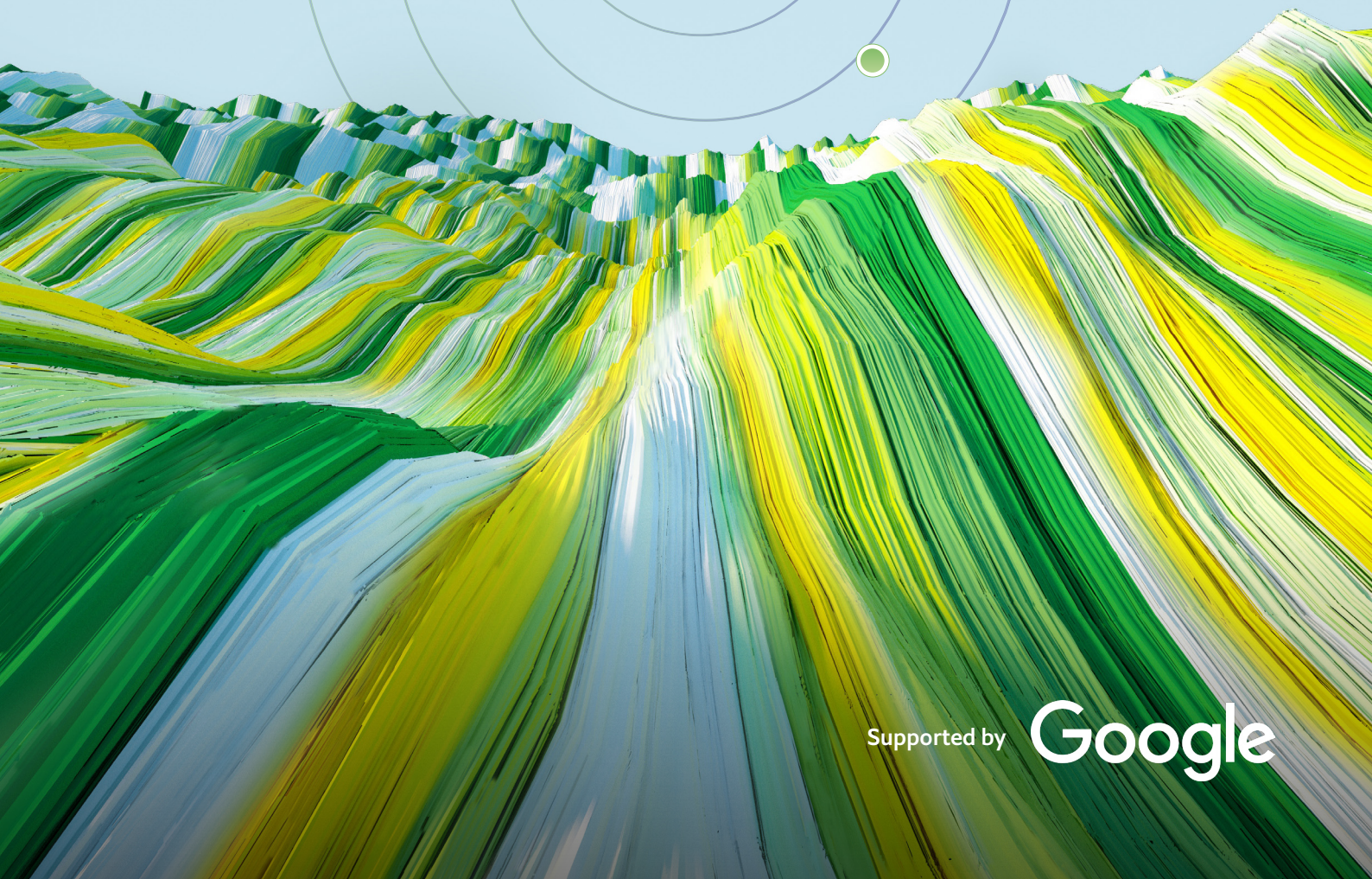
ECONOMIST IMPACT

AI landscapes

Exploring future scenarios of AI through to 2030



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About this report

AI landscapes: Exploring future scenarios of AI through to 2030 is an Economist Impact report supported by Google. The full editorial control of the research and outputs are the responsibility of the Economist Impact. The report explores the future of AI through four distinct scenarios. Grounded in in-depth research, an expert advisory panel and an interview programme conducted between June and November 2023, this report analyses pivotal technological, social, and macroeconomic factors extending to 2030, providing a nuanced understanding of AI's potential trajectories.

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Executive summary

The rapid advance of artificial intelligence (AI), turbo-charged in the past 18 months by advances in public distribution of large language models (LLMs), has captured public consciousness—stoking excitement as well as alarm. AI promises to generate enormous value for businesses and society—indeed, it already is—but responsible innovation will be key to unlocking this value while mitigating a litany of risks, from discriminatory algorithms and disinformation to job disruption. Getting the balance right will take coordinated and considered action by technologists, business leaders and policymakers. So where do we go from here?

To help navigate these issues and understand the long-term implication of current technological, economic and governance trends, Economist Impact conducted an expert-led strategic foresight programme rooted in the development of four scenarios for the future of AI through to 2030.

The many possible paths that AI development and governance can take, and the many possible risks, from current everyday concerns around safety and security to existential risks, have made it hard for stakeholders to have clear conversations. Scenarios provide common understanding of different ways the future could develop to root and align constructive conversations, and inform decision-making in the present.

Building on a literature review, a Delphi survey and a series of workshops and interviews with technology and policy experts (see methodology in Appendix), we identified the most critical and uncertain factors shaping AI development, use and impact. We identified the direction of global governance and the accessibility of the AI development space as foremost among these factors, and the primary axes on which to explore plausible and relevant futures.

The extent to which global and regional powers align on AI regulation and governance will critically influence AI safety, security and innovation. And, the manner in which they do remains highly uncertain. So too do the factors that will determine the enabling environment—from skills and data to the prevalence of open-source over closed models.

Using a global governance-accessibility matrix, Economist Impact crafted four scenarios. No single scenario is "ideal" or "worst-case". Instead, each captures both the positives and negatives outcomes. The scenarios are summarised below.

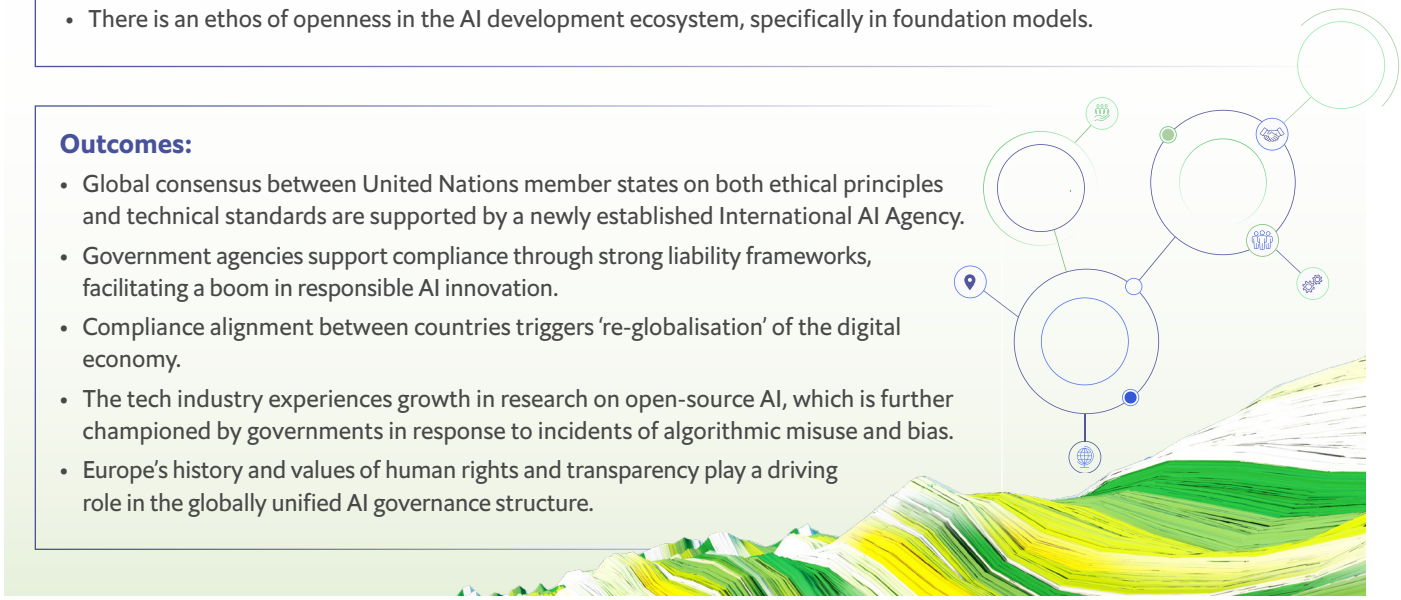
Scenario 1: The global orchard

Assumptions:

- Geopolitical tensions have calmed enough to pave the way for productive talks on AI regulation and governance between global leaders.
- There is an ethos of openness in the AI development ecosystem, specifically in foundation models.

