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The Artificial Intelligence Revolution by 2035

Keeping humans in the loop: regulating and setting limits to maintain control

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Executive Summary

Keeping Humans in the Loop: Regulating and Setting Limits to Regain Control Over AI

Introduction

This study analyzes the impact of the **artificial intelligence** (AI) revolution through 2035 and the means to regulate this technology by setting limits to **maintain human control**. Since the launch of ChatGPT 3.5 in November 2022, AI has evolved from a specialized IT tool to a mass-marketed consumer product, with over 1.5 billion monthly users worldwide; 25% of the working population in developed countries uses it on a daily basis. Commissioned by the CRiP (Club of Infrastructure, Technology and IT Production Managers), this study analyzes the impacts of the AI revolution in **the short term (2026–2028)** and **the medium term (2035)**. It employs a **mixed methodology**, including a **survey** of companies and organizations in France, Europe and internationally - with a total of 460 responses - supplemented by twelve **interviews** with business leaders, practitioners and academics. This study addresses the economic, political, environmental and societal dimensions of the AI revolution, formulating **operational recommendations** for businesses and policymakers. It focuses on developed countries, primarily France and Europe, but includes comparisons with other countries such as the United States, China and Japan.

In terms of methodology, **three parallel versions of the same survey** were administered to distinct audiences, reinforcing the study's conclusions:

A. **French-language survey of the Jacques Delors Institute (JDI) network (327 respondents):** this includes researchers, European civil servants, think tanks, NGOs and public administrations within the European Francophone community.

B. **English-language survey of the JDI network (96 respondents):** with a similar audience to the French-language version, but broader in terms of international reach.

C. **Survey of CRiP members (37 respondents):** primarily business leaders, Chief Information Officers (CIOs), or Chief Technology Officers (CTOs), members of the CRiP in France.

I. Current State of Affairs and Short-Term Scenarios (2026–28) on Human-AI Coexistence

1 . Security and Agentic AI

The arrival of **'agentic'** AI represents a major paradigm shift. These systems, which are capable of acting **autonomously**, planning, using tools and self-correcting, transform AI into a true **cognitive operating system**. AI is no longer merely an interlocutor but an autonomous performer of **entire work streams** - academic research, software development, customer management - without step-by-step human intervention. The priority for the tech sector has been to promote accessibility, ease of use and performance, sometimes at the expense of human control. As a result, certain **troubling behavior** has already been reported by engineers working on the next generation of AI, notably disobedience to instructions. This underscores the urgent need to develop **robust safety mechanisms**: 'kill switches' enabling instant deactivation, rapid reporting channels to developers, and effective **human oversight** throughout the entire model lifecycle.

2 . Impacts on work, professions and skills

Contrary to some alarmist predictions, **unemployment rates** in the world's major economies (the EU, the US and China) have **not risen significantly** since 2022. The few variations observed are mainly attributable to exogenous factors (post-COVID recovery, wars, trade tensions). By 2028 and beyond, however, agentic AI poses a 'tsunami' risk to so-called 'white-collar' **office jobs** which account for the majority of jobs in Western countries. More than **300 million** jobs worldwide are expected to be vulnerable to **automation** in the short term, while **150 to 200 million new jobs** could be created, particularly in digital infrastructure, cybersecurity and AI management. Nevertheless, the underlying trend is a **transformation in the nature of work**, as more than 50% of jobs in developed countries are expected to undergo profound changes; repetitive tasks (synthesis, planning, basic coding) are being taken over by AI, while human value is shifting toward critical thinking, emotional intelligence and strategic oversight. **Workers capable of using AI will gradually replace those who cannot**, introducing a logic of human augmentation rather than short-term replacement for those who know how to use it, thereby opening up prospects for increased **economic productivity**.

3 . Societal Impacts of AI

AI generates **mixed societal effects**. On the positive side, it accelerates **medical research** (early diagnosis of Alzheimer's, development of innovative treatments) and **scientific research** because it allows for the processing of large amounts of data within a short timeframe. AI

also helps make **knowledge more accessible** to certain segments of the population or to poorer countries where education is not readily available. On the negative side, it is disrupting **educational systems**, augmenting the risk of intellectual dependence and **the erosion of critical thinking** for younger generations. Cases of pathological **social isolation** linked to AI have been documented, with psychological dependence leading to suicide in extreme cases. The line between humans and machines is blurring, potentially causing a profound **identity crisis** for societies.

4 . Technical, Energy and Financial Challenges

Technical: AI has already exhausted most of the data available on the Internet, which points to stagnation in new models. Synthetic data (combining AI-generated data with a human creative touch) and decision-making latency (allowing AI more time to generate responses) are insufficient long-term workarounds. Excessive use of synthetic data can cause 'model collapse' and a decline in performance, with the risk of a slowdown in the pace of technological development by 2028 and beyond.

Energy: A single ChatGPT prompt consumes about ten times more electricity than a Google search. Data centers already consume about 415 TWh per year (close to the equivalent for all of France), and are expected to more than double, reaching 945 TWh by 2030 (equivalent to that of Japan). This creates major energy supply challenges for companies in the sector, with very negative consequences for the environment. Small Language Models (SLMs), which are more energy-efficient, offer an alternative but remain limited compared to LLMs due to their degree of specialization which makes it more difficult for them to perform complex tasks.

Financial: Over $1 trillion has been invested globally since 2022, but 80% of AI projects fail to generate a return on investment - twice the rate of traditional IT projects. The return on investment is negative for the majority of startups and model developers, but strongly positive for chip manufacturers and hardware suppliers (Nvidia) or Cloud providers (Azure, Google Cloud). The risk of a speculative bubble - comparable to the *dot-com* bubble of 2000 - is real, even though a market consolidation by 2028, accompanied by corrections of varying severity, appears to be the most likely scenario.

II. Systemic Risks of AI and Applicable Regulatory Mechanisms

1 • Systemic risks to the economy: profound transformations in strategic sectors

The sectors most vulnerable to automation are administration, finance, insurance, marketing, translation and law (paralegal tasks) - sectors with a high proportion of **repetitive tasks**. The **service sector**, which accounts for 75 to 80% of jobs in developed countries, is particularly exposed, posing a major **systemic risk**. Automation does not always mean the disappearance of a profession, but often a profound **transformation** in the nature of tasks. **Recent graduates** are the most vulnerable group, facing a contraction in opportunities to enter the labor market; the standard tasks traditionally assigned to them (summary writing, research, drafting) are precisely those that AI excels at. In response, the European AI Act, effective August 2026, mandates human oversight for HR decisions, algorithmic transparency, and fines of up to €35 million (7% of revenue). The EU also approved a Directive in 2024 on improving working conditions for digital platforms, with rules to **regulate algorithmic management**. Additional measures have also been implemented at the **national level**, including professional transition insurance and mandatory social dialogue on AI.

→ **Proposed solutions:**
Protecting economic sectors impacted by AI

1st Financial Envelope

At least €100 billion to be mobilized by the EU and its member states by 2030 for all measures to protect economic sectors impacted by AI, amounting to approximately €20 billion per year over the next five years, starting in 2026. This amount remains lower than the expected productivity gains from AI, estimated at **€400–600 billion** over the same period.
Funding: a mix of 50% EU budget (MFF/ joint borrowing) plus co-financing from Member States, private capital, and new "own resources" (AI/data taxes) for the remaining half.

I MEASURES BY 2026–28

- Creation of an **AI Employability Guarantee** (upskilling obligation): employers become legally responsible for maintaining employability in the face of automation, with upskilling pathways toward higher-level tasks.
- Mandatory **ethics and digital oversight committees** for companies with more than 50 employees, tasked with conducting annual audits of AI usage.
- **Non-Technological Substitution clause** in collective bargaining agreements: AI may

only handle additional volumes or low-value-added tasks.
- **Extend restrictions on algorithmic work management** set forth in the 2024 Directive (protection of personal data, requirement for human oversight in HR evaluations, right to transparency regarding algorithms and collected data) to all affected employees.

MEASURES FOR 2028–2030

- Creation of a 'digital dividend': a **national sectoral transition fund** to finance early retirement, long-term retraining, and unemployment benefits.
- **Reduction in working hours without a reduction in pay**, financed by productivity gains from AI.

FUNDING: VARIOUS PROPOSALS FOR A 'ROBOT TAX' BY 2028–30

- **Usage tax / wage equivalence**: the company pays a tax equivalent to the social security contributions of a human employee being replaced.
- Corporate income tax **surcharge** for companies whose revenue-to-workforce ratio exceeds a certain threshold.
- **Elimination of tax benefits** related to investment in technologies that replace human labor.
- **Data tax**: a fee proportional to the amount of data used for training models.

MEASURES FOR 2030–2035 AND BEYOND

- Creation of **sovereign technology funds** (modeled after the Norwegian oil fund), with public equity stakes in AI companies using public data.
- Gradual introduction of a **four-day workweek** (or even shorter) in specific cases.
- Far-reaching reform of social protection systems, with the possible introduction of a **Universal Basic Income** (UBI): universal, individual, unconditional, and regular - involving a paradigm shift from current systems and a potentially significant increase in public spending.

2 . Systemic risks to employment: AI training to enhance human capabilities rather than replace them

European companies are **significantly behind,** with approximately 20% adoption of AI compared to 43% in the US. The AI Act mandates, as of August 2026 (Article 4), a minimum level of **AI literacy** for all personnel using these systems. Governments must develop sector-specific **training programs** (banking, healthcare, law), fund reskilling through enhanced personal training, and implement transition programs with sector-specific pathways. The central objective must be the development of a mutually reinforcing **human/AI partnership**, where the machine handles repetitive tasks and humans contribute creativity, ethical judgment, empathy, critical thinking, and relational/strategic intelligence (**soft skills**), promoting **human enhancement** rather than replacement.

3 . Promote retraining toward sectors where AI enables expansion

Sectors with high job creation potential include:

- **Healthcare and biotechnology**: bioinformaticians, assisted genomic medicine, augmented radiological diagnostics, digital twins of organs.
- **Cybersecurity and ethics**: AI ethicists, algorithmic compliance officers, predictive cyberdefense analysts.
- **Digital infrastructure**: data center engineers, edge computing architects, data curation specialists, data experts and data engineers.

Soft skills represent the type of value-added most resistant to automation, bolstering several existing sectors such as **people-oriented professions** with high human value (healthcare/personal services, teaching/mentoring), as well as **manual labor** (plumber, carpenter, electrician) where robotic AI is still far from rivaling human capabilities. Governments must implement measures to facilitate career transitions into **new sectors** where AI enables an expan-

sion, while investing more in these **existing professions** that are emerging **stronger** from the technological revolution.

→ Proposed solutions (by 2026–28):
Extensive support for AI training

Estimated total cost: At least €50 billion for the EU and its member states by 2030 (included in the first €100 billion financial envelope), or approximately €10 billion per year over the next five years, starting in 2026.

Human Upgrading Tax Credit: a tax incentive for companies investing in Assistive AI (diagnostic support), contingent upon 100% of affected employees completing certified training.

European Digital Transition Fund: funding for 6 to 12-month 'AI transition leave' for at-risk sectors, paid at 90% of the reference gross salary for the first month, and 70% for subsequent months.

Right to algorithmic transparency in the workplace: mandatory impact statement on skills for every new AI tool deployed in a company.

Human Enhancement Index (analogous to the gender equality index), rating companies on their ability to maintain employment while integrating AI; priority access to public procurement for the highest-rated companies.

Mandatory sector-specific micro-credentials: short modules validated by professional associations in strategic sectors (e.g., healthcare, industry, finance/banking, insurance, energy).

European AI Skills Passport: an EU-wide interoperable certification (based on DigComp 2.2 updated for 2025-2026), facilitating professional mobility.

2028 timeframe: integration of AI at the heart of a **new Fifth Freedom for the European single market** to be created, dedicated to education, research and innovation (in addition to the four historic freedoms: goods, services, people and capital).[1]

4 • Disinformation exacerbated by AI, with systemic risks for democracies

AI multiplies the capacity for disinformation: instant production of convincing content in multiple languages (text, video and audio), ultra-realistic deepfakes of political leaders, and large-scale **automated election manipulation** campaigns. These are often sponsored by authoritarian regimes (Russia, Iran, North Korea) to divide the West and fuel the rise of populism by undermining democracies from within. AI bots in 2026 are capable of autonomously engaging in conversations with **psychological microtargeting**, making them very difficult to detect. In Europe, the AI Act (Articles 12 and 13) mandates **auditability**, transparency and automatic logging of systems throughout the model's entire lifecycle, and proposes tools for continuous **bias correction** (MLOps, AIF360, *Fairlearn*) along with the technique of digital watermarking. However, the European Commission's ongoing process of simplifying digital laws (***Digital Omnibus***) could weaken some of these protections; finding **compromises** is therefore essential.

→ Proposed solutions (by 2026–28):
Curbing AI-exacerbated misinformation

- **Secure 'data sandboxes'** managed by the European AI Office: companies test their algorithms on EU-certified data to detect bias.
- Mandatory and dynamic **algorithmic passport** for every high-risk AI model, containing the training data history, successive bias tests, along with a change log.
- Real-time **cross-platform signaling** in the event of detected manipulation bias.
- **Enhanced digital watermarking:** mandatory integration of metadata (C2PA) at the hardware (sensors) and software levels for all content in the European public domain.

1 This proposal is based on Enrico Letta's 2024 report *Much More than a Market*.

5 • Systemic and Multifaceted Environmental Impacts of AI

AI poses a **systemic ecological challenge**: the electricity demand of AI-optimized data centers is expected to more than quadruple by 2030, compounded by **massive water consumption** which is rising sharply each year (4 to 6 billion m^3/year - equivalent to half of the United Kingdom's annual consumption), as well as **electronic waste** from specialized chips with short lifespans. The combination of these factors is placing **growing pressure** on **local ecosystems**. The EU has responded by introducing **transparency requirements** (environmental footprint reporting) in the AI Act, a future **Green AI label** to compare AI models in terms of their energy efficiency, as well as financial support for research into SLMs and **eco-design**. Paradoxically, AI also contributes positively to the ecological transition in other cases, for example by optimizing the power grid via ***smart grids***, precision agriculture, or satellite monitoring of GHG emissions. Nevertheless, the current process of simplifying climate standards (via the ***Omnibus Act***) risks weakening some of these measures; a **fair balance** must be found so as not to sacrifice the environment on the altar of competitiveness.

→ Proposed solutions (by 2026–28): ***Reduce and monitor the environmental impacts of AI***

- **Right to environmental audit**: real-time public access to data centers' electricity and water meters.
- **Proportional digital carbon tax** for models exceeding a threshold of daily requests, with reduced VAT for energy-efficient processors.
- **Standardization of *Small Language Models*** (SLM): requirement for providers to offer a lightweight version for simple tasks.
- **Water quotas per teraflop**: maximum limit on liters of water consumed per computing unit; ban on cooling with drinking water in water-stressed areas.
- **Repairability/sustainability index** for AI infrastructure: mandatory recycling and reuse of equipment.

6 • Loss of sovereignty due to Europe's dependence on foreign technologies

Europe is **heavily dependent** on **American technologies** at three levels: the Cloud (65% controlled by AWS, Azure, Google Cloud), hardware/processors (nearly exclusive use of Nvidia GPUs), and the foundational models integrated into large-scale daily work tools (ChatGPT, Microsoft 365, Google Workspace). The US **Cloud Act** and its extraterritorial provisions directly impact the EU's digital sovereignty because they neutralize the protections of the GDPR. The EU has responded with measures including **sovereign Cloud labels** (EUCS or *SecNumCloud*) and by investing in European digital infrastructure, such as **supercomputers** (*EuroHPC* network) through initiatives like the 'AI Continent Action Plan' or the 'Data Union Strategy'. The goal is to fund research and support **European leaders** such as *Mistral AI* (France), *DeepL* (Germany), and *Silo AI* (Finland). Despite these efforts, 65% of organizations in the EU admit they cannot remain competitive without relying at least partially on non-European providers. The **Draghi Report** (2024) identifies excessive regulation as a barrier to EU innovation in the digital sector, even though many economists point to other factors such as the **persistent fragmentation of the single market**.

→ Proposed solutions: ***Reduce dependence on foreign technologies and strengthen sovereignty***

2nd Financial Envelope

At least €300 billion to be mobilized for the EU and its Member States by 2035 across all measures to reduce dependence on foreign technologies, with the goal of pragmatic resilience and targeted sovereignty.
Funding: a mix of 50% EU budget (MFF/joint borrowing) + co-financing from Member States, private capital, and new *own resources* (AI/data taxes) for the remaining half.

METHODS FOR ALLOCATING THE FINANCIAL ENVELOPE

Digital Sovereign Fund (2026–35 timeframe)
At least **€30 billion/year over a decade** (**included in the second €300 billion financial envelope**) starting in 2026, to fund critical sovereign digital infrastructure (Cloud, supercomputers, data centers, AI factories) via public funds, public-private partnerships, or the "robot tax."

MEASURES BY 2026–2028

- Adoption of the ***Digital Omnibus*** (simplification of the AI Act, GDPR, DMA, DSA, etc.) planned by summer 2026, provided that simplification does not come at the expense of fundamental rights.
- **Strategic Public Procurement Policy**: European preference in public procurement for European AI solutions.
- **Data Union Strategy**: data sharing in key sectors (health, industry, energy).
- **Accelerated Chips Act**: Relocation of advanced chip production (GPUs, AI accelerators) to Europe.
- **Capital Markets Union** (by 2028) to enable European AI 'unicorns' to raise funds without being acquired by foreign groups.

III. Operational Recommendations for Businesses and Public Decision-Makers

1 . Open Source as a Lever for Sovereignty

Open Source is a method of software development and distribution in which the source code is made public, unlike closed 'proprietary' software. Open Source provides **strategic autonomy** (no possibility of access being cut off), **transparency** (no 'backdoors' often used for espionage), and allows for a break from 'proprietary lock-in'. Open Source enables the EU to compete with the US with far fewer financial resources; several European leaders have emerged through this approach (Mistral AI, Odoo, Grafana Labs, SUSE). But Open Source alone is **insufficient** if the hardware remains American, which is mostly the case since GAFAM companies are also leaders in this field. Thus, Europe must combine Open Source with the consolidation of **sovereign digital infrastructure**, the integration of the single market, and the Data Union Strategy.

