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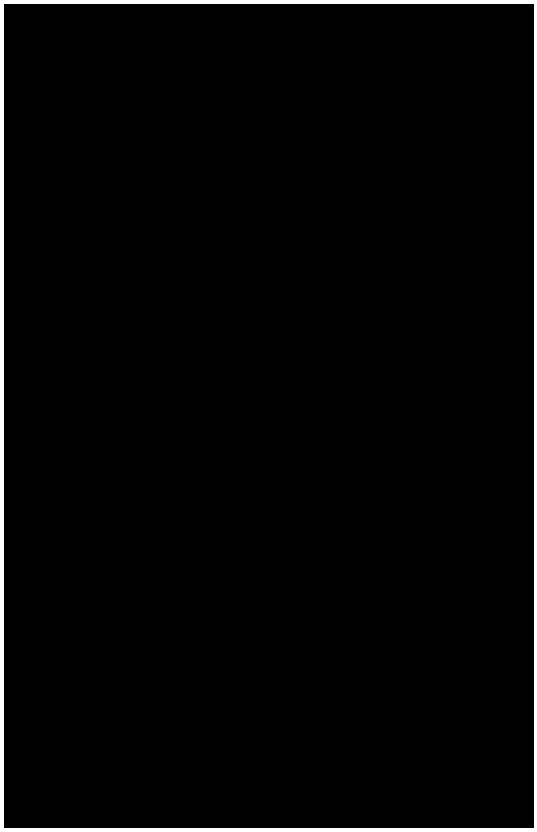
er ting the future

Conversations
FOR TOMORROW

Conversations FOR TOMORROW

Quarterly review



Generative AI today is at the threshold of an outburst of creative exuberance. The cover for this edition of Conversations for Tomorrow represents the myriad possibilities that arise at the intersection of light and shadow – not too dissimilar to the possibilities that generative AI creates. At the same time, it also highlights fleeting patterns and dark spots which one must bear in mind as they move forward. The content and design of this issue reflect the opportunities, the challenges, and the risks that generative AI is now throwing up in front of organizations.

Foreword

At Capgemini, we help organizations prepare for tomorrow by distilling the unique insights and perspectives of leaders from global business, academia, the startup community, and wider society.

Gener(AI)ting the Future

In Conversations for Tomorrow, the Capgemini Research Institute identifies the strategic imperatives for the future of business and the society it serves. In this ninth edition of the journal, among other areas, we explore:

- The rapid rise of generative AI (Gen AI)
- The rate at which organizations across industries are adopting the technology
- The use cases that it enables
- Its impact on sustainability journeys
- How it is likely to change work and the workforce
- How and why it needs to be regulated

Our annual research into the state of Gen AI shows that organizations are embracing generative AI, this is reflected by an uptick in investment levels. The vast majority (80%) of organizations in our survey increased their investment in 2023; 20% maintained their investment levels; and no organization has decreased its investment in Gen AI from last year.

In the past year, every organizational domain, from sales and marketing to IT, operations, R&D, finance, and logistics, has seen an increase in the rate of adoption. Early adopters are seeing benefits from improved operational efficiency to enhanced customer experience. Moreover, generative AI adoption among employees is robust in most organizations, with the majority allowing its use.

But adopters have also had to acknowledge AI's significant carbon footprint. Over one-third of organizations in our research are already tracking their Gen AI carbon emissions.

Organizations globally are rapidly embedding Gen AI across functions, with a ripple effect for wider society. In this edition of Conversations for Tomorrow we focus on this AI-generated future.

We would like to thank all the leaders and experts who have enriched this edition of the journal with their insights. By sharing the perspectives of such a diverse range of accomplished individuals, we aim to present a comprehensive overview of Gen AI and its contribution to generating a new future.

- The CEO of one of the hottest AI startups
- One of the most-respected AI scientists globally, who is also a board member at Amazon
- A former member of the European Parliament who played a key role in the EU AI Act
- A leading professor at Stanford
- Senior executives from Adobe, Salesforce, OECD, Telefónica, and Itaú Unibanco
- Capgemini's own subject-matter experts

Pulling together such a wide range of views was an extremely instructive exercise for us. We hope you enjoy reading this edition as much as we enjoyed putting it together for you.

Conversations FOR TOMORROW

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Executive Summary

Generative AI (Gen AI) is making rapid inroads into organizational structures, transforming them rapidly from the inside out. As businesses across industries begin to implement Gen AI, several key themes emerge that highlight its potential to impact organizations, workforce, and society.

Gen AI has the potential to reimagine the future of the workforce

Gen AI has potential to unlock human creativity, allowing employees to focus on complex strategic tasks. Clara Shih, CEO, Salesforce AI, comments: "AI will allow workers to move away from repetitive tasks to focus on doing what humans do best, which is building relationships, unlocking creativity, making connections, and addressing higher-order problems."

Scott Belsky, Chief Strategy Officer and Executive Vice President, Design and Emerging Products, Adobe, adds: "We are most creatively confident when we are five years old. We lose our creative confidence as we get older because of the skills gap, exposure to criticism, and just the lack of access to creative tools. Generative AI is fundamentally changing this."

Andrew Ng, CEO, LandingAI, emphasizes the boost to productivity: "For many jobs, AI will only automate or augment 20-30% of tasks. So, there's a huge productivity boost, but people are still required for the remaining 70% of the role."

We are most creatively confident when we are five years old. We lose our creative confidence as we get older because of the skills gap, exposure to criticism, and just the lack of access to creative tools. Generative AI is fundamentally changing this."

Scott Belsky
Chief Strategy Officer, Adobe

> **Whenever a traditional activity gets replaced or augmented with one based on bits, it usually brings significant energy and environmental benefits."**

Erik Brynjolfsson
Stanford

This shift is fostering a culture of continuous learning and adaptability. Erik Brynjolfsson, Professor at the Stanford Institute for Human-Centered AI and Director of the Stanford Digital Economy Lab, discusses the importance of workforce skill enhancement: "AI requires significant changes in the economy to create full impact, particularly in terms of organization and skills of the workforce. Identifying which skills are important, followed by self-learning and training programs, are required to prepare the workforce. Secondly, businesses will need to restructure and adapt to capitalize on new technologies."

Gen AI also has a significant impact on managers and leadership.

In the article, Generative AI for Management, Elisa Farri, Vice-President at Capgemini Invent, and Gabriele Rosani, Director at Capgemini Invent, comment: "AI's capability to collaborate on a cognitive and emotional level, offering insights and contributing to complex decision-making processes, is an area that many managers have yet to fully realize or integrate into their strategic thinking."

They add: "Executives need to cultivate the ability to adopt the co-thinking mindset. Whether in individual tasks or team endeavors, mastering this shift will become a vital competitive advantage."

In Gen AI deployment, ethical considerations are paramount

Gen AI has emerged as a transformative innovation. However, its potential for misuse emphasizes the need for organizations to uphold strong ethical standards.

Aiman Ezzat, CEO, Capgemini, stresses the importance of safe use of Gen AI: "Organizations should establish employee guidelines for safe use of Gen AI and validating outputs to eliminate bias."

Arthur Mensch, CEO, Mistral AI, underscores the importance of managing AI-driven products within ethical boundaries: "When an organization is making an AI-driven product, it must consider the decisions and outputs the system will make. These decisions and these outputs should be constrained to respect the company's role."

Audrey Plonk, Deputy Director of the OECD Directorate for Science, Technology, and Innovation, is responsible for the OECD's digital policy portfolio. She elaborates on data concerns: "Data privacy considerations are a key aspect that organizations and individuals are exploring extensively. There is a lot of work to be done to improve transparency and determine which sources of data should be used to train AI models. It is essential to put the appropriate safeguards in place, including data protection considerations."

Sharing Capgemini perspectives, Anne Laure Thibaud, Executive Vice President, Data AI and Analytics Group Offer Leader, and Steve Jones, Executive Vice President, Data-driven Business and Gen AI, remark: "The assumption is that Gen AI cannot be trusted in the same way as a human employee and given the opportunity, will act outside its boundaries. Organizations are compelled to build all the information about their culture, mission, and guardrails into the AI they use to retain control of it."

The path to responsible AI

To secure the future of AI, comprehensive safeguards and collaborative efforts are essential. Unified actions from policymakers and organizations are crucial to ensure the responsible use of Gen AI.

Dragos Tudorache, former member of the European Parliament and Rapporteur on the EU AI act, says: "Most companies working with AI already had general principles or codes of conduct or self-regulation in place. There were guidelines outlined by UNESCO, OECD, and even by the European Parliament. But we realized these measures were insufficient to mitigate the very real risks, such as discrimination bias."

> **"Organizations should establish employee guidelines for safe use of Gen AI and validating outputs to eliminate bias."**
>
> **Aiman Ezzat**
> CEO, Capgemini

On the need to draft the EU AI Act, he adds: "We needed to put stronger safeguards in place that command respect and, ultimately, help society to trust in the interaction with this technology, hence the decision to formulate the policy."

Ricardo Guerra, CIO, Itaú Unibanco, highlights the responsibility of organizations to use AI ethically: "Organizations have to take a lot of the responsibility for use and governance of AI and other technologies. But governments must still stay informed and try to implement supportive regulation."

Steering towards a sustainable future with Gen AI

Gen AI will play a pivotal role in addressing climate change. Additionally, businesses must adopt sustainable practices that align with environmental goals.

On climate engineering, Andrew Ng elaborates: "Given the world's collective inability to move CO2 emissions in the way we know it needs to, I think it is past time to take climate engineering more seriously. I think AI, specifically large AI foundation models of climate, have a large role to play in that."

Ricardo Guerra talks about sustainable data centers: "We're learning when to use different solutions and emphasize investing in sustainable data centers and green technologies. We're also closely monitoring the market, prioritizing providers that offer green solutions."

Erik Brynjolfsson says: "Whenever a traditional activity gets replaced or augmented with one based on bits, it usually brings significant energy and environmental benefits."

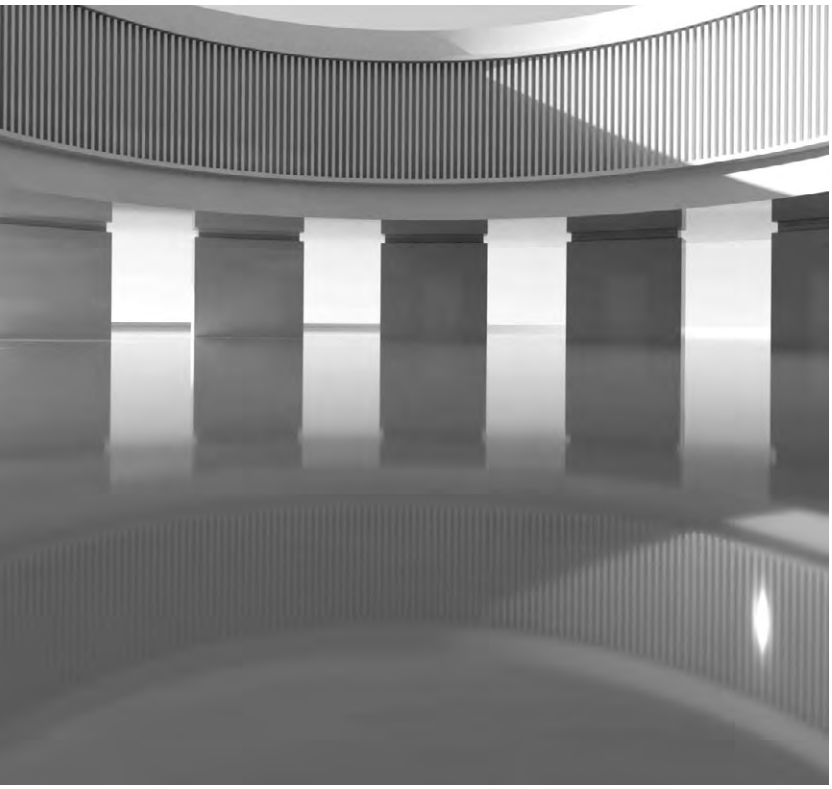
The rise of open-source and small language models

Small language models (SLMs) are highly cost-effective, resource-efficient, and have minimal environmental impact. Open-source models promote innovation, enhance collaboration, and ensure greater transparency in development and usage.

Aiman Ezzat says: "There are clear advantages to both open and closed approaches. Openness boosts innovation and drives collaboration. Open models also allow everyone to scrutinize the model for potential sources of bias, demystifying the 'black box' nature of AI models."

Arthur Mensch comments: "Smaller models also mean the applications are less costly to run and, more importantly, if you have a model that is 100 times smaller, you can call it 100 times more for the same cost, bringing a little more intelligence to your application with each call."

Clara Shih adds: "The future of AI will be a combination of both large and small models because of climate impact, as well as for cost and performance reasons."



> **"When an organization is making an AI-driven product, it must consider the decisions and outputs the system will make. These decisions and these outputs should be constrained to respect the company's role."**
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> **Arthur Mensch**
> CEO, Mistral AI

> **"The future of AI will be a combination of both large and small models because of climate impact, as well as for cost and performance reasons."**
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> **Clara Shih**
> CEO, Salesforce AI

Getting Gen AI right requires sound technical strategy and a culture of innovation

Effective Gen AI adoption requires a well-coordinated strategic approach with a strong technical foundation, support from leadership, and an organizational culture of innovation.

Chema Alonso, Chief Digital Officer, Telefónica, suggests: "You need to have a robust technical strategy based on cloud and sound data, and the rest will fall into place. Secondly, you need to have strong support from top management. Finally, you need sufficient budget. Once you have that, you need to make sure that your whole organization is very well trained on Gen AI – what can and cannot be done."

Ricardo Guerra says: "Adopting Gen AI requires a culture of innovation. With Gen AI, we need to engage the business and design teams actively, as they must identify opportunities beyond mere tech adoption."

Innovative startups point to the future of Gen AI

From content creation to multi-agent systems, alternative computing, and hybrid AI, emerging tech startups are pushing the boundaries of the next generation of AI applications.

Synthesia uses AI to create customizable video content featuring realistic avatars, allowing businesses to generate engaging video presentations. **Soundraw** offers an AI-powered platform for generating original music without the risk of copyright infringement.

In the realm of alternative computing, **Mythic** develops analog chips for faster, more efficient AI tasks such as matrix multiplications, while **Groq** creates AI-optimized language processing units (LPUs) designed for running LLMs.

Liquid AI is pioneering the development of highly efficient, task-specific models using liquid neural networks, with applications such as drone navigation, showcasing Gen AI's wide range of possibilities.

The CEO Corner

Arthur Mensch

CEO

Mistral AI

MISTRAL AI_

in discussion with

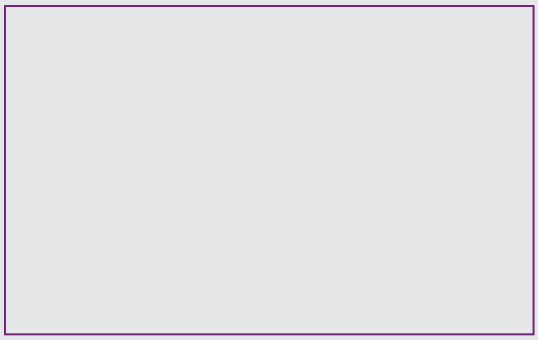
Aiman Ezzat

CEO

Capgemini

Capgemini

The CEO Corner

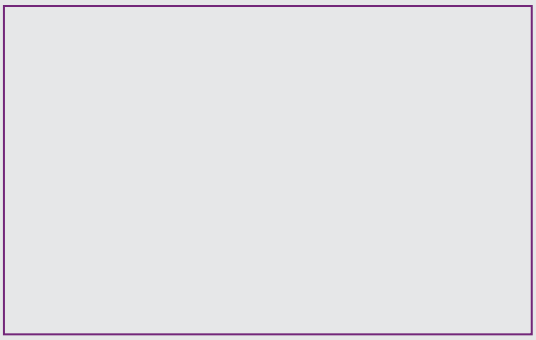


Arthur Mensch
CEO, Mistral AI

Arthur Mensch is a French entrepreneur and scientist.

In 2023, Arthur Mensch, along with Guillaume Lample and Timothée Lacroix, founded Mistral AI with the mission of making generative AI ubiquitous and pioneering a new approach to AI - one that is more open, portable, independent, and accessible to all.

After more than 10 years of academic work focused on the possibilities of machine learning in the field of brain imaging and on optimization of machine learning, he joined DeepMind Paris in 2020 as a researcher, where he spent three years and played a key role in the development and deployment of flagship projects in generative AI.



Aiman Ezzat
CEO, Capgemini

With more than 20 years' experience at Capgemini, Aiman Ezzat has a deep knowledge of the Group's main businesses. He has worked in many countries, notably the UK and the US, where he lived for more than 15 years.

Aiman was appointed CEO in May 2020. Prior to that, from 2018 to 2020, he served as the Group's COO and, from 2012 to 2018, as CFO. Aiman is also on the Board of Directors of Air Liquide and is a member of the Business Council and the European Round Table (ERT) for Industry.

What inspired you to form a new player [in Mistral] in the generative AI (Gen AI) space – and why in Europe?

— Arthur: My co-founders and I have been working in the Gen AI space for over 10 years, previously in large US-based organizations. When development accelerated at end-2022, it gave us an opportunity to create some very strong models in a short period of time. We secured funding, assembled a dedicated team and the GPUs [graphic processing units] required to train the LLMs [large language models], and were ready to go.

Why Europe? Europe is a great place to start a company. The education systems in France, Poland, or the UK, for example, are great for training AI scientists. We brought in recent PhDs from Paris; we were able to get the most important thing to get started – the team. As the only player in Europe in the field of conventional language models, we had some strong geographical business opportunities.

> **"We use both an open-source model and a portable platform for model deployment."**
>
> Arthur Mensch

What do you see as the advantages of the open-source gen AI model?

— Arthur: We use both an open-source model and a portable platform for model deployment. Even our commercial models are licensed. This allows users to customize the models to their needs.

It offers portability and comfort. With a model that you can deploy on any platform, on a private cloud or on-premise or on dedicated instances on the cloud, you can use the technology where your data is. So, this adapts to the data-governance constraints of the enterprises, and our customers very much appreciate this flexibility.

— Aiman: There are clear advantages to both open and closed approaches. Openness boosts innovation and drives collaboration. Open models also allow everyone to scrutinize the model for potential sources of bias, demystifying the "black box" nature of AI models. There are also challenges. Customizing open models for a particular industry or organization is tricky, but using open models out of the box can lead to suboptimal performance. Fine-tuning any foundation model, open-source or proprietary, is a time-consuming, resource-intensive process that requires significant financial investment. Hence, it is important for enterprises to assess ROI carefully before pushing out the Gen AI boat.

"Open models also allow everyone to scrutinize the model for potential sources of bias."

Aiman Ezzat

Do you see organizations using a generalized Gen AI model going forward or many different specialized models?

— **Arthur:** We see the field moving in these two directions simultaneously. A strong generalized model gives a good platform for testing solutions. But this can be a slow and costly process, offering poor ROI for specific tasks. You want your LLM to offer an intelligent, dynamic solution for a specific issue, whether that's parsing the logs of an IT system or parsing the conversation between a customer and a customer agent.

From a scientific point of view, smaller models can solve specific issues, but they must be finely tuned. We want to bring solutions to market that develop the smallest possible model to solve a specific defined task, which will allow for low-latency applications.

Smaller models also mean the applications are less costly to run and, more importantly, if you have a model that is 100 times smaller, you can call it 100 times more for the same cost, bringing a little more intelligence to your application with each call. We call this "compressed knowledge". We specialize models in order to make differentiated applications that go fast, that call LLM often and that are cost-controlled.

> **"If you have a model that is 100 times smaller, you can call it 100 times more for the same cost, bringing a little more intelligence to your application with each call."**
>
> Arthur Mensch

— **Aiman:** There's a very clear market for both generalized and specialized models. A generalized model can serve those use cases that don't require extensive customization. These are "low-hanging fruit" that rapidly demonstrate the power of Gen AI.

Developing and training specialized models for some basic use cases might even be counterproductive in terms of cost and sustainability. That said, there are use cases that benefit from specialized models, for instance, in terms of performance characteristics or in detecting and responding to specific nuances of the industry or use case. Any use case that requires high performance or deep domain expertise will likely continue to go down the path of specialized models. At the same time, specialized models potentially require significant resources in terms of maintenance and regular updates, so organizations might prefer a generalized model for use cases with less stringent requirements. I see a future where both types of models coexist harmoniously.

"Any use case that requires high performance or deep domain expertise will likely continue to go down the path of specialized models."

Aiman Ezzat

What are the most innovative use cases that you are seeing in Gen AI?

— Arthur: In financial services, for instance, Mistral has built models that extract information from financial reports and summarize it for bankers to analyze. This harnesses the power of generative AI to process a large amount of text and detect weak signals, which is very much the core business of banks. The other successful deployment is in customer services.

— Aiman: We have been working on several innovative cases using Gen AI across industries. In life sciences for instance, we have developed with generative AI a solution to design new drug molecules. This method significantly boosts the process of generating new structures, offering researchers a potent tool for designing molecules aimed at specific biological targets. It illustrates AI's transformative potential in accelerating and refining drug discovery, particularly in the preliminary phases.

Given the energy required to create and train the large models, what are the sustainability implications for Gen AI?

— **Arthur:** Most of the compute and energy resources required to run these systems are used at inference time rather than at training time. So you train for a couple of months, and when the models are deployed on many, many GPUs, then the large energy consumption is more linked to the usage than to the training itself. There are trade-offs between the amount you spend on training and the compression that you can achieve. If you invest more in training, you can make smaller models, achieving the same performance as a larger model with less compute. These smaller models consume less energy to deploy at inference time.

At Mistral, we focus on compressing knowledge and making models that are smaller than those the competition produces. Limiting carbon emissions is a cause that is very dear to our heart and the reason why we deployed our solutions in Europe. In Sweden, in particular, renewables compose a high proportion of energy consumption.

> **"Most of the compute and energy resources required to run these systems are used at inference time, rather than at training time."**
>
> Arthur Mensch

— **Aiman:** Our research shows that more than three-quarters of organizations are conscious of environmental concerns around Gen AI. As a leader in the eco-digital revolution, we at Capgemini recognize the need to weigh the immense potential of Gen AI against its cost to the planet and society. We are committed to taking a "sustainable by design" approach to developing Gen AI solutions that harness cutting-edge data, AI, and climate tech to maximize business outcomes in a sustainable manner.

Mitigation strategies include optimizing the amount of data required to train the models, working on smaller, task-specific energy-efficient models that employ more efficient training and operating algorithms, and powering the AI infrastructure with renewable energy as well as using more energy-efficient datacenters. We also promote transparency in AI development and operation by monitoring and disclosing the energy consumption and carbon footprints of Gen AI models. Our Gen AI lifecycle analysis tools help organizations to mitigate environmental impact.

How should large organizations address ethical considerations and potential bias in deployment of AI models?

— Arthur: When an organization is making an AI-driven product, it has to consider the decisions and outputs the system will make. So, these decisions and these outputs should be constrained to respect the company's role. What it means is that before deployment of a new AI product, the first thing to think about is how do you evaluate success. How do you ensure that the model is behaving as it should and not producing unwanted outputs? And is it able to provide a nuanced but unbiased answer to complex questions?

Owing to our open approach, the customer can make their own editorial choices from these evaluations.

— Aiman: Large organizations should be conscious of a variety of risks: Inherited risk, intellectual property, correctness, data leakage, and user privacy.