Outcomes:

- Global consensus between United Nations member states on both ethical principles and technical standards are supported by a newly established International AI Agency.
- Government agencies support compliance through strong liability frameworks, facilitating a boom in responsible AI innovation.
- Compliance alignment between countries triggers 're-globalisation' of the digital economy.
- The tech industry experiences growth in research on open-source AI, which is further championed by governments in response to incidents of algorithmic misuse and bias.
- Europe's history and values of human rights and transparency play a driving role in the globally unified AI governance structure.



Scenario 2: Walled gardens

Assumptions:

- Global political climate facilitates limited, but still somewhat successful, negotiations surrounding AI regulation and governance.

Outcomes:

- Global AI governance structures align on technical standards, led by the International Standards Organisation (ISO), but fail to do the same on ethical and values-based principles of AI.
- Limited alignment between governance structures on human rights and privacy limits public trust in AI, with limited participation from smaller firms in the market, owing to high compliance costs.
- Inflexible AI standards impact the fledgling AI industry in emerging economies, which also struggle with a lack of reliable Internet, high cost of compute, limited local data sets and brain drain.
- Europe's strength lies in academia while the US and China dominate as commercial leaders.

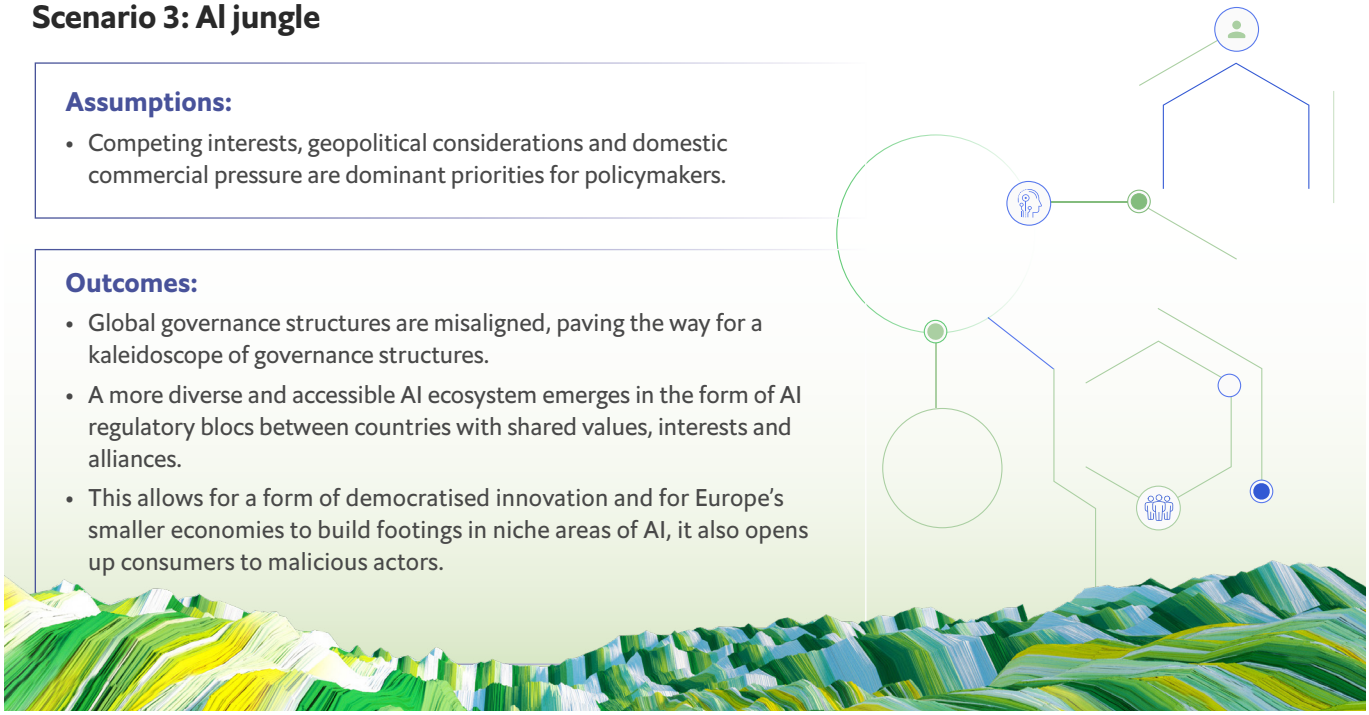
Scenario 3: AI jungle

Assumptions:

- Competing interests, geopolitical considerations and domestic commercial pressure are dominant priorities for policymakers.

Outcomes:

- Global governance structures are misaligned, paving the way for a kaleidoscope of governance structures.
- A more diverse and accessible AI ecosystem emerges in the form of AI regulatory blocs between countries with shared values, interests and alliances.
- This allows for a form of democratised innovation and for Europe's smaller economies to build footings in niche areas of AI, it also opens up consumers to malicious actors.



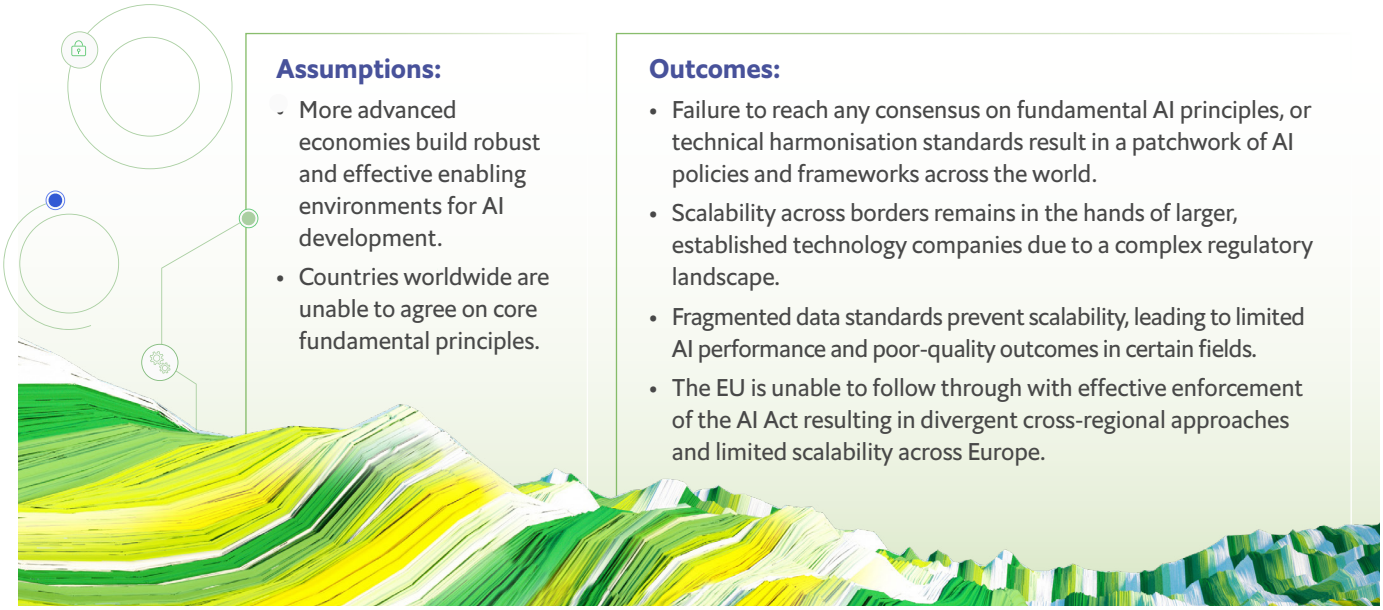
Scenario 4: Techno archipelago

Assumptions:

- More advanced economies build robust and effective enabling environments for AI development.
- Countries worldwide are unable to agree on core fundamental principles.