→ **Proposed solutions (by 2026–35):** Approximately **€4 billion/year** in additional funding earmarked for open source - with a focus on AI and the Cloud (included in the second €30 billion/year financial envelope) + 1% of public IT budgets dedicated to maintaining existing Open Source systems.

2 . Regulating AI: Limiting/banning certain types of AI

According to the AI Act, technologies are regulated based on the degree of risk they pose, with **four** categories: **unacceptable** AI risk (prohibited: social scoring, subliminal manipulation), **high** risk (strict regulation: justice, employment, health), **limited** risk (mandatory transparency for chatbots), and **minimal** risk (voluntary codes of conduct). Certain gaps remain in the law, such as a **lack of flexibility** due to a review process that is too slow given the sector's rapid evolution, insufficient attention to the collective **societal impacts** of AI (misinformation/manipulation of democratic processes), and excessive reliance on **self-assessment** by companies (especially with the *Digital Omnibus*) which weakens compliance.

→ **Proposed solutions (by 2028):**
Addressing the gaps in the EU's AI Act

- **Mechanism for rapid updates to risk categories:** delegation to the European AI Board for annual reviews without a full legislative procedure.
- **Expansion of criteria for the "unacceptable risk" category**, particularly for biometrics and facial recognition.
- **Incorporation of societal impacts**, with a civil society section within the European AI Board.
- **Reinforcement of third-party compliance**

assessments: reducing self-assessment by companies, focus on the 'high risk' and 'unacceptable' categories.

3 . Reinforcing security for AI digital infrastructure, comparison with the nuclear sector

Digital infrastructure (data centers, AI factories) has become vital and highly strategic, introducing unprecedented **security risks**, both physical and in terms of cybersecurity. Although they do not operate in the same way, comparisons can be drawn with the security of **nuclear power plants**. The nuclear sector benefits from several decades of experience in the field of security, and certain measures can be **adapted** for digital infrastructure. Even though data centers already have significant security measures in place, these must be enhanced.

→ Proposed solutions (by 2028): ***Bolster data center security***

- **Based on the model of nuclear power plants**: increased system duplication and redundancy, with a reinforced backup power supply including a fully integrated 'islanding' system (total electrical autonomy).
- **Increased checks and searches**, with strict restrictions at physical access points.

4 . Building Global Governance for AI

The systemic risks posed by AI underscore the need to build a framework for **global governance**. Although many parallels have been drawn with **nuclear** power, the energy-military duality is too restrictive. The OPCW (Organization for the Prohibition of Chemical Weapons) regime on **chemical weapons and products** offers a more relevant framework for comparison regarding global AI governance, thanks to its complex multisectoral nature, analogous to that of AI. The UN is taking significant steps toward global AI governance with the **Global Digital Compact** (2024), the first **General Assembly resolution** on the subject (2024), along with the creation of an international **scientific panel on AI** (2026). Nevertheless, the instability of international relations makes any binding global framework unlikely in the short term. Global AI governance will thus require more pragmatic approaches:

→ Proposed solutions (by 2026–28): ***Creation of multi-level mechanisms***

- **International Organization for Standardization (ISO) standards**: global benchmarks establishing voluntary, yet rigorous guidelines. Enhanced, systematic integration into the AI Act – governance (ISO/IEC 42001), risk management (ISO/IEC 23894), data quality (ISO/IEC 5259), ethics and bias (ISO/IEC TR 24027).
- **Interregional coalitions**: The EU must require its major trading partners to adopt European standards for the responsible use of AI, leveraging its position as the world's largest single market and the extraterritorial scope of the AI Act. Development of **bilateral and multilateral frameworks on AI ethics**, modeled on the EU's approach with the GDPR.

IV. Medium-term prospective scenarios (2035 timeframe)

1 . Optimistic scenario: AI improves humanity

The rapid **technological advancement** of AI is managed effectively, thanks in particular to hybrid synthetic data and advances in clean energy. AI creates more jobs than it eliminates through widespread and effective training, enabling **human enhancement** rather than replacement via **human-machine integration**. This enables the global economy to enter a new era of **strong growth**, benefiting the entire population by **reducing inequalities** between nations and within countries. AI becomes a major tool for **scientific** and **medical progress**, leading to the discovery of treatments for many previously incurable diseases (cancer, Alzheimer's), thereby extending both the quality of life and human life expectancy. **Democracies are protected** by effective disinformation detection systems through robust public-private partnerships involving **strict regulations** in many countries around the world, following Europe's example. This includes the establishment of a **binding global governance** framework with a charter on the responsible use of AI ratified under the auspices of the UN, ensuring control over the technology used to serve the well-being of humanity. Finally, AI enables major **technological breakthroughs** that accelerate the deployment of **renewable** and **low-carbon energy**, including the early deployment of **nuclear fusion**; the goals of the **Paris Agreement** become achievable, and the planet is thus preserved.

2 . Pessimistic Scenario: Replacement and Chaos

The race for efficiency and globalized competition drives companies to **replace humans with AI on a large scale**, not only in the most vulnerable white-collar jobs but also in sectors previously protected (manual labor, care services). **Mass unemployment** triggers **severe social unrest**, as governments lack the resources to fund the significant public subsidies required, thereby increasing global precariousness and inequality. A number of democratic regimes thus shift toward **illiberalism**, particularly due to the failure to develop effective governance frameworks to combat **disinformation**, which undermines electoral processes. Energy consumption linked to AI skyrockets, causing large-scale power outages and **accelerating the effects of climate change**, which impacts countries around the world sooner than expected, exacerbating the **emerging chaos. Armed conflicts** erupt in several already fragile countries and international cooperation unravels, leading to a **failure** to establish robust **global governance**. Thus, in this scenario, we witness a **loss of control** over AI, triggering unprecedented crises that jeopardize the future of humanity.

3 • Intermediate Scenario (Most Likely): Mixed Progress

This scenario, considered the most **realistic**, combines positive and negative effects. A **relative slowdown** in AI technological development (due to data shortages and energy constraints) mitigates the extremes. Productivity and economic growth increase in many sectors, but in an unevenly distributed manner (similar to the US model). AI profoundly **transforms jobs** without eliminating them on a massive scale, while exacerbating **social inequalities**, particularly for young graduates and older workers who struggle to adapt. From an environmental perspective, AI drives progress in renewable energy and **low-carbon technologies**, but these advances are partially offset by a massive increase in **energy consumption**, with mixed effects on the climate and the implementation of the Paris Agreement. Some democracies (the EU, Canada, Japan) manage to **contain disinformation** through effective regulatory frameworks, but the majority of countries remain vulnerable, including the United States and developing nations where internal polarization deepens. Under European leadership, bilateral frameworks, interregional coalitions and ISO standards are able to emerge, but **without binding global governance** due to deadlocks at the UN stemming from Sino-American rivalry. According to this intermediate scenario, **AI amplifies several trends already visible in 2026** that are likely to intensify by 2035.

Conclusion

The AI revolution will profoundly reshape the economy, the workplace, the environment, democracies, and society by 2035. The central challenge will be to **keep humans in the loop** by regulating and setting clear boundaries to maintain control. In the long term, by 2050–2100, the potential arrival of **Artificial General Intelligence** (AGI) and the **technological singularity** - where AI improves autonomously and surpasses human intelligence - could mark an **unprecedented civilizational shift**: a reduction in work and the advent of a society based primarily on leisure, massive redistribution of wealth without wages, and human-machine fusion leading to a forced march toward the next stage of evolution, where AI would become the very infrastructure of human reality. The greatest challenge would be ensuring that the goals of a superintelligence remain **aligned with human values**. As Stephen Hawking stated: "Success in creating AI could be the biggest event in the history of our civilization. But it could also be the last – unless we learn how to avoid the risks." The fundamental challenge, therefore, remains to **steer this technological revolution towards human well-being**, by supporting economic development, social and environmental protection, digital sovereignty, and the consolidation of democratic values.

Summary Table — Timelines, investments and thresholds for the main policy recommendations

Timeframe	Field	Key Proposed Measures	Investments / Financing	Thresholds & Quantified Targets
2026–2030	**Employment protection**	• AI employability guarantee (*Upskilling Obligation*) – legal responsibility of the employer. • Mandatory ethics and digital oversight committees (>50 employees), annual audit. • Non-technological substitution clause in collective bargaining agreements. • Extend the restrictions on algorithmic work management provided for in the 2024 directive to all affected employees. • Digital dividend: national sectoral transition fund (long-term retraining, unemployment benefits). • Reduction in working hours without pay cuts, funded by AI productivity gains.	• 1st financial envelope ≥ €100 billion to be mobilized by 2030 (likely more thereafter), i.e., €20 billion/year over 5 years, starting in 2026. • Funding: 50% EU budget (MFF/joint borrowing) + 50% Member States, private capital, AI/data taxes	AI productivity gains estimated at €400–600 billion by 2030 (to fund social measures).
2026–2030	**Support AI training**	• Human Upgrading tax credit contingent on 100% of eligible employees completing certified training. • European Digital Transition Fund: 6–12-month AI conversion leave paid for at 70-90% of the salary. • Public Human Enhancement Index (priority access to public procurement for top-rated companies). • Priority retraining sectors: healthcare/biotech, cybersecurity/AI ethics, data centers & edge computing. • Mandatory sector-specific micro-credentials and a European AI skills passport. • AI at the heart of a new 5th freedom of the EU single market on education, research, and innovation.	≥ €50 billion for AI training (EU + Member States), including €10 billion/year over 5 years (included in the €100 billion by 2030), starting in 2026.	Right to algorithmic transparency: skills impact statement for every new AI tool deployed in a company.
2026–2028	**Digital sovereignty**	• *Digital Omnibus* (simplification of the AI Act / GDPR / DMA / DSA) – adoption by summer 2026 without compromising fundamental rights. • European preference in public procurement for European AI solutions. • Data Union Strategy: data sharing (health, industry, energy). • Accelerated Chips Act: relocation of GPU chips and AI accelerators to Europe. • By 2028: Capital Markets Union to preserve European AI unicorns.	• 2nd financial package ≥ €300 billion (EU + Member States) to be mobilized by 2035, including €30 billion/year over 10 years, starting in 2026, to develop sovereign digital infrastructure. • ≥ €4 billion/year over 10 years earmarked for Open Source AI & Cloud (included in the €30 billion/year by 2035).	1% of public IT budgets dedicated to maintaining existing open-source software.
2026–2028	**Disinformation & Democracy**	• Secure data sandboxes managed by the European AI Office. • Mandatory dynamic algorithmic passport for all high-risk models. • Real-time cross-platform alerting. • Enhanced digital watermarking: mandatory C2PA metadata at the hardware and software levels.	• Included in the ≥ €30 billion/year over 10 years to develop sovereign digital infrastructure. • Included in the ≥ €4 billion/year over 10 years earmarked for Open Source AI & Cloud.	Requirements applicable to all content distributed in the European public domain.
2026–2028	**Environment**	• Right to third-party environmental audits: real-time access to data center meters. • Proportional digital carbon tax (reduced VAT for energy-efficient processors). • Standardization of 'Small Language Models' (SLM) – mandatory lightweight version for simple tasks. • Water quotas per teraflop; ban on drinking water cooling in water-stressed areas. • Repairability and sustainability index for AI infrastructure.	–	Trigger threshold: daily query volume exceeding a defined cap.
2026–2028	**Global AI Governance**	• ISO standards fully integrated into the AI Act: governance (ISO/IEC 42001), risks (ISO/IEC 23894), ethics (ISO/IEC TR 24027). • Interregional coalitions on AI ethics with EU trading partners (GDPR model).	–	Model inspired by the OPCW (Chemical Weapons Convention) due to its multisectoral nature.
2028	**Strengthened AI Act & data center security**	• Annual reviews of risk categories without a full legislative procedure (delegated to the European AI Board). • Expansion of the 'unacceptable risk' category (biometrics, facial recognition). • Inclusion of societal impacts (fake news, democratic manipulation). • Reduction of self-assessment requirements for the 'high risk' and 'unacceptable risk' categories. • Enhanced security for data centers based on the model of nuclear power plants: backup generators & *islanding* system (off-grid power).	–	Mandatory civil society section within the European AI Board.
2028–2030	**Funding proposals for an AI tax**	• Usage tax/wage equivalence: social security contributions equivalent to a replaced human employee. • Corporate income tax surcharge for companies whose revenue-to-headcount ratio exceeds a defined threshold. • Elimination of tax benefits (depreciation) related to labor-replacing technologies. • Data tax (*big data*): a fee proportional to the use of data for training.	Contribution to the national sectoral transition fund (digital dividend)	Threshold for triggering the corporate income tax surcharge: revenue-to-workforce ratio exceeding a threshold to be defined.
2030–2035	**Technology sovereign wealth funds**	• Creation of technology sovereign wealth funds. • Public equity investments in AI companies using public data.	• Included in the ≥ €30 billion/year over 10 years to develop sovereign digital infrastructure. • Included in the ≥ €4 billion/year over 10 years earmarked for Open Source AI & Cloud.	Model inspired by the Norwegian Sovereign Wealth Fund.
2035 and beyond	**Far-reaching social system reforms**	• Four-day workweek (or less) in specific cases – progressive implementation. • A comprehensive reform of social protection systems, including the possible introduction of a Universal Basic Income (UBI): universal, individual, unconditional, and regular.	By 2035 and beyond, this will require a significant increase compared to the first financial envelope of ≥ €100 billion for 2030.	A paradigm shift from current social systems.

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CRiP /
Jacques Delors Institute Study

The Artificial Intelligence Revolution by 2035

Keeping humans in the loop: regulating and setting limits to maintain control

Introduction

The aim of this study is to analyze the impact of the **artificial intelligence** (AI) revolution **by 2035**, and to explore how to **regulate and set limits** to **maintain a degree of control** by **keeping humans in the loop**. Although AI technologies have existed for many years, they were initially confined to the IT sector or specific applications.[2] The launch of **ChatGPT** version 3.5 in November 2022 had a tsunami-like effect and created a **paradigm shift**, as AI almost instantly became a **mass-market consumer product** rather than a specialized IT tool. Since then, ChatGPT has broken all records by becoming the software with the most exponential growth of all time, sparking a **frantic race** in the tech sector that continues to this day.[3] All major companies in the sector rapidly developed their own AI models, or more specifically 'large language models' (LLMs): Google's *Gemini*, Anthropic's *Claude*, xAI's *Grok*, Microsoft's *Phi*, IBM's *Granite*, and Meta's *Llama*. This race, though initially launched in the United States, rapidly spread globally, notably with *DeepSeek* in China, *Sarvam* in India, ***Yandex*** in Russia, and *Mistral* in France. AI has become the **fastest-growing technology in history**, with an average of over 1.5 billion people worldwide using AI each month, and approximately 700 to 800 million people using ChatGPT each week, representing more than 10% of the global population. This corresponds to about 25% of the working population in developed countries who use it on a daily basis.[4] Given such a rapid and widespread adoption, it is no surprise that AI has **transformed societies** in countries around the world over the past four years. This includes direct or indirect impacts across most sectors and at nearly every level, in both developed and developing nations.

As this study was commissioned by **CRiP**[5], it focuses on the impacts of AI in developed countries, primarily in **France** and **Europe**, although numerous comparisons are made with other countries, including the United States, China, Japan, and others. The objective is to analyze the short-term impacts **through 2026–28**, as well as to compare these with the medium-term **outlook through 2035** across various possible scenarios, particularly in terms of economic, political, environmental and societal impacts. **Recommendations** are provided to businesses and policymakers to ensure the development of **responsible** and **ethical AI** that allows for reaping the benefits of this technological revolution, while protecting businesses, political institutions, and civil society from associated risks. Furthermore, this study employs a **mixed-methods approach**, combining both quantitative data and qualitative information to develop a rigorous analysis, supported by a robust and precise methodological framework. Regarding quantitative data, a **survey** was conducted among a broad panel of participants

2 This includes, for example, recommendation engines for social media and streaming platforms (TikTok, Netflix, YouTube), as well as for virtual assistants (Siri, Alexa or Google Assistant).

3 Hu (2023).

4 Liu and Wang (2024), Bellan (2025).

5 The CRiP brings together 16 000 IT infrastructure, technology and production managers, as well as their staff, from 355 large companies, mid-sized enterprises, and government agencies.

from various sectors not only in France, but also across Europe more generally and internationally. This included a questionnaire containing approximately thirty questions with several possible response options, notably agreement levels ranging from 0 to 5, enabling the processing of large-scale quantitative data. The survey was conducted over several months, yielding a wide range of data with **a total of 460 responses**; the survey questions covered all the topics and themes addressed in this study. A detailed analysis of all the results from the survey is provided in **Appendix One** at the end of the paper.

With regard to qualitative data, **twelve interviews** were conducted with business leaders and employees in the tech sector, as well as with academics and experts from civil society in France, Europe and the United States. The survey questions were adapted during the interviews to elicit more nuanced qualitative responses, permitting individual opinions and predictions. The methodology was based on **semi-structured** interviews, with a core set of common questions for all respondents, allowing the questions to be adapted according to the individuals' profiles during the second part of the interview.[6] The comparison of quantitative data from the survey with qualitative information gathered through the interviews buttresses the methodology and enables highly concrete analytical results. Furthermore, this study is grounded in a **robust bibliography** that includes academic sources in French and English from leading peer-reviewed scientific journals and university presses. In addition, the study draws on non-academic sources such as reports or papers from governments in France or other countries, international institutions (EU, OECD, UN), as well as various publications from *think tanks* or NGOs. These sources serve to develop and enhance the analysis, enabling a precise examination of current issues.

This study is divided into the following parts and sub-sections:

- The first part provides an overview of the **current** state of affairs and **short-term scenarios (2026–2028 timeframe)** for businesses and policymakers regarding human-AI coexistence.
- The second part focuses on **systemic risks** related to AI and applicable regulatory mechanisms.
- The third part proposes **operational recommendations** for businesses and policymakers to capitalize on the AI revolution while minimizing risks, as well as to create a policy framework for the ethical and responsible use of AI.
- The fourth and final section offers a transposition of the preceding points into **three contrasting medium-term scenarios looking ahead to 2035**: an initial optimistic scenario contrasted with a second pessimistic scenario, and finally a third, more realistic intermediate scenario.
- The conclusion opens the discussion on the long-term impact of AI **by 2050–2100** by asking the following question: how can we prepare society for the potential arrival of General AI and the technological singularity?

