

Greenwheel Insights

Distortion in the machine: Four new AI considerations for investors



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Executive Summary

Over the last year, the AI landscape has evolved rapidly as systems are embedded in businesses, labour markets, and infrastructure. This has led to new forms of governance and social risks and impacts for investors.

In the world of work, AI is automating and augmenting roles. In some sectors, especially services such as tech and customer support, businesses are using AI as a rationale for workforce reductions, often without clear productivity gains and despite damage to employee morale and disruptions to talent pipelines. Some companies are already rehiring once the limits of AI systems become apparent.

So far, there is a mismatch between leadership enthusiasm and the reality for employees across companies. Businesses that do not adopt a human capital-centric and social lens to AI will see AI's benefits remain unevenly distributed by age, gender, geography, and seniority. Even with more powerful AI systems through the advent of agentic AI, AI governance is a necessity rather than a technical add-on.

To meet the global demand for AI systems, data centres are being quickly deployed, particularly in the United States. The lack of community consultation and mitigation measures taken to address the environmental and social impacts of data centres have led to significant backlash. In Q1 2026, 75 projects worth around US\$130 billion in planned construction were blocked or delayed because of local opposition; this is roughly the equivalent of the total delays in the entirety of 2025.

Regulation is beginning to catch up to manage the risks posed by AI development and deployment. As China and the European Union continue to lead the way with innovative AI laws, some emerging markets are following suit in adopting a risk-based approach to AI regulation. In the United States, given the severe environmental and social impacts of data centres, some states are proposing bills to protect communities from absorbing the negative externalities of existing and new projects.

Against this backdrop, this piece provides investors with a summary of the four key developments in AI:

1. The rise of agentic AI
2. The emerging regulatory landscape
3. The impact AI has on the world of work
4. The new risks posed by data centres

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Distortion in the machine: Four new AI considerations for investors

A year ago, we wrapped up our AI series mapping out the environmental and social impacts across the AI value chain and developed the Greenwheel Responsible AI Toolkit for deployers and developers.

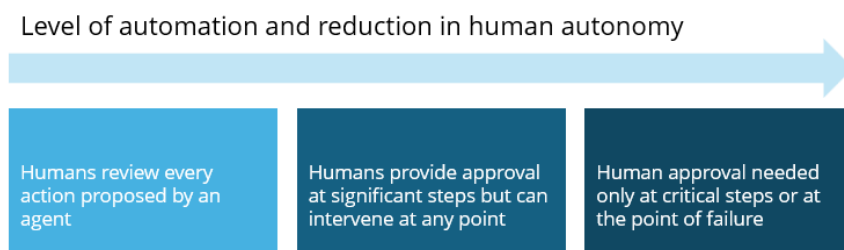
Over the last year, the AI landscape has evolved rapidly alongside a more volatile geopolitical environment. Against this backdrop, I have identified four key developments for investors to consider: (1) the rise of agentic AI, (2) the emerging regulatory landscape, (3) the impact AI has on the world of work, and (4) the new risks posed by data centres.

1. From GenAI to agentic AI: more capabilities, more risks to mitigate

Agentic AI is an AI system that has a certain degree of **independent planning, decision-making, and action-taking to achieve a user-defined goal**. Unlike generative AI, which primarily responds to individual prompts, agentic AI can break goals into subtasks, sequence them, and interact with tools or systems to complete multi-step workflows.¹

Because these models are designed to reason, plan, and use tools (e.g., other agents), agentic AI can complete more complex tasks than systems that only generate content. The level of an agent's autonomy depends on how it is instructed and how much human involvement is built into the process, such as whether humans review every action, approve key steps, or intervene only at critical points (Figure 1).²

Figure 1: Automation and human autonomy in agentic AI



Source: [IMDA, 2026](#); created by author. The information shown above is for illustrative purposes.

Agentic AI can pose new risks to businesses and investors. For investors, this translates into heightened exposure to operational, regulatory, and reputational risks, as well as adverse human rights impacts when autonomous systems act without meaningful oversight. Agentic AI may misinterpret a user's intent due to semantic misalignment or hallucinations. Agentic AI may make errors by using the wrong tools or pulling the wrong inputs as part of its decision-making. Because agents can chain multiple tools and actions, they can exacerbate existing AI human rights risks. Agents may take actions that lead to unfair outcomes as they replicate biases, but depending on the level of human autonomy assigned, decisions with biases may be made without the appropriate level of human intervention (e.g., hiring decisions). As agents have greater access to sensitive systems

and data, agentic AI also increases the risk of being manipulated in leaking or wrongly modifying data.³