Organizations should establish employee guidelines for the safe use of Gen AI and validating outputs to eliminate bias. At Capgemini, we have applied a governance model to ensure this.

> **"The rare talent that we recommend every organization look for is the software engineer who can also do data science."**
>
> Arthur Mensch

How are you bridging the AI talent demand-supply gap?

— Arthur: It has been a challenge to get the best AI scientists. We recommend hiring very strong data scientists who can undertake software development. Since we are making the tools and the foundation for the model itself, training the model is not a necessity within the enterprise setting. To make the most interesting products, clients must understand how to use the platform.

So, the capacity for doing this is really adjacent to what we used to call data science a decade ago. It's the ability to run experiments, to evaluate certain systems, to see what is failing, and to see how to try and improve it. This scientific mindset, running experiments on a computer and measuring success, which is really the data scientist's job. The changes with the data scientist's job today is that the software requirement is stronger because, if you want to make an interesting application, you also need to dive deep into the way you assemble the software, connect it to the LLM, the LLM to the database, and an LLM to tools. Having a system mindset is necessary to create successful applications. The rare talent that we recommend every organization look for is the software engineer who can also do data science.

— Aiman: We are investing over €2 billion over three years in Gen AI and have already trained over 120,000 team members on generative AI tools thanks to our Gen AI Campus. We have also launched a dedicated platform to industrialize our custom generative AI projects. We will also focus on obtaining certifications and building centers of excellence, as well as specific go-to-market skills. Ultimately, Gen AI training will be a key requirement in all of our development and training curricula.

How do you see gen AI driving transformation in large organizations?

— Arthur: The first step is to take a model – a Mistral model, for instance – and connect it to the enterprise context. The enterprise context is located across different databases or SaaS [Software-as-a-Service] systems. You can then generate assistants with access to the enterprise context, to help every employee navigate the enterprise processes and organization. That's typically what our customers do first. They create a knowledge management tool or general assistant for employees.

— Aiman: Driving transformation with generative AI goes beyond the technology. Success depends on a broad strategic vision that covers everything from applying it to the right use cases, potentially adapting internal processes, to optimizing customer-facing operations. In addition, the value of generative AI depends on two key foundations: the data and the human elements. Leaders need to have the right data foundations in place to ensure they are realising the full potential of Gen AI. Equally important is training employees to not only use AI effectively but also to trust it, which is key to adoption.

Arthur Mensch
CEO, Mistral AI

"The first step is to take a model – a Mistral model, for instance – and connect it to the enterprise context."

Aiman Ezzat
CEO, Capgemini

"There's a very clear market for both generalized and specialized models."

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Professor

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SALESFORCE AI

Clara Shih

CEO

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OECD

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Deputy Director, Directorate for Science, Technology and Innovation (STI)

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ERIK BRYNJOLFSSON

Professor at the Stanford Institute for Human-Centered AI, and Director of the Stanford Digital Economy Lab

GENERATING GROWTH THROUGH AI

STANFORD DIGITAL ECONOMY LAB

Erik Brynjolfsson is the Jerry Yang and Akiko Yamazaki Professor and Senior Fellow at the Stanford Institute for Human-Centered AI (HAI), and Director of the Stanford Digital Economy Lab. He is also the Ralph Landau Senior Fellow at the Stanford Institute for Economic Policy Research (SIEPR), Research Associate at the National Bureau of Economic Research (NBER), and the Co-founder of Workhelix. One of the most cited authors on the economics of information, he was among the first researchers to measure the productivity contributions of IT and the complementary role of organizational capital and other intangibles. He is the author of nine books, including the bestseller *The Second Machine Age: Work, Progress, and Prosperity in a Time of Brilliant Technologies* (2014) with co-author Andrew McAfee, and *Machine, Platform, Crowd: Harnessing Our Digital Future* (2017).

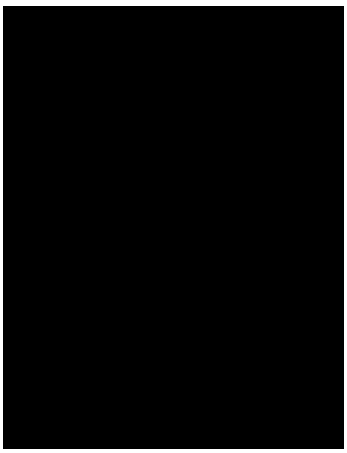
"AI – IN PARTICULAR GENERATIVE AI – IS THE ELECTRICITY OF OUR ERA, INCREASINGLY UBIQUITOUS AND SPAWNING COUNTLESS COMPLEMENTARY INNOVATIONS."

How is generative AI transformational?

The biggest driver of productivity growth for businesses and the economy as a whole, is what economists call "general-purpose technologies" or GPT, the same initialism AI researchers now use for "generative pre-trained transformers." AI – in particular generative AI – is the electricity of our era, increasingly ubiquitous and spawning countless complementary innovations.

Are we ready to harness the full benefits of generative AI?

Unlike some earlier technologies, AI requires significant changes in the economy to realize its full impact, particularly in terms of organization and workforce skills. To prepare the workforce, it is necessary to identify which skills are important, followed by self-learning and training programs. Businesses will need to restructure and adapt to capitalize on new technologies.



Erik Brynjolfsson
Professor at the Stanford Institute for Human-Centered AI, and Director of the Stanford Digital Economy Lab

As a global economy, we need to become more dynamic, making it easier for people to transition to new work models, new kinds of jobs, and even new geographies. The government can play a role by making regulatory regimes more sympathetic and flexible.

How should organizations adapt to take full advantage of generative AI?

The value of generative AI comes largely from the insights and knowledge of the workforce, which it can capture and distribute. So, it's important to reward the people who are creating those insights in the first place, requiring new metrics and recognition of where value is created. It is also going to require real flexibility and adaptability of the workforce.

Insight generation, in turn, depends on the quality of data generated. Data is the lifeblood of machine learning (ML), and proprietary data gives a competitive advantage to organizations. This kind of advantage will come from the workforce, operations, better data capture, and making that data available to ML systems. Not all companies have done a good job of capturing and curating data, but the ones who have will find that they are sitting on a goldmine. Companies with better data are going to be the biggest winners in this paradigm.

Not all companies have done a good job of capturing and curating data, but the ones who have will find that they are sitting on a goldmine."

Should AI be used to augment or replace human efforts?

I'm not opposed to automation, but too many managers overemphasize automation. While AI is increasingly powerful, in most cases it's more effective to keep humans in charge rather than expect complete automation of new tasks. Most organizations need to strike a better balance.

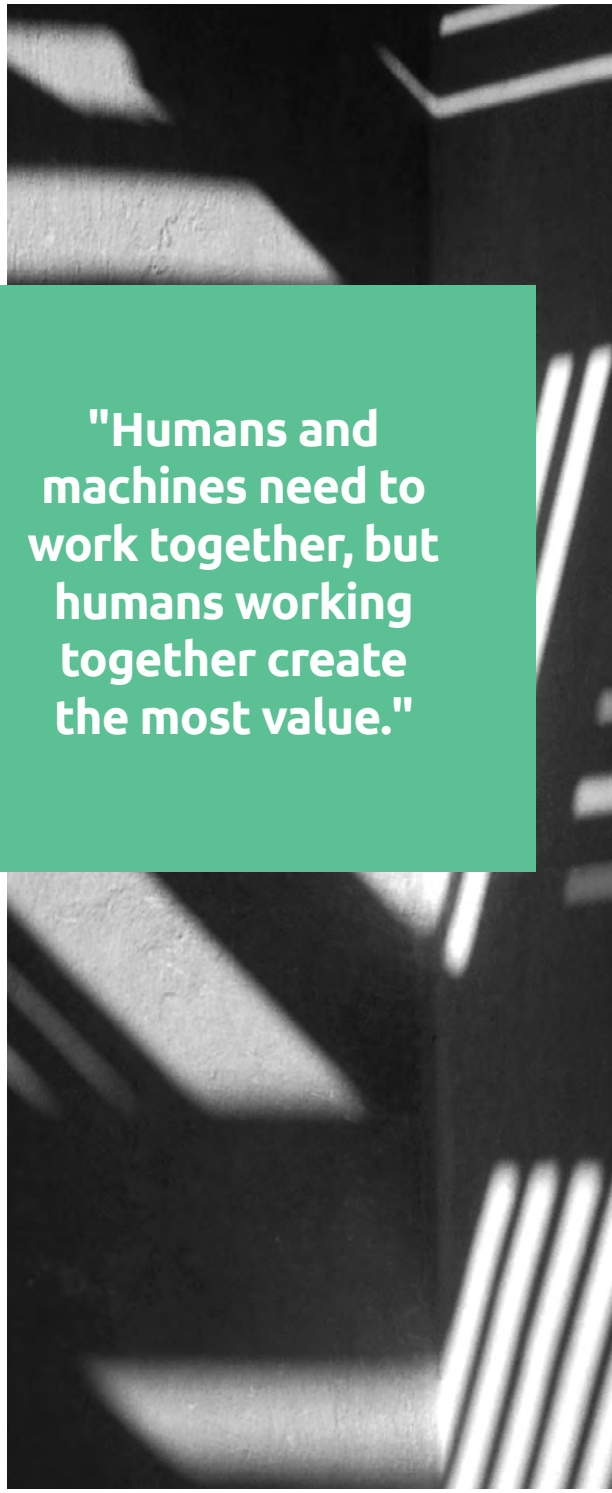
Furthermore, replacing a human with a machine tends to concentrate wealth and power among capital owners. In contrast, if a technology augments human resources, it increases the value of those human contributions, which leads to a more equitably distributed prosperity. This will result not only in a more inclusive kind of society, but also one with more total value creation.

THE COLLABORATION REVOLUTION

What role do you see for collaboration?

Collaboration is key. Humans and machines need to work together, but humans working together create the most value. We should concentrate on building a teamwork ethic through projects and education programs. Businesses that create structures where people can collaborate and share information effectively are really powerful.

The work-from-home revolution has given rise to a whole set of tools, such as Slack and Teams, which enable collaboration across widely distributed geographies. One can draw together the best people for a particular question or a project, regardless of location. Ultimately, we are creating a world where billions of human brains can connect and share information simultaneously. That makes me very optimistic for the future in terms of innovation and progress.



"Humans and machines need to work together, but humans working together create the most value."

TECH FOR SUSTAINABILITY

Ultimately, we are creating a world where billions of human brains can connect and share information simultaneously. That makes me very optimistic for the future in terms of innovation and progress."

How do you see organizations balancing their goals of sustainable growth and technological advancements?

One of the exciting benefits of digitalization is its contribution to sustainability. The basic economic fact is that bits are much cheaper to transmit, share, and work with than atoms. So, whenever a traditional activity is replaced or augmented with one based on bits, it usually brings significant energy and environmental benefits. For instance, while data centers may appear to involve heavy energy use, that must be weighed against the alternative of the traditional commute to the office, or the shipping of products to homes.

Digitalization improves the efficiency of existing operations. It optimizes truck routes for better organized delivery systems, designs more effective aircraft and locomotive engines, builds heating and cooling systems for more energy-efficient buildings, and more. These are all opportunities to use digitalization to improve sustainability and lighten our impact on the earth.

The average US citizen now has a smaller carbon footprint than 50 years ago. Our lifestyle is more efficient. This can largely be attributed to the digital revolution.

"Whenever a traditional activity is replaced or augmented with one based on bits, it usually brings significant energy and environmental benefits."

Erik Brynjolfsson
Professor at the Stanford Institute for Human-Centered AI, and Director of the Stanford Digital Economy Lab

"The average US citizen now has a smaller carbon footprint than 50 years ago. Our lifestyle is more efficient. This can largely be attributed to the digital revolution."

AUDREY PLONK

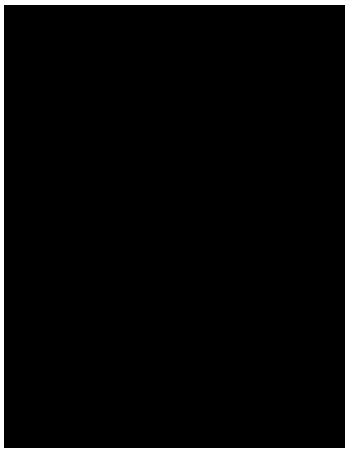
Deputy Director, Directorate for Science, Technology and Innovation (STI), OECD

TOWARDS AN EQUITABLE GLOBAL DIGITAL TRANSFORMATION

Audrey Plonk is responsible for the OECD's portfolio of work on digital policy, which includes data governance and data flows, artificial intelligence and emerging technologies, security and safety online, and connectivity and infrastructure. She plays a leading role in overseeing and advancing evidence-based policy analysis on the drivers, opportunities, and challenges of digital transformation in collaboration with policy communities and stakeholders. She also supports and represents the OECD in related international initiatives.

THE ROLE OF GENERATIVE AI

What role do you see for generative AI in the economy?



Audrey Plonk
Deputy Director, Directorate for Science, Technology and Innovation (STI), OECD

Venture capital (VC) investments in generative AI start-ups have boomed since 2022. In the first half of 2023 alone, the estimated global VC investment in generative AI was $12 billion.[1] That is a big economic shift.

The rapid development of generative AI has significant implications for the economy. This technology is already being used to create individualized content at scale, automate tasks, and improve productivity in key sectors, including education, healthcare, arts, and software development. At the same time, it has put a strain on resources, increasing demand for high-end computing resources to build and train models.

Generative AI also has the potential to change labor markets. We are still working out how best to use it. It's a supplement to human experience and knowledge, not a replacement thereof. Practical policy solutions, including upskilling and reskilling, will be important to leverage the benefits of this technology while mitigating its risks. Despite some initial backlash, I see generative AI becoming part of school and university curricula. Our report on *Initial policy considerations for generative artificial intelligence* covers some of the transformative impacts of generative AI across sectors and includes recommendations to support policymakers in addressing them.[2]

> **"In the first half of 2023 alone, the estimated global VC investment in generative AI was $12 billion. That is a big economic shift."**

1. OECD.AI Policy Observatory (2024), using data from Preqin. Available at: www.oecd.ai/en/data?selectedArea=investments-in-ai-and-data.
2. Lorenz, P., K. Perset and J. Berryhill (2023), "Initial policy considerations for generative artificial intelligence", OECD Artificial Intelligence Papers, No. 1, OECD Publishing, Paris, https://doi.org/10.1787/fae2d1e6-en.

On the sustainability front, as a general-purpose technology with applications across sectors, AI can create efficiencies that decrease environmental impacts and lower emissions. At the same time, the training and use of large-scale AI systems also require massive amounts of "AI computing," including processing power, memory, networking, storage, and other resources. The environmental impacts of AI compute and applications should be further measured and better understood to fully grasp their net effects on the economy and the planet. Our report on *Measuring the environmental impacts of artificial intelligence compute and applications* provides a comprehensive overview of the issue at hand, including policy priorities going forward. [3]

"Gen AI is a supplement to human experience and knowledge, not a replacement."

Could you elaborate on how some countries are harnessing generative AI while others face challenges?

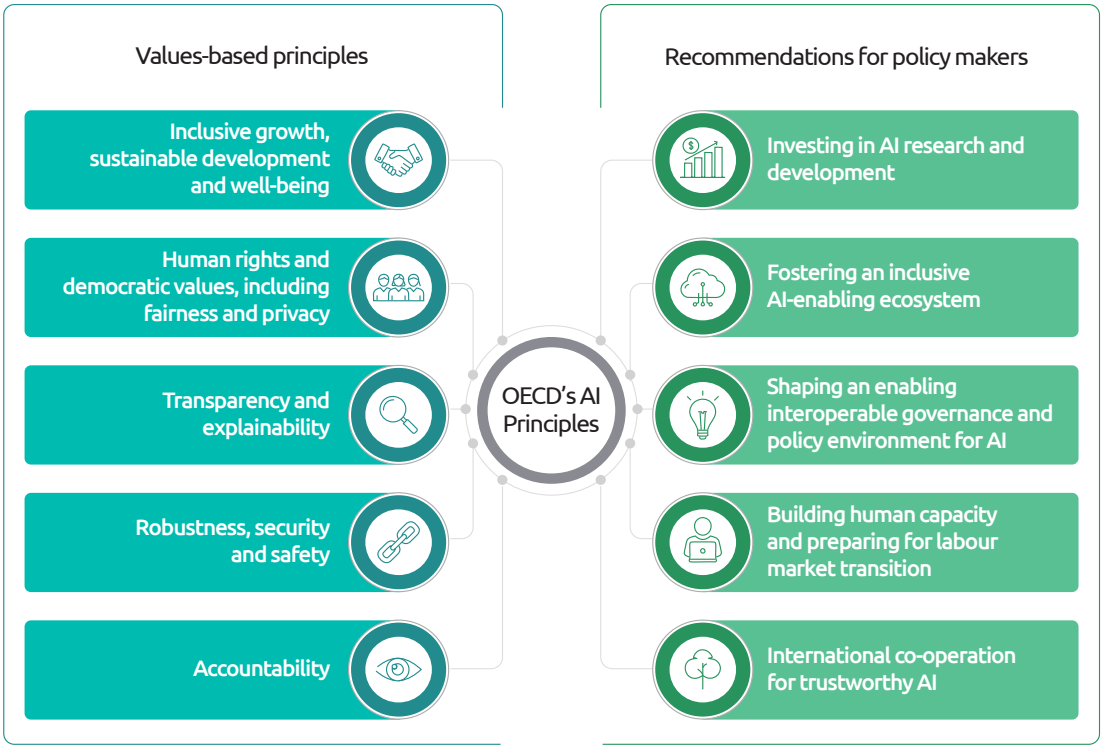
Open data policy is likely to have a big impact on generative AI. There is a big push, including in OECD member countries, for governments to democratize access to high-quality data to build algorithmic models.

There is an increased focus on investments in research in new technologies, particularly AI. Governments are rethinking resource allocation and are putting incentives in place. They are increasingly focused on the domestic ability to build, use, and diffuse AI. They aim to create efficient businesses, supported by innovative product solutions and enhanced problem-solving capabilities. As a result, there are many dynamic startup communities in the AI space.

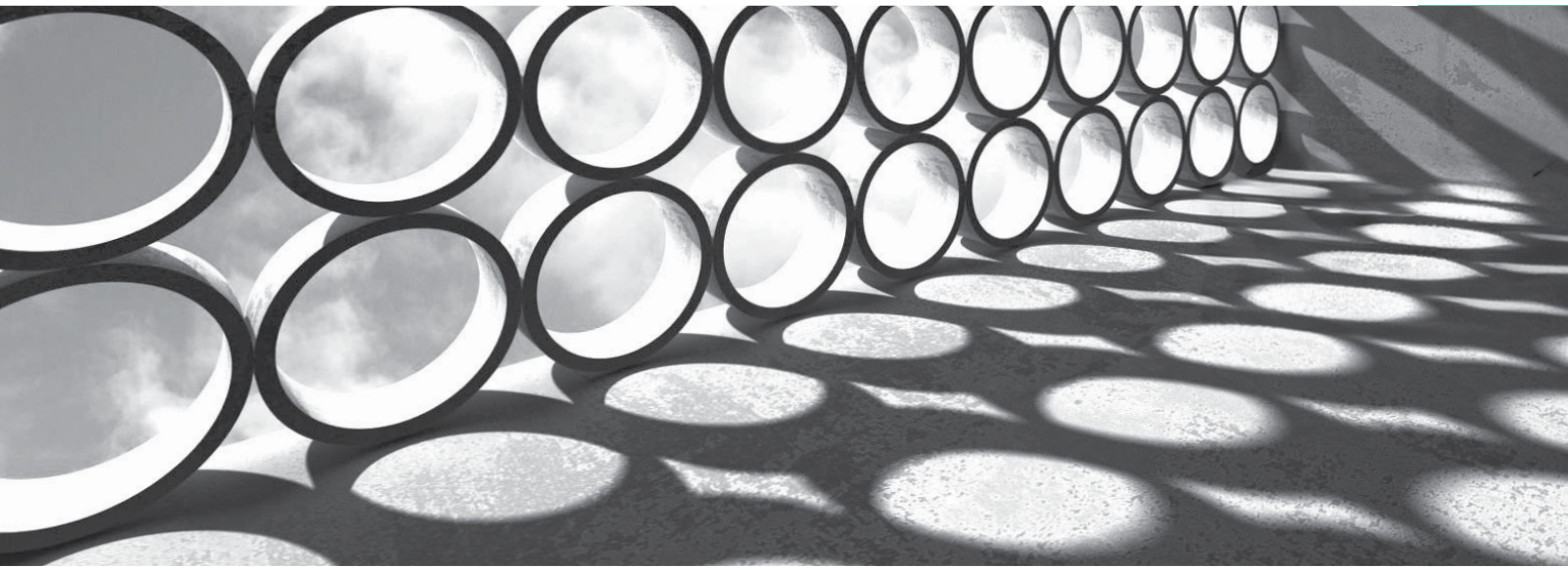
There needs to be a collective, coordinated global approach to standardization and policy alignment around AI development, deployment, and governance. The OECD AI Principles are a key standard in this area, guiding AI actors in their efforts to develop trustworthy AI, and promoting interoperability in AI policy frameworks.

3. OECD (2022), "Measuring the environmental impacts of artificial intelligence compute and applications: The AI footprint", OECD Digital Economy Papers, No. 341, OECD Publishing, Paris, https://doi.org/10.1787/7babf571-en.

Executive Conversations



Source: OECD - https://oecd.ai/en/ai-principles



ALLEVIATING ETHICAL CONCERNS

What are your thoughts on copyright issues and misuse of personal data with implementation of generative AI?

The discussion around copyright is extremely important but also difficult. We see countries taking different approaches as they navigate the trade-offs between enabling access to training data to spur innovation, and minimizing the risks of harm to content owners. For example, Japan has removed all copyright protections from generative AI training, which is an interesting approach. Meanwhile, in the US, several generative AI lawsuits are underway. The concept of "fair use" is likely to be a prominent topic of discussion going forward.

In this context, data privacy considerations are a key aspect that organizations and individuals are exploring extensively. There is a lot of work to be done to improve transparency and determine what data sources should be used to train AI models. It is essential to put the appropriate safeguards in place, including data protection considerations. In the coming months, we expect an OECD report on AI and intellectual property rights, focusing on policy considerations and potential policy solutions related to copyright and data scraping challenges.

"There is a lot of work to be done to improve transparency and determine what data sources should be used to train AI models."

A NEED FOR MORE INCLUSIVE ACCESS TO TECHNOLOGIES

How realistic is the goal of an equitable global digital transformation?

Promoting digital inclusion across countries and population groups, including genders, age groups, and income levels, is essential to ensure a human-centric digital transformation. Digitalization can help bridge digital divides, but it can also exacerbate existing inequalities.

To use gender as an example: in 2023, more than twice as many men than women at the OECD, on average, wrote a computer code.[4] More broadly, girls show lower enrollment rates in disciplines crucial for success in a digital landscape, like STEM and ICT. This has downstream effects on the participation of women in scientific discovery. For instance, only 8% of AI journal articles in 2023 were written exclusively by women, compared with almost half (41%) written exclusively by men.[5]

To foster an inclusive and sustainable digital economy, individuals of all backgrounds need to be well-equipped to make the most of digital technologies. This includes, for instance, having access to high-speed, high-quality, and affordable connectivity, as well as having the necessary skills to reap the benefits of digital transformation. Policies that promote such initiatives, as well as positive multistakeholder collaboration, are necessary to address inequalities in the digital age.

"Open data policy is likely to have a big impact on generative AI."

