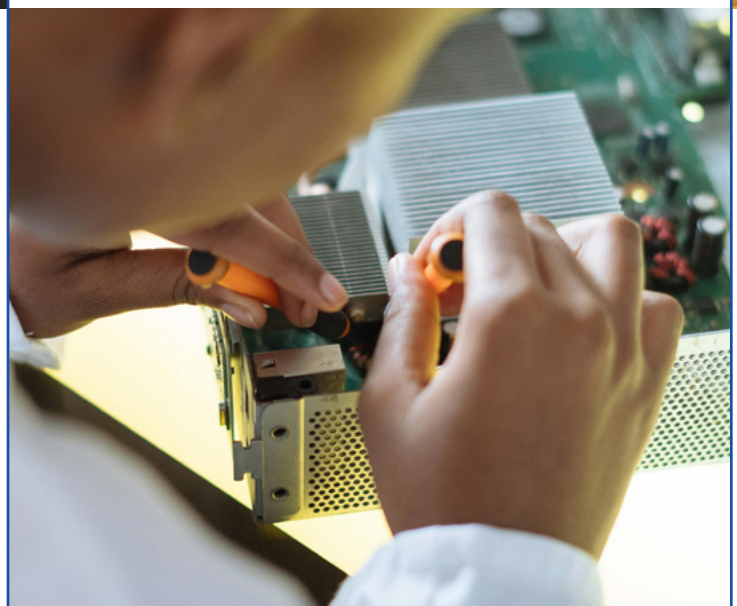
Google

October 2024

# Google's EU AI Opportunity Agenda



# Foreword

**Artificial Intelligence (AI) presents a generational opportunity to boost economic competitiveness, improve productivity, and deliver a new wave of technological and scientific breakthroughs.**

**Kent Walker**
President Global Affairs

Europe is well-positioned to capitalise on this opportunity, with a well-educated workforce, world-class universities and institutes that produce world-leading research, impressive numbers of STEM graduates, supercomputers for training models, a growing community of software developers, a single currency and well-functioning banking union, and industry leaders ready to deploy AI.

But to fulfil its potential, the EU will need a new *technology agenda* — one that prioritises innovation, R&D, infrastructure, and training while advancing policies that increase productivity and competitiveness. Google wants to be a part of this effort — by providing useful services, investing billions in EU infrastructure, educating millions of Europeans on new digital capabilities, and working collaboratively to develop AI responsibly and in line with shared values.

Several reports have highlighted the potential impact of AI on economic growth, with estimates ranging from substantial to truly transformative. It's undeniable that AI will have a positive impact on both productivity and overall economic expansion. In 2023 we commissioned an Implement Consulting report that found that generative AI alone could add €1.2 trillion to Europe's economy and save the average worker over 70 hours a year — the equivalent of about two weeks of work. Transformational advances in science and technology could have even greater benefits.

European leaders share this vision. The European Commission identifies AI as "a key lever of Europe's competitiveness and technological sovereignty" and has set ambitious targets through its Digital Decade initiative, including having 75% of EU companies using Cloud, AI, or Big Data by the end of the decade. The European Union's Economic Security Strategy points to AI as a critical European asset and named it as one of four priority technologies. Former Italian Prime Minister Enrico Letta argues that "Europe's future influence in the world will depend on the performance and scalability of its businesses." European Commission President Von der Leyen has also outlined Europe's ambition to become a leader in AI innovation.

Of course vision is necessary but not sufficient. To become "a prime location for the development of AI," Europe will need to work with industry to invest in infrastructure, develop cutting-edge skills across the workforce, build a pro-innovation regulatory framework that develops and spreads leading technologies, and increase AI adoption throughout the private and public sectors. This will require supporting EU manufacturers and other industries in using AI effectively. The new EU mandate presents a unique opportunity to craft policies that will accelerate the development and adoption of AI across Europe for years to come.

**Google is committed to developing and deploying AI boldly and responsibly with our European partners.**

We are investing in European AI and cloud infrastructure, workforce, and skilling programs, and entering into partnerships to deliver on AI's economic promise for Europe. We are working with policymakers, civil society, and industries across Europe to support an innovative economy that benefits everyone and drives European competitiveness. If we get this right, together, AI will help solve pressing social issues, advance progress in fundamental sciences, and unlock innovation and growth for European businesses and citizens. We hope this paper will act as a positive contribution to that forward-looking agenda.

# 02 Executive Summary

Google's mission is to organise the world's information and make it universally accessible and useful, and in an AI era, this is no exception.

We are an AI-first company — AI already powers many of our products that people use every day, from getting up-to-date travel information on Google Maps to scanning for spam messages in Gmail. While AI has been a part of Google's global innovation story in the past decade, we stand at a pivotal moment in the development of AI.

AI provides an opportunity for the EU to help boost its long-term competitiveness, allowing it to create new innovations and new jobs and to enhance performance in the EU's existing world-leading companies in industries such as automotive or pharmaceuticals. A 2023 report by McKinsey estimates the global economic impact of AI to account up to $26 trillion globally — an amount that far exceeds current EU GDP. Taking full advantage of this opportunity will require having the right underlying infrastructure, skills base and a supportive regulatory framework in place.

The European Union has been ambitious in its aim to unlock the opportunities of AI, including through the EU's AI innovation package. Yet, despite significant progress, more work is needed across the AI ecosystem to improve EU competitiveness and help ensure that citizens benefit from the opportunities of AI. Ahead of the next five-year EU policy cycle, this paper offers tangible suggestions for EU policymakers across three key pillars.

AI is moving from the 'wow' to the 'how'. The benefits of adoption will take time to fully unfold, but economies that embrace AI will see increased growth and productivity. The recommendations support driving EU action forward on each of these pillars and will ensure the broad distribution of AI's benefits across society. Google stands ready to support EU policymakers in unlocking AI opportunities across the EU.

By the end of the decade, in line with the EU's Digital Decade ambitions, we want to have developed AI boldly and responsibly, in partnership with the EU, Member States, other companies and industries, and civil society. If we get this right by working together, AI will help solve pressing societal issues, advance progress in fundamental sciences, and unlock innovation and growth for European industry. Google shares this vision and is investing responsibly in innovation and keeping humans at the centre of AI development.

**Three pillars to unlock AI opportunities:**

1. Investing in AI infrastructure and enabling innovation by supporting research, increasing compute capacity and ensuring legal frameworks support responsible AI growth.
2. Developing a comprehensive AI workforce strategy by investing in AI education and training programmes and supporting employers and workers in transition.
3. Promoting widespread adoption and universal accessibility by helping national governments, the public sector, start-ups, small businesses and enterprises across all sectors of the European economy adopt and use AI.