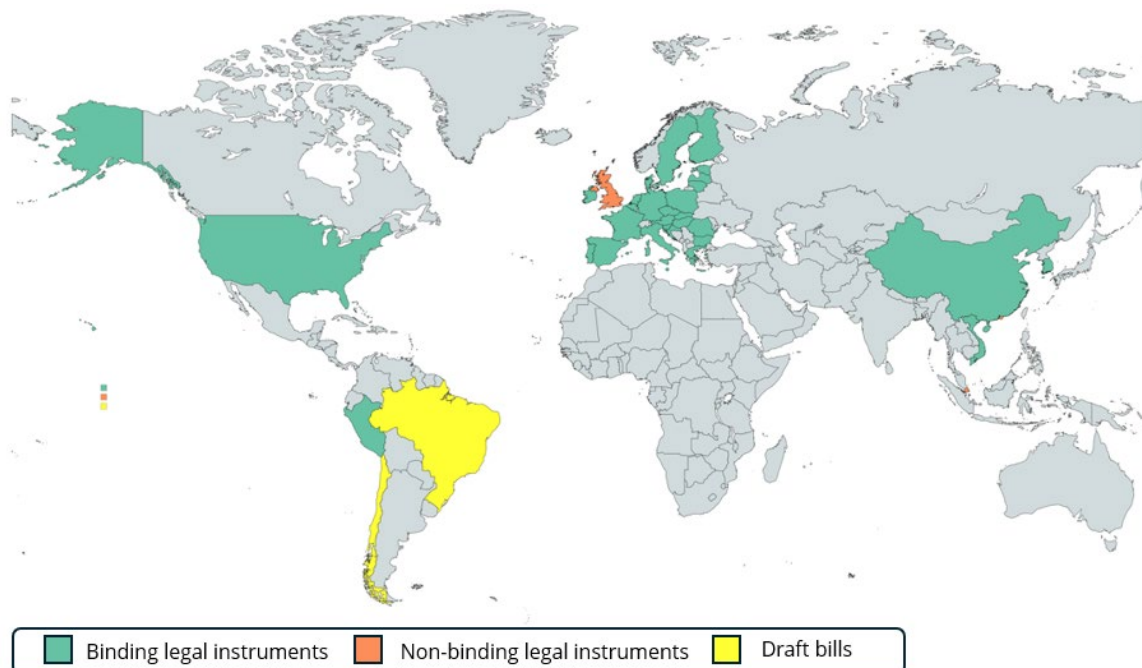
Relevance for investors

For investors and businesses, **the expectations for responsible development and deployment of agentic AI will go beyond publishing model cards or high-level explanations:**

- **Risk mapping:** Prior to the deployment of agents, organisations are advised to map the risks and potential impacts and identify checkpoints or action boundaries that require human approval (i.e., high-stakes actions and decisions, irreversible actions, outlier or atypical behaviour, and other user-defined metrics).⁴
- **Agentic AI governance:** Organisations should have a clear policy on the use of agents including clearly defined limits and permissions. Accountability should be assigned across the agent value chain and lifecycle.⁵
- **On-going monitoring:** Before deployment, organisations should test for baseline safety and reliability. After deployment, organisations should continue monitoring performance and efficacy. Similar to other AI systems, the error rates and mistakes should be tracked.⁶
- **AI labelling and explaining the use case:** Deployers will need to clearly define when an agent is acting, the authority provided to the agent, the data agents have access to, and the level of human intervention.
- **Enabling human oversight:** Human oversight needs to be active and meaningful.⁷ To ensure that oversight is meaningful, users should be trained in understanding the risks, relevant use cases, common failures, and agent limitations.

2. Most countries are moving towards regulations on responsible AI development and deployment

Figure 2: Major changes in AI norms since May 2025



Binding legal instruments



China

China has issued a series of interim measures to regulate AI anthropomorphism to address risks related to human-like AI systems including liability provisions and safety requirements. This regulation applies to AI systems that offer “continuous emotional interaction”, extending specific protection to vulnerable groups, including children and older persons.



South Korea

The AI Basic Act governs the development, deployment, and use of AI systems. Under this regulation, the Ministry of Science and Information and Communication Technology is responsible for setting the national AI strategy and overseeing safety. Transparency and safety duties are imposed for high-impact AI systems deemed to have significant societal risks.



Vietnam

The Artificial Intelligence applies to all organisations and individuals participating in AI-related activities in Vietnam across the value chain (e.g., developers, providers, deployers, and users). The law introduces a risk-based framework, placing additional obligation for high-risk AI systems on transparency and labelling, incident detection and reporting, mandatory conformity assessment, and ongoing risk management. The regulation prohibits AI systems for unlawful purposes or for manipulative and deceptive practices that cause serious harm.



European Union

To support the EU AI Act, the EU launched the Code of Practice on Transparency of AI-Generated Content, which sets parameters on the marking and detecting AI-generated and manipulated content for providers and the labelling of deepfakes and AI-generated and manipulated text for deployers. The EU developed the Whistleblower Tool to allow individuals to report harmful practices and identify potential violations that could endanger fundamental rights, health, or public trust. The Tool may increase compliance pressure for businesses that may need to respond to submissions.



Peru

Regulation of Law No. 31814 takes a risk-based approach to AI and establishes prohibited practices and mandatory human oversight for high-risk uses. The Regulation sets obligations across four thematic pillars of risk management and prohibited uses; transparency and explainability; privacy and data governance; and security, audit, and lifecycle controls.



United States (Federal)

Federally, the Executive Order 14365 directs federal agencies to review and potentially challenge state AI laws that are considered overly excessive. Under the Executive Order, AI is classified as a matter of national security issue.


United States (California)
 California's Transparency in Frontier AI Act requires GenAI developers to publish public, high-level summaries of the data and processes used to train public-facing systems.


United States (New York)
 The Responsible AI Safety and Education Act sets basic safety and security requirements for developers of "frontier models". Focusing on the largest developers, the Act ensures accountability through risk mitigation, establishing robust safety protocols, and transparent incident reporting.


United States (Texas)
 The Responsible AI Governance Act sets disclosure requirements, use-case limits, and safety measures for developers and deployers. The Act prohibits the AI systems that manipulates human behaviour, violates constitutional protections, discriminates unlawfully, and develops and distributes sexually explicit content.

Non-binding legal instruments


Singapore
 The Infocomm Media Development Authority released its Agentic AI Governance Framework to support safe adoption structured around four pillars of upfront risk assessment, clear human accountability, technical controls and processes, and end-user responsibility. The framework identifies unique risks posed by Agentic AI including erroneous actions, unauthorised access, biased outcomes, and unintended system level effects.


Hong Kong
 The Digital Policy Office published a guideline providing practical guidance and recommendations to developers, service providers, and service users of GenAI. The guideline covers key governing principles such as security and transparency, accuracy and reliability, fairness and objectivity, and practicability and efficiency.


United Kingdom
 The UK Government's AI Strategy strengthens its position on AI through increased investments across six priority areas of technology development; transforming research through AI; developing AI skills and talent; accelerating innovation for societal benefit and economic growth; promoting responsible and trustworthy AI; and, building world-class AI data and infrastructure.

 The Office of Communications released guidance on applying the Online Safety Act to AI chatbots covering user-to-user services, search services, and adult-content services.


European Union
 The European Parliament adopted a series of recommendations to strengthen transparency and copyright protection in generative AI. This includes new obligations for AI developers such as mandatory disclosures on all copyrighted works used in the training of AI systems and detailed record keeping on data crawls. For creators, the proposal seeks to provide fair remuneration to creators for both future and past use. A broad flat-rate training license is explicitly rejected under this proposal. News media have the ability to opt out of having their content used for AI training.

