost to individuals of retraining, the government should:

- Develop a certified set of free online courses available to all citizens (in collaboration with the Open University) which focus on skills and qualifications for sectors of the economy where demand for labour is growing rapidly.
- Incentivise firms in at-risk sectors to offer retraining opportunities through tax breaks on retraining costs. This ensures proactive engagement by firms and an additional nudge for employees who are unaware of risks to their occupation or unwilling to take remedial steps independently. This option was supported by our AI-user survey participants.

- Reduce the opportunity cost of retraining through automatic enrolment in LIFESPAN funds (described above) and reduce the cost of living for individuals engaged in retraining; for instance, by encouraging private banks to offer more permissive mortgage-payment holidays for individuals enrolled in formal retraining.
- Extend the UK's student-loan scheme to enable individuals to take out more than one loan in their lifetime provided the course they select is directly linked to an area that has a shortage of skills. More radically, the government should explore whether to allow mid-career workers over the age of 30 to draw down their state pension in the form of temporary income support for up to three years – paid for by a commensurate increase in that individual's state pension age or a higher rate of marginal taxation after returning to work.

To futureproof the type of training on offer, the government should:

- Use the Early Awareness and Opportunity System (described above) to suggest retraining opportunities for workers at risk of redundancy. This can be done using AI to match in-demand skills (that have been web-scraped from online job adverts) with existing academic and vocational courses. The same system would also notify educational providers about training gaps in areas where demand for skills is high.
- Build strong relationships with business and academia to ensure the new AI-era training curriculum provides recognisable qualifications that employers value. This should include a focus on human-to-human skills (such as empathy and communication), AI-complementary skills (prompt engineering, for example) and skills that are seemingly AI-immune (bespoke physical trades and personal services). The same curriculum could also include AI Proficiency Certificates that combine online tuition with free internships to private-sector firms that are designed to speed the uptake of AI across the economy.

To ensure groups that make less use of digital technology or those less able to adapt to AI-era technology are not left behind, the government should:

- Explore using outcomes-based funding models, like Social Impact Bonds (SIBs), to encourage tech-averse groups (particularly older workers) to

upskill. Third-party investors fund SIBs, and the bond is only paid (by the government) if a clearly defined social outcome is achieved (for instance, increased digital proficiency among older workers).[87]

- Adapt learning settings to ensure that the greatest number can benefit. This might include offering greater personal outreach for certain groups, or more in-person sessions for workers whose roles are offline (like delivery drivers). Group-based learning may boost participation and completion rates by creating learning communities. Using AI to offer adult training in different languages will also expand the potential learning community and improve accessibility.

Recommendation 8: Use AI to build a job-matching portal to reduce frictional unemployment.

Armed with this training, workers should be in a position to find new and better roles. But there is still work to do to ensure that the process of matching them to the right opportunity is as efficient as possible.

Some European governments are already pointing the way. France, for example, offers jobseekers access to a public platform called La Bonne Boîte,[88] which predicts those firms with a high probability of hiring over the next six months. The Estonian Unemployment Insurance Fund[89] uses AI to determine employment pathways for candidates and to determine the probability of finding a job. AI is also already widely used in the private sector to facilitate job matching – 97 per cent of Fortune 500 firms use automated Applicant Tracking Systems to manage candidates.[90] Although the UK's previous attempt at a job-matching platform failed,[91] these successful international pilots and technological advancements show success is possible. This type of service was strongly supported by blue-collar workers in our AI-user survey.