## Summary of recommendations

Having set important targets through the Digital Decade initiative, its AI Innovation Package and in line with President Von der Leyen's political guidelines, the EU must accelerate its focus on AI through further policy action.

### Investing in AI infrastructure and enabling innovation

1. Coordinate EU-wide strategic infrastructure investments by mapping existing capabilities, identifying gaps, and supporting strategic infrastructure investment.

2. Increase and accelerate investment in AI R&D to match the investment levels of the EU's global competitors.

3. Ensure that the EU's regulatory environment can help unlock the benefits of AI for everyone, including the proportionate implementation of the AI Act and global alignment with emerging best practices while avoiding duplications or contradictions within the EU digital regulatory framework.

4. Continue to work through international organisations on AI standards (e.g. the G7 and the AI Safety Summits), monitoring how the EU's own frameworks align with international best practices, and enabling the cross-border development of AI systems and data flows.

### Building human capital and an AI-empowered workforce

5. Increase the flow of European STEM talent by encouraging Member States to adopt basic computer science and AI training as part of school curricula and explore the use of generative AI as a tool to advance formal and informal education through pilot projects.

6. Upskill and reskill workers by leveraging existing EU public-private skilling partnerships to align on common standards, share insights and promote life-long learning opportunities on AI.

7. Bring industry, employers, workers' representatives and trade unions together to better understand European workers' needs in an AI transition and share best practices.

8. Ensure the Pact for Skills includes AI adjustment assistance for those jobs affected by AI, as well as wider training and support programmes to enable other workers to use AI to solve new tasks on the job.

9. Drive cross-sectoral skilling and certificate programme partnerships to help strengthen workers' career mobility and widen their opportunities, building on the Blueprint for sectoral cooperation on skills.

### Promoting widespread adoption and universal accessibility

10. Improve private sector adoption of AI by using the DESI dashboard to incentivise progress and the sharing of best practice by Member States on improving AI adoption, and boost existing initiatives that deliver results, particularly amongst SMEs.

11. Develop targeted AI deployment initiatives for small businesses and traditional industries, including agriculture, manufacturing, healthcare, and energy sectors that may have the highest needs or the lowest uptake of AI tools.

12. Improve public sector adoption of AI, by taking an AI-first approach to procurement, and build upon existing initiatives such as the EU Network of Member State Chief Information Officers to share best practice.

# 03 Investing in AI infrastructure and enabling innovation

## Infrastructure

AI breakthroughs are only possible with the right high-performance computing technologies, data centres and renewable energy opportunities to support them. To enable AI innovation at scale, the EU will need to allocate more funding towards financing such infrastructure at scale — as well as incentivising and enabling the private sector to do the same (for example, through reducing barriers to planning). Without this infrastructure, the research and development required to be at the cutting edge of AI development will take place elsewhere.

The EU Council has set an objective of "becoming a prime location for the development of AI" and the European Commission has set out its desire for AI to "respect fundamental rights, democracy and security, reflecting EU values" such that it is trusted by business and consumers. To meet these challenges, the EU plans to develop "European infrastructures allowing the storage, the use, and the creation of data-based applications or Artificial Intelligence services".

The EU is already undertaking important work in this area such as:

- The European Commission's recent communication on boosting startups and innovation in trustworthy artificial intelligence sets out its approach to the scientific and technological competitiveness of the EU in the field of AI, including commitments on AI infrastructure such as 'AI factories'. Importantly, President Von der Leyen has called for in the first 100 days to ensure access to new, tailored supercomputing capacity for AI start-ups and industry through an AI Factories initiative.

- The amendment of the EuroHPC Regulation intends to increase the number of operational, AI-dedicated supercomputers and expand access to these computers to a broader range of public and private stakeholders.

- The European Innovation Council's (EIC) budget of €10.1 billion supports early-stage research, technology transfer, and the financing and scale-up of start-ups and SMEs. President Von der Leyen has even proposed to set up a European AI Research Council to pool all of our resources, similar to the approach taken with CERN.

- The support of public-private partnerships, such as the AI, Data and Robotics Association (Adra), will accelerate research and create shared resources across the AI ecosystem. Adra uses €1.3 billion of public investments through the Horizon Europe programme, and €1.3 billion of private investments to address key challenges in European AI, data, and robotics.

- The Alliance for Language Technologies aims to "increase the availability of European language data and uphold Europe's linguistic diversity and cultural richness".

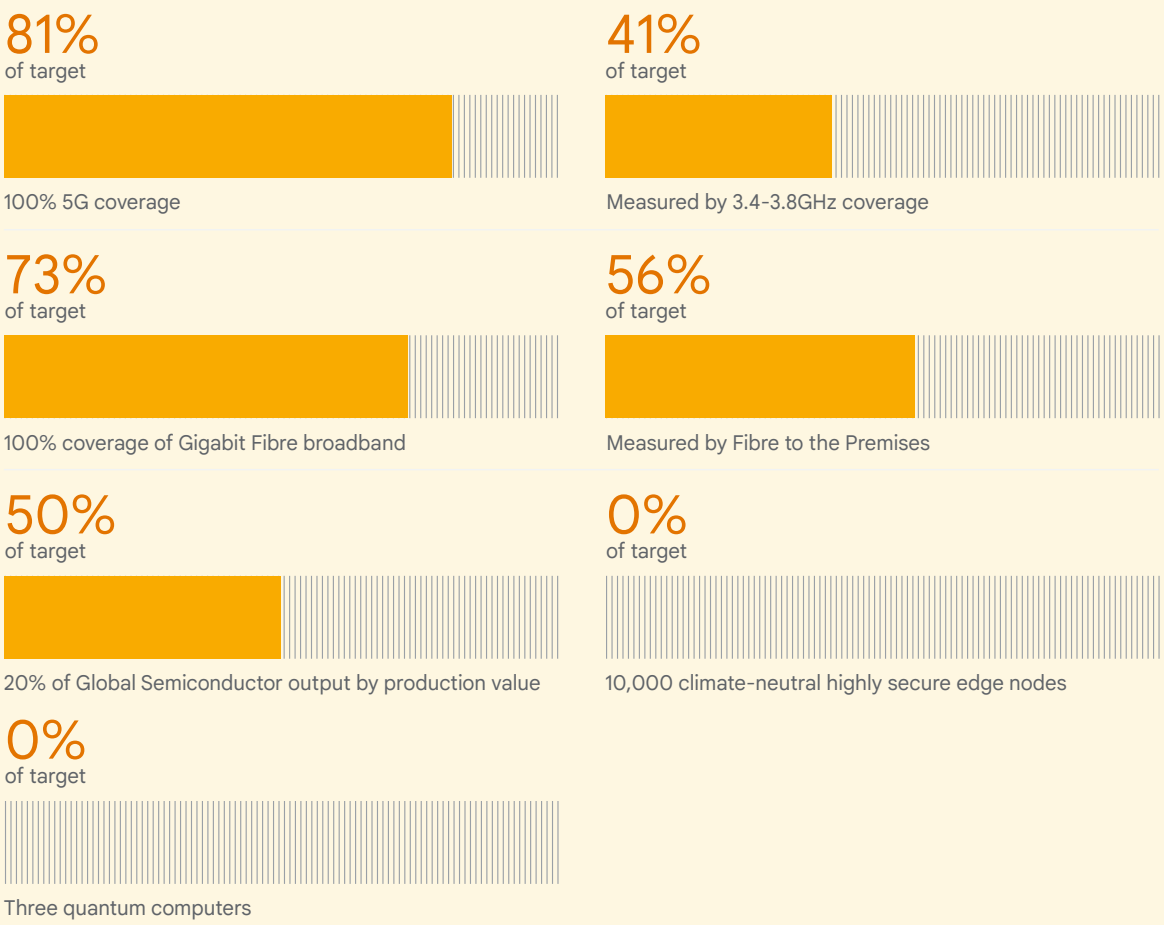
- The role of the newly established AI Office under the European Commission, apart from the enforcement of AI regulatory framework, will also focus on promoting an innovative ecosystem for AI in Europe to reap its societal and economic benefits.

