



HM Treasury

Artificial Intelligence and Growth

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OECD – Korea International Forum on Budgeting

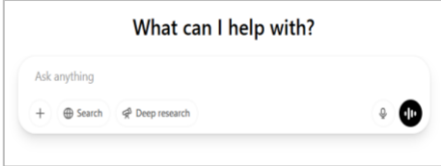
Seoul, 26 September 2025

Where are we now: AI capabilities continue to advance and evolve, enabling automation of increasingly varied and complex tasks

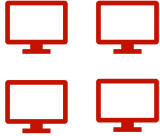


Chatbots

- Smart Q&A systems
- Useful, but limited impact



ChatGPT, Nov 2022



Multimodal models

- Capabilities beyond text
- Understand and process images, video and audio and more to enhance content creation

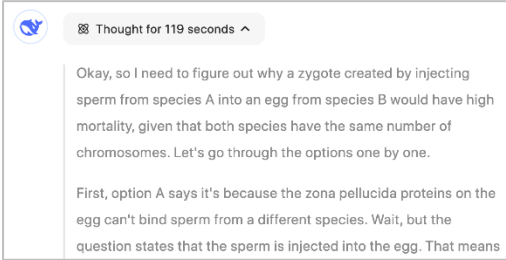


Google Veo, May 2024



Reasoners

- Reason deliberately, then answer
- Break down complex problems into logical steps



DeepSeek R1, Jan 2025



Agents

- Language models equipped with tools
- Can independently accomplish tasks without constant human oversight



Claude Code, Feb 2025



AGI

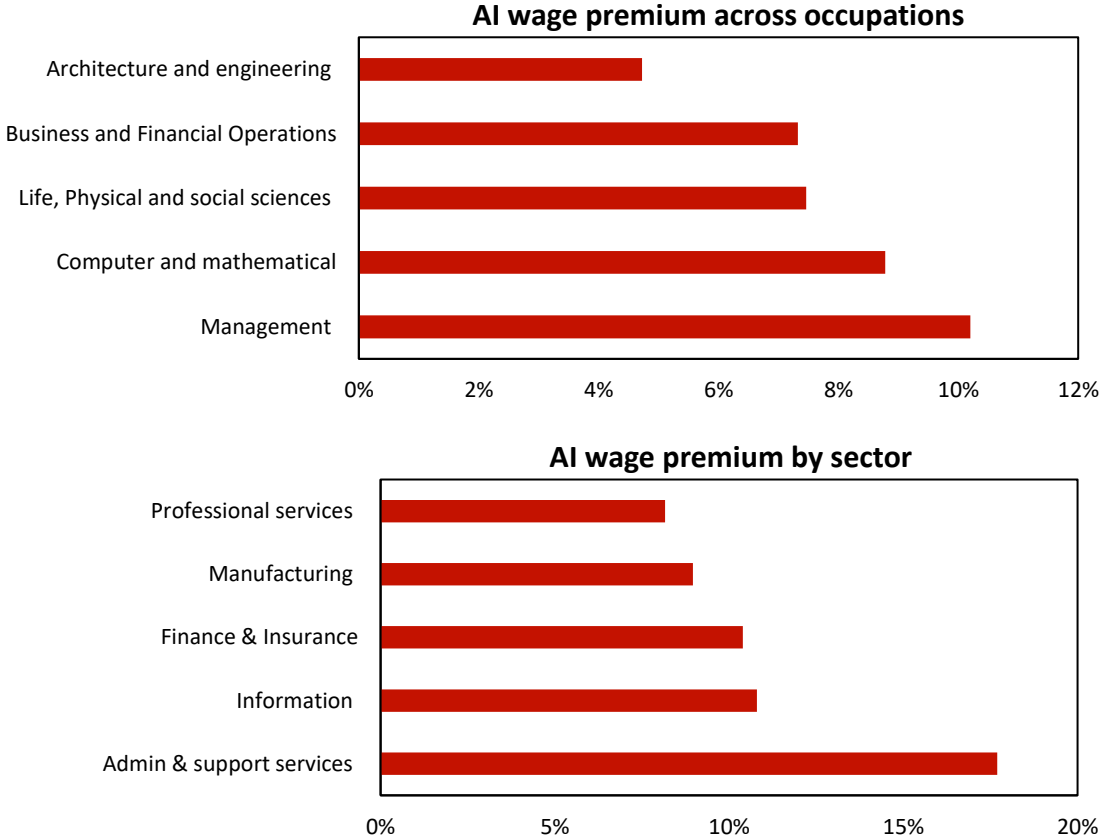
AI CEOs (*Sam Altman – OpenAI, Dario Amodei – Anthropic, Demis Hassabis DeepMind*) are now arguing Artificial General Intelligence (AGI) may be as little as **five years away**.

Current empirical literature on AI shows this could lead to potentially large productivity effects at a task and occupation level

- The literature focuses on **controlled experiments with LLMs** in specific contexts, such as comparing task-completion rates between a group with access to an LLM and a group without:

Study	Findings
Brynjolfsson et al. 2025	In call-centres using AI, productivity rose by 15% as measured by number of customer issues resolved per hour.
Alderucci et al, 2020	Firms that hold an AI patent experience a 6.8% increase in revenue per employee on average for each additional year. Impacts differ by sector, with revenue per employee increasing for services, decreasing for manufacturing.
Peng et al. (2023)	Using GitHub Copilot more than doubled the speed at which coding tasks were completed in a sample of 95 professional software programmers over a time period of 36 days.
Noy and Zhang, 2023	A study of 444 experienced professionals found that ChatGPT could decrease the time taken for mid-level professional writing by 37% and improve output quality.