Outcomes:

- Failure to reach any consensus on fundamental AI principles, or technical harmonisation standards result in a patchwork of AI policies and frameworks across the world.
- Scalability across borders remains in the hands of larger, established technology companies due to a complex regulatory landscape.
- Fragmented data standards prevent scalability, leading to limited AI performance and poor-quality outcomes in certain fields.
- The EU is unable to follow through with effective enforcement of the AI Act resulting in divergent cross-regional approaches and limited scalability across Europe.



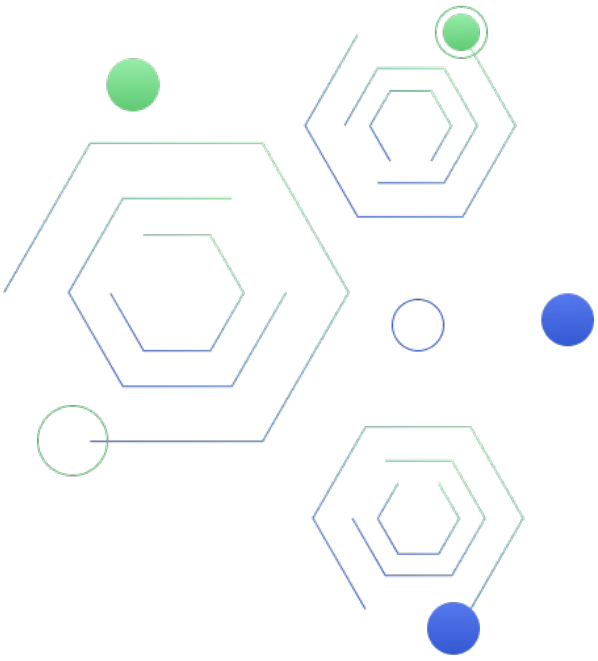
Despite these four differing future scenarios of AI with respect to global governance and accessibility, there are common core questions that policymakers, and other stakeholders, will need to answer. The solutions to these questions may not be one-size-fits-all but this further reflects the need to evolve and reassess policy considerations as the technology evolves.

If governments worldwide gravitate towards a unified approach to global AI governance, policymakers will need to consider establishing a viable framework for certifications and audits to ensure adherence to AI regulations. Furthermore, they must ensure that legal enforcement mechanisms are robust and accessible through national court systems. Policymakers will also face the challenge of enhancing the technical capacity of government agencies responsible for crafting

and enforcing AI policies. There is an important role for multilateral and bilateral donors to invest in building technical capacity in partner countries as part of their development programs, given the central role of technology in driving economic growth, which could simultaneously support international harmonisation through best practice adoption. Policymakers will need to leverage collaborative partnerships between the private sector and universities to facilitate the exchange of ideas, models and best practices. Lastly, policymakers may need to allocate resources to bolster the domestic AI ecosystem, promoting competitiveness on the international stage.

In the context of potentially moving towards a fragmented AI governance landscape, long-term business planning and research and development (R&D) will be essential. Policymakers will need to devise relevant strategies to integrate these efforts within an environment that may become increasingly unstable and uncertain. This necessitates flexible and adaptive approaches to navigate shifting regulatory landscapes. Additionally, governments should be mindful of crafting policies that align with the core purpose of AI regulation or democratic principles, without introducing unnecessary and unproductive complexities. Balancing the need for governance with the preservation of innovation and democratic values is at the heart of these deliberations, ensuring that AI remains a driving force for progress despite potential fragmentation.

When formulating policies to bolster widespread access to the AI development space, policymakers should prioritise two core considerations. Firstly, capability factors must be addressed, encompassing affordability, technical requirements and the infrastructure prerequisites necessary for AI-model utilisation. Ensuring accessible energy and stable graphics processing unit (GPU) supply is vital, necessitating investments in energy-efficient AI and 'green software'. Furthermore, innovating in areas such as quantisation and distillation is pivotal for fostering broad AI accessibility. Secondly, on the policy front, maintaining public support for AI is imperative. Mishaps, malpractices and opaque AI applications can erode public trust and support, as seen in sectors like healthcare. Policymakers must view governance as an integral element of AI's social licence to operate, given the unpredictable nature of digital risks and historical reactive government responses.



Introduction

"It is change, continuing change, inevitable change, that is the dominant factor in society today. No sensible decision can be made any longer without taking into account not only the world as it is, but the world as it will be… This, in turn, means that our statesmen, our businessmen, our everyman must take on a science fictional way of thinking." These words from science-fiction writer, Isaac Asimov, are just as relevant today as they were back in the 1970s.

For decades, "artificial intelligence" was only accessible to the everyday person through the pages of sci-fi novels. Fast-forward to today and AI platforms are integrated into our smartphones, laptops and televisions. AI is now a part of everyday activities, even if we don't realise it. From the facial recognition in your smartphone's screen unlock feature to the personalised ads on social media and movie recommendations from a streaming platform, AI is ubiquitous. Moreover, the recent proliferation of generative AI tools—a type of AI that takes what it has learned from examples to create new and original words and imagery[1]—showcases the growing ways in which AI can be used in daily life. Such tools are transforming how workers approach specific tasks, from marketers generating advertising copy to lawyers summarising legal texts.

AI is now a part of everyday activities, even if we don't realise it.

Stakeholders from technologists and academics to regulators and the broader public recognise the benefits they stand to gain by enabling AI. At the same time, there is a significant push from all sides to approach AI with caution. With the promise of AI comes potential perils—bias perpetuation, data privacy concerns and unethical use cases such as automated weapons, to name a few. These risks, and approaches to minimise them, are not new but as AI evolves and becomes more readily available, there is a need to ask, what happens next? What does the future of AI development and deployment look like? How will the current forces that are driving AI development evolve? Are we on track for a future in which AI is developed and deployed safely and responsibly? What policies and regulations will be needed to guide responsible AI, and who should participate in shaping them? And how will these different factors interact with each other, and external forces and events?

To answer these questions, this Economist Impact report employs a qualitative strategic foresight programme to explore scenarios illustrating the future of AI based on nuances in global governance approaches and accessibility of AI. The report highlights four potential futures of AI: The global orchard; walled gardens; the AI jungle; and the Techno archipelago (see Figure 2).

[1] https://www.turing.ac.uk/news/data-science-and-ai-glossary

Figure 1: Refining the axes

Figure 2: Potential pathways

Scenario 1: The global orchard

A global consensus covering both ethical principles and technical standards, combined with government agencies to support compliance, fuels a boom in responsible AI innovation and drives 're-globalisation' via the digital economy.

Scenario 2: Walled gardens

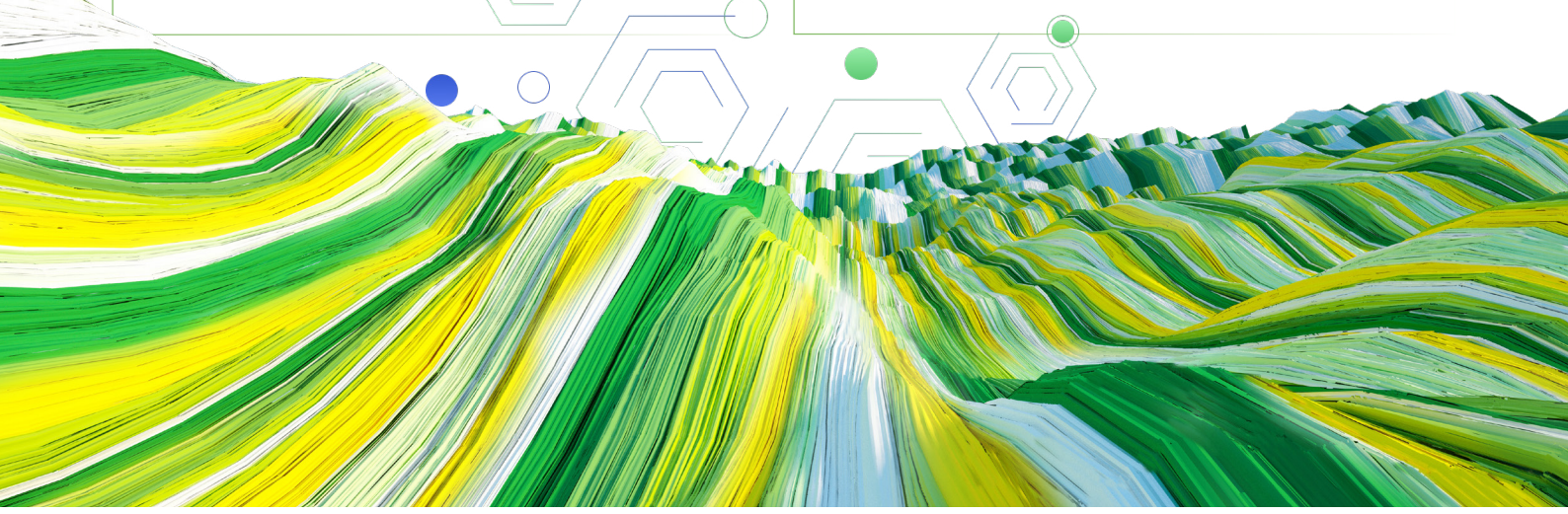
A unified, stringent agreement on technical standards, but without political consensus on ethical and values-based principles, like human rights and privacy, limits trust in AI and prohibits participation from smaller firms.

