



Leading with heart intelligence in the age of artificial intelligence

An exploratory study
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**RESEARCH
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In late 2022, Heart Leadership University (HLU) began research exploring one of the three major challenges of the 21st century: the risks **of the uncontrolled development of artificial intelligence (AI)**.

In light of the publicity surrounding the ChatGPT phenomenon, some of the associated issues that were hitherto confined to expert circles have sparked public debate: generation and dissemination of fake news, impacts in terms of job quality and quantity, discrimination linked to built-in cognitive biases in the training data for algorithms, surveillance and security issues, etc.

HLU intends to play its part in raising awareness about the impact of artificial intelligence by documenting questions that are currently less to the fore: Who are the main beneficiaries and who are the losers in the mass deployment of artificial intelligence? What are the end goals of the implementation of this development? Does automated decision-making (ADM) on a massive scale via the use of algorithms restrict freedom of choice and/or the capacity of humans to make decisions that mobilize their sensitivity faculties and their heart intelligence (intuition, empathy, courage)?

This will involve in particular helping business leaders to become more discerning in their decision-making. The information and training aimed at this particular audience are indeed often designed to get business leaders to adopt artificial intelligence systems without necessarily questioning the relevance or suitability of these systems to the specific concerns of their own organizations.

This study was carried out between mid-March and the end of May 2024 based on bibliographical research, the analysis of academic literature, interviews with experts in a multidisciplinary approach, and focus groups composed of executives from companies of various sizes and in various sectors. It aims to clarify the question of recourse to AI from the perspective of the executive's decision-making.

It will be followed by a speculative phase of scenario creation in the **form of design fiction**.

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EDITORIAL


Company executives, in their capacity as decision-makers in highly competitive market contexts, are often the first to seize the new “technological opportunities”.

They possess, in practice, a large share of the “power to act”, in the conceiving of our collective future. Yet will this contribute to guaranteeing the well-being of everyone, long term, and to preserving our humanity—our common living space, our unique aptitudes, our kindness of soul?

Faced with the exponential boom in artificial intelligence technologies, it is no easy thing for executives to take a step back: to take the time to find out more, to sharpen their discernment, to have the courage to decide on the “right use” of artificial intelligence, to balance the short and the medium term, and, lastly, to weigh all the “risks of doing” (using AI) against the “risks of not doing” (the FOMO—fear of missing out—phenomenon).

The fact is that any technology is never neutral. This may be on account of its historic roots and the way in which it was developed, geopolitical considerations, dominant players marketing it, influential players promoting it, or else on account of its systemic impacts—human, ecological and political.

Heart Leadership University, an Association of General Interest under French Law, has therefore chosen to explore in depth the “judicious use” of artificial intelligence systems, so as to share with everyone a broader and documented perspective.

We have, in particular, as part of a partnership with the *Centre des Jeunes Dirigeants* (Young Executives’ Center), run focus groups with executives of companies of different sizes and in various sectors. The accounts of the company executives that we have collated reflect the complexity of the topic. They are signaled in the study by this symbol: .

Executives tend to vacillate between fascination for “magical AI” (dazzlingly fast and practical, and which is now “generative” to boot) and repulsion as a reaction to what may be deemed “tragic AI”.

They are able to cite some of its adverse consequences: loss of power; loss of skills; impoverishment of relations and loss of value in the medium term; paroxysmal inequalities and exclusions; disproportion between the amounts invested and the real benefits; vulnerabilities and palpable increase in the cyber risks.

The experts, for their part, point out that AI is not in fact artificial but extremely material, which raises major issues in terms of dependency on resources and extended executive responsibility, with a view toward the longer term.

The experts also recommend not succumbing to the “marketing hype”, or to cultural influences. They tell us that intuition in particular is decisive in a volatile, unpredictable world. “More data” and more modeling will not protect us from the major upheavals to come (ecological, economic, social), and intuition along with socio-perceptive and adaptive aptitudes will be decisive. Accelerating economic warfare using AI exacerbates the balance of forces and produces major collateral damage.

AI, of course, has certain valuable applications, and is now a part of our world. However, if it spreads without conscience and without ethics, it will provide us with neither the keys to resilience nor the keys to happiness.

The experts and the accounts of the executives urge us therefore to keep in mind that certain human attributes, such as intuition, empathy and courage, are precious, essential and non-substitutable.

They are essential for keeping companies viable, robust and livable.

They are essential, as they are what makes us “human”, with all-around “intelligence”: capable of deciding and managing with fairness, sensitivity, freedom, and with love for our fellows and for all living things.

The intelligence of the heart will make all the difference in the age of artificial intelligence.

Hélène Le Teno

President, Heart Leadership University

TAKING A STEP BACK: POINTS OF VIEW FROM YESTERDAY AND TODAY

The UK Prime Minister also asked Musk about people’s fear of losing their jobs to AI. Responding to this, Musk said, “We are seeing the most destructive force in history here. We will have something that is smarter than the smartest human.”

Interview with Elon Musk, November 2023

“It is in this uniquely human potential for growth, compassion, and love where I see hope. I firmly believe we must forge a new synergy between artificial intelligence and the human heart, and look for ways to use the forthcoming material abundance generated by artificial intelligence to foster love and compassion in our societies. If we can do these things, I believe there is a path toward a future of both economic prosperity and spiritual flourishing. Navigating that path will be tricky, but if we are able to unite behind this common goal, I believe humans will not just survive in the age of AI. We will thrive like never before.”

Kai-Fu Lee

Investor, CEO of Sinovation Ventures

AI Superpowers: China, Silicon Valley, and the New World Order, 2018

“They are perfect conformists of the implicit technological orthodoxy. They believe they are fighting for their freedom but, in reality, it is the freedom of the technology, about which they have no inkling of knowledge, that they are blindly serving as slaves to the worst of fates.”

Jacques Ellul

Philosopher – *Le système technicien*, 1977

“We can only see clearly with the heart. The essential is invisible to the eyes.”

Antoine de Saint-Exupéry

Le Petit Prince, 1943



INTRODUCTION

Heart Leadership University, an Association of General Interest under French Law with an educational and scientific mandate, is tasked with developing a movement of leaders who are driven by heart intelligence (intuition, empathy, courage) to preserve our humanity in the 21st century.

In late 2022, HLU launched a research program on the risks posed by the uncontrolled development of artificial intelligence, one of the three great challenges¹ of this century. This is the context of the present study, which relates more specifically to the impacts for business leaders.

Since 2010, the digital transformation of the economy and of society has continued to accelerate. The leveraging of massive datasets has skyrocketed with the scaling up of ever more complex algorithms and the exponential increase in computational power.

Artificial intelligence is now tested and deployed in all kinds of sectors and in all types of organizations: finance, health, employment, education, social networks, justice, the armed forces, police, etc.

ARTIFICIAL INTELLIGENCE OR ARTIFICIAL INTELLIGENCE SYSTEM (AIS)?

Artificial intelligence can be defined as: “any computing technology that can be used to resolve complex problems that may have been considered the preserve of human intelligence.”²

While this expression is massively used in the media and among the general public, the term “artificial intelligence systems”³, used in particular in legal parlance and by analogy with the usual term of “information systems”, makes it possible to eschew personification and clearly highlight the multiplicity of the technologies at play.

These are the systems that we use in practice every day and which are able to make forecasts, formulate recommendations, or provide aid in decision-making.

We will be using both expressions in this study.

The boom in “generative” AI, popularized by ChatGPT and capable of simulating human reasoning and creativity in ways previously unmatched, has accelerated the adoption of AIS in businesses, enabling all kinds of new usages and accelerated propagation of their effects on the economy, democracy, and society. Every day the news throws up a new batch of features, newly launched tests, or promising cases of use.

¹ The other two being ecological collapse and rampant inequalities.

² Cédric Villani, in the Abeona Foundation program: “[Objective AI](#)”. For the definition published in the *Official Journal* see the glossary in [Appendix 4](#).

³ For a definition of AI systems, see article 3 of the European regulation on AI (*AI Act*), the first attempt by a regulator to put in place guardrails for a fast-developing breakthrough technology.

The benefits provided by the deployment of these systems for the productivity and performance of companies are extensively highlighted and constitute the main drivers of their adoption by company executives.

Their negative effects⁴ are starting to be studied and discussed, without the systemic risks that are likely to derive from them necessarily being fully understood and evaluated.

HLU intends to contribute to these reflections by seeking to cast light on aspects that are today less prone to be discussed, on three levels:

- 1 On an individual scale, and particularly regarding the executive and leader, to what extent and in what way can AIS deprive humans of the possibility to make decisions with sensitivity (i.e., as a minimum, with intuition and empathy)? Will algorithms deprive us of the capacity to make decisions in a “human” way? Will statistics and calculation always win out in the final reckoning?
- 2 On the scale of the economic players, who are the dominant players (financiers, developers, etc.)? What is the degree of concentration of power and what are the possible counter-powers? What are the impacts of the development of an economy based on data in terms of capturing value, the balance of power between economic players, and the notion of sovereignty?
- 3 On the scale of the planet, living things, and humanity, can we assume that the technologies and systems deployed will have a “sustainable” or beneficial orientation for the common good? Or are we, on the contrary, in the process of accelerating the exploitation, privatization and plundering of resources and the growth of inequalities?

Without claiming to offer comprehensive answers to all these questions, this study focuses in particular on the role and responsibilities of leaders in the face of AI.

What kind of questions are they asking themselves and what stance are they taking on the deployment of AIS with regard to their own company issues but also to the wider-scale impacts? How do they perceive the effects of these systems on their capacity to act and make decisions while calling on their sensitivity faculties?

HLU considers these questions to be fundamental, but they appear to be rarely addressed and discussed today. Yet business leaders have a decisive role to play in the game being played out on the scale of both their organizations and of the planet as a whole, and it would be useful for them to understand the dynamics at work, in order to make enlightened choices.

This study aims to contribute to these reflections by suggesting keys for navigating around the deployment of AIS, the need for which does not always seem to be adequately scrutinized.

⁴ For example, on work and jobs, inequalities, the manipulation of information, or democracy

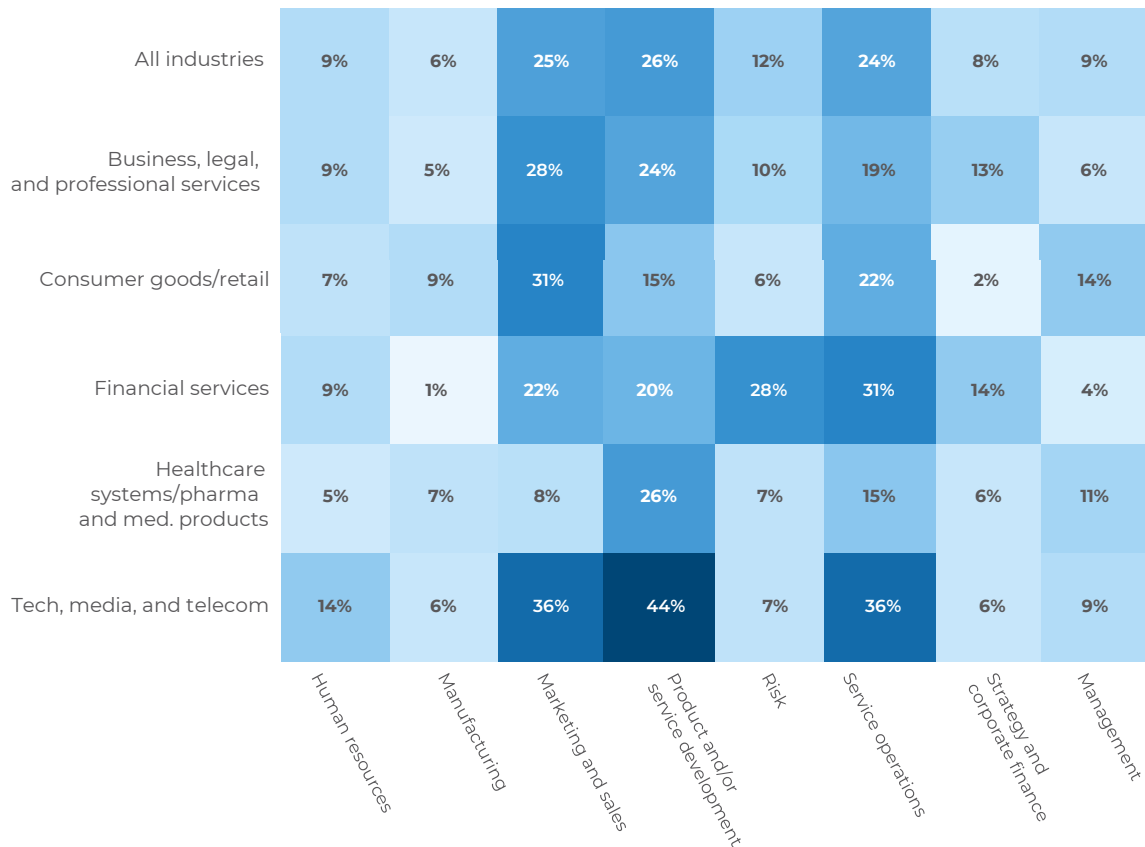


1 The many current uses of AI in business today derive from 70 years of science and technology

A ARTIFICIAL INTELLIGENCE IS NOW INTEGRATED IN ALL ENTERPRISE FUNCTIONS

No enterprise function is today exempt from artificial intelligence, which has progressively been incorporated into concrete usage in every domain, from logistics to marketing, from operations to corporate social responsibility (CSR).

RATE OF ADOPTION OF AI PER SECTOR AND PER BUSINESS DOMAIN



Source: Mckinsey & Company Survey 2023, [Stanford AI Index Report 2024](#) (p. 261)

Examples of this include chatbots and virtual sales assistants, targeted advertising, recommendation or prioritization algorithms for service provision or conducting inspections, fraud detection and client scoring, supply chain modeling, stock-keeping or predictive maintenance, all the way to industrial robotics and self-driving vehicles, with AI technologies being integrated in more and more extensive mechanical and software assemblies.

EXAMPLE CASES OF USE OF AI IN BUSINESS IN DIFFERENT DOMAINS

From operational processes to the most strategic decisions, AI has forced its way into every functional business domain. Accelerated by the arrival of generative AI on the market, the usages have spread into every stratum of business, both horizontally and vertically. Some illustrations are proposed below, deliberately chosen to spotlight lesser-known suppliers. This underscores just how, behind the giants of AI, a multitude of players of different sizes—but often small—are appropriating for themselves the technological “building blocks” of AI to propose all kinds of products meeting niche requirements (or at least targeting precise tasks) for all business functions.

- At the level of executive management, IBM Watson promises to help companies make strategic decisions based on the efficient analysis of data.
- For the HR function, AI solutions promise to accelerate and optimize the hiring process by improving selection of applicants by means of an in-depth analysis of their resumes (Eightfold AI solution), and tools for analyzing the satisfaction and well-being of employees such as Culture Amp or Cornerstone AI propose predictive management of talents through smart anticipation of training needs and career developments.
- In the field of marketing and communication, products are springing up for smart content generation or for automated personalization of targeted marketing messages (e.g. Persado).

Indissociable from the digital revolution and the “digitalization” that has been underway for several decades, the deployment of AI in businesses has followed a twin orientation. It is both bound up in the strategic and operational transformation dynamics and is managed as such (by large corporations in particular) but has also made its way in a more diffuse and insidious fashion into usages at every level of a company, with the rise of ChatGPT and generative AI in late 2022.

A hot topic both for the executive committees of large corporations and for the management boards of many SMEs and mid-caps, the issue of using AI and of how it is deployed is of concern to all executives, in many regards, including when this is done without due reflection or when the practice of AI use and implementation has caught them short. How can executives react once they have discovered that not only is AI being used by employees within the organization, but that no prior reflection has gone into the issues of its use for the company, its operational model, the associated risks, or indeed the executive’s own liability in the face of an unanticipated or unmanaged risk? How do executives address the question, after the fact, of whether such usage is of genuine utility and generates measurable positive value for their employees and their customers, but also whether its deployment is aligned with the corporate purpose and/or mission of the company?

To put into perspective these effects of speedy adoption, and sometimes even of excess, and to understand their origin, the next chapter gives a succinct overview of the scientific trajectory of AI and its basic concepts, through to its concrete application in professional or public use.



B FROM THE SCIENCE TO THE TECHNOLOGIES: A HISTORY PEPPERED WITH SPECTACULAR PROGRESS AND SETBACKS, UNTIL GENERATIVE AI MARKS A TURNING POINT

0 ARTIFICIAL INTELLIGENCE IS INITIALLY A SCIENTIFIC DISCIPLINE

This discipline began to take shape in the mid-20th century, with the term “artificial intelligence” being coined for the first time at the **Dartmouth workshop**.

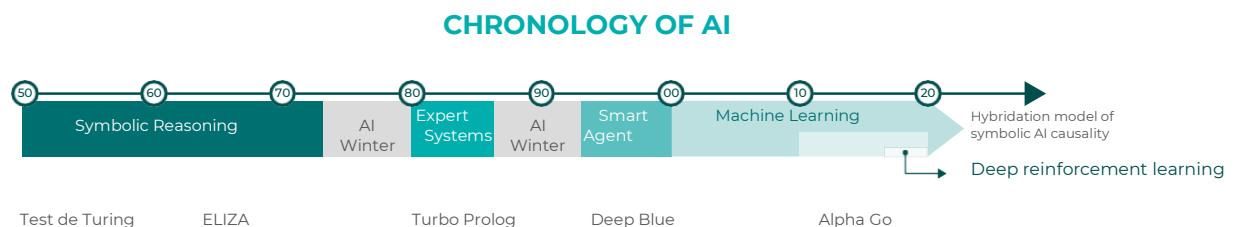
It designated a new field of research at the crossroads of mathematics, computing, and cognitive sciences, aimed at using computers and machines to imitate the problem-resolving and decision-making capabilities of the human mind. According to the initial premise of the Dartmouth scientists, every aspect of human intelligence could therefore be **simulated**⁵.

Since then, the use of this expression has become widespread, both in the realms of the imaginary—in particular in science-fiction—where AI is extrapolated to embody the machine capable of replacing (or indeed threatening) human beings, and in the field of technology, where AI designates all methods, services and applications deriving from this new scientific discipline.

0 HYPE HAS BEEN A BIG PART OF THE HISTORY OF AI

The fascination with artificial intelligence is nothing new, and its history has been marked by the alternation of phases of enthusiasm sparked by significant scientific breakthroughs with long “AI winters”, marked by technological setbacks, disillusionment, and the disinterest of investors (see details of the chronology in [Appendix 3](#)). These winters were triggered in particular by the lack of sufficiently concrete applications of AI (particularly in robotics and language processing), resulting in a decline in both public and private funding of research.

The start of the 21st century saw a resurgence in interest for AI, and which has never faded since. The emergence of a particular type of automatic learning, **deep learning**⁶, made possible by increased storage and computational capacities and access to big data, has enabled significant progress to be made. This progress has led in turn to the injection of considerable investments, both public and private, in particular on the part of the digital giants (notably Google, Facebook and Microsoft).



[Guide intelligence artificielle et collectivités](#), Banque des territoires, 2019 (p.7)

⁵ "The study is to proceed on the basis of the conjecture that every aspect of learning or any other feature of intelligence can in principle be so precisely described that a machine can be made to simulate it", John McCarthy, Marvin L. Minsky, Nathaniel Rochester, Claude E. Shannon - "A Proposal for the Dartmouth Summer Research Project on Artificial Intelligence", August 31, 1955, *AI Magazine*, vol. 27, No. 4, 2006.

⁶ Deep learning is based on a “neural networks” technical architecture, inspired by the human brain.

0 THE RISE IN DEEP LEARNING

Artificial intelligence covers a variety of analysis and learning techniques, defined in the glossary in [Appendix 4](#), which translate into algorithms programmed in computer code and integrated into software and services.

AI was first developed in the form of deductive rules of the “IF-THEN” type. This “symbolic” approach, based on reasoning and instructions, was largely predominant until the 1990s.

Although this symbolic approach was not abandoned, a statistical approach to AI gained ground from the 1990s, with automatic learning, also called machine learning.

This technique is based on a new computing architecture called a “**model**”⁷ and organized in the form of “neural networks” (inspired by how the human brain works). It allows an IT program to carry out a task for which it is not explicitly programmed.