- The expected productivity impacts may also be reflected in potential wage premium associated with AI skills against those that do not, as reflected in US vacancy data below.



Source: [Alekseeva, 2021](#)

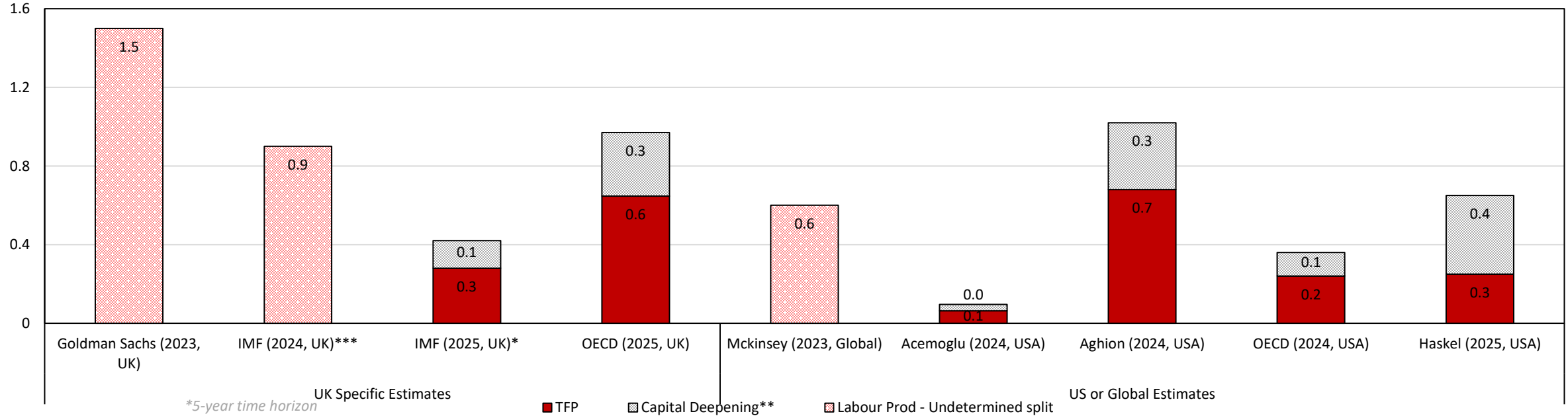
Overall, the literature has converged on a narrower range of estimates, falling between the optimistic early forecasts and Acemoglu’s more conservative predictions

There is a wide spread of estimates across the literature, **although the spread has narrowed over time**. The widely quoted Acemoglu estimate suggests little to no productivity impact from AI over the next years, while Aghion and the OECD both estimate more optimistic gains.

More recent estimates are likely to better reflect AI’s impact given the evolving capabilities of AI models. The pace of AI model development will also impact the scale at which AI contributes to productivity gains, meaning estimates may require further revision over time.

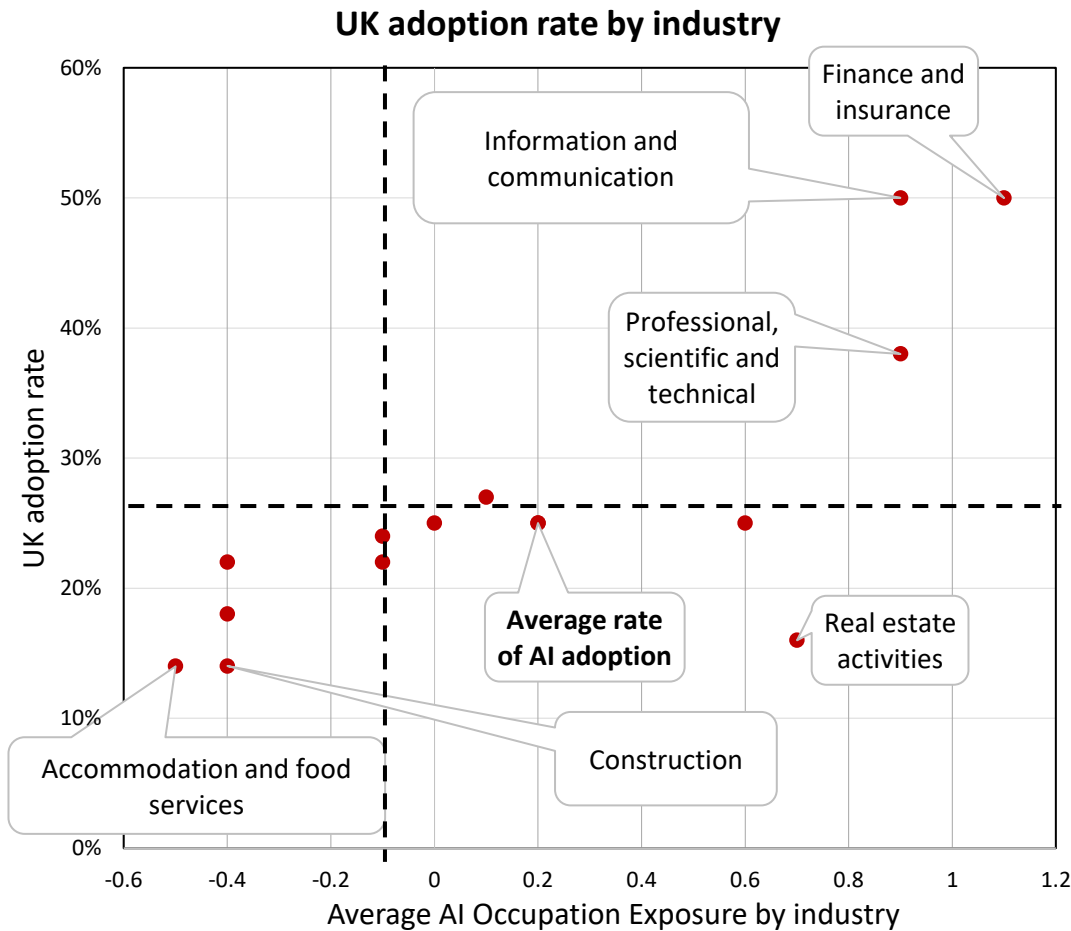
These estimates also do not consider AGI scenarios, with papers such as Korinek et Suh (2024) analysing tech progress scenarios, such as AGI, and their economic impact.