Scenario 3: AI jungle

A boom in AI innovation, but without a unified global approach to governance and standards, leads to a flourishing of innovation but opens doors to malevolent actors.

Scenario 4: Techno archipelago

Countries fail to reach an international AI agreement on fundamental principles or technical harmonisation standards leading to a severe splintering of the global AI policy map into a patchwork of different frameworks and differing levels of maturity and obligation.



Scenario 1: The global orchard

High accessibility, unified global governance framework

A global consensus on ethical principles and technical standards, combined with governance agencies to steer compliance, fuels a boom in responsible AI innovation. Adoption and growth of AI tools drives 're-globalisation' via the digital economy.

Moving towards global consensus

In 2026, a global AI treaty, the Convention of AI Principles, orchestrated through the United Nations, commits all member states to uphold fundamental principles of transparency, accountability and safety, including outright restrictions on the use of AI for the highest risk applications, such as predictive policing, social scoring or emotion recognition. A global advisory body called the *International AI Agency*, or IAIA, modelled on the Intergovernmental Panel on Climate Change (IPCC),[2] monitors developments, pools AI knowledge and provides scientific guidance to help governments monitor emerging threats and challenges, sharing best practices. The International Organisation for Standardisation (ISO) develops and continually updates technical and assurance standards, supporting interoperability and harmonisation of AI products and systems. Commercial sectors also come together to strengthen collaboration and coordination within their own sectors, led by the financial services industry, whose Global Fin-AI institution mirrors the Basel Committee's focus on financial stability, focusing on the systemic and governance risks of AI in the financial sector.

Domestic legal frameworks are enhanced to strengthen trust and transparency, with national courts empowered to handle liability cases, ensuring due process when AI tools are implicated in harms to an individual or companies. A host of new types of legal disputes start to emerge as AI becomes more commonplace. One such case emerged in 2027 involving virtual influencers that have become immensely popular on social media platforms, often gaining millions of followers and lucrative endorsement deals with major brands. In this case, Aria Lee, a human influencer, sued a virtual influencer, AI-mee, for infringement of her likeness and persona, claiming that the AI's persona and appearance mimic her own. Cases like these are resolved according to due process, and growth of case law provides ever-improving clarity about the permitted zones of AI activity. Commitments to uphold independent AI arbitration become part of bilateral and multilateral trade and investment treaties, starting with the 2025 Transatlantic Digital Trade Agreement (TADTA) between the US, UK and European Union (EU).

[2] https://www.ft.com/content/d84e91d0-ac74-4946-a21f-5f82eb4f1d2d

To enforce and uphold the global consensus on ethical and technical standards, and regulatory best practice, individual countries set up national AI offices to strengthen government policy coordination and support domestic companies in complying with regulation. This movement was led by a group of countries with pre-existing leadership in digital regulation and political will to build institutions to support AI development, including the likes of Spain,[3] the UK[4] and Estonia, alongside the East Asian economies of Singapore, South Korea and Taiwan. Over time, more countries adopt the principles and institutional design ideas of these frontrunners, creating a global network of like-minded institutions, fostering collaboration, coordination and regulatory harmonisation. The US and UK governments invest heavily in cloud-accessible AI compute resources, democratising supercomputing capacity, especially for academic institutions. Others follow, including Saudi Arabia, the United Arab Emirates and South Korea. The UK also leads the world in AI industrial policy, led by the Advanced Research and Invention Agency and modelled on the pioneering internet and computing interventions of the Defense Advanced Research Projects Agency (DAPRA). More and more countries develop their own industrial strategies to unlock fundamental advances in AI hardware and science.

A thriving ecosystem of AI innovators

This common global approach, covering ethics, regulatory design and technical standards, creates an enabling environment for AI innovation, allowing companies to build and scale products quickly and seamlessly without compromising safety. This thriving AI ecosystem, reflected in high demand for technology and AI-related education, inspires more talent into the sector across a growing array of roles from engineering and product development to governance and ethics.

It also sends a clear signal for technology companies to commit to ethical and responsible AI, above and beyond legal requirements.

[3] https://algorithmwatch.org/en/what-to-expect-from-europes-first-ai-oversight-agency/
[4] https://www.gov.uk/government/organisations/office-for-artificial-intelligence

Europe...becomes a global foundry of ideas and a central node for international frontier collaborations.

Approaches like Constitutional AI,[5] which trains and monitors AI systems based on core principles rather than relying on human oversight, allow AI governance at scale.

The tech industry sees a surge in global research efforts focused on open-source AI, leading to breakthroughs in model efficiency, adaptability and generalisation capabilities. Following incidents of algorithmic misuse and bias made possible through AI models of the past, governments pivot to champion the open-source model, prioritising the benefits of open-source AI, including greater transparency, accountability and security.

The prominence of open-source models facilitates greater accessibility of the AI field to a wider range of developers, leading to flourishing innovation and the emergence of new businesses. This, coupled with the signalling effect of the international consensus on the importance of AI standards, makes possible the continuous inspection of AI for issues like data contamination, privacy risks or model deterioration.

The unified global consensus on the need for responsible AI and the regulatory tools to enforce it, and the technical standardisation support offered by the ISO and related agencies, leads to an era of 're-globalisation' as digital economies become more tightly integrated. Shared values and standards, and legal predictability and protections, fuel a seamless digital supply chain as new companies emerge to capitalise on the opportunities of the AI era in everything from model tuning and training data to proprietary AI systems for enterprise. The combination of a strong global treaty, a culture of responsible AI in the business community and the creation of robust legal frameworks improves trust in AI among the public, fostering greater commercial innovation, as consumer appetite for AI products increases.

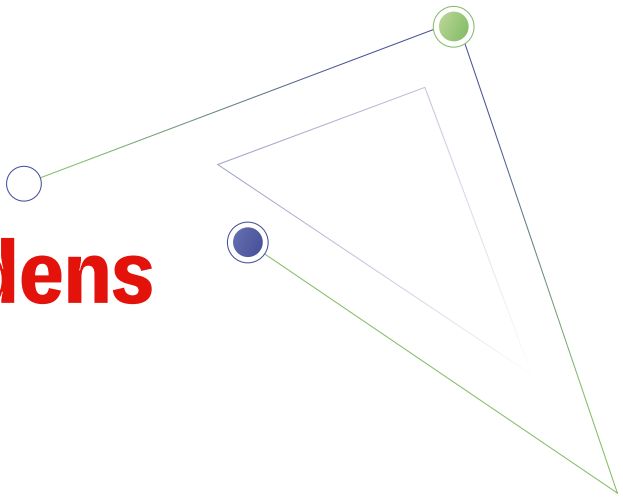
Europe's influential role

The EU plays an influential role in shaping global AI policy as European values on human rights and transparency are incorporated into the UN-brokered global agreement. The continent becomes a global foundry of ideas and a central node for international frontier collaborations. Leading scientific research institutions and universities, including CERN,[6] the Barcelona Supercomputing Centre[7] and the Alan Turing Institute,[8] collaborate on path-breaking projects sustainability, deep-tech and pandemic preparedness. European Laboratory for Learning and Intelligent Systems (ELLIS)[9] units expand across the continent, building research excellence, data and tool-sharing. European think tanks also help to develop and diffuse policy best practices globally.

A series of breakthroughs in medical innovation, including an mRNA vaccine for cancer approved in 2029, are hatched in Europe, powered by AI infrastructures and the existing skills and commercial clout on the continent. Owing to the growth in open-source AI models, European startups thrive. However, the unified global policy framework makes cross-border scaling frictionless and Europe's more limited venture capital community, and regulatory and tax frameworks persuade home-grown startups to move operations.