Through its Digital Decade initiative, the European Commission has called for the EU to achieve 100% coverage for high-speed internet, alongside the deployment of at least 10,000 edge climate-neutral and secure edge nodes to enable low-latency computing applications. However, progress towards these targets varies and specific additional AI infrastructure will be required to support the EU's AI ambitions.

**To further enhance the EU's investment in infrastructure, the EU should:**

- Coordinate and review the EU's future strategic infrastructure demands across Member States by mapping existing capabilities and the pipeline of potential investments to determine any gaps which require targeted support and policy interventions.
- Support strategic infrastructure investments, such as cloud, connectivity and underlying computing power, by prioritising targeted support and policy interventions, including by addressing regional gaps in infrastructure and financing.
- Support EU member states to identify and remove blockages to infrastructure development, including by ensuring that planning and other national requirements do not constrain the rollout of key research and innovative infrastructure.

**Progress towards 2030 EU Digital Decade Targets - Infrastructure**




Source: *2023 European Commission Progress Report on the Digital Decade*

## Google's investment in AI infrastructure - EU data centres and subsea cables

By the end of 2024, we will have invested over $5 billion in data centres in Europe — helping support secure, reliable access to a range of digital services, including broad generative AI capabilities like our Vertex AI platform. Google owns and operates seven data centres located in the EU in Ireland, the Netherlands, Denmark, Finland and Belgium. These data centres will help meet growing demand for our AI and cloud services and bring crucial compute capacity to people and businesses across the EU.

Since 2015, Google Cloud has launched 11 cloud regions in the EU, giving European businesses better performance, more control over where their data is stored, and enabling access to AI tools.

Mistral AI, one of Europe's leading providers of AI solutions, uses Google Cloud's AI-optimised infrastructure, including TPU Accelerators, to further test, build, and scale up its LLMs (large language models), all while benefiting from Google Cloud's security and privacy standards.

To boost connectivity and network resilience, we have also made significant investments in subsea cables — Nuvem Equiano, Dunant, and Blue — connecting Western and Southern Europe with the USA, Africa, and Middle East, expanding data connectivity and transfer speeds.

We want to deliver the digital transition and the green transition simultaneously. Since 2017, Google has been matching our energy consumption every year with new additional renewable energy generated from solar and wind power. We continue our work to reduce our carbon footprint and by 2030, we've set the goal to be completely carbon free. Numerous projects throughout the EU are testament to our commitment, such as:

- In Denmark, we launched the Net Zero Innovation Hub for Data Centers, while also launching Digital Decarbonisation studies for Belgium and Denmark.
- In Germany, we opened the Google Cloud Data Centre in Hanau and demonstrated our positive impact through the report 'a greener and more digital Germany'.

## Research and Development (R&D)

The US currently spends more than twice as much as the EU per capita on AI R&D. Recent research by the McKinsey Global Institute estimates that between 2014 and 2019, large European companies' revenues increased 40% more slowly than those in the US, with these companies spending 40% less on research and development. This gap is disproportionately concentrated in the IT and pharmaceutical industries. Across ten key current emerging technologies, McKinsey estimates that the EU is behind on eight out of the ten.

The EU should accelerate investment in AI R&D and in other key technologies if it is to meet its goals. This should include research into applying AI for societal benefit (such as in health, manufacturing and agriculture). Europe has the institutions to utilise this investment effectively. It is home to some of the world's best technical universities, which is why Google has built research teams throughout Europe in Amsterdam, Berlin, London, Munich, Paris, and Zurich. Google actively collaborates with leading research institutions and universities in Europe through our publications and research programs dedicated to driving innovation, advancing the field of knowledge and creating standards and guidance for responsible AI development.

Creating a network of AI research centres and enhancing researchers' mobility can help create a more unified and dynamic European research ecosystem. Both governments and industry can help support academic and civil society researchers through programmes like tech transfer frameworks, fellowships, and direct research support.

Google therefore welcomes the Commission's plans to invest €1 billion per year in AI, through the Horizon Europe and Digital Europe programmes which, alongside additional investments from the private sector and Member States, aims to reach an annual investment volume of €20 billion over the course of this decade. The EU must prioritise this expenditure in future research budgets.

### Google's initiatives to support the European research and startup communities

Engaging with the broader research community is a core part of Google's efforts to build a more collaborative AI ecosystem in Europe. We seek to reach beyond the usual suspects in academia and industry reflecting the geographic, socioeconomic, linguistic, and cultural diversity of national and global communities.

For example, Bulgaria's Institute for Computer Science, Artificial Intelligence and Technology, hosted in Sofia, has been supported by Google's investment in cloud infrastructure to run high-performance machine learning models, and the Institute worked in partnership with Swiss technology universities to attract leading AI researchers and engineers.

In addition, Google announced earlier this year that it is establishing a European AI research hub in Paris with 300 engineers and researchers. This new hub aims to get closer to universities and research institutes to stimulate fundamental research on AI.

Through Google's Data Commons initiative we make publicly available data accessible to researchers and educators to help solve society's challenges. Data Commons is one of the world's largest Knowledge Graphs on sustainability, spanning more than 100 new sources of data about climate, health, food, crops, shelter, emissions and more.

We are also continuing to support the startup community through our series of equity-free Google for Startups Academies focusing on AI for cybersecurity, education, or health.