The Estimated Annual Labour Productivity gains from AI over the next 10 years*, by study and publish date



**For papers where a TFP estimate is provided (Aghion, Acemoglu and IMF 2025) a multiplier of 1.5 has been applied to convert TFP estimates to LP estimates. This is consistent with the multiplier used in the OECD’s papers and is based on capital and labour shares of 1/3 and 2/3 respectively.

Adoption of AI will be key if full economic benefits are to be realised – the UK’s strength in the AI sector itself may assist domestic adoption and diffusion



Sources: ONS BICS (Waves 129 & 135, March 2025), DfE

- **Around 21%* of UK businesses are currently using AI**, generally by a small percentage of staff, but on a regular basis.
- **Adoption is higher among larger firms and in sectors that are most exposed to AI**, as well as generally more innovative firms.
- **Adoption barriers include** Lack of awareness, costs, skills and uncertain regulation.

The UK is supporting the growth of the UK’s AI sector through the implementation of the **AI opportunities action plan published in January 2025**

The UK’s **Technology Adoption Review** identified barriers businesses face.

The UK domestic AI sector may help domestic adoption and diffusion of AI technologies:

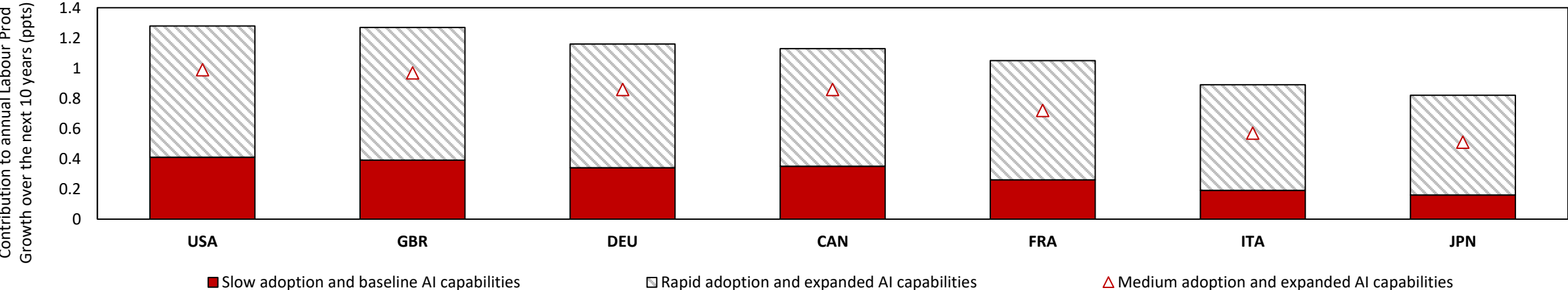
- **The UK is the third largest AI market in the world**, after the US and China.** The UK has strengths in research and early commercialisation of non-Frontier AI.
- **The UK’s AI sector is diverse and growing**, with the number of AI firms almost doubling since 2022 and the GVA of the sector more than tripling.

The OECD accordingly set out that the UK is in a particularly strong position globally to reap the benefits of AI

The OECD’s most recent [paper](#) suggests that the **UK is second in the G7 in terms of its potential productivity gains from the adoption of AI** because of the UK’s sector-composition, current adoption rates and digital infrastructure & skills:

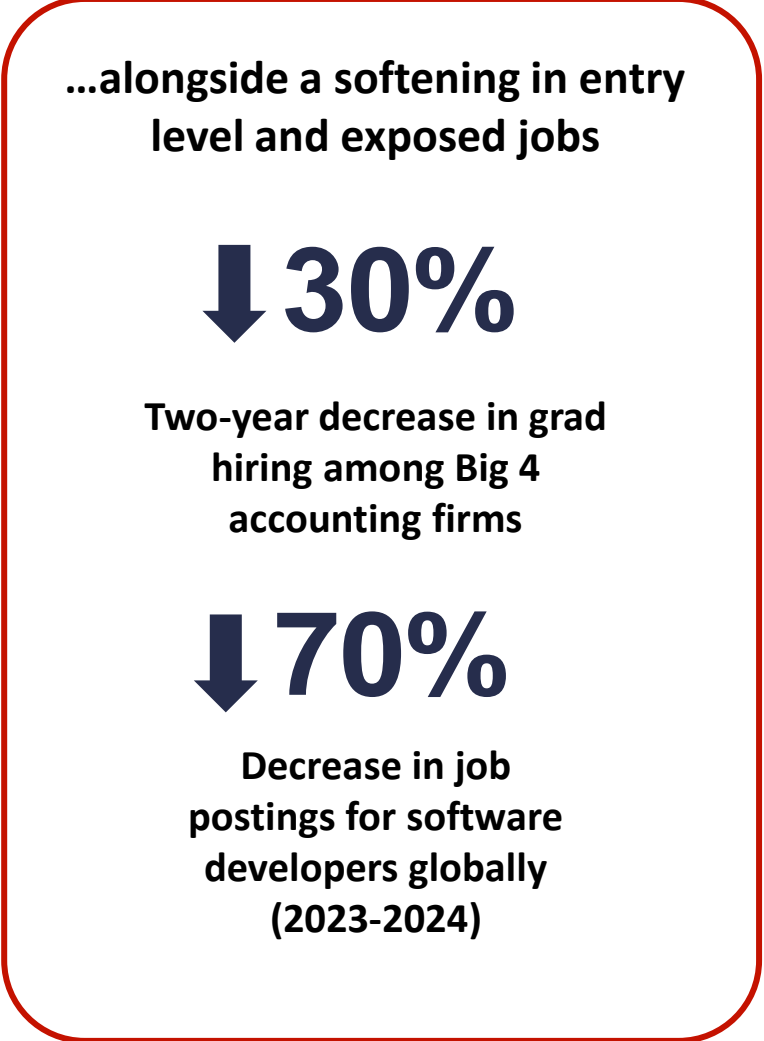
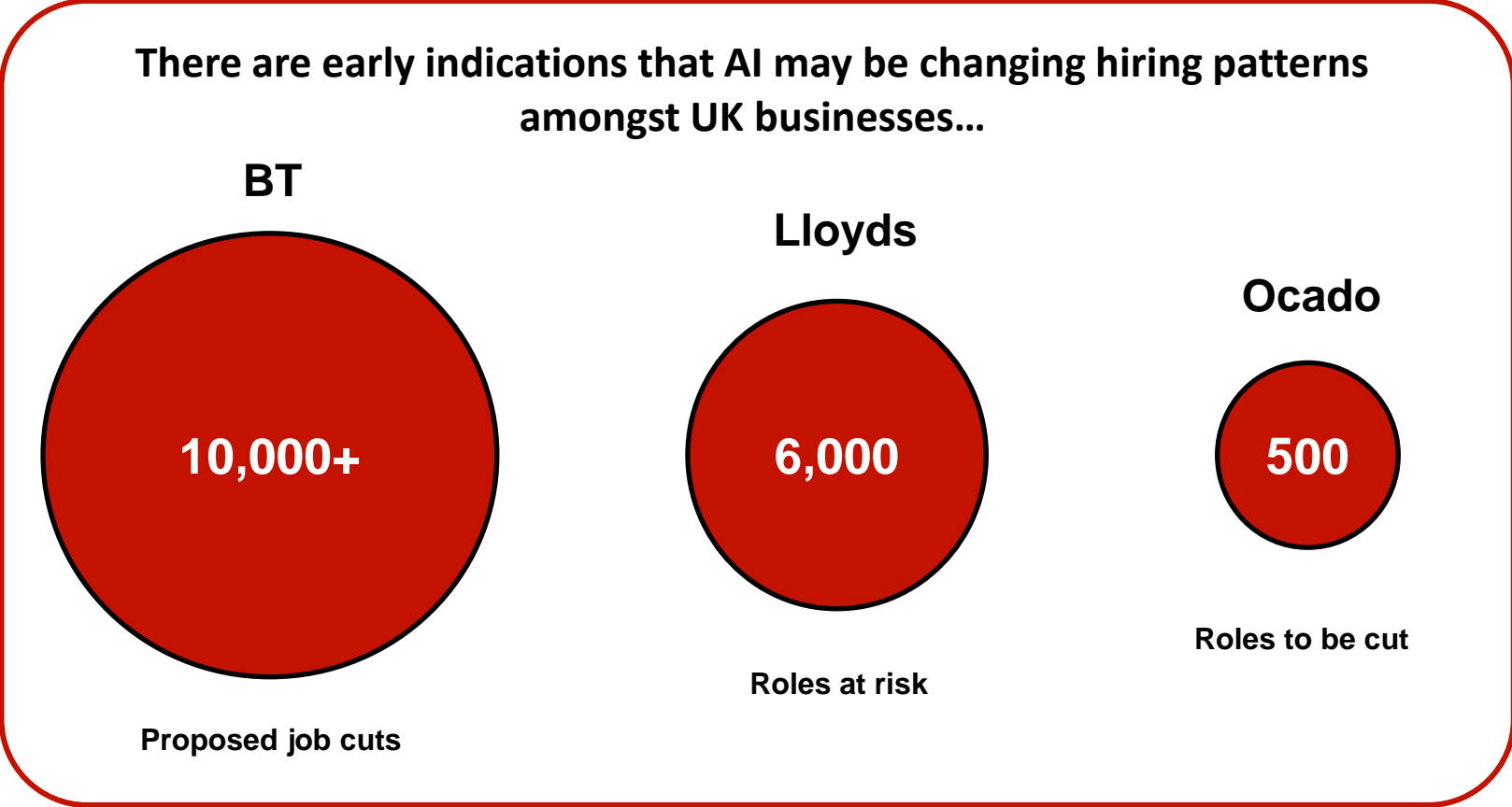
- **The five most exposed sectors to AI comprise 23% of the UK’s sectoral value-added share**, second only to the US (25%) in the G7. These include ICT services, Finance and Professional services. Service-based sectors are particularly well-positioned for AI adoption due to their high levels of digitalisation, data intensity, and reliance on knowledge-based tasks, all of which align closely with AI capabilities.
- According to the IMF, almost **70% of all employment in the UK is estimated as ‘highly exposed’ to AI interaction**.*
- **The UK’s high-intensity AI adoption rate is third highest in the G7**, with current adoption rates the biggest driver of future adoption rates in the OECD’s S-shaped adoption function.
- High adoption rates are positively correlated with digital infrastructure and skills such as internet use, share of STEM graduates, data centres and problem-solving capacity (OECD skills survey), with the **UK performing well in all categories** compared to other G7 countries.