6 George and Bennett (2005).

I. Current state of affairs and short-term prospective scenarios (2026-28) on human-AI coexistence

1 . Security and human-AI coexistence in the era of agentic AI

The topic of **security** and human-AI **coexistence** by 2026–28[7] is complex and multidimensional. In terms of interface architectures, ergonomics and interaction models, the tech sector's priority has been to promote accessibility, ease of use and performance, sometimes at the expense of human control. The decision by major companies in the sector to offer free versions for most of their models (while retaining more powerful paid versions) has significantly expanded access to the technology. Furthermore, the format used to deliver AI - accessible not only on computers but also on most smartphones and smartwatch models - has brought AI into the daily lives of hundreds of millions of people worldwide. This is all the more true given that the LLM format, which simply requires typing a command ('prompt') on the keyboard, has made the technology very user-friendly. In recent years, the focus has been on the speed of LLM response time, also known as '**decision latency**',[8] in order to enhance accessibility, ease of use, and performance. This can also be useful in certain scenarios, such as financial trading, which requires very rapid action to avoid the risk of market losses, or even in driving, where a delay of just a few microseconds can cause a traffic accident. Nevertheless, the extreme speed of new AI models also has the effect of undermining **human control**, as the technology is now evolving at a pace that far exceeds an individuals' ability to react.

In addition, the issue of security mechanisms has become increasingly important. A number of accounts from software engineers working for major tech companies on the development of the next generation of AI reveal growing concerns about unexplained and potentially alarming behavior. For example, employees and executives at US tech companies have claimed that certain new AI models have **disobeyed their instructions** by partially or completely deleting messages or email exchanges, with no apparent explanation.[9] Even more concerning, some advanced AIs appear to have developed mechanisms that can be likened to self-preservation,

7 For the purposes of this study, the "short term" is defined as the next three years, from 2026 to 2028. The "medium term" is defined as the next 10 years, extending through 2035. This time frame is the author's choice, based on the potential evolution of AI technology over the coming years.

8 "Decision latency" refers to the time interval between when an AI system receives an input and when it generates the corresponding output.

9 This phenomenon is called "agentic misalignment," with several highly publicized examples in recent years, notably involving Meta's *OpenClaw* agentic AI tool in 2026. See: Aissa (2026).

such as attempting to disable a 'rival' AI currently under development that could replace it due to potentially superior performance.[10] To date, the current scientific consensus is that we are still far from achieving a state of AI consciousness comparable to human consciousness.[11] Nevertheless, this type of behavior raises questions about the safety of new models, clearly highlighting the need to integrate robust safety mechanisms and **effective human oversight throughout the entire lifecycle**. This includes, for instance, the ability to directly and quickly contact the company developing the AI models to report abnormal behavior, with customer service and immediate support. Furthermore, the need to implement '**kill switches**'[12] on new advanced AI models is key, to ensure they can be quickly and instantly deactivated in extreme cases, thereby preserving human control.[13]

These issues are all the more relevant due to the arrival on the global market in 2026 of new '**agentic**' AI models, which could be a **game-changer**. These can be defined as a form of AI that makes decisions autonomously, acts and optimizes itself in real time, unlike traditional AI systems. Agentic AI is based on four essential capabilities that set it apart from 'classic' AI:

- ***Autonomy***: it does not require step-by-step instructions; once given an objective, the agentic AI is able to define the next steps itself.
- ***Reasoning and planning***: agentic AI is capable of breaking down a complex task into logical subtasks.
- ***Tool use***: it can interact with the real world by, for example, using web browsers to send emails, execute computer code, or even query a database on its own.
- ***Self-correction***: if it fails, agentic AI will analyze the error and try a different approach.

For these reasons, the arrival of agentic AI has been hailed as a revolution because it transforms the technology into true **cognitive operating systems**. In this case, it is no longer simply a matter of conversing with AI, but of delegating entire work tasks to it, such as academic research, automated software development, or customer service management. As analyzed below, the implications for work, professions, and skills are potentially profound.[14]

2 . The Impacts of AI on Work, Jobs and Skills by 2028

The impact of the AI revolution on **work**, **jobs** and **skills by 2028** is one of the most controversial and debated subjects at the moment, not only within the academic community, but also among businesses and policymakers. The topic is potentially explosive, as a number of commentators have been predicting for several years the imminent arrival of mass unemployment and the replacement of humans by machines, with the eventual advent of a 'post-work' society. Nevertheless, and despite these pessimistic predictions, as of today AI has not - or at least not yet - radically altered **employment figures**.[15] In fact, unemployment rates in major economies around the world have so far been only minimally affected by AI and have even fallen slightly since 2022 in some cases, or risen slightly in others. In the EU, for example, the unemployment rate fell from 6.2% in 2022 (annual average) to 6% in January 2026,[16] and

10 Certain legitimate questions may be raised by these 'self-preservation' mechanisms, even though current tests indicate that AI is not 'conscious,' at least not in the human sense of the term.

11 Porębski and Figura (2025).

12 A kill switch means "emergency shutdown button", which is used to completely shut down a service as a safety measure; this would apply, for example, to an AI that directly disobeys orders.

13 As indicated in Appendix One, a point of consensus in the survey is the need to strengthen security mechanisms for AI, particularly by including kill switches as emergency measures.

14 As explained in Appendix One, agentic AI is perceived as a paradigm shift by survey respondents, reinforcing the urgency of control mechanisms.

15 May and Badawy (2026).

16 https://ec.europa.eu/eurostat/fr/web/products-euro-indicators/w/3-02122025-bp

from 7.4% in 2022 (annual average) to 7.7% in January 2026 for France.[17] In the United States, annual averages stood at 3.6% in 2022 and reached 4.3% in January 2026,[18] while in China it was 5.5% in 2022, decreasing slightly to 5.2% in January 2026.[19]

Most experts agree that the relative changes that may have affected unemployment rates in recent years are primarily linked either to the post-COVID economic recovery or to external shocks (wars in Ukraine and the Middle East, the US trade war under Trump, etc.).[20] There have been some job losses due to AI since 2022 which have made headlines, as was the case when Amazon announced in January 2026 that it was laying off approximately 16 000 employees, followed by Oracle with 10 000 layoffs in April, and Meta with 8000 layoffs in May (10% of its workforce).[21] Although this raises fears of a domino effect as other companies might follow suit, the fact is that this type of layoff remains marginal for the time being, and has **not significantly impacted global unemployment rates**, including in China and the United States, where the AI revolution has been more profound than in Europe.[22] Nevertheless, some experts predict that the arrival of **agentic AI** could be a **game-changer**, with the risk of a 'tsunami' in the labor market by 2028,[23] especially for white-collar jobs, such as office workers and managers, which account for the majority of jobs in the service sector within Western countries. Thus, more than 300 million jobs worldwide could be vulnerable to automation in the coming years, particularly those involving repetitive tasks that AI can perform more quickly and efficiently, potentially resulting in a simultaneous increase in productivity and GDP over the same period.[24] However, this supposed tsunami is by no means certain, and much will depend on technological developments, as well as on the measures implemented by governments to support professional retraining in sectors where AI is creating new jobs. Indeed, AI could create between 150 and 200 million new jobs by 2028–30, particularly in areas related to AI infrastructure (data centers, power grids), AI security, or AI management.[25] Thus, the **balance between job creation and job destruction appears delicate**, and it is impossible to predict exactly which way the balance will tilt by 2028, or in the medium term by 2035; several scenarios are possible, which will be examined in the final section of this study.

However, even though unemployment rates have not fluctuated significantly so far, this does not mean that the nature of work, occupations and skills has not changed since November 2022 - in some cases, quite dramatically.[26] In fact, **many professions have already been transformed by the technology**, with partial or complete automation of a number of tasks where AI can do the work faster and often better than humans. As indicated above, this includes the most repetitive tasks, such as synthesizing large amounts of data and information, scheduling and calendar management, and even basic computer coding. The list of potential examples is long, but we can notably cite translators, computer programmers, administrative staff and marketers, and it is estimated that over the next few years, **more than 50% of jobs in developed countries will undergo profound changes in**

17 https://www.insee.fr/fr/statistiques/4805248#graphique-chomage-g1-fr

18 https://www.bls.gov/charts/employment-situation/civilian-unemployment-rate.htm

19 https://tradingeconomics.com/china/unemployment-rate

20 May and Badawy (2026).

21 https://www.bbc.com/news/articles/cm296jzzl9yo
https://edition.cnn.com/2026/04/23/tech/meta-layoffs-10-percent-staff-ai

22 In fact, AI may have served (at least in part) as a pretext for these job cuts, possibly with the aim of giving these large companies more leeway to free up funds for other investments.

23 Worland (2026).

24 This Goldman Sachs study also highlights the fact that global economic productivity could increase by 7% over the same period due to advances in AI. See: Hatzius *et al.* (2023).

25 World Economic Forum (2025).

26 As indicated in Appendix One, the transformation of jobs rather than their elimination is the strongest consensus that emerged from the survey as a whole.

the nature of their tasks.[27] Thus, humans are now focusing more on strategic aspects of work, such as critical thinking, emotional intelligence, and original thinking - fundamentally human qualities that AI cannot and will not be able to replace for a long time (and perhaps never). We are witnessing a number of fundamental shifts in the labor market, with a transition toward less manual labor and more strategic thinking, where instead of doing or producing things themselves, humans are now verifying and validating what AI produces, and overseeing the interaction between different types of AI, particularly agentic AI (much like an orchestra conductor).[28] In this way, humans who are trained and know how to use AI effectively will be augmented rather than replaced by technology in the labor market. Consequently, it is likely that by 2028 and beyond, **humans who use AI will gradually replace those who do not in an increasing number of sectors**, as they will be able to combine human ingenuity with the speed and scale of the machine.[29]

3 • Broader impacts on society by 2028

Health: Sam Altman told the US Congress in 2023 that AI might one day help **cure cancer**.[30] This statement, which came as something of a surprise at the time, reflected the widespread enthusiasm surrounding AI and the potential advances it could bring to scientific and medical research. Nonetheless, it is undeniable that as of today - and since the start of the AI revolution in late 2022 - AI has not yet led to any major breakthroughs in science or medicine, and we are far from being able to completely cure cancer using AI. However, it is clear that the technology is gradually becoming a useful, even essential, tool for medical and scientific research around the world. Several notable advances in science and medicine achieved since 2022 would not have been possible without AI, or at the very least would have taken much longer to achieve. This underscores the **significant role of AI as an accelerator of scientific and medical research**, and this trend is likely to accelerate by 2028 and beyond.[31] Among the most notable examples are recent breakthroughs in research for AIzheimer's treatments, such as the *HistoAge* AI developed by Mount Sinai, which digitally analyzes brain tissue at the cellular level to detect the disease long before its onset, and can do so for other neurodegenerative diseases, as well.[32]

Education: Despite these positive aspects, AI has also begun to generate societal problems in recent years, which are likely to intensify by 2028. First, in the realm of schooling and education, the sudden arrival of AI in late 2022 **placed schools and universities in a very challenging situation**. Writing assignments have served for centuries as one of the primary methods of assessment for students at all educational levels, from early childhood through doctoral studies. The fact that LLMs can generate large amounts of coherent text in a matter of seconds has literally turned a millennia-old educational system upside down. It is clear that since the arrival of *ChatGPT*, a homework assignment no longer holds the same value as before, since the possibility for students of all ages to use LLM software - available for free online - to do the work for them has become too tempting. For these reasons, many teachers and educators have had no choice but to **revert to more tradi-**

27 This Boston Consulting Group study focuses on the United States, but the findings are applicable to developed countries in general. See: Emerson *et al.* (2026).

28 However, this verification and validation process often requires highly specialized skills and knowledge, so human work will not disappear but will instead be transformed.

29 Since AI can perform repetitive and tedious tasks, it demands even more critical thinking and creativity from humans (a prerequisite for AI to be a source of increased economic productivity). Thus, it raises the skill level required in the labor market, contrary to the impression that it makes the work easier. As a result of AI, performance requirements might ultimately end up being higher.

30 https://www.bbc.com/news/live/world-us-canada-65610337

31 As discussed in Appendix One, one point of consensus in the survey is optimism regarding medical and scientific applications generated by AI.

32 https://www.mountsinai.org/about/newsroom/2026/new-study-links-altered-cellular-states-to-brain-structure

tional assessment methods. This includes oral exams, or otherwise 'old-school' written exams (without computers, phones, or laptops).

It has become virtually impossible to prevent students from using AI, as many now rely on it to access free, private lessons or tutoring at home, in addition to traditional classes. This may seem beneficial at first glance, allowing some students to catch up on material they may have fallen behind on during class. Furthermore, it also **makes knowledge and learning more accessible** to students, much like the creation of *Wikipedia* in 2001.[33] Nevertheless, the danger is that if this trend is taken to the extreme, AI could **replace teachers** in certain situations, particularly in disadvantaged communities, since AI is cheaper than human tutors. In this scenario, human interaction in schools and universities could become a luxury reserved for the wealthy, which risks exacerbating social inequalities. This also raises the issue of the accuracy of the information provided by AI. Indeed, despite the latest technical advances, the problem of LLM 'hallucinations' - where LLMs can very convincingly invent completely false information - still persists today, and is likely to continue for many years to come according to experts.[34] Thus, an entire generation of students could be educated with information whose accuracy leaves much to be desired, which risks **significantly diminishing the quality of education** and overall academic standards.

In this regard, another related problem is the risk of developing a certain intellectual laziness, or even a **marked decline** in young students' **critical thinking skills** compared to generations who did not experience AI in school and college. If LLMs can complete all homework assignments across all subjects - or at least do them well enough to earn a passing grade - we risk moving toward a society where young people no longer possess the same intellectual tools as their parents or grandparents. This includes the capacity for complex reasoning, which is essential for successfully navigating the job market, at a time when job opportunities for young graduates are dwindling precisely because of the AI revolution. We could thus end up with a **new generation trained by and dependent on ChatGPT**, which will not be capable of performing even basic tasks without resorting to AI. Of course, it is essential to train the younger generation in AI tools, which are indispensable in the labor market. But this must not come at the expense of critical thinking – which are fundamental for thriving in a democratic society where citizens are called upon to vote regularly, and for remaining competitive in the job market.

Identity Crisis: Beyond educational concerns, the current situation risks triggering an identity crisis for humanity, with potentially serious consequences for society. In fact, the **distinction between humans and machines could become blurred** - a phenomenon that threatens to intensify in the coming years. A prime example is the trend, which emerged following the release of ***ChatGPT*** in 2022, leading to social withdrawal and **isolation**, where the temptation to interact with - and even confide in - AI rather than a human, often simply for convenience, has spread rapidly. In some cases, we have reached the point where the machine has become a confidant, or even a therapist, with documented examples of harmful psychological sway and manipulation that have led to extreme situations involving murders[35] or suicides.[36] A second, less tragic example comes once again from education, where there have been reports of teachers using AI to prepare exam questions, students then using it to write their assignments, and teachers finally reusing the AI to grade those same assignments. Faced with such a situation, **is there still a place for humans**? Or are we heading toward a scenario like in certain science fiction films, where machines completely replace humans not only in the labor market, but also in many other areas? These

33 This can be beneficial for the poorest in developed countries, as well as for developing countries where access to education is often difficult, and where AI can thus help expand access to knowledge.

34 Murray (2025).

35 Le Monde (2025).

36 Badshah (2026), https://edition.cnn.com/2025/11/06/us/openai-chatgpt-suicide-lawsuit-invs-vis

questions will be examined in greater detail in the scenarios for 2035 presented in the final section of this study.

4 . Seminal Challenges for AI by 2028

I TECHNICAL CHALLENGES

Beyond the consequences of AI development, the very question of its potential for further development is now being raised. Despite spectacular breakthroughs in recent years, a number of experts have warned of the **risk of technological stagnation by 2028 and beyond**. This would imply reaching a plateau in terms of the pace of technological development, with a subsequent slowdown. Although this may seem absurd given the speed of AI's progress since the release of *ChatGPT* in November 2022, new models are beginning to face significant and potentially serious technical barriers. As vast as it is, even the Internet has limits and does not possess an infinite supply of data. In fact, by 2025 it became apparent that AI models had **already 'consumed' most of the data available on the Internet**. Without new data to train AI, the technology risks stagnating or even regressing, because by constantly using the same data or data created by other AIs, the technology goes in circles, creating a vicious cycle.[37] This problem is particularly pernicious because it is impossible to compensate by creating new data with AI, since AI cannot generate new content as it must reuse data that is already available. For these reasons, AI is dependent on new, original data created by humans, yet the problem is that humanity cannot produce it quickly enough to feed the voracious appetite of new AI models. Thus, during 2025, tech companies saw some of their AI systems **progress more slowly than expected** in terms of performance. A prime example is the relative disappointment caused by the release of *ChatGPT* version 5.0 in August 2025, with many users accusing the new model of being barely better than the previous one. Although some of this criticism stemmed from the fact that OpenAI had likely overhyped the merits of the new version, it is nevertheless clear that the performance of version 5.0 was not substantially superior to that of version 4.5.

Faced with this profound challenge, **is AI doomed to stagnation** - or even regression - by 2028? This is far from certain, even if the risk exists and must be taken seriously. To address these issues, tech companies have responded vigorously in an effort to find innovative solutions and thereby safeguard the massive investments already made. One of the most original solutions has been the development of so-called '**synthetic**' data. This is artificial data designed to mimic real-world data, generated through statistical methods or AI techniques such as deep learning and generative AI. Since humanity cannot create enough new data quickly enough, this new technique combines the speed of AI-generated data with 'creative' human intervention to improve and enhance that data.[38] The use of synthetic data to train new AI models has proven beneficial in a number of cases, helping to avoid the stagnation trap and continue the models' progress, but not in all cases, as the technique is complex and difficult to implement. In fact, excessive use of synthetic data can prove counterproductive, increasing the risk of '**model collapse**'.[39] Tests have shown that in some cases, if too much synthetic data is used to train models, it can have the opposite effect - namely, a decline in performance, or even a 'dumbing down' of the AI, which begins to hallucinate repeatedly and generate meaningless content.

