CANDRIAM
A NEW YORK LIFE INVESTMENTS COMPANY

AI Through the ESG Lens:

Zooming In on Sustainability Risks and Opportunities

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Executive Summary.

Is the AI revolution unstoppable? With lightning speed, Artificial Intelligence (AI) is reshaping industries, unlocking economic value, driving positive environmental impact, helping address social challenges – and additionally, offering compelling investment opportunities.

Yet, AI also ushers in a brand new world of **risks and complex sustainability challenges that investors must learn to navigate.**

Firstly, **investors must identify when and how the sustainability risks of AI applications may have negative financial impacts on their portfolios** - for example, financial and reputational consequences for companies lacking proper AI governance an infringing data privacy or human rights - especially in a fragmented regulatory landscape. Beyond recognising and managing these risks, **investors can also play a key role, notably through engagement,** in keeping AI development responsible and ultimately reducing the sustainability risks that can potentially affect their portfolios' risk/return profiles.

Secondly, investors concerned with the impacts of their investments on the environment and society are challenged to **understand the potential repercussions of AI on today's key sustainability challenges:** energy use, water demand, greenhouse gas emissions , alongside concerns around bias, privacy, and job displacement. Challenges include integrating AI with renewable energy, ensuring the fair distribution of AI's benefits, and protecting privacy and human rights. **Equally important is recognizing the positive impact AI can have in addressing these challenges** — for example, by optimizing energy systems to reduce emissions, enabling precision agriculture to enhance food security, and supporting new healthcare and education models—thus creating new avenues for value creation and long-term resilience.

To navigate this dynamic landscape, **ESG analysis is an essential tool to effectively manage the double materiality of AI's sustainability risks and opportunities,** i.e. to understand the potential financial implications of AI's sustainability risks and its impacts on the world. This involves evaluating how companies manage AI-related risks through their governance and risk management practices, and how they use AI to contribute to environmental and social challenges. Such a forward-looking analytical approach appears essential in unlocking AI's full potential while supporting sustainable long-term value.

Thus, in what follows, we explore how investors can use the ESG lens to navigate the brand-new world of sustainability risks and challenges that AI is bringing about.

Fast Growth, Fast Adoption.

> **Artificial Intelligence is on track to become a $4.8 trillion global market by 2033 – but unless urgent action is taken, its benefits may remain in the hands of a privileged few.**
>
> UN Conference on Trade and Development[1]

Full Speed Ahead

No longer a distant promise, AI is now embedded across key sectors, in which it is reshaping operations, efficiency and competition. By enabling machines to learn, detect patterns, and make decisions, AI is redefining human–machine collaboration and disrupting traditional business models. For investors, it represents an opportunity to capture value at the heart of a rapidly evolving global economy.

Adoption has been fast-paced. 78% of companies already use AI, and 90%. of Fortune 500 companies now integrate AI tools[2]. The user base is also growing: OpenAI reported more than 500 million weekly users in early 2025[3].

Against this backdrop, the global race for AI leadership is intensifying, at both the public and the private level. Countries like the US and China view AI as a strategic priority, while tech leaders such as Anthropic, Google, Meta, and OpenAI are joined by challengers like DeepSeek. Building high-performance models with lean computing needs, these newer players are driving innovation with ever fewer resources, contributing to fierce competition and broadening access.

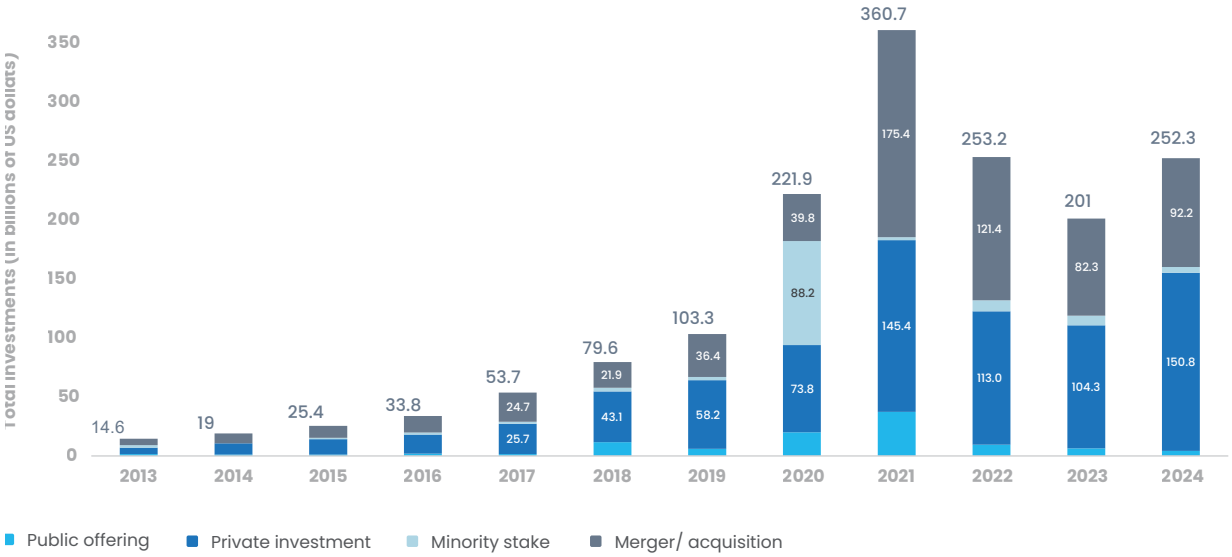
Fuelled by Powerful Investment Engines

AI's rapid growth is being fueled by a wave of strategic investments, public-private partnerships, and government-led initiatives. In the US, the $500bn Stargate Initiative marks the largest private AI infrastructure project to date[4], while Europe's €200bn AI Continent Action Plan will deploy 13 AI factories and multiple gigafactories[5].