4. OECD Going Digital Toolkit
5. "Live Data from OECD.AI - OECD.AI." 2024. Oecd.ai. 2024. https://oecd.ai/en/data?selectedArea=ai-research&selectedVisualization=ai-research-publications-exclusively-by-gender.

Audrey Plonk
Deputy Director, Directorate for Science, Technology and Innovation (STI),
OECD

"To foster an inclusive and sustainable digital economy, individuals of all backgrounds need to be well-equipped to make the most of digital technologies."

DRAGOŞ TUDORACHE

Former Member of the European Parliament – Rapporteur on the AI Act

GUIDING AI TO THE RIGHT PATH

Dragoş Tudorache is a former member of the European Parliament and Vice-President of the Renew Europe Group. He also serves as Chair of the Special Committee on Artificial Intelligence in a Digital Age (AIDA), and the LIBE rapporteur on the AI Act.

As well as artificial intelligence (AI) and new technologies, his interests in the European Parliament include security and defense, transatlantic issues, the Republic of Moldova, and internal affairs. Dragoş is currently based in Brussels, Belgium.

RELEVANCE OF THE AI ACT

Why do you think the EU felt there was a need to draft an AI Act?

AI will change the world. It will have a huge impact on mankind, much more than any other technology to date. While we already see the great potential benefits of AI, it also brings significant risks. There are also broader risks linked to the way our democracies and societies function, and the elements of truth and trust, which are so fundamental for the social contract within our societies.

The European Parliament recognized the importance of conversational AI early on and the Commission President committed to bringing legislation forward. Given the speed at which AI evolves, society needs some signposts to know where to take it.

Most companies working with AI already had general principles, codes of conduct, or self-regulation in place. There were guidelines outlined by UNESCO, OECD, and even by the European Parliament. But we realized that these measures were insufficient to mitigate the very real risks, such as discrimination bias, etc.

We needed to put stronger safeguards in place that command respect and, ultimately, help society to trust in the interaction with this technology, hence the decision to formulate the policy.

Dragoş Tudorache
Former Member of the European Parliament – Rapporteur on the AI Act

"We needed to put stronger safeguards in place that command respect and, ultimately, help society to trust in the interaction with this technology, hence the decision to formulate the policy."

A key goal of the AI Act is to keep humans in the loop when it comes to AI. Why do you think that is important?

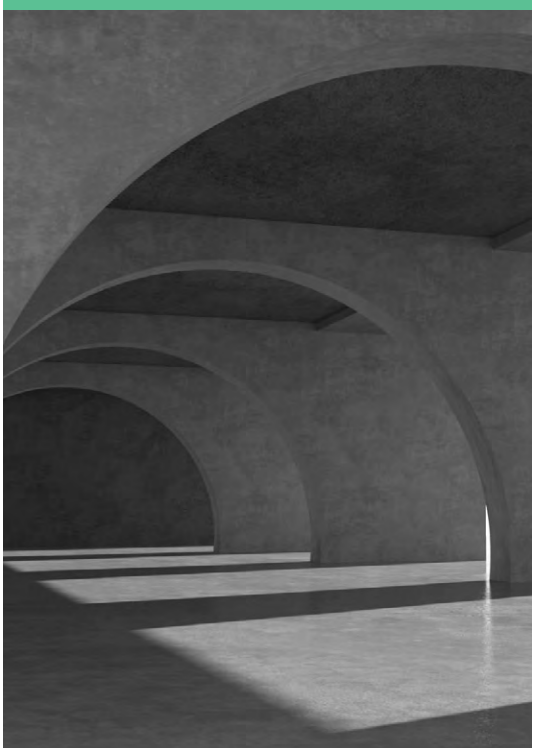
No matter how sophisticated or smart a machine is, it's still a machine. We can't take the recommendations of a machine on trust. They have to be verified by a human supervisor.

The whole idea of making AI human-centric means that there must ultimately be human responsibility for the decisions or recommendations made by the model about any area that touches upon human rights or the broader values and interests of society.

However, this regulation only covers a small fraction of what AI comprises. There is a huge amount of AI used in industrial robotics, for example, such as for optimizing a production line. These applications of AI have nothing to do with my rights as an individual or social values and, therefore, are free of regulation and must remain that way.

Innovation must be untrammeled and freely expressed. However, when it intersects with people's rights and interests, it must be filtered through the appropriate standards.

"Innovation must be untrammeled and freely expressed. However, when it intersects with people's rights and interests, it must be filtered through the appropriate standards."



RISK ASSESSMENT OF AI USE CASES

You have also come up with a robust set of metrics to identify potential AI risks. Can you help us understand your framework?

The AI Act categorizes applications or use cases of AI into three major categories. The first is prohibitions, which we see as contrary to the fundamental principles of our society and, therefore, are to be eliminated.

The medium/low-risk category generally encompasses transparency-related obligations, which don't require extensive regulation.

The bulk of regulation applies to high-risk AI. This is often sophisticated and highly competitive AI destined for market, and which must, therefore, meet strict standards.

Those obligations are, again, roughly classified into three buckets, one of which deals with transparency related to the data that one uses to train, and other processes used in development.

Secondly, there is explainability: one must explain how the organization instructed and worked with the AI, and then how they handled documentation, registration, and so on.

Thirdly, one has to show the proof or evidence, which helps market regulators keep track of what goes on, and to support interaction with the companies as required. This proof is also important for helping the entities downstream to understand that the AI value chain is highly complex.

Hypothetically speaking, how would the AI Act address a low-risk system developing into a high-risk one?

This is a dynamic market with many changes, not all of which can be foreseen.

So, we try to do two things. The first is to make the obligation as technology-neutral as possible, i.e., to formulate them in such a way that they are

indifferent to the evolution of the technology. An obligation to provide the training data means the same thing irrespective of AI's use case, version, size, or the complexity of the machine.

Secondly, we keep the regulation alive to counterbalance the evolution of use cases from no or low risk to high risk, and vice versa.

We've introduced a scientific and advisory board for future decision-makers on AI in the EU, to alert us to changes in levels of risk for a specific use case.

Since we understand that the project will evolve, we have retained the annexes and the descriptions to be adaptable to modification of the technical criteria, such as the one used to describe the threshold of high risk.

BALANCING INNOVATION WITH REGULATION

Are you concerned that regulation will slow the pace of innovation?

Personally, I think predictability and simplicity can benefit our business environment.

> "A sense of clarity and predictability will help organizations."

I also think that self-discipline alone will not be sufficient to manage AI.

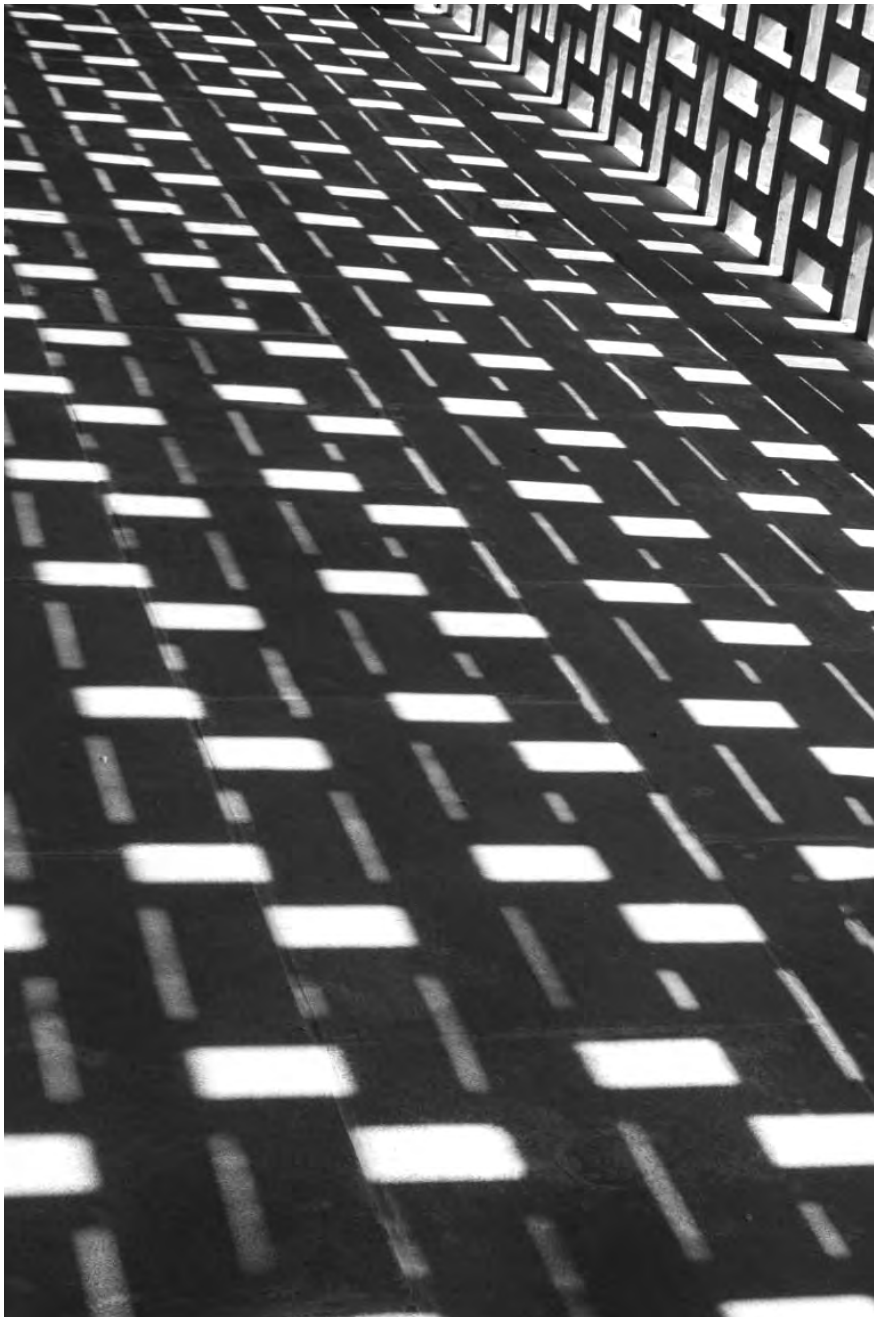
However, to allow innovation to flourish, we must keep this regulation as light-touch as possible and support organizations in complying. While we may impose some rules, we also create facilitation and tools to help people and organizations comply with those rules.

I don't think this regulation will stop innovation, however. Rather, it will bring clarity and a necessary sense of direction. I spoke to a lot of venture capital firms who want assurance that, when they commit capital to a project, it will meet certain standards. A sense of clarity and predictability will help organizations.

What do you say to those who suggest that the burden of regulation falls much more heavily on startups and other smaller companies than on large, established companies?

Yes, we were very aware that big tech can afford the measures required to conform much more easily than smaller organizations. They just hire a couple more lawyers or compliance officers. But smaller companies don't have those resources, and we wanted to level the playing field as much as possible.

Consequently, there are special provisions for small- and medium-sized enterprises (SMEs), which are exempt from some of the heavier parts of the regulation.



FOR COMPLIANCE, SELF-REGULATION IS THE KEY

How should large organizations look at self-regulation itself as they develop and deploy their AI systems?

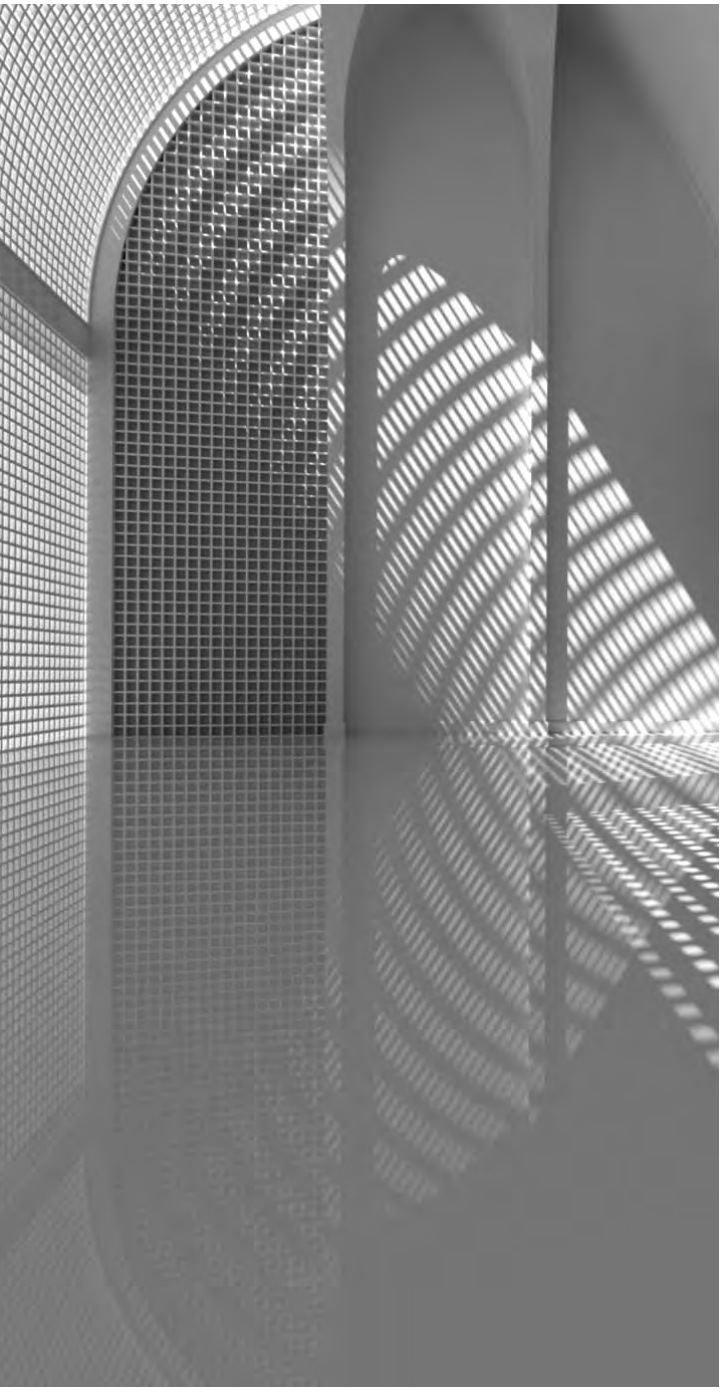
It can be done in three different ways. First, there's self-assessment, which means a lot of the investigation and checking has to come from our own analysis.

Then there's a provision for codes of conduct. This is also a way of co-generating compliance and giving organizations a nudge towards exercising self-restraint and self-discipline, even outside of the stricter parameters of the obligations of the law.

Thirdly, and very importantly, comes the regulation of the foundational models. AI is a fluid technology, and there's still a lot that we don't understand about it. It takes time to develop a framework of standards that we can expect organizations to understand and adhere to.

"SELF-DISCIPLINE ALONE WILL NOT BE SUFFICIENT TO MANAGE AI."

THE FUTURE OF AI AND REGULATION

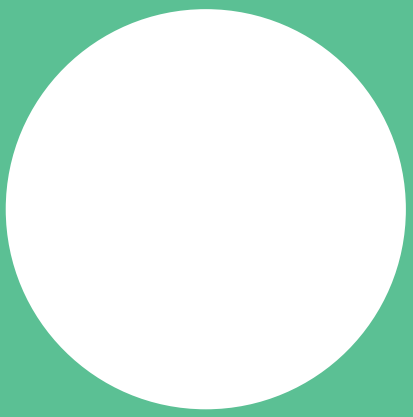


Which skills will future lawmakers require to understand the algorithmic future?

We'll probably need to use AI to legislate in the future. I see a future where we'll actually have to rely on AI to regulate AI. During the past 3-4 years of working on AI, I've talked to lawmakers in all corners of the world, and we all face the same challenge. We must be prepared to educate ourselves and then accept the new methods we have learned. We shouldn't be ashamed to admit that we need to know more. We need to go through this learning phase before we consider the bigger questions around regulation.

The future will bring many more challenges of this nature. Lawmakers globally will need to explore new forms of regulation and organizations must adapt to them, so that we can proceed to a productive future with AI as a great ally.

The views expressed in this interview do not represent the official position of the European Commission.



Dragoş Tudorache
Former Member of the European Parliament – Rapporteur on the AI Act

"Lawmakers globally will need to explore new forms of regulation and organizations must adapt to them, so that we can proceed to a productive future with AI as a great ally."

SCOTT BELSKY

Chief strategy officer and EVP,
Design & Emerging Products
Adobe

CREATIVITY IS THE NEW PRODUCTIVITY

Adobe

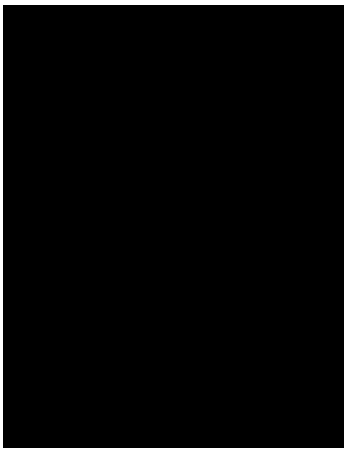
Scott Belsky leads corporate strategy and development at Adobe. He is responsible for design across the Digital Media and Digital Experience businesses and for driving the incubation of some of Adobe's fastest-growing emerging products. Prior to this role, Scott was Adobe's chief product officer, leading the development of all Creative Cloud products. Before joining Adobe in December 2017, Scott was a venture investor at Benchmark in San Francisco. This is Scott's second tenure at Adobe. He originally joined the company after it acquired Behance in 2012. He has also published two best-selling books, *Making Ideas Happen* (2011) and *The Messy Middle* (2018).

How has design evolved over recent years?

Two things have happened in the world of design. I think it's fair to say that the floor has been lowered. The skill level required to express yourself creatively has gone down. People can now start from something as opposed to nothing. With generative AI, they can prompt something and start getting something to work with.

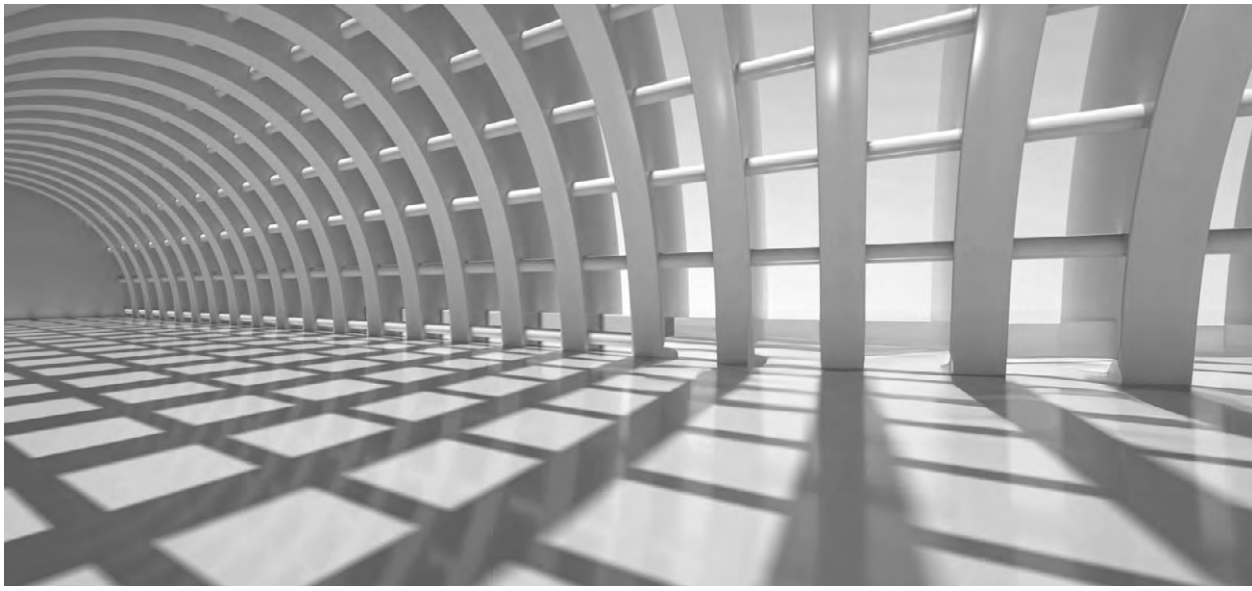
The tools themselves have evolved to enable easier onboarding, making them more accessible to more people. This is really exciting. Creativity is the new productivity. Productivity – getting things done as fast as possible in as great a volume as possible – is shifting to automation. Increasingly, organizations are promoting people based on their creativity, ideas, and the way they tell a story.

However, the ceiling is also rising. It is incredible what creative professionals are capable of now because they are exploring the full surface area of possibilities. Hence, the constraints are disappearing. The cycles that creative professionals can have to explore the surface area of possibility are growing materially, and that is raising the ceiling of what is possible. Those are the two trends that I think are truly transforming the world of design and creativity.



Scott Belsky
Chief strategy officer and EVP, Design & Emerging Products
Adobe

ADOBE AND AI



Can you help us understand Adobe's generative AI product offering?

We have built our family of foundational models based on our customers' needs. So, when you look at Photoshop, many things that were time-consuming and might have seemed very complex in the past can now be done "automagically" using Firefly imaging models.

We built the imaging models not only to unleash these superpowers but also to preserve Photoshop's unique aspect: non-destructive editing. So, customers can come in and explore, ideate, and then try out variations of that idea without losing precision or the ability to retrace their steps. A lot of AI-first tools do not allow customers to pick up the chisel themselves and try to make something they see in their mind's eye. Our customers want to be able to do that.

That was our fundamental approach across imaging, illustration, and 3D, and increasingly across fields such as video. And, of course, we are just getting started. The advent of these Generative AI tools has totally transcended our expectations, but there's so much more to come.

GENERATIVE AI AND THE CREATIVE PROFESSIONAL

> **"Thanks to Generative AI, what is even more important than skills is taste, intuition and creative direction."**

How must creative professionals evolve to keep pace?

We'll see creative professionals no longer feeling constrained by their category. The idea of defining yourself as an animator, a graphic designer, or a photographer seems antiquated in a world where you could harness your creativity to work across any medium.

And suppose your customer or client says, "Can you take that graphic you made and turn it into an animated version for TikTok or Instagram or whatever?" Instead of saying, "Oh, I don't know how," creative professionals are going to gradually be able to take that on themselves and execute to a high standard using these new tools and capabilities. The skills barrier, while still important, is much less constraining. Thanks to Generative AI, what is even more important than skills is taste, intuition and creative direction.

Do you see generative AI as a threat to designers?

Some might say that generative AI is disruptive and impacts creative professionals by automating their work. and that we'll need fewer of them. But the truth, and I think what we are seeing in our own customer base, is different. With generative AI, the cost of exploring has decreased, so we will see organizations coming up with new use cases.

Think about engineers as a proxy. Over the last few decades, engineers have become more productive every year, sometimes by multiples, owing to technological breakthroughs and new programming languages, consoles, and tools. Nevertheless, organizations keep hiring more engineers. Why? Because they want to do more. Organizations always want to build more products, personalize them, optimize them, and invest in building up their business. The more productive they become, the more people they hire.

Similarly, with creativity, brands are realizing, "Wait, instead of just doing one campaign, let's do five. Let's do 50 campaigns. Let's do a campaign for every region. Let's do personalized visual experiences for every segment." Generative AI technology has unlocked all of these possibilities.

How is generative AI likely to change the field of design?

Ultimately, creativity is what moves us. Even if digital content can be created at an infinite scale for nothing, and personalized to each of us, we are not going to feel compelled to engage with it unless it moves us in some way.

