UNITED NATIONS CONFERENCE ON TRADE AND DEVELOPMENT

OVERVIEW

2025 Technology and Innovation Report

Inclusive Artificial Intelligence for Development

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Content

Foreword

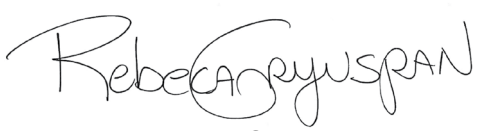
Frontier technologies, particularly artificial intelligence, are reshaping the functioning of economies and societies. However, their rapid and widespread diffusion is often outpacing the ability of many Governments to respond. The *Technology and Innovation Report 2025: Inclusive Artificial Intelligence for Development* surveys the complex artificial intelligence landscape, aiming to help decision makers design science, technology and innovation policies that foster inclusive technological progress.

The use of artificial intelligence has the potential to accelerate progress towards achieving the Sustainable Development Goals, but if unevenly distributed and not guided by ethical oversight and transparency, its diffusion can exacerbate existing inequalities. The report analyses the requirements and policies needed at all stages, from development to adoption, to foster inclusive technological progress for sustainable development.

This requires a multidimensional and evidence-based approach. For this purpose, three key leverage points – infrastructure, data and skills – are identified, offering a broad socioeconomic perspective and highlighting the need to build resilient infrastructure and promote inclusive and sustainable industrialization and innovation.

The report starts by documenting the significant concentration in artificial intelligence development in a few companies and countries and identifies extensive gaps in digital infrastructure that risk widening inequalities both within and among countries. Then it explores productivity and workforce dynamics focusing on economic growth and decent work. From a national perspective, the report analyses the requirements and policies needed to support adoption, adaptation and development of artificial intelligence. From an international perspective, it considers the need for global artificial intelligence governance to steer artificial intelligence towards inclusive and equitable development, emphasizing the importance of international collaboration.

History has shown that while technological progress drives economic growth, it does not on its own ensure equitable income distribution or promote inclusive human development. Stronger international cooperation can shift the focus from technology to people, enabling countries to co-create a global artificial intelligence framework. Such a framework should prioritize shared prosperity, create public goods and place humanity at the heart of artificial intelligence development.



Rebeca Grynspan
Secretary-General of UNCTAD

Steering artificial intelligence towards shared prosperity

AI is reshaping economies and societies – will it drive sustainable progress or deepen existing inequalities?

Frontier technologies, particularly artificial intelligence (AI), are profoundly transforming our economies and societies, reshaping production processes, labour markets and the ways in which we live and interact. Will AI accelerate progress towards the Sustainable Development Goals, or will it exacerbate existing inequalities, leaving the underprivileged further behind? How can developing countries harness AI for sustainable development?

AI is the first technology in history that can make decisions and generate ideas on its own. This sets it apart from traditional technologies and challenges the notion of technological neutrality. The rapid development of AI has also outpaced the ability of Governments to respond effectively. The Technology and Innovation Report 2025 aims to guide policymakers through the complex AI landscape and support them in designing science, technology and innovation (STI) policies that foster inclusive and equitable technological progress.

Global collaboration is key to ensuring that the benefits of AI reach everyone, shifting the focus from technology to people

The world already has significant digital divides, and with the rise of AI, these could widen even further. In response, the Report argues for AI development based on inclusion and equity, shifting the focus from technology to people. AI technologies should complement rather than displace human workers and production should be restructured so that the benefits are shared fairly among countries, firms and workers. It is also important to strengthen international collaboration, to enable countries to co-create inclusive AI governance.

The Report examines five core themes:

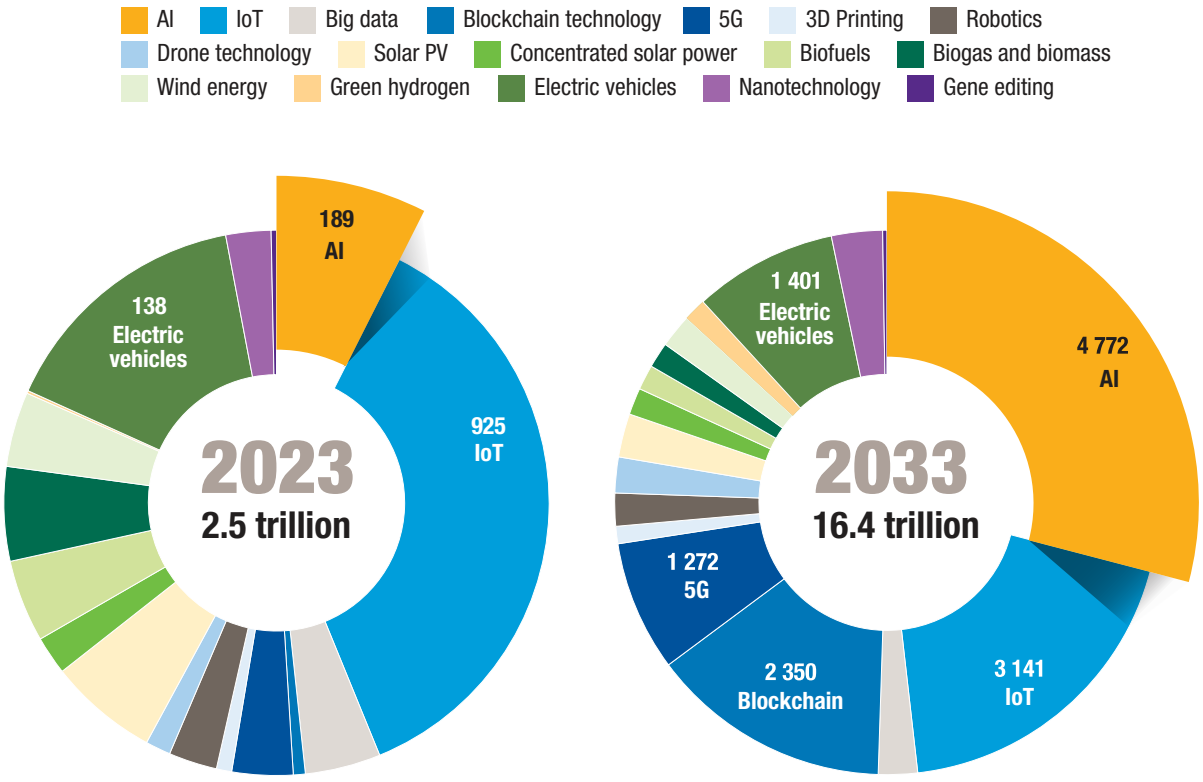
- **A** **AI at the technological frontier**
- **B** **Leveraging AI for productivity and workers' empowerment**
- **C** **Preparing to seize AI opportunities**
- **D** **Designing national policies for AI**
- **E** **Global collaboration for inclusive and equitable AI**

1

AI at the technology frontier

In 2023, frontier technologies represented a $2.5 trillion market and it is estimated that this figure will increase sixfold, to $16.4 trillion, in the next decade (figure 1). By 2033, AI is likely to be the frontier technology that has the largest market size, at around $4.8 trillion. Continuous breakthroughs are making AI more powerful and efficient, favouring its adoption in many sectors and business functions, including content creation, product development, automated coding and personalized customer service.

Figure 1
Rapid expansion of frontier technologies
(Market size estimates, billions of dollars)



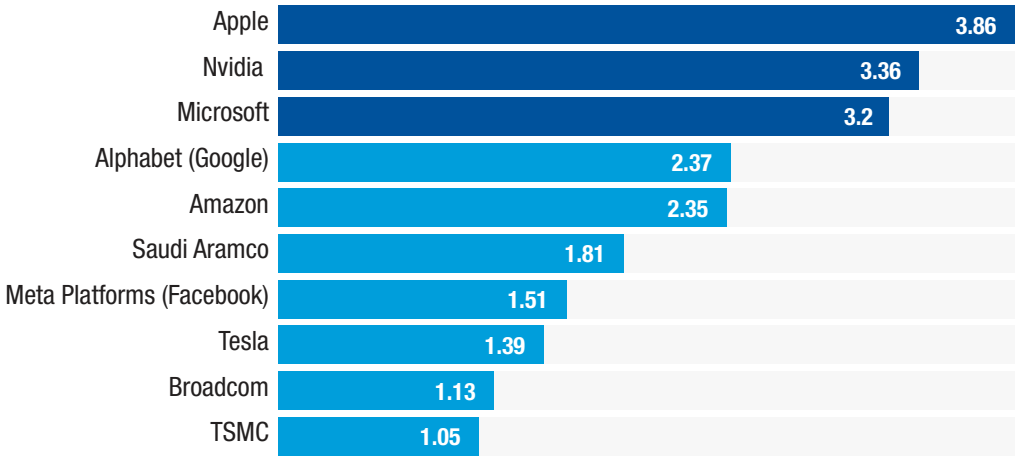
Source: UNCTAD based on various online market research reports.
Note: Market size data capture the revenue generated by the sales of products and services.