Corporate investment is also surging. One in three companies plans to invest over $25 million in AI this year[6]. Tech leaders Meta, Amazon, Alphabet, and Microsoft are on track to spend a combined $320 billion on AI and data infrastructure in 2025[7]. Nvidia alone is preparing to deploy up to $500 billion over the next 4 years[8] to build AI servers across the US.

A significant portion of this capital feeds internal AI infrastructure. For instance, Pfizer is investing $610 million in AI drug discovery[9], and Walmart $520 million in AI robotics for logistics[10]. In addition, corporates have also accelerated their external investments through significant merger and acquisition activity (see figure 1).

Figure 1:
Global Corporate Investment in AI by Investment Activity, 2013-24



Source: Quid, 2024[11]

Our World, Redefined?

AI's impacts on our world are tangible and wide-ranging, reshaping how societies function and economies grow, from optimising supply chains and accelerating R&D to transforming customer engagement.

Importantly, the nature of these impacts – whether they represent opportunities or risks for investors and whether they make positive or negative contributions to sustainable development – is a mixed bag.

For example, AI's consequences for the **workforce** are significant. AI could affect up to 40% of jobs worldwide[12], creating a need for large-scale reskilling and workforce transition programs. Generative AI alone may automate 50% of global work activities by 2060[13], with roles such as customer service subject to 80% automation within the next few years[14].

In the area of **climate change** too, AI may also have major repercussions: AI applications have the potential to lower carbon emissions, forecast climate risks, and accelerate clean technology innovation.

This diversity of AI applications underscores the importance for investors to **conduct thorough analysis to understand the full extent of risks and opportunities** inherent in AI-related investment opportunities. This becomes even more pressing as the global digital arms race accelerates and AI at times becomes politicised. For example, the US and China are investing heavily in domestic semiconductor manufacturing and securing their supply chains to assert **technological sovereignty**. These efforts are compounded by measures like export controls, reflecting a broader trend of technological nationalism that is reshaping the global geopolitical landscape.

AI for Good.

Beyond offering potential attractive returns, AI investments can help address urgent environmental and social challenges, highlighting AI's increasingly recognized role as a strategic tool for sustainable development. Indeed, certain AI applications deliver tangible contributions to climate action, the preservation of biodiversity, and inclusive social development.

Unlocking Economic Value

AI is creating powerful economic tailwinds. For companies and investors, it can **unlock new revenue streams and expand margins**: slash costs, minimise downtime, scale personalised production, and unlock efficiency gains through real-time insights, predictive analytics, automation and smarter resource use. Potential gains range from productivity, profitability, to competitiveness. For example, in the industrial sector, AI-powered digital twin technology* can create highly detailed virtual models of assets and processes. By using digital twins to simulate, visualise, and analyse operations in real time, companies reduce downtime and improve resource efficiency by running virtual tests instead of expensive physical trials.

For investors, identifying companies that leverage AI applications in this way may offer attractive potential returns.

Driving Environmental Impact

Across sectors, AI is increasingly integral to solutions addressing environmental sustainability. For example:[15]

- In urban areas, AI can help estimate emissions, monitor air quality, forecast pollution to support health interventions and simulate climate policies.
- In climate science, machine learning models using high-resolution data can improve forecasts of extreme weather, helping communities better prepare for disasters.
- In agriculture, AI tools can analyse regional climate, soil, and crop data to provide farmers with adaptive strategies that enhance yield stability amid shifting conditions.
- In transport, AI can suggest more efficient routes, reduce fuel consumption, and support the shift to low-emission mobility.
- In the energy sector, AI can forecast renewable electricity supply, balance grid performance, aid solar and wind integration, and help industries map cost-effective decarbonisation paths and clean energy infrastructure placement.

* – A digital twin is a dynamic virtual model of a physical asset, system, or process that uses real-time data and simulations to mirror, analyse, and optimise performance across its lifecycle.