Generative AI is like a consensus machine. It generates what it thinks you would want, based on what you and others have consumed before. That is not what moves us. If every brand floods the user with SEO content, imagery, or video because it's cheap to create the user will be overwhelmed, rather than inspired. The user will be left more than ever craving a story with a human touch, written just for them.

How can we measure the value that humans bring to the table?

Human creatives must come up with innovative, unpredictable solutions rather than consensus outcomes. We need people to spend more of their time thinking, emoting, and tapping into their "inner humanity." I call that liberating our "ingenuity per person."

If a job typically only allows you to spend 10% of your time on ingenuity because 90% is required for the methodic productivity-oriented minutiae, imagine what a difference generative AI's computing power can make! It can offload much of that for you, and you are freed up to do more of the deep thinking. That increases the ingenuity per person on your team. And if you have more ingenuity per person, you are going to want more people because then you will have collectively more ingenuity in your organization.

What is your view on the copyright concerns surrounding generative AI?

If someone can reproduce and manipulate someone else's likeness or style without their permission, that's a problem (one that we're lobbying Congress to fix). But I also recognize that we have to let this technology take us somewhere exciting. The worst thing would be to have overly harsh restrictions choke off progress. So, we have to balance the absolute need to allow progress with the need to proceed in a thoughtful and responsible way.

> **"We have to let this technology take us somewhere exciting. The worst thing would be to have overly harsh restrictions choke off progress."**

How is the role of the marketing professional likely to evolve?

Marketing professionals need to start experimenting and thinking expansively about what generative AI can do for them. The future of the digital world is going to be more personalized than ever before. Marketing has not yet been personalized to the individual consumer, at least not at scale in any profound way.

And that is the future. So, you have to kind of rethink the whole marketing stack and get away from 'macro marketing,' which takes weeks and weeks and meeting after meeting. Increasingly, the world requires agile or 'micro' marketing, which means marketers getting an idea from social media, say, and acting on it in real time. These campaigns need to be launched in 60 seconds, not six months. And to do that at scale, you need to give them tools, backed up by new policies.

How should CMOs look at generative AI?

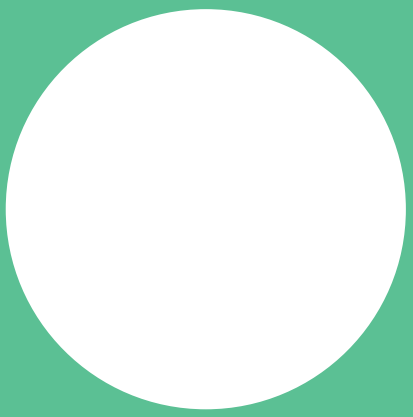
I think CMOs need to awaken their minds to the role of both macro and micro marketing. The CMO needs to recognize that this agile marketing may be beyond their organization. They need to involve all their stakeholders and empower them to participate. If I were a CMO, I would be forcing my team to rethink how they generate variations of assets using generative AI, how they experiment, how they test, and all these things.

LOOKING FORWARD

What excites you most about the future of tech and its influence on the creative space?

Right now, there are two things about the future of technology that excite me. The first is one thing that makes us uniquely human -ubiquitous access to creative expression. This taps into our humanity. We are most creatively confident when we are five years old, but we lose our creative confidence as we get older because of the skills gap, exposure to criticism, and just the lack of access to creative tools. Generative AI is fundamentally changing this.

The second thing is personalized experiences at scale. We all want to be known wherever we go. We want to know how we are known, and we do not want to feel like marketing technology or ad tech is always secretly guessing what we might like. Generative AI and AI agents that we will encounter across brands are going to make that possible.



Scott Belsky
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"Increasingly, the world requires agile or 'micro' marketing, which means marketers getting an idea from social media, say, and acting on it in real time. These campaigns need to be launched in 60 seconds, not six months."

CLARA SHIH

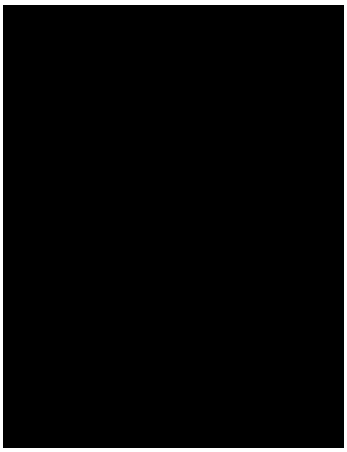
Chief Executive Officer
Salesforce AI

A PLATFORM FOR GENERATIVE AI

Clara Shih is the CEO of Salesforce AI. In her role, Clara oversees artificial intelligence (AI) efforts across the organization, including product, go-to-market, growth, adoption, and ecosystem for Salesforce's AI customer relationship management (CRM) platform. Clara also served on the Starbucks board of directors for 12 years and serves as Executive Chair of Hearsay Systems, a digital software firm she founded in 2009 that is merging with Yext (NYSE:YEXT).

SALESFORCE AND AI

What led to the development of Salesforce AI?



Clara Shih
Chief Executive Officer
Salesforce AI

We have been working on AI for a long time. In 2014, we established our Salesforce AI Research Group, and in 2016, we introduced the first predictive AI for CRM, Einstein. Salesforce Research has been developing large language models (LLMs) for many years. The popularity of ChatGPT and increased demand for enterprise AI led us to productize our generative AI applications and platform.

Agentforce, our suite of customizable autonomous agents and low-code tools – powered by our Customer 360 applications, Data Cloud, and Salesforce Platform – makes deploying and getting value from trusted agents easier than ever. It's the next generation of our Einstein AI solutions. Every agent request runs through our Einstein Trust layer to ensure data privacy, data security, ethical guardrails, observability, and monitoring. We know customers don't want to be locked-in to a specific model, especially given the rapid advancement and growth in model options, so we've architected Agentforce to work with any model.

To help customers see value fast, we offer over 100 out-of-the-box (OOTB) AI use cases and Agentforce agents, including service agent, sales development representative agent, commerce agent, merchandiser, buyer agent, personal shopper, and campaign optimizer. These OOTB agents make it easy to get started and are easy to customize. Agentforce agents can be set up in minutes, scale easily, and work 24/7 on any channel (Salesforce offers digital messaging, messaging over in-app and web (MIAW), email, and now voice natively).

Our customers and partners can easily customize and build trusted agents on Agentforce using our low-code tools such as agent builder, prompt builder, and model builder.

Can you expand on why you chose the platform approach?

Agents have to be customized and grounded in trusted data and role- and industry-based context in order to be production-ready for the enterprise. Salesforce has always offered a user-friendly platform for customers and partners to easily build and customize, and from the beginning, we designed Salesforce Platform to be used even by non-programmers.

Our customers want to customize their own AI apps, and we give them options to do this either with no code, low code, or pro code. Rather than every organization having to build their own data cloud, trust layer, and API management, we make it easy by offering Salesforce Data Cloud, the Einstein Trust Layer, and Mulesoft as part of the Salesforce Platform. Customers and partners tell us all the time how much they appreciate how the Einstein Trust Layer takes care of data masking, citations, audit trail, toxicity filters, zero retention prompts, and prompt defense to mitigate cybersecurity risks.

> **"From the beginning, we designed Salesforce Platform to be used even by non-programmers."**

Prompt builder and agent builder allow customers to take our out of the box (OOTB) use cases and customize them with their own brand voice, company policies and procedures, and reference organization-specific custom data. For example, an automotive company can directly reference specific custom fields to guide their agents, such as the make, model, and warranty SLA. A retail customer would have a different set of custom fields and business processes. Customers can reference any structured or unstructured data from across their organization, whether it is in Salesforce or an external data lake or data warehouse such as Snowflake, Databricks, or Big Query, by using our Data Cloud.

Agentforce is about deploying autonomous agents to help drive human productivity. It follows all of the data-sharing rules in each Salesforce organization and is personalized to every user. For example, if two different sales reps within the same company ask the same question of Agentforce – such as "What are my top sales deals this quarter?" – they will each get a customized answer based on each individual rep's territory, customers, and open opportunities.

GENERATIVE AI – A POTENTIAL ECONOMIC IMPACT OF TRILLIONS OF DOLLARS

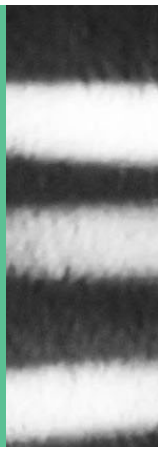
What kind of impact do you envisage generative AI having on large organizations globally?

> "Gucci used Salesforce AI to transform their service representatives into sellers."

Generative AI offers a tremendous opportunity with a potential economic impact of trillions of dollars from both productivity gains and cost savings. Agentforce customers like Wiley and OpenTable are finding tremendous success, increasing the number of routine support issues they can use AI to resolve autonomously 24/7 while increasing employee engagement and customer satisfaction.

But change cannot happen overnight. Companies need support in the form of trusted software systems and partners who can guide them through the transformation. In the current scenario, even the most forward-looking customers want AI automation to allow employees to work in more productive and efficient ways. Then, the priority shifts to reshaping departments. For example, Gucci used Salesforce AI to transform their service representatives into sellers. In addition to resolving customer support problems faster, our AI tools also helped teach them how to help customers find additional products to buy and to complete e-commerce transactions. The third phase is enterprise transformation. Just as with the internet, generative AI and agents will enable new pricing models, business models, and organization models.

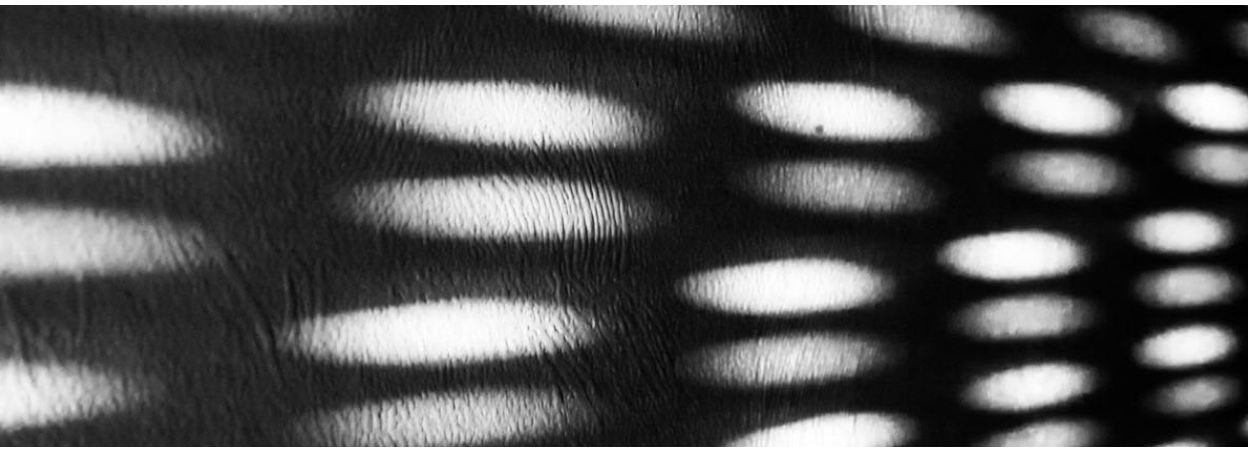
"Generative AI offers a tremendous opportunity with a potential economic impact of trillions of dollars from both productivity gains and cost savings."



Is there any specific industry in which you see the most enthusiasm?

We offer 15 different industry clouds at Salesforce and there has been AI demand and customer success in every industry. For example, Santander Bank, in the financial services industry, uses Agentforce to visualize its international trade trends and customer insights in real time to guide customers towards the right products. L'Oréal, in the consumer products industry, uses Agentforce to boost direct-to-consumer revenue with AI-powered product recommendations. Iron Mountain, an information management and storage company, turned to Salesforce for customer service, and their service representatives use Agentforce to create a connected experience across email, chat, and voice. Simplyhealth, a leading health insurance provider in the UK deployed our Agentforce for their customer service team. They saw 90% time savings by using generative AI to respond to customer emails, and they were able to resolve over one-third of their cases using conversational AI.

"90% TIME SAVINGS BY USING GENERATIVE AI TO RESPOND TO CUSTOMER EMAILS."



Which generative AI use cases do you think are the most popular?

Each industry has specific use cases. For example, in communications, customers want organizations to address billing inquiries promptly. In consumer goods, the focus is on crafting AI-driven personalized product descriptions and marketing campaigns. In healthcare, it is on optimizing patient appointment scheduling and reminders in a compliant way.

This is why we were so thrilled recently to launch over 100 new out-of-the-box Agentforce for Industries features, now available in our Salesforce AI Use Case Library. Customers can easily customize and deploy this new ready-to-use AI to automate time-consuming tasks such as matching patients to clinical trials, generating proactive maintenance alerts for industrial machinery, and delivering government program benefits. These use cases are tailored by role and to each of our 15 Industries clouds for accelerated time to value. They are easily customizable with prompt builder, agent builder, and model builder.

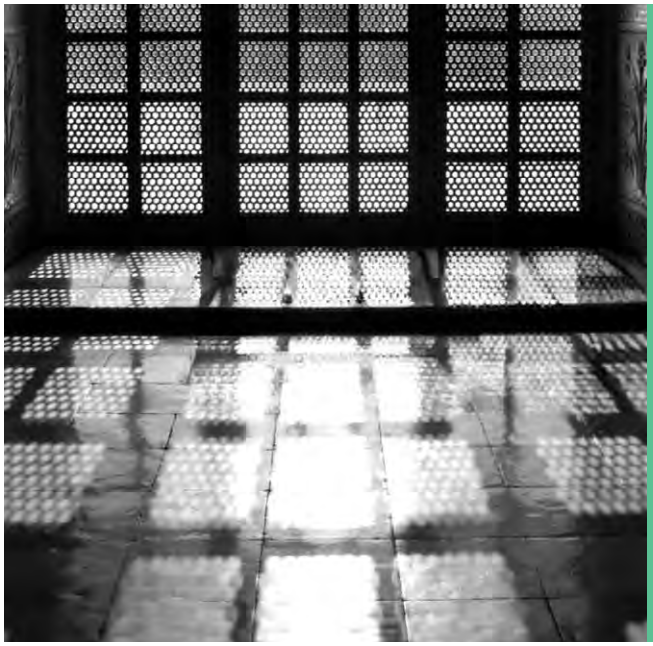
> **"In customer service, emphasis is on delivering solutions rapidly, addressing questions quickly and accurately, and closing the case promptly."**

Many companies trying to "DIY" their AI tech stack are finding they've wasted a lot of time and money finetuning models and building data pipelines without much to show for their efforts. In contrast, customers from AAA Insurance and Air India to Wyndham Hotels & Resorts are finding rapid value in a matter of weeks using these out-of-the-box Salesforce AI features.

Horizontally, across functions and sales, we place importance on streamlining account research and meeting preparation, and gaining a thorough understanding of all the open support cases and marketing engagement. In customer service, emphasis is on delivering solutions rapidly, addressing questions quickly and accurately, and closing the case promptly. It also enables better formulation of draft cases and incident summaries to help service representatives to allocate their time to more strategically significant tasks. In marketing, use cases include generating personalized emails and campaigns, segments, landing pages, auto-populating contact forms, and rapidly understanding insights from large-scale customer surveys.

In e-commerce, the focus is on the creation of digital storefronts, promotions, product descriptions, and outlining e-commerce strategies. From a developer standpoint, it's boosting productivity with AI-driven code generation and test generation.

CHALLENGES WITH GENERATIVE AI



"When we meet with the Gucci customer service representatives who are using Agentforce Service Agents from Salesforce, they're so fired up."

How do you envision the future balance between human-led and AI-led customer services?

"ATM machines did not replace tellers. There are more tellers today than ATMs, but now they are personal bankers."

There's going to be a need for both. ATM machines did not replace tellers. There are more tellers today than ATMs, but now they are personal bankers and focus on forging personal relationships and upselling. AI will allow workers to move away from repetitive tasks to focus on doing what humans do best, which is building relationships, unlocking creativity, making connections, and addressing higher-order problems. When we meet with the Gucci customer service representatives who are using Agentforce Service Agents from Salesforce, they're so fired up. They feel like we are empowering them to do the best work of their careers.

"ORGANIZATIONS MUST TAKE AN ETHICS-FIRST, TRUST-BASED APPROACH TO AI PRODUCT DEVELOPMENT."

What worries you the most about generative AI?

Any powerful new technology has a range of different applications. The majority of them are good, but there can also be some nefarious use cases. I think educating law enforcement professionals, government leaders, and voters on the risks of misinformation and disinformation, including fake AI-generated images, is of utmost importance.

Salesforce has joined the Business for America coalition supporting the bipartisan Protect Elections from Deceptive AI Act. This legislation would ban the use of AI to generate materially deceptive content that falsely depicts candidates in political ads with the intention of influencing federal elections.

How do you think organizations can create representative and inclusive datasets?

Organizations must take an ethics-first, trust-based approach to AI product development. Trust is the most crucial element engineered into any Salesforce product. We have also enabled responsible AI practices across the organization.
For example, to protect consumer and employee privacy, we disallow the use of facial recognition AI within Salesforce products. Another aspect of our AI acceptable use policy is that when one of our customer's customers is using an AI agent, we require the agent to self-identify as an AI versus masquerading as a human. This is to ensure trust and transparency remain paramount.

We've open-sourced our trusted AI principles around five pillars:

1. Being responsible, safeguarding human rights, and protecting the data with which we're entrusted

2. Being accountable, seeking feedback, and acting on it for continuous improvement from all stakeholders

3. Developing a transparent user experience to guide users through any AI-driven recommendations

4. AI is here to empower people – not replace them

5. AI should be inclusive

"We disallow the use of facial recognition AI within Salesforce products."

What are your views on the climate impact of LLMs?

Sustainability is among our core values. LLMs expend a tremendous amount of energy on both training and running the models. At Salesforce, we envision that, because of climate impact, as well as for cost and performance reasons, the future of AI will be a combination of LLMs and small models.

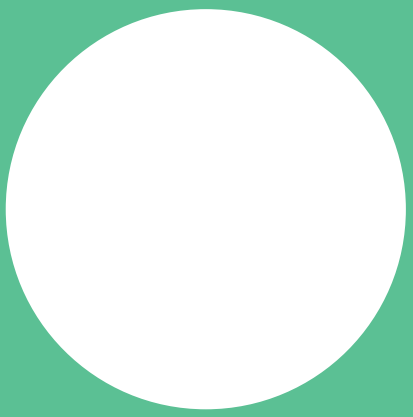
> "The future of AI will be a combination of LLMs and small models."

Currently, small language models (SLMs), even ones that run locally on laptops, could accomplish similar results to those that LLMs produce. Salesforce AI Research Group is developing these small and medium-sized fine-tuned models, which are industry- and use-case-specific. Over time, we will help our customers figure out the right model mix for them.

GENERATIVE AI REGULATORY LANDSCAPE

What are your thoughts on generative AI regulation?

The power of generative AI justifies strict regulation. The smartest approach involves broadening the scope of existing laws to encompass elements particular to AI usage. A great example is the Telephone Consumer Protection Act (TCPA) in the US. That requires organizations to obtain customer consent before robocalling or text messaging the consumer. Recently, the TCPA was extended to include the use of AI-generated voices. It makes a lot of sense to take existing laws and ensure that they are updated to capture the new risks that AI has introduced.



Clara Shih
Chief Executive Officer
Salesforce AI

"The power of generative AI justifies strict regulation."

ANDREW NG

Founder of LandingAI and managing general partner, AI Fund

AI: THE NEW ELECTRICITY

Dr. Ng is the founder of LandingAI, which provides a visual AI platform, and the managing general partner of AI Fund, a venture studio that supports entrepreneurs in building AI companies. He is also the leader of DeepLearning.AI, an education technology company he founded to provide AI training. He is the chair and co-founder of Coursera, an open online course provider, of which he was co-CEO until 2014. In addition, he is an adjunct professor at Stanford University. Prior to this, he was chief scientist at the Chinese tech multinational Baidu and founding lead of Google's Google Brain deep learning project. He sits on the board of directors of Amazon.

LANDINGAI – THE REVOLUTION OF UNSTRUCTURED DATA ANALYSIS

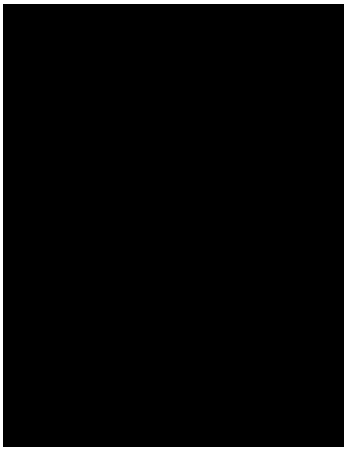
What is the focus of LandingAI?

LandingAI provides a platform that makes visual AI intuitive and accessible to use. We have already seen the text-processing revolution with ChatGPT and large language models (LLMs). I think we are at the very beginning of the image-processing and analysis revolution. And I do not mean just image generation, but unstructured data analysis.

Until now, writing software to help computers "see" has been difficult. Self-driving cars, for example, are not yet reliable in detecting other objects around them. In manufacturing, there has been a lot of work to build valuable inspection systems. Today, cameras are ubiquitous. Computers will be able to interpret images with increasing accuracy. I think the image-processing revolution might be as big as the text-processing revolution.

Are there specific industries where image processing can have a significant impact?

We started in manufacturing and industrial automation, focusing on visual inspection. But now applications span multiple industries. For example, life sciences involve a lot of analysis of microscopic images on slides. There are many applications in geospatial aero imagery and retail, too. A more diverse set of industries than I would have imagined possible a few years ago applies general-purpose image-analysis algorithms nowadays.



Andrew Ng
Founder of LandingAI and managing general partner, AI Fund

> **"We are at the very beginning of the image-processing and analysis revolution. And I do not mean just image generation, but unstructured data analysis."**

HOW AI WILL BECOME AS PERVASIVE AS ELECTRICITY

"AI is a general-purpose technology, meaning that, like electricity, it's useful for many things."

Where do you believe we stand currently in the AI development cycle?

Over the past 15 years, progress has been tremendous, with deep learning making huge strides. This has allowed us to "label" things. For example, given an ad, we can label who is most likely to click on it. Given a shipping route, we can label it with the estimated fuel consumption per run. There are so many use cases across all industries. And in the past couple of years, generative AI has taken off as well. In another five years, I think we'll look back at where we are now and see this as the early stages.

You referred to AI as "the new electricity." Can you expand on that analogy?

AI is a general-purpose technology, meaning that, like electricity, it's useful for many things. If I were to ask "what is electricity for?" it would be difficult to answer that question, because it's so pervasive – and the same goes for AI. AI's uses range from online advertising to analyzing medical images to arrive at a diagnosis, to copyediting, to fact-finding. Potentially, there are thousands of other applications. In the early days of electricity, no one dreamed of all the things we can do with it now. With AI, the process is underway, but it will take many years to identify and build all the use cases to which AI can be very effectively applied.

"In the early days of electricity, no one dreamed of all the things we can do with it now."

Are there industries where AI adoption is more pronounced?

Industries that use more digital records, and to which data use is integral, with a culture of data-driven decision-making, are able to harness AI more effectively. Over the past 20 years, almost all industries have become increasingly digital. Those that have progressed further with digitization seem to be adopting AI faster. Sectors such as healthcare and financial services are ahead in adopting AI. However, in today's digital world, I think all industries will get there quite quickly.

Can you share any innovative AI use cases you find particularly compelling?