OECD estimates show the UK is in a strong position to see productivity gains over the next decade



The OECD paper takes a two-step empirical approach looking at (i) Sector level TFP gains based on task level exposure and adoption and (ii) aggregates to economy – wide labour productivity where sector gains are weighted by each sectors share of value added in GDP using Hulten’s theorem.







Where are we now: Early adopters are signalling a shift to AI in place of traditional hiring, although the trend remains uncertain



- 1. Tech Radar, 'BT CEO warns greater job cuts could be coming – and it's all AI's fault', 16 June 2025, accessed 25 June.
- 2. CityAM, 'Lloyds places thousands of jobs under review in tech overhaul', 7 February 2025, accessed 25 June;
- 3. The Register, 'BT chief says AI could deliver more job cuts, hints at Openreach sell-off', accessed 30 June.
- 4. The Guardian, 'Ocado to cut 500 technology and finance jobs as AI reduces costs', 27 February 2025, accessed 25 June.
- 5. CityAM, 'Big Four slash graduate jobs as AI takes on entry level work', 23 June 2025, accessed 25 June.
- 6. Talando, 'Tech Labour Market Outlook in 2024-2025', 22 January 2024, accessed 03 July.

The January 2025 AI Opportunities Action Plan outlined the UK's strategy to harness the growth potential of AI

The [AI Opportunities Action Plan](#), published in January 2025, sets out the government's long-term plan for the **UK to realise the opportunities of AI**. It includes measures to:

- | | | | |
|---|--|---|---|
|  | Investment in new public and private AI infrastructure, including the establishment of AI Growth Zones |  | Develop, attract, and retain AI skills, including through new university courses |
|  | Promote the UK's global leadership on AI safety and governance, including through the AI Security Institute |  | Develop flexible and proportionate AI regulation to support AI innovation and protect against risks |
|  | Support the development of frontier AI capabilities, including through the creation of a new Sovereign AI Unit |  | Drive AI adoption across the country in both public and private sectors |

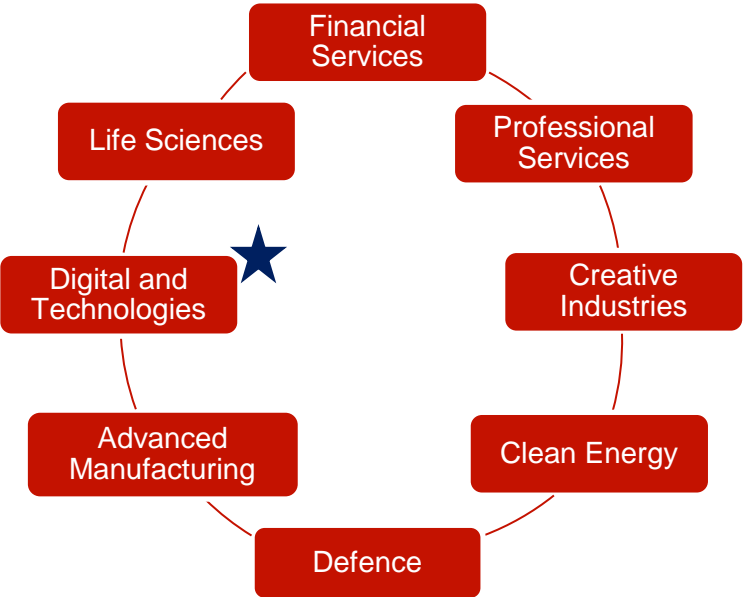
The Spending Review 2025 allocated more than £2bn of funding for AI from 2026-27 to 2029-30, including to:

- Build the UK's sovereign AI capabilities and **back UK AI companies** through the Sovereign AI Unit.
- Fund at least a **20-fold expansion** of the UK's **AI Research Resource**.
- Fund new **AI courses, fellowships** and an **AI talent scholarship**, as well as a new **AI adoption Fund**.

The Sovereign AI Unit as the Industrial Strategy in action

Industrial Strategy

The UK's Modern Industrial Strategy includes **8 sectors** which are key drivers of productivity, innovation, and global competitiveness. AI is a key pillar of the Digital and Technologies sector.



Sovereign AI: preparing for a scenario where AI underpins the UK's prosperity and economic and national security

Sovereign AI Framework



£500m of Funding to:

- Partner with frontier AI companies
- Invest in our own national champions, including through the British Business Bank
- Build on UK strengths to support AI sector growth e.g. Encode Fellowship



The 2025 US-UK Tech partnership



Accelerating AI innovation through:

- Collaboration in the build-out of powerful AI infrastructure and hardware, through promoting U.S. and UK AI exports to offer the full stack of chips, data centres, and models and multi-billion £ investment announcements in AI infrastructure by OpenAI and NVIDIA who announced a commitment to a UK Stargate, Microsoft £22bn, and Google £5bn.
- A focus on the use of AI for R&D, with a commitment to identify flagship R&D collaborations, including in health (biotechnology and precision medicine for cancer and rare and chronic diseases), space and fusion energy and accelerating the application of AI for science, including automated labs and compute collaborations.
- Advancing a partnership between the US Centre for AI Standards and Innovation and the UK AI Security Institute, working towards best practices in metrology and standards development for AI models, improving understanding of the most advanced model capabilities, and exchanging talent between the Institutes.