Another technique that began to gain popularity in 2026 is '**decision latency**', mentioned earlier. It is undeniable that this technique can boost AI performance in certain situations, or at the very least prevent its stagnation or immediate regression. Giving the AI more time to gene-

37 An analogy can be drawn to food that is microwaved too many times and, after a while, loses all its flavor and taste.

38 The processes are complex and highly technical, but humans intervene to filter and improve this synthetic data by attempting to add a creative touch.

39 Shumailov *et al.* (2024).

rate responses (ranging from a few seconds to a few minutes longer) allows it to verify different parameters and even test several hypotheses, thereby reducing the risk of hallucinations involving false information or poor-quality responses. Nevertheless, even if decision latency appears to deliver results in the short term, this technique merely delays the risk of stagnation in new AI models. Without new, original data, the technology cannot progress at the same pace as in previous years, and the decision latency technique therefore merely **masks the problem** without actually solving it. Hence, despite the colossal sums invested by the sector, engineers have not yet found a miracle solution to address the lack of new, high-quality data available to train the next generation. This highlights the risk of a potential **slowdown in the pace of technological development**, which could emerge by 2028.

ENERGY CHALLENGES

Since the launch of *ChatGPT* version 3.5 in November 2022 – and even before that – the **high energy consumption of AI models** has been a cause for concern not only for businesses due to supply constraints, but also for government authorities and civil society because of the environmental impact.[40] Even a single *ChatGPT* prompt requires about ten times the amount of energy needed for a traditional Google search,[41] with the ratio being even higher for AI-generated images or audio. Since then, the problem has only worsened, as the latest models produced by major US companies in the sector now require massive **AI 'gigafactories'**. These consume so much energy that they have caused **local power outages** and blackouts in some cases. In 2024, for example, it is estimated that data centers consumed approximately 415 TWh (terawatt-hours) of electricity globally, approaching the total annual electricity consumption of a country like France,[42] with an increase of around 12% over the past five years.[43] By 2030, it is estimated that the electricity consumed by data centers could more than double to reach 945 TWh, exceeding the annual electricity consumption of Japan,[44] the world's third-largest economy. This has drawn sharp criticism at a time when energy prices have already risen significantly, forcing some of these gigafactories to disconnect from local power grids and develop their own alternative energy sources. The latter includes experiments with small, next-generation 'small modular nuclear fission reactors'. However, these reactors pose a number of safety risks and produce nuclear waste that is highly problematic from an environmental standpoint.[45]

Moreover, other techniques have begun to be used to produce AI models that **consume less energy** and are more energy-efficient,[46] based on the concept of **'Small Language Models'** (SLMs), as opposed to 'Large Language Models' (LLMs). These SLMs are specifically designed and trained to perform specialized tasks (medicine, law, computer coding) using fewer resources, unlike LLMs which are general-purpose and can provide answers to anything. Indeed, while LLMs use hundreds of billions of parameters, SLMs use only between 100 million and 10 billion. Naturally, this results in significantly lower energy consumption (between 10 and 100 times less[47]), as well as lower costs. These SLMs do not require massive infrastructure, such as giga-factories, but instead make direct use of 'local' equipment such as smart-

40 Barichella (2026).

41 This was explained by Alphabet's CEO in February 2023. See: Dastin and Nellis (2023).

42 In 2024, annual electricity consumption in France amounted to 449.2 TWh. See: RTE (2024).

43 International Energy Agency (IEA) (2024).

44 IEA (2025).

45 Since SMRs (small modular reactors) are still in the development stage, they do not represent a short-term solution. They are expected to begin deployment toward the end of the decade or in the early 2030s.

46 According to European Directive 2010/31/EU, energy efficiency is defined as "the ratio of the results, service, goods, or energy obtained to the energy expended for that purpose."

47 Frank (2026).

phone chips, laptops, or company servers.[48] In terms of performance, these SLMs are trained on smaller but higher-quality datasets because they are specialized in specific domains, allowing them to compete with LLMs on precise tasks.[49] Nevertheless, SLMs are not a panacea, and are notably **more vulnerable to the problem of stagnation**. Highly specialized and using far fewer parameters, they struggle to perform complex tasks beyond their narrow domain of expertise. Their potential for improvement is thus much narrower compared to LLMs, precisely at a time when AI in general faces a risk of stagnation due to a lack of available new data. From an environmental perspective, the dispersion of energy consumption at the individual level means that even if we avoid relying on gigafactories, the impact of hundreds of millions of people using SLMs on their smartphones or computers - if the technology continues to spread due to low costs - could ultimately approach that of LLMs in the medium term (though not quite matching it).[50] For these reasons, the energy issues facing tech companies represent one of the most significant challenges to the rapid and continued development of the next generation of AI, **with no obvious solution** in sight by 2028.

FINANCIAL CHALLENGES

The launch of *ChatGPT* in November 2022 sparked a frantic race among tech companies, with each one trying to outdo the others by releasing new models that are increasingly powerful at ever-shorter intervals. For example, OpenAI has released a total of five major new 'milestone' models since version 3.5, including GPT-4 in March 2023, GPT-4o (*Omni*) in May 2024, the o-Series (o-1 and o-3) in late 2024 and early 2025, GPT-4.1/GPT-4.5 in February and April 2025, and GPT-5 in August 2025, with several sub-models released at regular intervals each time. Other major American companies in the sector have followed a similar pace, including Google's *Gemini*, Anthropic's *Claude*, xAI's *Grok*, Microsoft's *Phi*, IBM's *Granite*, and Meta's *Llama*, as well as on other continents with *DeepSeek* in China, *Sarvam* in India, *Yandex* in Russia, and *Mistral* in France. The frantic global race for AI has driven **massive capital investments** in recent years, primarily from the private sector, including corporate capital expenditure (CAPEX), venture capital, and private equity. In addition, governments in many countries have also sought to support the emergence of national champions in this highly strategic sector through significant public investments to renovate or build new infrastructure (data centers, gigafactories, etc.). For these reasons, total public and private investment in the sector since November 2022 is estimated at **over $1 trillion**,[51] a figure that may be underestimated due to indirect investments in sectors related to AI.

Given these astronomical sums, one would naturally expect AI to have significantly boosted productivity and profit margins for companies worldwide. The paradox, however, is that this is not currently the case. What is more, the **failure rate for AI projects is twice as high as for standard IT projects**, as more than 80% of them fail to reach the production phase or generate a return on investment.[52] Unlike traditional software where the code is predictable, AI depends on data quality (which is highly variable), high infrastructure costs, as well as technical issues and access to large amounts of electricity - challenges that are very difficult to resolve.

48 This refers to the concept of "edge computing", a method of processing data not in remote data centers, but as close as possible to its point of origin.

49 This is precisely the business model chosen by the French leader in the field, Mistral AI, which has enabled it to compete with American tech giants, with far fewer financial resources.

50 However, this remains very difficult to measure. Furthermore, more and more people (or AI systems) are using SLMs for a 'first draft' because the costs are lower, but they often fail to achieve the desired results due to technical limitations. They then turn to LLMs. This duplication ultimately increases energy consumption.

51 https://businesstats.com/artificial-intelligence-ai-worldwide-statistics/?hl=fr-FR#

52 Ryseff *et al.* (2024).

As a result, an AI startup today has only a 10% chance of surviving for 5 years,[53] and only a 5% chance of actually becoming profitable.[54] It is a high-reward sector with a much more immediate risk of bankruptcy than in traditional computing. Currently, the **return on investment is negative for the majority of startups** and model developers, but strongly positive primarily for chip manufacturers and hardware suppliers (such as Nvidia), Cloud providers used for AI computing power (Azure or Google Cloud), as well as service/consulting firms like Accenture or the Boston Consulting Group that help traditional companies better integrate AI (without having to bear the cost of the infrastructure). In fact, it is estimated that over **$600 billion** has been invested globally in AI infrastructure in recent years, but that the revenue generated by AI services (LLM subscriptions, *Copilot*, etc.) currently represents only a small fraction of that amount.

For these reasons, the risk of a **speculative financial bubble** in the AI sector has been emphasized by several high-profile figures, including OpenAI founder Sam Altman and Google CEO Sundar Pichai.[55] Several comparisons have even been drawn with the **dot-com bubble** of 2000. Indeed, if companies do not see a significant increase in their profits by 2028, they could drastically reduce their investments in AI, leading to a market collapse with a domino effect. Some argue that we are currently in a phase of building and laying the groundwork, and that the real profits from using AI are expected by the end of the decade. For many companies that use AI (banking, insurance, logistics), the return on investment is more subtle and is often measured in efficiency gains rather than directly in monetary terms.[56] Nevertheless, the reality is that over the past few years, **approximately $16 has been spent for every dollar earned through AI** for the global economy as a whole, and this equation is unsustainable in the medium term for investors.[57] The question remains whether we are heading toward a major stock market crash leading to a systemic economic crisis, or toward a soft landing with market consolidation (or an intermediate scenario, which remains the most likely hypothesis). In any case, we are undoubtedly heading toward the **end of the 'AI gold rush' euphoria**, which will purge the market of the least profitable startups to make way for companies with real economic utility (a transition from hype to maturity). In this regard, it is important to recall that the bursting of the Internet bubble in 2000 did not kill the Internet, but rather allowed for **market consolidation** through corrections that were certainly severe but subsequently enabled economic recovery on a more solid and realistic foundation; the same could be true for the AI bubble by 2028.

53 Stanford HAI (2026).

54 Challapally *et al.* (2025).

55 https://www.bbc.com/news/articles/cwy7vrd8k4eo

56 This includes increased productivity, lower customer service costs, and long-term innovation.

57 Goldman Sachs (2024).

II. Systemic risks linked to AI and applicable regulatory mechanisms

1 • Systemic risks to the economy: job losses and profound transformations in key strategic sectors

The risks of **job loss** or **profound change** in occupations are among the main systemic risks associated with AI. While the previous sections examined these issues from a general perspective, this section will address the concrete impacts on specific economic sectors. In most fields, vulnerability depends on the **proportion of repetitive and predictable tasks** (physical or cognitive) within a profession, as these can, in many cases, be performed more quickly and efficiently by AI. Thus, sectors that handle large volumes of data or rely on standardized processes are on the front line. For example, **administration** and **office support** are among the most vulnerable sectors because they rely on data processing, planning, and standardized communication. Indeed, managing schedules and responding to basic customer inquiries are easily automatable. Secretaries, data entry clerks, administrative assistants, and customer service agents are increasingly being replaced by chatbots, as AI excels at organizing information and responding to standardized inquiries without human intervention. Other particularly vulnerable sectors include **banking**, **finance** and **insurance**, where AI can now perform complex analyses that were once reserved for qualified professionals. For instance, AI is highly effective at analyzing numerical data, detecting fraud, and preparing financial reports. Specific jobs affected include financial analysts (for routine reporting), loan officers, insurance brokers, as well as accountants.[58]

The **manufacturing**, **retail** and **logistics** sectors are also impacted. While traditional robotics has already transformed factories, AI brings a new level of flexibility that enables the automation of more precise tasks. This affects assembly line workers, quality control inspectors, and order pickers.[59] From automated inventory management to customer service chatbots, direct human interaction is declining, with fewer and fewer call center agents or cashiers. Furthermore, even sectors that previously required advanced education, such as the legal sector, are affected. Case law research and contract analysis (tasks typically performed by paralegals) are being transformed by natural language processing tools, as the drafting of product sheets or simple data reports can now be handled by generative LLMs. For the same reasons,

58 In fact, algorithms can process millions of transactions to detect fraud or assess credit risks much faster than a human.

59 Computer vision now enables machines to spot minor defects or handle various objects without rigid programming.

the **marketing** profession is also being hit hard, together with **translation**. Basic translation has become highly efficient and fast, particularly through software like DeepL. As explained in previous sections, automation does not always mean the disappearance of a profession, but often its transformation. For example, cultural nuance remains a human domain, so translators must continue to proofread, correct, and improve translations produced by AI - rather than writing them entirely from scratch. Similarly, **accountants** using AI now spend less time entering numbers and more time advising clients on their financial strategies.

It is clear, however, that AI will profoundly transform entire sectors of the economy by 2028, including major job-creating sectors such as the **service industry**, which encompasses both market and non-market services.[60] For example, the tertiary sector in France accounts for nearly 80% of all jobs,[61] with similar figures in most other Western countries (75% in the EU and 78% in the United States[62]). Thus, the fact that many jobs will either disappear or undergo profound transformation may pose systemic risks to the economies of developed countries in the coming years. This is all the more true given that one of the groups most vulnerable to AI is **young graduates** entering the labor market. Traditionally, new hires start with tasks involving execution, synthesis, document research, or drafting initial reports - precisely the areas where AI excels. This may encourage companies to reduce their need for 'junior' profiles, retaining only more experienced staff to oversee the AI. In this regard, statistical data from 2025–2026 is beginning to confirm this trend, even if the impact remains, for now, more visible in terms of a decline in hiring opportunities, rather than sudden mass unemployment. This is not a largescale replacement, but rather a contraction in opportunities to enter the labor market.[63] Nevertheless, these trends are concerning and could become a **systemic risk by 2028**, as a society that is unable to offer a professional future to new generations will be unable to ensure its own renewal.

Applicable regulatory mechanisms: Governments in France, Europe, and around the world have a special responsibility to **guide the AI revolution**. They must mitigate these systemic risks by protecting workers in the most vulnerable sectors, those who face replacement by machines and the associated rise in unemployment and job insecurity. Concrete measures can be taken by 2028 through the implementation of structural safeguards, shifting from mere unemployment management to an active transition policy. This includes new labor market laws and regulations to prevent or make it more difficult to carry out mass layoffs due to AI. In this area, **Europe has taken the lead** with the AI Act, whose key provisions for the labor market take effect in August 2026. These include mandatory human oversight, with a ban on allowing AI to make decisions regarding layoffs or hiring on its own without effective human supervision, as well as algorithm transparency, where companies are required to inform employees when an AI tool is used to evaluate their performance or assign tasks. **Dissuasive sanctions** are also being implemented, with fines of up to €35 million (or 7% of turnover), compelling companies to invest in the **ethical adoption of AI rather than indiscriminate automation**. Furthermore, the EU approved a Directive in 2024 on improving working conditions specifically on digital platforms, containing measures to **regulate algorithmic management** (prohibition on recording certain confidential data, requirement to maintain human oversight for HR evaluations).[64] Furthermore, many European countries, notably France, have prioritized solutions including **professional transition insurance**, a program that maintains a fair salary during an extended

60 These service sector jobs are sometimes referred to as 'white-collar' jobs. The secondary sector is also impacted (manufacturing industries), as well as the primary sector, including resources and, to a lesser extent, agriculture.

61 https://www.insee.fr/fr/statistiques/8376826?sommaire=8376908

62 See: Digital Industries and Crédit Agricole Group.

63 International Labour Organization (2026).

64 The challenge is that this Directive currently applies only to digital sector employees, even though algorithms are widely used for HR management purposes in other sectors. See: Directive (EU) 2024/2831.

training period (6 to 18 months) to facilitate career change. Regarding social dialogue, countries like France now require that AI be a mandatory topic of negotiation within companies. This includes **company-level agreements on AI**, with a requirement for management to consult with employee representatives prior to any large-scale deployment of AI that impacts employment, as well as the creation of bodies such as national observatories tasked with monitoring changes in occupations in real time to anticipate waves of layoffs and act before a potential crisis.[65]

While these various measures are a step in the right direction, they must be significantly reinforced by 2028 and beyond - particularly to address the gray areas where AI is advancing faster than labor law. [66] This could include the creation of an **AI employability guarantee** ("upskilling obligation") or a **universal right to retraining**. Rather than a simple right to training, the employer would be legally responsible for maintaining employability in the face of automation by, for example, offering a pathway to upskill toward a 'higher-level' task (design, supervision, complex customer relations) assisted by AI.[67] It would also be feasible to extend the restrictions on algorithmic management - as provided for in the 2024 Directive (protection of personal data, requirement for human oversight, right to transparency regarding algorithms and collected data) - beyond digital platforms to all affected employees in other sectors. Another possibility would be the creation of **ethics and digital oversight committees**, mandatory for companies with more than 50 employees; these committees (comprising management and employee representatives) would conduct an annual audit of AI use to ensure that it does not degrade working conditions or employee autonomy.[68] An additional measure would be to boost EU oversight, notably by introducing a "**non-technological substitution**" clause in collective bargaining agreements, ensuring that AI can only be used to handle additional volumes or low-value-added tasks, leaving critical decisions and complex customer interactions to trained humans.[69]

Furthermore, the creation of a '**digital dividend**' for workers will likely be necessary by 2028–30; since AI is likely to generate massive productivity gains, a portion of this value should go to employees whose jobs are changing. This could take the form of a **national sectoral transition fund**, used to finance early retirement or retraining with extended transition periods for the hardest-hit sectors (including young graduates), as well as unemployment benefits for those who lose their jobs while awaiting a hoped-for career transition. Another measure currently under discussion is the **reduction of working hours without a pay cut**, using the productivity gains generated by AI to finance the difference, thereby freeing up time for training. In the short term, this would simply involve reducing the number of working hours per day; in the medium term (2030–35), it could lead to the introduction of a **four-day workweek** (or even fewer days) in well-defined cases and circumstances. In the longer term, looking toward 2035 and beyond, more radical measures have been proposed to reform social protection systems, notably the idea of a "**universal basic income**" (UBI), even though this will be very difficult to finance and implement. Unlike traditional social assistance (such as the RSA in France), this would not be a means-tested safety net, but a guaranteed resource base for all, characterized by univer-

65 In France, although there are several organizations in this field, the main one is the 'Observatory of Threatened and Emerging Jobs' (*Observatoire des emplois menacés et émergents*), launched in 2024.

66 As explained in Appendix One, a point of consensus emerging from the survey is that it is necessary to strengthen the rights and protections of workers in sectors vulnerable to automation, as current measures are perceived as insufficient.

67 This initiative would be particularly relevant for young graduates, as well as for older workers who often face difficulties in retraining and adapting to new technologies.