Draft bills


Brazil
 Brazil's Bill No. 2338/2023 adopts a risk-based structure similar to the EU AI Act. The Bill includes a dedicated chapter on human rights. The Bill is currently under debate in the Chamber of Deputies.


Chile
 Chile's Bill No. 16821-19 is explicitly based on the EU AI Act, importing the same risk-tier classification (unacceptable, high, limited, no evident risk). It has been approved by the Chamber of Deputies and is currently under discussion in the Senate, in second constitutional review.

Source: [Derbyshire, 2026](#), [European Innovation Council and SMEs Executive Agency, 2026](#), [European Parliament, 2026](#), [Eversheds Sutherland, 2026](#), [Gong and Wang, 2026](#), [Regulations.AI, 2026](#); created by author. The information shown above is for illustrative purposes.

Emerging markets are taking the lead in moving beyond ethical principles on AI to governance frameworks.⁸ This is observed across many emerging markets that are early adopters of AI regulations. China continues to adopt groundbreaking regulations to address the harms, including mental health harms, presented by anthropomorphic interactive services as part of its national AI governance framework. Brazil, Chile, Peru, and Vietnam are following in the footsteps of the European Union in adopting a risk-based approach to AI governance, setting more onerous obligations for high-risk systems and outlining clear prohibited uses for development and deployment.

Following its Continent AI Strategy in 2024, the **African Union has been building out a broad set of digital policies** signalling non-binding mandates on AI.⁹ Although the region has yet to see its first binding AI regulation, there is recognition of the challenging landscape for policy intervention to tackling low internet usage and access to electricity that can stymie the full realisation of its AI-led digital transformation.

The **EU is further strengthening its rollout of its landmark AI Act** through guidance on transparency in relation to AI-generated content and disclosures on the use of copyrighted material. The rollout of the EU AI Whistleblower Tool aims to increase compliance pressure for businesses that may have to respond to whistleblower submissions and regulatory follow-up.¹⁰

Unlike the European Union, **the UK has shied away from developing a comprehensive single regulation on AI** and continues to maintain a “pro-innovation” approach through the launch of its AI strategy and governing AI through existing regulations (e.g., GDPR and UK Data Protection Act, Data (Use and Access) Act).¹¹

Contrary to the global pattern, at the federal level, **the United States is attempting to roll back existing AI regulations** established at the state level through its recent Executive Order. Meanwhile, states such as California, New York, and Texas maintain the momentum seen in other states such as Colorado in adopting their own regulations for the safe and responsible development and deployment of AI systems.

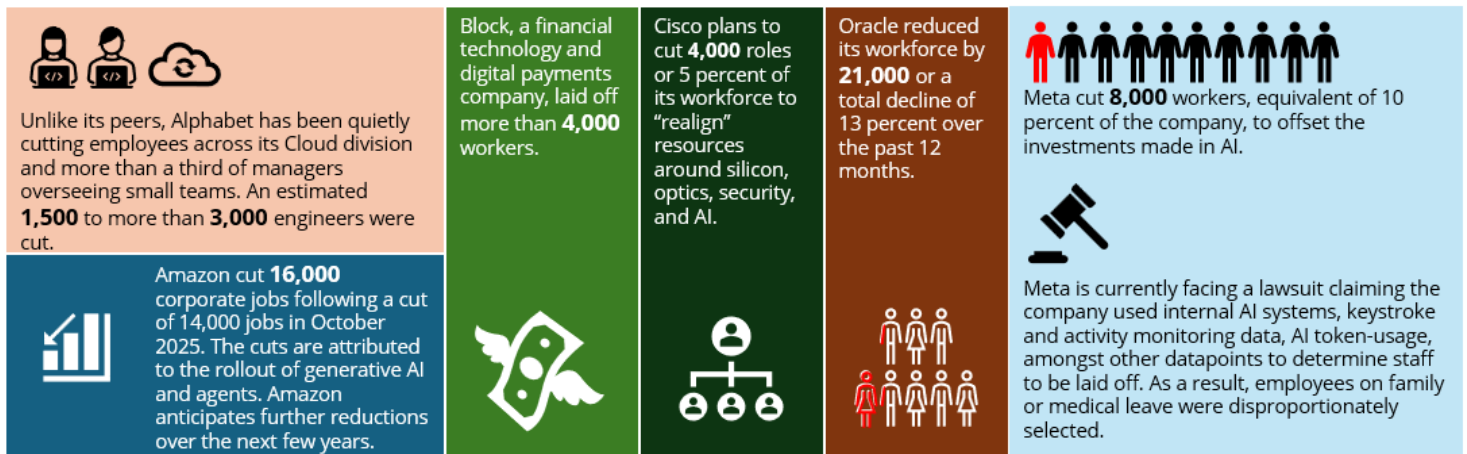
Relevance for investors

For investors, the **divergence in regulatory regimes can pose compliance-related risks for portfolio companies** developing and deploying AI systems. As seen in the trends developing across multiple markets especially in emerging markets, AI governance is no longer optional and should be embedded as part of core risk management processes. Although there are differing levels of alignment with international norms, upholding best practices as espoused by the OECD AI Principles and UNESCO's Recommendation on the Ethics of Artificial Intelligence can help ensure that businesses are ahead of future regulatory movements.

3. AI and its impact on the world of work

AI is changing the world of work, from augmentation to automation.¹² Since 2025, companies across multiple sectors have reduced headcount due to AI adoption. The **tech sector has been at the forefront of AI-related layoffs both in absolute numbers and explicit links to AI as a driver**. The layoffs span across fintech and e-commerce and software companies, totalling at least 140,000 tech roles in 2026 alone (Figure 3).¹³

Figure 3: Snapshot of AI-related layoffs in 2026



Source: [Bellan and Loizos, 2026](#), [De Neve et al., 2026](#), [Mansoor, 2026](#), [Ortutay and Olson, 2026](#), and [Kaye, 2025](#); created by author. The information shown above is for illustrative purposes.