The Tech Partnership also includes innovation measures on Nuclear and Quantum

Mission: Equip governments with a **scientific understanding** of the risks posed by advanced AI.

Activities



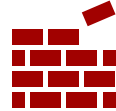
Research

Develop the deepest, most credibly technical understanding of the risks of frontier AI and what we do about them.



Mobilise

Drive agreement around AI risks and encourage the diffusion of effective mitigations across international governments, AI developers, civil society



Build

Create a world-class organisation fit for the challenge and is responsive to ministerial priorities and the fast-changing environment.

Growth



By ensuring the safety of the most powerful AI systems, we can build trust in the technology to drive adoption and harness the benefits of AI across the UK

Successes

Testing

- Evaluated models from **every major developer**

International

- Inspired 10 AISIs worldwide
- Joint testing with **US**. Partnerships with Canada, France, Japan, Singapore and the US. Played a leading role in establishing the **network of AISIs**

Research

- Launch of the **£5 million Challenge Fund** for AI security research
- Publication of **the International AI safety report**, which brings together 100 AI experts to advance international understanding of AI risks
- Published our **Research agenda**, to galvanise other research bodies and drive collaboration on AI security
- Open-sourcing the **'Inspect' testing platform**, an open source evaluation framework to standardise measurement of AI model capabilities

Talent

- Hired over **200 employees, 50% technical staff**, including senior hires from **DeepMind and OpenAI**



Public Sector AI adoption

There are exciting public sector AI use cases in flight...



Department
of Health &
Social Care

New technologies for chest X-Ray and CT scans for lung cancer



Department
for Education

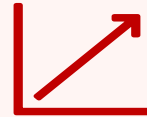
Generative AI and rules-based marking tool showed 92% accuracy

...But there is an opportunity to scale further

Going forward



Spending Review 2025 provides an additional **£1.2 billion investment to drive forward cross-cutting digital priorities** to modernise public services, improve quality and reduce costs. Targeted outcomes include reducing hospital waiting times, making faster planning decisions, and increasing the productivity of the Civil Service.



The **AI exemplars programme will target and scale up the most promising AI use cases in the public sector**. Funding and resources will be allocated based on performance, and re-prioritised where projects are not progressing towards scale or as new opportunities to accelerate AI adoption are identified. By accelerating the adoption of AI in public services, the intended outcomes of this portfolio are to i) deliver better public services for citizens, ii) improve public sector productivity and generate efficiency savings, and iii) build reusable AI capabilities in government. **Promising AI use cases in the exemplars programme include:**

1. **Citizen AI Agents** that will pioneer the use of agentic AI to make it easier for citizens to self-serve
2. **Future Customer Experience exemplar** will test and deploy AI applications in department call centres and case work, to streamline case handling and enhance service delivery.
3. **Government Efficiency Accelerator** will help departments transform their internal operations, employing AI to boost productivity and unlock efficiencies.



Coordinated and rapid action across almost all government departments is necessary to deliver the AI Opportunities Action Plan and continuously adapt to an evolving technology



Coordinated Government Action

Agile governance frameworks have been established to maximise central department oversight of AI workstreams across almost all departments to:

- Ensure coordinated AI initiatives are priorities across departments
- Maintain momentum in the delivery of AI initiatives
- Escalate tensions in policy objectives early on

Breaking Down Siloes

AI policy development and AI adoption in public services require the sharing of expertise, data, and resources between departments to:

- Avoid duplication of efforts
- Share lessons learned between AI adoption initiatives, especially those in large organisations such as the NHS

Central Leadership is Essential to Driving Prioritisation

AI is a priority for the Prime Minister and the Chancellor, ensuring that AI initiatives are prioritised within a challenging fiscal context and amongst competing objectives

Annex A – Economics of AI

At an aggregate level, Acemoglu’s “task-based approach” forms the foundation of today’s widely applied macro-productivity framework...

Timeline of Macroeconomic Literature

2023
Early Estimates

[Goldman Sachs \(2023\)](#) and [McKinsey \(2023\)](#) provided some of the first high-level estimates of AI’s potential impact on long-run labour productivity. **These studies focused on the degree to which AI could augment or replace labour, forming the basis for early quantitative projections** since the emergence of generative tools such as ChatGPT.

2024
Framework Formalisation

[Acemoglu \(2024\)](#) formalised the “task-based approach” for which **estimating the productivity gains of AI adoption in his model requires the estimation of three key parameters**: AI capabilities and scope (task exposure), the AI adoption rate, and the average labour cost savings from AI for each unit of output.

$$\text{Total Factor Productivity (TFP) gains over 10 years} = \text{tasks exposed to AI (Exposure to AI)} \times \text{share of economically profitable tasks exposed (Uptake of AI)} \times \text{Average cost savings from AI (Productivity of AI)} \times \text{AI exposure-adjusted labour share (Labour share)}$$

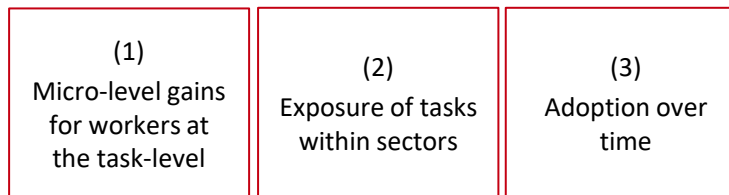
2024 -2025
Further Refinement

OECD ([2024](#), [2025](#)) and [IMF \(2025\)](#) refine the approach by providing their own assessments of the parameters and expanding the analysis to consider the growth impacts across countries. The OECD focused on deriving the **sector-level productivity gains** from AI adoption and then **aggregating** these to the macro level.