The leading frontier technology providers are now among the largest corporations in the world by market capitalization. Apple, Nvidia and Microsoft each have capitalizations of more than $3 trillion, close to the gross domestic product (GDP) of the African continent, or that of the United Kingdom of Great Britain and Northern Ireland, the world's sixth largest economy.[1] The top five companies are from the United States of America, and three leading chipmakers – Nvidia, Broadcom and TSMC[2] – are among the world's top ten; almost all are focused on frontier technologies and are investing heavily in AI (figure 2).

[1] GDP is a flow variable and market capitalization is a stock variable; the present comparison is for illustrative purposes only, to highlight the significant market size of leading technology companies.

[2] Nvidia and Broadcom, United States; TSMC, Taiwan Province of China.

Figure 2
Market dominance of technology giants
Top 10 listed companies in the world by market capitalization
(Trillions of dollars)



Source: UNCTAD, based on data from Companies Market Cap.
Note: The ranking shows the most valuable listed companies worldwide, as at end-2024.

Market dominance may widen technological divides, making it difficult for latecomers to catch up

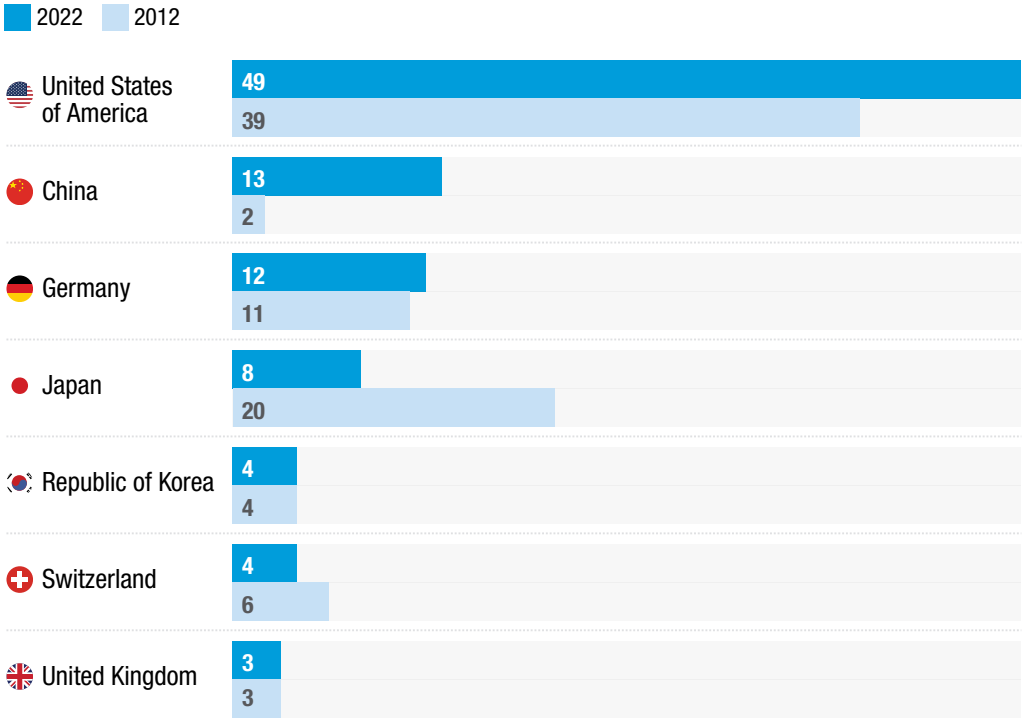
There is also a significant concentration of research and development (R&D) investment. In 2022, 40 per cent of business-funded R&D worldwide was carried out by only 100 companies, of which around half were headquartered in the United States, led by Alphabet, Meta, Microsoft and Apple. Around 13 per cent were headquartered in China, led by Huawei and Tencent, up from 2 per cent 10 years before and overtaking traditional R&D leaders such as Germany, Japan, the Republic of Korea, Switzerland and the United Kingdom (figure 3). Other than China, none of the top 100 corporate R&D investors are from developing countries. Market dominance, at both the corporate and national levels, risks widening global technological divides, making it even more difficult for latecomers to catch up.

A wide AI divide exists between developed and developing countries

Similarly, there is a significant AI divide between developed and developing countries. With regard to infrastructure, for example, the United States has around one third of the top 500 supercomputers and more than half of the overall computational performance. Most data centres are also located in the United States. Apart from Brazil, China, India and the Russian Federation, developing countries have limited capacities in AI infrastructure, which hinders their ability to adopt and develop AI. An AI divide is also evident in terms of services providers, investment and knowledge creation.

Figure 3
Significant concentration of research and development in a few countries

(Share of investment by global top 100 corporate R&D investors, by country; percentage)



Source: The 2023 EU Industrial R&D Investment Scoreboard (Joint Research Centre, 2023).

AI holds great potential for development but also risks – informed leadership is key to harnessing AI for sustainable and inclusive development

As a general-purpose technology, AI interacts with other technologies and is transforming the way research and innovation are conducted, with a wide range of applications across various activities. AI offers significant opportunities for businesses and countries to grow and to progress towards achieving the Sustainable Development Goals. However, it also presents various risks and ethical concerns. Decision makers need to know more about AI if they are to navigate its promises and perils for sustainable and inclusive development.

The experience of recent decades indicates that AI-driven transformations involve three key leverage points – infrastructure, data and skills (figure 4).

(a) ***Infrastructure*** requirements extend beyond basic access to electricity and the Internet, encompassing computing power and server capabilities, to process data, run algorithms and execute models.

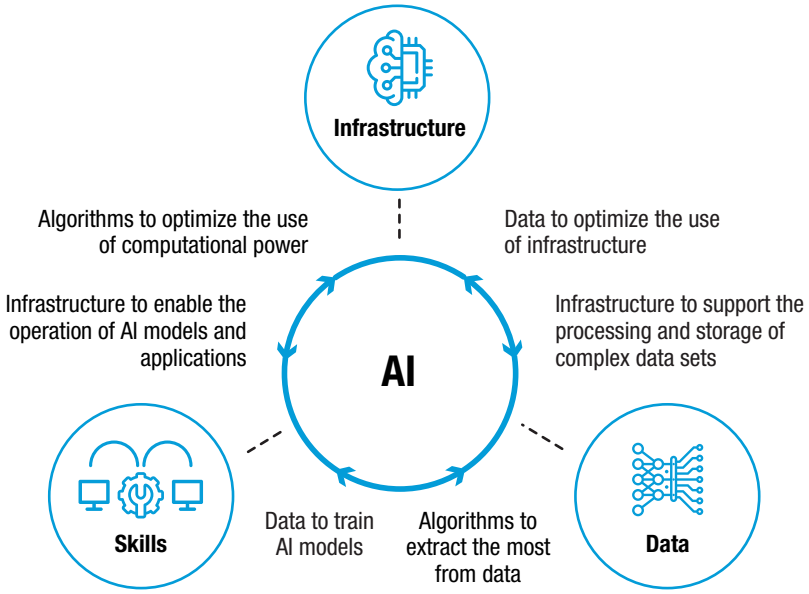
(b) ***Data*** are the primary input for the training, validation and testing of algorithms, enabling AI systems to classify inputs, generate outputs and make predictions. High-quality, diverse and unbiased data are essential for building effective and trustworthy AI systems.

(c) ***Skills*** span a wide spectrum, from basic data literacy to advanced technical expertise in developing algorithms and from proficiency in data analysis to integrating domain knowledge for tackling complex problems.

The interplay of and synergies among these three key leverage points can accelerate advances in AI. These are discussed in the report as a way of connecting the evidence and framing its policy recommendations.

The rapid progress of AI is driven by three key leverage points – infrastructure, data, and skills – that can catalyse continuous innovation

Figure 4
Synergies among three key leverage points can accelerate AI progress



Source: UNCTAD.