Unlike for the symbolic approach, the human input does not involve determining a set of “IF-THEN” rules; it involves ensuring that the models “learn” to identify statistical relations between data. There is therefore no explicit instruction from a human: these “models” are trained to recognize links based on a set of initially provided data, designated training data. The machine then applies these links to new data for conducting a task.

0 IN 2022, “GENERATIVE” AI RADICALLY CHANGES THE GAME

In November 2022, the US company OpenAI launched its ChatGPT product on the market. Made directly available to the general public, the service enjoyed enormous and unprecedented success: in just 5 days, ChatGPT had acquired one million users, compared to Twitter which had taken 2 years and Spotify 5 months to do so.

CHATGPT ADOPTION TRAJECTORY

- **Nov. 2022:** 5 days to acquire 1 million users
- **Jan. 2023:** 2 months to acquire 100 million active monthly users
- **Nov. 2023:** 100 million users per week, more than 1 billion people have tried it out. Since the launch of the programming interfaces (APIs), 92 million developers have taken it up, including 92% of the Fortune 500 companies.

⁷ See definition in [Appendix 4](#)



This success has thrown the spotlight on a new category of AI, known as “generative” AI, as it is capable of producing content (texts, images⁸, video, sound or computer code) in an unprecedented and high-performance way, based on an instruction formulated in everyday language (a “prompt”).

This progress has been made possible by the invention of new deep learning models called “foundation models”. They are based on a neural networks architecture that is far more powerful than before, enabling them to learn using gigantic databases and produce as output consistent and contextualized content.

In the conversational domain in particular, the models producing text are called “large language models” or “LLM”. Their power offers far better correlation between words and the production of results that simulate human thought and reasoning in a hitherto unprecedented way.

These models are called “foundation” on account of their capacity for subsequent reuse and adaptation by different actors for cases of use in a precise domain. They are continuously being improved and released in the form of “versions”, which are frequently announced in a blaze of publicity: for example, the ChatGPT service was based in November 2022 on model GPT-3; GPT-4 came out in March 2023; and the next version is said to be imminent.

Generative AI thus constitutes a game-changer in several respects:

- Through its ease of adoption and the democratization of uses across various modes of interaction (text, sound, image, video).
- Accessibility and ease of use thanks to simple interfaces via which humans can easily control the generation of content, giving an impression of a conversation with the machine.
- Relevance and realism of the results, even for complex tasks: the content is plausible, and presents characteristics of humanity (clarity of language, logical sequencing of words, consistency of the images, presence of intonation in audio output, etc.).
- Fluidity and rapidity of creation: a few seconds are all it takes for the most advanced models to generate content that would have taken a human hours, days, or months to produce (video creation, for example).

⁸ Popularized by services such as Midjourney or Dall-E



"It's true that algorithms have been around for a long time. What changes with generative AI is that, now, we can interact using our own words and not computer code, and so this opens up a whole world of possibilities to everyone: through simply chatting you can access knowledge and skills which were previously reserved for an elite that understood the algorithms. For me, what's at stake is the democratization of a tool that is now accessible to everyone."

Executive of a small business (Consulting & training)

- Through the speed with which the announcements and innovations have succeeded one another, the speed of integration in business lines, and the rise to prominence of new actors

Generative AI has seen the emergence of new players: as well as the advent of the creators of foundation models (such as Open AI and the French player, Mistral), AI startups or startups promoting AI-based services have mushroomed, and a multitude of experts have appeared, selling (via the social networks) advice and training to boost your professional activity by means of generative AI.

The sustained rhythm of the announcement of new functionalities and usages, along with the prospects of performance and profits promised by the market, feed into a new wave of hype and fuel the desire of many players to be part of all this.



"What impresses me most is that, often, when it comes to technology, you tell yourself: 'In three years, I'll be able to do that.' With AI, it's right now!"

Executive of a small business (Industrial services)

"It's the extension and speed of penetration in all service business lines that is the true pivot,"

Executive of an SME (Assets management consultancy)

With the success of ChatGPT, the general public has suddenly been able to appreciate the extent of the impacts of AI on a vast series of processes, activities, and businesses. At the same time, and driven by market pressures, businesses have started to pose questions about the integration of these technologies into their operations and business models, and about their potential impacts.

What is the market context in which these developments are playing out, with what concentration of powers and what kind of international dynamics? Is the rise of new players likely to disrupt the established order in the digital sector, or is it contributing to the consolidation of the dominant positions?

These insights, the subject of the next chapter, are useful for executives called upon to make strategic or operational choices, and who are keen to remain masters of the destiny of their companies.



2 Welcome to the world of the “AI Superpowers”



“To get their own slice of the cake, startups need to be aggressive, as the AI economy is under the growing domination of what are known as the “Seven Giants of artificial intelligence: Google, Facebook, Amazon, Microsoft, Baidu, Alibaba and Tencent. These behemoths, which are almost equally distributed on both sides of the Pacific, are forever vying to consolidate their hegemony. They pounce on all the available talent by plowing in billions of dollars and mountains of data. They are also working to build AI ‘power grids’—IT networks under private control that distribute automatic learning throughout the economy—thereby acting as ‘resource providers’.”

Kai-Fu Lee⁹, *AI Superpowers: China, Silicon Valley, and the New World Order*, 2018

Who are the main players benefiting from the artificial intelligence boom? This chapter aims to describe the structure of the market for AI in 2024, marked by a high concentration of power, along with the probable economic and systemic effects of its rapid development.

A THE MARKET IS IN THE HANDS OF A HANDFUL OF DOMINANT PLAYERS

A key component of the digital revolution, artificial intelligence has accentuated and accelerated the dynamics already in place.

Its rise has been made possible by the infrastructures and deployments that have been around for decades: underwater cables, datacenters, supercomputers, information systems, software, algorithms, and digital services—already in the hands of the tech giants involved in the production and capture of billions of items of data, the essential raw material of AI training.

Through its colossal needs for investment, computational power, and data capable of feeding the algorithms, artificial intelligence thus tends to reinforce the global movement of the concentration of power in the hands of the tech titans: aka the **GAFAM**¹⁰ or **Big Tech**. Controlling AI and its integration with the other hardware infrastructures, software and services operated by these players therefore constitutes a further step in consolidating their strategic positions¹¹.

⁹ Kai-Fu Lee worked successively for Apple, CGI, Microsoft and Google. In 2009 he created Sinovation Ventures, a capital risk fund investing in AI. [See other quotes from his book.](#)

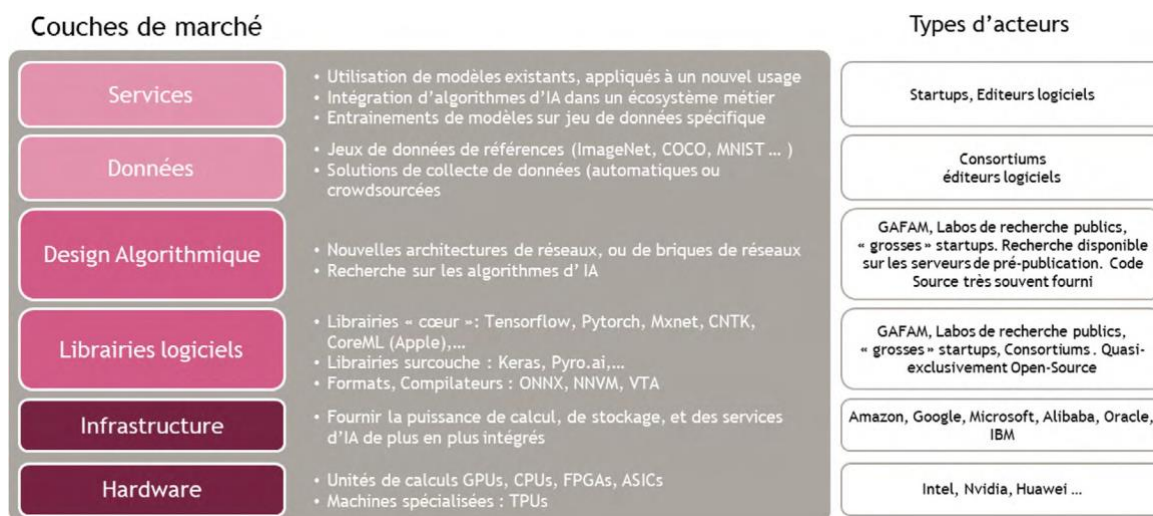
¹⁰ Acronym designating the tech giants: Google (Alphabet), Apple, Facebook (Meta), Amazon and Microsoft. The expression “Big Tech” is commonly employed to describe them.

¹¹ While Google, Facebook and Microsoft (via OpenAI) have the strongest presence for generative AI (via their research labs and the provision of associated models and services), Amazon participates in it indirectly via its cloud activity (AWS). Apple is currently less directly involved.

The description of the production and operation chain of AI makes it easier to understand the structure of the market and the positions of the various players participating in it.

Until the arrival of generative AI in 2022, the structure of the AI market could broadly be described as illustrated below, in which the place of Big Tech can already be noted.

STRUCTURE OF THE AI MARKET (DIAGRAM FROM 2019)



[Guide intelligence artificielle et collectivités](#), Banque des territoires, 2019 (p.8)

Since 2022, generative AI has partially changed the field of play by placing the creators of foundation models at the heart of a new value chain.

Certain independent newcomers have emerged (Mistral in France, Aleph Alpha in Germany) and have succeeded in mere months to rival the historic players¹².

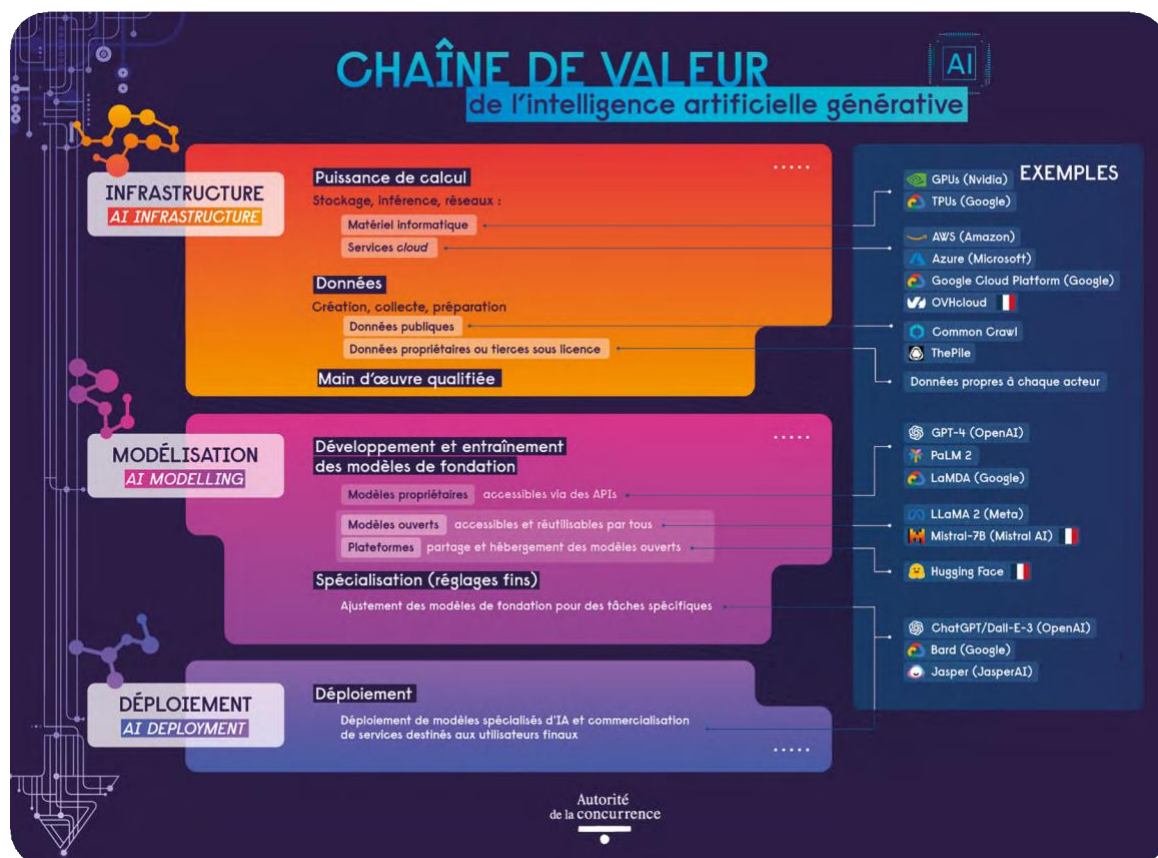
Yet the large proportion of these models remain in the hands of the Big Tech firms, which are moreover already present on adjacent markets such as the provision of cloud services¹³, to such a point that the competition authorities of certain countries¹⁴ have taken up the matter.

¹² In terms of performance of the models

¹³ The cloud refers to the use of the memory and the computational capacities of computers and servers spread around the world and linked by a network. See complete definition in [Appendix 4](#)

¹⁴ See for example [Generative artificial intelligence: the Autorité starts inquiries ex officio and launches a public consultation open until Friday, 22 March, Autorité de la Concurrence, France \(February 2024\)](#); [Foundation models: update paper](#), Competition and Markets Authority, UK, (April 2024)

AFTER 2022: THE GENERATIVE AI VALUE CHAIN



[Autorité de la concurrence](#) (February 2024)

The development of AI requires ever increasing financial resources. According to the estimates of the annual report [AI Index 2024](#) from the University of Stanford dedicated to this sector, the costs of training AI models have reached unprecedented levels since 2023 and continue to grow. By way of example, the training of GPT-4 (from OpenAI) is said to have cost \$78 million in computation, while Gemini (from Google) is said to have cost \$191 million to compute. Access to capital is therefore decisive for the structuring of the market, which again consolidates the predominance of Big Tech.

Taking a business model broadly based on advertising and [the attention economy](#) (therefore on capturing data), the challenge for these players is also to associate more closely AI services with their existing suites of solutions. Recent generative AI services are for example increasingly embedded directly in software products, starting with office suites (for drafting emails, the minutes of meetings, etc.).

This situation raises the question in particular, for SMEs and mid-caps, of how to choose or maintain profitable outlets or market segments in an environment dominated by these platforms.

Upstream, the manufacturing of chips and processors, essential for supplying the computational power required for training AI, has become a particularly critical link in the value chain, on which Big Tech is also jockeying for position.

CHIPS AND PROCESSORS AT THE HEART OF AI

Computer chips (also called integrated circuits or semiconductors) are at the heart of artificial intelligence, since they provide the computing power and the memory functions required for making it work. They are composed of a small silicon wafer on which electronic circuits are engraved then programmed to carry out certain tasks.

Different types of chips exist:

- Some have very specific usages (the tech giants have invested in the design of specific chips for their products and services).
- Others have general uses, such as CPUs and GPUs (the latter, deriving from the video gaming world, being more efficient for training generative AI).

The particular case of the Nvidia company is quite enlightening. It illustrates both the possibility for emerging players to obtain a dominant position in a market segment and the power of the Big Tech global market.

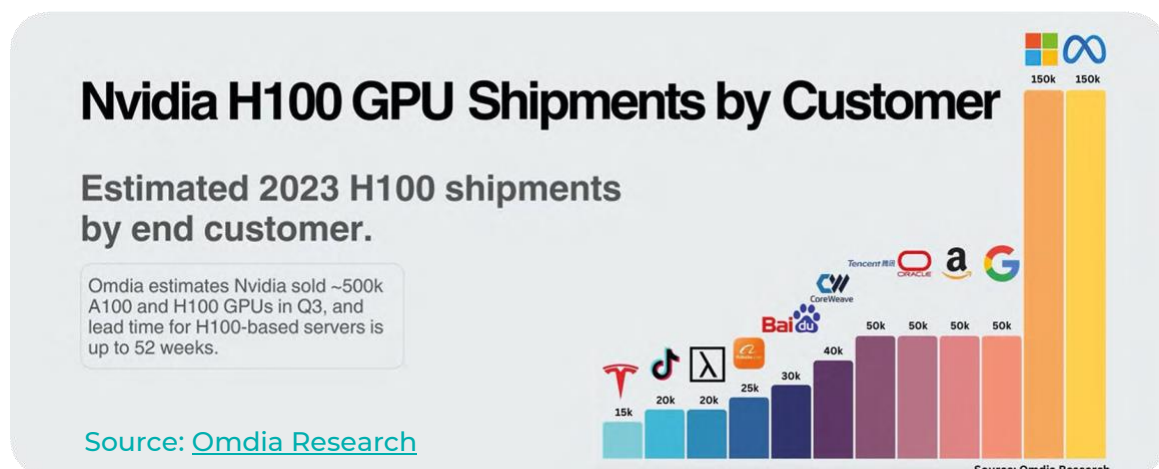
Initially ensconced in the world of video games, Nvidia has specialized in the design of the GPU chips needed to produce the processors and graphics cards used for deep learning, and therefore for generative AI. The value of its shares has increased by 17,000% in a single decade (exceeding even the capitalization of Amazon and Google in February 2024).

Today it enjoys a practical monopoly, with 84% of the total market for GPUs, and 92% of the market for GPUs designed for generative AI¹⁵.

The Big Tech firms in particular are currently highly dependent on this one player, from which they preempt a very large proportion of the production capacity (out of the 500,000 A100 and H100 GPU chips sold in the third quarter of 2023, Microsoft and Meta bought up 300,000 of them). They are reacting furthermore in developing their own microchip production capacity.

MAIN CLIENTS FOR A100 AND H100 CHIPS FROM NVIDIA

(flagship product among GPUs for AI in 2023)



¹⁵ [AI/IB shipments climb in Q2 2023, with unit sales increasing from quarter to quarter](#), Jon Peddie Research, September 2023 and [The leading generative AI companies](#), IOT Analytics, December 2023.



Besides the fact that a small number of players are capturing the value, this context of high concentration right across the value chain brings to bear constraints of commercial, strategic, and financial dependence on the client companies. There also arises the question of the long-term viability of generative AI, which for now is still heavily subsidized by investors.

A significant rise in the price of licenses for using data analysis or generative AI solutions was observed for example last year, burdening the large corporations that use them on a large scale¹⁶.



"There is an economic dimension: the AI providers have already increased the price of their licenses. This costs a fortune and so it can't be massively deployed, not at any rate with the current technologies."

Executive of a large corporation
(Consulting)

The financial question is quite a different matter however for more occasional usages of generative AI or productivity tools, as occur in particular in SMEs and small businesses, insofar as these solutions are today in part accessible for free (ChatGPT exists as a free version or a pay version for \$20 a month).



"[ChatGPT or services of the Gamma.app type (used for creating presentations)] cost €12 or €20 a month, which is practically free. Previously, access to the technology was very expensive, it was a different matter. Today, it costs nothing at the level of the company. It's cheaper than the Microsoft suite."

Executive of an SME (Waste disposal and management)

B GEOPOLITICS OF AI: THE CONSOLIDATION OF EMPIRES?

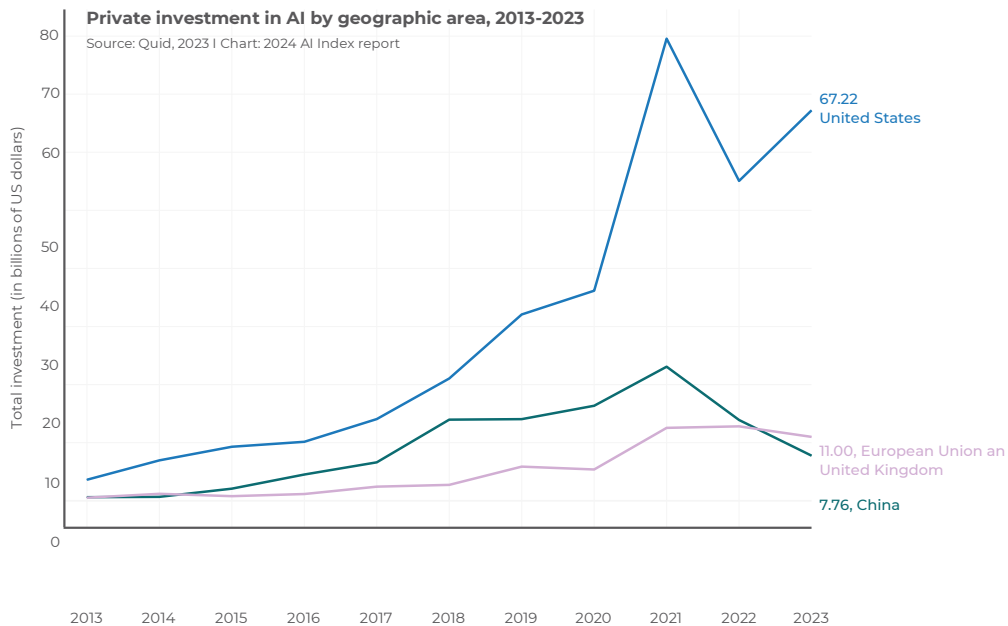
The artificial intelligence front is nothing new in geopolitics, but the new players in generative AI who have burst onto the scene are partially reshuffling the cards of worldwide competition, in which Europe is trying to secure its place at the table. This competition remains, however, largely structured around the United States / China duopoly. AI is becoming firmly established as a true tool of power, both in terms of "hard power" (military applications) and "soft power" (economic impact, political and cultural influence) and is participating in the crafting of new forms of empires¹⁷.