## Pro-Innovation regulatory frameworks

As Google's CEO Sundar Pichai has highlighted: "AI is too important not to regulate, and too important not to regulate well." Policymakers face the challenge of governing AI in a way that mitigates its risks and potential harms while supporting innovation and ensuring broad access to the opportunities created by AI. The EU's AI Act aims to create a uniform regulatory landscape across 27 countries, establishing a clear and consistent framework that encourages innovation, investment, and the development of human-centric, trustworthy and ethical AI applications.

Google agrees with the aim of the AI Act — to promote public trust in AI. The focus of the EU should now be on ensuring its proportionate implementation and advancing a truly risk-based approach that balances innovation and AI's benefits with the mitigation of potential harms. As it implements the AI Act, the AI Office should work to develop an approach that is future-proof, and support an AI regulatory framework which recognises the rapid pace at which AI technologies are developing and the need to align with emerging international standards. The drawing up of a Code of Practice as foreseen in the AI Act, together with the involvement of both a scientific panel and an advisory forum have the potential to help achieve these goals. Indeed, active participation from those who will have to apply the regulation while building on the expertise of the scientific community will encourage open dialogue and lead to better implementation and broader acceptance of the framework.

European innovation will be supported if the implementation of the AI Act, including through the Code of Practice, is aligned with emerging standards and best practices. Alignment with existing voluntary commitments and codes can help limit the risk of fragmentation or access barriers to the single market. Alignment can also strengthen the EU's position in AI governance, encourage global collaboration, and streamline compliance for AI model providers.

To this end, the EU should work to coordinate with other international AI governance approaches to the greatest extent possible. The EU was a major voice in the development of the G7's AI Principles and Code of Conduct, the UNESCO Recommendation on the Ethics of AI as well as the Council of Europe's Convention on AI. As other regions look to the AI Act to inform their own efforts, the EU should look to demonstrate robust regulatory approaches that are truly risk-based, grounded in evidence, and proportionate.

With safety issues now being addressed through the AI Act, the EU should ensure that its wider regulatory environment can help unlock the benefits of AI for everyone. The EU and national governments need to ensure that Europe's regulatory framework empowers small businesses and traditional industries seeking to adopt AI solutions.

**We believe there are three major universal policies that policymakers should consider to ensure AI researchers and innovators can convert ideas and data into discoveries, products, and services.**

1. First, the key to effective AI regulation is a truly risk-based approach that balances innovation and AI's benefits with the mitigation of potential harms. To be technology-neutral and future proof, AI regulation should focus on the level of risk posed by specific applications instead of the underlying technology or language model. Risk-based approaches should also include 'risk/benefit' analyses, be rooted in empirical evidence, and well tailored to case-specific needs[1]. We encourage policymakers to conduct thorough regulatory impact assessments before and after the implementation of new digital regulations and keep a sense of proportionality so as to avoid being overly broad in scope or overly prescriptive in ways that could limit the development of tools for societally beneficial and desirable applications. A flexible framework will help prevent potential loopholes and remain relevant even as AI technologies evolve. Moreover, given the cross-sectoral nature of AI, we need to avoid a siloed approach to AI regulation. Priority should now be given to effective implementation of existing regulations while ensuring regulatory consistency in areas like data, privacy, copyright, and AI, avoiding duplication and contradictions in the regulatory framework, particularly in the digital arenas of data, privacy, copyright and AI. Efforts to centralise supervision and oversight as provided for in the AI Act can help achieve this objective and avoid adding complexity, cost, or legal uncertainty.

2. Second, a copyright framework that fosters innovation and cumulative creativity is a crucial enabler for a flourishing AI ecosystem. We believe that AI can not only deliver significant societal benefits but also has the potential to help revolutionise the creative industries, changing the way we create, distribute, and consume content. For example, AI and generative AI can help creators and media companies increase engagement, profitability and efficiency, by giving them the tools to personalise, diversify and enhance the productivity of their services. Such potential relies on access to a diverse range of high-quality training data. As a result, we need copyright frameworks to take a pro-innovation, balanced approach. We believe the EU already has a robust system of copyright protection and enforcement which allows AI systems to learn from and engage with diverse information sources and datasets while ensuring that creators and rights holders can protect their creative works. The current regime of protections and exceptions, in particular for text and data mining, provides a balance that is fit-for-purpose and reflects a broad consensus.

3. Thirdly, policymakers should ensure the application of privacy safeguards to AI is proportional to benefits and risks while embracing long-standing privacy principles. Privacy regulations, especially the GDPR, are written with the goal of being adaptive, proportional, and technology-neutral. We should continue to lean on core, unifying principles of privacy and data protection laws — such as transparency, fairness, and accountability — as an important foundation to advance AI responsibly. As the GDPR already provides Europeans with a comprehensive framework to protect their privacy and control their data, creating new legislation targeting AI and privacy specifically would not only confuse citizens but also present an additional regulatory burden for industry, SMEs, and startups. Any new initiative, including guidance, should emphasise the dynamic landscape of technology and the need for maintaining a balance between data protection rights, security, trade secrets protection, and societal benefits. It should also encourage dialogue with technologists and industry when novel privacy issues arise, to explore the balance of issues and identify appropriate ways forward.

1 For more, see Ebers, Martin, Truly Risk-Based Regulation of Artificial Intelligence - How to Implement the EU's AI Act (June 19, 2024). Available at SSRN: *https://ssrn.com/abstract=4870387* or *http://dx.doi.org/10.2139/ssrn.4870387*

## International development of AI

AI is inherently a cross-border technology in terms of how it is researched, developed, and deployed. For example, scientists and researchers from Ukraine, Poland, Germany, India and Wales were core contributors to the foundational scientific paper on AI, *Attention Is All You Need*, published by Google in 2017. It is critical for EU Member States to work together and with allies on the development and governance of AI.

Enabling trade and investment policies can increase innovation, uptake, and governance of AI – and the EU's voice in supporting collaboration of international principles, standards and trade agreements is key to ensuring its safe and responsible development. One of the most meaningful steps that EU and Member State trade policymakers can take to advance the development of responsible AI is committing to support trusted cross-border data flows. Support for data flows is necessary to ensure that AI systems are trained on demographically and geographically diverse datasets, which helps make AI more useful and responsive to communities around the world. Other important trade provisions include high and uniform trade secret protections, commitments to non-discriminatory treatment, and provisions to protect source code. The EU has incorporated these provisions in trade agreements with many of their partners and more can be done to promote their relevance for AI — while also considering new measures to support capacity building and workforce preparedness around AI.