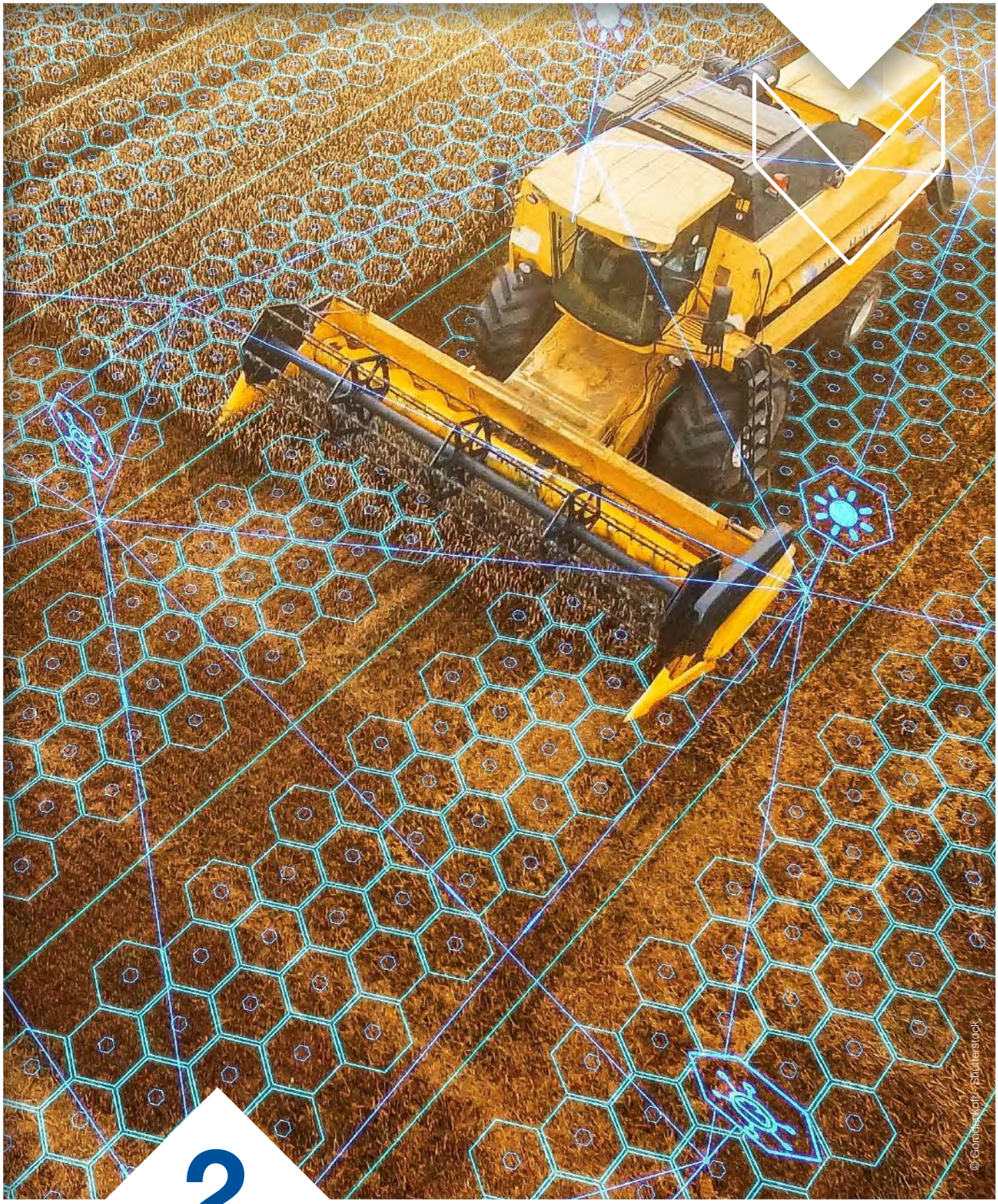
The next industrial revolution can bring a more inclusive future through human–machine collaboration, sustainability and personalization – if carefully directed

Frontier technologies could erode the comparative advantage of low labour costs in developing countries

- **Serving both private and public interests** – Leading technology companies are gaining control over the future of technology, and their commercial motives do not always align with the public interest. Governments need to explore policies and regulations that can incentivize and guide technological development along paths that promote inclusivity and benefit all.

- **Augmenting human capabilities** – Frontier technologies are capital-intensive and could be labour-saving. For many developing countries, this could erode their comparative advantage of low labour costs, putting at risk the gains of recent decades. With appropriate policies, however, AI can augment rather than substitute human capabilities and help sustain the competitiveness of developing countries.

- **Three key leverage points** – Three key leverage points that could catalyse transformational cascades for AI are infrastructure, data and skills. These provide the basis for assessing a country's preparedness for AI, developing effective industrial and innovation policies and strengthening global AI governance and collaboration.



2

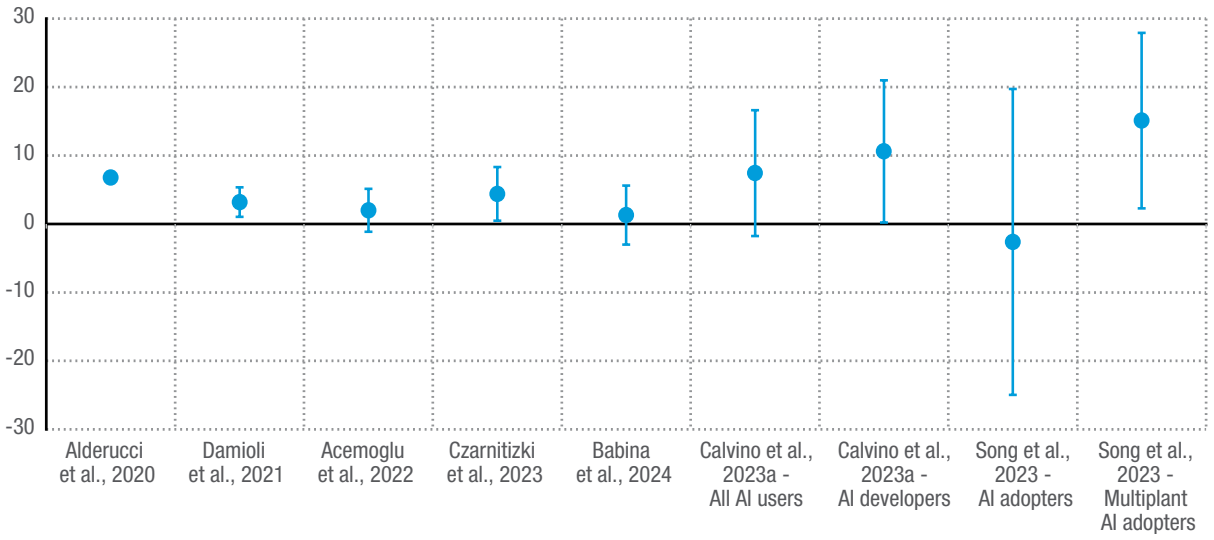
Leveraging AI for productivity and workers' empowerment

Unlike previous technologies, AI has the potential to transform a wide range of cognitive tasks once reserved for highly skilled workers

Unlike previous technological waves that primarily automated routine and low-skill functions, the use of AI can transform a wide range of tasks, including cognitive tasks once considered exclusive to highly skilled workers. Generative AI (GenAI), for example, can generate texts, produce images and videos, write computer code and identify complex patterns in data for knowledge-based services.

Research to date suggests that firms using AI can make substantial productivity gains, particularly those employing skilled workers and those in service industries (figure 5). However, the range of productivity estimates varies considerably, reflecting the differing capacities of firms to leverage AI effectively. In addition, much of the existing literature focuses on early adopters from developed countries, for which there is more detailed firm-level data. Whether similar productivity gains apply to latecomers, particularly in developing countries, remains to be ascertained.

Figure 5
Use of AI can improve a firm's labour productivity
(Change in productivity, percentage)

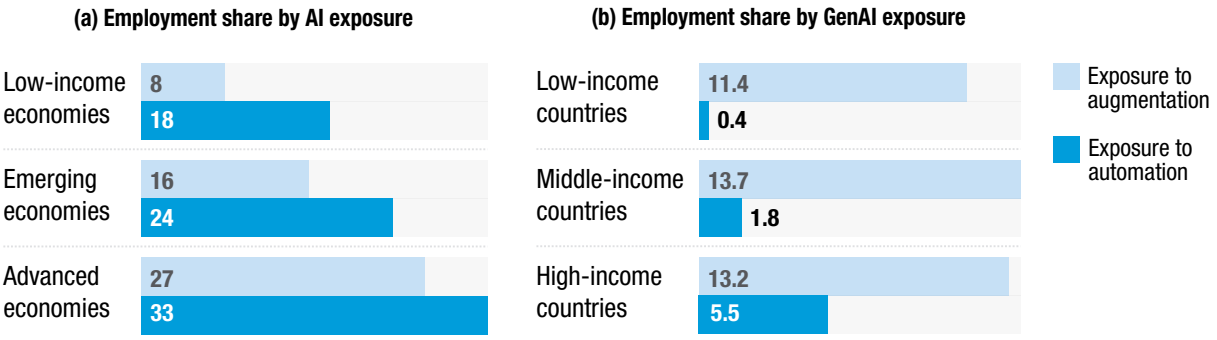


Source: UNCTAD (see bibliography in the report).
Note: Data points are the estimated average effects from listed articles, displayed as percentage changes through log-approximation; the tails represent the 95 per cent confidence intervals.