Although the tech sector is at the heart of the AI-related layoffs, **other sectors are seeing staff reductions as a result of the rollout of AI**. Banks are reducing their graduate intakes by cutting their junior analyst classes by as much as two-thirds. Banks are implementing AI in functions such as customer service, transactions, and trade monitoring.¹⁴ In manufacturing, General Motors eliminated between 500 to 600 jobs, which it partly attributed to the transformation of its information technology organisation.¹⁵

Some experts argue that while reducing headcount can bring short-term gains, these **gains may not offset long-term reductions in profitability** as a result of the adverse impact on staff well-being, lower worker engagement, disrupted talent pipeline, potentially higher recruitment and training costs, and missing out on unlocking future augmentation opportunities.¹⁶

Some experts expect companies to backtrack and rehire, which can be a more expensive process. The rehiring pattern is observed in the instance of Klarna, where the company eliminated approximately 700 customer service positions that were replaced by an AI assistant built on OpenAI. Following significant customer complaints over the robotic responses and response loops, the company began to rehire students and rural workers for remote and flexible customer service roles.¹⁷ The scale of rehiring can be impactful, as Gartner's study estimates that by 2027, 50 percent of companies that have

headcount reductions as a result of AI will have to rehire staff to perform similar functions but under different job titles as organisations encounter limits to AI systems.¹⁸

For companies that are using AI to automate and augment roles without significant redundancies, there is a **mismatch between how senior leadership views AI compared with employees**. A Columbia University survey found that 76 per cent of executives believed that their employees are enthusiastic about AI adoption. In contrast, 51 per cent of middle managers and only 31 per cent of individual contributors (employees without managerial responsibilities) agreed. While 80 per cent of senior leadership feel that employees are well-informed about their organisational AI strategies and tools, 58 per cent of middle managers and only 29 per cent of individual contributors share this view.¹⁹

Employees share concerns regarding AI adoption in their workplaces. A survey of 1,000 workers in the United States found that 59 per cent of workers believe that their employers will use AI to reduce jobs and cut costs in 2026. Of the workers surveyed, 33 per cent feel somewhat or very positively about the deployment of AI in their day-to-day work²⁰ In another survey conducted in Canada, the United Kingdom, and the United States, 40 to 50 per cent of workers across retail and professional services believe that the company adoption of AI undercuts their job security and that they are forced to use AI rather than encouraged.²¹

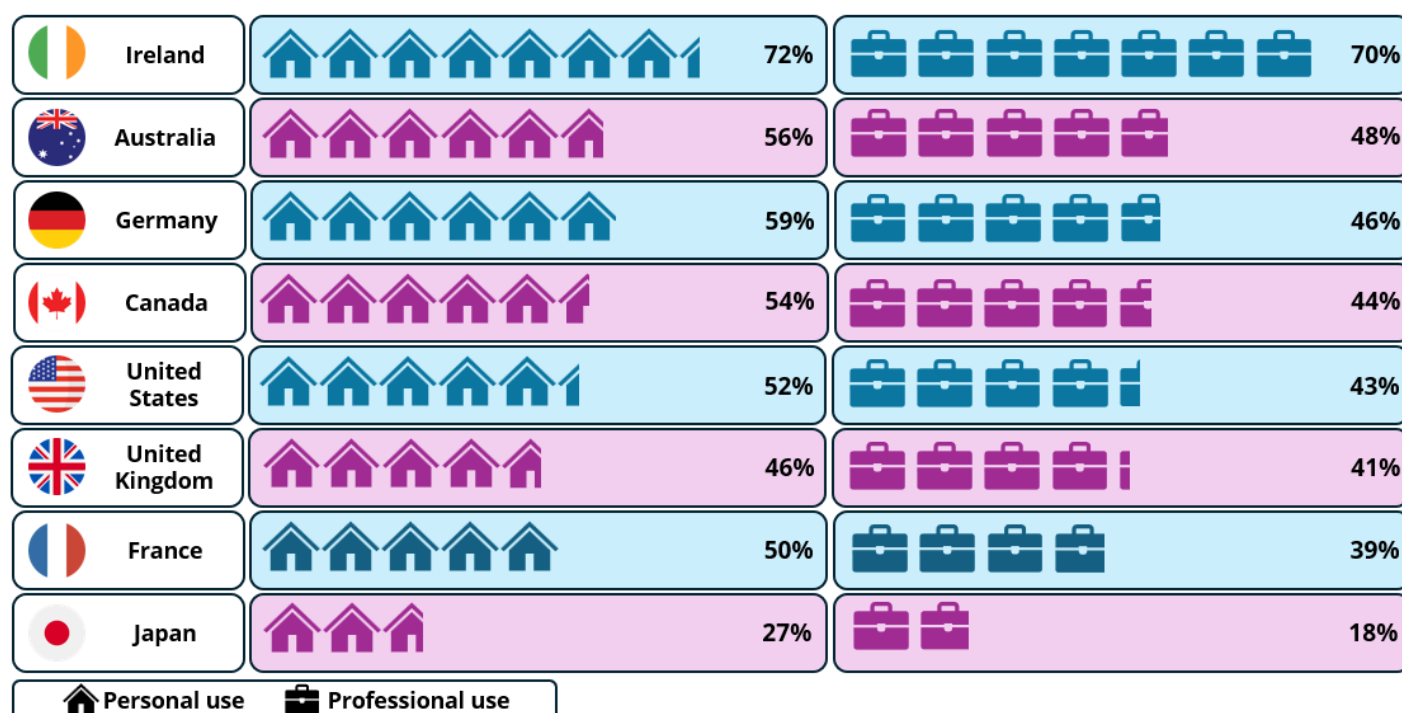
There are emerging gender gaps in AI deployment across workplaces. Overall, men are 22 per cent more likely than women to report using AI.²² Another study found that on average, women use GenAI for approximately 17.5 minutes fewer than men in the workplace.²³ While a handful of studies highlight exceptions showing a significantly smaller gap in AI usage, the bulk of existing research flags the gender disparity.²⁴

The gender gap in AI adoption can be explained by several factors. Firstly, adoption gaps reflect the existing self-reported knowledge, familiarity, and confidence gap in using GenAI amongst women and men.²⁵ Secondly, there may be differences in how women and men perceive the usefulness and benefits of GenAI for productivity gains.²⁶ Thirdly, women are more likely to see the risks related to AI adoption than men, including adverse impacts on privacy, mental health, and climate, amongst other risks.²⁷

Without adequate workplace policies to support the successful rollout of AI, **existing gender gaps may be exacerbated**. Gender gaps may reduce opportunities to boost productivity and innovate. As the digital divide further widens, women may lose out on opportunities for future promotions.²⁸

In addition to the gender divide, **AI adoption varies significantly by region** (Figure 4). Based on data from 2025, Ireland sees the highest share of employees using AI at work, far outpacing the average of approximately 44 per cent across eight countries. By contrast, AI adoption at work is very low in Japan, as only one in five employees are using AI at work. Across all countries, employees are more likely to adopt AI personally than at work, with the biggest gaps in personal and professional use in Germany (13 percentage points), France (11 percentage points), and Canada (10 percentage points).²⁹

Figure 4: AI adoption varies across countries



Source: [Hiring Lab, 2025](#); recreated by author. The information shown above is for illustrative purposes.