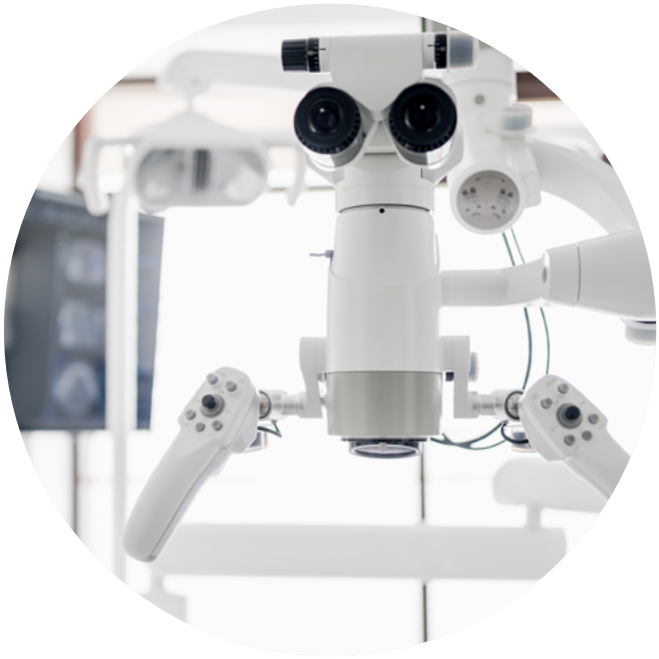
As these use cases expand, investors are increasingly recognising **AI's strategic role in driving environmental progress** and fostering resilient, future-ready economies.

Of course, these benefits cannot be considered without also acknowledging the question of the environmental footprint of large-scale AI models – a key issue that we will address in section 3 when we review the risks linked to AI.

Tackling Social Challenges

AI can also be a powerful tool in addressing social challenges with its applications in areas such as healthcare, education, financial inclusion, and employment. McKinsey has identified over 600 use cases where AI could support the UN Sustainable Development Goals (UN SDGs). These include natural language processing (e.g., detecting misinformation), sound recognition (e.g., enhancing accessibility through voice interfaces) and AI-assisted communication platforms (e.g., identifying early risks in maternal health)[16].

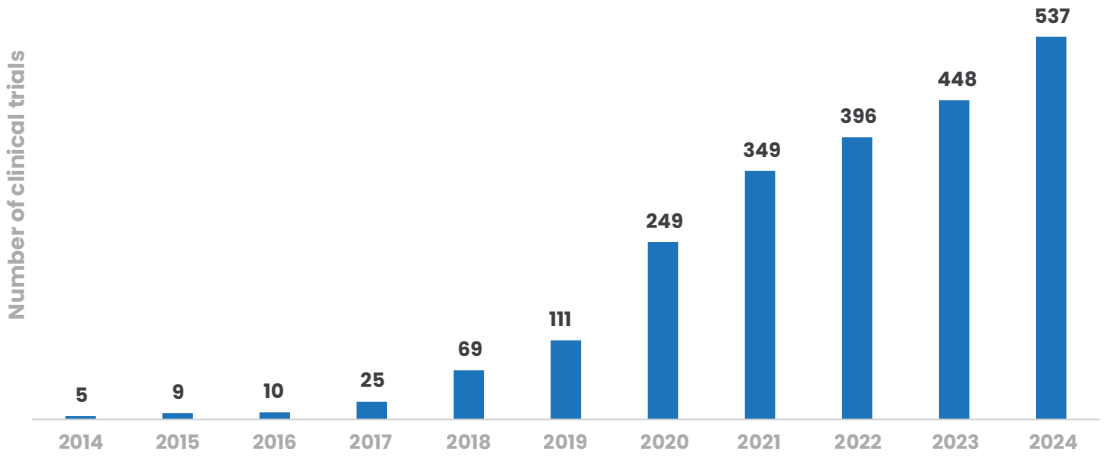
> "
>
> **I've been thinking a lot about how AI can reduce some of the world's worst inequities.**
>
> Bill Gates
> Co-Chair, Bill & Melinda Gates Foundation



AI is already showing promise in real-world applications.

- In **healthcare** for example, it can enhance disease detection, support personalised treatment, and accelerate drug discovery through innovations such as genome sequencing and protein structure prediction[17]. This momentum is reflected in the steady increase in AI-driven clinical trials, as shown in figure 2. In the field of oncology, which our thematic equity investment team is closely monitoring, the integration of AI has led to significant advancements in immunotherapy (biomarker discovery, smart drug design, CAR-T Cell Therapy optimization, and monitoring of immune responses) as well as radiopharmaceuticals, particularly in theranostics, which uses nuclear medicine for both cancer diagnosis and targeted treatment.

Figure 2 :
Number of clinical trials that have included mentions of AI, 2014-24



Source: Raise Health, 2025 [18]

- In **education**, AI-powered adaptive learning platforms are transforming how students learn by personalising content to individual needs, learning styles, and pace through real-time feedback and dynamic content adjustments [19].

- In **finance**, AI-driven platforms can contribute to greater inclusion by connecting marginalised borrowers with lenders, helping foster more equitable economic growth. For example, AI is being used to support alternative credit scoring by analysing non-traditional data such as utility and mobile payment histories [20].

As mentioned earlier, AI and automation are also expected to drive major shifts in the structure of the global workforce, potentially creating up to 78 million new jobs worldwide by 2030 [21].

The expanding application of AI in these areas - education, healthcare and finance - is unlocking significant investment opportunities in many areas, each poised to reshape industries through increased efficiency, accessibility and innovation.