The United States are unsurprisingly well ahead of the field in this "arms race". In its [AI Index Report 2024](#) Stanford University estimates that the private US investments in AI amounted to more than \$335 billion in the period 2013-2023. The sector profits from the strike force of Big Tech: the technology companies capable of shouldering such costs are mainly American and they invest massively on their own territory.

¹⁶ The cost of integrating AI and the associated ROI remain, moreover, very complex to assess for both large corporations and SMEs / mid-caps. This applies all the more so insofar as this particular business case needs to be evaluated at its complete cost, including not only the technological investments and purchases, but also the cost of recruiting talent and the transformation and implementation of the changes to be made, while the gains specifically attributable to AI are also very complex to separate out.

¹⁷ [Géopolitique de l'intelligence artificielle : le retour des empires](#), Nicolas Miaillhe, - IFRI, 2018

For the year 2023 alone, \$67.2 billion were dedicated to the field of AI (including \$25 billion for generative AI), investments to which can be added the public funding mobilized in particular in academic research and training.

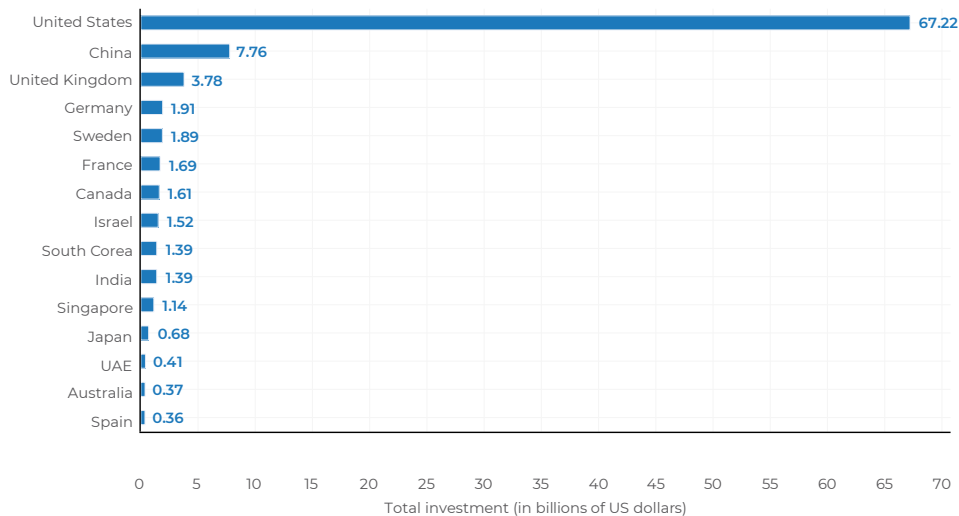


Source: [IA Index Report 2024](#) (p 249)

China—for which the invested amounts (as reported by Stanford, although the figures may not be thoroughly reliable) have amounted to \$103 billion over the past ten years—is the number one challenger.

Artificial intelligence in that country is the object of a veritable State strategy aimed at coordinating the action of the political, economic, social, and military forces of the country, with the goal of making significant headway in the field of AI¹⁸, and with the crucial support of the major Chinese platforms and equipment suppliers (BHATX - Baidu, Huawei, Alibaba, Tencent and Xiaomi).

PRIVATE INVESTMENTS IN AI PER GEOGRAPHIC ZONE (CUMULATIVE 2013-2023)



[IA Index Report 2024](#) (p 247)

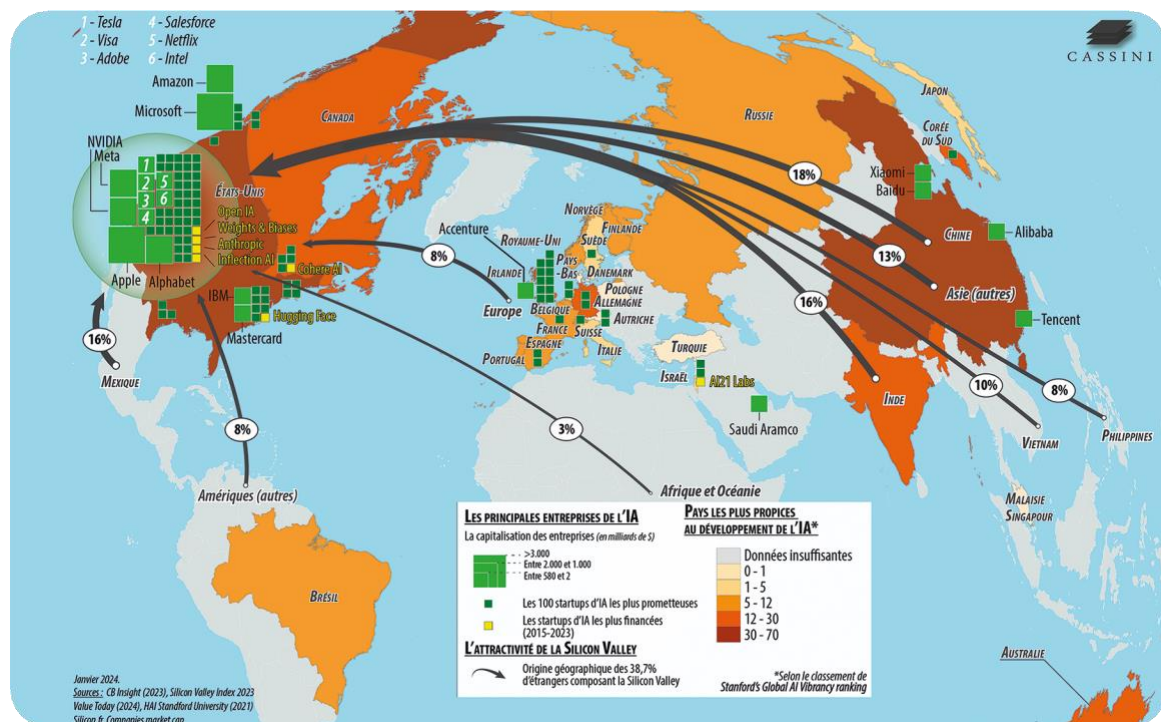
¹⁸ [L'intelligence artificielle, un enjeu stratégique pour la puissance chinoise](#), Xavier Seurre IRIS, 2020

In its 2023 report, the AI Now institute notes that the growing debate around the race for AI between the United States and China has switched from sporadic spurts of rhetoric to an increasingly institutionalized position, supported by the governments, in which the big players in AI appear as crucial instruments in this geopolitical struggle. This political discourse favorable to the Big Tech firms contributes to legitimizing and therefore to reinforcing their dominant position.

Data owners or operators, controllers of patents, of commercial applications, of hardware and software infrastructures, and often of the devices or networks on which AI systems are run, the Big Tech firms and their ecosystems dominate by a wide margin in attracting the critical talent for the development of AI.

The skills flow presented on the map below illustrates the uncontested appeal of Silicon Valley, composed 38% of foreign talent, and on which engineers and experts converge from every corner of the world.

GEOPOLITICS AND ARTIFICIAL INTELLIGENCE: WORLDWIDE COMPETITION



Cassini Groupe in CyberLeaders 2024 (InCyber)

The insights in this chapter make it possible to place in a broader perspective the current movements of the AI market and should help executives to make informed decisions in their choice of suppliers, whether in terms of technological solutions or online distribution partners, for example.

The next chapter aims to shed light on other decisive factors in the development of AI: its fundamental dependence on data, the capturing of which can give rise to particularly predatory behaviors, and on human or natural resources, the exploitation of which raises questions that the decision-makers may have to face.

3 Behind the scenes: AI is an “extractive industry”

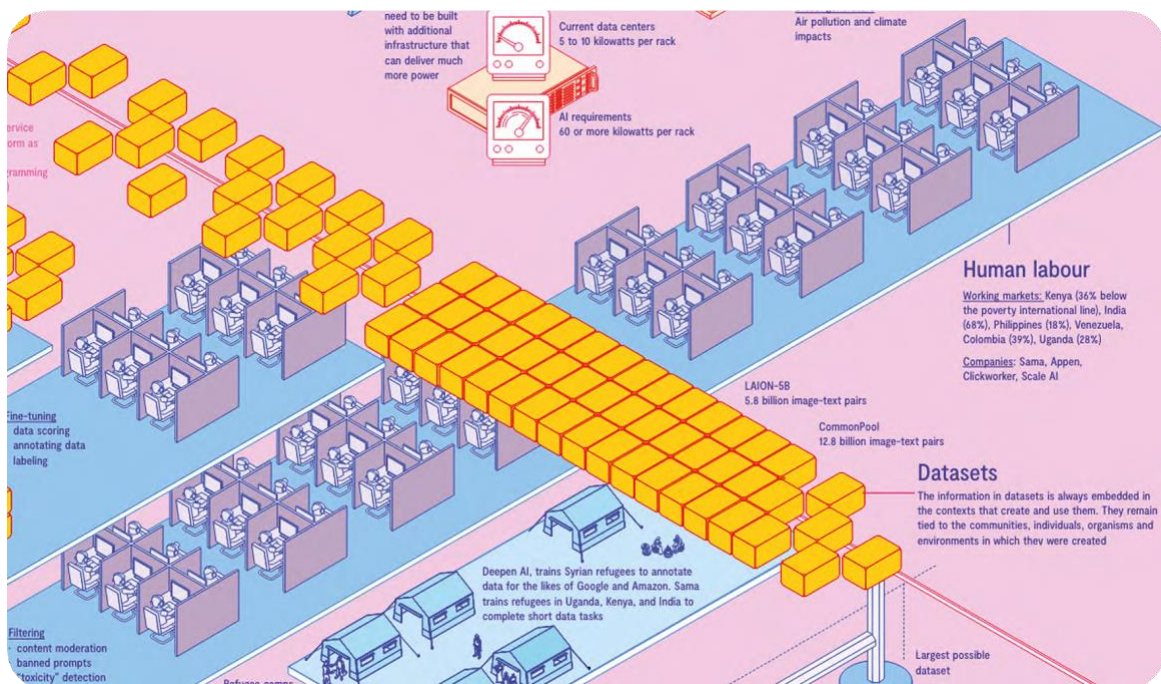


“AI is neither intelligent nor artificial. Rather, artificial intelligence is both embodied and material, made from natural resources, fuel, human labor, infrastructures, logistics, histories, and classifications.” **Kate Crawford**, *Atlas of AI*, 2021¹⁹

Beyond its economic dimension, the prospects for profitability, and the innovations that it enables, the hidden face of the AI production chain reveals a complex and generally little-known reality.

Often seen as abstract and immaterial, AI is in fact an industry that is a heavy consumer of natural, logistical and human resources. Addressing these facets makes it possible to cast light on some of its deleterious effects, provide a full picture of the cost of AI from a broader social and environmental perspective, and bring to light the power or dependency relations that its development is contributing to amplify.

EXTRACT OF THE MAPPING PRODUCED BY THE ESTAMPA COLLECTIVE²⁰ ON THE GENERATIVE AI PRODUCTION LINE



Estampa Collective – [See complete map and its description](#)

¹⁹ **Kate Crawford** is Senior Principal Researcher at Microsoft Research. She co-founded the AI Now institute in New York.

²⁰ **Estampa Collective:** collective of programmers, filmmakers and scientists in the fields of audiovisual media and digital environments.



A AI: AN OGRE THAT FEEDS OFF DATA



“There is no better data than more data.”

Kai-Fu Lee, [AI Superpowers: China, Silicon Valley, and the New World Order](#) (2018)

Data, the profusion of which goes hand in hand with the growing digitalization of society and the economy, is one of the main driving forces of AI: the large-scale collection of data is more than ever necessary for the performance of the algorithms and for the learning of the AI models.

The data used by companies in the AI applications come from diverse sources: they make extensive use of their own internal data²¹, but also data from web scraping and from the social networks, publicly accessible data, IoT sensors, etc.

This gives the Big Tech firms a major competitive edge, since they have in part built their model on the exploitation and monetization of these data.

The development of generative AI and foundation models in particular, requiring gigantic data bases for their training, has reinforced this dependency on data, and has accentuated the rarity effect, leading the companies from where these technologies originated to adopt particularly predatory behaviors. In this headlong race for data, everything that could be acquired or “mopped up” to build this technology has been envisaged²² (textual transcription of YouTube in its entirety, buying a publishing house). For example, GPT-3 from OpenAI was trained on 500 billion words collected on Wikipedia, on all web publications from 2014 to 2021 (“Common Crawl” dataset), on the Reddit.com forum, and on 135,000 books of the “Book 3” dataset.

This question of data raises many more or less visible issues: data collection may often infringe legislation on intellectual property, copyright²³, or personal data protection²⁴.

Furthermore, AI models—operating like black boxes whose precise mechanics are now complex or impossible to track—perpetuate and amplify fundamentally partial and discriminatory visions of the world: inequalities of representation and of cultural values, of language, of gender, etc., due in particular to the biases that are extensively present in the training data.

²¹ For example, their own knowledge bases or data deriving from interactions with customers or partners.

²² See the report of the *NY Times* (in litigation with OpenAI): [AI's original sin](#), April 2024

²³ As testified for example by the disputes between press publishers and creators of models.

²⁴ See the challenges raised by European data protection authorities on the non-compliance of ChatGPT with the GDPR in the *Report of the work undertaken by the ChatGPT Taskforce*, European data protection board, May 2024.

B SLAVES TO THE CLICK: AI RELIES IN PART ON MICRO-TASKING

Behind the moderation of social networks and the performance of certain artificial intelligence services there is a hidden mechanism at play, invisible to the users of these services: a world of micro-tasking, based on human intervention.

The specialist researcher Antonio Casilli defines microworkers—or crowdworkers—as “any person who annotates, filters, enriches or structures data for the creation of enormous databases”²⁵.

Initially developed in particular via the Amazon Mechanical Turk (MTurk) platform starting in 2005, and broadly used subsequently for the moderation of social networks, this practice is also used for the learning and improvement of models and for the filtering of toxic or non-compliant content of artificial intelligence services.

It consists in having humans carry out microtasks (sometimes in just a few seconds) that are essential for the creation and improvement of algorithms and models: annotation of data or images, audio transcription, evaluation of predictive results, filtering and moderation of content in the creation and alignment phases of models.

Not all the techniques or applications of AI require these steps, which can also be carried out by internal teams within companies. Furthermore, the latest developments in generative AI make it possible to have these tasks carried out in part by the AI itself, and certain projects attempt specifically to avoid such human intervention²⁶.

Yet this microtasking still remains indispensable in many cases, and Big Tech in particular still makes extensive use of it. Firms therefore call upon specialized companies (called crowdworking platforms, such as Sama, Appen, Clickworker, Scale AI, among the most well-known), which propose these tasks to the clickworkers registered on their platform. These workers often tend to come from low-wage economies (the likes of Kenya, Uganda, India, Lebanon, Colombia and Venezuela). Some of these companies even operate in refugee camps, training displaced people to carry out these microtasks²⁷. In France, startups such as [Isahit](#) hold out the promise of “responsible and inclusive” microworking, enabling women to be trained while carrying out these tasks.

The extent of microworking is far from marginal: worldwide, it is estimated that between 165 million people (University of Oxford) and 430 million people (World Bank) could be concerned by these activities. This number was estimated to be 160,000 in 2019²⁸ in France.

²⁵ [Les impacts sociaux du numérique et sur les travailleurs du clic](#), Interview (in French) with Antonio Casilli, Nov. 2023.

²⁶ The creators of the LAION-5B project, one of the most utilized training datasets consisting of 5.8 billion “image-text” pairs, wanted to avoid annotation and filtering by humans and used “statistical curation” and machine-learning to create this dataset – see report: [Models All The Way Down](#), Christo Buschek & Jer Thorp, March 2024.

²⁷ [Work Without the Worker: Labour in the Age of Platform Capitalism](#), Phil Jones, Verso, 2021.

²⁸ Antonio Casilli, 2023 op. cit



Besides the questions raised by the duress and precariousness of the working conditions, these people are potentially exposed to violent, toxic or extreme content, bringing with it consequences in terms of health issues and traumatic stress.

C MATERIALITY OF AI: CRITICAL DEPENDENCY DUE TO MASS EXTRACTION OF RESOURCES AND ENVIRONMENTAL IMPACTS

The collective imagination around the digital revolution is based in large part on the myth of the dematerialization of the economy that this transformation would facilitate, all the more insidious inasmuch as the materiality of digital activities is largely invisible for most users.

However, the digital revolution is well and truly material, and is based on a physical infrastructure, comprising:

- networks (underwater cables, copper and fiber networks, relay antennas, modems, etc.)
- datacenters
- terminals (smartphones, computers, screens, TV, etc.).

While it may be difficult to specifically isolate what the development of artificial intelligence systems, which draw it on this entire infrastructure, changes in this equation, we can identify that it is leading in particular to two additional developments: a growth in need in terms of compute power and data storage, with the consequences in terms of demands on energy and materials that go with this.

Left unchecked, and bearing in mind that the work on frugal AI²⁹ will take some time before bearing fruit, the trend is therefore toward an exponential growth in materiality.

The materiality of the digital industry, and in particular of AI, translates into a dual relation of dependency and predation with respect to the natural environment.

0 THE DIGITAL IS DEEPLY DEPENDENT ON NATURAL RESOURCES (METALS, ENERGY, WATER)

According to a Green IT study relating to the environmental footprint of the digital industry worldwide³⁰, in 2019, there were on the planet 34 billion IT devices (screens, smartphones, connected objects)³¹ and several hundred thousand datacenters hosting nearly 67 million servers, interconnected by millions of kilometers of cables, all of which need to be supplied with power.

²⁹ "Performance optimization makes it possible to reduce by 30-40% the energy impact of the large digital platforms, but these gains are canceled out by the acceleration of usages. To go further, we therefore need to rethink the model entirely, question the behaviors, and determine what usages are truly necessary." [Les défis d'une IA frugale](#), CNRS, November 2023.

³⁰ [Empreinte environnementale du numérique mondial](#), GreenIT.fr, 2019.

³¹ Not counting accessories such as chargers, keyboards, mice, USB sticks, etc.

Manufacturing all this equipment requires the extraction of many metals:

- metals used in large quantities for constructing networks and equipment (copper, aluminum and certain steels)
- metals used in small quantities³² but which are vital for the operation of the digital technologies.

One of the characteristics of the digital industry resides in this extremely significant diversity of the metals (and alloys) used. In one century, humanity has gone from “an economy based on the exploitation of less than a dozen metals to an economy necessitating 60 or so metals”³³.

Lastly, many of these metals constitute what can be termed critical resources for the digital industry on a worldwide scale, since they are associated with procurement vulnerabilities (in particular Chinese domination in terms of production), while their use is essential for high-performance digital technology in terms of the current technological standards and the least-cost prerogatives.³⁴

The extraction and refining of these metals, the production of the digital infrastructure and terminals, along with their operation, also generate large-scale consumption in terms of water and energy. According to the aforementioned Green IT study, the primary energy consumption of the digital industry amounted to 4.2% of worldwide consumption in 2019.

Although the freshwater needs—required for the downstream segment (extraction and refinement of metals) or for the cooling of datacenters—may seem less significant (0.2% of worldwide consumption according to the Green IT study), they are often concentrated in zones where they come into conflict with other usages³⁵.

Since 2019, these trends have continued to grow: the development of AI in particular involves increasing consumption of energy and water for the training phase (in particular on account of the massive need for compute power and for datacenters), but also and above all in the operating phase³⁶.

This dependence of the digital industry and of AI on critical resources, on water and on energy, needs to be considered, as it could constitute a physical limit to the exponential developments we have seen to date. This is, moreover, the gist of what Mark Zuckerberg had to say in a recent interview³⁷.