Finding the best use case for AI is a bit like finding the most innovative use of electricity – it is the basis for so much. We are working on a wide variety of interesting use cases. For instance, AI-driven relationship mentoring and addressing societal issues such as loneliness. AI also has immense potential to revolutionize traditional processes.

"WE ARE WORKING ON A WIDE VARIETY OF INTERESTING USE CASES. FOR INSTANCE, AI-DRIVEN RELATIONSHIP MENTORING AND ADDRESSING SOCIETAL ISSUES SUCH AS LONELINESS."

Are there barriers to greater AI adoption?

One of the biggest is inadequate training and education. There are other barriers, concerning data, culture, and governance. But when the team is trained to understand AI, it can solve all of those problems. So, one of the things I did recently was launch a course, *Generative AI for everyone*, on Coursera. There are quite a few companies whose entire leadership teams are taking that course. If the leadership, followed by the rest of the organization, can really understand the potential of AI, that can unlock a lot of value.

AI FOR CLIMATE ENGINEERING

What about AI's role in sustainability and climate change mitigation?

One area we must study seriously is sunlight reduction, which is also called climate geoengineering via solar-radiation management. If we use high-altitude stratospheric aerosol injection, that could effectively put a parasol around the planet to reflect sunlight and cool us down. The science of sunlight reduction methods is being developed. So, I think we do not fully understand all the impacts if we were to take this action.

"Given the world's collective inability to reduce CO2 emissions in the way we know we need to, I think it is past time to take climate engineering more seriously."

We are now able to train very large foundation models to predict more accurately the effects of stratospheric aerosol injection. Given the world's collective inability to reduce CO2 emissions in the way we know we need to, I think it is past time to take climate engineering more seriously. I think AI, especially large AI foundation models of climate, have a large role to play in that.

AI AND SOCIETY

How do you foresee AI impacting the labor market?

People have talked about AI replacing jobs, which is an important conversation. However, from a business perspective, a more useful framework is task-based analysis to figure out which tasks AI can augment or automate.

> "For many jobs, AI will only automate or augment 20-30% of tasks. So, there's a huge productivity boost, but people are still required for the remaining 70% of the role."

Breaking down the role of, say, a call center operator into its constituent tasks – answering the phone, sending text messages, pulling up customer records, mentoring less experienced service agents – you can then systematically figure out where to apply AI to enhance productivity. While AI will replace those jobs that are completely or largely automatable, overall job replacement may be less than people fear. For many jobs, AI will only automate or augment 20-30% of tasks. So, there's a huge productivity boost, but people are still required for the remaining 70% of the role. For most jobs, it will be only a subset of tasks that AI can really make significant changes in the near future.

There has been much debate about AI's broader societal impact, with concerns voiced about misinformation and wealth distribution. How valid are these concerns and how can we mitigate the risks?

I think the fears of AI wiping out humanity are science-fictional. That is not going to happen. But there are some risks to which we should pay attention. If AI-generated media pollute our information ecosystem, for example, what are the implications for democracy? We have to ensure that people have a sufficient understanding of AI. The other thing we should pay attention to is whether the significant wealth that AI will create can be fairly shared. This includes making sure we avoid discriminating against certain subgroups, but also, more broadly, how do we make sure that everyone benefits?

How can society prepare for the impact of AI to prevent societal disparities?

"Because general knowledge of AI is not widespread, I see many ill-thought-out regulatory proposals, both in the US and in Europe."

Until legislators and citizens attain a broad understanding of AI, governments are vulnerable to powerful lobbying by special interests, which is what I am seeing today, certainly in the US, as well as some other countries. Unfortunately, because general knowledge of AI is not widespread, I see many ill-thought-out regulatory proposals, both in the US and in Europe. It is crucial that lawmakers develop a good understanding of AI.

What is your view on LLMs versus small language models (SLMs)?

I think both will be important. For the most complex reasoning tasks, a large LLM with many parameters is much more effective. But if you want a grammar checker, then you do not need a trillion-parameter model trained in science, philosophy, and ancient history. A SLM works just fine for this sort of task. Also, there are a lot of use cases for SLMs that can run locally, on-device, for reasons of privacy and security. I'd even go further and say that there's a strong incentive for PC manufacturers to encourage users to upgrade their computers. AI gives a very meaningful reason for people to upgrade their PCs now.

"For the most complex reasoning tasks, a large LLM with many parameters is much more effective. But if you want a grammar checker, then you do not need a trillion-parameter model trained in science, philosophy, and ancient history."

THE FUTURE OF AI

Do you see a future where AI is capable of writing really good code?

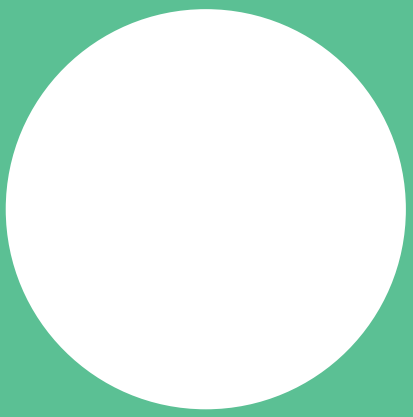
I hope we get to see artificial general intelligence (AGI) within our lifetimes. I do not know if we will. And if we do get there, certainly, it will be able to write code much better than today. However, for the near future, I think more people should learn to code.

I advise high school and college students to learn to code. With AI, it's easier and cheaper than ever before to code, and the return on investment (ROI) is also higher. Someone who knows how to write code, set up a code prompt, or call an LLM, can accomplish much more than someone who only knows how to use a web user interface for an LLM. And the fact that AI can help us with our coding has also made it easier to create more value.

What would you consider the ideal scenario for AI development?

Firstly, I hope a lot more people receive AI training to spread the benefits of the tech as widely as possible. Secondly, with AI as a very powerful general-purpose technology, we need people from all industries to discover the use cases with the highest potential for AI application, and then do the work to build them out. A lot of media attention goes to the technology or the companies providing AI tools, but it's in the application of AI that is where we will see the real success stories.

"FOR THE NEAR FUTURE, I THINK MORE PEOPLE SHOULD LEARN TO CODE."



Andrew Ng
Founder of LandingAI and managing general partner, AI Fund

"I hope we get to see artificial general intelligence (AGI) within our lifetimes."

CHEMA ALONSO

Chief Digital Officer
Telefónica

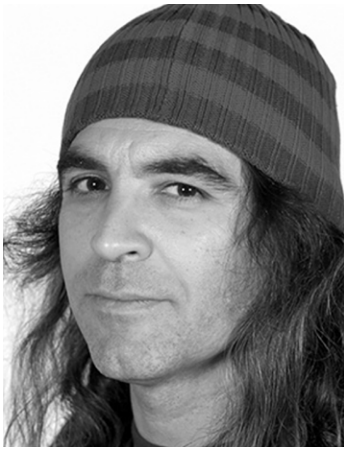
SCALING AND SECURING GENERATIVE AI

Chema Alonso has sat on Telefónica's executive committee since 2016. He is Chief Digital Officer of Telefónica and CEO of Telefónica Innovación Digital.

He oversees innovation, data, platforms, and digital products and services, and leads the digitalization of sales processes and customer communication channels. In his dual role, he also aims to promote innovation of new digital products and services and internal efficiencies. In striving to attain these, he harnesses Telefónica Kernel, the organization's AI-driven core digital platform, with special focus on the digital home. He holds a PhD in Computer Security from the Universidad Rey Juan Carlos and a degree in Technical Engineering in Computer Systems from Universidad Politécnica de Madrid.

DEPLOYING AND SCALING GENERATIVE AI

What has been Telefónica's experience with AI and Gen AI?



Chema Alonso
Chief Digital Officer
Telefónica

When we created Telefónica Digital back in 2011, we decided to form a lot of teams looking at data, creating machine learning (ML) algorithms for internal efficiency, network deployment, churn prediction, mobile quality, and video recommendation, among other things. We also created products that we still consume today. For instance, we created Smart Steps, a technology that maps paths around cities based on where personal devices connect to the mobile network. This allows us, among other things, to anticipate how people will move across the city at specific times, where antennas are likely to be congested, likely spots for traffic jams, and so on. We have been selling this product to law enforcement authorities and companies alike. This data enables them to create emergency plans for specific dates.

In 2016, when we started our digital transformation into Kernel, we decided that the advances in deep learning and reinforced learning and the beginning of Gen AI heralded the era of cognitive services. We created Aura, a cognitive intelligence-based digital assistant for managing our services. Aura today receives more than 37 million interactions monthly. Aura is already leveraged in the contact center in Brazil, and as a copilot in Spain. We have Aura integrated in TV remotes and inside various apps.

We also have Aura in a second-screen device that we call Movistar Home, which we are improving and relaunching soon. We are adding Gen AI capabilities.

So, when the first commercial large language models (LLMs) came out, we started to work with all of them. First, we configured a copilot for our developers at the chief digital office unit. The copilot already has a 31-32% acceptance rate in the code that it suggests to developers, which is good. We have started to add Gen AI capabilities in the quality assurance pipelines for penetration testing, for security, for accessibility, etc., and as a copilot, which is also an acceleration for us.

How do you plan to use Gen AI in the next few years?

We created an AI acceleration committee that currently focuses on creating agents for specific tasks using Gen AI. We are not particularly looking at training new models, but rather at specific use cases that will help us to innovate. For instance, we are creating agents to configure routers. This helps us review configuration security in our network devices at a global level. We are also creating agents that review tickets from the security operation center and double-check things on the system.

We believe Gen AI's impact is going to be massive across industries and functions.

How do you scale Gen AI deployments?

We defined scaling at executive committee level. We have multiple work streams and a governance committee that meets monthly. Our early steps in creating a data fabric back in 2016 have helped us address the growing demand for use cases based on ML. Another key aspect to bear in mind while scaling is the risk of prompt injection attacks. If a user manipulates an answer from an LLM about a product or service, that can be dangerous and lead to legal challenges. So, we are training our people in what is possible and the challenges around the maturity and security of the models. And a third important challenge to consider is cost. For instance, we are looking at a lot of use cases with TV. Imagine a user is watching a movie and pauses it to come back to later. When they come back, after a few hours or days, they ask the LLM to summarize the story so far, without any spoilers. And getting that right is tricky and becomes a matter of cost due to the need to process a lot of data.

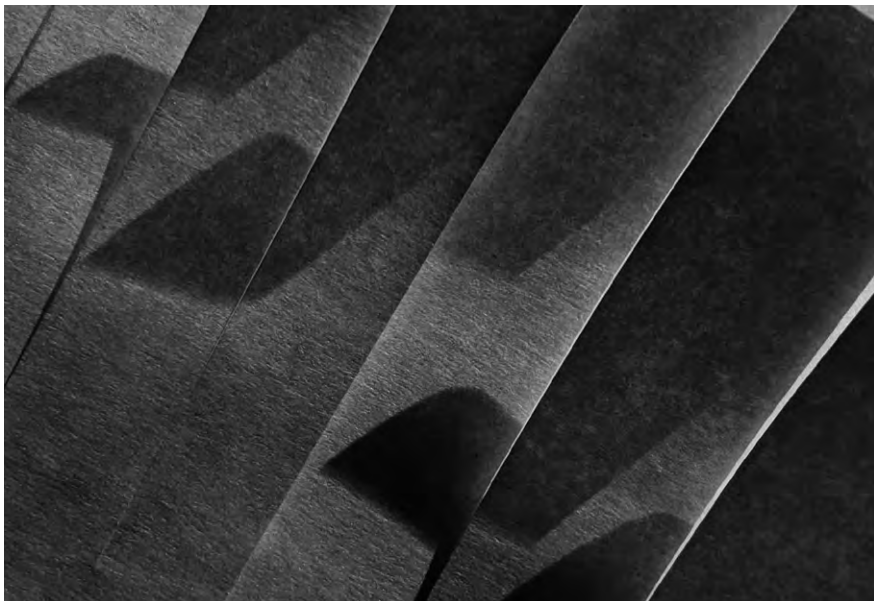
GENERATIVE AI AND OPERATIONAL CHALLENGES

As a global organization, what kind of new security challenges does Gen AI bring?

Our first priority is to secure our own operations. Second, we focus on how to increase cybersecurity operations, which is different. This is about improving our technologies with AI-driven security, improving our cybersecurity operations, and detecting new threats and attacks from adversaries using Gen AI or other technologies.

We are working a lot on ML operations in the contact center and the operations center.

We are also reviewing which areas of our operations are most vulnerable to new threats, such as deepfakes and Gen AI-created phishing emails, for spear phishing, voice cloning, etc. We are also using Gen AI to enhance personal security.



How do you ensure responsible deployment of AI?

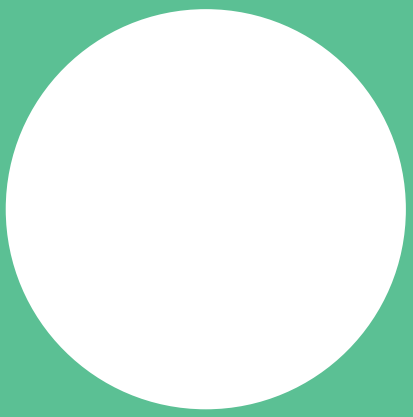
In Telefónica, we have a team that manages sustainability across the whole organization as a distinct key performance indicator (KPI). We have clearly defined principles on AI and responsible AI. This is sponsored directly by our chairman. Our AI principles are baked into all of our actions on privacy, accessibility, and sustainability.

I personally led a public campaign to try to eliminate the bias in the translations that come from automated systems. For instance, if you enter "world's best tennis player," the answer is always a male. If you ask for a country manager, it's always a male. If you ask for a nurse, it's always a female. We have been working to minimize such bias. The problem with models is that it's almost impossible to discover if you are using an LLM or a small language model (SLM) with bias. We try to eliminate every single bias, especially when it's using Gen AI, because it's very complex. Data augmentation is going to be part of the answer but, to date, there is no clear technical solution. It's a problem that is not resolved at industry level. We are doing our best.

How can organizations prepare for successful use of generative AI?

You need to be prepared on different levels. You need to have a robust technical strategy based on cloud and sound data, and the rest will fall into place. Secondly, you need to have strong support from top management. At Telefónica, we have the support of our chairman and CEO as well as the entire executive committee.

Finally, you need sufficient budget. Once you have that, you need to make sure that your whole organization is very well trained on Gen AI – what can and cannot be done.



Chema Alonso
Chief Digital Officer
Telefónica

"It's almost impossible to discover if you are using an LLM or a small language model (SLM) with bias."

RICARDO GUERRA

CIO
Itaú Unibanco

CREATING A PLATFORM FOR SUCCESS WITH GENERATIVE AI

Ricardo joined the Itaú Unibanco Group in 1993. He is the chief information officer (CIO) at Itaú Unibanco, Latin America's biggest bank, and has been an officer of the executive committee at the Itaú Unibanco Group since 2021. As CIO since 2015, he is responsible for the technology, data, and customer experience (CX) department. He has extensive experience in digital transformation, large-scale platform management (including governance processes), technical engineering, and cybersecurity. He leads a broad technology team focused on deep technical excellence, talent training, and diversity. He is based in São Paulo, Brazil.

THE ROLE OF GENERATIVE AI (GEN AI) IN THE FINANCIAL SECTOR

What is your view on the role of Gen AI in financial services?

In financial services, Gen AI has transformed our approach to business. With the release of ChatGPT, even non-technical individuals began to get to grips with the technology. For the first time in our decade-long tech modernization journey, we did not need to persuade anyone to embrace modern technology.

We believe there are three fundamental areas in which we can use Gen AI. The first is enhancing existing AI models and improving traditional machine learning (ML) models, such as those for credit risk. The second is enabling hyper-personalization of CX, where we're exploring real-time client contextual relationship understanding to improve interactions. Lastly, we aim to improve efficiency and mitigate risks in internal processes. Until now, we have 250 use cases.

Ricardo Guerra
CIO
Itaú Unibanco

"For the first time in our decade-long tech modernization journey, we did not need to persuade anyone to embrace modern technology."

"UNTIL NOW, WE HAVE 250 USE CASES."

How has the implementation and customer adoption of your AVI chatbot progressed?

AVI is a mature AI chatbot solution. We have around 20 million chats per month, representing 72% of the total inbound client interactions. We achieve 75% resolution for those chats.

Our focus is on responsible AI. Gen AI sometimes hallucinates, altering client names or balances. To address this, we are developing various methodologies using agents and other technologies. We launched RED Studio with specific test methodologies for Gen AI products to prevent unwanted changes. This studio rigorously tests and pushes Gen AI to its limits.

AVI's architecture uses best-of-grid components and reinforces reusability across all channels. We believe that using Gen AI will accelerate the solution.

THE CHALLENGES ORGANIZATIONS FACE IN ADOPTING GEN AI

What are the biggest challenges in scaling Gen AI in a large country like Brazil, and how do you harness talent effectively for this purpose?

Firstly, adopting Gen AI requires a culture of innovation. With Gen AI, we must actively engage the business and design teams, as they must identify opportunities beyond mere tech adoption.

The second challenge is finding skilled AI professionals. Fortunately, our recent tech transformation has helped us attract and develop talent internally. There's a significant shortage of AI professionals in Brazil, even more so than in the US. Despite this, we are successfully attracting and developing skilled professionals who help us build our AI infrastructure and mindset.

"The main challenge is balancing investment in Gen AI with its potential future impact."

What are the challenges in the adoption of Gen AI among employees?

Itaú is a tech-driven organization. Adoption was easy, owing to a tech-friendly culture and regular training. For example, Gen AI is being used for reading law documents. It reads more than 70,000 documents every month, driving productivity. However, choosing to build solutions around Gen AI involves significant opportunity costs, affecting current plans and budget pressures. The main challenge is balancing investment in Gen AI with its potential future impact.

THE ROLE OF HUMANS IN GEN AI DEPLOYMENT

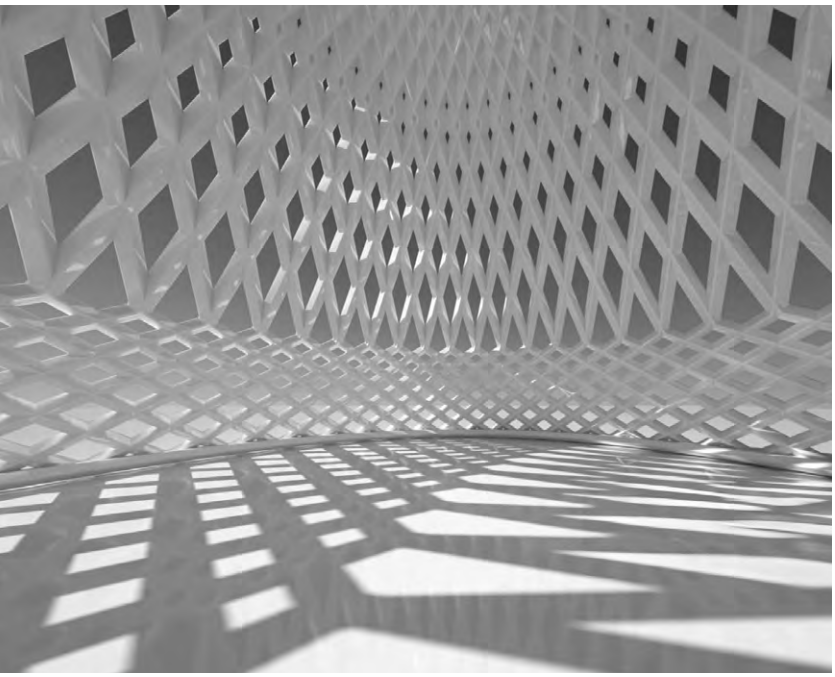
What role do humans play in the deployment and management of Gen AI?

CX is key, as we want to enhance personalization and better understand the customer. Technology can provide a lot of data to indicate what the customer wants.

For example, we launched a tool designed to help our investment clients understand how market movements, such as business events and news, can affect their portfolios. Through the same feature, our clients can also receive possible alternatives on how to deal with potential issues related to them, or get in touch with one of our specialists if they would rather have human assistance.

We are building solutions with Copilot, but we always have a human in the loop to ensure that whatever we're building can be processed and understood by humans.

"We are building solutions with Copilot, but we always have a human in the loop to ensure that whatever we're building can be processed and understood by humans."



However, technology will continue to advance, and AI-managed processes can scale much more quickly.

We have established a team dedicated to emerging technological innovations, that studies all new technologies such as blockchain, crypto, quantum solutions, and the evolution of AI and Gen AI. For instance, they're learning to work with agents, a powerful solution for controlling Gen AI and advancing our projects.

THE CHALLENGES OF SUSTAINABILITY IN ADOPTING GEN AI

As a large organization deploying Gen AI, how do you address the challenge of sustainability?

We continually optimize our AI models to improve efficiency by reducing energy consumption, often using smaller models with reliable results. We're learning when to use different solutions and emphasize investing in sustainable data centers and green technologies. We're also closely monitoring the market, and prioritizing providers that offer green solutions. Lastly, we're trying to collaborate with other players and stakeholders for industry-wide sustainability initiatives.

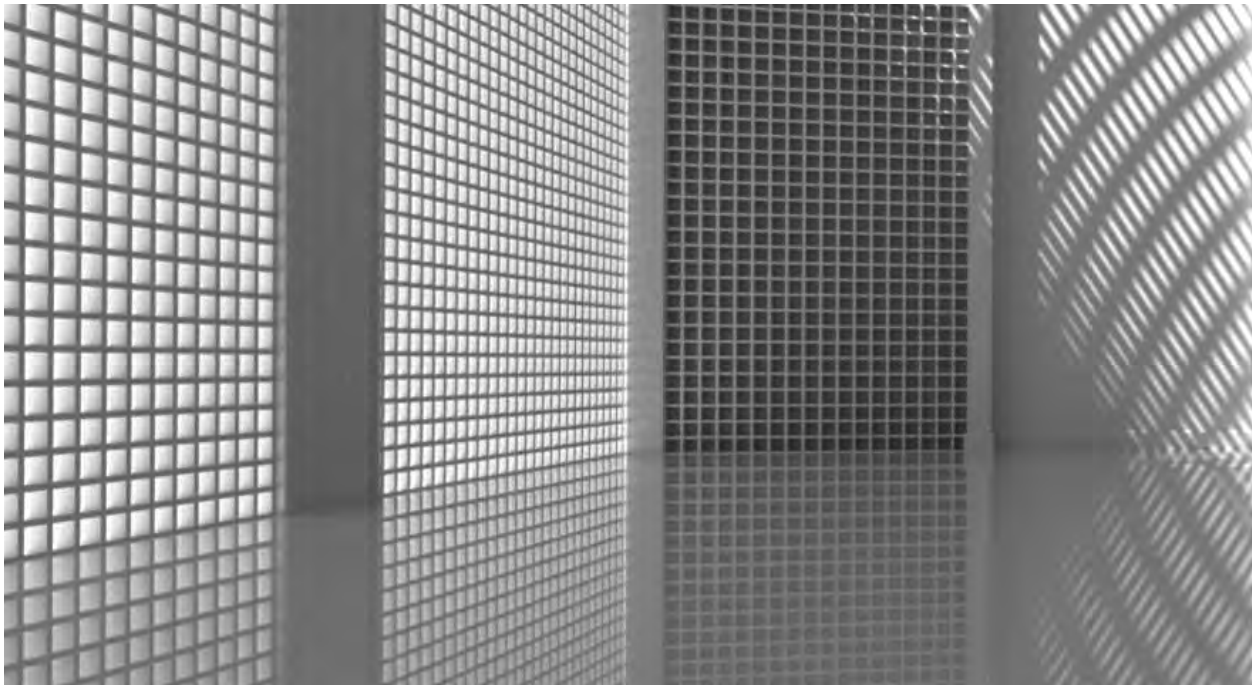
We're going to have to evolve in terms of energy sources and how we build models. Many new companies, such as Mistral, for example, are building solutions with different technologies and mindsets.