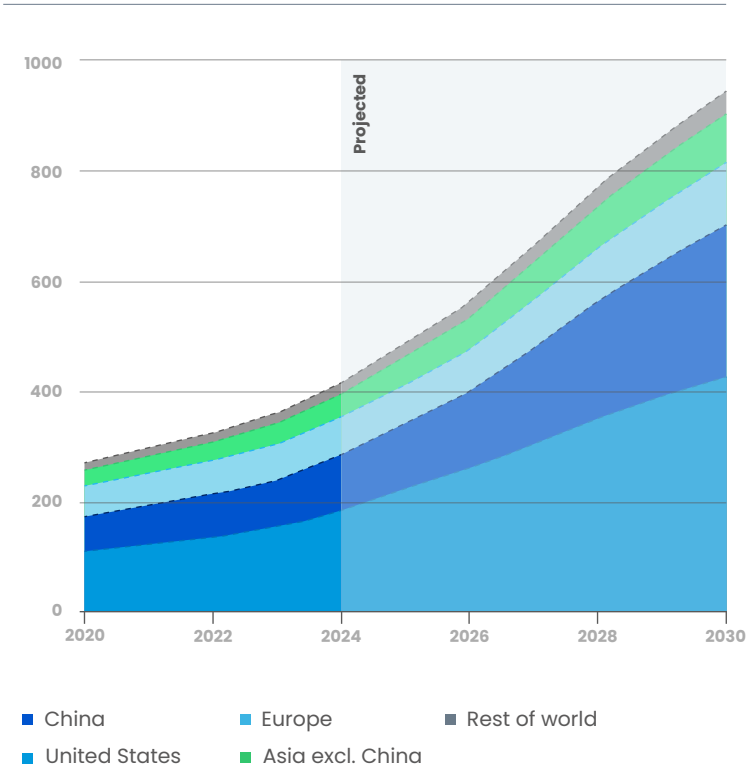
The Bad, and the Ugly?

Fast growth often goes with a lack of hindsight and discernment. For all its potential, investing in AI can also be a source of significant uncertainty. Just like for the Internet decades ago, it may take time to assess the full extent of consequences linked to such a powerful driver of innovation and productivity.

As AI becomes more integrated across sectors, the associated ESG risks are becoming more complex and pressing, with potential negative impacts on the investor's portfolio's value –what is called *financial materiality* –, the environment and our society. Investors who want to capture the upside of AI therefore need to uncover these risks and integrate them into their investment decisions. ESG analysis can be a useful tool to do so.

Environmental Risks and Impacts

Figure 3 :
Data centre electricity consumption by region, Base Case, 2020-2030 (TWh)



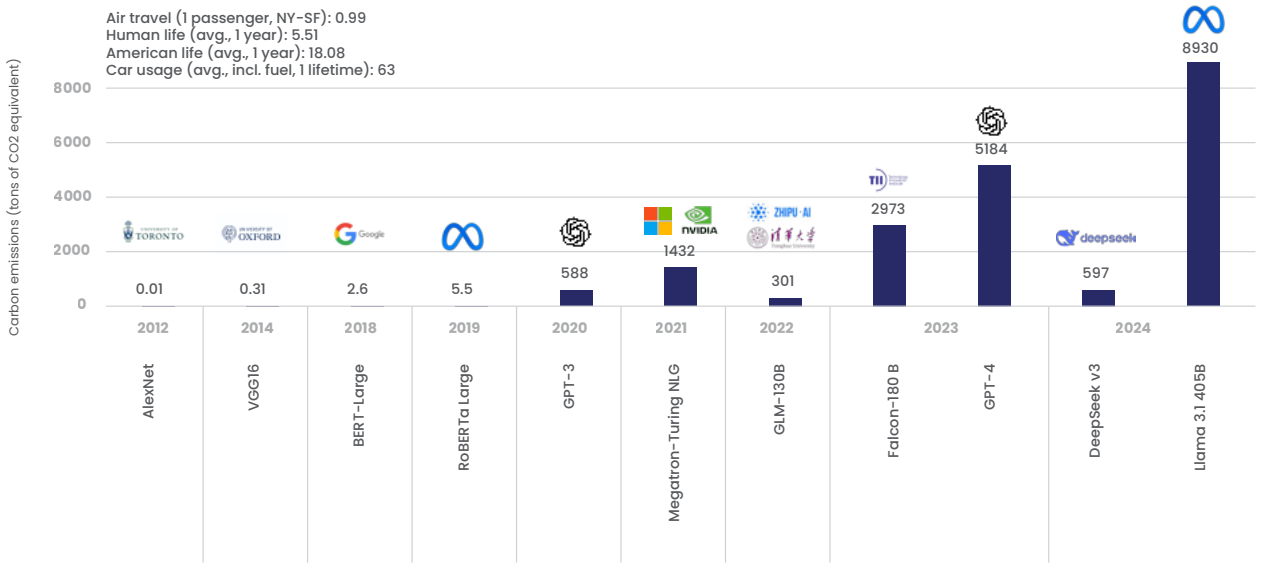
AI's rapid expansion brings growing environmental challenges. In particular, **the energy and resource intensity of AI infrastructure is becoming a major concern** as adoption accelerates.