³² These are precious metals such as gold or platinum along with less well-known metals but with indispensable properties for the operation of devices, such as indium (for touchscreens), silicon, gallium, germanium (for semiconductors), tantalum (for the capacitors that have enabled the miniaturization of digital devices), and the rare-earth metals whose very low concentration requires the extraction of large volumes of material.

³³ [La consommation de métaux du numérique : un secteur loin d'être dématérialisé](#), France stratégie, 2020

³⁴ [the digital sector?](#) Carbone 4, 2023 and [L'Europe peut-elle être une puissance de l'IA Générative ?](#) France Digitale, 2024

³⁵ L'info Durable, [En Europe, une hostilité émergente contre les centres de données](#), September 14, 2022

³⁶ [Argent, eau, énergie, combien coûte ChatGPT ? Le vrai prix fou de la révolution IA](#), lebidata.fr, 2023

³⁷ [Energy, not compute, will be the #1 bottleneck to AI progress](#) - Mark Zuckerberg, 2024



0 THE DIGITAL REVOLUTION DEGRADES THE NATURAL ENVIRONMENT

The materiality of the digital sector is also manifested in its impact on the environment and on living beings. As we have seen, the digital industry and AI participate in the growing consumption of metals. However, mineral extraction is among the most harmful activities for the environment and for human health. As the Carbone 4 report explains: *“Opencast mining modifies the landscape, the soils, and the local water regime. The extraction of ores and the separation of elements generate chemical effluents (cyanide, arsenic, lead, sulfates, mercury, etc.). Aside from these harmful materials for biodiversity and human health, the production of the raw materials for the digital industry generates a gigantic quantity of inert waste, issuing from the grinding of rocks.”*³⁸ The mining industry is also socially problematic, with issues such as child labor, sites in conflict zones, hazardous working conditions, etc.³⁹

The end of life of digital industry products is a source of pollution, too. In 2022, Waste Electrical and Electronic Equipment (WEEE) reached the record high of 62 million tonnes (or almost 8 kg per person per year), of which scarcely 1/5 was officially collected and recycled⁴⁰. The rest is therefore either informally recycled⁴¹, or incinerated, or dumped in landfill, where it pollutes the soil and the groundwater, posing a health risk. The situation appears all the more inextricable insofar as a large proportion of digital components are quite simply **non-recyclable**⁴². This is linked in particular to the fact that the digital industry is characterized by the proliferation of metals and alloys used to manufacture a single product. For example, according to the Systex association, specialized in mineral extraction:

*“The complexity of the composition of smartphones and of the alloys that they contain makes the recycling of these devices impossible at end of life.”*⁴³

Lastly, the energy consumption of the digital sector clearly gives rise to rapidly growing greenhouse gas (GHG) emissions. According to various studies, these already represented 4% of global GHG emissions in 2019⁴⁴. Since then, the trend has shown no signs of slowing down⁴⁵ and artificial intelligence is also playing its part.

³⁸ [the digital sector?](#) Carbone 4, 2023; See also [Controverses minières - Volet 1 - Caractère prédateur et dangereux](#), Systex, 2021

³⁹ *Le Monde*, [En finir ou pas avec les supplices du Tantale](#), 2017 and Downey L, Bonds E, Clark K. [Natural Resource Extraction, Armed Violence, and Environmental Degradation](#). Organ Environ, 2010

⁴⁰ [Global E-waste monitor 2024](#), ITU (UN agency for information and communication technologies)

⁴¹ This is generally done by hand in countries without environmental standards and protection of the rights of workers who are exposed to hazardous substances (mercury, lead, cadmium, etc.).

⁴² Many metals are present in very small quantities and most often in the form of alloys. Furthermore, the recycling of certain metals causes them to lose all or part of their technological performance, which prevents the formation of a profitable market.

⁴³ [Animation en ligne | Des métaux dans mon smartphone ?](#) Systex, 2017

⁴⁴ In addition to the aforementioned GreenIT study, see [Impact environnemental du numérique : tendances à 5 ans et gouvernance de la 5G](#), The Shift Project, 2021.

⁴⁵ The lack of aggregated data on a worldwide level regarding the impacts of the digital sector both in terms of energy and in terms of GHG emissions is highly problematic, considering that this is one of the sectors for which these impacts are likely to grow significantly.

Microsoft's emissions have, for example, increased by nearly 30% since 2020 due to the “construction of new datacenters and the associated incorporated carbon in construction materials, along as well as in hardware components such as semiconductors, servers and racks”⁴⁶, corresponding to the equipment required by AI.

0 DIGITAL INDUSTRY AND AI COMPETING AGAINST OR FOR ECOLOGICAL TRANSITION?

The digital industry and AI can contribute to ecological transition⁴⁷. However, they can also appear as competitors rather than allies for this transition, whether in terms of the consumption of natural resources, the objectives of public policies, or the allocation of financial or human resources dedicated to these sectors.

For example, many of the metals used in digital devices are also required for the needs of the technologies of energy transition (renewable energies, electric vehicles, LEDs, batteries, etc.). The increase in consumption can therefore lead to fears of conflicts of use. With regard to energy (and the associated greenhouse gas emissions), the problem is similar: energy transition implies a lowering of consumption. The development of the digital industry and of AIS therefore implies that other sectors (transport, food, construction) need to reduce their consumption all the more.

In terms of public policy objectives and therefore regulations aimed at orientating economic activity, the digital revolution is often placed on the same footing as ecological transition. This is what can be concluded from reading the [Strategic priorities 2019-2024](#) of the European Commission, or the objectives put forward in the economic activity recovery plans following on from the COVID crisis.

This background and the imbalances inherent in the digital industry in general and in AI in particular tend to pass under the radar of those who choose to deploy these solutions.

They are factors however that need to be set against the promises of efficiency and optimization associated with artificial intelligence, so pregnant are they with consequences for living things, the climate, and society. They are therefore likely to jar with the sensitivity and empathy of the decision-makers, or the “caring conscience for others”, as formulated by the philosopher Julien de Sanctis (*see box insert*).

The next chapter explores the way in which corporate leaders—whether from large corporations or from SMES and small businesses—are today addressing the issues and usages of AI and critically considering its impacts.

⁴⁶ [L'intelligence artificielle met en péril les objectifs climatiques de Microsoft](#), Novethic, 2024 citing the [Environmental sustainability report](#) from Microsoft published on May 15, 2024

⁴⁷ See, for example, the French Government's road map: [Numérique et données pour la planification écologique](#), 2023. Many projects and cases of use have been deployed or are currently being tested in both public and private sectors: optimization of energy usage, water, waste, leak detection, management of the power grids to integrate intermittent renewable energies.



**ARTIFICIAL INTELLIGENCE:
MORAL ISSUE OF THE “CARING CONSCIENCE FOR OTHERS”**

“It is now commonplace to hear artificial intelligence and, more precisely, generative AI being talked about as truly revolutionary technical progress. (...)

Only with the passage of time can the anthropologically revolutionary character of AI be confirmed or refuted. One thing is however certain: the social organization from which the currently dominant artificial intelligence emanates, that which the artist and essayist James Bridle calls “corporate AI”, is absolutely in no way revolutionary, as long as it relies on an “extractive industry” which violently exploits natural resources and cheap labor.

*The sources of information on the reality of this system are multiple and increasing. **The conditions of production of AI therefore call into question our collective relationship with human and non-human otherness, and make of artificial intelligence a moral issue as much as a political, technical and economic one.***

*It is this moral issue that I would like to look at in detail. (...) What do we need to understand by “moral issue”? (...) There is a fairly indistinct line between ethics and morals, in that both refer to **the same fundamental disposition of subjectivity: the caring conscience for others.***

(...) If the AI industry is booming as it is today, it is in particular because we are collectively deficient moral agents and this deficiency is, I would stress, socially organized. (...)

Basically, AI as it exists today is merely the symptom of a social organization (itself relating to a relationship with the world) that precedes it and makes it possible. This organization is the basis of and is based on a crisis of moral sensitivity that impels us, at best, to consider the exploitation of others as inevitable and, at worst, as something that we need not care about. The moral issue with which artificial intelligence confronts us is therefore also a political issue attached to this question: how do we create the conditions for living together in a way that encourages moral experience to flourish?”

Extract from the article (in French) [Intelligence artificielle, un dispositif de « froideur bourgeoise »](#), published on [maisouvaleweb.fr](#) April 2024

4 Leaders in the face of AI: a contrasting picture



“Right now I feel both attracted and repelled by artificial intelligence. I tell myself that if I show no interest in it, it will show some interest in me.”

Executive of a small business
(HR consulting)

When it comes to the “leader” or “executive”, there is no “one size fits all”: there is a diversity of individuals and particularities. Their issues and concerns are clearly variable, depending on whether they are heading up large corporations or smaller structures, whether or not they have international exposure, or else according to the modes of governance of the structures that they lead.

Their attitudes toward AI are also diverse in terms of their stances: enthusiastic pioneers, those fascinated by AI or keen not to miss out on the opportunities, prudent and pragmatic connoisseurs, reluctant adopters who feel “obliged to get on the bandwagon”, those who prefer to adopt a wait-and-see attitude, not knowing what it’s about or what position to take.

While not claiming to have established a fine segmentation, or to have interviewed a representative panel of leaders⁴⁸, this study assembles and compares various perspectives (individual interviews, reports and surveys, points of view of experts, focus groups) in order to help clarify the way in which executives of companies of various sizes and sectors approach AI.

The work carried out in this framework showed a demonstrable attitude on the part of leaders as being relatively favorable to AI, globally perceived as a source of opportunities. The trajectories for realizing these opportunities and integrating them in practice in their businesses are not yet clear and many of those surveyed express the need to try out and test the tools available in order to better understand their possibilities and limits.

While the inevitability of adopting AI regularly crops up in the exchanges, the limits to be set and the areas of concern also emerge.

A GLOBALLY HIGH APPEAL AND TRUST LEVEL AMONG LEADERS, DRIVEN BY PROMISES OF PRODUCTIVITY AND INNOVATION

0 A GLOBALLY FAVORABLE ATTITUDE TO AI

According to a survey carried out in February 2024 of 100 leaders from large corporations worldwide by the management consulting firm AT Kearney and by the consulting and leadership advisory firm Egon Zehnder⁴⁹, **85% of the leaders of large companies see in AI an opportunity to be grasped rather than a risk**, and consider that it will allow them **to improve the capacities of their organizations and gain in competitiveness**.

⁴⁸ See methodology in [Appendix 2](#)

⁴⁹ [Leadership at the age of AI](#), Egon Zehnder and AT Kearney, 2024.



A barometer⁵⁰ conducted in 4 countries by OpinionWay and Wavestone in 2024 reports moreover on very high levels of trust in the technology (86%) on the part of the leaders of large corporations or mid-cap companies. More than a quarter of those asked consider AI to be the technology most likely to influence the activity of their companies.

This interest was also globally demonstrated among the participants in the focus groups led by HLU, who identify AI as an opportunity for enhancing their services or improving their operations.



"We're really in for a shock to humanity. I'm pretty sure of that. I believe that, in three years, if you haven't mastered AI, you'll be left behind.

I'm not fearful, on the contrary, I'm enormously excited at what we'll be able to do with it."

Executive of an SME (Industrial services)

0 **PRODUCTIVITY AND PERFORMANCE: THE MAIN DRIVERS OF DEPLOYMENT**

70% of the decision-makers of large corporations interviewed in 2024 by AT Kearney and Egon Zehnder consider that AI will generate major changes in the organization of their companies over the next five years. They consider that AI will give better access to the know-how of the company and its markets, in order to bolster their decision-making, improve risk management, and create innovative products and services.



"We see it clearly as an opportunity because we look at it pragmatically: if you have good tools, you do good work. Obviously, you need to do it well, to be able to handle these tools, but we are very positive about the integration of AI inasmuch as we are not going to be subjected to it, rather, we are going to choose it."

Executive of an SME (Financial services consultancy)

Whatever the case, the prospects for optimization and efficiency that generative AI has revived since 2022 are today among the main motivations for companies taking an interest in artificial intelligence.

Although their extent is still up for discussion⁵¹, the benefits that AI offer for growth, performance and productivity constitute the main argument today for its adoption. *"The potential gains in productivity and increased profits are such that AI represents a unique opportunity for newcomers, followers, challengers, to grab market share or even to take over leadership from those content to rest on their laurels. (...) AI is also a unique opportunity to create new revenues and to advance on the value chain."* These words are taken (translated) from the [Guide pratique de l'Intelligence artificielle dans l'entreprise](#) (French publication from 2024).

⁵⁰ [Baromètre de la confiance des dirigeants d'entreprise dans la tech](#) (January 2024), a survey of the trust of business leaders in technology conducted by OpinionWay for Viva Technology, in partnership with Wavestone, involving 1000 executives of companies with more than 50 employees in France, Germany, the United Kingdom, and the United States.

⁵¹ Economists from Goldman Sachs forecast a rise in productivity in the order of 1.5% per year in the United States over the next ten years. In France, according to the [AI Commission](#), "annual economic growth could double thanks to the automation of certain tasks. After ten years, the rise in GNP would be between €250 and €420 billion (NB: 2023 annual GNP = €2800 billion), in other words in the same order of magnitude as the current activity of industry as a whole." These estimations are contested by Daron Acemoglu, professor of economics at MIT. In the article [The Simple Macroeconomics of AI](#), published in April 2024, his assessment was that less than 5% of the tasks of US workers were impacted by AI. According to him, the rise in productivity generated by AI would be only 0.071% per year over the next ten years. These figures would moreover most likely be overestimated, due to negative effects such as the proliferation of cyber-attacks, fake news, and other manipulations induced by AI, which would be likely to increase costs.

C PRUDENCE AND / OR EXPERIMENTATION

0 THE DESIRE TO EXPERIMENT IN ORDER TO CLARIFY THE IMPLEMENTATION PRIORITIES...

According to the aforementioned AT Kearney and Egon Zehnder survey, one in two leaders feels obliged to take the subject in hand personally, with the need to come up with a strategy that is accompanied by investment in infrastructures, external partnerships, and the hiring of experts.

Large French companies find themselves at an experimental stage of implementation, testing different cases of use, whose effects they are waiting to measure before looking to consider more widespread deployment.

This need to try things out and to pit your wits against them in order to better understand them is also extensively cited among the leaders questioned in the focus groups.



“As soon as it came out, I tested it, I tried it out. I use AI as an assistant, broadly like someone who is always by my side and who sees things in a way that I don't.”

Executive of a small business (Consulting and training)

0 ...WHEREAS, IN THE LONGER TERM, AI RANKS FAIRLY HIGH UP AMONG THE GLOBAL RISKS ENVISAGED BY BUSINESS LEADERS

For around 20 years, the World Economic Forum has published the [Global Risk Report](#), which explores the global risks that could face humanity in the coming decade. It is based on a survey (the Global Risks Perception Survey) carried out every year with the network of academics, companies, governments, members of civil society, and opinion leaders of the WEF.

For the 2024 edition, almost 1500 people responded, half of whom were from the private sector. They were asked in particular to estimate on a scale of 1 to 7 the seriousness of the impacts of 34 global risks in 2 and 10 years' time. The results place the risks linked to AI technologies high in the rankings.

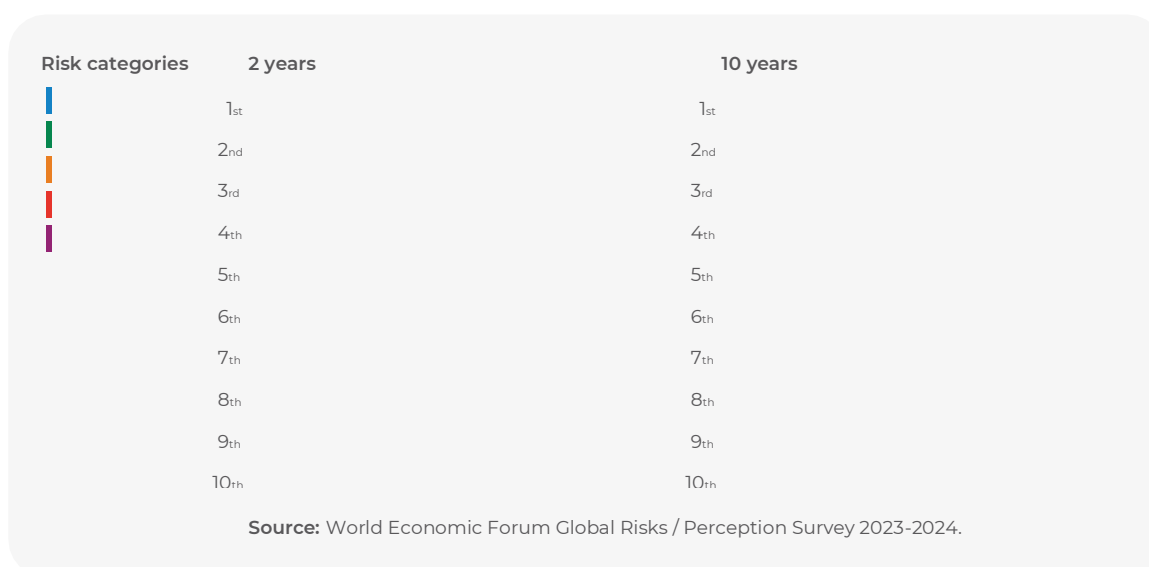
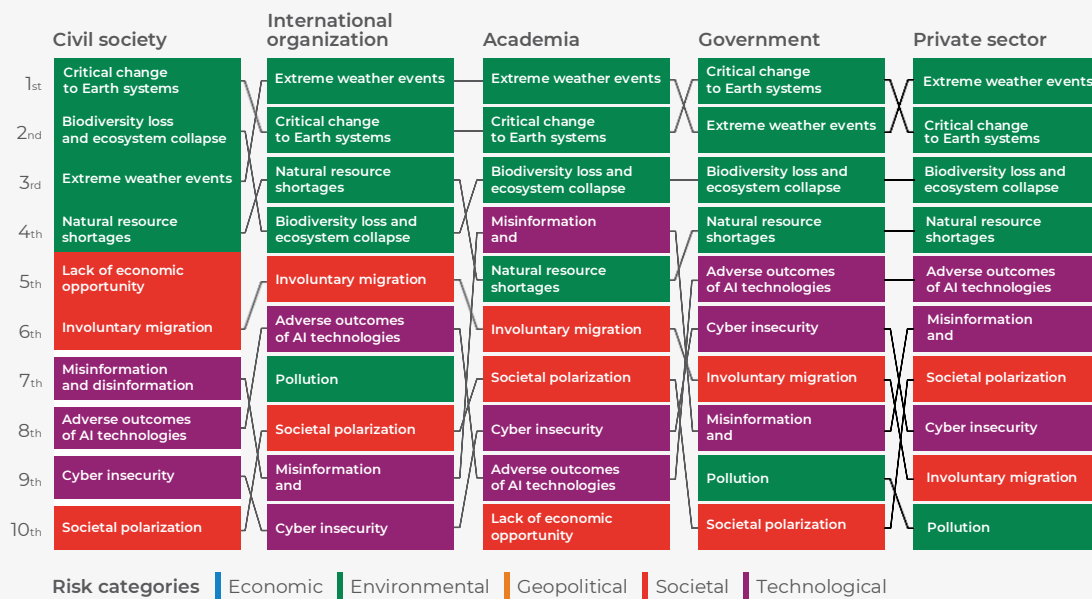


FIGURE 2.3: Severity by stakeholder over the long term (10 years)



Source: World Economic Forum Global Risks / Perception Survey 2023-2024.

Source: [The Global Risk Report 2024 - WEF \(p.8 and 39\)](#)

D CERTAIN ADVERSE CONSEQUENCES ALREADY PERCEIVED

Echoing the enthusiasm and desire for taking on AI through experimentation in order to better perceive its benefits and limits, the risks and areas of concern were spontaneously identified and expressed by leaders in the OpinionWay Barometer and in the focus groups.

0 THE ACQUISITION OF SKILLS AND THE GROWTH IN PROFESSIONAL INEQUALITIES

The disparities of access to the digital technologies in general, accentuating the fracture of a two-speed society, where only those who can afford to offer themselves the latest innovations benefit from their advantages, are brought up by the leaders surveyed in the Opinionway Barometer.