Beyond increasing economic ties, demonstrating and strengthening the value of trade principles for AI can create another vehicle to further the international consensus on AI governance based on agreed common principles. The G7, OECD, ISO, CEN-CENELEC and other international bodies are developing a series of principles, commitments, and standards on AI that can help guide its safe, secure, and responsible development. Countries like Australia, Chile, New Zealand, Singapore, and the UK have pioneered new trade agreements that support international alignment of AI frameworks and facilitate the cross-border use of data and AI technologies. The US and UK have recently signed a memorandum of understanding on AI Safety to collaborate on testing and sharing best practice.

### The EU should:

- Continue to work with international organisations to ensure the alignment of approaches to regulatory initiatives and continue to monitor and review how the EU's own frameworks align with emerging international best practices.
- Collaborate with international counterparts to ensure approaches to AI safety and testing are aligned and not duplicative, e.g. through mutual recognition of tests and benchmarks.
- Strengthen longstanding trade principles on trusted cross-border flow of data, trade secrets, interoperability, least-trade-restrictive regulation, and non-discrimination, to enable trust, investment and alignment among partners.

# 04 Developing a thoughtful AI workforce strategy

With every digital transition, we have seen how skills are vital to unlocking new opportunities for workers and businesses helping them innovate and grow. Generative AI tools can supercharge the productivity of individual workers, saving individual workers over 70 hours a year, which is the equivalent to about two weeks of work. AI can help workers accomplish more with their resources, and focus on the more rewarding aspects of their work.

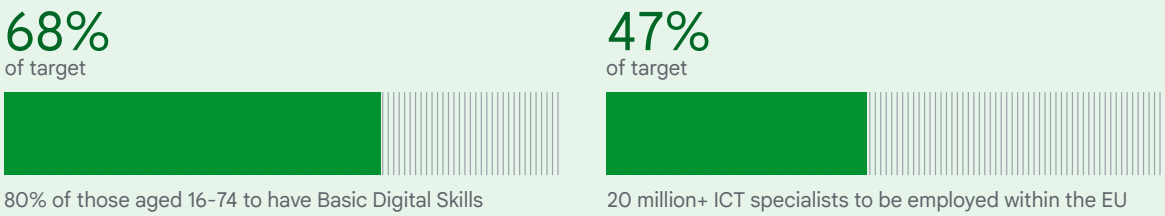
The EU has the ambitious goal to "empower people and businesses to seize a human-centred, inclusive, sustainable and more prosperous digital future" and has recognised that digital upskilling is the central to achieving this. Google has been a proud partner to this mission, having trained over 13 million people across Europe in digital skills. In January this year, the European Commission set out a strategic framework to attract, train and retain generative AI specialists, which Google supports.

Despite extensive EU and Member State efforts, the digital skills gap and the scarcity of STEM talent remain the most significant barriers to the digital transition and innovation in Europe. The Commission's State of the Digital Decade report has found that Europe is currently falling short of its targets to assist workers to acquire basic digital skills and increase the number of ICT specialists by 2030, with one third of Europeans (30%) not feeling appropriately equipped for the Digital Decade.

Without more targeted policy interventions and investment into upskilling and reskilling the wider workforce, the existing digital skills gap could be widened in Europe and the benefits of AI technology will only be felt by a narrow set of businesses and workers. We need to equip everyone in the workforce to realise the benefits of AI.

EU policymakers must take stock of the progress that has been made — including initiatives such as the the Deep Tech Talent Initiative and the European Digital Skills Awards — as well as the work that lies ahead, for industry, civil society and worker representatives in partnership with the EU institutions, to improve basic digital skills across the workforce, upskill workers on AI technology, and support workers impacted by technological advancements.

**Progress towards 2030 EU Digital Decade Targets - Skills**




Source: *2023 European Commission Progress Report on the Digital Decade*

### A shared vision for building an AI empowered workforce

To ensure the opportunities from AI are truly available to everyone and AI's benefits are widely shared, we need to take a collaborative approach and deploy a comprehensive, thoughtful workforce strategy that considers a wide range of perspectives. This will require a shared vision — and a shared responsibility — across Industry, policymakers and civil society:

- Industry has a critical role to play in signalling the demand for future skills and developing new upskilling programmes that focus on AI preparedness. Given the transformative impact of AI across all sectors of the economy, the technology sector should develop new cross-sectoral AI training partnerships to ensure workers in all industries are ready to harness AI. For example, Google has partnered with companies like SAP and labour groups like the European Vocational Training Association to launch an AI Workforce Consortium, which is helping to identify skilling pathways for job roles most likely to be impacted by AI.

- Civil society, foundations, and academics should develop new research to understand what has and hasn't worked in the past in terms of worker preparedness for new technologies and the implementation of skills programmes. Those insights should then be applied to ensure those most affected by AI are at the centre of AI workforce programmes.

- Policymakers must help scale up AI training programmes so that they reach all communities, including those from rural or traditionally underserved communities. We need to help workers of all backgrounds learn to use AI effectively. This should involve:

    - Specialised upskilling programmes which should be well targeted at improving productivity in key sectors; and

    - Basic skills programmes that can reach all communities.

### Modernising skills programmes for the AI era

EU workers and businesses have begun to understand and explore the opportunities that AI could bring to them. Public First's research shows 74% of workers across the EU think generative AI tools will help them be more productive, while 79% of European businesses said that they are likely to use the freed up time for workers to give them other more valuable tasks. Furthermore, just over half of full-time workers (52%) said that they expected to explore more AI-powered tools in 2024, and 39% said that they expected to use generative AI tools as part of their jobs within the next five years. This was particularly true for younger workers, with over half of those under-35 expecting to use generative AI tools as part of their work in the next five years.

These benefits, however, are not automatic; we need to ensure access for all workers who need essential AI skills. To ensure that every European worker and business, big or small, does not lose out on the global competition of AI growth, it is essential that the EU continues to accelerate the digital skills transformation and puts AI skills and education at the centre of a revitalised European Skills Agenda.

We welcome the EU's European Skills Agenda, which has promoted important initiatives like Individual Learning Accounts and micro-credentials that will support workers to embark on lifelong learning and ensure that workers can successfully navigate the changing skills landscape. However, generative AI has the ability to support a much wider range of tasks and occupations and its capabilities and use are evolving much more quickly than earlier technologies.

This is a shared responsibility across governments, civil society, and industry. We want to work with governments and industry to build skilling programs that equip people with the essential AI skills and confidence to succeed in this shifting landscape.

No single employer or policymaker will be able to modernise workforce programs on their own. Google is actively collaborating with government leaders, economists, and think tanks to develop a thoughtful AI workforce strategy across all sectors that will identify the policy reforms needed to prepare workers for the new opportunities created by AI, while supporting the transition of workers whose roles are becoming less in demand.