AI-driven data centers are now among the fastest-growing energy consumers worldwide[22], accounting for between 2% and 4% of total electricity use in some economies[23]. A single ChatGPT query can consume up to ten times more energy than a typical Google search[24]. The International Energy Agency estimates that global data center electricity demand could more than double within the next five years[25].

Source: IEA, Energy demand from AI[25] - https://www.iea.org/data-and-statistics/charts/data-centre-electricity-consumption-by-region-base-case-2020-2030, Licence: CC BY 4.0

Despite advances in hardware efficiency, the increasing power consumption required to train large-scale AI models remains a leading contributor to the **carbon emissions** of AI systems. Key impacting factors include model size, data center efficiency, and grid carbon intensity. Figure 4 shows carbon emissions from training key AI models, sorted by release year.

Figure 4 :
Estimated carbon emissions from training select AI models and real-life activities, 2012-24



Source: The 2025 AI Index Report. Stanford University [26]

AI's growing energy demands raise **concerns about whether today's energy systems can sustainably keep pace**. In the US, for example, about half of the power supply is at risk of shortfalls over the next decade[27], a risk intensified by unstable energy supply chains and strained infrastructure. This will jeopardise the country's potential to achieve AI supremacy while keeping energy costs low. As demand rises, supply constraints and limited energy storage complicate the reliable powering of AI technologies and integration with renewables.

For investors, volatile energy costs, potential disruptions, and costly contingency measures could translate this energy challenge into financial risks. Therefore, energy dependencies and environmental risks should be carefully considered when making AI investment decisions.

Water use is also a critical concern in the AI ecosystem. For example, it is estimated that by 2027, AI operations could account for over half of the UK's total water consumption[28]. AI data centers, which require significant water for cooling, are often in regions already grappling with water scarcity. However around 40% of global chip production is concentrated in high-risk water regions, such as Taiwan, Arizona, and parts of China[29]. The high water demand for cooling in these areas could worsen shortages, threaten aquatic ecosystems, and jeopardise supply chains in industries like automotive and electronics. But AI's environmental footprint actually starts even earlier in the value chain, with the mining and manufacturing pertaining to the production of IT hardware that houses AI software. Chip factories, for example, use a lot of ultra-pure water. The potential water shortages that AI can thus contribute to not only harm ecosystems but also create risks for production, leading to higher costs. This again illustrates the **double materiality of AI-related sustainability risks**: their realisation impacts both portfolio value and the environment.

Social Risks and Impacts

As AI becomes woven into industries, its impact on society is accelerating. It is reshaping jobs, challenging privacy standards, and creating new governance risks that businesses and investors cannot ignore.

One emerging concern is **algorithmic sovereignty**: the ability of governments to guide AI in line with democratic values. Yet, in the global race for AI leadership, policy agendas, corporate strategies, and market forces often prioritise speed, scale, and competitive edge over long-term ethical oversight. This pressure risks sidelining principles like fairness and accountability, making it harder to ensure AI's benefits are equitably shared, and increasing the likelihood of social backlash. Risks related to bias, data misuse, and lack of transparency are becoming more pronounced. The social and regulatory concerns raised by these issues can destabilise markets, erode public trust, and have direct financial implications.

For investors, these risks can transform into negative financial consequences, as companies failing to address AI's social issues may face fines, reputational damage, and legal actions.

Compounding these risks are broader challenges such as the spread of misinformation, cybersecurity threats, deepfakes, data breaches, and the use of AI in sensitive areas like surveillance and autonomous weapons.

Coming back to disruptions in the workforce: while some jobs may benefit from the productivity gains unlocked by AI, the automation of other tasks will reduce labor demand and suppress wages. In developed economies, the impact is expected to be evenly split, with about half of exposed jobs potentially gaining from AI, while the other half face major disruption or even disappearance[12]. Impacts should vary by sector; for example, manufacturing is rapidly automating routine tasks, while in healthcare, AI is expected to enhance efficiency rather than replace workers. At the broader society level, risks of widening inequality exist between and within countries, tied to differences in the state of existing digital infrastructure, workforce skills, and how AI differently affects income groups - notably if it disproportionately benefits higher-income workers. We believe these risks should be considered through an assessment of sector-specific dynamics, and an evaluation of companies' policies and investments in retraining and social programs supporting the adaptation of their workforce.