The government should support the development of a new AI-powered job-matching platform, either through direct commissioning for a government-sponsored service or providing the means to access government-held data that can enhance privately built services. This platform should match employers looking to fill vacancies with newly retrained workers who match those skills requirements. It would guide candidates along the entire

recruitment pipeline. The platform would offer:

- **Career coaching**: Use AI to provide bespoke advice to individuals on how their existing skillset could transfer to different occupations and their potential professional-development trajectories.
- **Application assistance**: Deploy generative AI tools to craft personalised CVs and cover letters, which are especially important to pass automated-decision-system filters in the recruitment process. The platform could even, with appropriate opt-in and consent protocols, create and automatically submit job applications as proof of job-seeking activity with regards to eligibility for unemployment benefits.
- **Job matching**: Use machine-learning techniques[92] to map skills in job descriptions with those in CVs and personalisation (for example, recommendation engines that target roles with a higher chance of success).
- **Social connections**: Identify volunteers, programme alumni or recruiters in target firms that candidates could contact for guidance in the interview process or use as a workplace buddy in their new roles using tools like social-network analysis. This will help alleviate structural barriers to unemployment, such as a lack of professional networks for instance.
- **Interview preparation**: Offer interview preparation tools such as mock behavioural interviews, practice assessment tests and suggested reading material. These would be delivered in a variety of media to ensure accessibility (could be a chatbot for younger workers or an audio aid for visually impaired workers).
- **Negotiations**: Assist candidates who receive offers with wage and benefits negotiations by showcasing salary comparisons, offering negotiating tips, obtaining multiple successful offers for the candidate and highlighting other leverage.

C) Maximise the Impact of AI to Improve Job Quality

AI tools and applications are already being used to improve worker wellbeing in a wide range of settings. Emerging evidence shows that in

aggregate, AI appears to be associated with greater job satisfaction, and commentators[93] have remarked that AI could "help restore the quality, stature and agency that has been lost to too many workers and jobs".

However, there is also a perceived risk that AI in some cases could worsen job quality.[94] Our AI-user survey highlighted some concerns that workers will face pressure to perform to unrealistic levels of intensity, and around the potential effects of employment- and recruitment-specific tools involved in overseeing workers.

The role of government should be to ensure that AI supports worker welfare and organisational productivity while minimising the risks. Given the latest wave of AI technology is still quite nascent, one of the major challenges governments face is tracking how AI is being adopted, so a key focus in the short term should include measures to generate a clearer picture – to share best practice to speed uptake and identify risk areas where firmer guardrails are needed.

Recommendation 9: Generate better data on worker welfare by adapting the Transformed Labour Force Survey (TLFS) to inform regulatory and policy development.

The government has scant information on the extent and impact that AI is having on job quality across the economy. The UK's Skills and Employment Survey[95] collects some information on job quality (work intensity, job insecurity) but it is only conducted once every four to six years.

To plug this data gap without incurring additional compliance costs, the Office for National Statistics (ONS) should augment its new TLFS to collect timely and frequent data on the impact that AI has on job quality and working conditions. The ONS should include a screening question to identify those who use AI in the workplace (as in recent OECD[96] surveys) and, for those that do, to ask a series of questions on how AI is affecting worker welfare through its role in decision-making, health and safety, the intensity of work, worker surveillance and enjoyment of work.[97]

Recommendation 10: Launch a Taskforce for AI-related Workplace

Disclosures (TAWD) to share best employer practice related to AI tools that impact workers.

Better transparency in how companies are using the technology has the dual benefit of making it easier to identify and share best practice to speed adoption (highlighted by our AI-user survey) and identifying potential high-risk AI cases that require more guardrails. The market for AI employment and recruitment tools is nascent, and employers can struggle to identify products that meet their needs and obligations. A recent independent review into the adoption of these tools highlighted that unclear governance is the greatest barrier to responsible innovation.[98] One lever to improve adoption is better transparency.

The government should create a new Taskforce for AI-Related Workplace Disclosures. This taskforce would follow similar principles to the successful Taskforce on Climate-Related Financial Disclosures[99] (TCFD), which designed a disclosure framework and promoted the uptake of these disclosures among employers.