[5] https://www.anthropic.com/index/claudes-constitution
[6] https://sparks.cern/ai-cern
[7] https://www.bsc.es/
[8] https://www.turing.ac.uk/
[9] https://ellis.eu/units

Scenario 2: Walled gardens



Low accessibility, unified global governance framework

A unified, stringent framework on technical standards, but without political consensus on ethical and values-based principles, like human rights and privacy, limits trust in AI and prohibits participation from smaller firms. The fledgling AI industry in emerging markets also struggles due to unreliable infrastructure, data limitations, computing costs and talent scarcity.

Two diverging tiers of governance

A set of practical AI standards and certifications are agreed, forged by the International Standards Organisation (ISO), with a high bar in areas like safety, explainability and cyber security. However, it lacks political teeth on issues like privacy, human rights or military use due to a lack of consensus among nations. Negotiators opt for more stringent requirements on technical AI performance, partly due to difficulties in agreeing on more politically divisive areas. Competent authorities in each country adopt the ISO standards and there is some regulatory harmonisation on operational requirements, such as mandatory reporting when developing AI models with any potential impact on public health and security.

Technical requirements for testing, monitoring and audits mitigate risks related to consent, copyright, cyber security and liability, but because they are not differentiated by model size or the commercial clout of the developer, only the largest firms are able to comply. The rules are also criticised as too static to accommodate and respond to the evolution of AI itself, limiting the incentive for innovation.

AI standards have a chilling effect on smaller companies and the fledgling AI industry, especially in emerging economies, which struggle with the additional deficit of IT infrastructure and skills, due to a lack of reliable internet, the high cost of compute, limited local data sets and a brain drain. Moreover, the energy intensity of AI model training comes with a price tag that only the biggest firms can afford. AI's strong contribution to GDP in the most advanced economies adds fuel to global inequality. Pedro Havas, the incoming head of UNESCO in 2030, says the world's richest economies have purposefully created a high barrier to maintain their dominance of the lucrative AI industry.

Geopolitical tensions between the US and China lead to tit-for-tat export controls and expanding 'designated entities' lists, leading to a chronic shortage of critical materials like high-performance GPUs. Larger tech companies control the global supply chain and costs of AI training remain high.

Consolidation of AI among giants

The biggest AI companies realise that globally unified technical standards allow them to operate across markets, justifying heavy investment in legal and compliance headcount and technology. Multinationals outside of the technology sector, in areas like energy and finance, increase their spending on AI, as they calculate that an efficient international standards environment makes the investment worthwhile for scaling AI. This leads to notable breakthroughs in high-impact sectors, including advances in energy system optimisation and planning, boosting progress to net zero, and computational systems for drug development that significantly lower the cost and risk of medical R&D. Large 'moats' are an incentive for large tech companies and deep-pocketed multinationals to invest in higher-ambition AI ventures, in ways that a more competitive and open environment may not. It also brings deployment efficiencies as AI capabilities are seamlessly rolled out across digital infrastructures. Companies with the most experience in deploying AI, such as finance and healthcare, move the fastest to adopt and develop new capabilities, but less experienced sectors, and smaller firms, remain on the side lines. This culminates in a 'two-speed' digital economy, and increased consolidation of economic power.

The consolidation of AI power among a few companies creates a polarised environment and pushback on AI products for fear of corporate capture. In 2024, we saw the rise and fall of multiple new-to-market AI accessories from large tech companies. For example, leading fashion brands partnered with established AI developers to bring to market the AI Reflect—a mirror that employed facial recognition to provide users with tailored outfit options, depending on weather, and fitness advice. The product did not take off due to privacy concerns and complaints by users of the mirror providing advice based on traditionally accepted body types. Another discontinued product type was the 'virtual desk'. Developed in response to the 2020 coronavirus pandemic-induced work-from-home adaptation, employers start working

[10] https://techcrunch.com/2023/11/06/get-the-pdf-outta-here/;

with developers to provide AI-enabled workspaces—a home workspace that projects a holographic desktop with interactive 3D elements and virtual assistants—only for the investments to be unfruitful due to a backlash against employer snooping.

A surge in AI startups around the 2022 to 2024 era petered out, as many companies could not afford the compliance costs that emerged with tighter standards, and large firms preferred to solicit AI products from established technology companies. Tweaks and improvements to foundation models erode the commercial opportunity for some wrapper startups.[10] These improvements start to solve problems that companies were set up to solve around the edges of earlier models, such as sector-specific use cases, functionalities like PDF reading and writing assistants, and co-pilots trained on data in specific verticals, leading to further consolidation. Improvements to data privacy and security in dominant foundation models lessens companies' adoption risk, thereby pulling the rug from startups that had developed more secure models for highly regulated sectors like finance.[11]

Public interest in AI wanes as consumers see little direct benefit in their daily lives. Lack of demand for AI from enterprises overall, means limited incentive for new companies and startups in the reg-tech and AI auditing space. These companies would otherwise bring down the costs of such technology consulting services and democratise access to auditing and data tools, as has occurred in ESG benchmarking and data services.

Europe lags behind

Apart from the pharmaceutical and finance sectors, in which it has a global leadership position, Europe falls behind the US and China in this low-access environment. AI diffusion is quicker in the US due to a more dynamic and experimental business culture, tighter linkage between industry and academia, high-skilled immigration, especially from India, and an enabling business environment. The US government invests heavily in supporting domestic companies to achieve AI compliance as it considers the field a geopolitical and strategic priority vis-a-vis China, and the country builds on its early lead in AI, which leads to a feedback loop in terms of talent attraction.

European AI progress remains confined to universities, which lead important research initiatives, and benefit from EU Horizon funding that increasingly targets AI, but, as mentioned above, there is little progress in commercial spinouts due to compliance risks, uncertainties and adoption bottlenecks. US companies quickly dominate global AI and build unbreachable 'moats' as the quality and reach of their models accelerates. In addition, slow progress on improving access to, and the cost of, renewable energy makes the energy intensity of computation an access challenge. Europe's emissions trading system (ETS)[12] ratchets up pressure on energy-intensive industries to meet the continent's net-zero targets. High energy costs make AI-model development unaffordable for many European firms.

The consolidation of AI power among a few companies creates a polarised environment and pushback on AI products for fear of corporate capture.

[11] https://www.worklife.news/technology/chat-gpt-data/
[12] https://taxnews.ey.com/news/2023-0740-european-parliament-approves-eu-emission-trading-system-reform-and-new-eu-carbon-border-adjustment-mechanism

Scenario 3: The AI jungle

High accessibility, fragmented global governance framework

A boom in AI innovation, but without a unified global approach to governance and standards, leads to a flourishing of innovation but opens doors to malevolent actors.

Global governance at odds

A resurgence of strategic rivalry between nations leads to governments being at odds due to competing interests, geopolitical considerations and domestic commercial pressure, including leveraging competitive advantage through regulatory arbitrage. As a result, countries fail to agree on AI governance and industrial policy, including technical and ethical regulatory principles. Initial optimism that the EU AI Act, the text of which was approved in 2023, would become a benchmark for global governance, as with GDPR, was over-optimistic. AI proves to be too diffuse a technology, without definitional agreements, and even European economies struggle to implement the provisions consistently. Each country designs its own regulatory approach, with some embedding AI into the purview of existing regulatory agencies and authorities, and others designing AI-specific regulatory frameworks.

National sovereignty concerns mean most countries prefer to regulate AI based on their own values, principles and capacities, rather than sign up to an international framework led by the 'Global North'. Electoral politics also fosters policy instability, as domestic attitudes and priorities shift hot and cold and AI and digital regulation moves up and down the policy agenda based on other policy priorities. An already existing shift towards robust industrial strategy and protectionism increasingly moves into the digital sphere.

Rather than a single unified approach, what emerges is a kaleidoscope of initiatives, with countries forming blocs and networks based on shared interests and alliances. An AI Treaty led by the Council of Europe, provides some consensus among signatories, but many countries do not participate, including the UK, the US, and China. The EU AI Act includes strong provisions and legal restraints on certain use cases, including biometrics, welfare allocation and surveillance, which some non-EU countries reject. Emerging economies favour a more liberal approach that they hope will foster innovation and be more practical to uphold. India, in particular, as part of the AIndia Initiative, offers a light-touch regulatory framework to encourage its home-grown, Bangalore-based software industry to excel in the fast-growing AI services market.

More access, more risk

Positively, the lack of a single stringent global policy framework enables companies and startups to exploit niches and leads to a more

The lack of a single stringent global policy framework enables companies and startups to exploit niches and leads to a more diverse ecosystem.

diverse ecosystem. As AI becomes interpretable and low or no-code, and AI literacy becomes part of education curricula, more and more countries are able to compete and build products. The high-access environment is also democratising overall, with 'code co-pilots' allowing more entrants into tech and data, bringing new perspectives and creativity.