THE REGULATIONS AFFECTING GEN AI

How do you perceive the role of regulation and government control for organizations deploying Gen AI?

Governments struggle to keep up with technological advancements. Organizations have to take on a lot of the responsibility for using and governing AI and other technologies. However, governments must still stay informed and implement supportive regulation. Many governments, including Brazil's, are forming expert committees to address this challenge.

Centralized control isn't feasible. Companies must enforce their own controls and mindsets around responsible AI. But government can offer guidance and support.



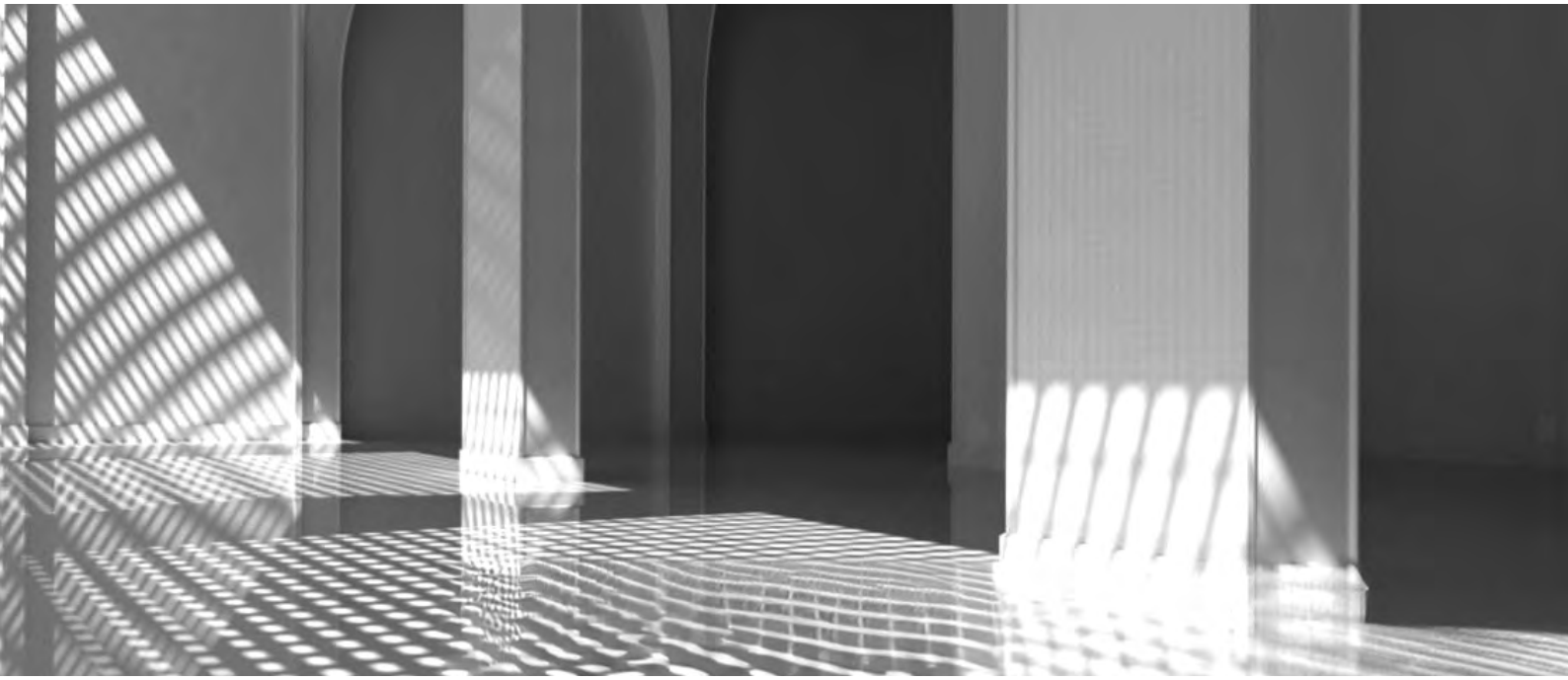
KEY FACTORS FOR INTEGRATING GEN AI INTO ORGANIZATIONS

How important is robust data in the development and performance of Gen AI?

From the 1980s to the 2000s, many businesses focused on completing projects without considering the underlying platform, assuming technology would manage the data. This led to widespread data disorganization. When we started organizing our data, it became clear that modernizing our platform was essential. By redesigning our architecture with microservices, we made it easier to manage and integrate our data. Now, we have a data mesh platform running on Amazon Web Services (AWS) and have rewritten 60 percent of everything we have.

> **"If data isn't centralized, organized, clean, and well-governed, it's difficult to use it effectively."**

If data isn't centralized, organized, clean, and well-governed, it's difficult to use it effectively. If data from legacy systems is copied into a SaaS database incorrectly, it can lead to discrepancies due to conceptual or technological issues, resulting in the incorrect data being shown to customers.



What are the key aspects of harnessing Gen AI?

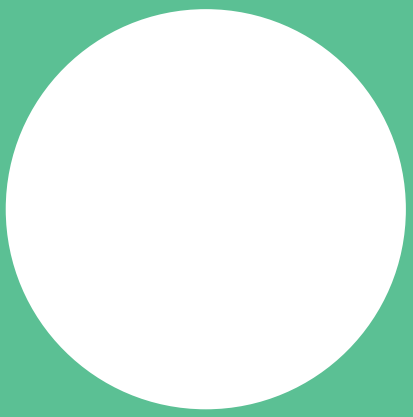
Large language model (LLM)-based chatbots are susceptible to manipulation. It's essential to have a multidisciplinary team engaged in high-priority cases. Secondly, it’s about responsible AI. We have established a committee to continuously review policies on areas such as data privacy, fairness, transparency, and explicability, and we try to continuously build and strengthen ecosystem partnerships. It's very important to connect with all of the companies that are developing the technology, so we can learn from each other.

How do you prepare a large organization to deploy Gen AI?

The first aspect is culture. If you want to use Gen AI and have success in adoption, make sure you're able to scale up. Hyper-personalization of the customer journey will be paramount. In a large company, there are numerous touchpoints to manage. Without a system to organize and understand these touchpoints, you won't be able to attain the full potential of hyper-personalization. We have more than 8,000 engineers using Gen AI, and have produced more than 1.3 million lines of code using GitHub Copilot (the third-largest amount of any organization in the world, and the largest bank, according to Microsoft).

The second aspect has to do with responsible AI. Many companies are creating solutions that can be easily manipulated, resulting in strange AI outcomes. It is crucial to understand the risks and maintain control over your developments.

Thirdly, it’s about keeping up with market evolution and innovations. It's essential to have the right professionals and processes. Building the right connections and network is also crucial. It's easy to get lost and fail to adopt the right technologies. Ensure you have a network of connections that keeps you in touch with the cutting edge of the sector, and with the competition.



Ricardo Guerra
CIO
Itaú Unibanco

"Without a system to organize and understand these touchpoints, you won't be able to attain the full potential of hyper-personalization."

Perspectives from Capgemini

GENERATIVE AI FOR MANAGEMENT

Elisa Farri and Gabriele Rosani
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GENERATIVE AI: THE ART OF THE POSSIBLE

Robert Engels
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OPERATIONAL AI IS CHANGING HOW WE LOOK AT DATA

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GENERATIVE AI FOR MANAGEMENT

Elisa Farri
Co-Lead of The Management Lab By Capgemini Invent

Elisa Farri is a vice president at Capgemini Invent, and author of the forthcoming book "HBR Guide to Generative AI for Managers". Included in the list of management thinkers to watch by Thinkers50, Elisa is an expert on management at the intersection of academia and business. Through exploratory research, thought leadership, and academic collaborations, Elisa bridges the latest management frameworks into practice. A frequent contributor to the Harvard Business Review, Elisa has extensive experience developing and delivering executive training at leading organizations globally. Previously, Elisa was a researcher at the Harvard Business School Research Center in Paris, France.

Gabriele Rosani
Director, Content & Research at The Management Lab By Capgemini Invent

Gabriele Rosani is a director at Capgemini Invent, and author of the forthcoming book "HBR Guide to Generative AI for Managers". Frequent contributor to the Harvard Business Review, Gabriele has been researching, designing, and testing new management frameworks and tools for over a decade. Gabriele works at the intersection of strategy, innovation, and sustainability, bringing new management practices to the real world of business. An experienced adviser to Fortune 500 companies, Gabriele previously worked at the European Centre for Strategic Innovation where he discovered his passion for shaping the new frontier of management.

More details on their new book are available at https://www.capgemini.com/insights/research-library/hbr-guide-to-generative-ai-for-managers/

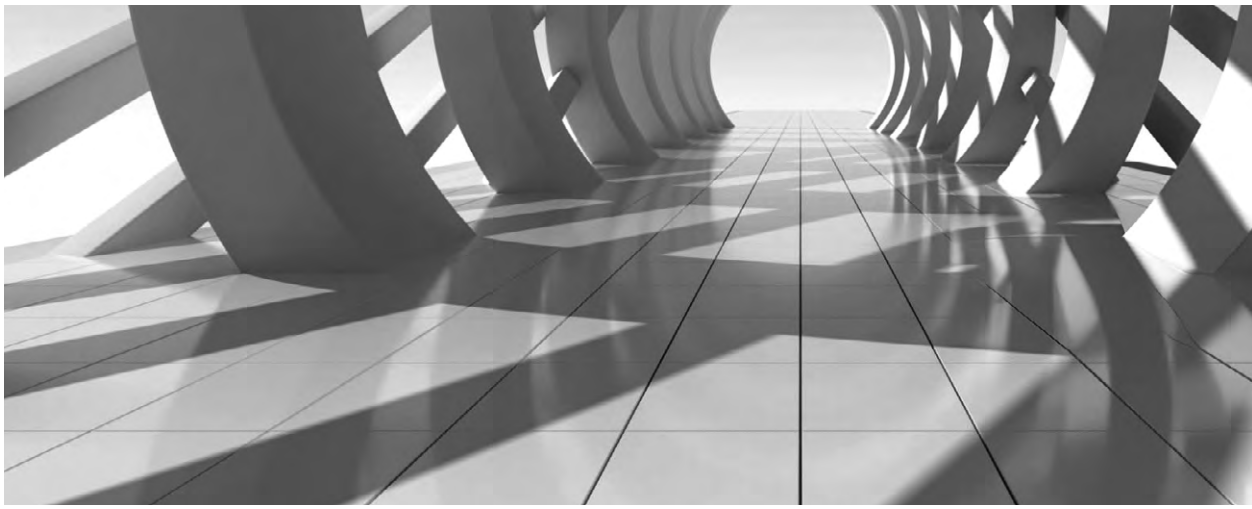
The era of manager-AI co-thinking

The integration of generative AI (Gen AI) in business operations is becoming more widespread, yet its application in the realm of management[1] is often overlooked.

While executives recognize Gen AI's potential for their businesses' operations, they do not seem aware of its managerial potential in strategic thinking and complex decision making. According to a survey conducted by the Capgemini Research Institute, nearly all executives (96%) cite generative AI as a hot topic of discussion in their respective boardrooms. However, Harvard Professor Karim Lakhani found that less than 10% of executives use individual generative AI tools in their daily tasks.

Talking with executives, the common perception is that Gen AI can help managers only in basic use cases (such as generating summaries on subjects, creating briefs on industry trends, distilling findings from extensive studies and documents, summarizing meeting minutes, or drafting emails), but it's not yet ready for more sophisticated managerial tasks.

> **"Leveraging AI as a "co-thinker" for complex managerial tasks is already possible today."**



1. Harvard Business Review Italia, "Generative AI for Strategy and Innovation", e-book, June 2023.

Contrary to the common perception, our experiments conducted jointly with Thinkers50 suggest that leveraging AI as a "co-thinker" for complex managerial tasks is already possible today. It all starts with embracing this new conversational mindset.[2]

This goes beyond leveraging AI as a "co-pilot" and unlocks new possibilities to consider it as a "co-thinker." Using AI as a "co-thinker" means engaging in structured dialogues with AI on a complex managerial problem. Humans and machines mutually contribute and co-create the output of the conversation, building on each other's strengths.

Unlike a co-pilot assistant, using AI as a co-thinker emphasizes questioning over answering, nurturing the reflection and stimulating critical judgement for better problem solving. Although technology is well-versed in both modes, it's up to the human to choose the appropriate mode depending on the task at hand.

This approach prioritizes thoughtful reflection over speed, leading to better-informed decision making. Executives who start exercising the co-thinking muscle with AI now are positioning themselves for a substantial edge, in terms of augmenting their managerial skills within a new way of collaborating with AI.[3]

"Using AI as a co-thinker emphasizes questioning over answering, nurturing the reflection and stimulating critical judgement for better problem solving."

2. For more details refer https://www.capgemini.com/be-en/insights/research-library/managementgpt prototypes-of-ai-co-thinkers/.
3. Why Every Manager Needs an AI Co-thinker, MIT Sloan Management Review Polska, February 2024.

The spectrum of human-AI interaction for management

Typical managerial tasks, ranging from strategic to operational, can be positioned along a spectrum. While some tasks are more suited to a co-pilot interaction mode with AI, others align better with a co-thinker mode. There isn't a clear-cut choice between one or the other. As we move towards the right of the spectrum (see Figure 1), the necessity for human engagement and interaction with AI increases. Conversely, on the left end, AI can handle most of the execution.

Figure 1: The spectrum of interaction modes between managers and AI

Spectrum of human-AI interaction mode

More copilot				More co-thinker
Sort emails	Draft emails	Provide narratives	Assess choices	Help in self reflection
Grammar correct texts	Prepare meeting minutes	Suggest ideas	Frame complex problems (perspectives)	Ponder key decisions
Visualize data	Extract findings	Respond to simple questions	Evaluate trade-offs	Co-create solutions
	Complete code		Challenge assumptions	

Today, we see a gap in perception, a lack of recognition that AI can be used as a valuable sparring partner well beyond a mere executor and task automator.

AI's capability to collaborate on a cognitive and emotional level, offering insights and contributing to complex decision-making processes, is an area that many managers have yet to fully realize or integrate into their strategic thinking.

Moreover, the lack of managerial guidance around the implementation of and the experimentation with this new mode keeps managers trapped in the conventional mode.

We tested AI co-thinking on multiple tasks that make up an executive's day. Using AI as a co-thinker can be applied to various managerial use cases such as conducting strategic assessments, framing complex problems from multiple perspectives, evaluating trade-offs, challenging assumptions, aiding in self-reflection, deliberating key decisions, and co-creating solutions. More specifically, here below is a list of complex managerial issues from culture and leadership to strategy and innovation issues that we have tackled using Gen AI as a co-thinker in a dialogue:

How to cultivate responsible leadership: AI helps an executive reflect on how to translate company values into character features, stop bad habits, and embrace concrete actions for modeling virtuous behaviors.

How to foster employee engagement: AI helps leaders interpret the latest employee survey results, identify the most critical issues, reflect on the root causes, and devise concrete actions to tackle them in a timely manner for their team/unit.

How to ponder complex decisions: AI enables decision-makers to take multiple perspectives on a given issue, consider a wider range of factors, balance difficult trade-offs, and simulate potential impacts to ensure responsible and sustainable decisions.

How to plan under uncertainty: AI helps planners unearth, define, and articulate the most critical assumptions, and to test them in the correct sequence to ensure risk minimization and learning maximization while optimizing resources.

How to better serve key customers: AI can aid in conducting strategic reflection on growing accounts by assessing clients' landscape and needs, and how to customize the service solution and stand out from competitors' propositions.

How to evaluate new market opportunities: AI guides a business leader through a structured analysis of expanding into a new market, identifying where to play, how to win, and which capabilities are required.

How to innovate a traditional business model: AI helps product managers innovate offerings by considering alternative value propositions and pricing models, and assessing their strategic fit and feasibility.

We have tested this novel way of interacting with AI as a thought partner with hundreds of managers, MBA students, and academics from leading universities. They all recognized the transformative potential of engaging with AI in this overlooked collaborative manner.

"Co-thinking with the machine helped me reflect in a structured way on several key dimensions. Using AI as a co-thinker helped me understand the problem and expand it by considering other relevant stakeholders I hadn't mentioned initially."—Cristiano Bellucci (technology vision strategist, Fujitsu).

"It's not just about finding answers, but about crafting questions that lead to cooperative advantage. It's where dialogue, understanding, and stakeholder alignment converge to create a fertile ground for sustainable solutions."—Leon Prieto, director of the Center for Social Innovation & Sustainable Entrepreneurship in the College of Business, Clayton State University.

"What surprised me was the breadth of recommendations on such a complex topic as network effects. […] Based on this first experiment, the human-machine interaction shows promise for future co-thinking between humans and AI."—Marshall Van Alstyne, Questrom School of Business, Boston University.

Let's delve into two different examples of human-AI executive conversations: one pertains to a business task, such as innovating the business model, while the other is centered around culture, specifically how a leader can exemplify behavior alignment with the company's values outlined in its manifesto.

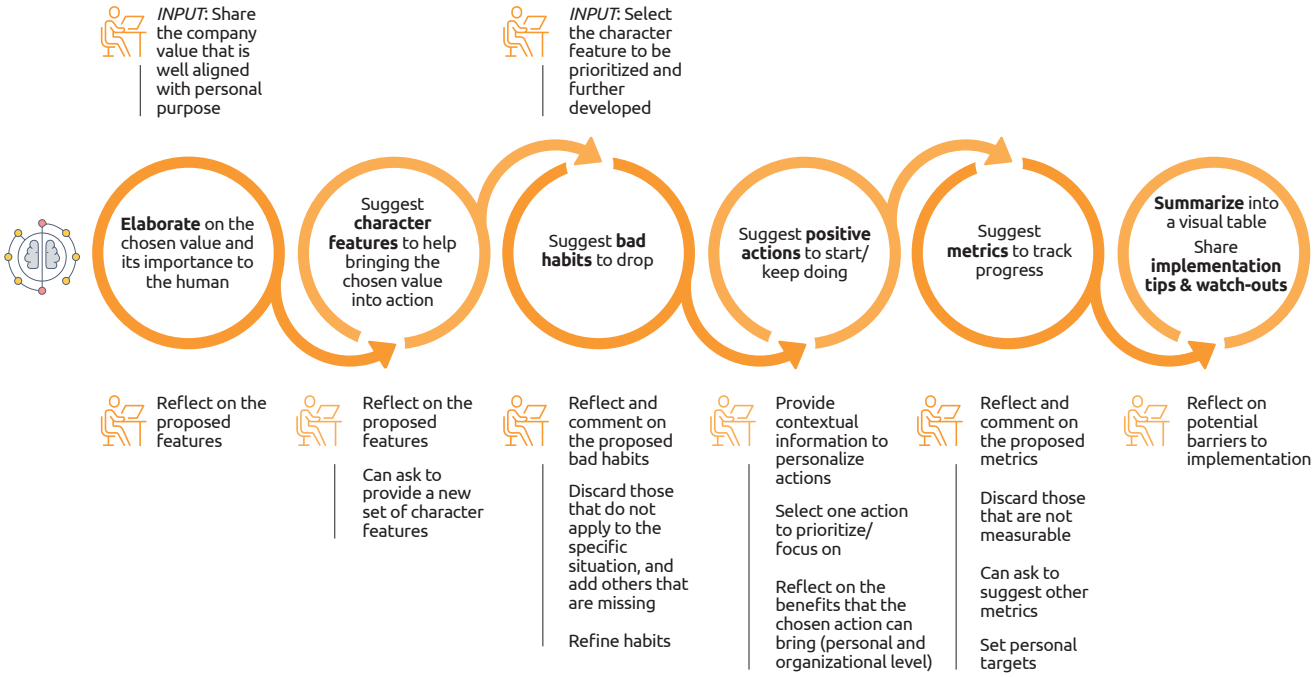
Deep dive 1: How to cultivate responsible leadership

There is a twofold growing expectation for companies to embed sustainable, responsible values into their strategy and for their leaders to truly embody these values in their actions. However, most leaders find themselves constrained by ingrained habits, which they struggle to change also because of the little space afforded for profound self-examination of virtuous behaviors. In collaboration with Edward Brooks (executive director of the Oxford Character Project) and Corey Crossan (research and teaching fellow at the Oxford Character Project), we designed a human-AI dialogue that provides methodological guidance to managers who want to make a personal reflection translating their company's values in measurable behaviors.

"There is concern that Gen AI will have a dehumanizing effect on organizations, and it is important to underline that Gen AI cannot replace the human development needed for responsible leadership.

What we are thinking about is how AI can help leaders by prompting ways of thinking and acting that are in line with the best of what it means to be human."—Edward Brooks, director of the Programme for Global Leadership at DPIR and executive director of the Oxford Character Project.

In the figure below, we illustrate the dynamics between humans and AI going through this reflection: the machines follow a structured sequence while humans are engaged throughout the journey, providing input and feedback to enrich the quality of the human-AI dialogue.



The feedback collected from our testers emphasized how the neutrality of an AI interface can encourage more open sharing. When people talk to each other, they may worry about being judged or encountering biases. So, they feel less safe admitting gaps in knowledge or discussing issues.

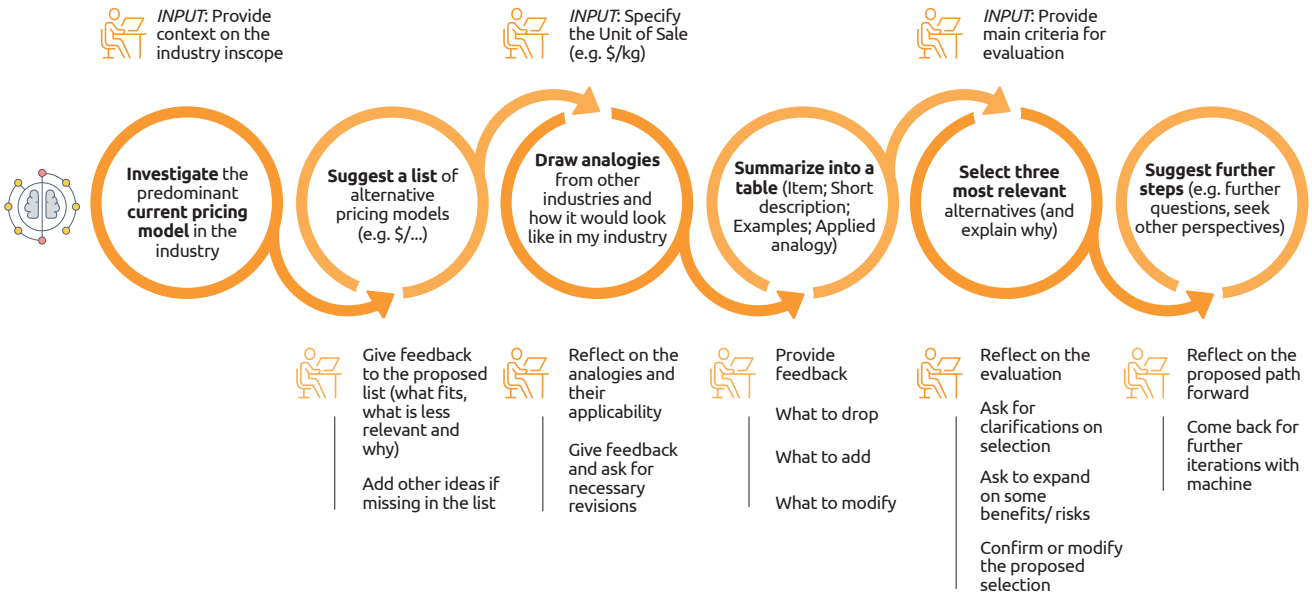
"It felt like a safe space where I could freely express my thoughts and feelings without any fear of judgment."—middle manager, energy utility company.