### To build an AI-enabled workforce, the EU should:

- Increase the flow of European STEM talent by encouraging Member States to adopt basic computer science and AI training as part of school curriculum and explore the use of generative AI as a tool to advance formal education through pilot projects. Policymakers should ensure the flow of talent is diverse by attracting more women and girls into AI careers.
- Upskill and reskill workers by leveraging existing EU skills public-private partnerships (like the European Pact for Skills) to align on common standards, share insights and promote life-long learning opportunities on AI.

### Google's AI digital skills programmes for Europe

Since 2015, Google has trained over 13 million people across Europe in digital skills, working in collaboration with governments and local communities through programs such as our Google Career Certificates. We're now building on our long-established digital skills training to ensure that the opportunities presented by AI can be open to all.

In February 2024, we launched the AI Opportunity Initiative for Europe, with the aim of helping all European workers who will need essential AI skills through the following commitments:

- €25 million in funding from our philanthropic arm, Google.org, to support AI training and skills for people, with a particular focus on vulnerable and underserved communities. This includes the AI Opportunity Fund: Europe, a €15 million open call to support nonprofit and civil society organisations helping workers most impacted by workforce transitions brought on by AI and face barriers in accessing training. Together with the Centre of Public Impact, we will support a wide range of nonprofit and civil society organisations to deliver the knowledge to those that need it most, while eliminating barriers to learning by providing cash grants for additional tailored wraparound support, such as childcare, to successfully facilitate the training.

- Supporting startups through launching a new series of equity-free Google for Startups Academies focusing on AI for cybersecurity, education, or health.

- Expanding our free-of-charge foundational AI courses to be available in 18 languages. In addition, we are adding more resources to our Google Career Certificates program.

Beyond our comprehensive (online) offering that is available across the whole of the EU, we are also present in many local communities across Europe with projects and initiatives to support youth, adults, and educators in their efforts to learn, teach and harness the potential of AI skill development. Google has launched several related initiatives including:

- In Finland, we have partnered with Code School Finland to support primary and secondary school teachers, district-level education authorities, private education companies, corporates, ministries of education, extra-curricular education providers, kindergartens, vocational schools, and teacher training universities about digital skills.

- In the Netherlands, we offer free digital skills training courses to primary school teachers working at schools around our data centres in the Eemshaven and Middermeer. We also provided a further €6.1 million in funding to Dutch communities to improve STEM education and training courses offered in schools and vocational education.

- In France, we have set up a program called 'Les Ateliers Numeriques': together with our local partners, we offer a range of training and tools on AI, data analytics, and cybersecurity to individuals who want to advance their career or develop their business.

### Supporting workers in transition

Europe has been a global leader in ensuring that the benefits of technology can be maximised and distributed fairly among sectors and communities and that the green and digital transitions are socially beneficial.

The AI era is no different to previous technological advances — it's not inevitable that all workers will realise the economic benefits from AI the same way. But at the same time, AI can help, and is already helping, democratise access to high-value skills and expertise such as coding, language and writing skills, and promises to enable more people to use productivity strategies that were once the preserve of workers at the top of the income ladder, empowering European workers to keep up technological changes and and capitalise on the high growth high-value economy. AI can help a broad range of people — nurses, contractors, teachers, and people in the trades — increase their capabilities, get more done with their resources, build deeper knowledge and expertise, and prepare them for future-focused jobs.

Deloitte has found that "European organisations are less active in reskilling workers, educating their workforce and recruiting technical talent" than the US and Asia Pacific countries — with only 29% of the EU businesses having begun to approach this issue whereas 39% of US businesses and 38% of APAC businesses have done so. While it is crucial that the EU continues to ensure that workers' rights and fair working conditions are maintained, if not improved, in the AI transition, the EU should not shy away from the opportunities that AI could bring to improve the work experience and workers.

This can be delivered by focusing on workers who are most impacted and ensuring a smooth transition to prepare them for the occupations of the future. The European Commission has already committed to work with European Digital Innovation Hubs specialised in AI to deliver training to address the new skills requirements that public and private sector workers will need.

**Building upon this initiative, EU policymakers could further increase the European workforce's resilience in the AI transition by:**

- Bringing AI developers, industry, workers' representatives and policymakers together in a European Social Dialogue on AI to improve understanding of AI, the opportunities for the workforce and explore the support that European workers need to realise the benefits of the AI transition.
- Ensuring the Pact for Skills includes AI adjustment assistance for those jobs affected by AI, as well as wider training and support programmes to enable other workers to use AI to solve new tasks on the job
- Driving cross-sectoral skilling and certificate programme partnership to help strengthen workers' career mobility and widen their opportunities, building on the Blueprint for sectoral cooperation on skills.

# 05 Promoting widespread adoption and universal accessibility

In addition to building AI infrastructure and developing a thoughtful workforce strategy, we ultimately need to ensure that AI is applied and deployed in a universally accessible and useful way. In that context, President Von der Leyen has called for co-development with Member States, industry and civil society an Apply AI Strategy to boost new industrial uses of AI and to improve the delivery of a variety of public services, such as healthcare.

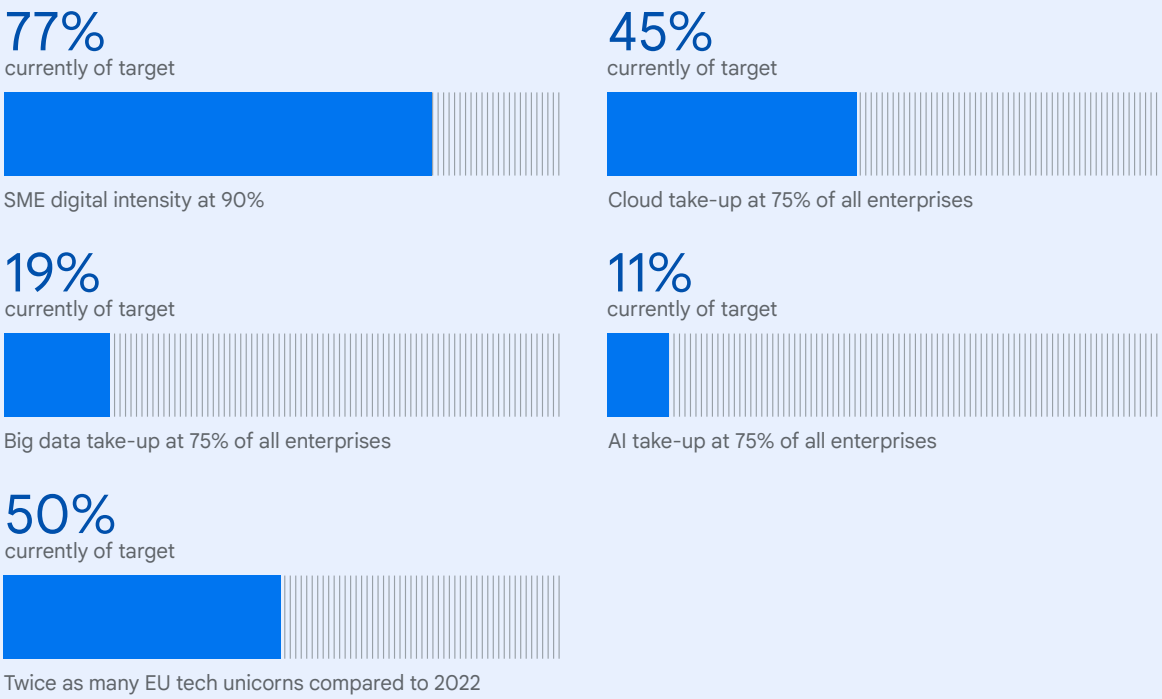
We must harness AI to help solve real world problems and for public good — in government buildings, schools and hospitals. The global technology competitions are often won — not by the first country to invent — but by the best to deploy widely across the society and sectors.