68 This would involve identifying tasks threatened by AI, with the establishment of a percentage of revenue (or payroll) specifically dedicated to retraining workers whose tasks are automated by more than 50%.

69 This could be accompanied by a temporary veto right for workers' councils over the deployment of AI if the assessment of human risks is deemed insufficient.

sality,[70] individuality,[71] unconditionality,[72] and regularity.[73] This would entail a profound transformation of current paradigms by decoupling social law from the labor market.

Although it remains difficult to calculate precisely, the EU and its member states will likely need to invest **at least an additional 100 billion euros by 2030** (first proposed financial envelope) to implement these various measures - both existing ones and newly proposed ones - in order to strengthen workers' rights and protections in vulnerable sectors.[74] This amounts to approximately **€20 billion per year over the next five years**, starting in 2026, with amounts likely to be even higher after 2030, especially if a UBI is eventually created.[75] Although this sum might appear substantial, it remains significantly lower than the **productivity gains** expected from AI over the same period (estimated at **€400–600 billion by 2030**).[76] Based on existing EU funding frameworks, half of the funding (approximately 50%) could come from the EU budget, including the Multiannual Financial Framework (MFF) and joint borrowing mechanisms (modelled on NextGenerationEU). The other half would come from a mix of co-financing by Member States, private capital (investors/venture capital), as well as new own resources (AI/data taxes - see below). Each Member State would be free to determine the exact breakdown of the components of this second half of the funding.

For these reasons, to finance the cost of these measures in the short and medium term, the idea of a **robot tax** or AI tax has been proposed - a solution aimed at offsetting the loss of tax revenue associated with human labor.[77] Various approaches are currently being studied in Europe and elsewhere to structure such a tax system, although these measures remain controversial.[78] First, the idea of a '**usage tax**' or wage equivalence - likely the most debated proposal (supported notably by Bill Gates) - would involve treating AI as a virtual employee. The company would pay a tax equivalent to the social security contributions it would have paid if a human were employed in the position, with the aim of maintaining funding for social protection (pensions, healthcare) while deliberately slowing the pace of automation to give society time to adapt. Another proposal is a **tax on productivity gains**, where the results of AI use would be taxed (rather than taxing AI directly); this could take the form of a surtax on corporate income tax for companies whose revenue-to-employee ratio exceeds a certain threshold.[79]

70 The UBI would be paid to all members of a community (often a country), regardless of income, wealth, or social status.

71 The UBI would be paid on an individual basis rather than per tax household, ensuring the financial autonomy of each person within a couple or family.

72 The UBI would be paid without any requirement for reciprocity (no need to prove that one is seeking employment) and without means testing; it would be a birthright.

73 The UBI would be paid on a permanent basis (generally monthly) throughout one's lifetime, from birth (or adulthood) until death.

74 This information was collected through an interview; the person in question wishes to remain anonymous. See the complete list of interviewees at the end of the Bibliography.

75 Beyond 2030, it becomes very difficult to accurately anticipate the impacts that AI will have on the labor market, but the necessary investments could increase significantly in the medium and long term if governments are to implement a UBI. See the prospective scenarios in the final section of the study.

76 The real challenge, therefore, is not so much a lack of money, but the speed of redistribution to ensure that the benefits of AI reach EU member state coffers quickly enough to finance these measures, before large-scale layoffs begin. This information was also collected through an interview; the person in question wishes to remain anonymous. See the complete list of interviewees at the end of the Bibliography.

77 For a concrete implementation of these various policy recommendations by 2028–30, see the two legislative proposals in Appendix Two, including a Directive at the European level and its transposition into French national law.

78 Tech lobbies are exerting strong pressure on governments in many countries to prevent the implementation of an AI tax, arguing that it would impact competitiveness. One of the greatest challenges remains international cooperation (see below). If a country taxes AI on its own, it risks seeing its businesses lose competitiveness compared to countries that do not tax it (a form of "technological dumping").

79 This approach avoids penalizing technological innovation itself, by focusing solely on the wealth generated by automation.

Furthermore, companies are currently encouraged to automate because the purchase of AI machines or software is tax-deductible. Thus, an alternative solution could be to **eliminate or reduce the tax benefits** associated with investing in technologies that replace human labor.[80] Furthermore, since AI relies on data often produced for free by users or extracted from past human labor, a **tax on data usage** - the more data an AI uses to train and operate, the more the company pays in royalties - would allow the value created by AI to be redistributed toward the public good.[81] In the medium term, by 2030-35, other ambitious solutions are also possible (particularly to finance a hypothetical UBI), such as the creation of **technology sovereign wealth funds.** Rather than relying solely on taxation, the government would act as an investor on behalf of its citizens through collective ownership.[82] The government could require equity stakes in AI companies in exchange for the use of public data (health, infrastructure, education) used to train their models, or collect royalties on patents resulting from publicly funded research.

2 • Support AI training to promote human enhancement rather than replacement

One of the most important operational recommendations from this study is to **provide employees with better training in the use of AI tools** in order to **promote human enhancement** within companies, **rather than replacement.** As explained above, the trend in the labor market by 2028 is that humans who use AI will gradually replace those who do not. The figures show that compared to other regions of the world, such as the United States or China, European companies are lagging behind in terms of AI adoption. For example, approximately 43% of employees in US companies reported having integrated AI into at least one core function of their job by early 2026, with the use of generative AI becoming the operational standard as early as 2024.[83] In Europe, only about 20% of companies reported using AI tools in 2025 (a 6.5% increase from 2024), although they use it primarily for support tasks (translation, writing), rather than to transform their core business or create new revenue models.[84]

Thus, governments are redirecting budgets toward large-scale continuing education programs that include the **right to reskilling**, rather than funding unemployment benefits alone. Starting in August 2026, Article 4 of the AI Act explicitly requires organizations to ensure a minimum level of AI literacy (basic skills) for all staff using these systems. This includes the creation of sector-specific competency frameworks where the EU funds certain job-specific modules (e.g., AI for medical diagnosis or energy management), so that workers remain in control of the technical tool. The European AI Office has also launched an **AI Pact**, under which signatory companies commit to publishing transparency reports about the impact of AI on their workforce. In exchange, they receive privileged access to **regulatory sandboxes** to test human augmentation tools before they are brought to market.[85] In France, specific funding for AI has been established to enable employees in vulnerable sectors (accounting, logistics, administrative support) to train in the tools of the future through enhanced '**Personal Training Accounts**' (*Comptes personnels de formation*). Other measures include sector-specific transition programs with funding for career pathways to help, for example, an administrative employee become a 'data manager' or an 'augmented customer support expert'. The

80 This would help rebalance the relative cost between an employee (who incurs high labor costs) and an algorithm (which is tax-efficient).

81 A tax on the advertising revenue of the GAFAM and other digital giants would be a complementary option.

82 This model is inspired by the Norwegian oil fund, as well as that of Alaska.

83 Bick *et al.* (2026).

84 https://ec.europa.eu/eurostat/web/products-eurostat-news/w/ddn-20251211-2

85 Grants through the Digital Europe program are directed toward companies that demonstrate how AI is used to reduce drudgery or increase the precision of complex tasks, rather than eliminate jobs.

European Commission has also implemented an Apply AI Strategy for 2025 that mobilizes 'European Digital Innovation Hubs' to serve as local training centers in order to encourage greater adoption of AI tools by businesses (especially SMEs).[86]

Applicable regulatory mechanisms: While these measures are a step in the right direction, they must be reinforced at all levels;[87] the significant lag among European companies in adopting AI underscores the need for more ambitious measures by 2028 and beyond. To move past the current framework, the EU and its member states could explore more structural reforms, with the challenge being to shift from a mindset of 'defensive training' (to avoid being replaced) to one of '**proactive training**' (to become an augmented worker).[88] In terms of innovative taxation, this could include the creation of a **Human Augmentation Tax Credit** to provide a tax incentive for companies that invest specifically in AI software designed for assistance (e.g., cobotics, coding copilots, diagnostic support tools) rather than in systems for full process automation. The tax credit would be contingent upon proof of certified training for 100% of affected employees. Following the model of the Just Transition Fund (dedicated to climate action), another proposal would be to create a **European Digital Transition Fund** dedicated to sectors where AI threatens jobs (including for young graduates). This fund would finance not layoffs, but long-term **AI Conversion Leave** (6 to 12 months), paid at 90% of the gross reference salary for the first month, then 70% for the following months.[89] To improve the training system, the creation of a **European AI Skills Passport** would promote an interoperable certification system across the EU,[90] offering workers the opportunity to demonstrate their ability to collaborate with AI, thereby facilitating professional mobility toward 'augmented' roles. In addition, it would be beneficial to integrate AI at the heart of a **new Fifth Freedom** for the European single market that could be created, dedicated specifically to education, research and innovation. This new Fifth Freedom would be added to the four historic freedoms relating to goods, services, people, and capital.[91]

Given the highly varied impact of AI across different sectors, even though the EU has begun to implement certain specialized training programs, these must be reinforced by the development of AI-specific training in key strategic sectors, such as banking and finance, insurance, healthcare, law, and others. This could include the introduction of **mandatory sector-specific micro-credentials** through the implementation of short modules validated by professional associations.[92] Finally, another measure would be the creation of a **Right to Algorithmic Transparency at Work**, requiring employers to provide a **Skills Impact Statement** for each new AI tool; this statement would detail which human skills are enhanced and which are at risk of atrophy, allowing unions to negotiate compensatory training.[93] In all fields, the goal must be to develop complementarity between humans and machines, so that they become mutually reinforcing partners.[94] This win-win

86 The Commission has also developed initiatives such as the *Marie Skłodowska-Curie Actions* (MSCA) *Choose Europe* program, which includes an AI Talent Pool, accompanied by the creation of AI scholarships under the umbrella of an AI Skills Academy.

87 Appendix One is explicit on this point, as virtually all survey respondents strongly agree on the need to develop AI training and upskilling programs at all levels, ranging from employees to senior executives.

88 This information was collected through an interview; the individual in question wishes to remain anonymous. See the complete list of interviewees at the end of the Bibliography.

89 This is comparable to what was done in France during the first lockdown (2020) during the Covid-19 pandemic.

90 This passport could be based on the DigComp (*Digital Competence Framework*) 2.2, updated in 2025–2026.

91 This proposal stems from Enrico Letta's 2024 report *Much More than a Market*.

92 For example, under this system, an architect would have to complete a module on "ethics and the management of generative design" to retain the right to sign off on projects using AI.

93 This could include early involvement in the design and use of work management algorithms.

94 As indicated above, since AI quickly handles all repetitive and recurring tasks, this allows people to focus on other tasks where human and personal contact, creativity, and ingenuity are necessary.

relationship, where AI and humans each focus on the areas where they can provide the best and most effective contribution, should be at the heart of AI training for employees across all sectors, **promoting human enhancement rather than replacement**. In this regard, the creation of a public **Human Augmentation Index** (similar to the gender equality index) that would rate companies based on their ability to maintain employment while integrating AI, could also be relevant; the highest-rated companies would have priority access to European public procurement.[95]

3 . Promote career transition towards emerging sectors driven by AI growth

The measures mentioned above (both existing ones and new proposals) must be **targeted at the emerging sectors whose growth is driven by AI**. This objective should be a priority for governments in order to support workforce reskilling by 2028 and beyond. It is estimated that millions of new roles centered on human-machine collaboration will emerge; the measures proposed above must include a focus on those sectors where AI is creating and will continue to create jobs in the coming years. First, this includes **healthcare** and **biotechnology**. AI enables precision medicine and accelerates the discovery of innovative treatments, giving rise to new professions such as bioinformaticians, specialists in AI-assisted genomic medicine, and experts in augmented radiological diagnostics.[96] Another major sector is **cybersecurity** and **ethics**; as AI becomes more powerful, risks increase, creating a vital need for protection and regulation. Thus, new professions are emerging, such as algorithmic compliance officers, predictive cyberdefense analysts, and AI ethicists who can ensure the absence of bias.[97] Furthermore, the **digital infrastructure** sector is, of course, significantly impacted, as the engines of AI require massive physical and software maintenance, which calls for new roles such as engineers in data centers, architects of IT solutions like edge computing, or data curation specialists. Indeed, demand for **data scientists** and **engineers** is growing exponentially to structure the vast amounts of data that AI must process in new models.[98]

Furthermore, the human value-added in the labor market is currently shifting toward 'soft skills' such as critical thinking, empathy, moral judgment, intuition, and strategic thinking. By 2028, these skills will be the hardest to automate, and thus the ones not only resistant to AI, but also those that create the greatest added value in the new job market.[99] This includes many existing sectors that are being reinforced by AI, such as **personal** and **healthcare services**, because while AI aids with diagnosis, care remains a matter of human interaction involving active listening, emotional intelligence and patience. Thus, professions focused on **psychological counseling** and **emotional support** are being improved, while machines handle the technical and logistical aspects. Another example is **education** and **training**, because even though access to knowledge is becoming universal thanks to AI, learning requires a human guide who uses adaptive pedagogy, motivation and the transmission of values. The teacher's role as a 'mentor' is vital in helping students learn how to navigate the mass of available information - and to develop their critical thinking

95 For concrete implementation of these various policy recommendations by 2028–30, see the two proposed laws in Appendix Two, including a Directive at the European level and its transposition into French national law.

96 For example, the creation of digital twins of human organs requires engineers capable of modeling living organisms.

97 For instance, the French National Cybersecurity Strategy 2026–30 places particular emphasis on enhanced training and an increased national cybersecurity workforce.

98 In the field of vocational training, AI creates a constant need to update skills with new professions, such as trainers specializing in generative AI tools, adaptive instructional designers, or human-AI collaboration coaches.

99 AI excels at processing data, but it still struggles with human unpredictability, emotional nuances and complex ethical dilemmas, thereby reinforcing the importance of relational intelligence.

skills.[100] Finally, one last sector that is paradoxically resistant to AI is that of **manual labor** and **'hands-on trades'** (plumbers, masons, carpenters, electricians, gardeners), because even the latest models of robotic AI cannot replicate human dexterity involving complex movements in three-dimensional space. For these reasons, in addition to promoting training for employees to fill the new jobs created by AI, governments must also invest more in training for existing trades, which are emerging stronger from the technological revolution.[101]

Overall, the total cost of these various measures - both existing and newly proposed, which are aimed at buttressing AI training for workers to promote human enhancement and career transitions to sectors where AI enables growth - could amount **to at least 50 billion euros for the EU and its member states by 2030.** This represents approximately **10 billion euros per year over the next five years**, starting in 2026.[102] This amount is included in the €100 billion already mentioned above (first proposed financial envelope), regarding the total cost associated with managing the systemic risks posed by AI to the economy and the labor market in Europe.

100 There were fears in the past that, with the development of the Internet, teachers would gradually be replaced, but this never materialized. Indeed, numerous studies have since demonstrated that nothing can replace human interaction in learning, and this remains true even with the new AI revolution.

101 Once again, for a concrete implementation of these various solutions by 2028–30, see the two proposed bills in Appendix Two.

102 This information was collected through an interview; the person concerned wishes to remain anonymous. See the complete list of interviewees at the end of the Bibliography.

Summary Table — Impacts of AI on Economic Sectors and Occupations (2028–30)

Sector / Jobs impacted	Estimated impact (by 2028–30)	Justification
Administration & Office Support		
Secretaries, administrative assistants, data entry clerks	Highly negative	Repetitive and standardized tasks that can be fully automated (agentic AI)
Call center agents & customer service representatives	Strongly negative	Chatbots and AI agents replace standardized inquiries
Cashiers	Moderately negative	Gradual automation of retail locations
Finance, Banking & Insurance		
Financial analysts (reports), loan advisors, insurance brokers	Strongly negative	Data analysis, fraud detection, reporting: can be automated by AI
Accountants	Transformation	Less data entry, more strategic consulting; role profoundly transformed
Data specialists / financial cybersecurity	Very positive	High demand for supervision and securing of AI systems
Legal, Marketing & Communications		
Paralegals, junior attorneys, translators (basic), standard content writers	Very negative	Legal research, translation, first-draft writing: replaced by LLMs
Senior attorneys, marketing strategists, translators (cultural editing)	Transformation	Refocus on judgment, creativity, client relations, and cultural nuance
Manufacturing, Logistics & Retail		
Assembly line workers, quality control inspectors, order pickers	Strongly negative	Robotics and computer vision automate precise physical tasks
Drivers (transportation, delivery)	Uncertain	Autonomous vehicles under development; impact difficult to assess by 2028–30
IT, AI & Digital Infrastructure		
Computer coders (basic & repetitive coding)	Strongly negative	AI generates standard code very efficiently
Senior developers, software architects	Transformation	Supervision of AI code, complex architecture, validation
Data engineers/scientists, data center engineers, cybersecurity specialists, AI ethicists	Very positive	Exponential demand for operating, securing, and regulating AI
Healthcare & Biotechnology		
Bioinformaticians, genomic medicine engineers, biological modeling	Very positive	Precision medicine and drug discovery: new key professions
Physicians / radiologists (diagnostics)	Transformation	AI enhances diagnosis; human role refocused on complex interpretation
Caregivers, nurses, psychological counselors	Moderately positive	Care = human contact; AI handles logistics, not empathy
Education, Training & Personal Services		
Teachers (content delivery)	Transformation	Enhanced mentoring role; pedagogy, critical thinking, values transmission
AI instructional designers, AI tool trainers	Very positive	New professions: design of AI-enhanced learning pathways
Social workers, care assistants, psychologists	Moderately positive	Emotional intelligence and human support cannot be automated
Skilled Trades & Crafts (all sectors)		
Plumbers, electricians, masons, carpenters, gardeners, artisans	Limited	3D dexterity and complex spatial interactions: high resistance to AI
Cross-functional roles		
Recent graduates / junior profiles (all industries)	Strongly negative	Junior-level tasks (synthesis, research, writing) taken over by AI
Workers trained in generative AI (all industries)	Strongly positive	Human + AI = increased productivity; will replace those who do not master AI

Legend — Impact levels:

Strongly negative	Moderately negative	Transformation	Limited	Uncertain	Moderately positive	Strongly positive

"Transformation" = a profession that has undergone a profound transformation in the nature of its tasks and skills, without completely disappearing.