Advanced economies are more exposed to AI but have greater potential to leverage its benefits, with GenAI offering more opportunities for labour augmentation

The use of AI has the potential to impact 40 per cent of global employment. In advanced economies, one third of jobs are vulnerable to AI automation, while around 27 per cent have the potential for AI augmentation, that is, enhancing human capabilities rather than replacing them. Workforces in advanced economies are at greater risk, as more of their jobs involve cognitive tasks. Nevertheless, they are also better positioned than emerging and low-income economies to harness the benefits of AI (figure 6). A similar picture emerges when considering the impact of GenAI. However, GenAI might offer greater potential for labour augmentation than automation, particularly in low- and middle-income countries.

Figure 6
Developed countries have greater likelihoods of AI automation but also greater opportunities for augmentation
(Employment share exposed to AI, by country grouping; percentage)



Source: UNCTAD calculations, based on Cazzaniga et al., 2024 and Gymrek et al., 2023 (see bibliography in the report).
Note: Data from 125 countries in panel (a) and from 59 countries in panel (b); middle-income countries are the average of upper middle-income countries and lower middle-income countries, weighted by the number of countries in the sample.

The full impact of AI may take many years to materialize, and the long-term economic outcome remains highly uncertain

If the history of previous general-purpose technologies is any indication, it may take years or even decades for the full extent of AI-related impacts to materialize. It will also take time to build complementary assets in AI infrastructure, data and skills. AI-related case studies in agriculture, manufacturing and health care, in which the use of AI enhanced productivity and human welfare, are summarized in table 1, illustrating how challenges related to infrastructure, data and skills can be overcome through careful implementation and collaboration among stakeholders.

Table 1
Case studies of AI adoption in developing countries

Sector	AI application	Case study
Agriculture	Pest and disease control	Tumaini and MkulimaGPT
	Yield prediction	Beijing Normal University and South China Agriculture University
	Precision irrigation	iFarming
Manufacturing	Production automation	Smart welding robot
	Predictive maintenance	Vestel Electronics
	Smart factories	Tata Steel and Unilever
Healthcare	Improving diagnoses	Ubenwa and AI-assisted portable X-ray machine
	Extending health-care coverage	mMitra and mDaktari
	Pandemic management and control	Refugee population modelling

Source: UNCTAD.

The use of AI can lead to productivity gains and increase the income of some workers, but it may lead to job losses for others, reshaping workplace dynamics and labour demand. To date, technological advances have tended to drive automation, shifting value towards capital. However, if supported by effective policies and strategic implementation, the use of AI offers significant potential for augmenting worker capabilities.

POLICY FOCUS

Adapting solutions to local infrastructure, using new data, reducing skill barriers and forming strategic partnerships can speed up AI adoption in developing countries

Inclusive AI focuses on empowering workers, reskilling for new roles and involving them in designing AI tools that preserve meaningful work

- **Complex workforce dynamics** – The impact of AI on workplaces depends on a complex interplay of automation, augmentation and the creation of new roles. Policymakers should understand these dynamics, to ensure the equitable distribution of the benefits of AI and to support smooth workforce transitions.

- **Strategies for acceleration** – Adoption of AI in developing countries can be accelerated by redesigning AI solutions around locally available infrastructure; utilizing and combining new sources of data; lowering skill barriers for AI with simple interfaces; and building strategic partnerships, to access essential resources for AI.

- **Involving and empowering workers** – Inclusive AI requires a strong emphasis on workers and their professional growth. This includes empowering them with digital literacy, supporting those transiting to new jobs with reskilling training and enhancing overall capabilities through upskilling programmes. Workers should also be involved in the design and implementation of AI tools that preserve meaningful human roles.

- **Financial drivers** – R&D funding, strategic public procurement and targeted tax incentives can be used to promote human-complementary AI technologies. Improving labour market opportunities and establishing clear career development pathways can mitigate the risk of brain drain.

3

Preparing to seize AI opportunities

The UNCTAD frontier technologies readiness index helps assess countries' preparedness through key indicators

Developing countries should prepare for a world that is rapidly being reshaped by AI and other frontier technologies. To assess the potential for progress, UNCTAD has devised the frontier technologies readiness index, which combines indicators for information and communications technology (ICT) deployment, skills, R&D activity, industrial capacity and access to finance, to offer a comprehensive measure of a country's preparedness for frontier technologies. The index rankings are dominated by developed countries in Europe and North America (table 2). Developing countries are generally lower in the rankings but Singapore stands out in fifth position and performs well across all the dimensions. The economies of Brazil, the Russian Federation, India, China and South Africa (BRICS), also have good ranking positions, notably China, at 21; the Russian Federation, at 33; India, at 36; Brazil, at 38; and South Africa, at 52.

Table 2
Developed countries are better prepared for frontier technologies
Readiness for frontier technologies, selected countries

Country name	Rank in 2024	Rank in 2022	Movement in rank	ICT ranking	Skills ranking	R&D ranking	Industry ranking	Finance ranking
				Top 10				
United States	1	1	=	4	17	2	17	2
Sweden	2	2	=	17	2	15	7	14
United Kingdom	3	3	=	18	12	6	14	17
Netherlands (Kingdom of the)	4	5	↑	3	6	13	11	31
Singapore	5	4	↓	12	5	20	4	11
Switzerland	6	6	=	25	14	11	3	7
Republic of Korea	7	9	↑	14	32	4	13	5
Germany	8	7	↓	26	18	5	12	34
Ireland	9	12	↑	27	11	28	1	116
France	10	14	↑	7	21	8	24	19
				Selected economies				
China	21	28	↑	101	64	1	6	3
Russian Federation	33	33	=	41	29	17	72	63
India	36	48	↑	99	113	3	10	70
Brazil	38	40	↑	38	59	18	50	41
South Africa	52	51	↓	76	71	41	55	27

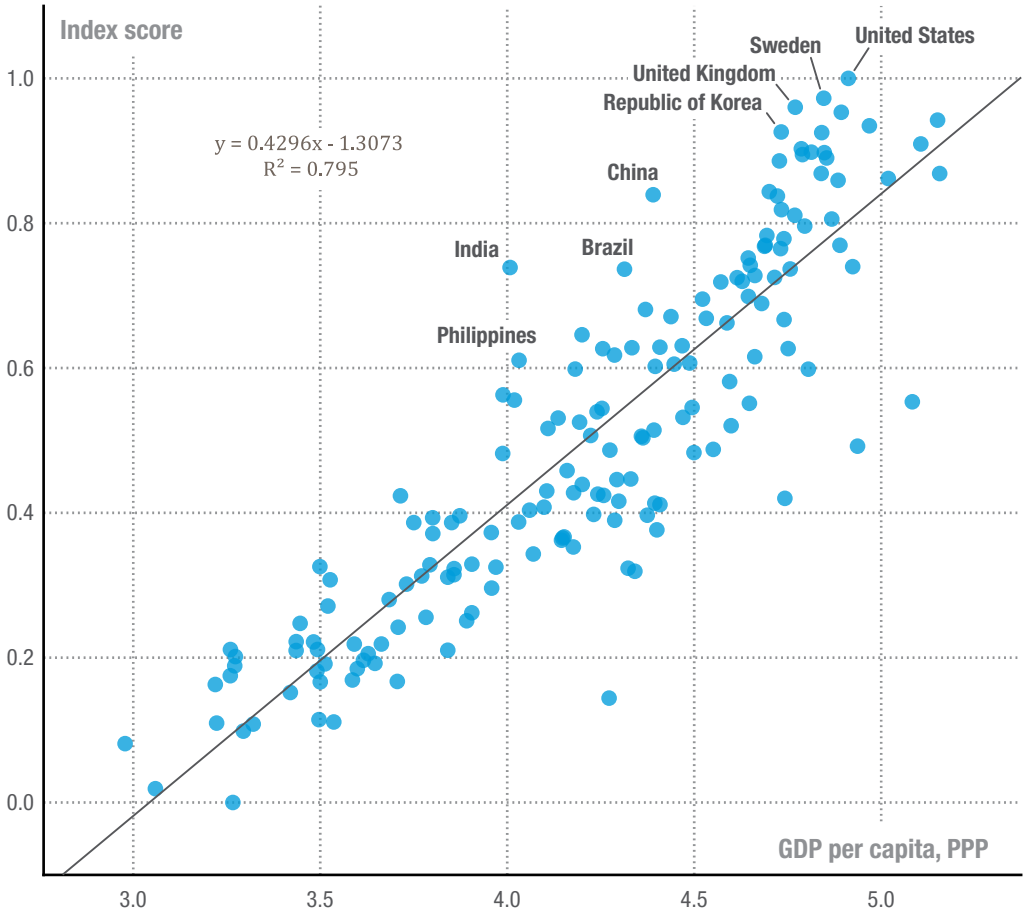
Source: UNCTAD.