## Private Sector adoption of AI

The EU's Digital Decade Progress Report 2023 notes that the "digitalisation of businesses is one of the most crucial current elements for the success and growth of the economy". However, it also notes that "the adoption of digital technologies by European companies is still well below these Digital Decade targets, in particular those for the uptake of AI and big data".

EU policymakers and AI developers must work together to develop outreach strategies to traditional industries and small businesses who have much to gain from AI adoption in terms of their competitive posture if they are quick to harness and deploy AI. However, adopting AI may not be the first priority for harried small business owners or industries that are accustomed to taking a "wait-and-see" approach to new technologies.

### Progress towards 2030 EU Digital Decade Targets - Adoption




Source: *2023 European Commission Progress Report on the Digital Decade*

In the next few years, generative AI is set to create a whole generation of digital tools, with the potential of this already recognised by larger businesses. 75% of larger businesses with greater than 250 employees told us that they expected generative AI to significantly improve the productivity of their business in the next five years.

By contrast, smaller businesses were less aware of the potential benefits of generative AI. For example, businesses with fewer than 50 employees were only half as likely to say that they were already using generative AI for help with writing and drafting documents in the next five years as those with more than 250 employees. In the next five years, just 31% thought they would likely use it. The impetus for boosting AI uptake is clear as recent studies have already proven the immense benefits AI can bring to a range of industries.

SMEs are the backbone of the continent's economy, employing 100 million people across Europe. In our previous research, SMEs named three main barriers to starting, or continuing, their digital journey. They said they lacked the knowledge and skills to adopt, they lacked the funds and they expressed concerns about cybersecurity.

Progress in digitalisation is uneven across Member States and across sectors. Our research showed that technology companies (69%) and finance and insurance (72%) firms are most likely to have a digital strategy. Logistics businesses are 1.3x more likely to want to accelerate their use of digital than the average EU SME, possibly due to potential cost efficiencies. Meanwhile, hospitality and the arts sector are half as likely to see digitalisation as important, even though it can play a vital role.

In addition to focusing on SME uptake of AI, it is important to devote AI resources and outreach to sectors of the economy that are not typically associated with early tech adoption – such as agriculture, energy, manufacturing, and other traditional sectors. In many cases, there are impressive proofs of concept being developed by companies in these sectors on AI adoption. The EU can play an important role in helping to scale up these deployment solutions, while making AI programs more accessible to employers and workers in traditional industries.

**The EU should improve private sector adoption of AI by:**

- Using the DESI dashboard for the Digital Decade — particularly the indicator on enterprises using AI technology — to incentivise progress and the sharing of best practice by Member States about the delivery mechanisms for improving private sector AI adoption.
- Boosting initiatives that deliver results in AI adoption, particularly amongst SMEs, by accelerating the existing GenAI4EU initiative.
- Developing targeted AI deployment initiatives for small businesses and traditional industries, including agriculture, manufacturing, healthcare, and energy sectors that may have the highest needs or the lowest uptake of AI tools The Apply AI Strategy to boost new industrial uses of AI could be a right way forward.

## How we're helping others adopt AI and realise its benefits

### Contrails (a partnership with Eurocontrol)

Contrails, vapour trails from aircraft engines, account for one-third of aviation's global warming impact. American Airlines and Eurocontrol (the European Organisation for the Safety of Air Navigation) partnered with Google Research and its Climate AI team to develop a model that predicts areas in the sky where contrail formation is less likely. By integrating AI-generated routes into aviation planning, airlines can optimise flight paths and reduce emissions. Test flight data suggests that this approach could reduce aviation emissions by up to 20%.

### Lung cancer detection

Scientists affiliated with Google Health have worked with Dutch Aidence on an AI-powered solution to improve the way radiologists detect malignant nodules in lung cancer — and ultimately reduce mortality. The solution enables radiologists to interpret pulmonary nodule scans up to 40% faster than they would otherwise be able to manually. Since late 2023, it has been implemented in nearly 100 locations across the Netherlands, EU, and UK, and processes over 50,000 scans every month.

### Staying ahead of the attack: predictive AI

Bfore.AI is a French-founded cybersecurity startup co-founded in 2020 by Luigi Lenguito (CEO), Sebastian Cesario (CTO) and Luciano Allegro (CPO). With over 18 years of combined experience in IT corporate and startup environments in different sectors, these three co-founders imagined a world where cyberattacks are stopped before they even occur. Recognising the need for preemptive defence, they created Bfore.AI, a company that leverages behavioural Artificial Intelligence (AI) to provide predictive cybersecurity solutions, aiming to prevent cyberattacks before they occur.

In 2024, Bfore.AI secured $15 million in funding and expanded its workforce to 81 team members. Its innovative approach positions it as a leading startup in predictive cybersecurity. Their technology identifies potential cyberattacks by analysing large datasets for patterns and anomalies that might indicate malicious infrastructures. Instead of simply reacting to attacks after they happen, Bfore.AI blocks these predicted attacks, preventing them from causing harm to their clients. The company places a significant emphasis on malicious infrastructure, processing millions of web records daily to identify threats like phishing and brand impersonation, often using logo recognition. Its unique approach made Bfore.AI, which this year participated at the *Google for Startups Growth Academy: AI for Cybersecurity* and uses Google tools, like *Web Risk API* to assess the maliciousness of websites, an instant success. This startup is at the forefront of a new era in cybersecurity. By harnessing the power of AI, they are making the internet a safer place for businesses and individuals alike.