On average, **one in four workers feels disengaged from AI**. For older workers in the United Kingdom, 50 per cent of workers aged 55 or older feel disengaged when compared to young workers between the ages of 18 and 24, where 40 per cent feel disengaged. Youth disengagement is highest in the United States (over 40 per cent), United Kingdom (40 per cent) and Japan (37 per cent).³⁰

Despite the disengagement, across the eight countries surveyed, **81 to 96 per cent of AI users reported saving at least an hour a day using AI tools**. In Ireland where AI adoption is high, workers self-reported saving three or more hours daily. Benefits are not equally experienced, as 20 per cent of AI users in the United Kingdom reported no time saving at all.³¹ This is backed by a growing body of academic evidence that shows that in some contexts, AI can improve productivity in tasks that are structured, language heavy, or supported by clear feedback loops.³² For instance, the automation of workflow processes across legal, sales procurement, customer experience, human resources, and information technology functions can lead to time savings.³³

However, **where AI tools are poorly matched to the tasks, productivity gains are marginal or even negative.**³⁴ A Bain study on AI budgets and ROI across 951 global companies showed that 40 per cent of companies measured AI cost savings of below 10 per cent. AI's underperformance is partially explained by data access and interoperability, compliance (data privacy), and competing business priorities and needs. Despite the gaps, 90 per cent of the surveyed companies seek to increase their AI budgets.³⁵ Some experts believe that the low productivity gains so far are explained by the fact that organisations are absorbing the initial costs of adopting AI before larger productivity gains manifest.³⁶

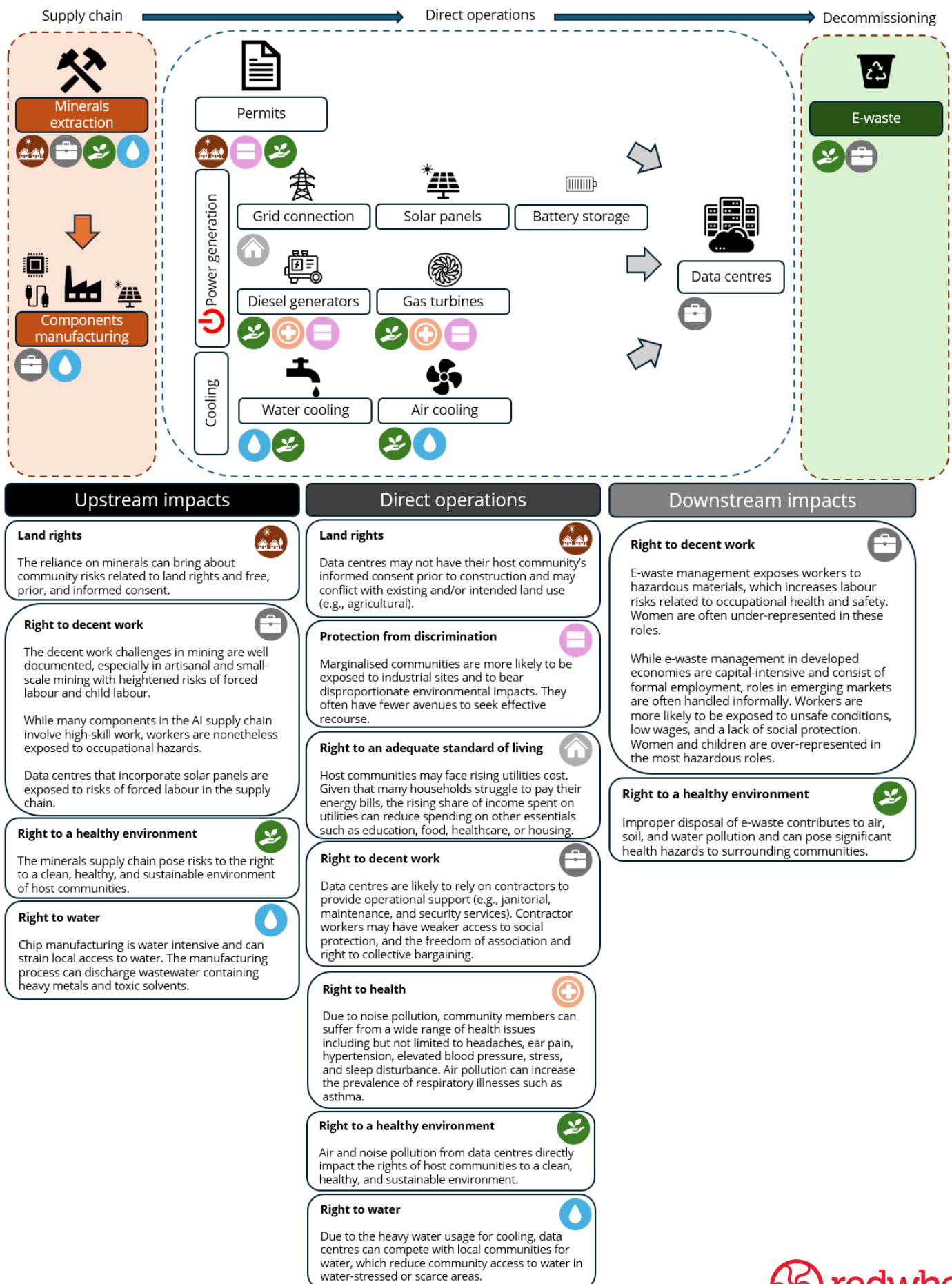
Relevance for investors

Investors should be cautious of the workforce impacts of AI deployment. Particularly, investors should consider the following factors:

- **Short-term gains but long-term pains:** Companies are quick to reduce headcount on the promise of AI efficiencies and productivity gains. So far, the return on investment is modest. What is clear is that AI-related layoffs adversely impact worker morale and disrupt future talent pipelines. Some firms are having to rehire a number of roles made redundant, which carries operational and reputational risks. Rapidly rolled out AI redundancies are a potential investor red flag, especially where redundancies are not carried out fairly and without discrimination.
- **AI deployment needs to be human capital-centric:** Successful deployment of AI needs to take into consideration the social dimension of the workforce. Businesses should factor in the challenges to employees fully engaging with AI including age, gender, region, seniority, and skills gaps. Proactive measures to improve AI literacy, organisational change management, and worker engagement are necessary for successful adoption.
- **AI deployment needs strong governance:** Companies need to move beyond treating AI as a magical solution and be clear about the processes that can benefit from automation or augmentation. This involves clearly understanding workflows and ensuring that human judgment and oversight remain at the forefront of business decision-making. Ultimately, AI systems are just another technological solution and cannot fix structural issues that underlie the lack of productivity in companies.

4. The net impact of data centres: expectations meet reality

Figure 5: The social impact of data centres



Source: [De Vries-Gao, 2026](#), [Environmental Defense Fund and Nuveen, 2026](#), [Tao and Gao, 2026](#), [TNFD, 2026](#), [Walker and Goldsmith, 2026](#), [Wang, 2026](#), [Yanez-Barnuevo, 2026a](#), [Yanez-Barnuevo, 2026b](#), [ILO, 2025](#), [Nguyen and Green, 2025](#), and [Sandhu et al., 2025](#); created by author. The information shown above is for illustrative purposes.

Although data centres may bring economic benefits for host communities, so far, critics argue that the **positive impacts on employment and increased property, sales, and income taxes are often overstated**.³⁷ Data centres have not delivered high-paying tech jobs or large numbers of permanent roles. After the initial influx of temporary roles from the construction of data centres, the remaining jobs are low-wage term-limited non-technical jobs like security, maintenance, and janitorial work.³⁸

In terms of tax benefits in the United States, the drive to attract data centres at the state level has led to tax breaks offering exemptions from paying personal property taxes on physical assets (e.g., machinery and computers). Where property taxes are collected on the land and buildings, the benefits to local communities are frequently less than anticipated.³⁹

Conversely, data centres carry significant environmental and social impacts across their lifecycle (Figure 5).¹ Due to the reliance on electrical components including chips, data centres face upstream human rights risks, especially through the minerals supply chain. In cases where data centres use on-site solar energy, there is increased exposure to forced labour risks.

Without adequate protections in place, local communities are shouldering the bulk of the negative externalities. Data centres are notoriously energy intensive. For instance, in the United States, a single data centre can use as much power as 100,000 homes in a year and the amount can increase up to twentyfold for large data centres.⁴⁰ The continuous computing workload accounts for most of a data centre's electricity use. A secondary contributor to the high energy use is cooling, which is required to address the heat produced by the computational demands to prevent shutdowns, slowdowns, and damage to the chips.⁴¹ Up to 40 per cent of a data centre's electricity use can be attributed to cooling systems.⁴²

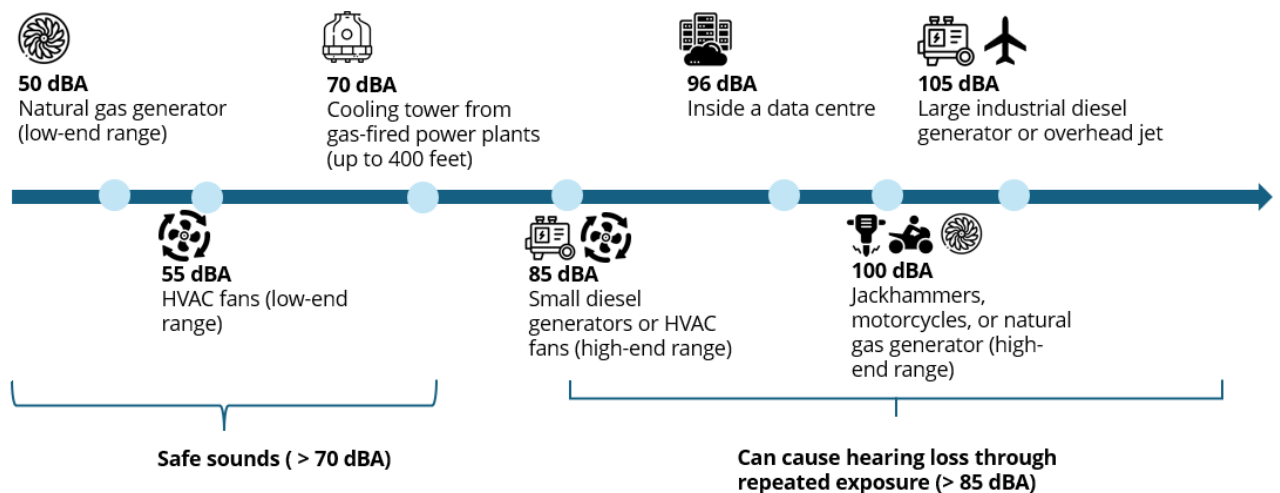
There is evidence showing that **host communities are effectively subsidising the energy costs of data centres**. Infrastructure upgrades to accommodate data centres have been passed onto local residents and small businesses. American consumers faced around US\$60 billion in rate increases in 2025.⁴³ In states with high concentration of data centres such as Virginia, electricity prices spiked 267 per cent over five years compared to the national average of 27 per cent.⁴⁴ And while communities continue to face higher energy prices, data centres negotiate lower prices through bulk power purchasing agreements (PPAs).⁴⁵

¹ Note that most of the research is drawn from the experience in the United States, given that a large share of the world's data centre is located there (37 per cent of all global data centres as of January 2026). [Walker and Goldsmith, 2026](#).