The participants in the focus groups, for their part, mentioned several times the risk of a disconnect between generations, involving those arriving on the work market and the established professional categories, and which is likely to be amplified by AI.

- On the one hand, there are the employees who are already experienced or experts, and who could take advantage of the AI tools (and more particularly the tools of generative AI) to gain in efficiency and production quality in particular;
- On the other, there are the younger generations, who might carry out tasks without having acquired the basic knowledge and skills (and would therefore be incapable of even doing them without AI), and without necessarily having the necessary discernment to avoid errors.



“If we cut off the branch of basic, arduous activities, which are the basis for building up expertise, where will this expertise be in 30 years time?”

Executive of a small business
(HR consulting)

“My feeling is that if you add AI to an expert in his trade, he will be better for it. I am very concerned, however, for the young people, the new arrivals on the work market, and I fear that they will not develop their critical faculties.”

Executive of a large corporation
(Consulting)

Beyond the potential effects on organizations, it is therefore the question of the impact on individuals, on their skills, and on the meaning of work that is raised.

“What disturbs me most in the terminology surrounding AI is the term ‘augmented employee’. What is it really that has been augmented? Their profitability maybe. But the employees themselves are, in reality, almost diminished.”

Senior executive of a mid-cap (Mobility services)

“If, among the populations of executives who like to reflect, AI replaces the activities for which they feel they themselves provide added value, there may be the risk of a feeling of loss of utility, of control, and ultimately, of meaning.”

Executive of an SME (Sustainable development consultancy)

0 THE ENVIRONMENTAL FOOTPRINT

The environmental footprint of technology (in the broad sense) is a growing topic of attention. Within the French companies surveyed by OpinionWay, this concern is particularly acute, with three-quarters of the executives expressing their concern about the subject. The extraction of the resources necessary for electronic devices, energy consumption by datacenters, and the persistent problem of electronic waste are perceived as obstacles to the sustainability of the technological trajectory.

More specifically, the energy consumption and the costs of training and production for generative AI are identified as sources of concern, while we wait for the impacts to be more clearly distinguished and evaluated.



“Among the impacts of AI, and the questions that I ask myself as an executive - and as a citizen - there are also the impacts on energy consumption and the consequences of datacenters (and therefore the greenhouse gas emissions).” **Executive of an SME**
(Consulting in the field of energy and sustainable development)

“For now, I don’t have the impression that these questions are getting addressed from an environmental angle, but rather from an economic angle.”

Executive of a small
business (Consulting)

0 ETHICS AND RESPONSIBILITY

The ethical issues raised by AI were brought up, on the subject of bias and stereotypes, but also on the subject of transparency regarding the usages of AI by companies, with respect to their clients and their employees. The questions linked to the use of data (compliance with obligations in terms of personal data, for example) or the explicability of processing and decisions based on AI were spontaneously expressed. The definition of scalable charters of use enabling red lines to be drawn and the circumscription of the framework of use was underlined as a useful practice.



“What is important is the explicability dimension of the models. In fact, this is one of the limits, one of the glass ceilings of the current technologies. When we use a model, we must be capable of explaining the result. Yet the way in which AI is developing is making this less and less comprehensible.”

Executive of a large corporation
(Consulting)

0 ERRORS AND HALLUCINATIONS

The management of errors described as “hallucinations” or which engage the liability of companies in the face of false information or non-compliant information likely to be created by generative AI is a source of concern (for example, in the case of a chatbot in customer services).

This term “hallucination” is employed to designate the false or fallacious responses that generative AI can sometimes “invent”.

By operating on a probabilistic basis, the large models trained on vast data corpora⁵² can indeed generate false or uncorroborated responses, which are all the more difficult to detect in that they are plausible since they are statistically probable. Even if the publishers of models sometimes publish the list of data (datasets) on which the models have been trained, these remain black boxes: we cannot really know the impact of the training data nor the sequencing of the rules used for them to conduct their reasoning.



“If you use a chatbot you risk getting a deviant response, a case of hallucination, which poses problems with respect to your values, with respect to subjects that are better avoided.”

Executive of a mid-cap (Consumer goods)

⁵² The LLMs have been exposed to far more words or rules than a human gets exposed to in an entire lifetime: we are talking for example about 500 billion words read by GPT-3. To put this into perspective, a 10-year-old child will have heard approximately 100 million words. A human who read 24/7 for one year would be exposed to 130 million words (250 words read per minute). 500 billion words therefore represent 3846 years of reading for 24 hours a day, 7 days a week.



0 THE VULNERABILITY AND SECURITY OF COMPANIES

While growing digitalization was already a source of vulnerabilities for businesses, challenging their resilience and robustness, the recent progress in artificial intelligence has brought new threats to the fore: cyber-crime and increasingly sophisticated cyber-attacks, data leaks and risks for the data integrity⁵³, and the dissemination of fake news⁵⁴.

This new state of play is identified as an additional pressure on companies, forcing them to upgrade their organization and budgets dedicated to this.



“Today, you can have words put in your mouth (by audio, video, ‘fake president’ fraud...). For me, this will be about creating new trade specialties, but it also raises questions about how you can protect your company against these kinds of things” Executive of an SME (Industrial services)

The issue of cybersecurity is underlined in particular by the European Parliamentary Research Service in a report⁵⁵, and this report also reiterates the benefits heralded by the recent progress in AI in the prevention and detection of threats, and the improvement of the times and procedures in responding to incidents, for example. At the 2024 InCyber Forum, the cybersecurity professionals also drew attention to what they perceived to be the currently nuanced impact of AI in this domain⁵⁶.

However, the risks are likely to weigh more heavily on SMEs than on large organizations, as the former will not have all the resources for adopting the latest protection techniques in the face of increasingly sophisticated attacks.

E YET THERE REMAIN LOTS OF BLIND SPOTS

The questions raised by leaders in the interviews and focus groups are far from exhaustive with regard to the many risks, misuses and potential abuses of a rapidly developing technology, which national and supranational legal frameworks, world governing bodies, ethical charters, and initiatives for responsible AI such as are proliferating worldwide are attempting to partially contain.

All this testifies to a real but still incipient sense of progress on the part of decision-makers, the maturity and depth of which varies according to the levels of exposure to the effects of AI in the organizations that they run.

The tension is perceptible between, on the one hand, opting for efficiency, the prospects of optimizing and improving services, the desire to be a pioneer in the new spaces to be conquered, and, on the other, the risks, which seem far more distant or diffuse.

⁵³ Malicious attacks for corrupting databases and models or “data poisoning”.

⁵⁴ For example, by using generative AI to copy the voice or image of strategic persons in the company (damaging the brand, “[Fake President](#)” fraud).

⁵⁵ [Artificial intelligence and cybersecurity](#) - European Parliamentary Research Service, April 2024.

⁵⁶ [Ni fin du monde ni panacée : l'intelligence artificielle n'a pas révolutionné la cybersécurité](#), *Le Monde*, March 2024.

0 CERTAIN CONSIDERATIONS ARE ABSENT OR RARELY MENTIONED

The notions of digital sovereignty and dependence on the American Big Tech firms were rarely raised. The same applies to the dependence on raw materials (metals, energy, water): while the negative impacts on the environment are clearly perceived, the risks of technologies that are based on continuously drawing on resources whose procurement is not guaranteed (in particular due to the predominance of China in this area) were not brought up.

The questions of acceptability of AI usages by the stakeholders in the company—be it employees, customers, or partners—or the questions relating to the responsibility and obligations incumbent on a business leader who is consuming or using AI, were hardly mentioned if at all.

0 THE RISK OF DISCONNECT WITH MORE RESERVED PUBLIC OPINIONS REGARDING AI, WITH STRONG CONTRASTS PER GEOGRAPHIC ZONE

According to a study of trust in artificial intelligence conducted in 2023 in 17 countries by KPMG⁵⁷, three in five people (61%) are either ambivalent or reluctant to trust AI.

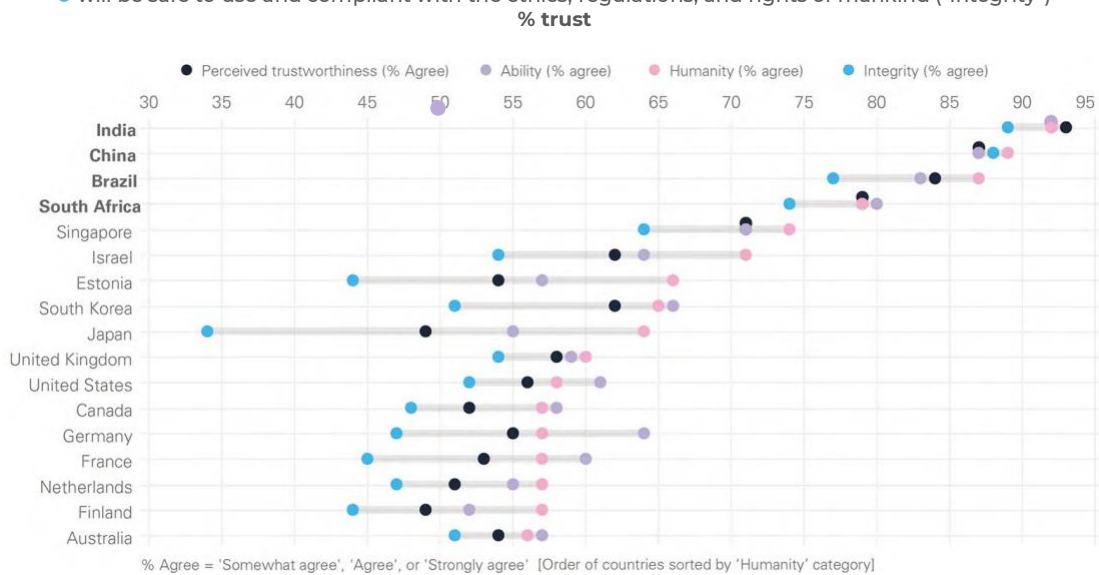
While most of them (82%) have heard of it, half (49%) do not know exactly how and when it is used. 82% say they would like to know more about it. On average, one in two people considers that the advantages of AI outweigh the risks.

Those living in India, China, South Africa and Brazil have the most positive opinion about the benefits of AI. By contrast, Finland, Japan, and the Netherlands have the least trusting populations, closely followed by France.

PERCEPTION OF AI SYSTEMS AS WORTHY OF TRUST

I consider that AI applications will produce a result that will:

- be perceived as reliable- Ability (% agree)
- be relevant and appropriate ("ability")
- will have a positive impact for most people and society ("humanity")
- will be safe to use and compliant with the ethics, regulations, and rights of mankind ("integrity")

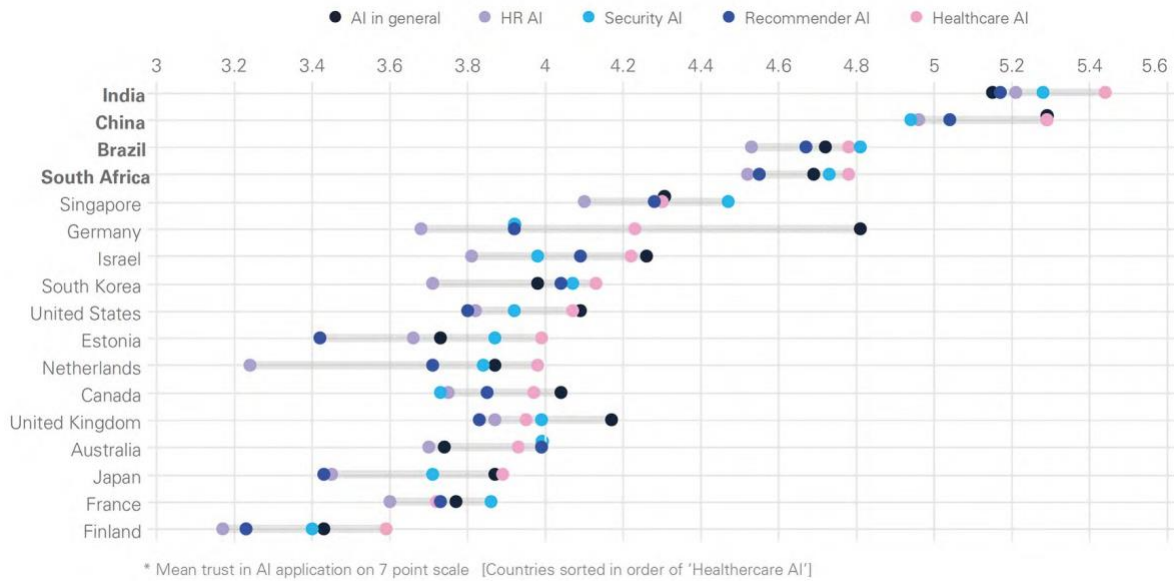


Trust in Artificial Intelligence: Global Insights 2023, KPMG (p. 18)

⁵⁷ Trust in Artificial Intelligence: Global Insights 2023, KPMG, a survey involving 17,000 people in 17 countries, on representative samples of the population in each country.

The level of trust and acceptability also varies significantly according to the fields of use of AI, with the study distinguishing five types of usage: AI in general, AI in the field of healthcare (diagnostic aid, for example), public security (preventing crime and security threats, video surveillance), human resources (hiring, performance of employees), and in the recommendation of contents and services (targeting, personalization).

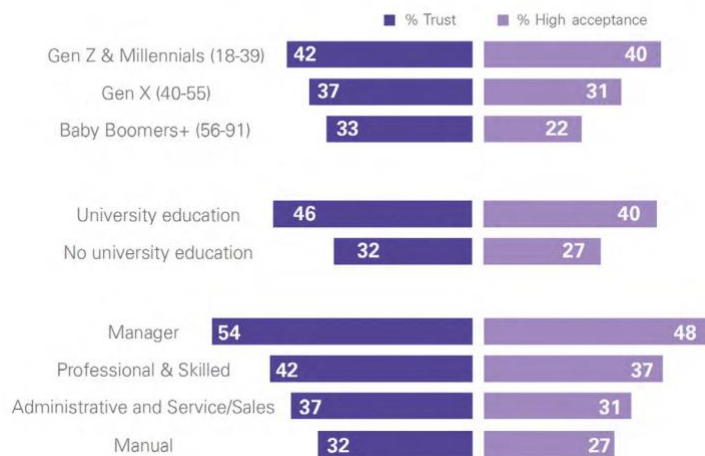
PERCEPTION OF AI SYSTEMS AS TRUSTWORTHY PER FIELD OF USE – MEAN TRUST ON A SCALE OF 7 –KPMG SURVEY



[Trust in Artificial Intelligence: Global Insights 2023, KPMG \(p.15\)](#)

The study also reveals significant deviations per generation, education level and professional category / managerial position, with executives and managers better disposed towards AI than the other job categories.

Figure 9: Trust and acceptance of AI systems by generation and education



[Trust in Artificial Intelligence: Global Insights 2023, KPMG \(p. 21\)](#)

Gaining in efficiency and in service rendered to customers via the technology, at the risk of alienating certain employees: this is an example of the decision-making and arbitration between stakeholders that leaders may have to assume, requiring both courage and empathy.



“When we chose to digitalize our activity, we plowed almost 25% of our revenue into this investment. Why is this decision courageous? Because, internally, absolutely no one believed in it, and afterwards this required transformation of all the processes at every level. (...) Out of four technicians, two quit due to their aversion at the outset to the digital. (...) But today, this digitalization allows us to be far more rapid and efficient for serving our customers, for example, by being able to change more quickly the window for a little girl who's been sleeping for several days in the cold in social housing.”

Executive of an SME
(Construction industry)

The next chapter aims to look into the possibilities, in this context, of demonstrating leadership by mobilizing the intelligence of the heart (“heart intelligence”), based on a number of specific decision-making areas.



5 AI and executive decision-making: heart intelligence put to the test by concrete cases

HEART INTELLIGENCE (HI)⁵⁸

The Heart Leadership University association is tasked with favoring leadership driven by the heart and, in so doing, transforming business leaders and their companies in order to preserve our humanity in the face of the challenges of the 21st century. Intelligence of the heart—“heart intelligence”—is therefore at the core of the association's actions, whether in the lessons of the [“Straight from the heart” program](#)⁵⁹ or as a study subject of the [research programs](#).

Combining empathy, intuition and courage, heart intelligence—HI—enables decision-making by mobilizing the faculties of sensitivity of human beings, to fit in alongside rational argumentation, shored up by logic and statistics. It is built around three fundamentals:

- trusting in your **intuition**, reinforcing it to perceive the world around you, and the world as it will be, and innovating differently
- having the **courage** to be yourself, to embrace your values, and to act accordingly

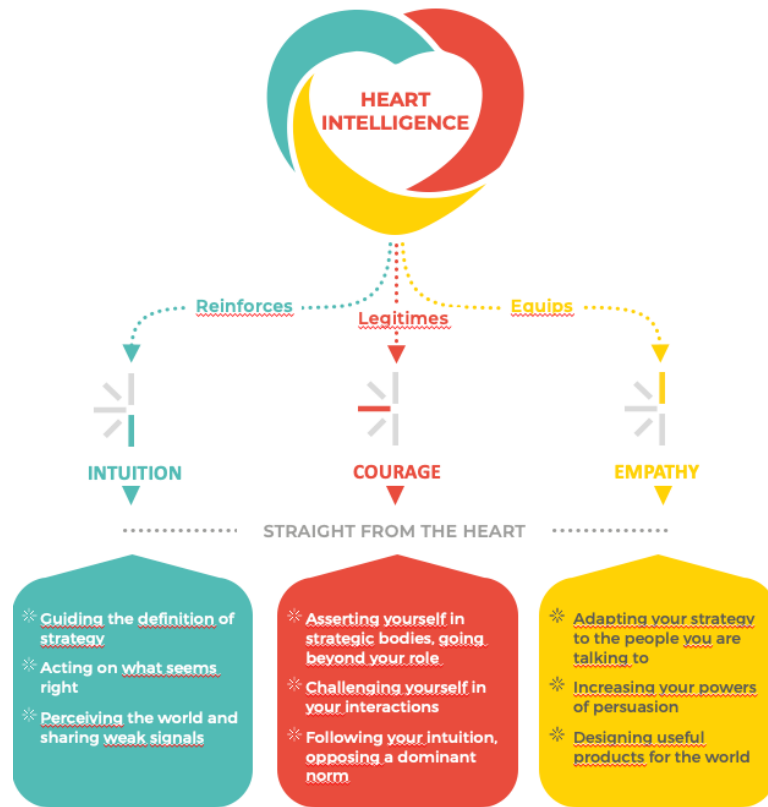
Addressing the equation of the costs and benefits of AI both in terms of the individual capacities and the limits of the company while envisaging the long-term social and environmental effects is one of the challenges facing leaders.

Choosing the structure and the mode of governance of the company, recruitment and human resources, major arbitration on expenditure and investment, choosing partners: the decisions incumbent on leaders are many and varied. These decisions come increasingly thick and fast, in a business environment marked by volatility and uncertainty and with increasingly hectic time frames. 43% of the executives surveyed by AT Kearney and Egon Zehnder consider that their roles will be called into question by the deployment of AI.

What are these changes shaping into? Does a world where AI is widespread risk having an impact on the capacity of leaders to make decisions by mobilizing their sensitivity faculties, their intelligence of the heart? What place is there for intuition, empathy and courage in the decisions of leaders in the age of AI?

⁵⁸ To find out more about how the mobilization of heart intelligence can transform leaders and their companies, see [Impact study and reflections on the transformation of corporate governance through heart intelligence](#), Prophyl and HLU 2023 and [Heart intelligence in action - Obstacles and levers](#), Stéphane La Branche and HLU, 2023.

⁵⁹ HLU designed the [“Straight from the heart” program](#), an 18-month “executive education” course aimed at developing heart intelligence among leaders. By way of eight successive thematic and immersive modules, the participants try out HI, acquiring the tools to attain the objectives of individual and organizational transformation that they have set themselves at the start of the program.



To what extent will the deployment of AIS take the place of the leader's choices, by eliminating for example moments of decision-making in favor of a sequence of increasingly opaque automated processing and computation? If human intervention is still required, to what extent will it genuinely relate to the freedom and autonomy of choice? Just where exactly will modeling and recourse to AI constrain or alter the decision-making process?

In order to start exploring these questions⁶⁰, we present some cases of use of AI to investigate the desired trajectory and illustrate the challenges for Heart Leadership in this context. We take a particularly close look at areas concerning relationships (customer relations, suppliers, human resources), since this is at the heart of what makes us human beings.