AI user hardware interfaces emerge to offer a 'form factor' for AI, such as ultra-thin digital glasses and voice-activated pendants, and green software innovations lower the compute and energy requirements of AI models through techniques like distillation and quantisation. Innovation in cooling technology also allows data centres to dramatically lower their energy intensity. AI techniques are applied to areas like nuclear fusion, unlocking breakthroughs in energy production that significantly improve progress to net zero. Following the Transformer breakthrough, an AI visual processing innovation from a French startup, SpAItial, enables AI systems to understand and navigate 3D space, unlocking new commercial avenues in robotics, drones, transportation and healthcare.

Negatively, in a high-access environment with no unified policy framework, some companies use AI to execute questionable practices like behavioural manipulation and predatory pricing that exploits consumers by recognising patterns of reckless spending. BetIntel, a Las Vegas-based startup, uses AI to drive up transactions through means such as constantly prodding users with updates and special offers during typical work breaks like lunch time or late afternoon, using pattern analysis of user activity. BetBot, an AI agent, provides a 'human' face to the platform that increases engagement and creates a false sense of trust. Unrestricted APIs allow a boom in startups emulating the 'GPT-wrappers' of 2023, leading to significant duplication and many failed ventures. Emerging economies that have built significant economic growth and employment in the business process outsourcing (BPO) industry, like Kenya and the Philippines, suffer major economic contractions as AI tools replace millions of human knowledge workers. The more seamless intersection of AI with robotics leads to more common fully automated or 'lights-out' factories, removing a job creation workhorse that delivered much of the late 20th century's economic growth in emerging economies.

Innovations do emerge to tackle malfeasance, such as allowing 'poisoning'[13] of AI models trained on copyright content, but so do nefarious hacks and techniques like jailbreaks that circumvent model safeguards. There is a constant cat and mouse between foundation-model developers and mischief-makers. The open-source ideology backfires, as nefarious actors strip out guardrails and access toxic base models, and fine-tune them on harmful data like malware code and bio-weaponisation. DNA synthesis laboratories, which produce DNA sequences 'to order', are unable to spot malevolent manufacturing requests at huge scale and frequency, as their guardrails were based on a small set of diseases like smallpox.

The uncontrolled AI boom leads to several crises. AI-powered synthetic media ('deepfake') technologies wreak havoc on elections, especially in fragile or emergent democracies. A flood of fake news leads to low public trust in online information, leading to a public health crisis during a new coronavirus emerging in a Mexican poultry factory in 2028, due to a lack of reliable information. AI is used on rights-critical areas, like recidivism/crime prediction, prompting

calls for bans from public lawyers who believe it transgresses constitutional rights and freedoms, such as presumption of innocence, and replicates racial bias. A proliferation of unregulated AI personal doctors are launched without clinical validity, leading consumers to take faulty actions on symptoms.

A series of 'flash crashes' and financial market turbulence, brought about by robo-investment tools, excessive algorithmic-based trading and AI-powered crypto bubbles, leads to news rules from the US Securities and Exchange Commission (SEC). But this prompts 'challenger' financial hubs to pass more welcoming legislation to attract investment. These become breeding grounds for financial crime.

A high-access environment allows Europe's smaller economies to build niches. Lithuania builds a fin-tech leadership position. Estonia develops electronic health data infrastructures that countries licence. Nordic and Baltic states build unique capabilities based on large data sets, open-data economies and digital ecosystems, thanks to e-government initiatives and large popular support for and engagement with digital tools. European research institutions[14] and independent developers release models in their own languages, including but not limited to Spanish, Basque, French and Nordic languages. Other regions follow suit leading to greater access to LLMs, in Arabic for instance.

A high-access environment allows Europe's smaller economies to build niches.

[13] https://venturebeat.com/ai/meet-nightshade-the-new-tool-allowing-artists-to-poison-ai-models-with-corrupted-training-data/
[14] https://github.blog/wp-content/uploads/2023/07/Supporting-Open-Source-and-Open-Science-in-the-EU-AI-Act.pdf

Scenario 4: Techno archipelago

Low accessibility, fragmented global governance framework

Countries fail to reach an international AI agreement on fundamental principles or technical harmonisation standards leading to a severe splintering of the global AI policy map into a patchwork of different frameworks and differing levels of maturity and obligation.

Diverging pathways

Yawning gaps in capacity mean the most advanced economies build robust and effective enabling environments for AI development, but many countries are unable to agree and enforce meaningful legislation, or pass legislation without effective support for companies to comply. The US, lead economies in Europe, and East Asia each forge a leadership position in AI development as measured by IP, patents and commercial activity, but the lack of global consensus and standards means AI players are generally confined to their home market.

Countries reach very different levels in terms of their AI policy governance, with the most advanced, such as the US, parts of the EU and East Asia, investing heavily in government AI capacity and support for the domestic ecosystem but many other countries failing to advance. Resource-constrained or 'AI-immature' countries struggle to apply existing laws in the AI era, in terms of identifying when AI-powered tools have led to a breach of existing legislation, like bias, leading to scepticism that AI governance on a global scale can be deployed.

Globally, like-minded countries, bonded by language, culture, history or migration flows, form bilateral AI partnerships e.g. US and India.[15] Western-oriented Asian economies (Taiwan, Japan) combine resources and capacity to build an indigenous AI ecosystem allowing them to defend against a more aggressive China. High-income Gulf nations, led by Saudi Arabia, invest heavily in AI infrastructure, energy and computing as part of economic diversification plans and to find sources of competitiveness in the AI-centred global economy. In Latin America, domestic tech companies with a deep understanding of local tastes and demographics build the most popular AI-centric businesses.

Inferior AI

There are few agreements on technical AI standards either, which makes scaling AI products across borders difficult for all but the largest, best-resourced companies. Due to differing legal requirements, non-tech companies invest far less in AI than they

[15] https://www.reuters.com/technology/us-india-partnership-targets-arms-ai-compete-with-china-2023-01-31/

The lower quality of AI in a balkanised data ecosystem leads to more flawed products on the market.

might desire, for fear of falling short in higher regulated markets. Multinationals procure dozens of different AI services and products within each market, rather than singular platforms across the enterprise. Because scale and data richness confer quality for AI, global fragmentation and limited corporate uptake mean the performance of AI generally plateaus. As the first Generative AI tools of 2022 to 2024 exhaust the corpus of human data, developers lean more heavily on synthetic training data, leading to model collapse[16] and a significant deterioration in the quality of AI tools. Synthio, a synthetic data startup, becomes a pioneer in the field of training AI models once human-generated sources are exhausted. The company enjoys huge success as data-hungry industries like healthcare run up against their limits. However, backed by growth-hungry venture capitalists, the company under-invests in data governance and its models suffer from ever-growing levels of pollution as models tend to replicate existing patterns and lose performance in terms of accuracy and probability. This leads to deteriorating accuracy in fields like medical diagnosis.

The lower quality of AI in a balkanised data ecosystem leads to more flawed products on the market. One UK platform, GovAInfra, promises to deliver AI-powered public infrastructure decision intelligence, but due to weak model testing and human oversight, it over-responds to minor price shifts in energy markets and shuts down energy provision prematurely. Other countries suffer similar challenges as the complexity of building reliable AI energy networks in a fast-changing international energy market makes electricity provision and modelling difficult. Positively, limited cross-border AI and data flows also limits the significance and reach of risks like AI-powered cyberattacks across networks, or financial market 'flash crashes' from algorithms run amok.

Splintered approaches

The US and China dominate the AI ecosystem as the centres of investment, talent and power. In the US, a highly developed venture capital and entrepreneurial ecosystem leads to a boom in consumer and enterprise demand for the large domestic market. In China, sizeable domestic data, including through participation in the ecommerce ecosystem and 'super apps', provides raw material for high-level AI training. China leads the world in patent development. While the EU's AI Act is enacted into legislation, the region lags in consistent and effective enforcement. The Act struggles to reach consistent implementation at the national level, meaning the continent struggles with 27 micro-markets' differing approaches to enforcement, leaving companies with a lack of regulatory clarity, low adoption rates and limited scalability across EU borders.