It might be expected that countries with higher per capita GDP would be better prepared for frontier technologies. Overall, this situation is observed but, as shown in figure 7, some countries perform far better than their levels of income would suggest, signifying strong potential to seize the opportunities offered by frontier technologies, to boost economic growth and development.

A common feature of the better-performing countries is greater R&D activity and stronger industry capacities, which enable them to keep pace with technological development and eventually take the lead in some frontier technologies. This highlights the importance of making efforts to improve a national innovation ecosystem.

Some countries perform better than expected at their income levels due to R&D activity and industry capacity, underscoring the need to enhance innovation ecosystems

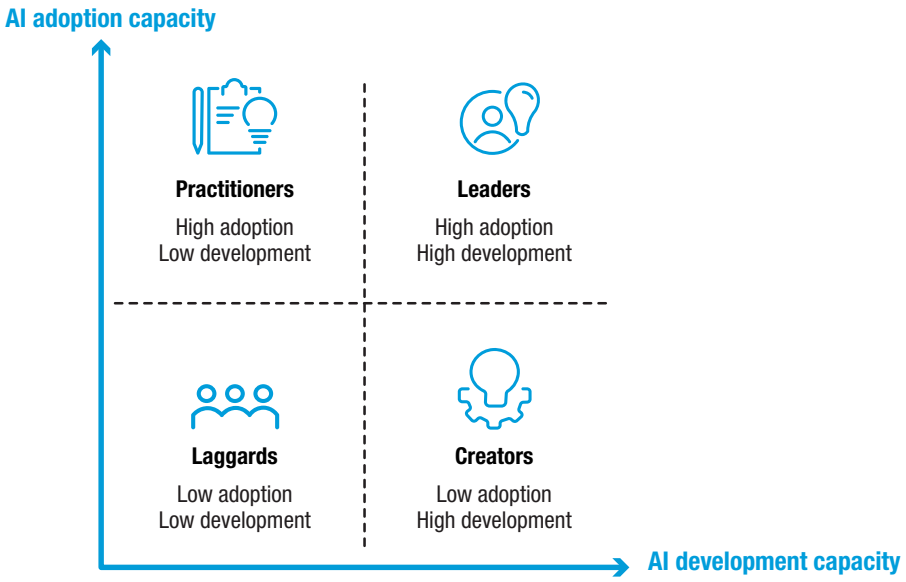
Figure 7
Brazil, China, India and the Philippines are developing countries outperforming in technology readiness
(Correlation between frontier technologies readiness index score and GDP per capita)



Source: UNCTAD.
Note: GDP per capita is in current international dollars, purchasing power parity.

The frontier technologies readiness index can be complemented with a detailed assessment of a country's preparedness for AI adoption and development, which depends critically on three leverage points: infrastructure, data and skills. Countries can be considered under four categories according to adoption and development capacities, as shown in the four quadrants in figure 8. This locates a country's current position, illustrating its relative strengths and weaknesses, as well as its potential catch-up trajectories (e.g. from laggards to practitioners, then to leaders).

Figure 8
Classification of countries according to their capacity for AI adoption and development



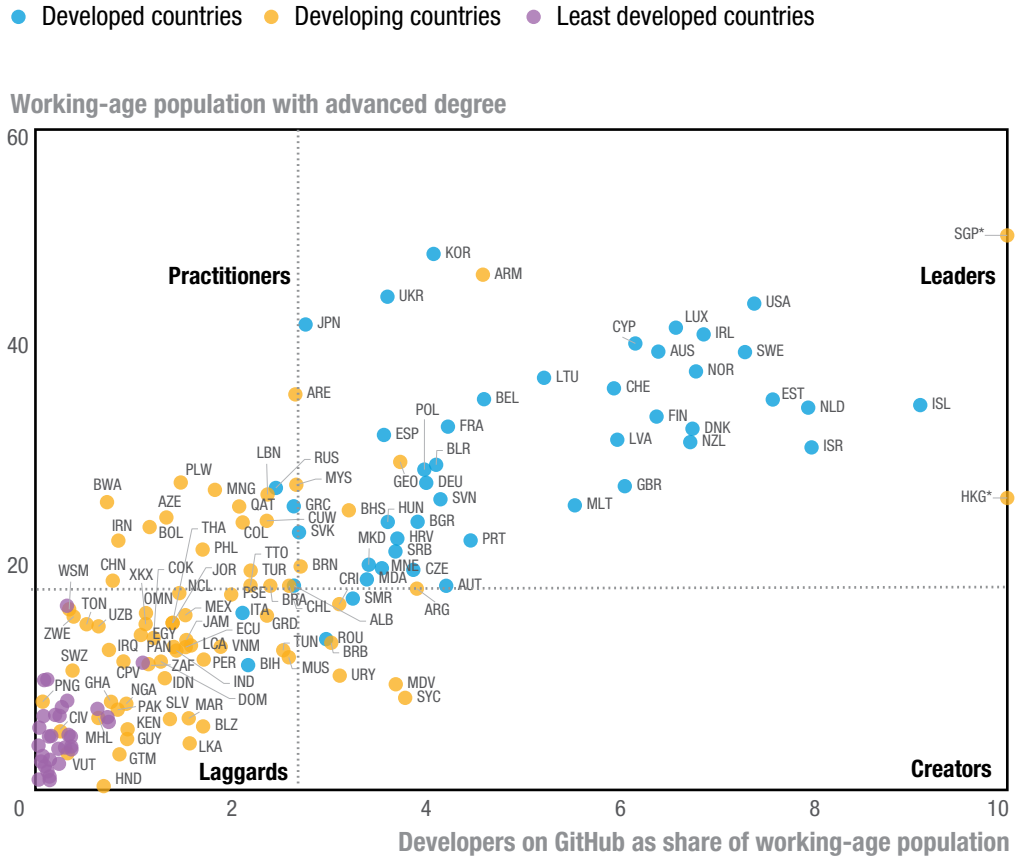
Source: UNCTAD.

Countries can be categorized by AI adoption and development capacities, revealing strengths, weaknesses and potential catch-up trajectories

The assessment of country preparedness uses selected proxy indicators that have wide country coverage. The assessment can then be refined through detailed reviews of a country's STI ecosystem. For example, as shown in figure 9 with regard to skills, AI adoption capacity is proxied by the proportion of the working-age population with tertiary education and AI development capacity is proxied by the number of developers on the platform GitHub as a proportion of the working-age population.

Differences in the level of AI skills preparedness may be observed across country groupings, with the least developed countries (LDCs) scoring low for both indicators. Developed countries rank higher than developing countries for both indicators, with the notable exceptions of Hong Kong (China) and Singapore.

Figure 9
Developed countries lead in AI skills preparedness
(Percentages)



Source: UNCTAD, based on data from GitHub and the International Labour Organization.
Note: Names of economies abbreviated using International Organization for Standardization alpha-3 codes. * Hong Kong (China) and Singapore have very high shares of GitHub developers with respect to working-age population, at 25 and 27 per cent respectively; values have been truncated at 10 per cent to improve the presentation.

Large countries may have a low proportion of developers, but this could still represent a substantial body of developers on which to build AI advantages. The United States has the greatest number of developers, followed by India and China, which also have the world's largest populations and, despite relatively low proportions of their workforces involved, can leverage a large number of AI developers. The size of a country thus influences its strategic options for AI adoption and development.

Strategic positioning to leverage AI for sustainable development can be coupled with a gap analysis to link the vision with actual actions. Some developing countries in Africa and South-East Asia have strengthened their infrastructures to support Internet usage and cross-border connectivity. China has established a strong advantage in data affordability and quantity. India, China, and Brazil have produced large pools of AI developers. Different catch-up policies and trajectories can be followed, to enhance preparedness in light of the rapid evolution of AI.