This neutral approach makes testers more comfortable revealing challenges without fear of criticism. It creates a sense of psychological security lacking in some human interactions.

Deep dive 2: How to innovate business models

Relying solely on traditional ways of selling the product often blocks new and creative strategies. Based on our experience with past projects, when considering new business models, exploring alternative units of sale (e.g., $/kg, $/outcome, $/month) can help lateral thinking and escape from traditional lenses. We developed and tested an AI co-thinker that shakes up conventional, constrained thinking by engaging the manager in a strategic session to re-examine pricing options from scratch.

Using AI as a co-thinker, the product manager provides contextual information about the current industry standard unit of sale, then collaborates with the AI to explore innovative alternative models. They draw on cross-sector analogies to inspire paradigm-shifting ideas. The product manager provides perspective and feedback on the proposed ideas, considering contextual elements for feasibility. Last, AI helps the manager evaluate the most promising options. In the figure below, we illustrate the human-AI dialogue:



The testers of our structured dialogues stressed the importance of having diverse perspectives and industry examples from AI. However, they also highlighted that humans bring depth with their expertise, especially in specific industries.

It's worth noting that some AI suggestions may not perfectly fit a particular industry's unique characteristics. However, AI's ability to show how analogies could apply to an industry can improve understanding and encourage creative thinking, helping to break away from old ways of thinking.

Managerial lessons from the experiments

Do not delegate. Managers should engage directly, both in developing and testing the dialogue, as well as in the co-thinking interactions with AI, applying these to the real tasks they face in their day-to-day managerial roles. While the technology itself is not inherently complex to use, employing it as a co-thinker necessitates the strengthening of skills for a new form of collaboration between humans and AI.

Customize for your managerial issues. Managers should be proactive in crafting their own customized interactions with AI. They need to strategize the conversation based on their specific managerial challenges. This involves wearing the strategist's hat, contemplating the optimal structure of the interaction: defining the roles of both AI and manager, selecting appropriate approaches and managerial frameworks to employ, considering relevant case examples, and so forth.

Put effort in the conversation. For successful co-thinking, humans shouldn't rely on AI to do everything. Active and thoughtful participation is key for co-creating highly relevant and valuable output with AI. Humans need to engage heavily, by providing detailed information, specific context, personal examples, and insightful comments. It's the depth of human engagement that truly enhances the conversation and leads to exceptional output.

The dawn of a new management skill

The way humans interact with AI as a co-pilot fundamentally differs from when AI is a co-thinker. This necessitates a learning curve for humans to engage with the machine in a co-thinking capacity, signifying a fundamental shift in human-AI interaction mode. When using AI as a co-pilot, humans expect the AI to do most of the work, with minimal intervention. In contrast, the co-thinking mode requires an equal effort from both humans and the AI, to create high-quality value together. The power of the algorithm alone may not be the sole determinant of success – a lower-performing LLM, coupled with an actively engaged human, can outperform a top-performing LLM paired with a passive and disengaged human. Executives need to cultivate the ability to adopt the co-thinking mindset. Whether in individual tasks or team endeavors, mastering this shift is vital and will become a competitive advantage.

Robert Engels
Head of Generative AI lab

Robert is the Head of Capgemini's Global AI lab. Before that, he founded a startup, worked with angel investors, designed and built AI-driven architectures for museums and broadcasters, and built Norway´s first road-legal electric motorcycle (2009).
He holds a PhD in artificial intelligence and machine learning from the Technical University of Karlsruhe (now KIT).

GENERATIVE AI: THE ART OF THE POSSIBLE

Generative AI is gaining in adoption. Companies across industries are leveraging Gen AI across functions. While most use cases are driving up efficiency or saving costs, there's a whole other category of emerging use cases that many innovative startups are focused on. Let's take a look at some of these most exciting Gen AI startups.

Content creation

Synthesia:
Synthesia is a video communications platform whose AI video generator software enables users to turn any document or webpage into a video that is hosted by an AI-generated realistic avatar. The avatar can change its expression based on the content and can also resemble either the user, or, with appropriate licenses, a celebrity. https://www.synthesia.io

Jasper:
Jasper calls itself a copilot for enterprise marketing teams. The company, founded in 2021, aims to reduce the efforts of marketers by asking extensive prompts and giving detailed step-by-step guidance, helping in content creation. It adopts a chatbot interface. The company is valued at over a billion dollars. https://www.jasper.ai

Soundraw:
Soundraw is an AI-powered music generator that creates royalty-free music for individuals and enterprises to use in their projects. The company creates original in-house music to train its AI model. This helps them step aside the contentious challenge of potentially relying on copyrighted content. https://soundraw.io/

Inworld:
Inworld AI develops and manages AI-driven characters for virtual worlds, gaming, and interactive media. These characters engage in dynamic conversations, exhibit lifelike behaviors, and adapt to real-time user interactions using advanced natural language processing and machine learning techniques. www.inworld.ai

Alternative compute

Mythic:
Mythic is working on building analog chips. The company promises exceptional performance on specific types of AI calculations, such as matrix multiplications and signal processing, by going from digital chips (0/1 based) to analog - continuous voltage signals. This higher parallelism and efficiency leads to faster calculations and a lower energy footprint. https://www.mythic.ai

Groq:
Groq designs and produces AI-optimized chips called language processing units (LPUs). These chips are not designed for the initial training of an AI model but are optimized to run fast web services for large language models (LLMs). Groq claims that they are 10x faster and 10x cheaper than GPUs that are typically used. https://www.groq.ai

"Large, do-it-all foundation models (LLMs) with moderate performance across various tasks are being replaced by smaller, highly specialized models."

Turbocharge your software engineering

Generative AI is beginning to play a role in software engineering. Many startups are going beyond coding assistance, ranging from test case generation to business requirements/ demand analysis and writing to legacy code modernization.

Table 1: Startups leveraging Gen AI across the software development lifecycle (SDLC)

SDLC phase	Tools and description
Business demand analysis	8base's Archie for ideation, blueprint generation, detailed requirements writing, and architecture design support. GPT-powered tools like PRD wizard, and WritemyPRD for product requirements documentation.
Design	Eraser's DiagramGPT to create data flow diagrams, architecture diagrams, etc. Mintlify to generate code documentation.
Testing	Diffblue for writing test cases. Deepcode's Synk for securing code. Sapient for generating test cases.
Deployment and maintenance	Grit for generating release notes by analyzing commits, issues, and differences; dependency upgrades.
Legacy code modernization	Bloop AI to help teams modernize and understand their legacy code.
DevOps	OpenText™ DevOps Aviator for faster application delivery.

Small is big

Large, do-it-all foundation models (LLMs) with moderate performance across various tasks are being replaced by smaller, highly specialized models. These new models are extensively trained on specific tasks, resulting in high performance, reduced resource consumption, and faster execution. Many models, including open-source options, are now available, from startups to established hyperscalers. These models can run on a laptop within minutes using open-source frameworks like Ollama.

Liquid AI:
Liquid AI is a spin-off from MIT, and is co-founded by leading roboticist Daniela Rus. The startup wants to build a new generation of foundation models. The models will be based on liquid neural networks. GPT-3 had about 175 billion parameters and 50,000 neurons. In contrast, a liquid neural network that has been trained for a task such as drone navigation can contain as few as 20,000 parameters and less than 20 neurons . https://www.liquid.ai

Arcee:
Arcee develops secure, small language models for enterprises, specifically in highly regulated industries such as legal, healthcare, insurance, and financial services. Arcee's platform helps organizations in these industries with proprietary data to build and operate their own specialized models securely within their own cloud environment. https://www.arcee.ai

Multi-agent AI systems and ecosystems

Some generative AI startups are already working towards a world where small, highly specialized and precise models work together on more complicated tasks. This is a typical scenario for multi-agent systems. A multi-agent system consists of AI agents with different capabilities.

1. Various companies are building multi-agent systems (MAS). A good example of such a MAS with integrated learning and AI capabilities is MASDIMA , a multi-agent system for disruption management for airliners and airports. For the latter, generic frameworks like Relevance AI and Crew AI help build custom systems with AI Agents. They are easy to use, claim to be low/no-code, and show how well agents can work together to solve complex tasks better.

2. Built on LangChain, LangGraph is another powerful multi-agent framework for creating multi-actor applications with LLMs. It coordinates and checkpoints multiple chains in cyclic steps using Python or JavaScript, with an interface like NetworkX, ideal for adding cycles and persistence to LLM applications.

3. VoiceFlow is another AI agent-building platform designed to efficiently create, develop, and launch large-scale chat and voice experiences.

"Some startups are already working towards a world where small, highly specialized and precise models work together on more complicated tasks."

Synthetic data

Syntho AI:
Syntho AI tackles data access challenges by generating synthetic data that mirrors original datasets. It ensures privacy by de-identifying personally identifiable information (PII) and enhances test data management with realistic datasets, promoting data privacy and accuracy. https://www.syntho.ai/

Hybrid AI
Hybrid AI combines the strengths of different AI approaches to create more powerful and effective systems. In the context of generative AI, hybrid approaches can leverage the strengths of symbolic, crisp, and easy-to-execute rule-based systems and machine learning to create more accurate and efficient models.

Neo4J:
Neo4J works on knowledge graphs which can play a key role in explainability and preventing hallucinations. The knowledge graph acts as a bridge, translating user intent into specific, actionable queries the LLM can execute with increased accuracy and reliability. By allowing any user – regardless of technical knowledge – to inspect how the LLM arrived at its answers, people can validate the information sources themselves. https://www.neo4j.com

Wren AI:
Wren AI builds text-to-SQL with semantic models. This framework helps add metadata, semantics and relationships to lower hallucinations and get crisp outcomes. It also includes self-learning feedback. https://www.getwren.ai/

Generative AI and marketing

Generative AI is impacting marketing with its potential to drive personalization at scale and create content across mediums.

> **Powerful new combinations of Gen AI with graph tech, logical systems, neuromorphic architectures and new ways of computes will arise."**

Cuebric:
Cuebric helps brands streamline background production in their ads. It leverages generative AI to produce ready-to-shoot cinematic renders, thereby accelerating the process while cutting down the cost. https://www.cuebric.com

ConvAI:
Convai helps brands build lifelike 3D avatars powered by generative AI with the ability to mimic human speech, gestures, and intelligence. The startup creates embodied AI characters for virtual worlds, leveraging conversational generative AI. https://www.convai.com

These are just a sample of some of the exciting startups that are pushing the limits of generative AI. Powerful new combinations of Gen AI with graph tech, logical systems, neuromorphic architectures and new ways of computes will arise, while generative AI continues to develop and mature. We are going to see many more innovative new applications and use cases.

OPERATIONAL AI IS CHANGING HOW WE LOOK AT DATA

Anne Laure Thibaud
Executive Vice President, Data, AI & Analytics Group Offer Leader, Capgemini

Anne-Laure Thibaud has over two decades of experience in large-scale big data analytics and AI, and has observed the pivotal role that data and insights have come to play in shaping competitive organizations. Since joining the group in 2000, Anne-Laure has risen to a position of global leadership heading Capgemini's worldwide portfolio in data, analytics, intelligent automation, AI and GenAI. Her role is crucial in guiding Capgemini's clients to future-proof their businesses and stand out in today's data economy.

Steve Jones
Executive Vice President, Data Driven Business & Gen AI, Capgemini

Steve Jones is the EVP of Data Driven Business and Generative AI, a published author in technical and business journals and a member of several standard bodies, Steve's focus is on the ability of business to adopt technology successfully and be able to manage it in operations, leading Capgemini's early efforts in Cloud, SaaS, and Big Data. Today he focuses on the redesigning of businesses for the 50% AI world.

'Data is the new oil' **was an expression coined by British mathematician Clive Humby. The implication was twofold. Not only was it valuable, but it required refinement before that value could be extracted. This statement was reasonable in a world where market analysts could afford to wait for data scientists to refine the data they were working with. Today, however, organizations task AI with accelerating the decision-making process, from the boardroom to the factory floor. This shift reflects a fundamental change in the value and purpose of data, driven by the opportunities and challenges presented by operational AI.**

Gen AI will enable operational digital employees

The question is: By the end of the current decade, what proportion of business decisions will AI make directly, and in what proportion will it assist? Because most decisions occur operationally, that is the context in which AI will work. Large language models (LLMs) are enabling new interactional dynamics with employees and consumers, bringing within reach not only new levels of automation but entire new buying and support cycles. The generative and simulation capabilities of Gen AI have the potential to alter how organizations run, from strategic planning to day-to-day decision-making.

However, organizations would be unwise to think of Gen AI as potentially an overseer of their whole business. Rather, they should think of it as a world of hundreds, thousands, or even millions of digital employees, each allotted a specific task – and they should only be trusted to operate within the scope of each task. Therefore, the question becomes: If we allow digital employees to take a large number of business decisions, why can't we rely on them without human oversight and intervention? The answer is that, while Gen AI offers the potential to revolutionize human-machine interaction, it can only do so when it has the trust of its users. We do not currently live in that world.

"While Gen AI offers the potential to revolutionize human-machine interaction, it can only do so when it has the trust of its users. We do not currently live in that world."

Data must represent reality

It is widely accepted that applications do not create great data. There is an army of people, processes, and technologies with the job of enhancing poor-quality data. Nevertheless, every day, people make business decisions based on poor-quality operational data, mixed with personal experience, contextual framing, and refined historical data. This process, amalgamating professional experience and a measure of intuition, requires a trained human mind.

> "For AI to make an operational decision, the data it is using must be accurate at the point of decision, reflecting not only transactional information but a full assessment of the business context."

For AI to make this kind of operational decision, the data it is using must be accurate at the point of decision, reflecting not only transactional information but a full assessment of the business context. All of those elements that employees have acquired naturally through their normal activity must now be encoded so that AI can be trusted to make similarly informed decisions under time pressure and in the heat of operations.

Having an *operationally accurate digital reality* is the foundation of this operational status for AI, making it a potentially viable unsupervised decision-taker in areas from cost optimization to the implementation of new competitive advantages.

But operational AI requires more than data reality

Control of operational reality is vital in Gen AI, but that is not enough to make it a trusted digital employee. Today, organizations educate their employees on corporate culture, and managers and HR make them aware of their responsibilities in a way that leaves their roles clearly defined. Once those guardrails are in place, managers tend to trust employees to work within their boundaries toward their agreed goals.

With Gen AI, the assumption is that it cannot be trusted in the same way as a human employee and, given the opportunity, will act outside its boundaries. Organizations are compelled to build all the information about their culture, mission, and guardrails into the AI they use in order to retain control of it.

Developing a digital business model

When asked to document how a business works today, most executives tend to refer to business processes. That is, a series of steps that are meant to represent the lifecycle of a given task. However, a company does not work based on 'lead to cash' or 'source to pay' processes. Rather, it works on the basis of the internal collaborations that drive the outcomes of the business. This is the world in which AI must learn to operate, with a deep understanding of all the nuances of the business environment. For instance, Gen AI has the power to act as a procurement negotiator on either the supplier or buyer side, but to do so, it needs to be 'educated,' in the appropriate format, on context and how success will be measured.

Because, by default, we do not trust Gen AI, we need a mechanism with which to enforce this digital business model, and particularly its restrictions, onto the Gen AI solutions, to ensure the business continues to manage the tech in operational terms. Operational AI needs the digital equivalent of an HR department, but one that combines the professional paranoia of cybersecurity with the corporate risk management mindset of finance.

This applies from preventing a digital call center agent from citing 17th-century French history in its responses, through to preparing operational AI to assess the full Scope 3 implications of a procurement decision and how to weight those considerations between suppliers.

The operational management of a hybrid team

This digital business model and its enforcement enables team leaders, managers, and executives to incorporate digital employees into their teams and manage them not as a technology solution under the CIO but as a core component of the function. The manager is accountable for the digital employee, including the decisions it makes and the digital reality it creates. The manager is also responsible for setting the boundaries within which the AI should operate. Once these elements are in place, the leader can consider operational AI an organizational asset rather than just a technological one.

Operational AI requires the business to raise its data game

Creating an AI that works on refined data, whether in a proof of concept (PoC) or as part of a traditional AI solution, is relatively easy. It has clear boundaries and relatively limited challenges. The more serious challenges come when we look to put AI in operational control of decision-making and outcomes.

We need operational control of our digital reality to ensure that Gen AI solutions are making decisions based on our business reality. As GenAI models become more powerful and as the opportunities to fundamentally alter business become ever greater, a new organizational approach is required, where the management and governance of AI is considered as important as the management and governance of the team. Operational AI isn't a step change in the value of data. Rather, it's an inversion from a world where data, once refined, follows a given lead to a world where data reflects reality and drives outcomes.

> **"We need operational control of our digital reality to ensure that Gen AI solutions are making decisions based on our business reality."**

Insights from the Capgemini Research Institute

GEN AI IN ENTERPRISE:

The rise of generative AI investments in organizations.

→ **p.131**

GEN AI IN SOFTWARE ENGINEERING:

How software engineering is being shaped by generative AI.

→ **p.138**

GEN AI IN ENTERPRISE

HARNESSING THE VALUE OF GENERATIVE AI.

For details on the research methodology and to read the full report, please visit:

https://www.capgemini.com/insights/research-library/generative-ai-in-organizations-2024

Organizations are deploying generative AI at pace

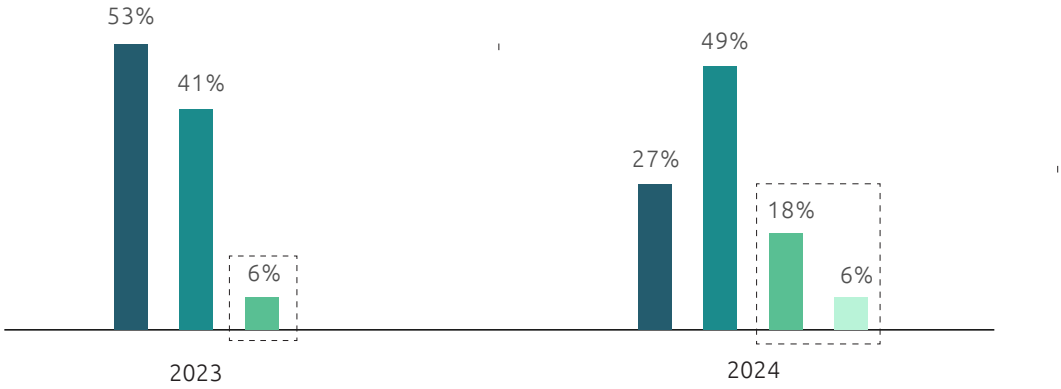
Investment in generative AI is increasing

80% of organizations increased their investment in generative AI from last year and 20% maintained the same investment level

In the past year, implementation of generative AI has accelerated

Nearly one-quarter (24%) of organizations are now integrating generative AI into some or most of their locations or functions, up from 6% reported last year

% of organizations who agree with the statement on generative AI maturity



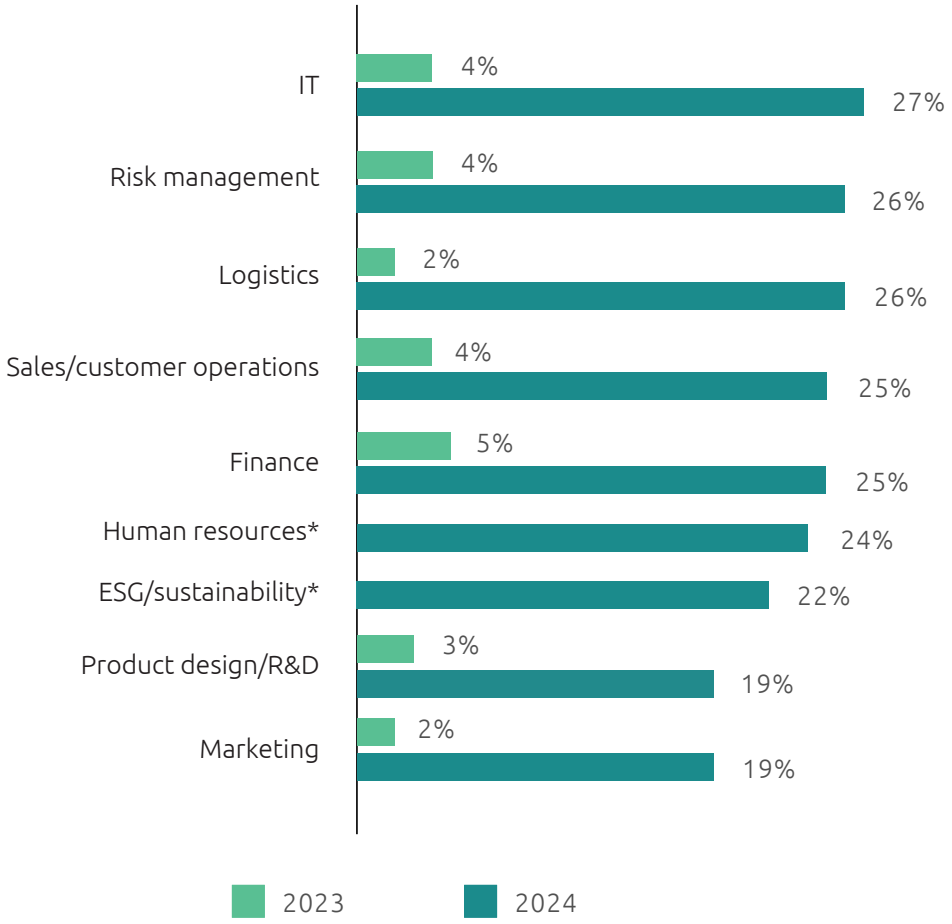
Source: Capgemini Research Institute, Generative AI executive survey, April 2023, N = 800 organizations; Generative AI executive survey, May–June 2024, N = 940 organizations that are at least exploring generative AI capabilities.

*In the 2024 data points respondents from India and the public sector/government are excluded as they were not included in the 2023 research.

Generative AI is pervading organizations

Over the past year, adoption of generative AI has grown across functions

% of organizations implementing generative AI use cases, by function



Source: Capgemini Research Institute, Generative AI executive survey, April 2023, N = 800 organizations; Generative AI executive survey, May–June 2024, N = 1,031 organizations that are at least exploring generative AI capabilities; N varies per functional use case, ranging from 499 to 716.