The scheme would be voluntary but would incentivise firms to disclose information within reasonable bounds of commercial confidentiality (for instance, a time lag might be appropriate before disclosure of a major investment in a new system). The key areas of disclosure should cover both best practice and risk management. Employers would be encouraged to provide information on:

- **Use**: The name of the AI system and its intended use in the workplace.
- **Worker benefits**: The benefits it has had on workers (such as improved health and safety, reduced recruitment bias, improved welfare, relieving mundane and repetitive tasks), to help highlight and share best practice.
- **Risk management**: Whether the system is used in any “high-risk” or “high-impact” workforce decisions (hiring and firing, disciplining and so on), and what governance procedures and processes have been put in place to manage risks (related to recruitment bias or surveillance, for instance). For the most part, this would involve disclosing information that employers are already expected to collect. For instance, employers are required to produce impact assessments for high-risk data processing

(see Information Commissioner's Office (ICO) guidance[100]), and are encouraged to publish this (or a summary to protect commercially sensitive information) on their website.[101]

- **Adoption process**: How the technology was adopted in the workplace and whether workers were consulted in advance. Multiple international studies have shown that dialogue between workers and managers can lead to better performance and improved working conditions, including when adopting new technologies.[102] And in our AI-user survey, worker engagement was seen as critical to ensure innovation and responsible adoption by managers and HR representatives. Disclosing such information would again enable sharing of best practice for adoption of these tools.

These disclosures should be kept in a public repository to help: 1) identify and share best practice in AI deployment; 2) enable employers, unions and other public-interest bodies to identify gaps in AI workplace deployment; 3) streamline questions as to legal compliance.

The taskforce should also publish an annual review on disclosure activity. This report would highlight some of the best practices across employers. Based on this assessment, the taskforce could award a "Transparent AI Gold Standard" for the most transparent companies, mirroring similar government schemes such as the Employer Recognition Scheme (ERS) Gold Awards[103] for supporting the armed forces. To further encourage uptake of disclosures, the Transparent AI Gold Standard should also be used as a positive signifier when tendering for government contracts, similar to London's Good Work Standard.[104]

The taskforce could also use learnings from adoption-process disclosures and publish guidance on best practice for the integration of worker voices. This information is often lacking in guidance documents[105] relating to the adoption of AI.

Recommendation 11: Clarify and disseminate guidance on automated decision-making and, if necessary, dynamically adjust its worker-protection legislation.

The priority for governments should be to ensure that employers understand and can meet their current responsibilities under the law and navigate the legal landscape before problems appear.

The UK has a raft of legislation that offers workers safeguards when AI tools are used, relating to data collection, processing and monitoring. Yet some aspects of the law are difficult to follow and relatively untested or unknown. This can lead to malpractice through accident or intention, especially for SMEs without dedicated HR resources.

For instance, the law around automated decision-making – one of the key areas for concern in relation to job quality – is confusing. There is a series of legal tests and caveats that are highly prone to contestation, which means there are varying levels of compliance, including around knowing which tools fall under the legislation.

In the first instance, more guidance may be required from the ICO to help clarify not only what solely automated decision-making means, but also the conditions upon which solely automated decision-making should be applied. More touchpoints should also be created to disseminate this guidance. To this end, the AI business-advisor bot (Recommendation 3) could incorporate this guidance and act as an HR co-worker to increase capacity in employers to understand and meet their responsibilities under the law. Further touchpoints could be created through partnerships with professional bodies, such as the Chartered Institute of Personnel and Development's (CIPD) professional network.

If this does not work – and the ICO and its partners (including CIPD) find in their interaction with employers that the law is still leading to a lack of clarity on which people can base investment decisions – the government should consider whether and how the legislation could offer that greater clarity.

Separately, the scope of legislation may also need to be broadened. As technology evolves quickly and as more is learned about the interface between decision-making and AI, laws need to keep pace with the reality of the risks that they pose. Safeguards, and when companies must apply them, may need to be modified as a result. For instance, there is some emerging

evidence that suggests even when humans are in the loop (one of the identified safeguards), they may reaffirm automated decision-making without properly scrutinising these provisions. In one study, human monitors were less likely to adjust recommendations containing large errors, thus failing to serve as an emergency break.[106]

Recommendation 12: Improve the enforcement capacity of the UK's three regulators responsible for regulating the impact of AI in the workplace and build their capacity to test and certify regulatory technology (regtech) tools that help firms navigate the legal landscape.