The **price burden can disproportionately impact disadvantaged communities** including but not limited to low-income, renting, black, and Hispanic households. One in four households experience difficulties paying their energy bills because of higher energy costs. Hispanic households can spend up to 20 per cent of their income on energy compared to the average of 3 per cent for higher-income households. Today, one in six households are behind on paying their utility bills. Utility shutoffs increased from 3.5 million customers to 4 million in 2025.⁴⁶

Data centres rely on diesel generators as backup in case of grid failures to ensure “always on” services. Even if diesel generators are not used regularly, generators need to be tested at least once a month.⁴⁷ In cases where the grid cannot support the energy demands of data centres, on-site gas power turbines are used. Communities reported experiencing an increase in air and noise pollution from on-site diesel generators and off-grid gas power turbines (Figure 6).⁴⁸

Figure 6: Noise pollution from data centres



Source: [Walker and Goldsmith, 2026](#), [Yanez-Barnuevo, 2026b](#), and [Richardson, 2024](#); created by author. The information shown above is for illustrative purposes.

Community members reported cases of headaches, nausea, sleep disturbance, ear pain, and hypertension as a result of noise. While exposure to noise above 65 dBA can increase stress and blood pressure, exposure to loud noises (over 85 dBA) can lead to hearing loss,⁴⁹

Data centres are water intensive, as water is used as a more efficient form of cooling than air. Approximately 22 per cent of data centres use water-based cooling systems through chilled water loops, liquid immersion cooling, or evaporative cooling to circulate, capture, and carry away heat.⁵⁰ **Modern data centres can consume 300,000 gallons of water a day, with larger facilities consuming upwards of 5 million gallons daily.**⁵¹ At Google's Bluffs Centre in Iowa, an average of 980 million gallons per year is used, which is equivalent to the annual use of 4 million homes.⁵²

As much as **57 per cent of cooling water comes from potable sources**, which can exacerbate water scarcity in water stressed regions.⁵³ Since 2022, two-thirds of data centres have been built or are in development in water-stressed areas.⁵⁴ Some communities reported experiencing low water pressure because of their proximity to data centres.⁵⁵

Emerging **research identified a “heat dome effect” as a new environmental impact associated with data centres**. Researchers assessed the land temperature through remote sensing platforms over 11,000 locations across a twenty-year period (2004 to 2024) and found that temperature increases can range from 0.3C to 9.1C. On average, the compound heat island effect is between 4C and 6C.⁵⁶

Given the environmental and social impact of data centres and the underwhelming positive impacts, communities are reluctant to approve further development. A Gallup poll found **7 out of 10 Americans oppose the construction of data centres in their local area**. They would rather live in proximity to a nuclear power plant than a data centre.⁵⁷ The backlash is further exacerbated by the concern that communities were not consulted in a meaningful or informed way. Multiple communities noted the secrecy behind the development of data centres as well as legal system failures where data centres are allowed to be situated near residential areas due to their classification as a non-industrial property.⁵⁸

The **backlash is translating into operational risks for data centre developers**. In Q1 2026, 75 projects worth US\$130 billion in planned construction were blocked or delayed because of local opposition. This is roughly the equivalent of the total delays in the entirety of 2025.⁵⁹ The backlash is not strictly limited to the United States, as the Scottish government is considering a moratorium on all new data centres.⁶⁰

Given the computational demands, the **lifespan of computing devices in data centres is limited, which can create significant e-waste**. Estimates for data centre computing devices range from two to six years.⁶¹ Estimates for shorter lifespan take into consideration the varying demands, for instance, frontier training can reduce the lifespan to 2.7 years.⁶² Assuming a general lifespan of five years, AI servers could generate between 131.0 to 224.8 kilotons of e-waste per year by 2030, which is the equivalent of the total e-waste from countries such as Austria, Denmark, and Norway in 2022.⁶³

80 per cent of the world’s e-waste is processed in emerging and frontier markets. Whereas e-waste in developed markets is managed through capital-intensive and formal systems, e-waste management in emerging and frontier markets relies on informal work.⁶⁴

Although e-waste management is a source of employment, it carries significant health and safety risks to workers. When e-waste is heated and burned, harmful chemicals are released into the air. E-waste can also contaminate groundwater and soil, impacting food and water supplies to local communities. In emerging markets, e-waste management carries additional risks of child labour as children are often used as cheap

labour to dismantle e-waste. In addition to the human rights risks, e-waste generation is outpacing formal collection and recycling by a factor of five.⁶⁵ This gap is likely to widen with the rise of e-waste from data centres.

Relevance for investors

With the rise of data centres, investors should be informed of the environmental and social impact across the lifecycle and across the supply chain. Although regulation is slow to respond to these risks and impacts globally, **there are signs of increased regulatory expectations for data centres across select jurisdictions**. Currently, the “gold standard” is the German Energy Efficiency Act, which mandates energy audits, performance standards, renewable energy use, and public reporting for data centres.

Two states in the United States are pushing for regulatory requirements for data centres. In California, there are two bills under consideration that may place additional obligations for data centre developers and operators.

The Ratepayer and Technology Innovation Protection Act introduced in 2025 requires data centres to not pass costs to other ratepayers and enter into 12-year binding contracts to cover transmission and distribution costs with exit fees and insurance bonds to mitigate financial risks if operators cease operations or underutilise energy. Grid infrastructure updates are prepaid by developers. By 2030, 100 per cent of electricity generated for these facilities are to come from zero-carbon resources. A second bill, the Data Centre Energy Usage Reporting and Modelling Bill, mandates reporting by developers on their estimated energy demand before commercial use or third-party availability as well as annually reporting on energy consumption including total energy use, energy efficiency, renewable energy usage, and energy used for AI development.

In Virginia, a bill is proposed to prohibit data centres from passing costs (utilities) onto consumers including in the acquisition of land.⁶⁶

While AI model developers can influence the impact of data centres and the demand on hardware by avoiding frontier-scale training and modelling where feasible⁶⁷, investors should be aware of the mitigation measures that can be adopted practically to address some of these risks, for instance:

- **Manage responsible sourcing practices:** Data centres encounter risks that are not unique, as these are commonly found across the electronics and automobile sectors. These sectors have extensive experience in managing risks at the tier 1 level (manufacturing) all the way to responsible sourcing of minerals. Data centres can benefit from borrowing existing best practices.
- **Carry out community consultation:** While community conflict may be new to the tech sector at the operational level, this sector can learn from other land-intensive industries such as extractives to manage community relations. Early, meaningful, and open dialogue with communities can help address concerns,

including the development of benefit sharing mechanisms to obtain the social license to operate.