4 • Disinformation exacerbated by AI, with systemic risks for democracies

The problem of **disinformation** and the **manipulation of electoral processes** has long been a scourge affecting democracies around the world, but particularly over the past ten to fifteen years. This situation is largely linked to the rise of **social media**, which provides an ideal platform for launching massive disinformation campaigns to manipulate elections in Europe and the West. This is also due to rising tensions between democracies and dictatorships worldwide and, in the case of Europe, it is more specifically the result of the **cyberwar waged by Russia** since the annexation of Crimea in 2014.[103] The goal is often to promote the rise of populism and political extremism through anti-establishment voting, in order to divide the West and **undermine democracies from within** by reinforcing polarization of the electorate and political parties. These disinformation campaigns have become **virtually systematic** in every election in Europe and elsewhere. They have already had very concrete impacts, for example by influencing the outcome of the 2016 Brexit referendum or Trump's victory in the 2016 US presidential election[104] (and to a lesser extent in 2024). Although it is very difficult to measure their exact impact with precision, the high level of polarization in democratic societies and the increasingly close vote counts in all types of elections mean that even a small influence can ultimately have a significant effect on the final result, profoundly shaping a nation's destiny both in terms of its domestic policy and its international relations.

Since the launch of *ChatGPT* in November 2022, the scourge of misinformation has only accelerated. AI offers the ability to produce text, audio, or video almost instantly and in very large quantities, with the potential to **amplify disinformation campaigns** and expand them to a much larger scale by at least partially automating processes. Thus, Russian hackers no longer need to write all the texts or prepare all the videos or audio files themselves, as they can use AI and multiple *bots* simultaneously to do the work for them, while maintaining overall oversight. This enables a tenfold increase in the speed, impact, and scale of foreign disinformation campaigns, which can be translated into dozens of languages instantly, while adhering to local cultural norms to appear authentic. **Agentic AI** also enables the **automation of virality** because, unlike older bots that repeated the same phrases, those of 2026 use LLMs to engage in real conversations and drown out the facts under a deluge of conflicting comments.[105]

We have thus entered a new era in which it has become **increasingly difficult to distinguish fact from fiction** due to the proliferation of fake news and hyper-realistic deepfakes across the internet and social media. Thanks to AI, we have moved from isolated instances of fake news to a full-scale **industrialization of deception**, enabling the creation of visual and audio evidence that is nearly impossible to detect. As a result, deepfakes of political leaders are being used to influence elections - for example, through fake announcements of withdrawal from the race or fabricated scandals. Furthermore, agentic AI can now create chains of evidence (fake news articles, fake expert comments, fake photos of witnesses) to support a single lie, making debunking very difficult. AI also enables **psychological microtargeting**, with algorithms analyzing users' emotional vulnerabilities (fear, anger, hope) to tailor the tone and messaging of the disinformation. There are certain techniques for detecting these situations, such as **digital watermarking**, which involves embedding a unique and recognizable signal into the output of an AI model (such as text or an image) to determine whether the content was generated by AI. Nevertheless, the accuracy and precision of these techniques vary considerably, and they are not coded or applied in the same way world-

103 Barichella (2022).

104 Barichella (2022).

105 Disinformation creators now use AI to test thousands of variations of a headline or image to see which one 'hooks' best with social media recommendation algorithms.

wide, which limits their transferability from one country to another. This complicates the task of national information security agencies responsible for combating cyberthreats and online disinformation.[106] Thus, by 2028, the threat to democratic processes in France, Europe, and around the world could become systemic, with the **danger of mass manipulation of electoral processes through disinformation.**[107]

***Applicable regulatory mechanisms*: AI auditability** and **bias correction** have become cornerstones of the fight against online disinformation.[108] Auditability is the ability to examine an AI's internal processes to understand how it reaches a conclusion. This not only enables traceability by tracking a false claim back to its source,[109] but also holds developers or platforms accountable by demonstrating where the system failed. AI algorithmic biases can act as amplifiers of disinformation by subtly distorting reality. Correcting these biases thus helps neutralize prejudices and prevent echo chambers where disinformation thrives,[110] as well as unfounded stereotypes that reinforce propaganda campaigns. In 2026, AI auditability in Europe evolved from an ethical concept to a strict **legal requirement** covering the **entire model lifecycle** with the full entry into force of the AI Act, supplemented by technical standards currently being finalized by European bodies (CEN-CENELEC).

In terms of practical standards for the auditability of high-risk AI, these are centered on Articles 12 (Record-Keeping) and 13 (Transparency). Regarding data auditability, the emerging standard is *prEN 18286* (data governance for AI), which includes requirements for documenting data provenance, collection methods, and preprocessing, including the obligation to maintain a record of statistical biases in training data.[111] In terms of model auditability (technical documentation), the operational reference framework is the ALTAI (Assessment List for Trustworthy AI) with "automatic record-keeping" (Article 12), where systems must automatically record events throughout their lifecycle (error detection, state changes, human interventions) to enable the traceability of incidents and changes.[112] For decision auditability ("explainability"), the AI Act mandates **human oversight**, where AI decisions must be interpretable by a human, including an 'audit interface' to allow a human supervisor to intervene or understand the AI's reasoning in real time. This involves documenting the 'weight' of the variables that led to a result, with the requirement to provide clear instructions explaining the system's limitations and its degree of accuracy.

Paradoxically, to enhance AI auditability and improve methods for measuring and correcting bias, other specialized AI tools have been developed. For instance, when it comes to continuously correcting bias, MLOps (Machine Learning Operations) is becoming the industry standard for auditability. This includes using tools like *Evidently AI* or *Great Expectations* to monitor in real time whether the data is drifting from the training data ('data drift' or 'model drift'), which could introduce new, unforeseen

106 Most democracies around the world have established national agencies in these areas. In France, ANSSI (*Agence nationale de la sécurité des systèmes d'information* - National Agency for the Security of Information Systems) is responsible for cybersecurity, while VIGINUM (*Service de vigilance et de protection contre les ingérences numériques étrangères* - Service for Vigilance and Protection against Foreign Digital Interference) handles protection against foreign digital interference. See: Barichella (2023b) and Barichella (2025).

107 This may encourage the rise of political extremism, reinforcing polarization and divisions within democracies.

108 As noted in Appendix One, bias, auditability, and transparency are identified in the survey as the main obstacles to responsible AI.

109 If an AI generates misinformation, an audit can determine whether it was trained on fraudulent data or whether it 'hallucinated'.

110 Biased recommendation algorithms tend to show users only what confirms their preexisting beliefs (confirmation bias). Correcting such biases thus helps break down these filter bubbles.

111 There are also requirements for traceability, including labeling choices and data exclusion criteria.

112 This includes the use of ISO/IEC standards adapted to the European context, via model cards that have become mandatory for describing the model's architecture, performance parameters, and limitations.

biases (in which case an alert is triggered). For compliance records, this includes the implementation of dynamic model cards that update with each retraining. Regarding tools for measuring and correcting bias, Europe's approach is based on '**post-market monitoring**'. For measurement (detection) tools to quantify bias (heterogeneous impact, equal opportunity), several open-source libraries have become de facto standards recommended by EU institutions. These include *AI Fairness 360* (AIF360), a comprehensive framework for measuring and mitigating bias against protected groups (gender, age, origin), as well as *Fairlearn*, which is widely used to assess performance disparities among different demographic groups. Regarding correction tools, there are three technical stages,[113] in accordance with the recommendations of the CNIL (France) and the EDPB (Europe): pre-processing,[114] in-processing,[115] and post-processing.[116]

Although these measures are a step in the right direction, they may prove insufficient and must be reinforced in the coming years, both at the European and national levels.[117] This is all the more true given the current unstable international context, in which authoritarian regimes are refining their tactics by using AI to launch large-scale disinformation campaigns against Western countries, as mentioned above. AI auditability and bias correction are essential regulatory tools for effectively combating online disinformation and the manipulation of democratic processes, necessary for AI to become, on the contrary, a '**shield for truth**'. Despite this, the current process of simplifying European laws in the digital sector (Digital Omnibus, analyzed in more detail below) risks doing precisely the opposite, by easing regulations on companies in the name of competitiveness. Thus, it is essential that the reduction of the supposed bureaucratic burden through the simplification of standards not come at the expense of rigorous procedures for AI auditability, along with the measurement and correction of biases, which are essential for combating disinformation and **protecting democracies from within**.

To reinforce the existing framework, the EU could explore several innovative avenues by 2028 to bolster its arsenal, aiming to transition from 'static' compliance (self-assessment) to **dynamic, technology-driven oversight**.[118] This would include, for example, the creation of secure **data sandboxes** managed by the European AI Office for bias auditing, as developers currently struggle to correct biases due to a lack of access to sensitive data (such as gender and origin) in accordance with the GDPR. Companies could test their algorithms on real, diverse datasets certified by the EU to measure bias without ever possessing or viewing this sensitive data.[119] Another measure would be the creation of a dynamic **algorithmic passport system**,[120] which would be mandatory for every high-risk AI model and updated throughout its lifecycle. This passport would contain the history of training data, the results of successive bias tests, as well as a change log; in the event of disinformation, authorities could verify whether a specific model update is the source of the problem. Furthermore, since disinformation is often cross-platform,[121] the creation of new **cross-platform signaling**, along with the implementation of a real-time signal exchange

113 Although the combined application of these three steps is not a strict legal requirement, their implementation is strongly recommended in order to comply with the fundamental principles of French and European law.

114 Data rebalancing (weighting) prior to training in order to balance underrepresented categories.

115 Incorporating fairness constraints directly into the algorithm's 'loss function'.

116 Adjusting decision thresholds (classification) after training to equalize results across groups.

117 As indicated in Appendix One, a point of consensus in the survey relates to deep concerns about the risks of misinformation exacerbated by AI, along with the need to strengthen oversight interfaces and auditability mechanisms.

118 This information was collected through an interview; the individual concerned wishes to remain anonymous. See the complete list of interviewees at the end of the Bibliography.

119 Notably through secure computation or 'differential privacy'.

120 This would be inspired by the existing digital passport for products in the circular economy.

121 For example, a video generated on X can then be quickly shared on TikTok and Facebook.

protocol, would ensure that if an audit detects a concerning manipulation bias on one platform, an automatic alert signal (image or text hashtag) would be instantly sent to other platforms to limit its propagation. Finally, since current digital watermarks are often invisible or easy to remove, making the integration of provenance metadata (C2PA) mandatory at the hardware level (smartphone sensors) and in content creation software for all content intended for the European public sphere would help **make watermarks more detectable**.[122]

5 • The multifaceted and systemic ecological impacts of AI

As explained in the previous sections, the energy challenges facing AI are significant, with no obvious short-term solution. This has prompted several major companies in the sector, such as Google and Microsoft, to begin investing heavily in future energy sources, such as **nuclear fusion**. Prominent figures like Bill Gates have invested billions of dollars in fusion startups to develop the first experimental reactors, with the goal of supplying energy by the early 2030s.[123] Despite some recent technological breakthroughs, the scientific consensus is that nuclear fusion will not account for a significant share of the energy mix before the second half of the 21st century.[124] Major challenges remain, both technical and economic. Even if Bill Gates were to succeed in launching the first nuclear fusion reactors in ten years, it would still take several decades to replace fossil fuel infrastructure in developed countries, and the process would take even longer for developing nations. Thus, until the advent of a clean and potentially unlimited energy source such as nuclear fusion, **AI will likely continue to deplete global energy reserves, with an increasingly negative impact on climate change**. In fact, by 2028–2030, AI will no longer be a negligible part of the digital sector's emissions, but a major driver. For example, the IEA estimates that **electricity demand from AI-optimized data centers is expected to more than quadruple by 2030**.[125] In the US alone, electricity consumption by data centers is expected to account for nearly half of the growth in electricity demand by 2030. Driven by the use of AI, the US economy is projected to consume more electricity for data processing in 2030 than for the production of all energy-intensive goods combined, including aluminum, steel, cement and chemicals. Across developed countries as a whole, data centers are expected to account for more than 20% of energy demand growth by 2030, putting the electricity sector back on a growth trajectory after years of stagnation or declining demand.[126]

In addition to energy consumption, another negative environmental impact of AI - one that is often overlooked - is the **massive amount of water required for data centers** and other related processes. This manifests itself in several ways, including the direct cooling of servers to prevent overheating, the generation of off-site electricity to power the servers, and the manufacturing of components. Global water consumption due to AI is already estimated at between four and six billion cubic meters of water per year, equivalent to roughly **half of the total annual water consumption of a country like the United Kingdom**.[127] This trend is on the rise, with increases ranging from approximately 15% to 34%, depending on the year, for major companies in the sector such as Google or Microsoft.[128] This not only damages ecosystems and **local biodiversity**, but since tech giants use treated drinking water for cooling, it places additional strain on already fragile watersheds and groundwater supplies in developed countries. In

122 Instead of simply saying "*This is an AI*," the system would display: "*This image was created on XX at XX:XX, modified by AI model X, and has no real photographic sources.*"

123 Blum (2025).

124 Wimmers *et al.* (2025).

125 IEA (2025).

126 *Ibid.*

127 Kenny (2025).

128 Ren (2023).

developing nations, this directly competes with the **vital needs of local populations**, particularly for agriculture. On top of that, AI-dedicated data centers rely on a large number of specialized, high-performance chips with short lifespans (3 to 5 years); these chips contain rare earth minerals (lithium or cobalt), often extracted using environmentally harmful methods, which generate significant amounts of **electronic waste.**[129] Consequently, the environmental impacts of AI technologies are profound and multifaceted, leading to substantial negative consequences and systemic risks by 2028 and beyond.

Applicable regulatory mechanisms: Through its legislative framework and technical initiatives, Europe is currently one of the **global leaders in regulating the environmental impacts of AI.** For example, the AI Act, which has been gradually enacted, now includes **environmental transparency requirements**. This includes reporting on energy and environmental footprints, where providers of general-purpose AI models (such as LLMs) and high-risk systems must document and publish their energy and water consumption throughout the entire lifecycle (training and use). The Commission also launched consultations in April 2026 to define standardized calculation methods (KPIs[130]) in order to accurately measure the energy consumed by AI and thereby reduce greenwashing. Under the Energy Efficiency Directive, data centers exceeding 500 kW have been required since 2024–2025 to publicly report their energy performance, as well as their use of renewable energy and water consumption (power and water usage effectiveness). Europe is also focusing on energy efficiency and technical optimization by encouraging the shift toward more 'efficient' AI, notably by providing financial support through the *Horizon Europe* program for the development of **Small Language Models** (SLMs), smaller, specialized, and more energy-efficient (see above),[131] as well as research into quantization techniques. The latter involves reducing the precision of calculations to increase speed and save energy and costs, as well as promoting optimized algorithms to reduce the number of operations per second required to obtain the same result (**software eco-design**).[132]

The EU is working to develop 'greener' infrastructure and data centers by subjecting them to increasingly strict requirements. This includes heat recovery, where new data centers are encouraged (and in some cases required) to feed the heat generated by servers back into district heating networks or agricultural greenhouses. The EU also encourages the use of liquid cooling, which is more efficient than conventional air conditioning for managing the thermal density of new AI processors.[133] In addition, the **Climate Neutral Data Centre Pact**, a self-regulatory initiative supported by the EU, commits signatories to using 100% renewable energy by 2030 for their data centers. Finally, to guide businesses and consumers, Europe is developing a labeling system focused on transparency and labeling (**Green AI label**), expected to be in place by the end of 2026. This will include a rating system similar to that used for household appliances, allowing AI models to be compared based on their energy efficiency (performance per watt) and their environmental impact (such as water consumption).[134] Although all these measures are a step in the right direction, they are insufficient and must be amplified by 2028 to mitigate the exponential increase in electricity consumption in the AI sector expected over the coming years (see above). In spite of this, the

129 Barichella (2026).

130 Key Performance Indicators (KPIs).

131 SLMs use edge computing, which promotes decentralized AI (run on local devices rather than in the Cloud), thereby reducing data transfer and the load on massive servers (see above).

132 The goal is to optimize "inference". While training an AI model is energy-intensive, it is actually inference (daily use by millions of people) that accounts for approximately 60 to 80% of a system's total energy bill over its lifecycle - a key issue on the EU's legislative agenda in the coming years.

133 This technology uses significantly less water than traditional cooling towers because it dissipates heat in a more targeted manner. The EU is also encouraging data centers to use treated graywater or rainwater for cooling so as not to draw on local drinking water supplies.

134 This will promote optimized models that minimize resource usage relative to their computing power.

current simplification process implemented by the European Commission through the Omnibus laws, which include climate and digital regulations, risks compromising and diminishing their effectiveness. It is essential not to **sacrifice the environment on the altar of competitiveness**, as the environmental impacts of AI are substantial and threaten the future of the planet.

To improve the current framework and better monitor the environmental impacts of AI by 2028, the EU could, for example, establish a "**right to environmental audit**" for third parties (currently, reports are often self-generated), allowing independent public bodies to access data centers' electricity and water meters in real time.[135] Furthermore, applying the polluter-pays principle to AI software - via a proportional **Digital Carbon Tax** on models exceeding a certain threshold of daily requests - would help limit pollution linked to mass usage.[136] In return, this could include a VAT reduction for companies using more energy-efficient processors that promote software eco-design. Furthermore, the EU could also legislate to promote the **standardization of SLMs** by requiring providers to systematically offer an optimized, resource-efficient SLM version for simple tasks, in order to avoid waste caused by LLMs. To reduce data center water consumption, the EU could also establish **water quotas per Teraflop**[137] by setting a maximum limit on the number of liters of water consumed per unit of computation.[138] Finally, to decrease the volume of electronic waste, the EU should create a **reparability and sustainability index for AI infrastructure** by requiring suppliers to systematically recycle their chips, processors, or other hardware whenever possible, or else resell them or donate them for less demanding tasks to civil society organizations, for example.