The UK seeks to be a 'bridge' between the rules-based EU and market-driven US, approaching AI within existing regulatory capacity in different sectors without new laws. The UK and Netherlands embed AI into existing legislation and mandates, while France and Germany create new AI-specific legislation. On the positive side, the legal complexity of Europe's AI landscape(s), combined with the large domestic markets in the US and China, acts as something of a 'moat' for European AI companies in their home markets due to diminished global competition.

[16] https://www.techtarget.com/whatis/feature/Model-collapse-explained-How-synthetic-training-data-breaks-AI

Policy considerations

The following section outlines the core considerations and questions that policymakers will need to account for when thinking about AI and its governance. These considerations build on the scenarios above, aiming to highlight the pathways towards greater access to AI and balancing the benefits and risks of both the unified and fragmented governance framework scenarios.

Unity vs. fragmentation: Balancing standardisation with context

Contemporary AI is a general purpose technology with ever-lower barriers to entry thanks to the accessibility of generative AI and low-code/no-code interfaces. An international level playing field with transparent rules and principles allows companies to scale across borders and enhances competition by allowing smaller firms or new entrants to build global products. A rules-based, stable international trading environment for critical hardware like GPUs will also be essential to the flourishing of AI. To be maximally successful, a unified global AI framework would combine fundamental ethical principles on the one hand and technical standards and harmonisation on the other. The latter includes a workable system of certifications and audits with legal enforcement through national court systems, where appropriate. Government agencies would also need sufficient technical capacity to design and uphold AI policy. Ensuring this on a global level would require investment and capacity support from international donor groups and governments to help bring all countries into alignment.

A unified approach to AI could also be achieved through 'bottom-up' collaboration to embed common practices and approaches beyond legal compliance and to ensure that

The AI community needs to view governance as part of its social licence to operate, not just as a means of compliance.

principles like transparency, explainability and safety are operationalised and not mere window dressing. Partnerships between the private sector and universities can strengthen the flow of ideas, models and practices between academia and industry, allowing research groups to support commercial operators much as they have done in sustainability and ESG or cybersecurity. Academic institutions can support international AI coordination by acting as hubs for major research initiatives, spreading power and influence for the direction of AI across societal stakeholders. Europe can leverage its strong academic AI ecosystem by supporting spinout, commercialisation and technology transfer, and IP, including through research initiatives like Horizon.

One risk of a unified international AI framework is that, as with the globalisation of trade, there are winners and losers, and fledgling domestic AI players can lose market share to better-resourced international competitors where capacity to compete is too weak or immature. Governments may need to consider appropriate investment and support for the domestic AI ecosystem to build competitiveness. A second risk of a unified global governance approach is that, without appropriate flexibilities, the standards could be set too high for many companies, leading to a chilling effect in which only the largest, most experienced and best-resourced firms can comply. An inclusive approach to AI policy and standard-setting would enable the design of a framework that applies differential obligations. There is also a pressing need to close the digital infrastructure gap in emerging economies since without access to reliable, affordable digital services, they will fall behind, worsening global inequality. The technology industry can invest in labs and local offices in emerging economies to build capacity, knowledge-sharing and partnerships.

In either a high or low AI access future, a fragmented policy environment, which is more likely, will bring both complexity and benefits. On the risk side, fragmentation creates a more unstable and unpredictable policy environment, which limits the ability of AI companies to scale across borders. It may lead to market consolidation if legal complexity means only the biggest companies can scale the compliance burden, or significant duplicated effort internationally as AI innovations are built within each market, based on its own policy requirements, prohibiting scale. If policy is unstable within countries, as governments adopt differing positions, it makes long-term business planning and R&D problematic. This is already the case in areas like net zero, where governments are continually shifting positions and sending confusing signals to the market, deterring investment. On the positive side, fragmentation would allow for a multi-layered approach that reflects the nuances of different sectors, allows countries choices as to their own policy framework, and by introducing some trade frictions, could provide 'space' for domestic AI industries to emerge. It could also allow sectors to craft contextual requirements without the need to align all AI policies to an international benchmark. The key differentiator is whether fragmentation reflects purposeful policy and democratic difference, or unproductive complexity.

Facilitating access

Access to AI is contingent on both capability and policy considerations. Capability refers to the cost and complexity of working with AI models, especially foundation models, including both technical requirements and infrastructure considerations like energy and hardware. A high-access environment can only be achieved with affordable energy and stable trade in essential components like GPUs. Investing in energy-efficient AI and 'green software' will be critical to ensure AI does not introduce new environmental risks. Going forward, innovations like quantisation and distillation could be as important to a high-access AI environment as the performance of AI algorithms and foundation models.

On the policy front, access hinges on public support for AI. Accidents and malpractices as well as opaque uses of AI in both commercial and public sector domains could profoundly impact public support for AI, as they have already in areas like healthcare. Learning lessons from the societal backlash against the tech industry following the toxic content and deepening polarisation dynamics from social media, the AI community needs to view governance as part of its social licence to operate, not just as a means of compliance. This is especially true given that the risks of digital technology are emergent rather than foreseen; governments have generally responded to problems rather than anticipated them ahead of time.

Onwards we march

Within the rapidly evolving world of AI, the exploration of various scenarios and policy considerations is essential in trying to uncover the complex patterns shaping the future of AI rules, relevance and availability and to align on common understanding. Through this investigation, policymakers and community actors can understand the various opportunities and risks associated with AI, define their priorities and take action to enable AI in a responsible way. This report aims to do this by looking to the future and understanding two key components—the degree of accessibility of AI development and worldwide governing systems directing AI advancement.

The scenarios outlined in this report paint a vivid picture of potential futures. The emphasis lies on how governance should be viewed not only as a form of compliance but as an integral part of AI's social licence. Learning from historical public backlash against the technology, the AI community must actively engage in ethical, transparent and responsible practices, both from a domestic standpoint and on the international stage.

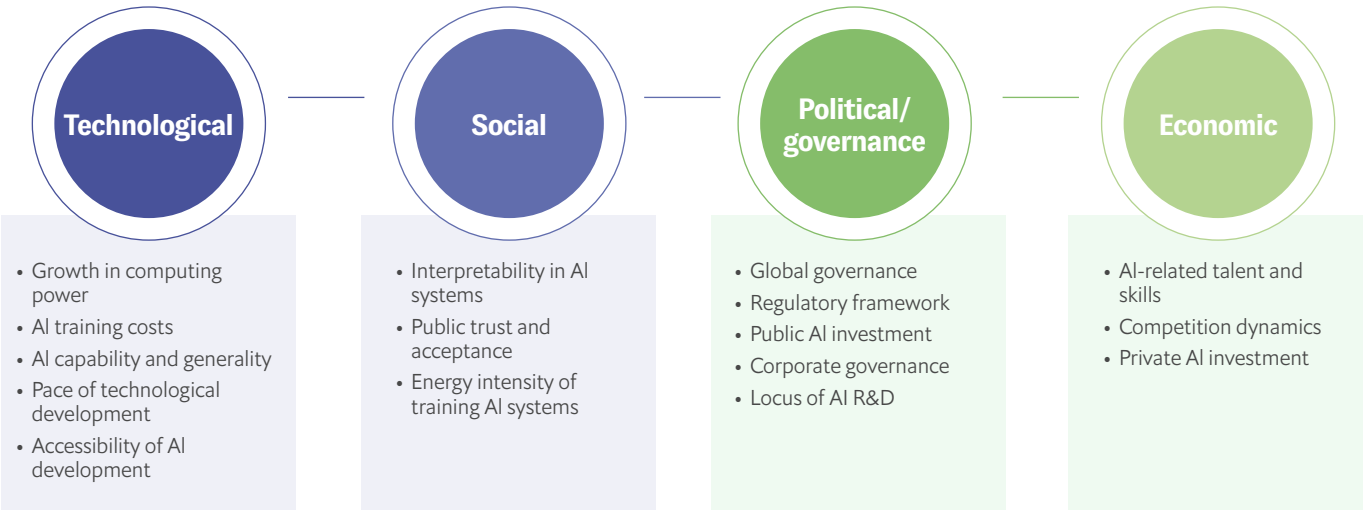
But these scenarios make up only a small share of potential futures and pathways that AI could take. This forward-looking approach to exploring how AI development and governance could evolve illustrates how policymakers, technologists and business leaders need to remain agile and resilient to potential shocks. These different stakeholders across the world are increasingly raising their voices for greater international cooperation in regulating AI.[17,18] For example, the inaugural 2023 AI Safety Summit, held in the UK, brought together leading actors in the international AI community and saw a consensus in the need to minimise potential AI risks.[19] European policymakers need to factor in this initial alignment to AI governance, as well as inevitable future divergences, when thinking about the future of AI policymaking and what this means for the future of AI, its development and its deployment.