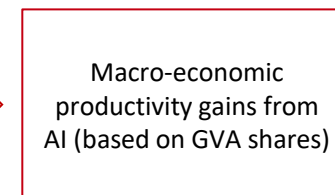
[Aghion \(2024\)](#) follows Acemoglu’s approach but provides an alternative view to what reasonable assumptions are for the key parameters based on his readings of the literature e.g. exposure of AI.

While similar to Acemoglu’s framework, the OECD do not downscale their estimate by the labour share

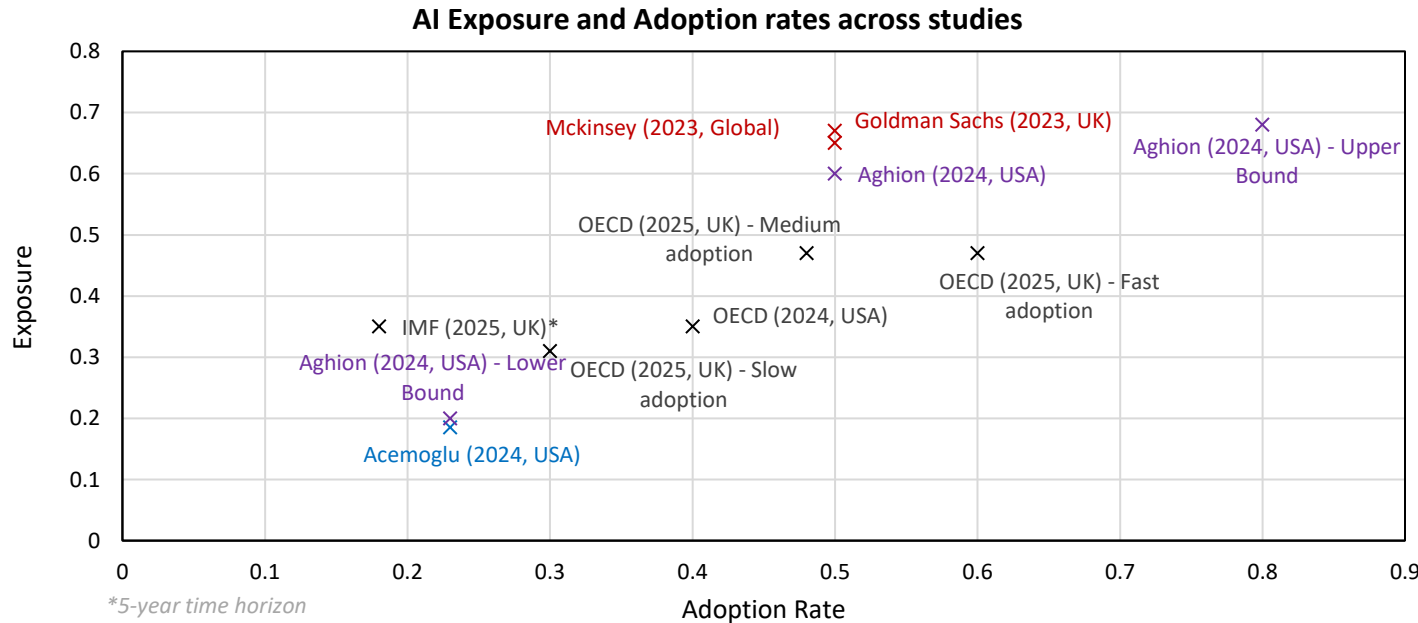
Step 1: Deriving sector-level productivity gains



Step 2: Aggregating to the macro-level



...with the assumptions of these key parameters within the framework the main drivers of variation across the literature



Approach (Region)	Exposure to AI	Uptake of AI	Micro-Productivity gains / Cost savings from AI	Labour share	Annual TFP gains (ppt)
IMF (Europe)*	0.35	0.18	0.27	0.53	0.28
OECD (UK)	0.47	0.48	0.3	N/A	0.26 – 0.62
Acemoglu (US)	0.20	0.23	0.27	0.536	0.066
Aghion (US)	0.60	0.50	0.40	0.57	0.684

A few of the figures for IMF and OECD – in particular, the exposure estimates and OECD’s uptake figure – are not explicitly provided in their papers. The OECD 0.48 uptake figure was obtained by reading a graph in their paper. The 0.35 (IMF) and 0.47 (OECD) exposure figures come from Eloundou et al. 2023/24, which both papers cite for their estimates. Since Eloundou et al. include multiple figures, the values we reference in the table represent our best judgment of which figures each paper (IMF/OECD) was using based on their descriptions.

- **Early estimates** both the private sector in 2023 were optimistic about the rate and scale of AI adoption across developed economies.
- **Acemoglu (2024)** is more pessimistic with his predictions, assuming it would be unprofitable to adopt AI in most instances and that it will have fewer applications in the workplace.
- **Aghion (2024)** argues the cost of AI technology will fall over time while Acemoglu’s estimate assumes it will not. This assumption leads to Aghion’s 0.5 adoption rate.
- Since Acemoglu (2024), new estimates from the **IMF (2025)** and **OECD (2024, 2025)** have been more optimistic, although they are still more conservative than the upper estimates of the early papers.