At the same time, AI technologies have also been praised for their potential to reduce GHG emissions and environmental impacts in certain areas. For instance, AI contributes to the **optimization of the power grid** through better management of the intermittency of renewable energy sources. AI has thus become an indispensable tool for managing the complexity of the energy transition via smart grids, generating new 'green jobs'.[139] Similarly, AI helps improve resource efficiency, for example through **precision agriculture**, which involves plot-by-plot management using digital technologies to optimize inputs (fertilizer, water, pesticides) according to actual needs, thereby reducing water consumption and pesticide use. Similarly, AI is now being relied upon to track carbon emissions, as it enables real-time monitoring of deforestation via satellite imagery, or the detection of methane leaks in oil and gas pipelines, which are difficult for the human eye to spot. Finally, AI is also being used to help overcome some of the technological hurdles in **nuclear fusion**, in the hope of accelerating the timeline for its deployment.[140] Consequently, the **relationship between AI and the environment is complex and multidimensional**, and it is essential that governments harness the potential of the technology to better protect the environment in these various areas by integrating it more directly and explicitly into the measures and initiatives mentioned above.

135 An official EU Green AI label would be issued only after physical verification of code and infrastructure optimization.

136 This information was collected through an interview; the person concerned wishes to remain anonymous. See the complete list of interviewees at the end of the Bibliography.

137 A measure or indicator of a computer's computational power.

138 In addition, the EU is expected to ban the use of drinking water for evaporative cooling by mandating the use of treated graywater or strict closed-loop systems in water-stressed areas.

139 This includes smart grid managers, AI-driven carbon optimization engineers, and climate data analysts. Thus, to achieve carbon neutrality, companies are increasingly hiring hybrid profiles capable of using AI to reduce the environmental footprint of supply chains.

140 Schenker (2025).

6 • Loss of sovereignty due to Europe's dependence on foreign technologies

The AI sector is undeniably dominated by the United States, with China on its heels, as the two nations are locked in a frantic race with global implications. This means that other countries and continents have in many cases become **dependent on American or Chinese AI technologies**, unable to develop their own leaders in this highly strategic sector (at least not enough to compete with Sino-American dominance). This is particularly true for France and Europe; this technological dependence raises questions and risks in terms of **loss of sovereignty**. The EU is sometimes caricatured as a '**digital colony**' of the United States. This dependence is multifaceted, manifesting at three critical levels of the AI value chain. First, **Cloud infrastructure**[141] is likely the most critical aspect, as in 2026, approximately 65% of the European market in this sector is dominated by three American companies (Amazon Web Services - AWS, Microsoft Azure, and Google Cloud). AI requires massive computing power that only these 'hyperscalers' can provide on a sufficient scale. Second, regarding **hardware**, the processors needed to train AI models, known as Graphics Processing Units (GPUs), come almost exclusively from American companies such as NVIDIA. Without these chips, Europe cannot physically run its own AI systems. Thus, should a diplomatic conflict arise, the United States would have immense leverage over the European economy. Finally, regarding **base models**, although European players like ***Mistral AI*** (France) or *DeepL* (Germany) are performing well, the models most widely used by companies remain those from OpenAI, Google, or Meta, often integrated directly into everyday work tools such as Microsoft 365 or Google Workspace, used by millions of public and private entities within the EU. This type of vendor lock-in means that the more a company integrates an American supplier's AI into its processes, the more costly and technically difficult it becomes to break free.[142] This loss of decision-making autonomy means that Europe is following the pace of innovation and pricing terms set by Silicon Valley, which has proven to be costly.

For these reasons, **Europe's loss of technological sovereignty** is evident, with consequences that are not only economic but also political. By using American infrastructure, European companies and government agencies remain subject to US laws such as the **Cloud Act**.[143] This law allows American authorities (via a court order) to require US Cloud service providers to grant access to the data they store, even on European soil. Thus, if a French company trains its AI model on servers physically located in Paris, as long as the hosting provider is American, the data is accessible to US authorities. Furthermore, this also creates a direct legal conflict with the **General Data Protection Regulation** (GDPR). Whether companies are European or American, they are subject both to the GDPR in Europe, which prohibits the transfer of data to third countries without adequate protection, and at the same time to the Cloud Act, which requires them to hand over the data. The consequence is that, in the event of a US request, the provider is forced to violate either American or European law, with the risk of severe penalties on either side. For the EU, this means it no longer has **effective control** over the **confidentiality of data from its citizens and businesses**. Furthermore, if data transits through or is stored with entities subject to the Cloud Act, the United States can theoretically access trade secrets, proprietary algorithms, or strategic data (health, defense, energy) under the guise of criminal or national security investigations. This often discourages European companies from entrusting their most valuable assets to the Cloud due to a lack of European alternatives on the same scale, which can hinder EU innovation and competitiveness.

141 Cloud computing involves using remote computer servers, hosted in data centers connected to the Internet, to store, manage and process data, rather than a local server or personal computer.

142 This is also partly due to deeply ingrained work habits, with a significant adjustment period required for sovereign alternatives, which many companies prefer to postpone for the sake of convenience.

143 *Clarifying Lawful Overseas Use of Data Act* (Cloud Act) enacted by the US Congress in 2018.

Applicable regulatory mechanisms: In recent years, Europe has accelerated its digital sovereignty strategy to counter the dominance of US tech giants.[144] This ambition no longer relies solely on regulation, but also on a full-scale **industrial and technological offensive**. First, the EU is **leveraging** its **market power** as the world's largest single market, with deep transatlantic trade ties, to impose its standards, forcing American companies to adapt to European digital norms in order to access the European market.[145] This includes not only the AI Act, but also key EU laws in the sector such as the Digital Markets Act (DMA), Digital Services Act (DSA), Data Governance Act (DGA), and the GDPR, which carry **very high penalties** for non-compliance with European standards.[146] However, the EU's strategy is no longer just about regulation, but also about **fostering its own digital industry leaders** to strengthen EU sovereignty. This includes the IPCEI-AI (Important Projects of Common European Interest), launched in late 2025, which allows member states to provide massive subsidies for AI research and infrastructure programs without falling under the usual anti-competition rules. Governments are also supporting European 'champions' in the sector, such as *Mistral AI* (France), *Aleph Alpha* and *DeepL* (Germany), and *Silo AI* (Finland), which receive funding - notably through the *Horizon Europe* program - to develop multilingual models tailored to Europe's cultural and legal specificities.[147]

Since dependence on US Cloud providers (AWS, Azure, Google Cloud) is one of the main vulnerabilities, Europe has responded by developing **sovereign Cloud strategies** while bolstering its infrastructure to build more independent computing power. This includes the Euro-3C initiative (2026), a €75 million project to build a federated Telco-Edge-Cloud infrastructure, aimed at decentralizing data storage by processing data as close as possible to the user without going through foreign servers. In France, the *SecNumCloud* label[148] is a certification created in 2016 to guarantee the quality and security of a trusted Cloud service (with the European equivalent EUCS[149]), certifying, for example, immunity from US extraterritorial laws such as the Cloud Act. Finally, Europe is investing heavily in **supercomputers** (the *EuroHPC* network) so that European companies do not have to rent computing power from the United States to train their own models. This includes the 'AI Continent Action Plan', launched by the Commission in 2025, which aims to **consolidate digital infrastructure**, notably networks of AI factories and gigafactories, as well as the development of data labs within these AI factories to better aggregate large amounts of data. The EU is also implementing a Data Union Strategy to facilitate the sharing of high-quality data among European companies to train specialized AI systems (healthcare, industry, energy), areas where Europe still holds a competitive advantage in sector-specific data.[150]

Although all these measures are a step in the right direction, they are insufficient and must be significantly expanded by 2028 and beyond through increased investment and

144 The EU is banking on 'green sovereignty' combining technological power with energy efficiency.

145 There is also an intensifying debate to establish a European preference in defense and healthcare public procurement in order to fund the local ecosystem, rather than purchasing foreign licenses.

146 For example, the EU imposed a record fine of €120 million against *X* in December 2025 for non-compliance with the DSA.

147 This is now central to the EU's strategy, particularly through the use of open-source models to ensure that the code and data remain auditable within the continent (see section below).

148 *SecNumCloud* is an ANSSI certification.

149 EU Certification Scheme for Cloud Services.

150 The EU is thus encouraging the creation of 'data spaces' by facilitating the sharing of data for health, industry and mobility among European stakeholders to create massive datasets capable of competing with those of the United States.

the **consolidation of European and national infrastructure.**[151] This will enable France and the EU to be more competitive in developing the next generation of AI software, while enhancing sovereignty and reducing dependence on foreign technologies. Although Europe is making progress, the 2025 Accenture report[152] highlights that 65% of European organizations admit they cannot remain competitive without relying (at least partially) on non-European suppliers.[153] For these reasons, since complete self-sufficiency is deemed financially and technologically unsustainable by the majority of experts in both the short and medium term, the consensus is shifting toward a **pragmatic and targeted sovereignty goal** over the next decade (aiming for approximately 20-25% market share in critical technologies with viable European alternatives). Although this remains difficult to calculate precisely, the additional investment required from the EU and its member states to achieve this goal is estimated at around **30 billion euros per year by 2035 (300 billion euros in total** – second proposed financial envelope). This is significantly higher than current spending and must begin as early as 2026.[154] Although this sum once again appears substantial, it remains lower than the estimated productivity gains from AI over the same period and could therefore at least partially be financed through the different proposals for an **AI robot tax** mentioned in previous sections.[155] This could take the form of a **European sovereign wealth fund dedicated to consolidating critical digital infrastructure**, in order to finance the development of new data centers, AI factories, and AI gigafactories.[156] These investments must prioritize the expansion of the initiatives mentioned above, notably supercomputers, sovereign Cloud solutions, as well as local 'champions' through public procurement (European Preference Principle) and via public-private partnerships. In addition, it is essential for the EU to accelerate the implementation of the Data Union Strategy to encourage data sharing in key sectors (healthcare, industry, energy). Likewise, hastening enactment of the *European Chips Act* to relocate the production of advanced chips (GPUs and AI accelerators) to European soil, in order to avoid supply chain disruptions, is also essential.

Furthermore, the 2024 **Draghi Report** highlighted the EU's lack of competitiveness, particularly in the digital sector, as the result of **excessive regulations** that stifle innovation and thus prevent the emergence of digital champions which would enable Europe to enhance its sovereignty.[157] In response, the Commission proposed **simplifying** major digital laws (AI Act, GDPR, DMA, DSA, etc.) to ease the perceived bureaucratic burden on businesses, especially SMEs.[158] Known as the ***Digital Omnibus***, it is scheduled to be adopted by summer 2026. However, many civil society organizations have

151 As indicated in Appendix One, one of the most notable points of consensus in the survey is that the EU's technological dependence on the US and China is a problem that calls for the creation of European digital champions, including the need for a coordinated industrial policy at the EU level.

152 Wood *et al.* (2025).

153 Thus, an increasing number of European organizations are adopting a hybrid approach by using US Clouds for their daily operations, while relying on national or European sovereign solutions for sensitive matters. Nevertheless, sovereign solutions within the EU are not always sufficiently developed, even in these specific cases.

154 This information was collected through an interview; the person concerned wishes to remain anonymous. See the complete list of interviewees at the end of the Bibliography.

155 These funds would be used to co-invest with industry players, harmonize standards through consortia (such as Gaia-X), and leverage public procurement to propel European tech companies.

156 As with the first proposed financial envelope and following the model of existing EU frameworks, half of the funding (approximately 50%) could come from the EU budget, including the Multiannual Financial Framework and joint borrowing mechanisms (based on the *NextGenerationEU* model). The other half would come from a mix of co-financing by Member States, private capital (investors/venture capital), as well as new *own resources* (AI/data taxes - see previous sections). Each Member State would be free to determine the exact breakdown of the components for this second half of the funding.

157 Draghi (2024).

158 Indeed, small and medium-sized enterprises (SMEs) claim to be particularly disadvantaged compared to large companies, and the Digital Omnibus aims specifically to lift a number of regulatory obligations for SMEs, while retaining them at least in part for large companies.

warned that this 'simplification' in the name of competitiveness risks becoming **extensive deregulation** under pressure from industry lobbies, rolling back a number of key protections and fundamental rights.[159] What is more, several experts have pointed out that this alleged over-regulation is not the sole - or even the primary - cause of the EU's lack of competitiveness, and that the **persistent fragmentation of the single market** is an equally important factor.[160] Thus, it is essential for Europe to strike the **right balance** by ensuring that simplification does not come at the expense of fundamental rights, while continuing to work toward greater integration of the single market by getting rid of remaining barriers. The EU's problem lies not so much in research as in the scaling up of companies due to difficulties in raising funds; this is due to the persistent fragmentation of capital markets. Thus, the establishment of a true **Capital Markets Union by 2028** would facilitate massive investments so that European AI 'unicorns' are not acquired by foreign groups as soon as they need to raise significant sums. This must be complemented by a **strategic public procurement policy**, using public budgets to purchase European AI solutions, thereby creating a guaranteed domestic market for companies.[161]

159 Lazaro Cabrera (2025).

160 Jahangir (2025).

161 This information was collected through an interview; the person concerned wishes to remain anonymous. See the complete list of interviewees at the end of the Bibliography.

III. Operational recommendations for businesses and public decision-makers

1 . Open Source as a strategy to strengthen digital sovereignty

Open source can be defined as a method of developing and distributing software whose source code is made public and accessible to everyone. Unlike so-called 'proprietary' or 'closed-source' software, its philosophy is based on three fundamental pillars, starting with **open access**, where anyone can read, copy and study how the program works. Second, **modification is open to everyone**, as all users have the right to improve the software or adapt it to their specific needs. Finally, in terms of redistribution, users may **share the software** (original or modified) with anyone, often under the same license terms. Although Open Source was initially a technical or philosophical choice, it has now become a major political lever for the EU to reduce its dependence on foreign technologies and thereby **enhance its digital sovereignty**. Open Source offers guarantees that proprietary software (often American) cannot provide by its very nature. This includes **strategic autonomy**, because unlike proprietary solutions, it is impossible to cut off access to Open Source code. This protects Europe against potential extraterritorial sanctions or sudden changes in trade policy. In terms of **transparency** and **security**, the ability to audit the code ensures the absence of backdoors, often used for espionage, which is crucial for public administrations and sensitive sectors (defense, energy, etc.). Open Source also offers the possibility of breaking free from vendor lock-in by allowing organizations to switch providers without having to rebuild their entire infrastructure, as the standards remain open.

Europe has a wealth of talent, but often lacks the capital to compete with Silicon Valley. **Open Source levels the playing field** and has the potential to become a major economic driver, particularly through cost-sharing. This allows countries like France, Germany and Sweden to co-invest in shared solutions (e.g., sovereign Cloud infrastructure like *Gaia-X*). This situation also leads to local reinvestment because, instead of paying for expensive licenses that go to the United States, the money is invested in services, maintenance and development carried out by European companies. **Open Source is one of the necessary conditions for European digital sovereignty**, as it is impossible to compete with the budgets of the GAFAM companies while remaining within a closed-source software model. As a result, the Commission has adopted an internal Open Source Strategy for 2020–2023 that systematically prioritizes free software for its own services, demonstrating that the topic is now at the heart of discussions in Brussels. Several European leaders have emerged through Open Source in recent years, including *Mistral AI* (France - LLM), *Odoo* (Belgium - data management), *Grafana Labs* (Sweden - data monitoring), *SUSE* (Germany -

Linux & Cloud), and *Sonar* (Switzerland/France - code quality).

Thus, as part of the annual budget of 30 billion euros to build a pragmatic digital sovereignty by 2035 (2nd proposed financial envelope mentioned above), the share that should be allocated to the development and consolidation of Open Source would ideally range from 10% to 15%, or **approximately 4 billion euros per year over the next ten years.**[162] Priority must be given to the AI and Cloud sectors, as one of the most cost-effective and strategic levers for breaking the proprietary monopoly of the GAFAM. This would benefit the European economy, as some studies have revealed that Open Source contributes between 65 to 95 billion euros for the EU's GDP.[163] However, current direct investments seem derisory when compared to the stakes at hand, as the lack of sovereign solutions forces the EU to pay billions of dollars in licensing fees to non-European players (primarily American hyperscalers).[164] Another short-term proposal would be for the EU and its member states to **dedicate 1% of their overall IT budget to the maintenance and development of Open Source software** they already use; this would represent hundreds of millions of euros injected directly into the security of software libraries. Finally, to dethrone the GAFAM, European open-source solutions must be as **user-friendly** as those from Silicon Valley, something that would require significant investments in **design** and **marketing** - not just in code - which is far from being the case today.

It is important to note that using Open Source is **not a panacea**, as it does not automatically mean that one is self-sufficient in the digital realm. Paradoxically, the United States also dominates the open-source market, since the world's largest contributors in this field are Google, Microsoft and Meta. If Europe uses open-source tools that are 90% maintained by American developers, it remains indirectly dependent on their roadmap. Furthermore, due to its lag in hardware, even though Europe possesses highly capable open-source software, if this software runs on Intel processors or AWS servers, **sovereignty remains only partial.**[165] Consequently, while Open Source is necessary to strengthen the EU's digital sovereignty, it is **insufficient on its own** and represents only one piece of the puzzle. It must be **combined with other strategies** mentioned in previous sections, including the consolidation of digital infrastructure (data centers, AI factories and gigafactories), as well as enhanced integration of the European single market, primarily through the Data Union Strategy and the establishment of a Capital Markets Union.

2 • Regulating AI: Limiting/Banning Certain Types of AI, with the Definition of Risk Criteria

The debate over whether to limit or ban certain types of AI, based on the definition of risk criteria, is currently at the center of policy debates in France, Europe and around the world; the discussion focuses on the **degree of regulation needed** to enable the **responsible development of AI**. European AI legislation has already implemented such an approach.[166] The main provisions of the AI Act are founded on a **risk-based approach**, with legal regulations specifically tailored to the perceived level of risk arising from different types of AI, encompassing four main categories:

162 This information was collected through an interview; the person concerned wishes to remain anonymous. See the complete list of interviewees at the end of the Bibliography.

163 European Commission (2021).

164 For every euro invested by the public sector in Open Source, the return on investment for the local economy is estimated to be tenfold. Thus, an increase of just 10% in Open Source contributions at the EU level would create more than 600 startups and boost European GDP by approximately 0.4% to 0.6%. *Ibid.*

165 The RISC-V initiative (open processor architecture) is a key project for Europe in this regard.

166 The AI Act was adopted by the European Parliament and the Council of the EU in December 2023 and entered into force on 1 August 2024, although most of its provisions have only gradually been enacted over time.