Three cross-sectoral bodies are responsible for regulating the impact of AI on job quality:[107]

- The Information Commissioner's Office, responsible for enforcing compliance with the UK General Data Protection Regulation (GDPR) and Data Protection Act 2018,[108] related to data privacy and protection.
- The Health and Safety Executive, responsible for regulating working time, related to the intensity of work.
- The Equality and Human Rights Commission, responsible for enforcing the Equality Act 2010 and the Human Rights Act 1998, related to discrimination and bias in the use of AI tools and automated decision-making.

To date, these regulators have struggled[109] to build the capacity and capabilities to respond to the AI era. The issue tends not to be the bodies' legal powers, but rather a lack of resources for compliance and enforcement of existing legislation. The Department for Science, Innovation and Technology has recently allocated a time-limited fund of £10 million to help regulators address these shortfalls and create the necessary tools, but the small fund is shared between 90 regulators.[110]

Instead, the government should fund a programme that brings together the three cross-sector work-related regulators. This programme should have two functions:

- **Review AI analytics capabilities within the regulators to improve**

enforcement capacity. AI has significant potential[111] to streamline the regulatory process by analysing large volumes of compliance documents and other data to improve monitoring and detection. For instance, the programme could explore the potential for natural-language-processing algorithms to combine information from existing GDPR and other workplace disclosures with public information scraped from employer-review websites to identify high-risk cases that warrant review. Using AI in consultations (which the ICO regularly holds[112]) could also create a seven-fold efficiency boost in processing the responses - as highlighted in TBI's paper *Governing in the Age of AI: A New Model to Transform the State*. Analysis provided by the proposed taskforce outlined in Recommendation 10 would be used as a resource to improve the regulator's understanding of best practice.

- **Create a functioning market for regtech tools by testing and certifying specific tools to aid adoption and reduce the burden on employers.** AI-era regtech tools offer significant potential to cut the cost and burden of complying with workplace legislation. However, a key barrier to adoption is that the market for such tools is nascent and employers are often unsure of the benefits and risks of using specific tools. To help plug this gap and create a market for regulatory compliance tools, the three cross-sector work-related regulators should work with providers of regtech tools to identify, test and certify them. For example, there are significant gaps in the evidence for the validity and utility of GDPR compliance tools, so many organisations continue to take a manual and informal approach to GDPR compliance.[113] But by creating a list of certified tools that have been tested for bias and accuracy, the UK's regulators could both improve compliance and reduce the regulatory burden on employers.

Together, these recommendations improve employers' capacity and capabilities to meet their legal responsibilities and build the regulator's capacity to respond to the evolving landscape of AI.

D) Preparing for a More Radical Future

Recommendation 13: Use scenario analysis to explore the next wave of

policy responses.

Given the rapid pace at which AI technologies are developing and the uncertain impact they could have on the future of work, the government should take a scenario-led approach to the way it develops AI policy for the future, as advocated by economist Anton Korinek.[114]

As well as implementing the list of "no-regrets" policies identified above, the government should engage in scenario analysis to identify the range of alternative futures that could materialise, the likelihood and risks associated with each scenario, and the key drivers that will determine which scenario ultimately becomes reality.

Scenario analysis already happens within government, but it needs to be given more weight and combined with contingency planning – preparatory policy work that creates a practical plan, including trigger points, for transitioning from the labour market as it is today to a more radical future.

For example, in a scenario where AI continues to advance rapidly and is capable of performing an ever-higher share of worker tasks, rapidly accelerating productivity growth could enable a shortened working week, as predicted by John Maynard Keynes in the 1930s.[115] However, transitioning society to a shorter workweek would not be straightforward, particularly if the impact of AI were felt unevenly across the labour market (this was a concern among participants of the AI-user survey). Governments would have to consider: 1) how to coordinate the shift in working time across society, such as whether to encourage all citizens to work similar days each week or stagger them; 2) where the tipping point might be, given that some sectors will change faster than others; 3) how pay levels should adjust, particularly for the self-employed, those on part-time contracts or those who are paid per hour; and 4) what approach to take for the public-sector workforce.