A AI AS A SUPPORT OR CONSTRAINT FOR DECISION-MAKING?

The modeling and the predictions enabled by AI are based on the analysis of collected data (including historical data collected over a defined period of time), to which can be added hypothetical parameters. The results obtained are frequently presented as tools in aiding decision-making: dashboards, scores and success rate statistics for a given operation (controls, favorable conversion of a lead).

These tools make it possible for example to inform and manage an activity in real time and react rapidly to changes to the environment, or else explore scenarios by way of simulations. They also facilitate more collaborative decision-making and alignment between stakeholders thanks to the sharing of data and analyses that are accessible within a team or an organization.



The degree of automation of the decisions supported by algorithms is variable. It can range from configuration of a tool to provide simple decision-making aid, through to the complete automation of the decision in certain areas (e.g. credit allocation).

Furthermore, when these decisions concern an individual—for example, the allocation of a benefit or a penalty—they can have consequences for the persons subjected to them.

The use of algorithms to support decision-making therefore raises questions on a number of fronts⁶⁰.

- Legitimacy: are the use of the system and the criteria taken into account legitimate in the envisaged context? Could the system have harmful secondary effects on the company?
- Efficiency, reliability: is the system sufficiently reliable and does it bring added value to the decision-making process?
- Discrimination, bias: is the system designed so as to avoid bias or discrimination?
- Control, intelligibility: is the information on the logic mobilized by the system and the results it provides sufficient?

All these questions need to be weighed in the balance by the decision-makers who choose to make use of these tools.

0 WHAT PLACE THEREFORE IS THERE FOR DEVIATING FROM OR REFUSING TO DO WHAT THE TOOL OR THE MACHINE RECOMMENDS?

Beyond the questions about the usefulness of turning to automated decision-making aid systems, it is possible to formulate the hypothesis that the mass deployment of AIS is likely to increase the frequency of automation biases via which an individual tends to follow the recommendations of the automated systems to the detriment of their own judgment.

AUTOMATION BIAS⁶¹ AND TRUST IN DECISION-MAKING AID TOOLS

The foundation of automation bias is in the excessive trust that we place in automated technologies and systems, to the detriment of our own judgment and vigilance.

It reflects an inclination to accept the recommendations of a tool without sufficiently questioning this, even when faced with machine errors, while ignoring clear evidence or one's own expertise. In this way it resembles conformity bias, which involves individuals modifying their behavior or their judgment to align with that of a group or a perceived authority.

⁶⁰ [Décider avec les algorithmes, quelle place pour l'Homme, quelle place pour le droit ?](#), Sonia Desmoulin-Canselier and Daniel Le Métayer, Dalloz, 2020.

⁶¹ [A handy guide to cognitive biases](#) by Kate Goddard, Abdul Roudsari & Jeremy C. Wyatt [Automation bias: a systematic review of frequency, effect mediators and mitigators](#), *Journal of the American Medical Informatics Association*, 2012.

The notion of trust is central to automation bias. While trust in oneself reduces this bias, trust in the machine increases it. Automation bias is therefore considered to be a negotiation between these two types of trust.

Several studies show that humans tend to have a favorable bias toward artificial assistants compared to humans, who are judged to be less worthy of trust⁶².

This bias can also be rooted in the relationship with authority: individuals would be more disposed to blindly obey the authority of a machine, on the presumption that the machine would have been programmed specifically not to make errors (unlike human beings). This is amplified by the belief in the fact that machines are intrinsically more reliable and capable of making objective decisions, leading to an overestimation of their capacities and an underestimation of the risks of error.

The complexity of automated systems and their lack of transparency can make it difficult for their users to criticize or comprehend their results, contributing to an increased dependency with regard to these systems.

According to the scientific literature relating to automation bias and trust in decision-making aid tools, the difficulty in going against the recommendations of an automated tool is more prevalent among individuals with little experience in a given task, who are very accustomed to using the machine to assist them, or who are less autonomous in their dealings with authority.

If we can assume that an expert and experienced leader is less inclined to this type of bias, maybe this take on bias can be disseminated throughout the organization that he or she runs.

This person's position as a leader can also precisely allow them to arbitrate differently, since they are capable of taking into consideration other dimensions, in particular human dimensions, which the sole parameters processed by the model do not integrate, as illustrated by the following account:



"We have in-house a tool that assesses the probability of winning an invitation to tender. Are we doing right by putting our efforts into this dossier rather than others?"

We have lots of opportunities with high probabilities of winning the contract.

But I have in mind a case where the success rate predicted by the model was 8%: normally, with so little chance of winning, we abandon it. Yet we took the decision to invest all the same in this proposal, because we considered that it was of interest nonetheless, particularly in terms of learning and the team: discovering a new client, producing a benchmark sales proposal. I've got teams who've just arrived here, who I'll be able to bring on board via this customer proposal. What is of interest is that the tool provides insight. It doesn't mean you can't make a decision to the contrary."

Executive of a large corporation (Consulting)

⁶² Dzindolet, Mary T., Scott A. Peterson, Regina A. Pomranky, Linda G. Pierce & Beck P. Hall. [The role of trust in automation reliance](#). *International Journal of Human-Computer Studies*, 2003.



At the same time, there is the risk that executives might lose confidence in their intuitive capacities when faced with systems that end up being perceived as omniscient. The corporate cost of not following the recommendations of the machine can prove to be high moreover: by deviating from the recommendations of predictive models, leaders risk losing the trust of the stakeholders and imperiling the stability of their organization.

Studying the conditions of relevance of modeling and AI informs us on the importance of preserving these intuitive capacities.

B IN A WORLD OF MULTIPLE CRISES, THE LIMITS OF MODELLING LEAVE THE FIELD OPEN FOR INTUITION



“Analysis deals with the immobile whereas intuition deals with mobility or—and this amounts to the same thing—duration.”

Henri Bergson, *The Creative Mind* (1934)

Intuition is a decision-making mode based on complex mental processes which are quasi-instantaneous, subconscious, based on accumulated experience, and which do not involve analytical thought⁶³.

It is an essential faculty of leaders. History abounds with examples testifying to the decisive character of an idea that goes against the grain, or of a decision made in a situation of urgency that has turned out to be a stroke of genius.

INTUITION HAS MANY FIELDS OF APPLICATION

We use it to innovate, to anticipate and to perceive major changes (in strategic forward planning), to identify weak signals, or to create new links with key partners.

According to Victoria Pellé-Reimerson, there are three broad types of intuition:

- Visionary intuition, which senses the imminence of a danger or the potential of a technology, a concept or a product
- Contextual intuition, which reinforces the relevance of a choice of a decision to be made, and allows you to act quickly
- Relational intuition, which facilitates discernment in relations (team management, hiring, relations with service providers, suppliers, customers).

⁶³ Stéphane Ethier, [Epistémologie de l'intuition](#), HEC Montreal, 2014.

Intuition is extensively mobilized by corporate executives, not least the tech or risk capital leaders in Silicon Valley. Take Jeff Bezos, the Amazon founder, who declared: *“All the best decisions in my life, whether in business or in my private life, have been made with the heart, intuition, guts, and without analysis.”*⁶⁴

In a world that is constantly changing, characterized by increasing complexity and unpredictability (geopolitical, ecological, economic, and technological), the mobilization of intuition (in particular in its visionary dimension) would appear to be all the more important.

As Bertolucci and Pinzon point out: *“Empirical research has demonstrated that intuition is often mobilized and shown to be effective in situations involving tight time constraints (Agor, 1989; Klein, 2003; Dane et Pratt, 2007), with few precedents or with high levels of uncertainty (Agor, 1989; Sinclair and Ashkanasy, 2002). The use of this decision-making mode has been reported to be positively correlated with organizational performance in an unstable environment (Khatri and Ng, 2000).”*⁶⁵

The question therefore arises of the boundary conditions for recourse to AIS for doing predictive modeling which enables companies to plan ahead in various scenarios: to what extent are the investments made in this area to be prioritized, as compared to other investments, for example those necessitated by ecological imperatives? How do you build resilience in an organization that makes it possible to switch back, as far as possible, to manual mode when the tools no longer work? To what point is it possible to organize this resilience, when the consequences of developing the tools have been the loss of skills, knowledge and know-how among the individuals and across the company?

The example described in the following box insert casts light on some of these questions. The implementation of a predictive analysis system for a raw materials procurement and production supply chain in factories provides relevant decision-making support so long as the environment does not change. When a crisis occurs it stops working. If this has not been anticipated (in terms of maintaining skills in-house and the possibility of switching to manual mode) there can be serious consequences for the company. The choices made below pose questions therefore about the capacity of the company to deal with the risks, over time, of the loss of expertise and of trade skills, of the loss of intuition (automation does not encourage mobilization of intuition to pick up on weak signals) and, lastly, of the loss of resilience, with an organization that is no longer capable of reacting in the event of a crisis.

⁶⁴ [Jeff Bezos at the Washington Economic Club](#), 2018.

⁶⁵ Marius Bertolucci, Juan David Pinzon, [De l'intuition dans la décision des managers de l'action publique. Le cas du pilotage des réseaux territorialisés d'organisations](#). *Revue française de gestion*, 2015.



CASE STUDY: MODELING THE PROCUREMENT AND PRODUCTION CHAIN FOR AN INDUSTRIAL PLAYER

AI algorithms were used to improve the performance of the supply chain and of “Operations Planning” (S&OP)

Within the company, a committee bringing together Executive Management, Finance, Supply Chain, and Sales makes decisions every month about orders and the mobilization of four European factories (€1.5 billion in turnover, 50% of which on production costs).

Until 2020, this sales and operations planning (S&OP) process was discussed in committee by pooling the analyses and expertise of the various functions. With the support of the R&D teams, a global predictive analysis model was put in place to support this process, integrating numerous variables in the tools and dashboards, and enabling the plotting of scenarios for various events likely to have an impact on the corporate environment in 3 or 6 months.

Benefits were observed:

- The modeling revealed significant sources of optimization and enabled integration over time of new variables (for example, greenhouse gas emission factors).
- It made it possible to conceive then to describe the scenarios collectively, with visualization of clear impacts for all stakeholders (stock levels, financial impacts, human impacts).
- It helped reduce the asymmetries of information between the different functions of the company and to build a consensus (compared to a decision based on the human expertise of a small number of people).

Nevertheless, the model proved to be inoperative in times of crisis

In 2020-22, there was a successive series of crises: COVID and its impact on the global supply chain, the war in Ukraine, the crisis in the cost of raw materials and energy. The recommendations of the decision-making aid tools became completely erroneous. Certain teams changed nothing and continued to place their trust in their work tool, applying aberrant action recommendations. Others wanted to react to the errors. But they were unable to take control of the existing models and tools to isolate its parameters as the tool was not designed to permit a return to manual mode.

✳ “The impacts of the modeling were very significant on the quality of service, the stock levels, and the—quite substantial—costs of the supply function at corporate level.”

✳ “We couldn't get back into the tools, particularly since the people who had carried out the developments in some cases were no longer there.”

One of the actions implemented to reduce this risk consisted in bringing the skills back in-house and creating a mixed digital transformation team with both the data science and modeling capabilities and the business knowledge.”

Source: interview

0 CAN INTUITION AND AN ANALYTICAL APPROACH TO DECISION-MAKING, BASED ON DATA AND AI, BE COMBINED?

In an interview with the BCG Henderson Institute on the use of intuition in the business context, the psychologist **Gerd Gigerenzer**⁶⁶ specifies the **areas of relevance for AI**, distinguishing the contexts in which its use may be relevant from those in which it is not:

“The general idea is that AI will work well if the problem is well defined and if it is stable, such that tomorrow will be like yesterday. AI would have difficulty predicting an uncertain future or certain unpredictable variables such as people or their behavior, or viruses that are continuously mutating (...)

We are now living in a “VUCA⁶⁷” world, a world of uncertainty. We need intuition, intelligence, and data. The big mistake would be to bank on just one of these factors. We will always need all of these assets.”

It is therefore a matter, for the leader, to be capable of selecting the right approach to problem resolution and anticipation, case by case, out of analytical modeling, an approach based on intuition and experience, and —henceforth— recourse to artificial intelligence.

Whatever the deployment trajectories for AI within companies, intuition remains a faculty that leaders need to cultivate, and all the more so in an environment marked by the proliferation and unpredictability of crises along with the accelerated timing of events and decisions.

0 COULD AI BE CAPABLE OF INTUITION?

With the victory of **Alpha Go** over Lee Sedol in 2016, the notion of intuition, for so long sidelined by the school of symbolic AI, is emerging once again in the field of artificial intelligence. By describing the game of Go as involving the incalculable⁶⁸, and with the machine producing moves and strategies that were unprecedented and incomprehensible for experienced players (“which no human would have played”), the inventors of the deep learning algorithms of Alpha Go posited that these moves and strategies **were a demonstration of intuition**⁶⁹.

What about beyond the scope of a game, which, despite its complexity, remains a relatively stable environment to model? What about in the real life of individuals and businesses, and with regard to the more recent progress of AI?

The more recent developments of artificial intelligence are based on deep learning techniques. AI analyses a gigantic number of parameters and constructs statistical correlations. In this way, by construction, they detect weak signals that humans would not necessarily have the capacity or the time to detect.

⁶⁶ [The intelligence of intuition](#), Gerd Gigerenzer, Cambridge University Press, 2023 and [interview with the BCG Henderson Institute](#), March 2024.

⁶⁷ VUCA for Volatile, Uncertain, Complex, Ambiguous

⁶⁸ Based on there being “more possible combinations than atoms in the universe”, estimated at 10⁸⁰

⁶⁹ Alban Leveau-Vallier, [Intelligence artificielle et intuition : Les algorithmes d'apprentissage profond comme occasion de décrire l'intuition](#), Philosophy dissertation produced at Université Paris 8 - Vincennes-Saint-Denis, 2023.



As such, AI may be likely to manifest characteristics that suggest intuition. We may therefore imagine that this type of technique enables the industrialization of intuition.

These assertions tend to lend credence to the anthropomorphic statements endowing AI not only with cognitive capacities (knowledge, reasoning) but also with intuitive and creative faculties. Such statements feed into scenarios in which humans are not sole custodians of these faculties, and that these faculties may be incorporated in applications or commercial services.

Taking a step back from such “demiurgical” or commercial promises, we need to remember that intuition is not “mechanical” but “organic”. It is enabled by the laws of biology more than by the laws of mathematics (inference, statistics, correlations, games theory). It is specific to each individual: it is exercised, it is refined with age, and it depends on lived experience. There is therefore a biodiversity of intuition.

It also requires a capacity to “integrate” not only facts, but also our past emotions (memorized, and linked to favorable or unfavorable lived situations), our current emotions, our immediate sensations. It is also particularly corporeal and multi-sensory: it is formed on the basis of information deriving from our five senses and even from our internal sensations⁷⁰.

For example:

- The sense of smell is essential in the creation of relationships of trust and attachment (consider the phrase “to smell a rat”) and contributes to relational intuition.
- The perception of the cardiac electromagnetic fields of our neighbor gives us an intuitive sense of their emotional status.
- Our guts also come into play: experiencing stress modifies the composition of the gut microbiome, which sends information to the brain via the nervous system, modifies our emotional state, and creates a “gut feeling” that can feed into our prospective intuition, particularly with regard to risks.

Since each of us presents a genetic diversity (subsequently associated with a different life path), there is therefore a great variety of intuitive potential among human beings. It is precisely this biodiversity which, in evolutionary biology, is a factor of robustness and evolutionary adaptability.

Lastly, human intuition “put into practice” cannot be separated from intentionality (the “why”), which may range from survival (one’s own) to domination (intuition to conquer) or to more noble ends: mobilizing one’s intuition for the survival of a wider human group, or for a world that is as harmonious and livable as possible.

⁷⁰ [Développez votre intuition pour prendre de meilleures décisions](#), Isabelle Fontaine, *Quotidien Malin*, 2013 ; Hélène Loos, Benoit Schaal, Pause, Jan Havlíček et al. [Past, Present, and Future of Human Chemical Communication Research](#), *Perspectives on Psychological Science*, 2023 ; [The mind-gut connection: how the hidden conversation within our bodies impacts our mood, our choices, and our overall health](#), Emeran Mayer, Harper Collins, 2016.

The love of the living, and concern for preserving socio-perceptive capabilities (or more broadly our “organic intelligence”), should lead us to put into relative perspective the “potential” of machines, which, like AlphaGo, have been configured to “win”, and not to establish quality links with the other player or make wise decisions.

C AI AND RELATIONSHIPS: WHAT CHOICES TO BE MADE TO PRESERVE OR IMPROVE RELATIONSHIPS WITH YOUR STAKEHOLDERS?

The relationship with its stakeholders is at the heart of a company’s DNA. Now that AI is capable of simulating natural language, reasoning and interaction, what can we truly delegate to it for fostering this relationship?

The choice of distribution partners but also of the quality of the relationships that the company wishes to establish with its stakeholders (employees, customers, suppliers, partners) is among the major decisions taken by and embodied in the leader. Does AI need to be brought into this, and if so, how?

0 AI USAGES ARE BEING DEVELOPED MASSIVELY IN CUSTOMER RELATIONS

Although chatbots long suffered from inefficient natural language processing techniques, generative AI has led to these capabilities progressing in leaps and bounds. Equipping call centers with AI now appears to be a promising way forward. The improving performance—including in terms of customer satisfaction—of players making massive use of AI is leading even the companies that are most attached to the human dimension in relationships to think again⁷¹.

Generative AI has increased extraordinarily the possibilities of data cross-referencing in supporting a personalized and fluid customer experience. Advisers now have access to new capabilities to answer requests or propose products. Generative AI even enables empathic communication elements to be introduced into the formulated responses.

What is more, interactions with AI systems can even be judged by users to seem more “empathetic”, as these systems have no time constraints and do not suffer from being overworked or overburdened, the effects of which can have an impact on communications between human beings. In the field of healthcare⁷² for example, the results of an experiment showed that the answers to questions asked on the social networks were judged to be of better quality and more empathetic than those proposed by doctors.

The risks of dehumanization that may be feared in the face of massive automation, leaving to one side exclusive qualities that an empathetic human is able to mobilize, are to be set against the state of the mechanisms for receiving the public and fielding their queries (whether this be customers, users, patients, etc.). Understaffed reception desks, call centers streamlined to the bare minimum, overburdened switchboard attendants, overworked healthcare professionals: is all this really propitious to quality relationships?

⁷¹ [Podium de la relation client 2024](#) and interviews with professionals from the sector.

⁷² Ayers JW, Poliak A, Dredze M, et al. [Comparing Physician and Artificial Intelligence Chatbot Responses to Patient Questions Posted to a Public Social Media Forum](#), JAMA Intern Med, 2023.



The hypothesis of artificial intelligence systems being used to take over the most repetitive tasks or tasks with least added value (telephone switchboard, first-level written responses, pointing the way, etc.), in order to allow humans to make time and room for maneuver with a view to mobilizing their capacities for empathy and to reinforce social links, is often put forward as a beneficial area of deployment. However, this requires that the chatbot development strategy should not purely serve as a short-term means of bringing down costs.

The question of the true final goals of these deployments, of the right balance to be found between chatbots and humans in relations with stakeholders, should constitute one of the strategic points to be ruled upon by leaders, once the first lessons have been learned from the current trials in this regard.

These questions are indissociable from the questions surrounding the choices for the reassignment of the capacities and availabilities freed up by AI, questions that are destined to be posed more and more in the social dialog.

Will customer service advisors spend more time with satisfied customers or dissatisfied customers (all of which has an impact on the pressures and emotions to which they are exposed at the end of the day)? More broadly, will the space and time gained be filled with new tasks in the search for permanent productivity, or will this human and financial capital be redeployed for developing relationships, or for developing other skills or aptitudes, to be reinforced or invented?

The following box insert illustrates this questioning and the choices—deriving from tests and rejections—made by the management of CAMIF (a French online furniture company with a socially responsible mandate, €32M revenue in 2022, and approximately 100 employees).

CASE STUDY: THE USE OF AI AT CAMIF (e-commerce for sustainable and local home design)

Several cases of use deployed and AI trials underway

- Use of an **“AI assistant” to make appointments** for the executive management, in place for several years, which frees up quality time and significantly increases the number of appointments per week.
- Test underway of **generative AI via the chat on Camif.fr**, for answering customer queries (currently out of office hours, with the possibility of speaking to an advisor at any time).
- Tests of **image retouching and contextual photos**, to replace the organization of product shoots.
- Testing of Copilot, the integrated solution in the Microsoft Office suite for **producing minutes and meeting summaries** (Teams).