Examples of AI Opportunities and Risks Across Sectors

Sector	ESG risks, opportunities, and potential consequences for investors	
Healthcare & Pharmaceuticals	**Opportunities**	AI applications such as patient data analysis, and personalised medicine can lead to faster drug development, more accurate diagnoses, and better patient outcomes. Investors can contribute to improving healthcare access through scalable, AI-powered diagnostic tools and data-driven treatment approaches.
	Risks	Regulatory challenges, potential data privacy violations, and ensuing penalties can harm financial performance and damage reputation. Biased algorithms may produce unequal treatment outcomes, reinforce healthcare disparities and attract legal or regulatory scrutiny. These issues present broader societal risks and could lead to increased government oversight, reducing operational flexibility and raising compliance costs.
Retail	**Opportunities**	Retail, logistics, consumer goods, fashion: AI applications like smart inventory management, personalised marketing, and intelligent routing can boost efficiency and customer engagement. Smart systems help reduce waste, emissions, and costs, while improving sustainability metrics and margins. These innovations support long-term growth by aligning operational performance with environmental goals.
	Risks	Automation can lead to job displacement across supply chains, raising concerns about inequality where reskilling is limited. The use of personal data for marketing also brings privacy and regulatory challenges, potentially resulting in fines, lawsuits, and reputational damage. These risks can undermine financial performance and limit strategic flexibility over time.
Energy & real estate	**Opportunities**	AI is enabling smarter infrastructure through grid optimisation, renewable energy integration, and intelligent building systems. For example, in energy, AI-driven smart grids can balance supply and demand more efficiently on renewable energy, reducing reliance on fossil fuels and enabling cost-effective renewable energy adoption. In real estate, smart buildings powered by AI can monitor and optimise energy use, lowering utility costs and improving sustainability metrics which are key for long-term asset value.
	Risks	Growing energy dependencies and infrastructure limits. Financial risks include volatile energy costs, costly downtime, maintenance, and regulatory penalties. Cybersecurity threats and environmental impacts such as increased emissions and supply disruptions.
Agriculture	**Opportunities**	AI-driven precision farming allows increasing crop yields, lowering input costs, and boosting profitability creating more resilient and scalable growth prospects. These efficiencies can improve margins and reduce operational risks. Environmental and social benefits such as conserving water, reducing fertilizer use, protecting soil health, and supporting biodiversity.
	Risks	Mismanagement of resources, leading to fines, supply chain disruptions, and reputational damage. Environmental risks like water overuse, soil degradation, and biodiversity loss.

Regulation and Governance.

As AI adoption accelerates, regulators are coming under pressure from various stakeholders. Investors, notably, are increasingly pushing for more homogeneous AI regulatory frameworks to provide greater visibility. ESG concerns such as transparency, accountability, and long-term impact are gaining traction across stakeholder agendas, too, but **regulation still tends to lag the pace of AI innovation** at a time when clear regulation and credible industry initiatives are becoming critical to supporting sustainable AI growth and offering investors a healthy context for investment.

Key Regulatory Developments on AI and ESG

The regulatory landscape for AI is evolving quickly as policymakers seek to address ESG risks and the broader technology implications. **The EU is taking the lead with the AI Act**, offering a risk-based regulatory approach. In contrast, US regulation remains fragmented. while the **National Artificial Intelligence Initiative Act** promotes innovation and coordination, a unified federal framework has yet to emerge, with states like Colorado enacting their own laws.

Yet, challenges remain despite growing regulatory momentum. Divergent regional standards complicate global compliance, with many frameworks relying on voluntary self-assessment. Political differences have further fragmented approaches and politicised AI governance, at times limiting market access and complicating global AI deployment. Regulations are sometimes seen as barriers to innovation, and stricter rules in one region can trigger political pressures elsewhere, resulting in a patchwork of regional controls instead of a unified global system.

Industry-led Initiatives and Best Practices

Ethical AI is both a governance imperative and a competitive advantage.

With regulation struggling to keep up, **industry-led efforts play a key role in defining responsible AI**** in practice. Although speed and scale can sometimes eclipse ethical considerations, a growing number of companies now recognise that **ethical AI is both a governance imperative and a competitive advantage.** Global frameworks such as the OECD AI Principles, UN guidance, and the Partnership on AI promote AI development that supports sustainability, human rights, and accountability. Additionally, the World Benchmarking Alliance (WBA) plays an important role through initiatives such as the Ethical AI Collective Impact Coalition to promote the safe and responsible use of AI, and the WBA's Digital Inclusion Benchmark that tracks the performance of the world's most influential digital technology companies on digital inclusion. Building on this, Candriam actively engages with companies via the WBA's Digital Inclusion Benchmark to understand and promote ethical AI practices aligned with these principles. Through these engagements, we have encountered several responsible practices such as:

- Red teaming – expert stress-testing of AI systems for bias, safety, and resilience.
- Watermarking – tagging synthetic content to counter misinformation.
- AI ethics committees – overseeing governance and managing emerging risks.
- AI audits and safeguards- driving accountability through independent reviews and robust ethical controls.

** – Responsible AI refers to the development and use of artificial intelligence that is ethical, transparent, fair, and accountable prioritising user privacy, minimising bias, and preventing harmful impacts.

Shareholder engagement and voting are also becoming important tools to advance AI governance, with rising demands for disclosure, board accountability, and responsible innovation.

Future Outlook: Strengthening AI & ESG Governance

As adoption increases, ESG-aligned initiatives are gaining momentum across industries, enabling companies to meet stakeholder expectations and navigate evolving regulatory demand. While global oversight is tightening, some markets may push for more flexible frameworks to accelerate innovation and stay competitive.