The above is just one example of a potential future scenario. Other examples could advance into very different territory. In each case, the point of exploring the scenario is to understand what fundamental drivers could cause it to materialise, what action governments can take to mitigate

adverse outcomes and to identify what policy mix would be appropriate in different states of the world.

AI offers immense possibilities for the future of work. To capitalise on these, governments need to plan for the future.

04

Conclusion

AI's impact is already, mostly in small ways, being felt across the economy, society and politics. It is likely that, at some point in the near future, the mood towards AI will take a more sceptical turn – commentators will look around, see a handful of popular apps and a couple of more-or-less impressive pieces of transformation, and ask whether it adds up to the promised revolution. The temptation at this point would be to pause and wait to see how things play out.

This would be a poor basis on which to make policy. Even without perfect visibility of how workplace AI will develop, who will be affected and how, we can predict with confidence that change is coming. Those affected will be best served by policy that takes the best of what new technology has to offer and supports the nation in embracing it.

Even if our analysis at this stage needs constant revision, and some of it may be outdated before too long, there are good reasons to take all of the steps outlined in this report. Our approach is built around using the tools AI gives us to address the concerns about its effects. It must surely be a good thing to use technology to enhance what government services and policymaking can do.

Either way, we are clear that concerns about the implications of a technology are not well served by trying to hold that technology back. A pro-tech, pro-employment, pro-economy policy is not just possible but imperative. We hope that the recommendations in this report can point the way to such a policy.

05

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Technology and Design

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Endnotes

1 There's already real-world evidence of AI's potential to boost productivity in the economy. In a fast-developing field, much of the evidence of AI's impact will for now remain anecdotal, but nonetheless these individual stories lead the way for many more developments. For example, the California utility firm Pacific Gas & Electric used AI to create hundreds of low-code business solutions that save the firm more than half a million hours annually, generating almost $75 million in annual savings. Closer to home, Swedish fintech Klarna created an AI assistant to handle tasks from multilingual customer queries to refunds processing. Within the first month of its launch, it handled more than 2 million conversations, the equivalent of 700 full-time agents, faster and more accurately. In 2024, this is expected to translate to more than $40 million in increased profits. And nonprofit Age UK built an AI-enabled text-to-speech tool to transcribe calls between volunteers and seniors, enabling faster safety audits and freeing up employee time from actively monitoring calls. It has saved 9,500 staff hours over 23,000 service calls.

2 https://www.ft.com/content/8f7b9b52-9243-4c34-af80-223522273ab4

3 https://oecd.ai/en/ai-principles

4 https://www.europarl.europa.eu/RegData/etudes/BRIE/2021/698792/EPRS%5FBRI%282021%29698792%5FEN.pdf

5 https://www.state.gov/artificial-intelligence/

6 https://goodjudgment.io/AI/Superforecasting%5FPower-Seeking%5FAI%5FII%5Fsupplementary%5Fproject.pdf

7 https://ourworldindata.org/ai-timelines

8 This included: industry research (Goldman Sachs, McKinsey & Company for instance), academic research (Massachusetts Institute of Technology, University of Oxford for instance), superforecaster opinions, multilateral reports (OECD, International Monetary Fund (IMF) for instance), opinion articles and news media (including ***Financial Times***, ***The Economist***, ***The Wall Street Journal***), government sources (UK Department for Education, US National Institutes of Health for instance), business surveys (including PwC and Gartner), civil society (The Health Foundation, Center for Democracy and Technology for instance), industry case studies (including OpenAI, Sparx Maths and Khan Academy), and multiple discussions with high-level AI and academic experts. Our literature review drew on work from world-renowned economists and AI experts such as Erik Brynjolfsson, David Autor and Daron Acemoglu.