[17] https://www.whitehouse.gov/briefing-room/presidential-actions/2023/10/30/executive-order-on-the-safe-secure-and-trustworthy-development-and-use-of-artificial-intelligence/
[18] https://www.ft.com/content/c7f8b6dc-e742-4094-9ee7-3178dd4b597f
[19] https://www.gov.uk/government/publications/ai-safety-summit-2023-the-bletchley-declaration/the-bletchley-declaration-by-countries-attending-the-ai-safety-summit-1-2-november-2023

Appendix: Methodology

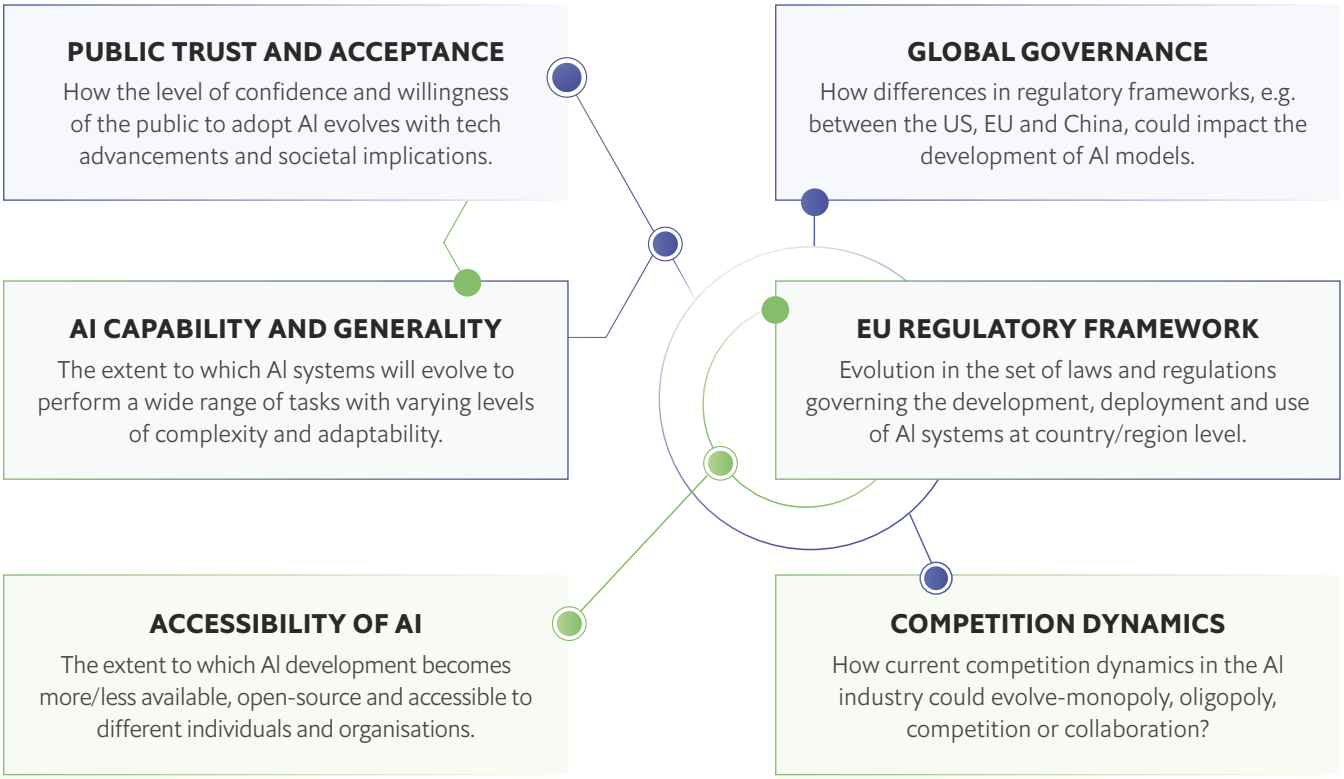
The research was built on an extensive literature review, a Delphi survey, a series of workshops and an interview programme. The literature review examined various aspects of AI development and application, addressing key questions about its current landscape and future trajectory. Convening technologists and academics with expertise in AI, Economist Impact conducted a Delphi survey to build expert consensus on the most important factors shaping AI development in an anonymous manner. Experts were asked to list 10-12 factors spanning AI regulation and governance, technological considerations, economic factors, and societal elements. All factors were compiled and reshared anonymously with the experts who were asked to rank the factors in order of importance. The factors ranked highest in importance by most experts were then selected to inform the two scenario development workshops.

Figure 3: Longlist of factors



In the first workshop, through a series of ranking activities and discussions, the group agreed on a set of six critical uncertainties—high-uncertainty, high-impact factors shaping the trajectory of AI development and deployment.

Figure 4: Critical uncertainties

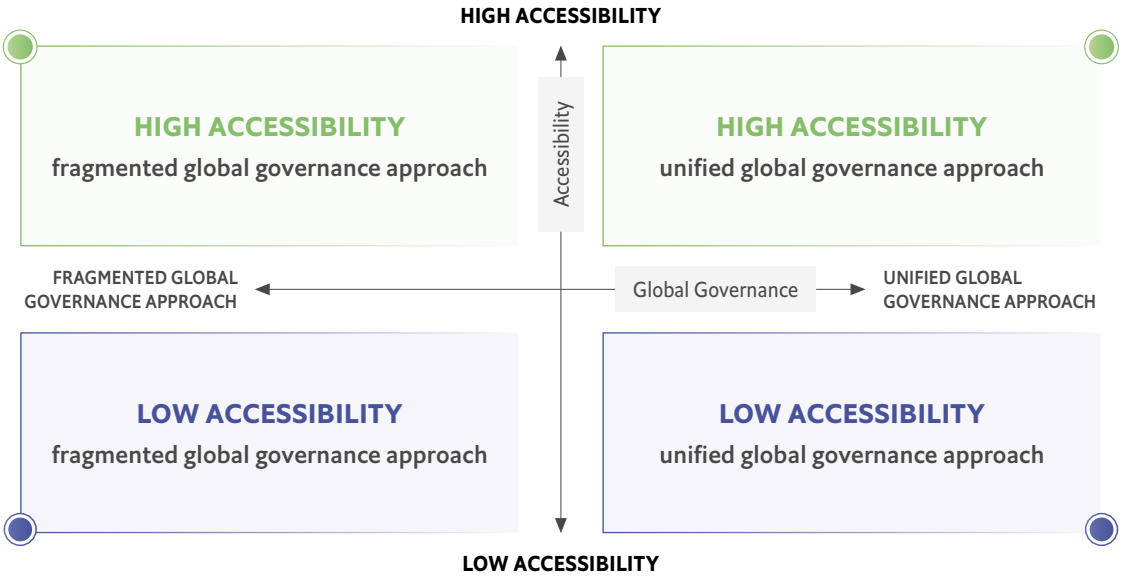


Following this, the session delved into a detailed exploration of how these prioritised factors could translate into trends. Experts were invited to attach directionality to each critical uncertainty and describe the alternative ways that each one might play out in the form of different axes to use in a 2x2 scenario matrix.

The second workshop focused on agreeing on a final set of two axes to form this matrix. The group agreed on building the scenarios using the following two axes:

- **Global governance:** This axis focuses on a unified vs. fragmented global governance framework.
  - The unified approach involves a multilateral, collaborative approach to regulatory decision-making and as a result there is greater international exchange of AI technologies and promotion of innovation through common standards and data flows. This unified approach implies strength in safety, risk management and containment of potential downsides.
  - The fragmented approach fosters a competitive mindset to regulating AI across different regions/countries and results in divergent approaches to AI regulation across nations globally. This creates challenges for cross-border flows of innovation and information.
- **Accessibility of AI:** This focuses on **high vs. low** levels of accessibility to the AI development space.
  - High accessibility entails greater democratisation of AI development driven by fewer barriers to entry, lower input costs (training data, capital costs), lower skills needs, prevalence of open-source models, etc. This facilitates a larger number of smaller developers and startups joining the market in addition to large actors.
  - Low accessibility involves greater barriers to entry to the AI development space, such as cost, high skill requirements and more closed and proprietary models, resulting in the market being dominated by few large players.

As a result the experts started to explore the potential futures that may arise using the following scenario matrix:



This report illustrates four scenarios for the future of AI along with core considerations that policymakers and business leaders will need to factor in when considering the development and deployment of AI.

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