Responsible AI is becoming central to how companies manage risk, build trust, and differentiate themselves in the market. Companies that embed ethical safeguards, conduct independent audits, and implement clear governance structures will be better equipped to navigate scrutiny and drive sustainable growth. Sustained progress will depend on stronger collaboration between industry leaders, policymakers, and investors to ensure AI is scaled in a safe, transparent, and inclusive way.

Building an ESG Approach to AI.

AI presents a unique blend of opportunities and risks that have profound implications for investors. On one hand, AI-driven innovations can unlock potential for significant financial returns while contributing to global sustainability goals. On the other hand, AI also introduces risks, adding complexity to investment decisions.

As the regulatory landscape continues to evolve, it becomes increasingly crucial for investors to manage both these risks and opportunities effectively. Here, **an ESG analytical framework can be a valuable tool, offering a structured approach to navigating the complexities of investing in AI.**

Considerations for Fundamental Analysis

To assess AI investments - such as companies that develop or utilise AI applications - it is crucial to consider both risks and opportunities through a double materiality lens, an approach that lacks in traditional financial analysis. Moreover, applications being very diverse, context-specific ESG assessments are essential. It is important to analyse companies' different types of exposure to AI across their business activities, as well as the risks and opportunities that come from these exposures.

Given the variety of AI applications, there's no one-size-fits-all approach in assessing the management of these risks. As companies take very different approaches, a tailored and flexible ESG analysis is essential to ensure a comprehensive understanding of AI's double materiality - capturing both the potential financial repercussions and the environmental and social impacts of its sustainability risks and opportunities.

Factors such as whether a company operates in a B2B or B2C model, the sensitivity of the data it handles, and its role in AI model development can dramatically shape the ESG risks and opportunities that come with AI usage. For example, a B2C company offering AI-powered health or financial advice faces scrutiny over key concerns such as data privacy, transparency, and algorithmic bias. In contrast, a B2B firm providing AI infrastructure risks issues tied to how clients use its technology, especially in critical decisions with limited oversight. Similarly, companies developing facial recognition AI face heightened ESG risks around privacy, surveillance, and misuse, especially in areas with weak regulations. By contrast, a company using AI to optimise energy efficiency in manufacturing may offer ESG-aligned opportunities, such as reducing carbon emissions and improving resource efficiency, presenting a more positive risk-reward profile for investors.

These examples underscore the importance of **looking beyond whether a company is adopting AI and focusing on how it is doing so**, along with the governance structures in place to manage risks. For investors, this means paying close attention to companies' adoption of responsible AI principles and their transparency in disclosing human rights risk assessments, which are crucial for understanding the long-term ESG impact of their AI activities.

As more companies embrace responsible AI, it becomes increasingly important to assess how they translate these principles into action. One material indicator of commitment is whether companies conduct and disclose human rights risk assessments related to their AI products. To effectively evaluate such practices, investors can focus on several key areas, such as companies' transparency and governance of AI use, ethical guidelines, impact on decision-making and supply chains, regulatory preparedness, and efforts to mitigate bias and ensure responsible data usage.

More broadly, evaluating how AI is integrated into decision-making, supply chains, and customer interactions is key to understanding a company's ESG alignment. As AI regulation continues to evolve, firms must proactively address compliance and ethical deployment. Companies that lead in ethical AI governance by publishing algorithmic audit results or engaging in multi-stakeholder initiatives are often better candidates for long-term ESG portfolios. Dialogue with these companies is key to gaining insight into their AI governance practices.

Considerations for Engagement : Dialogue with Companies

Engagement is a powerful lever for investors to better understand how companies manage ESG risks and opportunities, especially in rapidly evolving areas like AI where practices and standards are still emerging. It helps uncover financial material insights, strengthen ESG analysis, and deepen understanding of how AI governance is integrated into corporate decision-making.

By entering active dialogue with companies, investors can encourage greater transparency around AI-related risks and safeguards, gain clarity on governance practices where public disclosures fall short, and influence the adoption of stronger, more ethical approaches. In doing so, engagement not only supports more informed investment decisions but also fosters more responsible AI development.

As stewards of capital, investors also have a critical role to play in shaping the broader trajectory of AI

As stewards of capital, investors also have a critical role to play in shaping the broader trajectory of AI. Through ownership dialogue, voting, and participation in collaborative initiatives, they can help ensure technology evolves in ways that respect human rights, protect democratic values, and align with long-term ESG goals. Key considerations along engagement and voting activities include:

- **Direct dialogue** to gain insights and drive change: How are ESG principles embedded in AI development? This includes assessing sustainability commitments, innovation ethics, workforce impact, governance frameworks, and compliance. Engaging with policymakers and regulators also helps investors advocate for AI practices that uphold human rights and environmental standards.

- Support for **collaborative initiatives**: Look if you or your asset manager supports certain initiatives such as the WBA's Responsible AI initiative, Ranking Digital Rights engagement, WBA's Corporate Human Rights Benchmark engagement on Human Right Due Diligence.

- Via **investors' voting activities**: Look out for shareholders' resolutions calling for stronger due diligence on human rights risks associated with the development and use of new technologies. Such resolutions have been prominent among major tech companies over the past few years. It is important to review your own or your asset manager's voting policies to ensure alignment with these priorities.