- **Design with intent:** There are multiple ways to design data centres to minimise impact on local communities.
 - **Heat dome effect:** Data centres can manage extreme thermal loads by mixing active and passive cooling. Localised liquid cooling at the chip level can complement system-wide air cooling to target heat extraction from critical hotspots. The adoption of solar reflectivity on outdoor surfaces can also minimise the thermal load on data centre infrastructure. For instance, passive radiative cooling coating is already implemented in residential buildings, urban infrastructure, and agricultural cooling facilities that can reduce thermal load between 10 to 40 per cent.⁶⁸
 - **Noise pollution:** Data centres can address the issue of noise pollution through adequate soundproofing at the equipment and building level. Data centres can invest in quieter cooling technology (immersion cooling) or add sound barriers inside the building itself. In addition to building soundproofing, data centres may consider planting trees, shrubs, and other natural barriers to dampen noise. Locating data centres further away from residential areas can also reduce noise pollution for local communities.⁶⁹
- **Carry out environmental and social audits:** Data centre developers and operators should actively monitor their environmental and social impacts. This should minimally include metrics on energy use, water use, community consultation, and employment generation.
- **Adopt a responsible approach to e-waste management:** Given the potential impact data centres have on e-waste generation, data centres could consider prioritising equipment reuse and refurbishment where technically feasible over replacement and recycling. Where disposal is unavoidable, secure partnerships with e-waste managers to promote decent work.

References

- ¹ [IBM, 2026](#) and [IMDA, 2026](#).
- ² [IMDA, 2026](#).
- ³ Ibid and [TechUK, 2026](#).
- ⁴ [IMDA, 2026](#).
- ⁵ [IMDA, 2026](#).
- ⁶ [IMDA, 2026](#).
- ⁷ [TechUK, 2026](#).
- ⁸ [Rosén et al., 2026](#).
- ⁹ [Benett School of Public Policy, 2025](#).
- ¹⁰ [Eversheds Sutherland, 2026](#).
- ¹¹ [Howell, 2025](#).
- ¹² [De Neve, 2026](#).
- ¹³ The roles that are being slashed are mostly based in the United States, however, can include international roles depending on the company. [Bellan and Loizos, 2026](#) and [Financial Times, 2026](#).
- ¹⁴ [Short and Bloomberg, 2026](#).
- ¹⁵ [Wayland, 2026](#).
- ¹⁶ [De Neve et al., 2026](#) and [Markman, 2026](#).
- ¹⁷ [Markman, 2026](#).
- ¹⁸ [Gartner, 2026](#).
- ¹⁹ [Columbia Business School, 2025](#).
- ²⁰ [Spencer, 2026](#).
- ²¹ [De Neve et al., 2026](#).
- ²² [Cranney et al., 2026](#).
- ²³ [Zahs et al., 2026](#).
- ²⁴ [Barisano et al., 2024](#) and [Cranney et al., 2026](#).
- ²⁵ [Aldasoro et al., 2024](#) and [Zahs et al., 2026](#).
- ²⁶ Ibid. and [Cranney et al., 2026](#).
- ²⁷ [Cranney et al., 2026](#) and [Zahs et al., 2026](#).
- ²⁸ [Zahs et al., 2026](#).
- ²⁹ [Hiring Lab, 2025](#).
- ³⁰ Ibid.
- ³¹ Ibid.
- ³² [Stanford University Human Centered Artificial Intelligence, 2026](#).
- ³³ [Deloitte and Docusign, 2026](#).
- ³⁴ [Stanford University Human Centered Artificial Intelligence, 2026](#).
- ³⁵ [Heric et al., 2026](#).
- ³⁶ [Brynjolfsson, 2026](#), [De Neve et al., 2026](#), and [Stanford University Human Centered Artificial Intelligence, 2026](#).
- ³⁷ [Walker and Goldsmith, 2026](#) and [Nguyen and Green, 2025](#).
- ³⁸ [Nguyen and Green, 2025](#).
- ³⁹ Ibid.
- ⁴⁰ [Walker and Goldsmith, 2026](#).
- ⁴¹ [Marinoni et al., 2026](#).
- ⁴² [Yanez-Barnuevo, 2026b](#).
- ⁴³ [Walker and Goldsmith, 2026](#).
- ⁴⁴ [Yanez-Barnuevo, 2026b](#).
- ⁴⁵ [Nguyen and Green, 2025](#).

- ⁴⁶ [Yanez-Barnuevo, 2026a](#).
⁴⁷ [Yanez-Barnuevo, 2026b](#).
⁴⁸ Ibid.
⁴⁹ Ibid.
⁵⁰ [Nguyen and Green, 2025](#).
⁵¹ [Walker and Goldsmith, 2026](#).
⁵² [Nguyen and Green, 2025](#).
⁵³ [Tao and Gao, 2026](#).
⁵⁴ [Walker and Goldsmith, 2026](#).
⁵⁵ [Madhawi, 2026](#).
⁵⁶ [Marinoni et al., 2026](#).
⁵⁷ [Madhawi, 2026](#).
⁵⁸ [Noel, 2026](#), [Wheeler, 2026](#), and [Yanez-Barnuevo, 2026b](#).
⁵⁹ [Data Centre Watch, 2026](#).
⁶⁰ [Down and Booth, 2026](#).
⁶¹ [De Vries-Gao, 2026](#), [Emberson et al., 2025](#), [Hintemann et al., 2024](#), and [Wang et al., 2024](#).
⁶² [Emberson et al., 2025](#).
⁶³ [De Vries-Gao, 2026](#).
⁶⁴ [ILO, 2025](#).
⁶⁵ [Scougall and Sanderson, 2025](#).
⁶⁶ [Nguyen and Green, 2025](#).
⁶⁷ [Marinoni et al., 2026](#).
⁶⁸ Ibid.
⁶⁹ [Yanez-Barnuevo, 2026b](#).

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