And some usages have been rejected: in HR, hiring, the sorting of resumes.

It is critical to support employees in the face of change and to include collective discussion on AI in the social dialog in order to look beyond the fears of job losses, discuss the redeployment of the time and space freed up by AI, including with regard to training, and to **set collectively a framework of use** (charter currently being drafted in conjunction with the employees, akin to the one for teleworking).

CAMIF has made a conscientious choice: withdrawing from the Amazon marketplace, on account in particular of the brutal delisting of the CAMIF offer in the middle of the weekend, without any possibility of speaking to a human. The loss of sales was estimated at €500k per year.

- *“Could the exponential growth of artificial intelligence call into question the social model defended by socially responsible companies, and the positive dynamic that they have established? I don't believe so. On the contrary, our companies are likely to use this technology to improve quality of life in the workplace. By automating tasks of low added value, they will free up time and resources that can be reinvested in the human capital, personal development, and empathy. This means that human activities will be able to focus on what distinguishes us from machines: our capacity to create social ties.”*
- *“Leaders of tomorrow will be augmented, they will be able to draw on the technology to make better use of their humanity. Our mission is our guiding light.”*

Source: Interview with E. Jacquillat, [interview for France Travail](#), (2023), [2022 mission report of CAMIF](#)

D AI AND HUMAN RESOURCES (HR): BEST OF ENEMIES?

The field of HR, more than most—precisely on account of its direct dealings with humans and relations—constitutes a particularly pertinent field for exploring the crossover of usages and effects of AI and of heart intelligence. AIS can be used to facilitate recruitment, improve efficiency, or improve the experience of employees.

O AI IN HR: HIGH-RISK SYSTEMS

Here we shall cite only a few examples of possible usage in this field:

- Analysis of resumes and supporting letters to rapidly analyze large quantities of resumes and select candidates
- Recruitment chatbots to answer questions, schedule interviews, and even conduct preliminary interviews
- Assessment of applicants: analysis of answers to online tests and videos to assess their skills and their cultural fit
- Onboarding, personalization of training and development



- 24/7 HR assistance: continuous assessment for employees, answering questions on policies, social benefits, employee leave, etc.
- Performance analysis: assistance in continuously monitoring and evaluating the performance of employees
- Preventing churn, by analyzing precursor signs of potential departures and proposing employee loyalty initiatives.

It should be noted that the **European regulation on AI⁷³** classifies these **systems**, in particular those used for selecting individuals, and making decisions about their promotion or their dismissal, in the **“high-risk” category**, as they can have an effect on the careers and lives of the people concerned. While this classification does not totally prohibit their use, it does give rise to the implementation of specific restrictions and obligations for those operating them.

0 TO DATE, THE EFFECTIVE USE OF AI SYSTEMS BY HR DEPARTMENTS IS MARKED BY CONTRASTS, AS IS THE DESIRE TO USE THEM AT ALL

According to a survey carried out by OpinionWay for Kelio, publisher and integrator of IT solutions, 76% of human resources professionals do not use and do not wish to use AI tools. 54% of them point to a lack of trust in the quality of the work carried out by AI⁷⁴.

Usage also differs between large corporations and SMEs. It is above all companies with more than 250 employees that use AI, with 59% of the HR managers finding it particularly useful for recruitment.



According to **Eric Ruty**, CEO of Kelio, the company commissioning the aforementioned survey, this difference *“could be explained by several factors. Firstly, resources. Small companies often have tighter budgets and fewer specialized personnel, which makes the adoption of new technologies such as AI more difficult. Next, there is a lack of technical skills in-house, which can be an obstacle to the implementation of efficient AI solutions. Furthermore, for a small company, the impact of AI may seem less immediate or less evident, especially if their current processes already meet their needs. There are also major concerns around the security and confidentiality of data. The resistance to change should not be underestimated either. In a small structure, changing well-established working methods can be seen as risky or unnecessary.”*⁷⁵

The appetite for AI also differs according to the types of tasks, and the greater or lesser importance that executives accord to human relations, relational intuition, and empathy.

⁷³ See the [AI Act](#) - Annex 3, category 4 (page 426).

⁷⁴ [L'intelligence artificielle et les Ressources Humaines en entreprise](#), survey carried out by OpinionWay for Kelio, publisher and integrator of IT solutions.

⁷⁵ [Plus de trois quarts des RH sceptiques face à l'IA : un vrai défi de confiance!](#) solutions-numeriques.com portal, May 2024

Thus, according to the aforementioned OpinionWay survey, barely 6% of the respondents could conceive of entrusting AI with the final selection of candidates, and 8% with negotiation with those shortlisted for the posts to be filled. There could be several reasons for this:

“The final selection often necessitates keen human judgment to assess aspects such as cultural fit and personality traits, which are hard to encode in AI algorithms. Also, negotiations require a personalized and empathetic approach, essential for responding appropriately to applicants’ expectations.” These crucial steps in recruitment benefit significantly from human intuition and personal interactions, which explains the reluctance for completely automating them.”⁷⁶

In the field of temping, there are contrasting practices among companies in terms of automated searches for job applicants. Some choose to close their local branches, whereas others (such as Actual, with 600 local branches), continue to favor the building of direct strong human links with the local populations, in order to better establish trust with the temping applicants, and avoid costly no-show phenomena.

0 THE POSSIBLE EFFECTS OF AI IN THIS FIELD

The constitution and organization of teams and of the collective, the capacity to bring employees on board around a vision and values, and the attention paid to employee well-being, have been evoked by executives as fundamental components of their function and of their exercise of leadership⁷⁷.

These attributes are manifested in part in the HR policy of a company, potentially fertile ground for expression of heart intelligence.

All the same, modern management encourages optimization and analysis of performance (statistical indicators of performance measurable objectives, SMART, etc.), **supported by technological tools.**



“The history of the deployment of HR processes and tools in large companies is pretty grim. Gradually, HR departments have become shared support functions. Initially, there was an HR manager who may have been accompanied by a team, with empathy. This represented and meant something. Then, slowly but surely, everything got divided up per specialty. We started calling a number in Poland for the pay slips, then came the specialists for hiring, for firing, for training. These are the transformations that the tools have brought us.”

Executive of a mid-cap (Energy consulting)

The quest for objectivation is frequently asserted in HR, with a dual intention: data or quantification make it possible to both measure the contribution of employees to the performance of the company and to combat subjectivity, bias, and inequalities by drawing on statistical data and indicators, in order not to make a decision based on “a feeling” (about the employee).

⁷⁶ [Plus de trois quarts des RH sceptiques face à l'IA : un vrai défi de confiance ! solutions-numeriques.com portal, May 2024](#)

⁷⁷ This is also what comes out of the [study carried out in 2023 by Heart Leadership University and Eranos on the imaginaries of leadership.](#)



0 HOW CAN AI CONTRIBUTE TO REINFORCING OR MODIFYING THE EXISTING DYNAMICS?

On the one hand, there is the extreme fear of even greater dehumanization in the management of human resources, with a loss of courage and sense of responsibility on the part of decision-makers, seeking to hide behind the decisions of the machine. We can imagine employees being boiled down to mere “datapoints”, or an algorithm automatically calculating promotions and wage rises based on data collected about employees and their performance.



“AI is clearly a subject at the heart of the profession’s concerns. Unsurprisingly, and this is nothing new, predictive tools are already used a great deal in recruitment. But today, with AI, you can generate a job profile, a job ad, conduct resume-matching, and even start to predict the success of a candidate in a job, which raises real questions!”

Executive of a small business
(HR consulting)

On account of their practically infinite capacities for analysis, AIS could potentially also outstrip human capacities in the fine-scale analysis of large quantities of data, which might be described as a form of “tool” for intuition.

Take for the example the analysis of a large quantity of resumes for selecting a list of applicants to be received for interview, a process that needs to be carried out in a short time frame: is having this step carried out by AI more perilous than doing it under the pressures of time constraints, or with limited availability or resources to be devoted to it? This kind of organization can be envisaged so that leaders can focus on the genuinely empathetic or intuitive steps in the recruitment process.

The challenge is therefore to succeed in combining AI with human work, and to free up time for doing what is considered to be essential.



“Before, when we wrote a job ad, it took us 10 to 15 minutes to do it. With AI, we obtain the same ad in just a few seconds. It needs to be proofed and validated, of course. But this allows our employees to free up time, in order to concentrate on the essential: following up on candidates, and following up on more of them.” **Samuel Tual**, CEO of Actual⁷⁸

⁷⁸ [« Je vois plein de possibilités » : Ces patrons mayennais ont choisi l'intelligence artificielle](#), *Ouest France*, February 2024

0 THE SPECTRE OF SURVEILLANCE

Certain uses of AI, around control functions participating in the quest for optimization, are likely to call into question the responsibility of the leader with respect to the individual freedoms of a company's employees. As Kate Crawford notes: *"AI and algorithmic supervision are just the most recent technologies in the long history of factories, clocks and surveillance architectures."*⁷⁹ This question is not therefore new: surveillance in companies appeared with the first factories, and really took off with production line working at the end of the 19th century. It is therefore about controlling time, and above all controlling work rates and therefore bodies.

This form of surveillance is still present today. The Amazon warehouses have generated the most hype in this regard, its most extreme manifestation being the Amazon warehouses in the United States, where the tasks to be carried out and the work rate (including break times) are dictated by the computational distribution infrastructure that has been programmed by the engineers in Seattle with a view to attaining optimization objectives.

To this surveillance of bodies and of tasks, AI adds new dimensions, of which the "read.ai" productivity tool, developed by the American company Read, provides a first glimpse.

The solution makes it possible to produce statistics for video conferences and measure the participation of employees, by displaying scores for engagement, sentiment analysis, and speaking time. This example demonstrates the propensity and the capacity of these tools to contribute to a possible surveillance of employees in companies, which has been denounced with renewed vigor since the COVID crisis.

EXAMPLE INTERFACE AND MEASUREMENTS PROPOSED BY READ.AI



Source: site web read.ai

⁷⁹ [Atlas of AI](#), Yalebooks, 2022.



THE LEGAL AVENUES FOR THE DRAFTING OF NEW RIGHTS

Beyond bans and restrictions on certain uses of AI, and echoing a legal approach founded on risks (as adopted notably in the AI Act), lawyers around the world are exploring **the drafting of new rights**.

These include rights qualified as “neuro-rights”—when they coincide with neurotechnology (with the prospect of cerebral implants, for example)—or reflections on the right to incalculability (not being reduced to a score or to data cross-referencing), or to indeterminacy (as a right not to know, not to forecast, not to be reduced or assigned).

0 MORE BROADLY, LEADERS WILL BE IN THE FRONT LINE OF THE UPHEAVALS OF AI FOR WORK AND JOBS

Faced with the upheavals that AI is in the process of creating in work and employment, with major impacts anticipated in certain professions or trade categories, leaders will be called upon to make far-reaching choices. What will be the compass to guide them, with what values and what project for their company, but also for society as a whole?

Job cuts, company reorganizations and retraining of employees for other functions, the need to address the downgrading of certain trades and professions, the choices in reassigning time that may have been freed up by the automation of numerous tasks, and productivity gains: these are all occasions for decisions that make intensive demands on the empathetic and intuitive aptitudes and the courage of leaders.

The capacity to demonstrate heart leadership will certainly be likely to make a fundamental difference in this regard.

E CONSEQUENCES FOR HUMAN APTITUDES: PRESERVING COGNITIVE AND SOCIO-PERCEPTIVE CAPACITIES



“When faced with these big technical systems that capture our skills, we need more and more to learn how not to forget how to learn.”

Dominique Cardon *À quoi rêvent les algorithmes. Nos vies à l'heure des big data (2015)*

As we have seen, the risks of losing our acquisition of knowledge, skills and know-how have been clearly identified by leaders in the focus groups. This could ultimately turn out to be problematic, leading to a concentration of skills in the hands of the few, and even the disappearance of some of these assets.

80 See, for example, the [work of Mireille Delmas-Marty on digital technology and AI](#) or [the work of Unesco](#)



“The loss of skills has always existed. It’s what happened, for example, when we switched from shorthand to the computer. There has always been a loss of skills and expertise when people have had tools to support them.”

Executive of an SME
(Construction industry)

“We are in the process of cutting off the branch beneath the construction of expertise by subcontracting the acquisition cycle to artificial intelligence.”

Executive of a small business
(HR consulting)

According to the [two-year study carried out by LaborIA](#) (2024), a laboratory dedicated to the study of the effects of AI on work⁸¹, the deployment of AI systems generates tensions between the “management logic of designers or decision-makers and the logic of the actual work of the workers”. The former aims to optimize processes and productivity, while the latter is concerned with the recognition, autonomy and meaning of work in the face of these changes. This “conflict of rationality” can lead to difficult situations for working people, if it is not resolved by a compromise between the stakeholders. Conversely, a successful compromise can lead to ‘capacity-generating’ configurations.”

Beyond the field of cognition and skills, leaders will have a role to play in setting up environments that are truly propitious to the development of human potential.

The widespread use of automation and AI might indeed lead to blocking out our singular, sensitive capabilities and inhibiting people’s self-expression.



Once AI starts churning data and tending to converge toward the mean, we will progressively see the extremes being pushed further out, in other words, divergent thinking, incipient ideas and, potentially, the death of innovation in the medium term. This presupposes that we are capable of exercising critical thinking in the use of artificial intelligence, but critical thinking is already the poor relation of skills in a company.

Executive of a small business (Consulting)

These risks of the standardization of thought and of speech, of collective impoverishment, can nonetheless be set against the new roles likely to be filled by AI, which may, in mobilizing its generative capacities, find for itself a place for stimulating debate and exercising argumentation, by playing an adversarial role.

The use of AI systems may also lead to a form of passivity, with individuals losing interest and acting at odds with the perception of the signals from their environment and their sensory capacities.

⁸¹ In 2021, the French Ministry of Employment and Inria (French Institute for Research in Computer Science and Automation) jointly founded the [LaborIA](#), a laboratory for constructing and consolidating a field vision for better understanding artificial intelligence and its effects on work, the active population, jobs, skills, and social dialog.



AI, AUTONOMY AND SURVEILLANCE IN THE WORKPLACE

Extract from an interview with Yann Ferguson, specialist in changes in the workplace,
Doctor of Sociology, and Scientific Director of LaborIA

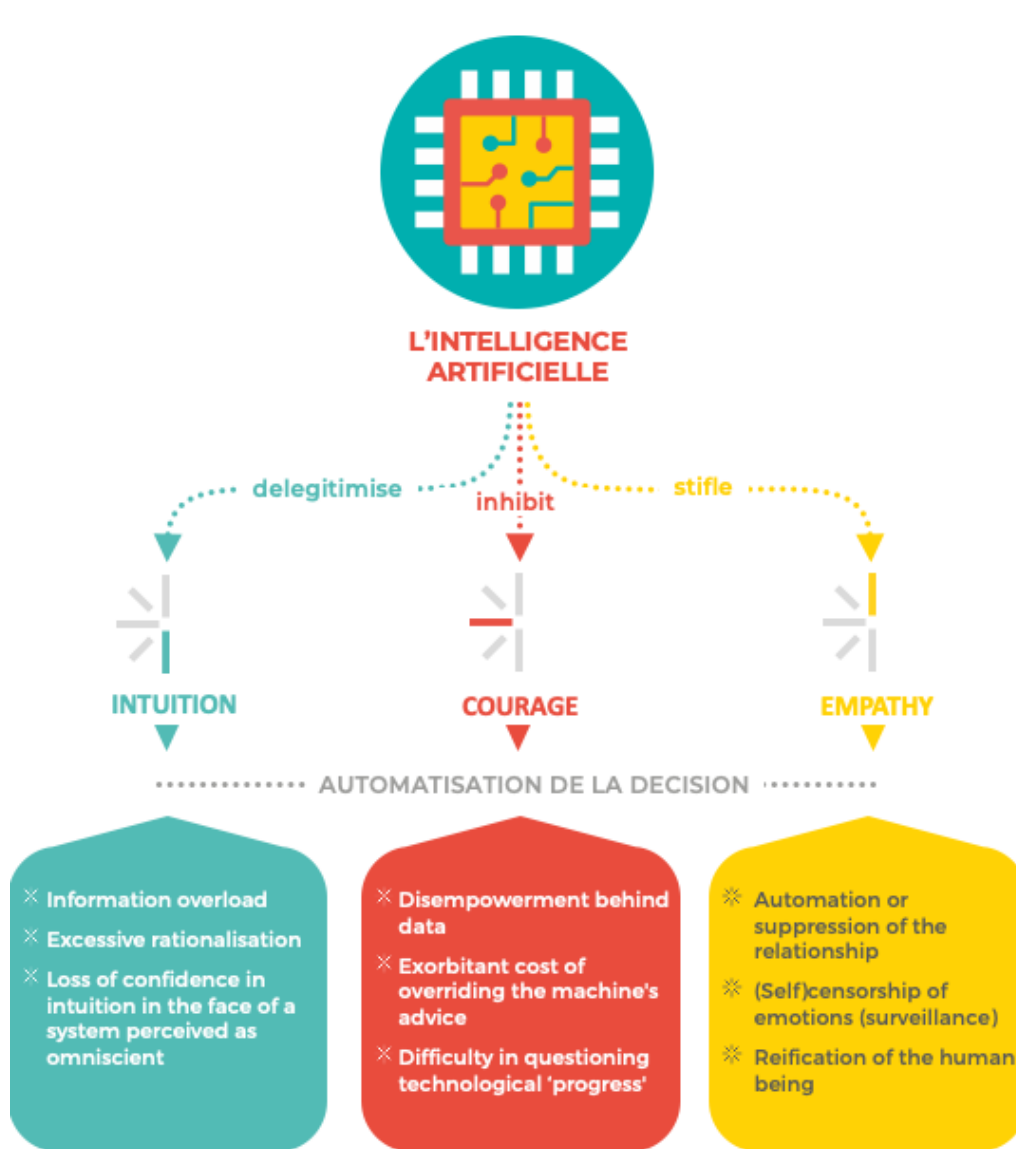
AI can increase the feeling of injustice at work on two levels:

- First by a form of “**active domination**”, with a system that, very clearly, has been introduced by management as a way of keeping track of employees, controlling what they do (...)
- But, in another way too, with artificial intelligence bringing in a form of insidious control, not through any decision of management, but because in our relationship to the tool, in the way the tool expresses its results, we are likely to develop a certain form of **passivity**, and I call this passive domination. This may be due first of all to having too much trust in the system or not enough trust in oneself. It may also be because, increasingly, we are happy to settle for a solution that produces results quickly, and we don't want to expend more energy than is needed for doing this task. It may also be because we are excessively focused on the system to the detriment of our perception of our environment (...). It may also be because we gradually become more and more dependent on the system, and we can't work things out if we don't have the system.

Whatever the case, there is a whole stack of interactions with the machine which, progressively, insidiously and passively, will increase the hold that AI has on our own practices and on our own decisions.