At Candriam, we prioritise responsible technology management and leverage our position as investors to advocate for ethical standards and human rights. Here are some examples of our engagement efforts.

From 2021 to 2023, Candriam initiated and led a collaborative initiative to **promote the safe use of Facial Recognition Technology** (FRT). 55 investors signed the Investor Statement on Facial Recognition demanding companies to adopt a safer and more transparent use of FRT. We engaged 15 companies involved in the technology to understand how they assess, manage, and mitigate human rights and societal risks linked to FRT. These dialogues helped define best practices on human rights, which we actively promoted among lagging companies (see report Dialogue and Best Practice Report-web.pdf). Through dialogues with large tech firms, we found those closest to the algorithm better understood the ethical implications, while chip and hardware makers were less concerned. Most welcomed regulations to ensure a fair playing field. Additionally, many firms rejected FRT use in law enforcement, and several adopted a "human in the loop" approach using FRT for routine tasks but reserving critical decisions like border entry for humans.

From 2023 onwards Candriam has taken a co-leading role **the** World Benchmarking Alliance **(WBA) Collective Impact Coalition for Ethical Artificial Intelligence** (AI). Our group of over 63 institutional investors represents approximately $ 8.7 trillion AUM and is engaging 76 of the largest global tech companies in the world to advance the important topic of ethical AI. See our updated Investor Statement on Ethical AI . Our outreach is informed by the 2023 WBA Digital Inclusion Benchmark findings. In the first phase, we have engaged companies on their AI policies or principles, along with the governance structure to ensure safe, ethical, or responsible AI. In the 2nd phase, we are now digging deeper into companies processes to understand how these policies and governance are being implemented into companies' operations. Backed by the WBA and civil society partners, our engagement focuses on identifying best practices and promoting them across companies that are falling behind. Here are key insights from our dialogues:

- On policies: companies are showing progress with a growing number of companies adopting some form of acceptable policy, guidelines, or principles on ethical AI. In 2022 only 17% of the 200 companies in the index had such a public commitment, at the end of 2024 this had grown to 37%. Progress but still a long way to go !
- On Governance: progress is evident, but expertise varies widely, and executive mandates often remain vague.
- On operational processes: we are seeing very little progress in the public domain.

Capturing AI Opportunities and Managing its Risks: The ESG Toolkit.

AI is rapidly transforming the global economy, unlocking significant opportunities for innovation and long-term value creation. Yet these opportunities come with growing ESG risks that investors can no longer overlook. To harness AI's full potential, ESG analysis can be a powerful tool to better understand risks and opportunities that are financially material, and to leverage the positive contributions AI can make to the environment and society. Thus, ESG risks such as data privacy, algorithmic bias, workforce disruption, and resource intensity can be assessed not for their financial implications but also for their broader societal and environmental impact. Applying this double materiality lens helps investors evaluate how ESG factors influence both financial performance and real-world outcomes ensuring alignment with long-term value creation and stakeholder expectations.

AI... for Better AI Analysis?

As data availability grows and AI technology matures, there is a significant opportunity to integrate AI into ESG analysis. AI can rapidly process vast and complex datasets, revealing risks and opportunities that might otherwise go unnoticed. Its ability to detect patterns, harmonise data from diverse sources, and enable near real-time monitoring of ESG events enhances responsiveness to emerging risks, supporting more comprehensive ESG assessments across sectors and regions.

However, **AI remains a tool** that can support but not replace the expertise of ESG analysts. In-depth sector knowledge remains essential for identifying the ESG factors that significantly affect a company's financial performance, as well as their impact on the environment and society. By integrating both qualitative and quantitative data, ESG analysts evaluate a company's ESG trajectory, incident severity, and effectiveness in managing stakeholder relationships and risks. This assessment also considers how well companies embed stakeholders' long-term interests into their strategies, factoring in sector-specific challenges, engagement responsiveness, company outlook, and alignment with industry standards. Furthermore, ESG analysts play a critical role in ensuring data quality and consistency by identifying gaps, validating external information, and supplementing analysis with proprietary research, especially for private or small companies with limited coverage.

While AI offers efficiency in processing large datasets, its effectiveness depends on data quality. Incomplete or biased data can lead to misleading results, and models often miss the nuance of complex ESG issues. This is why, like in many other areas, human expertise remains essential to interpret both quantitative and qualitative data.

Conclusion.

The amplitude of the AI revolution is leaving very few areas untouched. As we navigate the complex landscape of this brand-new world, an ESG lens can serve as a critical compass for a holistic assessment of risks and opportunities. By actively engaging with companies to promote responsible AI practices, investors can help mitigate the environmental and social challenges that AI poses. Moreover, stakeholders must collaborate with policymakers, industry leaders, and civil society to create a more transparent, accountable, and sustainable AI ecosystem. After all, the future of AI is not just about technological advancement; it's about aligning with the broader goals of economic prosperity, environmental stewardship, and social equity. By focusing their efforts through the ESG lens, investors can ensure that AI's potential is harnessed for the greater good, driving long-term value and contributing to a more sustainable world.

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