Large countries may leverage a substantial base to build AI advantages – size shapes strategic options

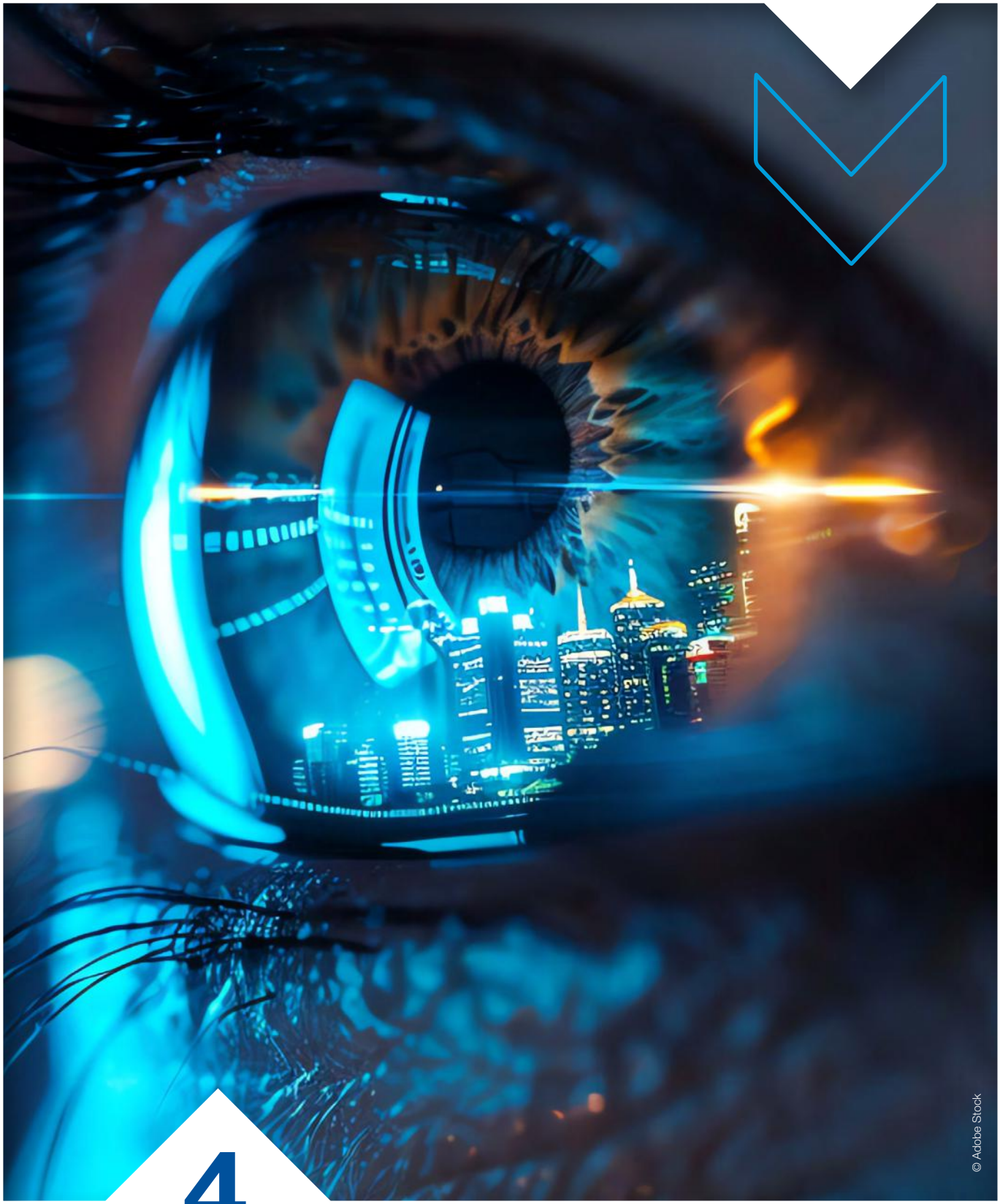
POLICY FOCUS

Governments should position themselves to seize AI opportunities by assessing national capacities, identifying gaps, and defining catch-up trajectories to meet future goals

- **Strategic positioning** – Governments should strategically position themselves to seize the opportunities offered by AI. This involves assessing national AI capacities across the three leverage points – infrastructure, data and skills; and identifying gaps to pinpoint areas of action. Different catch-up trajectories can steer the transition from current technological and productive capacities towards desired targets.

- **Strengthening innovation systems** – Countries can evaluate their AI opportunities and challenges through technology assessment and foresight exercises and identify actions to strengthen their innovation systems. UNCTAD assists developing countries in technology assessment, and its STI Policy Review Programme supports the development of their innovation systems.

- **Government and stakeholder collaboration** – Successful structural transformation requires cooperation among public authorities and ministries, such as those for STI, industry and education. Stakeholder engagement is crucial to identify AI solutions for sustainable development and to formulate STI plans that align with national objectives.



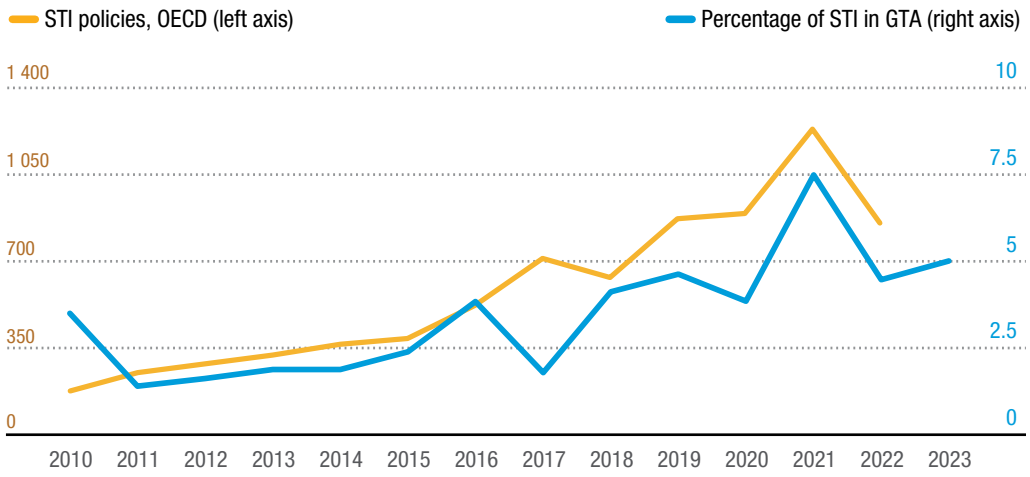
4

Designing national policies for AI

The evolution of digital technologies and the global economy has reshaped opportunities for developing countries to pursue catch-up strategies. National competitiveness and the guiding industrial policies should increasingly be centred on enhancing technology, innovation and knowledge-intensive services.

Since 2010, industrial policies have had an increasing share of interventions tied to scientific, technological or innovation-related aspects (figure 10). There has also been a general increase in R&D expenditure as a percentage of GDP, at least in most advanced economies. Most of this has been driven by the private sector, but some countries have also greatly expanded their public R&D allocations.

Figure 10
Increased relevance of STI in national policies



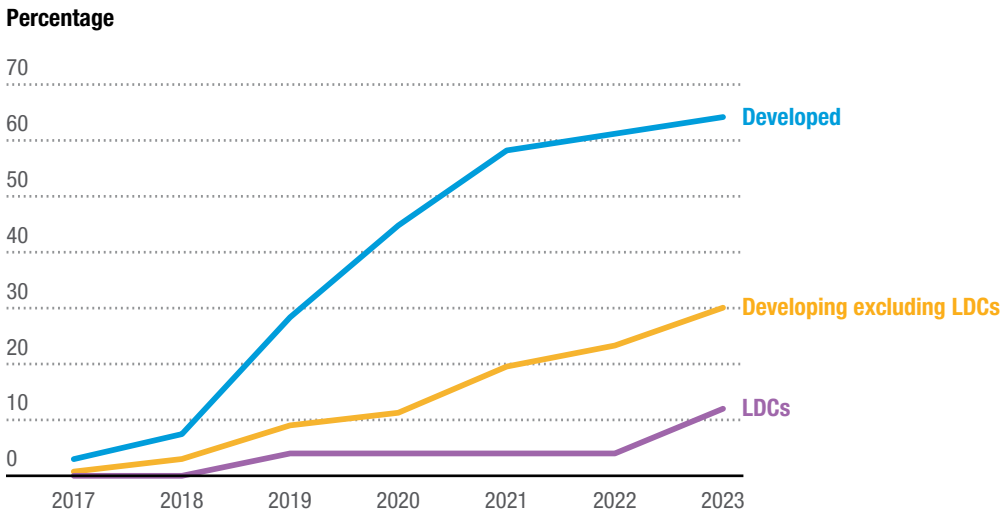
Source: UNCTAD, based on data from Global Trade Alert (GTA) and the Organisation for Economic Co-operation and Development (OECD) STI policy database.
Note: The STI policy database covers developed countries and a selection of developing countries.