9 For example, Walmart used AI-powered floor scrubbers to increase employee productivity by 15 per cent. https://www.cnbc.com/2023/03/27/how-walmart-is-using-ai-to-make-shopping-better.html

10 https://ide.mit.edu/sites/default/files/publications/2019-04JCurvebrief.final2%5F.pdf

11 https://www.oliverwymanforum.com/content/dam/oliver-wyman/ow-forum/gcs/2023/ai-report-2024-davos.pdf

12 https://www.imf.org/en/Publications/Staff-Discussion-Notes/Issues/2024/01/14/Gen-AI-Artificial-

Intelligence-and-the-Future-of-Work-542379?cid=bl-com-SDNEA2024001

13 https://www.imf.org/en/Publications/fandd/issues/2023/12/Rebalancing-AI-Acemoglu-Johnson

14 https://www.nber.org/system/files/working%5Fpapers/w30911/w30911.pdf

15 Our analysis focuses on the potential time savings for workers from using AI tools. This has also been the focus of many studies, which have produced headlines regarding the large numbers of jobs exposed to AI. But AI may also help workers improve the quality of their output. Indeed, several studies – including Brynjolfsson et al (2023) (https://www.nber.org/papers/w31161) and Dell'Acqua et al (2023) (https://papers.ssrn.com/sol3/papers.cfm?abstract%5Fid=4573321) have documented this effect already, particularly for those who are less able. Our analysis does not consider the impact of this potential levelling-up effect of AI, which may be considerable.

16 Our use of AI on this project is thus an exemplar of how AI can both save time and increase the quality of work by enabling the authors to take a more granular approach than would otherwise have been possible.

17 This is the same typology used within our previous work (https://institute.global/insights/economic-prosperity/the-potential-impact-of-ai-on-the-public-sector-workforce). This categorisation also served as an additional robustness test as we excluded the estimated time savings from the limited number of tasks for which GPT-4 was unable to assign a specific technology as this suggested that the technology may not yet exist.

18 https://www.mckinsey.com/about-us/new-at-mckinsey-blog/meet-lilli-our-generative-ai-tool

19 https://www.mckinsey.com/about-us/new-at-mckinsey-blog/meet-lilli-our-generative-ai-tool

20 https://corporate.walmart.com/news/2024/03/14/walmart-commerce-technologies-launches-ai-powered-logistics-product

21 https://corporate.walmart.com/news/2021/06/03/walmart-unveils-all-in-one-associate-app-me-walmart-and-gives-740-000-associates-a-new-samsung-smartphone

22 https://verbit.ai/

23 https://www.aboutamazon.com/news/operations/how-amazon-deploys-robots-in-its-operations-facilities

24 https://www.viact.ai/manufacturing

25 This report is focused on the impact of AI on the private sector. Please refer to our earlier report for analysis of potential impact within the public sector: https://institute.global/insights/economic-prosperity/the-potential-impact-of-ai-on-the-public-sector-workforce

26 There is, of course, a possibility that demand for these occupations might be reduced by other means that may involve much greater automation – for instance, demand for motorcycle mechanics may fall as electric motorcycles are developed that require less servicing. But these processes have been underway for some time and while they might accelerate, it remains legitimate to take a snapshot of these roles as they exist at the present.

27 Source: TBI analysis of ONS Labour Force Survey data

28 https://www.nytimes.com/2024/04/01/business/ai-tech-economy.html

29 Source: TBI analysis of ONS Labour Force Survey data.

30 This is already playing out in practice. For example, one study by the Toronto Metropolitan University (https://dais.ca/reports/automation-nation-ai-adoption-in-canadian-businesses/) reported that the AI-adoption rate for large firms (those with more than 100 employees) in Canada was 20 per cent, compared to less than 3 per cent of small firms (those with five to 19 employees).

31 https://www.ansa.it/documents/1680080409454%5Fert.pdf; https://www.ippr.org/articles/transformed-by-ai

32 https://data.europa.eu/doi/10.2765/39957

33 https://www.ons.gov.uk/employmentandlabourmarket/peoplenotinwork/redundancies/datasets/redundancieslevelsandratesnotseasonallyadjustedred01nsa

34 We assume each 1 per cent increase in productivity increases labour demand by 0.57 per cent with a lag of one year, in line with: Victoria Morén and Elias Wändal, 'The Employment Elasticity of Economic Growth', 2019.