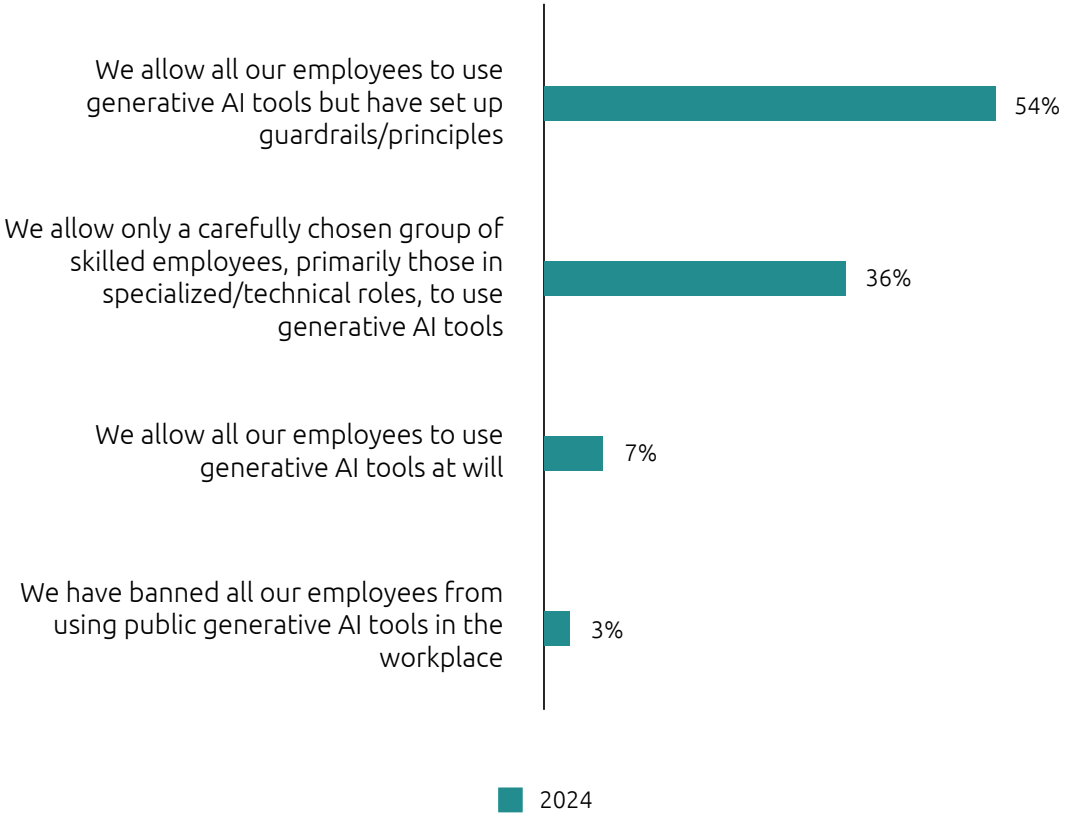
*ESG/sustainability and human resources were excluded from the 2023 research.

** "Implementation" refers to organizations that have partially scaled the functional use case in question.

***In the 2024 averages, respondents from the public sector and India are excluded, as they were not included in the 2023 research.

Generative AI is used by employees in some capacity at most organizations

% of organizations who agree with the statements

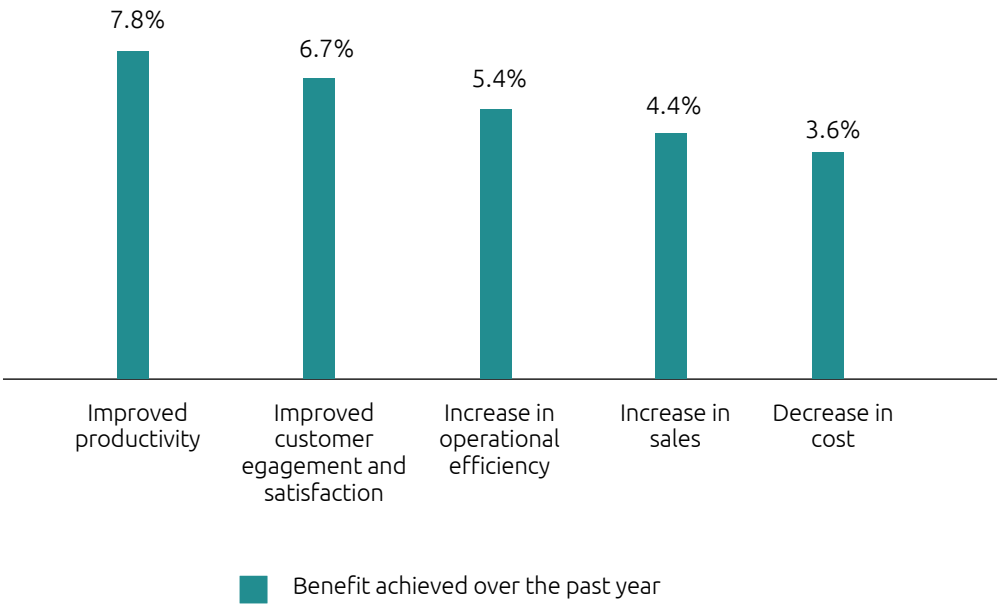


Source: Capgemini Research Institute, Generative AI executive survey, May–June 2024, N = 1,031 organizations that are at least exploring generative AI capabilities.

Generative AI is driving benefits

Generative AI yielded benefits in the past year in the areas in which the technology has been piloted or deployed

Average benefits realized from generative AI within the past year



Source: Capgemini Research Institute, Generative AI executive survey, May–June 2024, N = 940 organizations that are at least exploring generative AI capabilities.

Improved productivity: Leveraging generative AI to optimize and improve the performance of existing resources, such as machines and employees. Increase in operational efficiency: Applying generative AI to pinpoint areas of waste and inefficiency, thereby reducing the time employees spend on non-value-added activities or inefficient processes.

*Question asked: What benefits have you already achieved at an organizational level from generative AI, within the past one year?

These benefits stem mostly from pilot or partial implementations of generative AI and will increase as more organizations fully scale generative AI across all operational areas.

Organizations think generative AI will shift strategies and business models and drive revenue

Generative AI…	Share of organizations	
	2023	2024
…is a transformative technology that will help us drive revenue and innovation	60%	74%
…has the potential to fundamentally shift business strategy	39%	54%
…will require us to rethink our business models in order to remain competitive	22%	40%

AI agents: The new technology frontier

We define an AI agent as a technology designed to function independently, plan, reflect, pursue higher-level goals, and execute complex workflows with minimal or limited direct human oversight. A multi-agent system is a collection of these agents working together to solve tasks in a distributed and collaborative way. Such systems exhibit characteristics traditionally found exclusively in human operators, including decision-making, planning, collaboration, and adapting execution techniques based on inputs, predefined goals, and environmental considerations.

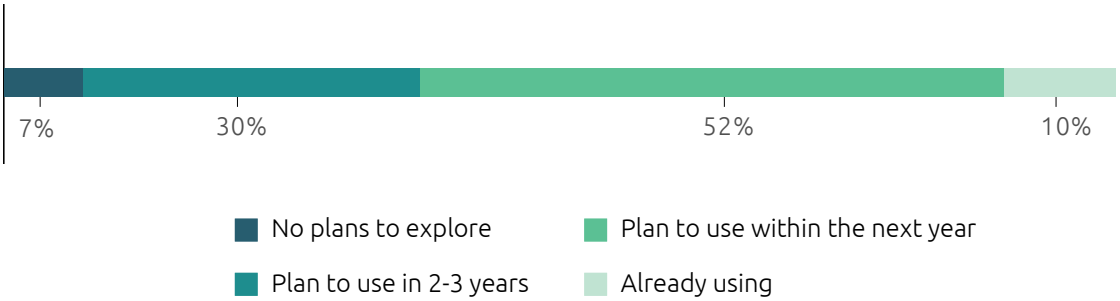
AI agents promise smoother automation and enhanced productivity

% of organizations who agree with the statements

Source: Capgemini Research Institute, Generative AI executive survey, May–June 2024, N = 1,031 organizations who are at least exploring generative AI capabilities.

The next few years will see an uptake in adoption of AI agents

% of organizations using or planning to use AI agents



Source: Capgemini Research Institute, Generative AI executive survey, May–June 2024, N = 981 organizations who are at least exploring generative AI capabilities, excluding the public sector.
*The chart excludes 1% that answered unsure/don't know.

GEN AI IN SOFTWARE ENGINEERING:

TURBOCHARGING SOFTWARE WITH GEN AI.

For details on the research methodology and to read the full report, please visit:
https://www.capgemini.com/insights/research-library/gen-ai-in-software

Organizations are reaping multiple benefits from leveraging generative AI for software engineering

One in two organizations adopting generative AI sees improvements in enabling innovative work and quality of software.

Percentage of organizations seeing benefits through the adoption of generative AI, as mentioned by software leaders

Organizations with active* generative AI initiatives have seen 7–18% improvement in total productivity across the SDLC#

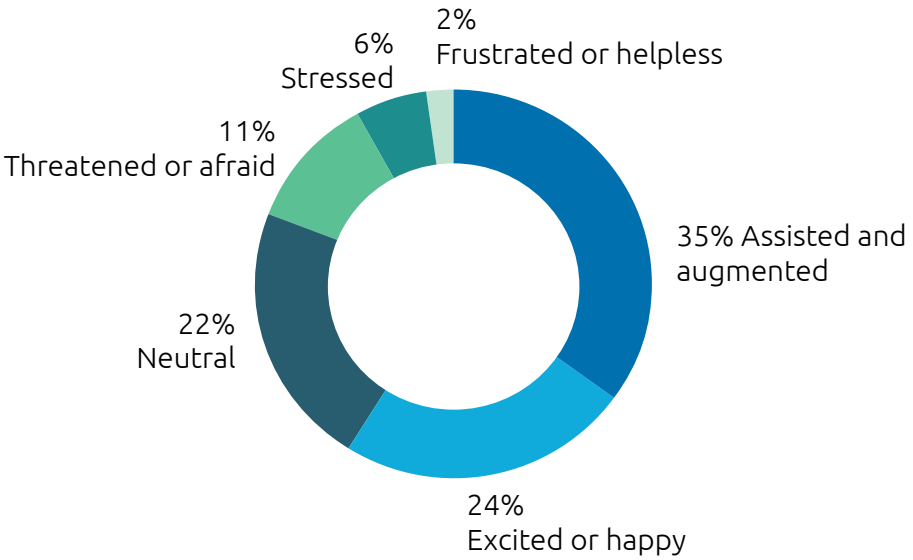
Source: Capgemini Research Institute, Generative AI in Software Engineering, Senior Executive Survey, April 2024, n = 412 software leaders that have scaled up or are running pilots with generative AI in software engineering.

* active initiatives are those generative AI deployments that are in the pilot or scaling stages.

#Total productivity improvement refers to overall improvement in the productivity of the software professionals from all types of tasks accelerated by generative AI.

Generative AI benefits extend to job satisfaction and happiness.

How does the workforce feel as regard to the adoption of generative AI

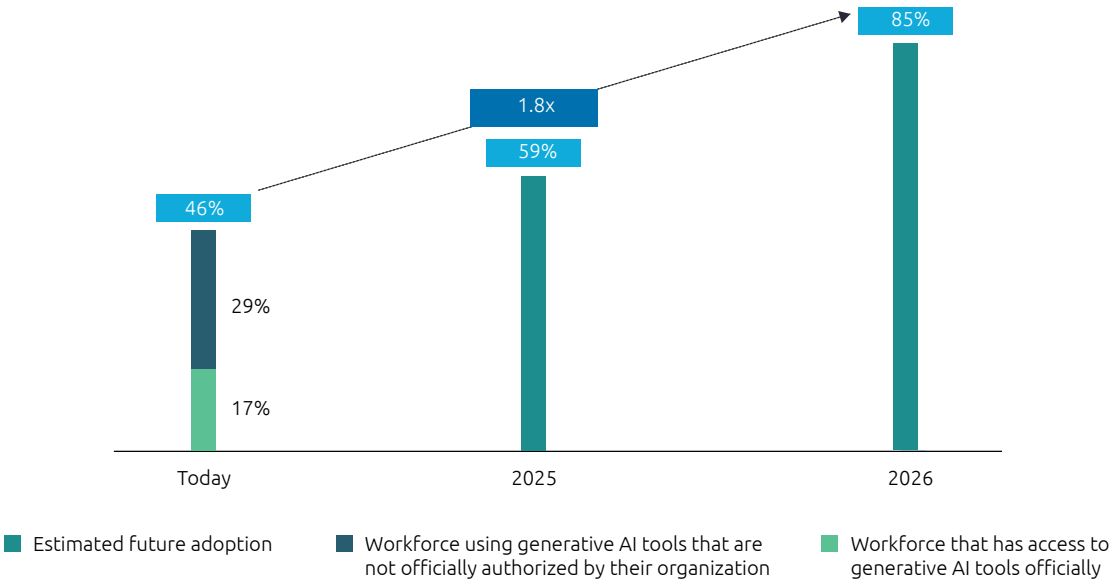


Source: Capgemini Research Institute, Generative AI in Software Engineering, Software Professionals Survey, April 2024, N = 1,092 software professionals

Generative AI adoption is at an early stage but is expected to accelerate sharply

Adoption of generative AI in software engineering is in its early stages, but more than four in five software professionals are estimated to leverage* it by 2026

% of workforce leveraging generative AI tools in the workforce



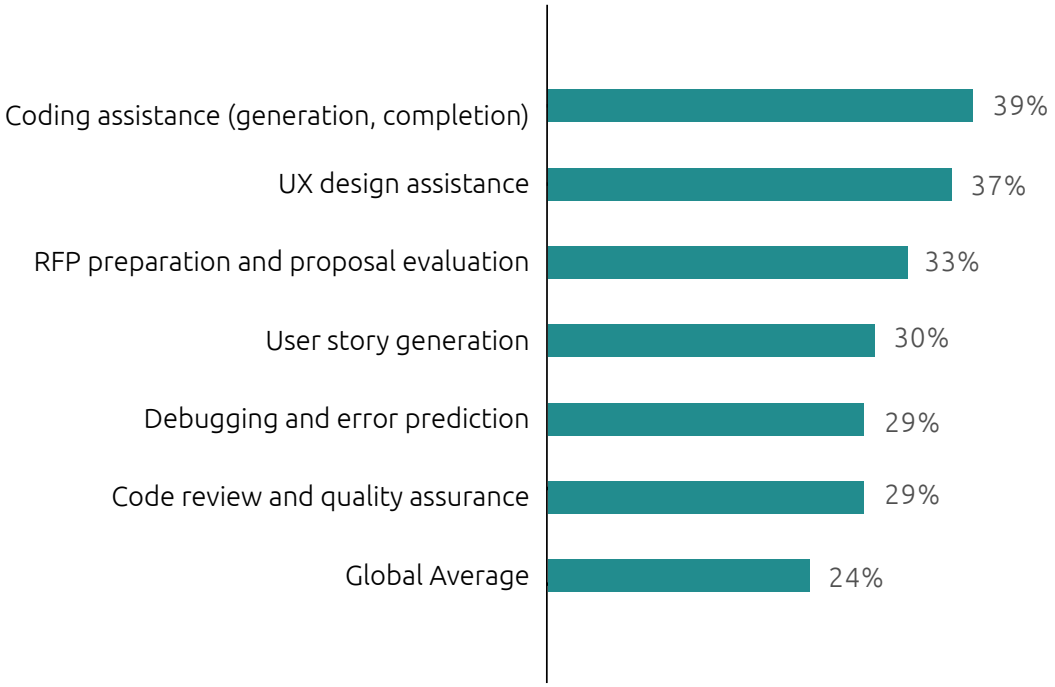
Source: Capgemini Research Institute, Generative AI in Software Engineering, Senior Executives Survey, April 2024, N=1, 098 Senior Executives

Note: Today's data is representative of the survey results, while 2025 and 2026 is estimated on senior executive's future deployment plans and the trends in unofficial usage.

* both officially and with unauthorized access

Most use cases are in early stages of adoption.

% of organizations focusing on the following use cases for implementation (pilot or scaled)



Source: Capgemini Research Institute, Generative AI in Software Engineering, Senior Executive Survey, April 2024, N = 1,098 senior executives; Software Professionals Survey, April 2024, N = 1,092 software professionals.

Note: Adoption and implementation refers to any scale - from trial/pilot, to a scaled implementation

Lack of foundational prerequisites and unofficial usage of generative AI pose significant risks

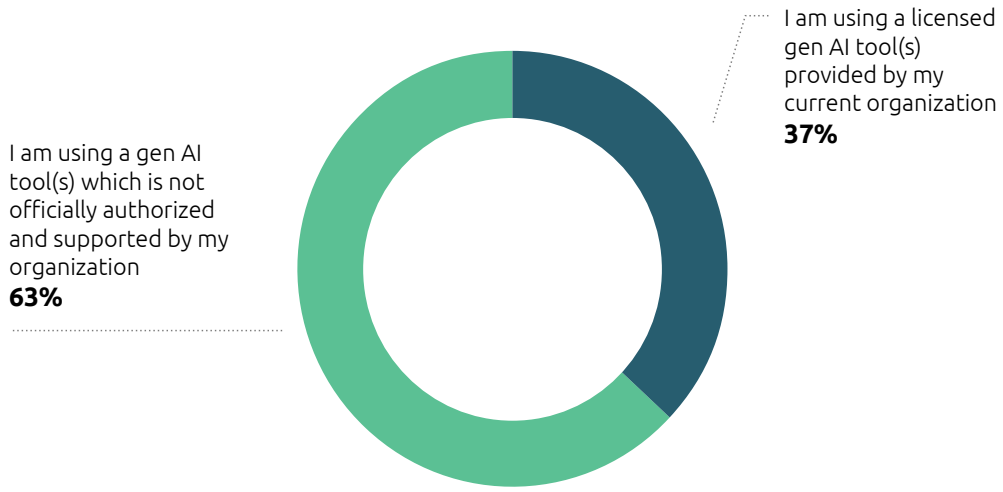
Organizations lack the governance framework and upskilling and reskilling programs for leveraging generative AI for software engineering.

organizations lack a **governance framework** for generative AI in software engineering

also lack an **upskilling/ reskilling program** for generative AI

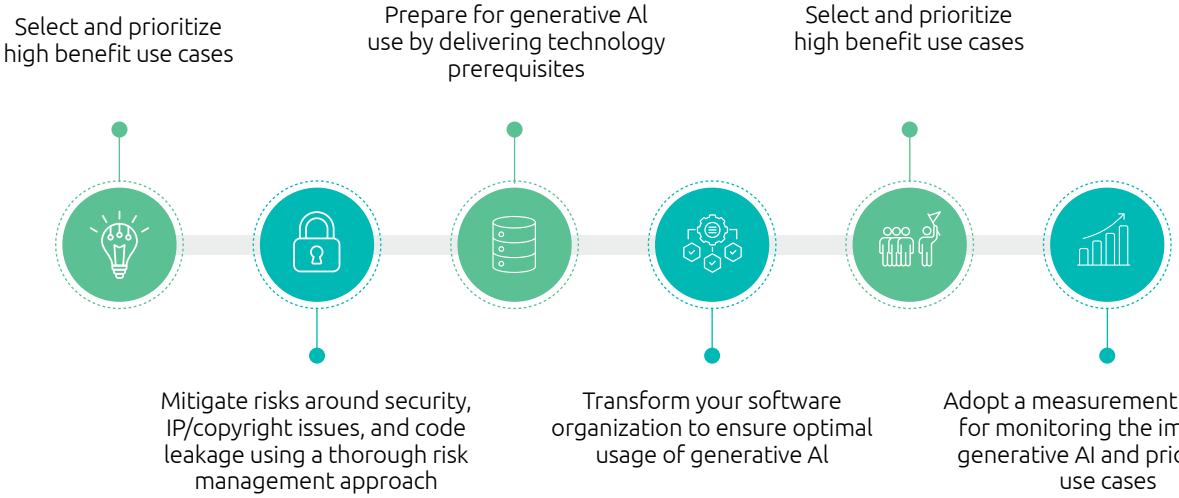
More than three in five software professionals using generative AI are doing so without organizational approval, exposing organizations to functional, security, and legal risks.

Distribution of generative AI tools being used by workforce, by the type of usage



Source: Capgemini Research Institute, Generative AI in Software Engineering, Senior Executive Survey, April 2024, N = 1,092 organizations represented by 1,092 software professionals.

How can organizations harness the full potential of generative AI for software engineering?



Source: Capgemini Research Institute.

We are grateful to all our guest contributors for sharing their experience and insights as well as to their teams and in particular Arthur Mensch (Mistral AI), Erik Bryjnolfsson (Stanford), Clara Shih (Salesforce AI), Audrey Plonk (OECD), Andrew Ng (LandingAI), Dragos Tudorache (former Member of European Parliament), Chema Alonso (Telefonica), Scott Belsky (Adobe), and Ricardo Guerra (Itau Unibanco) for their contributions to this edition of the journal.

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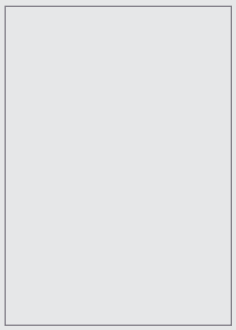
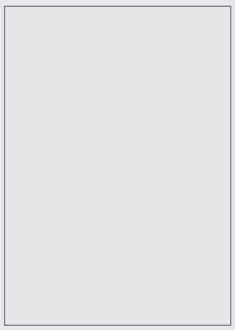
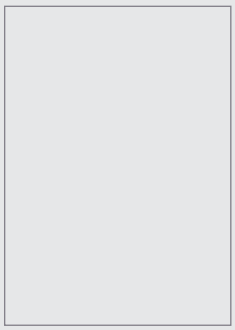
Discover more about our recent research



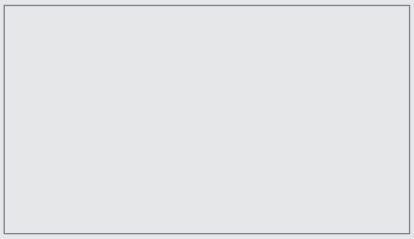
Conversations for Tomorrow: The dual transition to a digital and sustainable economy



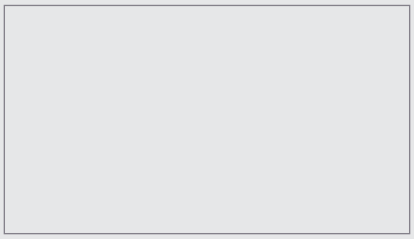
Conversations for Tomorrow: Sustainability and climate tech



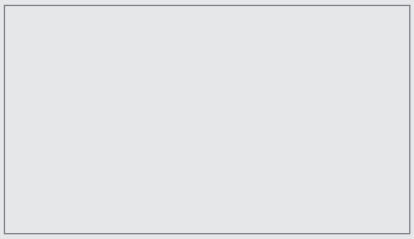
Conversations for Tomorrow: Breathe (in)novation – uncover innovations that matter



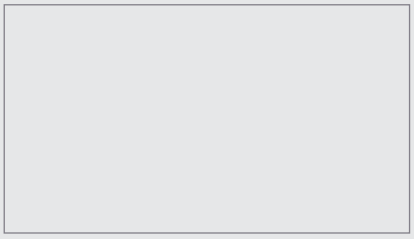
Generative AI in organizations 2024



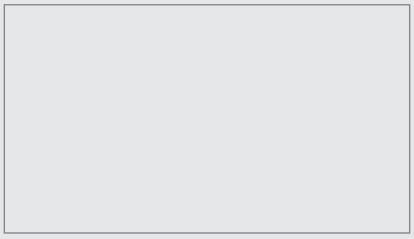
Gen AI in software engineering



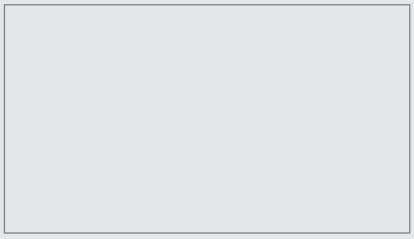
Gen AI for leadership



Data powered enterprises 2024



A world in balance 2024: Accelerating sustainability amidst geopolitical challenges



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