Digital technologies have redefined opportunities, making technology, innovation and knowledge-intensive services central to industrial policies

Policies for frontier technologies and AI add new rationales for industrial policies. They can address market failures and take into account the uncertainty of R&D and of the diffusion, direction and impact of new technologies in the economy.

To date, most AI policies have emerged from developed countries. By end-2023, about two thirds of developed countries had a national AI strategy; out of 89 national AI strategies, only 6 were from LDCs (figure 11). AI policies implemented by major economies can have significant spillover effects, influencing the policy options of other countries. Developing countries therefore need to quickly set and implement AI strategies that align with national development goals and agendas. Following the paths set by others may not fulfil their needs and priorities.

Figure 11
Few developing countries have national AI strategies
(Cumulative share of countries with national AI strategy, by country grouping; percentage)



Source: UNCTAD elaboration on data from *Artificial Intelligence Index Report 2024* (Stanford, United States).

Policies targeting AI adoption can support the uptake and diffusion of AI products and solutions in the economy, while providing training for upskilling and reskilling workers exposed to AI. Policies targeting AI development, on the other hand, should consider the need for more advanced infrastructure, robust data systems and the skills and capabilities needed to stay at the technological frontier.

The two approaches are not, however, mutually exclusive, and countries need to strike a balance between them. Some developing countries may find it less challenging to support adoption, but they also need to make long-term strategic plans to promote AI development.

A series of illustrative examples of policy instruments implemented by economies at various stages of development are listed in table 3. The design and implementation of AI strategies for adoption and development should also account for country specificities involving the three key leverage points: infrastructure, data and skills.

Most AI-related policies have emerged from developed countries; developing countries need to act swiftly to create AI strategies aligned with their particular needs and priorities

Table 3
Case studies of national policies for AI

	Adoption (supporting uptake and diffusion of AI)	Development (cultivating capacity to generate new AI)
Overarching approaches	Measures for the Administration of Generative Artificial Intelligence Services (China) AI Act (European Union) CHIPS [Creating Helpful Incentives to Produce Semiconductors] and Science Act (United States)	
Infrastructure	Digital inclusion and connectivity (Brazil) e-Agriculture (Côte d'Ivoire)	High-performance computing infrastructure (Japan) K-Chips Act (Republic of Korea)
Data	Data Observatory (Chile) Mobility Data Space (Germany) Ethical guidelines for application of Artificial Intelligence in Biomedical Research and Healthcare (India)	Sandbox on privacy by design and by default in AI projects (Colombia) Computational data analysis provision (Singapore)
Skills	Digital Workforce Competitiveness Act (Philippines) National Plan for Digital Skills (Spain)	National junior high school computing curriculum (Ghana) Artificial Intelligence Research Scheme (Nigeria)

Source: UNCTAD.

The renewed interest in industrial and STI policies and the rapid growth of AI capabilities have brought AI policies to the forefront of current policymaking. AI policies are essential for achieving structural transformation and productivity growth, and for addressing other societal, ethical, and environmental challenges arising from the diffusion of the technology.

- **Rethinking industrial policies** – Accelerated digitalization and the rise of AI call for new industrial policies. As value in the global economy shifts towards knowledge-intensive services, decision makers need to consider their roles in supporting the adoption and development of new technologies, as well as the creation, dissemination and absorption of productive knowledge in the economy.

- **A whole-of-government approach** – National strategies should target better coordination across domains, including STI, industry, education, infrastructure and trade. Moreover, AI policies should go beyond incentives, such as tax deductions, and include regulation, such as those related to consumer protection, digital platforms and data protection, along with governance and enforcement, to orient the direction of technological change.

Policies should address the three leverage points:

- **Infrastructure** — Upgrading infrastructure is key to ensuring equitable access to enablers such as electricity and the Internet, favouring AI adoption and reducing inequalities. Fostering a conducive business environment to incentivize private sector investment can help build the necessary infrastructure. Distributed networks and computing power can support AI development, but it is important to ensure interoperability and harmonization between infrastructures and systems.

- **Data** — Encouraging open data and data-sharing can enhance data integration, storage, access and collaboration. Promoting good practices in data collection and ensuring interoperability and accessibility across the innovation ecosystem can support AI adoption and development. Privacy, accountability and intellectual property aspects should also be addressed, to foster innovation while safeguarding human rights.

- **Skills** — Population-wide AI literacy will promote widespread AI adoption and can be achieved by integrating science, technology, engineering and mathematics and AI subjects, from early education to continuous learning. Partnerships between academia and the private sector can help build AI talent to meet specific industry needs and drive AI development.

AI requires a whole-of-government approach, aligning and coordinating actions across ministries, along with regulation and governance to guide technological change

5

Global collaboration for inclusive and equitable AI

AI diffusion brings cross-border impacts and requires global governance; ensuring AI as a public good demands multi-stakeholder cooperation

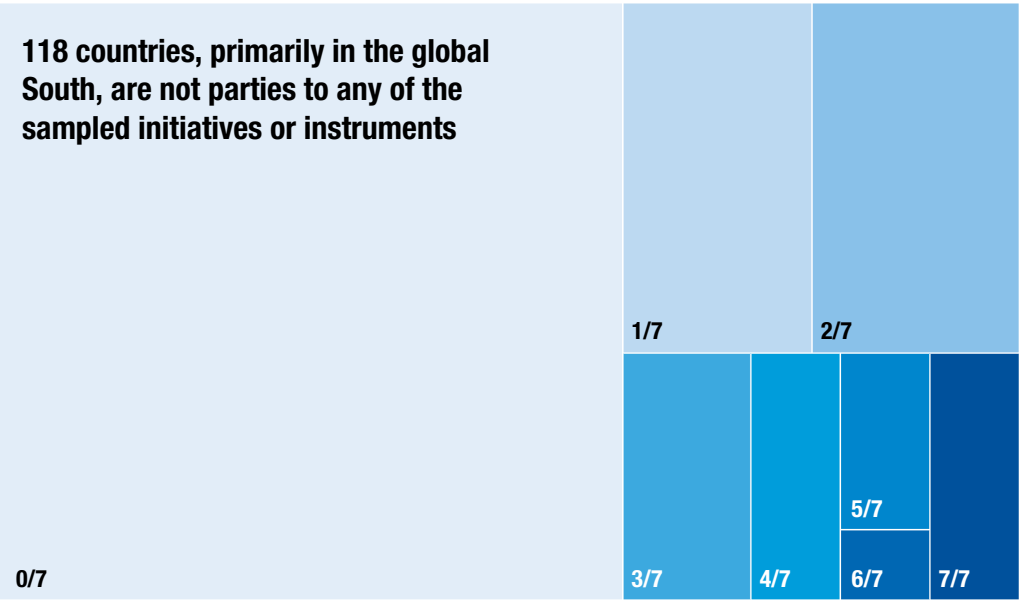
Many AI-related issues can be addressed at the national level through well-designed policies. However, since AI involves intangible goods and services that can be replicated and used virtually anywhere, there are also cross-border impacts. This calls for international collaboration. Ensuring AI as a public good requires multi-stakeholder cooperation to make it accessible, equitable and beneficial for everyone, fostering inclusive innovation to tackle global challenges.

AI is at present largely controlled by multinational technology giants. Without external oversight, businesses are unlikely to prioritize societal benefits over profit incentives. Governments therefore also need to influence and guide the development of AI in the public interest.

At the global level, the AI governance landscape is shaped by a series of initiatives and frameworks that are not yet truly comprehensive. By end-2024, only the Group of Seven (G7) states participated in all major initiatives, while 118 countries, primarily from the Global South, were not represented (figure 12). The limited representation of developing countries is disproportionate to their significant roles in the use of AI and may result in the failure of global AI governance.

AI governance suffers from fragmentation; the limited representation of developing countries could undermine the effectiveness of global AI governance

Figure 12
International AI governance initiatives are largely driven by G7 members
Country involvement, from 0 to 7 initiatives
(Box size proportional to number of countries in each category)



Source: UNCTAD, based on United Nations, High-Level Advisory Body on Artificial Intelligence (2024).
Note: The following initiatives are considered: OECD AI Principles, 2019; G20 AI principles, 2019; Council of Europe AI convention drafting group, 2022–2024; Global Partnership on Artificial Intelligence Ministerial Declaration, 2022; G7 Leaders' Statement on the Hiroshima AI Process, 2023; Bletchley Declaration, 2023; and Seoul Ministerial Statement for advancing AI safety, innovation and inclusivity, 2024.