## Public Sector adoption of AI

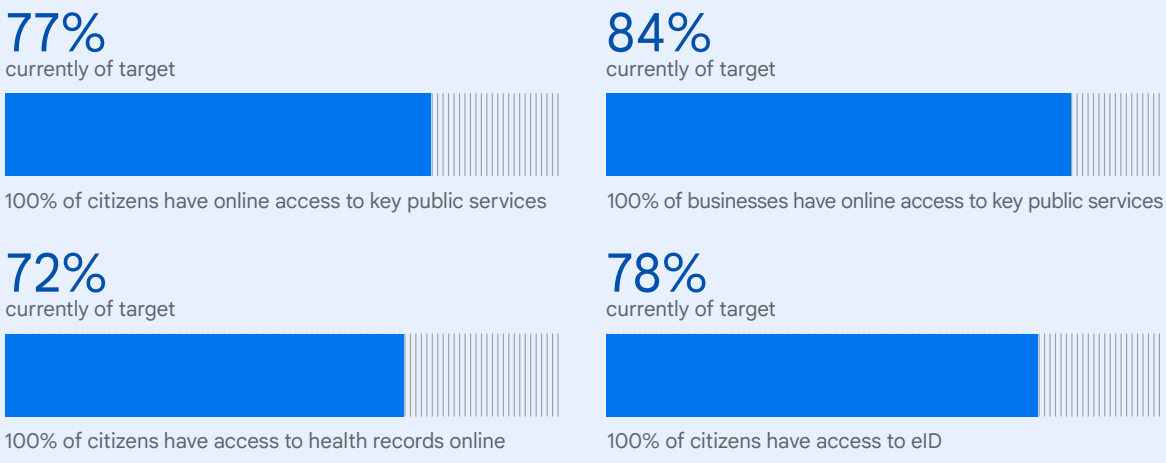
Digitalising public services and adopting AI to increase efficiencies and improve outcomes presents huge opportunities for the EU and its Member States. According to the Special Eurobarometer survey, four out of five (81%) Europeans think that digital technologies will be important to access public services online by 2030. European citizens think that improving online access to and usability of public services should be one of the top five priorities of their government with regards to digitalisation.

AI presents the opportunity to save billions for public services and improve and protect the lives of EU citizens. Through AI, we can diagnose and treat emerging health conditions earlier, improve safety and reduce traffic accidents, detect flood risks and take preventative measures, make it easier to learn or gain new skills, and improve energy efficiency and sustainability.

Public procurement is an important lever to stimulate investments in AI, as stated in the New European Innovation Agenda. However, the EU has acknowledged that "public procurement of innovative digital solutions (e.g., based on AI or big data) is insufficient and would need to increase substantially from €118 billion to €295 billion in order to reach full speed adoption of innovative digital solutions in public services". This procurement activity is required across public services in health, transport, security, education and culture, construction, energy, water, and environment.

While these targets aim to improve digital adoption, they do not increase the use of AI and these targets should be updated to encourage the uptake of AI-based solutions. The European Commission has already contributed to the development of AI-specific contractual clauses, developed the Public Sector Tech Watch observatory and supported experimentation and piloting through the GovTech4all Incubator. In its January 2024 Communication on Artificial Intelligence in the European Commission, the European Commission also committed to fostering knowledge sharing and cooperation among Member States on AI uptake by national administrations, including by building on existing Member State forums such as the Network of Member State Chief Information Officers, the Interoperability Expert Group and the GovTech and experimentation cooperation set out in the recently adopted Interoperable Europe Act.

### Progress towards 2030 EU Digital Decade Targets - Adoption




Source: 2023 *European Commission Progress Report on the Digital Decade*

**The EU should improve public sector adoption of AI by:**

- Doubling down on existing initiatives to increase the public procurement of AI, improving procurers' knowledge about the innovative solutions available and sharing best practice among EU member states.
- Taking an AI-first approach to procurement, ensuring that innovative options are considered as the primary solution.
- Considering restricting the use of 'old' solutions where AI can deliver the best outcomes.
- Developing bolder AI adoption targets as part of the review of Digital Decade targets in 2026.

### Google Cloud and public service delivery

Cloud is a major enabler of AI adoption for the governments and industries: customers can bring their own data and use our computing power to find ways to drive efficiency savings and improve service delivery.

The European Institute of Oncology (IEO) and the Monzino Cardiology Center introduced the Clinical Data Platform (CDP) based on Google Cloud's AI. It allows you to classify and analyse anonymized clinical data at a speed 300 times faster than traditional methods used previously. Using artificial intelligence solutions, including Vertex AI, the IEO and Monzino were able to analyse large amounts of unstructured data and classify the information in a structured way within the CDP to facilitate analysis and research. This allowed the team to develop a proprietary model based on data extracted from 500 pathological anatomy reports, achieving significant goals in record time. In just 2 months, 76,000 medical report data were standardised and 45 days were enough to train and put the model into production. The Clinical Data Platform has therefore made it possible to significantly accelerate the process of converting clinical data, with a processing speed 300 times higher than traditional methods, facilitating access to crucial information for researchers.

The Generalitat of Catalan uses PaLM 2 to field citizen queries. The model is fed the Generalitat's information, which the model then uses to build an understanding of customer questions and produce responses. At the moment, AI is only being used for simple, frequently asked questions that the business management office receives. A human being supervises the responses, but eventually the Generalitat hopes that the system can work on its own and anticipate the needs of their citizens.

Deutsche Bank is testing Google's generative AI and large language models (LLMs) at scale to provide new insights to financial analysts, driving operational efficiencies and execution velocity. There is an opportunity to significantly reduce the time it takes to perform banking operations and financial analysts' tasks, empowering employees by increasing their productivity while helping to safeguard customer data privacy, data integrity, and system security.

"Google Cloud has been a strategic partner for Deutsche Bank, working with us to improve operational efficiency and reshape how we design and deliver products for our customers," said Gil Perez, Chief Innovation Officer, Deutsche Bank. "We appreciate their approach to Responsible AI and look forward to co-innovating with their advancements in generative AI, building on our success to date in enhancing developer productivity, boosting innovation, and increasing employee retention."

# 06 Towards an AI future for Europe

As governments around the world look to increase the public's trust in AI, policymakers have a critical role to play in developing AI policy frameworks showing that safety, security, innovation, and opportunity go hand-in-hand. Trust has rightly been an overarching priority for policymakers in the EU: The AI Act will now provide a regulatory foundation and roadmap across Europe's 27 countries.

Yet, as this paper sets out, there is a broader opportunity for Europe. The new EU mandate provides a platform on which Europe can set a course to secure these opportunities and harness AI to drive a new era of competitiveness. By prioritising investments in AI infrastructure and innovation, developing a thoughtful AI workforce strategy, and promoting widespread adoption of all the technology, Europe can realise the full promise of AI.

# Google's EU AI Opportunity Agenda