35 https://www.ons.gov.uk/economy/grossdomesticproductgdp/timeseries/ihyp/pn2

36 https://www.gspublishing.com/content/research/en/reports/2023/03/27/d64e052b-0f6e-45d7-967b-d7be35fabd16.html

37 https://www.imf.org/en/Publications/WEO/Issues/2024/04/16/world-economic-outlook-april-2024

38 This isa result of excluding the 7.2 per cent of total workforce time savings attributable to bespoke AI systems used in small firms and the 0.8 per cent attributable to the use of AI-enabled high-cost equipment in small firms.

39 https://www.nber.org/papers/w32487

40 https://www.edtechreview.in/trends-insights/trends/how-data-driven-ai-platforms-revolutionize-success-in-classrooms/

41 https://schoolsweek.co.uk/chatgpt-one-in-three-teachers-use-ai-to-help-with-school-work/

42 https://belitsoft.com/custom-elearning-development/ai-in-education/ai-in-edtech

43 TBI has done substantive work on what this might look like in the following papers: https://www.institute.global/insights/politics-and-governance/a-new-national-purpose-harnessing-data-for-health; https://www.institute.global/insights/public-services/fit-for-future-modern-sustainable-nhs-providing-accessible-personalised-care-for-all

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47 https://customers.microsoft.com/en-us/story/1571334830524227984-somerset-nhs-foundation-

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48 https://www.wired.com/story/ai-is-fueling-smarter-prosthetics-than-ever-before/

49 This increase in employment is inferred from the employment-rate analysis contained in our report Prosperity Through Health: The Macroeconomic Case for Investing in Preventative Health Care in the UK, mapped onto the ONS's population projections.

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51 We obtained this estimate by analysing the UK Labour Force Survey, which subdivides individuals in unemployment by the duration they have been out of work. In our scenario, we proxy the impact of AI-enabled job matching by reducing the difference in unemployment numbers between two adjacent spells (for example, less than 6 months and 6-12 months) by 10 per cent – meaning that these individuals would find a job and the employment level increases accordingly.

52 The AI-user survey included 16 managers and workers from four key sectors of the economy, representing both blue- and white-collar workers. All participants had some experience with the adoption or use of AI tools in the workplace. The research was carried out by the design-research agency STBY and consisted of two stages: the first was a series of workshops and interviews that interrogated the perceived opportunities and issues related to the adoption of AI in the workplace. The second was a series of workshops with the same participants to test recommendations and offer novel solutions.

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97 Potential questions could include: a) To what extent do you agree or disagree with the following statements? AI helps me make faster decisions; AI helps me make better decisions; I like that AI assists me with decision-making; b) Where AI has automated or created tasks: Were most of these tasks repetitive?/complex?/dangerous? How do you think AI has changed your physical health and safety in the workplace/your mental health in the workplace? c) How has AI changed the pace at which you perform your tasks? d) Are there AI systems that continuously monitor aspects of your work? e) Has AI affected your enjoyment of work?

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101 In addition, the government, through the Responsible Technology Adoption Unit (RTA), has a framework for assurance at different stages of the AI lifecycle including compliance and bias audits (https://assets.publishing.service.gov.uk/media/65ccf508c96cf3000c6a37a1/Introduction%5Fto%5FAI%5FAssurance.pdf) alongside global technical standards that can help companies reduce bias, discrimination and privacy infringement.

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107 In addition, the Labour government has proposed creating a Fair Work Agency (FWA) by merging the Gangmasters and Labour Abuse Authority (GLAA), the Employment Standards Inspectorate and the National Minimum Wage Unit. The FWA may also have a role in enforcing fair employment practices and worker rights within the context of AI decision-making, for instance if AI is used in hiring or firing practices that contravene employment law.

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