Over the years, the United Nations has made a significant contribution to global discourse on AI governance (figure 13). In 2024, the General Assembly adopted two key resolutions on seizing the opportunities of safe, secure and trustworthy AI systems for sustainable development and on enhancing international cooperation on AI capacity-building. Moreover, the Pact for the Future emphasizes the importance of international cooperation for harnessing the benefits of STI while bridging the growing divide within and between countries. To this end, Member States committed to establishing an Independent International Scientific Panel on AI and initiating a Global Dialogue on AI Governance. Moreover, the Commission on Science and Technology for Development has established a dedicated working group to engage in a comprehensive and inclusive multi-stakeholder dialogue on data governance.

Figure 13
Key United Nations efforts in global AI governance

Source: UNCTAD

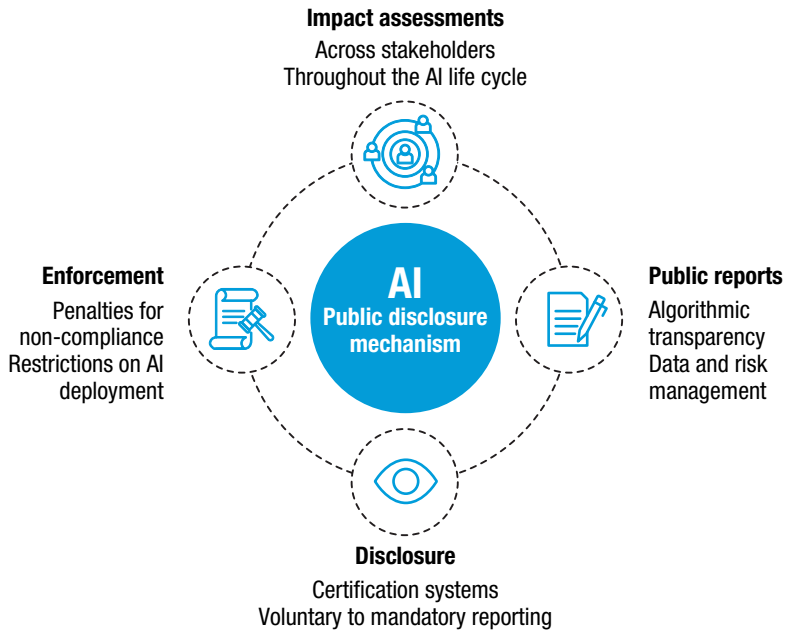
Global discussions on AI governance have shifted from establishing principles for a human-centred approach to adopting risk-based frameworks for managing frontier AI systems. This has been accompanied by increasing demands for a more proactive role from industry stakeholders. Companies need to ensure the development of safe and trustworthy AI, with a greater emphasis on transparency and accountability across the AI life cycle. Transforming such commitments into practical, impactful outcomes requires the establishment of common standards and effective mechanisms for implementation.

Global AI governance has shifted towards risk-based approaches; safe, trustworthy, transparent and accountable AI needs common standards for effective implementation

Impact assessments and detailed explanations about the functioning of AI models can improve transparency and accountability

A framework for industry commitment – More demanding expectations about public disclosure for companies deploying large-scale AI systems can lead to improved transparency and accountability. One possible model is the environmental, social and governance framework. An AI equivalent could involve impact assessments throughout the AI life cycle and detailed explanations of how AI systems function. Once shared standards have been established, certification could shift from voluntary to mandatory reporting supported by measures for enforcement (figure 14).

Figure 14
Establishing an AI public disclosure mechanism

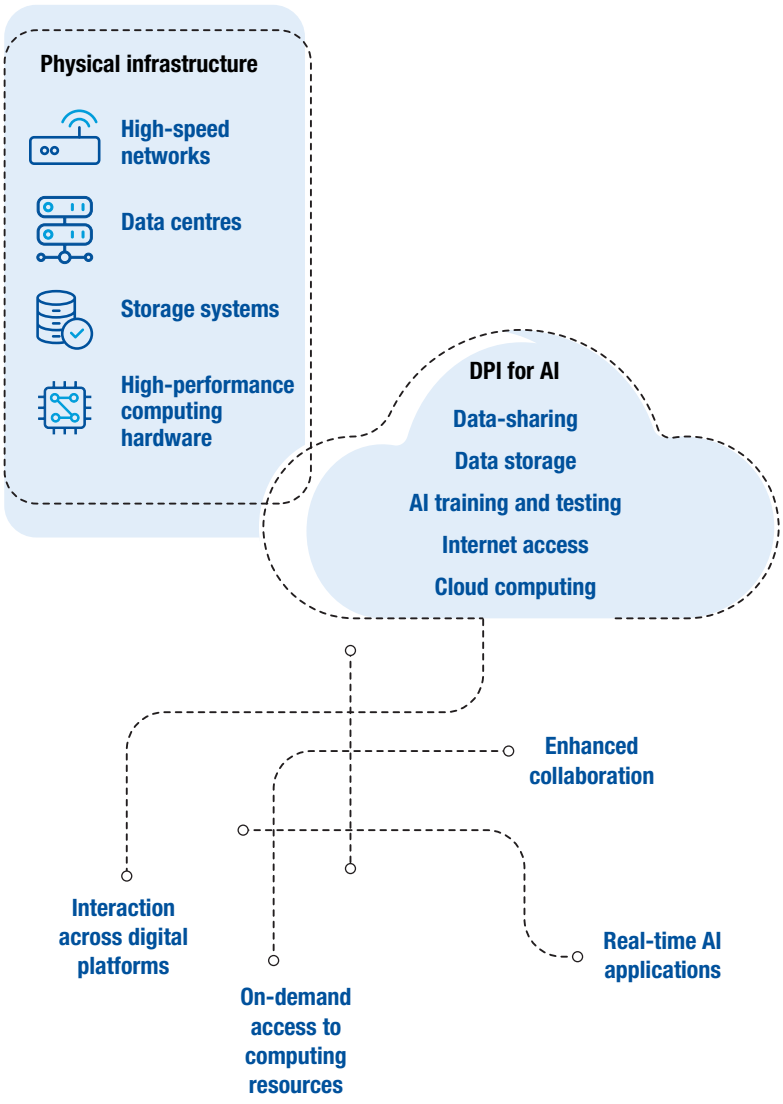


Source: UNCTAD.

A multi-stakeholder approach – AI public disclosure requirements should balance innovation with public safety and trust. Doing so requires a multi-stakeholder approach, to incorporate diverse perspectives and flexibility while adapting to rapidly evolving technologies. Attention should be paid to vulnerable populations, who are less likely to benefit from AI advances but more likely to experience AI-related harms.

Shared digital public infrastructure – A global shared facility, for example, following the CERN model, can provide equitable access to AI infrastructure. Governments can also collaborate with the private sector through public–private partnerships to expedite the development of digital public infrastructure (DPI) for AI in local innovation ecosystems. Tailored DPI systems can offer essential resources and services, to support AI adoption and development (figure 15).

Figure 15
Developing digital public infrastructure for AI



Source: UNCTAD.

Shared global digital public infrastructures can help ensure equitable access to AI infrastructure

Open innovation models can democratize knowledge, fostering inclusive AI innovation, and global coordination can enhance access, quality and security through trusted hubs

- **Open innovation** – The use of open innovation models, such as open data and open source, can democratize knowledge and resources, to foster inclusive AI innovation. The international community can benefit from coordinating and harmonizing the valuable but fragmented open-source AI resources worldwide. The use of connected and interoperable repositories with common standards can enhance the global knowledge base and improve access through trusted hubs that ensure quality and security.

- **A global hub** – An AI-focused centre and network, modelled after the United Nations Climate Technology Centre and Network, can function as a global hub for building AI capacity, facilitating technology transfer and coordinating technical assistance to developing countries.

- **South–South collaboration** – Strengthening South–South cooperation in science and technology can enhance the capacity of developing countries to address common AI challenges. Existing mechanisms can be used to exchange AI technologies, data and services and to facilitate the sharing and coordination of AI frameworks and policies. For example, provisions for AI technology and services could be included in trade agreements. Regional institutions can assist in sharing best practices and developing coherent AI policies.

The United Nations Conference on Trade and Development – UNCTAD – is the leading body of the United Nations focused on trade and development.

UNCTAD works to ensure developing countries benefit more fairly from a globalized economy by providing research and analysis on trade and development issues, offering technical assistance and facilitating intergovernmental consensus-building.

Standing at 195 countries, its membership is one of the largest in the United Nations system.

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