- Different assumptions lead to significant final productivity estimates. Aghion’s results suggest a TFP increase 10 times larger than Acemoglu’s.
- **Acemoglu’s estimates are likely underestimating AI’s impact on productivity due to:**
 - Assuming the proportion of profitable tasks will remain constant over 10 years.
 - Using an adoption parameter based on computer vision rather than the broader generative AI landscape.
 - Not considering UK-specific exposure analysis such as [Pizzinelli \(2023\)**](#).

* 5-year time horizon

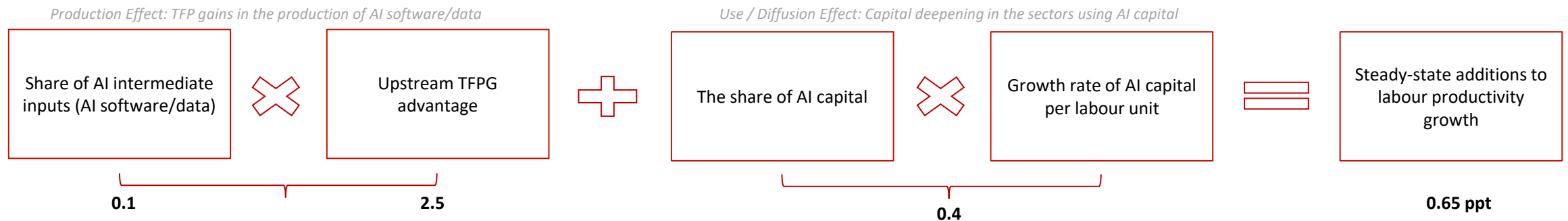
**Based on [Felten et al. \(2021\)](#) Exposure Measure. Acemoglu used sub-indicator from [Eloundou et al \(2024\)](#) which sets a higher bar for AI exposure

Haskel, in his forthcoming paper, goes further than current estimates by considering AI as an “invention in the method of invention”

Haskel argues that both ICT and deep learning should be understood not only as GPTs, but also as inventions in the method of invention (IMIs). **IMIs enhance the productivity of R&D itself, accelerating the pace of innovation and impacting productivity growth.** His analysis complements studies like Acemoglu (2024) and the OECD (2024, 2025), by asking: **What happens to the numbers if we take the extra step and treat AI as a force that improves the process of innovation itself?***

- While Acemoglu (2024) and the OECD focus on the TFP improvements in all the various sectors across the economy, Haskel also considers the capital deepening effects arising from those TFP improvements.
- Haskel, building on Crafts (2003), looks at the growth impacts of previous GPTs based on a two-sector model with TFP gains in the production of the good and capital deepening across sectors using the good.
- For AI, Haskel adds in an intangible production sector, with the combined productivity growth the combination of TFP gains in the upstream sector producing intangible goods (“AI goods”) plus capital deepening in the downstream sector comprised of firms using the intangible AI goods (diffusion effect).

Haskel’s current estimate for AI’s future labour productivity contributions



Haskel believes AI labour productivity contributions will be large due to AI being both a GPT and an IMI and because the AI intangible sector (software and data) already has a large production and income share (10%) versus previous GPTs (ICT, Steam).

Annex B – AI Opportunities Action Plan Implementation

Laying the foundations for AI

Investing in the enablers...

The UK has developed a 10-year long term compute plan, and is taking actions to:

- Expand **public compute** twentyfold by 2030
- **Accelerate the buildout of private infrastructure**
- Develop **international partnerships**

The **National Data library** will work to develop **high-impact public data sets** for AI researchers and innovators

DSIT has established the **Spärck AI Scholarship programme**, expanded existing **AI fellowships**, and **will review future AI skills requirements**

Ensuring a pro-innovation regulatory environment...



Securing the future through a new Sovereign AI function

Sovereign AI has the mandate to strengthen the UK's capabilities:

- **Investing in UK companies** to support AI national champions.
- Exploring **making available high-potential data sets** for partnered companies, in coordination with the National Data Library.
- **Supporting top AI talent** to relocate to the UK to work with UK-based partnered companies.
- **Building relationships with Frontier AI companies** to ensure the UK public and private sectors have access to cutting edge technology

The function is supported by advice from experts

- Matt Clifford has advised the Prime Minister on AI opportunities
- Nobel Prize-winner, Sir Demis Hassabis is also providing expertise to the government



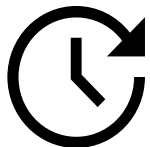
Progress in delivering the AI Opportunities Action Plan

Delivered



- First **AI Growth Zone** selected and applications for new zones launched
- New **funding secured** for European Research collaboration through EuroHPC
- Partnership with **Anthropic, Cohere, Nvidia, and OpenAI** announced
- Established and hosted the first two meetings of the **AI Energy Council**
- Seed investment for the **OpenBind consortium** which will create the largest protein-ligand structural dataset in the world
- Published a 10-year **National Compute Roadmap**
- Launched Edinburgh as the first **National Supercomputing Centre**
- The **Isambard-AI supercomputer** is fully operational

To be delivered
in 2025



- Select new AI Growth Zones
- Begin procurement to expand the AI Research Resource
- Identify 5 high impact public data sets through the National Data Library
- Deliver AI parts of the Industrial strategy