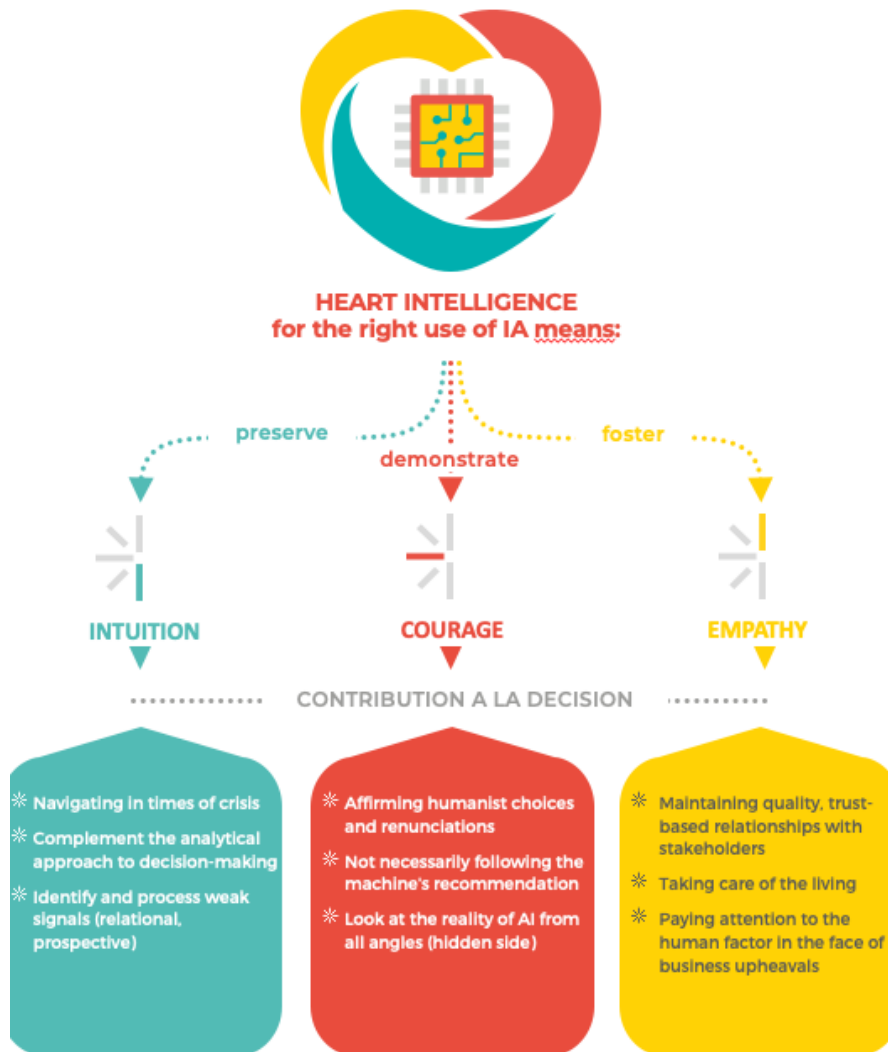
Source: [Labor IA - le podcast \(12/20/23\)](#)

To summarize, uncontrolled development of artificial intelligence and widespread automation can pose threats to our sensitive faculties, in that they are likely—when taken to the extreme—to play a part in delegitimizing intuition, inhibiting courage, and stifling empathy.



This will make heart intelligence all the more necessary for making a difference and contributing to a more informed adoption of AIS, in a society sometimes inclined to deploy these systems without due reflection.

We can therefore propose the diagram below as an attempted response to the question about the dynamics between artificial intelligence and heart intelligence as seen through the prism of the leader's decision-making, as discussed in this study.



Conclusion: Leading from the heart in the age of artificial intelligence



“Remaining smart [in a world of artificial intelligence] means understanding the potential and the risks of the digital technologies, and being determined to remain in control in a world populated with algorithms.”

“Must we remain spectators while software makes our personal decisions? Certainly not. Remaining smart does not mean placing blind trust in the technology, nor in overly distrusting it. It is more about understanding what AI can truly do and what remains in the realms of marketing hype and techno-religious faith.”

Gerd Gigerenzer, *How to Stay Smart in a Smart World*
(*Why Human Intelligence Still Beats Algorithms*), 2022

This study has made it possible in particular to cast light on the markers likely to be set, by distinguishing areas of relevance for AI and identifying cases of use where its need may be called into question:

- either because the artificial intelligence systems would be called upon to operate in contexts that are too volatile and uncertain for them to be of lasting utility, calling into question their true return on investment;
- or because they bring with them high risks of a loss of perspective, intuition or resilience for the individual and for the organization;
- or because they involve unethical or superfluous usages (passing fads, marketing hype), leading to a waste of resources.

The digital world and corporate decision-makers alike still pay too little attention to the consequences of what they are deploying, and to the disputes and difficulties that the technology may give rise to.

They are insufficiently aware of the underlying principles of the tools and objects that they handle every day, considering them to be “just instruments”⁸², whereas they constitute a system and are indissociable from the political, cultural, ethical, ecological, and social challenges that need to be discussed collectively.

In sociological terms, leaders are moreover influenced by the thought standards specific to their environments. They are exposed to imaginaries and scenarios presented as “inevitable and desirable”, which set up AI as an unquestionable source of economic growth, and even of human progress. Sometimes, they are themselves the producers and the active relays of these accounts and visions. The conventional media are not necessarily the most influential forces. Think-tanks (funded by private players, individuals, companies) and certain networks play a fairly predominant role in the production and dissemination of these imaginaries, and in the drafting of public policy proposals, which does not help in ensuring that decisions for the future are taken with due deference to the needs and opinions of all stakeholders in our society.

⁸² [Media “Dans les algorithmes”](#) (2024)



In this context, the determination and the mobilization of enlightened and humanistic leaders, capable of asserting courageous choices that go beyond the “for or against”, and based on debate, may prove precious.

This involves expanding the focus of the field of analysis, by looking beyond the quest for gains in efficiency or performance alone (of individuals or for the company) in order to take account of the impacts of AI on a larger scale, and in particular:

- Understanding the dynamics at work: being able (and being trained) to scrutinize the determining factors and the effects of the deployment of the technology, with an awareness of what is going on “behind the scenes”, and dedicating the time needed to stay informed and optimize the prospects for the future.
- Cultivating critical thought: questioning and calling into question, being able to keep things in perspective despite the speed of change, both individually and within one’s organization.
- Creating and sustaining dialog with the company's internal and external stakeholders on the judicious use of AI, while envisaging its potential drawbacks and its risks.

Taking account of advice in the strategic decision-making processes and seeking a certain balance in the hoped-for individual and collective benefits.

- Anticipating and organizing the resilience of the organization, not least by considering how to revert to “manual” mode if and when necessary.
- Developing and reinforcing heart intelligence, which could well make the difference, in light of the choices that the widespread deployment of AI (sometimes chosen, sometimes endured) will give rise to.

APPENDICES

Appendix 1 : Bibliographu

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Appendix 2: Methodology and focus groups

This study was conducted between mid-March and May 2024 on the basis of bibliographical research, analysis of the academic literature, and interviews with experts in a multidisciplinary approach. It was supplemented with focus groups of leaders and executives from companies of different sizes and from various sectors.

Executives or experts interviewed:

- Pascal Alix (lawyer)
- Mikael Coste (Naos)
- Antoine Grillard (Saint-Gobain)
- Emery Jacquillat (CAMIF)
- Alban Leveau-Vallier (philosopher)
- Julien de Sanctis (philosopher)

Focus groups

- Organized with the CJD (*Centre des Jeunes Dirigeants* - Young Executives' Center) and its territorial network
- Four 2-hour discussion groups bringing together 15 leaders or senior executives from different companies (2 in-person sessions, 2 video conferences, voluntary registration)
- From companies of different sizes and diverse modes of governance, sited throughout France:
 - Leaders / senior executives of large corporations or mid-caps (4)
 - Executives of SMEs (6) and small businesses (5)
 - 3 mission companies
 - Operating in different secondary and tertiary sectors
 - Industries and services in the fields of materials for industry and housing, construction, mobility, waste disposal and management, cosmetics, personal services
 - Consulting and intellectual services: training and coaching, technology and IT consulting, assets consulting, CSR consulting, HR consulting
- 5 HLU alumni, the rest knowing little or nothing about the association.

These focus groups provided the opportunity to discuss the role of the leader and the broad categories of decision-making relating to the leader's competence and responsibility, how AI is perceived and understood, the perceived risks and benefits, the cases of use implemented or envisaged, the questions raised, and the concrete problems encountered or likely to be encountered.

Appendix 3: Chronology of AI and of its technical developments

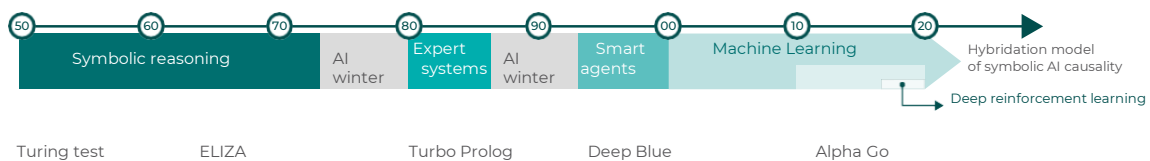
It was in the mid-20th century that AI began to take shape as a scientific discipline, on the occasion of the Dartmouth Conference in 1956, which postulated that all aspects of human intelligence could be simulated⁸³, and this marked the very first occurrence of the term “artificial intelligence”.

Although the 1950s and 1960s witnessed major progress, notably with Alan Turing and his famous test, the initial optimism came up rapidly against the lack of computational power and storage capacity for processing more complex problems. The funding for and the appeal of AI diminished, leading to the first “AI winter” in the 1970s.

The 1980s saw a renewed interest in AI, thanks in particular to the growth in expert systems⁸⁴ using known facts and rules and inferences (of the type “IF-THEN”) for making decisions in specific domains. This period was marked by increased investments in developing compute power (Deep Blue from IBM for example) and by industrial opportunities⁸⁵. This was nonetheless followed by a new winter in the 1990s, on account of the difficulty in rolling out the expert systems and unsatisfied expectations.

We would have to wait for the advent of the Internet in the years 2000-2010 to witness a new wave of AI development, buoyed by more sophisticated algorithms (“deep learning” algorithms) based on the performance of artificial neural networks inspired by the operation of the human brain, and by access to the big data enabling them to be trained. Furthermore, rather than using conventional processors (CPUs), some researchers turned to graphics card processors (GPUs), the power of which has grown exponentially, spurred on by the video games industry, and whose parallel architecture is more propitious than CPUs to training a neural network.

FIGURE 1: CHRONOLOGY OF AI



Source: Caisse des dépôts –Local Authorities and AI survey – 2019

⁸³ "The study is to proceed on the basis of the conjecture that every aspect of learning or any other feature of intelligence can in principle be so precisely described that a machine can be made to simulate it." John McCarthy, Marvin L. Minsky, Nathaniel Rochester, Claude E. Shannon, *A Proposal for the Dartmouth Summer Research Project on Artificial Intelligence*, August 31, 1955, *AI Magazine*, vol. 27, No. 4, 2006.

⁸⁴ An expert system is a software program capable of answering questions by reasoning on the basis of known facts and rules. It can serve as a tool for aid in decision-making.

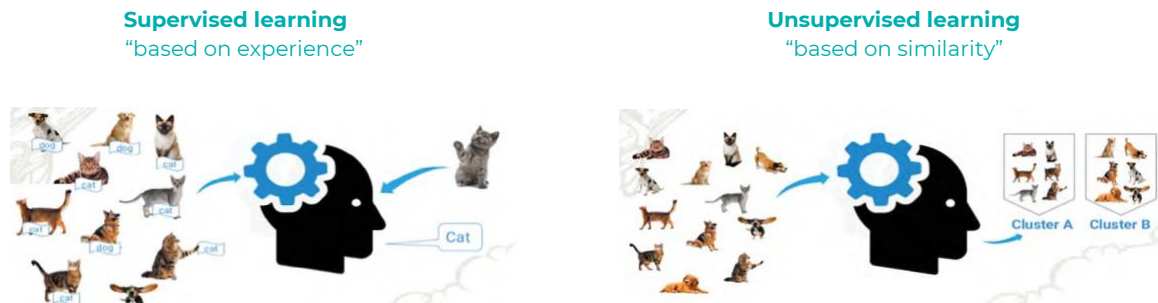
⁸⁵ Dendral in 1965 in the field of chemistry, MyCin for blood disease diagnostics and prescription in the medical sector, R1 and XCON in IT, Sachem at Arcelor for managing blast furnaces.



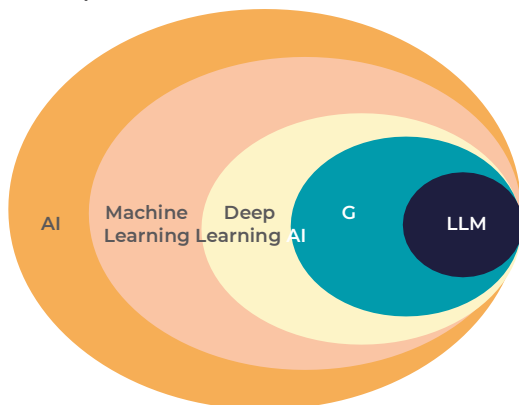
The 2000s and automatic learning

The start of the 21st century was marked by the rise in automatic learning, two broad categories of which we present here:

- supervised learning, which requires a preliminary stage of data labeling (still called annotation or labeling), generally done by humans, to be able to deduce predictions from it;
- unsupervised learning, in which the algorithm operates on the basis of non-annotated examples to classify them in categories (“clusters”), by identifying common characteristics and structures in them.



A subset of automatic learning, the techniques of deep learning, based on a computing architecture called “neural networks”, was a particular focus of development from 2010.



2022 and the generative AI revolution

A new branch of artificial intelligence, generative AI is distinguished from previous approaches by its capacity to generate original content based on training data rather than simply analyzing or classifying these data.

It is based on a new structure of neural networks (“transformers”, as described for the first time in 2017 by a Google team in the article “Attention is all you need”) and models (“foundation models”), which are more powerful, scalable and contextually intelligent, thereby paving the way to significant advances in many domains.

Popularized by the launch of ChatGPT, accessible to the general public, generative AI is based, in the conversational domain, on the use of a new type of model:

- **large language models or LLM.**

Based on recurrent neural networks that integrate better correlation of words with one another and trained on large production corpora written by humans, they have revolutionized the generation of coherent and contextual text, simulating human thought and reasoning in a way hitherto unprecedented.

Appendix 4: Glossary

Algorithm: Description of a sequence of steps for obtaining a result based on elements provided at input.

Automatic learning (or **Machine learning**): Process whereby an algorithm evaluates and improves its performance without intervention from a programmer, by repeating its execution on datasets until relevant results are regularly obtained.

Notes

1. An automatic learning algorithm includes a model for which it modifies the parameters with a generally random initial value, according to the observed result.
2. Automatic learning pertains to artificial intelligence.
3. Automatic learning is frequently used for processing natural language and computer vision or for conducting diagnostics and forecasts.

Unsupervised learning: Automatic learning whereby the algorithm uses a raw dataset and obtains a result based on the detection of similarities between some of these data.

Note: Unsupervised learning is used, for example, for identifying behaviors and recommending purchases.

Supervised learning: Automatic learning whereby the algorithm is trained on a defined task using a dataset, with each data item associated with an annotation indicating the expected result.

Notes

1. Supervised learning most often uses neural networks.
2. Supervised learning is used, for example, for image recognition and automatic translation.

Reinforcement learning: Automatic learning whereby an external program evaluates positively or negatively successive results of the algorithm, with the accumulated results enabling the algorithm to improve its performance until it attains a previously set objective.

Notes

1. Reinforcement learning is used in particular in robotics.
2. The efficiency of reinforcement learning has been attested by its use in certain strategic games such as the game of Go.

Deep learning: Automatic learning that uses a network of artificial neurons composed of a large number of layers, each of which corresponds to an increasing level of complexity in the processing and interpretation of data.

Note: Deep learning is used in particular in the automatic detection of objects inside images and in automatic translation.

Knowledge base: Part of an expert system containing all the information, in particular rules and facts, that constitute the field of competence of the system.



Datacenter: Physical site containing the computing or telecommunications infrastructures for storing, processing, or distributing data securely.

Cloud Computing: Refers to the use of the memory and the computational capacities of computers and servers spread around the world and linked by a network. The applications and data are no longer on a specific computer but in a “cloud” composed of many remote interconnected servers.

Data: Representation of information in conventional form designed to facilitate its processing.

Input data: In the field of artificial intelligence, input data is data used for the automatic learning or decision-making of the AI system (in production phase).

Bayes estimation: Bayes estimation or inference is based on a theorem stated by the mathematician Thomas Bayes. This theorem gives a method for calculating the probability of a phenomenon based on the knowledge of certain information. Bayes estimation is therefore the method based on this reasoning.

- Example: Knowing 1) that my shoes are smooth-soled, and 2) that it has rained, the risk of slipping on my way to work this morning is high.

Artificial intelligence: Theoretical and practical interdisciplinary field whose purpose is the understanding of mechanisms of cognition and reflection and imitating them by means of a hardware and software system for the purposes of assisting with or substituting for human activities.

Software: Set of programs, processes and rules, and possibly documentation, relating to the operation of a data processing system.

Model: The AI model is the mathematical construction generating a deduction or a prediction based on input data.

Inference engine: Part of an expert system that selects and applies rules with a view to resolving a given problem.

Neural network: In the field of artificial intelligence, a neural network is a computation architecture based on an organized set of interconnected neurons for resolving complex problems such as computer vision or natural language processing. It involves a particular type of automatic learning algorithms characterized by a large number of neural layers, whose weighting coefficients are adjusted in the course of a training phase (deep learning).

Expert system: Set of software making use in a specific domain of explicit and organized knowledge that can take the place of a human expert.

Sources: [Official Journal](#), [CNIL](#)

ABOUT US



Founded by 15 business leaders, Heart Leadership University is an educational and scientific non-profit organization.

Our mission is to revolutionize the education of business leaders, renew the imaginaries of leadership, and bring to the fore a movement of leaders who will lead, innovate, and make decisions from the heart (with intuition, courage, and empathy) to preserve our humanity and overcome the challenges of the 21st century (misuse of AI systems, ecological collapses, rampant inequalities).

Our activities: a transformation pathway for company managers, spaces for information and debates, and research activities.

Guided by its Scientific Advisory Board, HLU conducts independent, interdisciplinary research work in a singular field: that of relations (inter-human relations, relations with other living creatures, with machines). Largely unexplored, this field is nonetheless fundamental, insofar as relations are at the heart of what makes us human beings. Our current programs are focused on leaders and the exercise of leadership. How, as sensitive human beings, do leaders relate with their living environment, with their field of operation? Can leaders really transform their companies by making strategic decisions driven from the heart? What are the imaginaries of leadership of yesterday and of today, and what kind of leaders do we want for the 21st century? What are the consequences of deploying artificial intelligence systems on the quality of human relations, and on the capacity of leaders to make decisions in total freedom? These are some of the questions that our work aims to document, disseminate and debate.

To find out more, visit our website. <https://www.heartleadershipuniversity.org/>



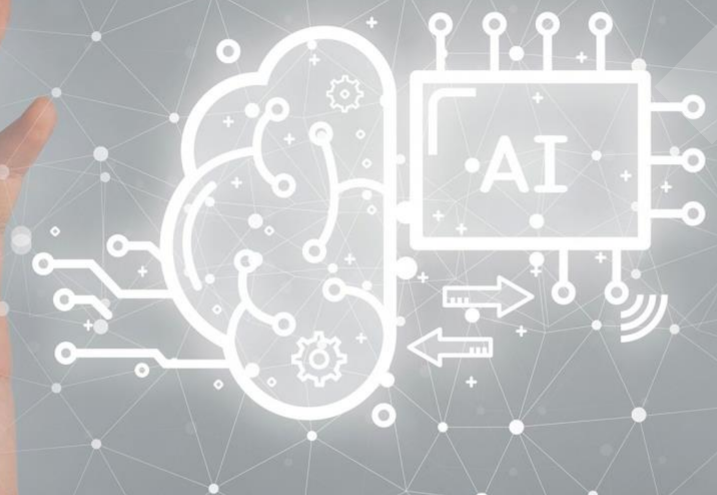
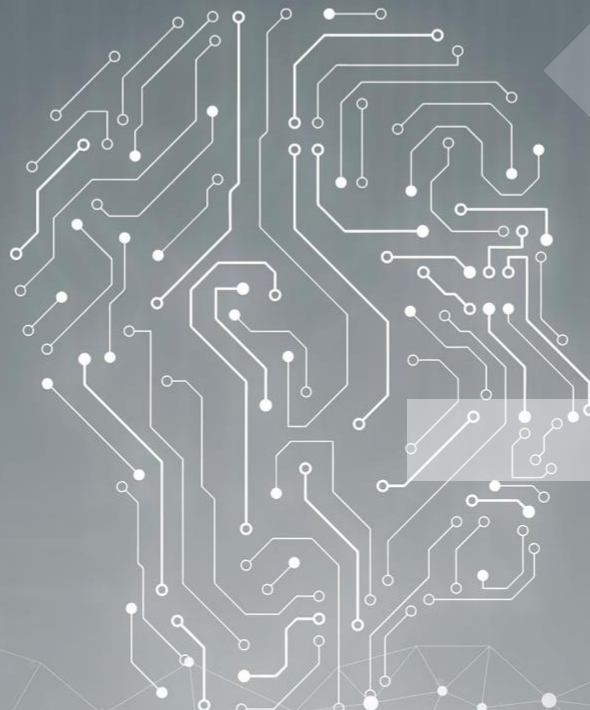
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