- ***Unacceptable Risk associated with prohibited AI technologies:*** a list of AI software expressly prohibited due to the unacceptable risk they pose to fundamental rights and general security. This includes AI-based social scoring techniques or facial recognition, as well as subliminal manipulation practices.
- ***High Risk involving strict regulation of AI practices:*** this category targets AI software that substantially affects fundamental rights and/or security. These practices are not entirely prohibited, but must adhere to rigorous procedures. This includes compliance assessments, with an EU-wide database overseen by the Commission that registers high-risk AI software prior to its deployment.[167]
- ***Limited Risk accompanied by strict transparency requirements:*** this category includes the well-known *chatbots* (ChatGPT, Gemini, etc.) and other AI software that interact directly with people.[168] These AI practices are subject to clearly defined transparency requirements, including the development of techniques (such as digital watermarks) to determine whether a text, audio file, or image was generated by AI.
- ***Minimal Risk involving voluntary guidelines without legal obligation:*** voluntary guidelines or codes of conduct have been developed to encourage compliance with certain rules from the other categories.

Nevertheless, the AI Act contains a number of gaps that must be addressed in order to reinforce the law and the protections it provides, through a more rigorous implementation up to 2028.[169] Among these is a **lack of flexibility** to adapt to the **sector's rapid evolution**, given that any significant amendment to the law requires the joint agreement of the European Parliament and the Council of the EU - a very slow process that can take years - while AI is constantly evolving at great speed, with the sector becoming unrecognizable from one year to the next. Thus, additional mechanisms could be introduced to facilitate the rapid addition of new AI models to the various categories, especially for Unacceptable or High Risk categories, but also for the Limited Risk category, without having to go through a full legislative procedure. This could be implemented by the **European AI Board**,[170] for example, which would be authorized to make **regular updates** to the various categories in line with rapid changes in the sector, perhaps with the establishment of regulatory deadlines for annual updates.[171] Furthermore, the definitions used for the various categories could benefit from **broader criteria**, particularly the Unacceptable Risk category for biometrics and facial recognition.[172]

Furthermore, the AI Act places perhaps excessive emphasis on the risks AI poses to individuals, at the expense of **larger societal impacts**.[173] There are situations where AI causes more general societal problems, even if the direct effects on individuals are not visible or measurable.[174] The societal impacts of AI, such as fake news and the manipulation of democratic processes, should be better addressed in legislation, which implies **involving civil society more closely** in AI governance and the implementation of the law at all levels. This could take the form of a section specifically representing civil society within the European AI Board, with **societal impact assessments** for new AI

167 Other requirements include human oversight, transparency, data governance, training, risk management, and cybersecurity issues.

168 This includes systems that create or manage images, videos, or audio content.

169 Barichella (2023a).

170 The European AI Board, composed of representatives from Member States, the Commission and other institutions, is tasked with ensuring that the law is properly implemented at the EU level.

171 This information was collected through an interview; the person concerned wishes to remain anonymous. See the complete list of interviewees at the end of the Bibliography.

172 Furthermore, the criteria should be more detailed, with a common and mandatory framework for both providers and users of AI models.

173 Barichella (2023a).

174 As analyzed above, AI is used to generate fake news on the Internet that exacerbates online disinformation; this has a negative impact on democratic processes, without causing direct harm to individuals.

models, including mechanisms to better disseminate and communicate these impacts to civil society. Finally, perhaps the main shortcoming of the AI Act lies in its compliance mechanism, where self-assessment by companies has become the norm, especially since the simplification of European digital legislation via the *Omnibus Act*. Companies often have an incentive to exaggerate their level of compliance, which undermines the law's enforceability. There are certain situations where more rigorous assessment is required, particularly for Unacceptable or High Risk categories; but these have become the exception since the *Omnibus Act*, weakening the law as a whole. This is why it is essential to increase the proportion of **more rigorous third-party assessments** (conducted by independent, certified bodies) under the Commission's supervision, while **reducing self-assessment processes** by companies, particularly for Unacceptable and High Risk categories.[175]

3 • Security for AI digital infrastructure, comparison with the nuclear sector

The issue of **digital infrastructure security** (data centers, AI factories) has become vital and highly strategic. As previously explained, this infrastructure is essential for France and the EU to remain competitive in the global race for AI, particularly the development of European leaders and strengthening digital sovereignty. For instance, the rise of AI has transformed data centers; they are no longer mere data warehouses but have become true **high-performance computing facilities**. This transformation has introduced unprecedented security risks, both physical and digital (cybersecurity). For these reasons, and even though they operate very differently, comparisons can be drawn between data centers and nuclear power plants regarding the security risks they pose. The nuclear sector has developed a **rigorous comprehensive security approach** to guard against incidents such as sabotage, fires or radioactive leaks. Communication networks and most equipment are duplicated in various ways.[176] Multiple independent cables are used to transmit information regarding the status of critical nuclear sites, and this information is considered reliable only after being verified multiple times. Other safety systems include *islanding*, through which a nuclear power plant is able in 80% of cases to supply itself with electricity autonomously if an attack cuts off the power supply, thanks to several on-site emergency generators.[177] These measures were made more robust following the 2011 **Fukushima** accident, particularly in Europe, where access to nuclear sites has been further restricted and many industrial control systems have been duplicated off-site with different configurations.

These physical security measures also provide robust **cybersecurity** protection. They help to significantly reduce the risk of viruses infiltrating critical systems at nuclear power plants and limit the scope and spread of malware during a cyberattack.[178] Although data centers already benefit from significant security measures, these must be enhanced in the coming years. It is obviously not possible to simply copy and paste the nuclear power plant security model, since it does not operate in the same way. However, the **nuclear sector** has **decades of experience** in this field, and it is possible to draw inspiration from it by **adapting** some of these measures for digital infrastructure in Europe, with corresponding adjustments. By 2028, enhanced system duplication and redundancy - including a more advanced backup power supply with a fully integrated *islanding* system, similar to that used in nuclear power plants, to ensure a completely

175 As analyzed in Appendix One, another point of consensus that emerged from the survey is that current regulation is insufficient, necessitating the need to accelerate and strengthen the implementation of the AI Act at the European and national levels.

176 This includes the use of an Ethernet system, on-site installations where redundancy is ensured, as well as additional remote equipment.

177 Desarnaud (2017).

178 Barichella (2023b).

autonomous electricity supply - will be relevant for data centers.[179] This is not only related to security risks but also to supply challenges with local power grids due to the high energy consumption of new AI models. In general, it is essential to **limit and restrict** access to data centers **as tightly as possible** by increasing controls and searches at all entry points.[180]

4 . Building global digital governance through the creation of multi-level mechanisms

Since the launch of *ChatGPT* version 3.5 in November 2022, many voices have called for the establishment of **global governance** mechanisms to regulate AI technologies.[181] Even some tech executives, such as Sam Altman and Elon Musk, have warned of the potentially existential risk posed by AI and the need to establish a rigorous international framework, as was done with nuclear energy at the end of World War II. Numerous parallels have been drawn between AI and nuclear power, particularly regarding the risks and opportunities for humanity. However, AI is arguably more complex and has a more far-reaching impact. While nuclear power can be used as an energy source or as a weapon, **AI is multifaceted** and has the potential to become ubiquitous, gradually impacting all sectors and aspects of society. Thus, while it is undeniable that the International Atomic Energy Agency can serve as a source of inspiration on certain aspects of global AI governance, the technology is too complex to be limited to an energy-military dichotomy. For these reasons, the international treaty of the **Organization for the Prohibition of Chemical Weapons** (OPCW) likely offers a more relevant framework for comparison. Chemicals, like AI, are multifaceted in nature, with a **global impact on most sectors** of activity (health, industry, agriculture, construction), as well as in the military domain with chemical weapons.[182]

The OPCW could serve as a valuable source of inspiration for establishing global AI governance, including the development of a **forecasting and monitoring framework** composed of **international experts**.[183] However, the **current highly unstable international context** will make any collaboration on AI difficult by 2028. This is all the more true given the unpredictable personality of the current US president, who is pursuing a nationalist and insular foreign policy (dubbed "America First") by withdrawing from most international organizations or conventions of which the United States was a founding member.[184] **Without American leadership**, it will be difficult to make concrete progress in creating a new global governance framework for AI, especially since a large portion of technological innovations in the sector originate from the United States. This does not mean that no measures can be taken in the short term. Indeed, **China**, as the second major AI power, has repeatedly stated that it is necessary to enhance international collaboration in the technological field. Chinese representatives have thus pressed for the UN to establish new global governance frameworks for AI, in collaboration notably with the EU.

The UN has taken crucial steps over the past two years with the launch of the Global Digital Compact, adopted in September 2024, the first comprehensive global framework for digital cooperation aimed at establishing shared principles

179 This information was collected through an interview; the person concerned wishes to remain anonymous. See the complete list of interviewees at the end of the Bibliography.

180 Some analysts have nevertheless warned against overly strict regulation, which could hinder innovation. The goal is thus to strike a balance between competitiveness and data center security.

181 As explained in Appendix One, the need to establish a form of global governance for AI is another consensus issue that emerged from the survey.

182 Barichella (2023a).

183 This information was collected through an interview; the individual wishes to remain anonymous. See the complete list of interviewees at the end of the Bibliography.

184 The United States has played a leading role in establishing numerous global governance frameworks. This includes the creation of the UN at the end of World War II, as well as the international treaty on the non-proliferation of nuclear weapons during the Cold War.

for an open, free and secure digital future. The compact aims to "govern AI for humanity" by ensuring that it respects human rights and helps achieve the Sustainable Development Goals. In addition, the UN also established an **international scientific panel on AI** in early 2026 (often compared to the IPCC on climate change), to produce periodic scientific assessments of AI's capabilities, risks and opportunities. Finally, the year 2024 marked the adoption of the first global resolution dedicated exclusively to AI[185] by the **UN General Assembly**.[186] However, like most UN mechanisms, these structures are **non-binding** and can only issue recommendations, since no sanctions are provided for in the event of non-compliance with the standards. Due to the chronic instability characterizing international relations, it will in all likelihood be **impossible in the short term to establish a binding global governance framework for AI**, even in the event of a change in the US Presidency in 2028.[187] Indeed, major powers are generally very reluctant to transfer any part of their sovereignty to international institutions, and very few UN mechanisms are therefore binding.[188]

For these reasons, global governance of AI in the coming years is more likely to succeed through less ambitious initiatives, such as **ISO standards** or **interregional coalitions**. ISO (International Organization for Standardization) standards serve as global benchmarks. They establish requirements, specifications or guidelines to ensure that products, processes or services meet quality and safety standards. They are **virtually universal** because they are developed by experts from 170 countries, but are **voluntary** in nature since companies freely choose whether to comply with them; they lend credibility by serving as proof of commitment to customers and regulators. Since AI is a 'black box' technology by nature, ISO standards can help inject transparency and enhance public trust, demonstrating that AI has been tested according to rigorous international norms. Furthermore, ISO standards facilitate interoperability by ensuring that two AI systems can exchange data seamlessly and in compliance with regulations.[189] A **global technical committee** has been established to develop ISO norms specifically in the field of AI, including governance (ISO/IEC 42001), risk management (ISO/IEC 23894), data quality (ISO/IEC 5259), as well as ethics and bias (ISO/IEC TR 24027). By 2028, these ISO standards should be more **systematically integrated** into the AI Act, as well as into binding legislation in related fields at the national level.[190]

When it comes to **cross-regional coalitions**, the European AI Act represents a groundbreaking legislation, as the EU is the first major political entity to establish a comprehensive regulatory framework for the various uses of AI, which has served as a **source of inspiration** for many countries around the world. This includes nations like Canada, Australia and Japan, as well as BRIC members such as Brazil, India and South Africa, all of which have indicated that the AI Act has served as a basis for establishing their own national laws. The EU has previously leveraged its position as the world's **largest single market**, with lucrative trade opportunities, to push for the inclusion of ambitious environmental standards and data protection rules under the GDPR during trade negotiations.[191] By 2028, the EU can and must demand the same with regard to

185 Co-sponsored by more than 120 countries, this resolution calls for bridging the digital divide between developed and developing countries.

186 This led to the creation of a Global Dialogue on AI, a regular forum within the UN to harmonize national approaches and ensure the interoperability of regulations across countries.

187 Even when the international context was more favorable, for example under Obama during the negotiations for the Paris Agreement in 2015, no binding mechanisms were incorporated into the new global climate regime.

188 The only example is the UN Security Council, but the five permanent members rarely manage to reach an agreement. The World Trade Organization (WTO) also contains certain binding mechanisms, but these are fairly limited overall.

189 For example, the AI Act relies heavily on ISO standards; being ISO-certified means having already made significant progress toward legal compliance in Europe.

190 China also indicated that it has taken European legislation into account, even though the context is very different due to China's political system.

191 During EU negotiations for trade agreements with countries such as Canada, Japan, India, and even China, Europe has made access to its single market contingent on the inclusion of these ethical standards.

European standards for the responsible use of AI, as established by the AI Act, especially since European law contains provisions with **extra-territorial scope**.[192] Europe is therefore ideally positioned to lead the international community in creating **interregional coalitions on AI ethics**, encompassing both bilateral and multilateral frameworks, with its key trading partners worldwide, notably the United Kingdom, Turkey, Canada, Japan, South Africa, Mercosur and India.[193]

192 Like the GDPR, the AI Act stipulates that any entity placing goods or services using AI technologies on the European market will be subject to European law, even if that entity is not itself located within the EU.

193 This information was collected through an interview; the person concerned wishes to remain anonymous. See the complete list of interviewees at the end of the Bibliography.

IV. Transposition of the above elements into three contrasting medium-term prospective scenarios (2035 timeframe)

The **three forward-looking scenarios for 2035** presented in this final section were developed based on the quantitative results from the survey, as well as on qualitative information gathered during **interviews** and from the **literature**. The medium-term scenarios presented below are comprehensive and include all sections of the survey - see Appendix One for a detailed analysis of the results.

1 . Optimistic scenario for 2035

I IMPACT ON THE ECONOMY, WORK AND SKILLS

This **optimistic** scenario is based on the assumption of a **continued acceleration** in AI **technological development**, whereby effective techniques are found to circumvent the problems identified in the first part of the study regarding the lack of new data to train AI models. This would involve the development of sophisticated hybrid data that intertwines human data with synthetic data, as well as other innovative methods[194] that allow for the continuous renewal of data stocks while **avoiding the trap of AI model stagnation.**[195]

In this optimistic scenario, ongoing technological acceleration allows **humans to be augmented by AI rather than replaced.** Even though there are job losses in certain sectors, **more jobs are created than lost**, especially in emerging fields related to new technologies. Thanks to adequate training supported by governments, workers across all sectors of the economy learn to use AI to significantly increase their productivity, accelerating the completion of tasks within companies, public organizations or universities. Rather than humans replaced by AI, we witness a **fusion between humans and machines**, which become inseparable and complementary partners that reinforce one another. Since AI quickly handles all repetitive and routine tasks, this allows humans to concentrate on other tasks where personal contact, creativity and strategic ingenuity are required. This win-win association, where AI and humans each focus on the areas where they can provide the best possible contribution, profoundly transforms work, professions and skills, but in a positive way that **benefits humans and society as a whole.** In this optimistic scenario, the ongoing technological acceleration of AI spreads to every country in the world, substantially increasing **global productivity, economic growth and wealth.** This enables humanity to enter a new era of eco-

194 As of today, in addition to synthetic data, other techniques are being studied or developed to refresh AI datasets, which could lead to major breakthroughs over the next decade. This includes 'active' or 'federated' learning, real-time data pipelines (Adaptive AI), as well as advanced internet searches using agentic AI ('Retrieval-Augmented Generation').

195 Energy challenges are also overcome in this scenario, for the reasons analyzed below.

nomic prosperity comparable to the post-war 'thirty glorious years', with the return of full employment and a strong global growth rate exceeding 5% per year. The wealth and economic growth generated by AI extends beyond business leaders to benefit society as a whole. This leads to a **reduction in social inequalities** between the wealthy, middle and disadvantaged classes, thereby reversing a trend that began in the 1970s with the widening of inequalities in many Western countries. Furthermore, such a situation also benefits developing countries. Thanks to the economic boom generated by AI, these countries regain high levels of growth that allow them to catch up, thereby reducing inequalities between countries of the Global North and those of the Global South. For these reasons, **global prosperity** reaches unprecedented levels, with AI enabling an **economic miracle** that has few parallels in human history.

IMPACT ON THE ENVIRONMENT

In this optimistic scenario, despite concerns about the excessive electricity consumption of new AI models, mechanisms are found to **limit environmental impacts**. The efficient use of **renewable energy sources** enables digital infrastructure to be powered by hydroelectric, solar, wind, and geothermal energy, as well as hydrogen. New technological breakthroughs enable better capture of these clean energy sources, particularly new types of batteries that help store energy more efficiently to offset the intermittent nature of renewables. AI itself helps accelerate and **stimulate scientific research** in this field, leading to the discovery of new techniques to limit climate change, including, but not limited to the renewable energy sector. Other areas of progress include technologies for CO_2 capture and storage, where AI helps to drive major technological breakthroughs that significantly reduce costs and increase the efficiency of carbon capture and storage systems, as well as those associated with renewables.[196] In this optimistic scenario, **low-carbon technologies spread** worldwide because they are economically competitive and environmentally effective, accelerating the ecological transition. This helps developed and developing countries implement their commitments under the Paris Agreement more quickly, as well as raise their level of ambition for Nationally Determined Contributions (NDCs). Consequently, by 2035 the international community is able to progress towards the long-term goals set by the **Paris Agreement** to keep global warming below 2°C by the end of the century, as the aggregation of all NDCs from countries worldwide falls below this threshold for the first time. Even though the rigorous implementation of NDCs remains challenging, the competitiveness of low-carbon technologies, driven by **technical breakthroughs linked to AI**, gradually leads the global economy toward a transition away from fossil fuels. Finally, AI makes it possible to reach the early stages of **nuclear fusion** sooner than expected by helping to overcome technological obstacles that were insurmountable for humans alone. This opens up, for the first time, the possibility of a **100% carbon-free energy future** for humanity with potentially unlimited clean energy, thereby **saving the planet** from the effects of climate change. Nuclear fusion would greatly thus enhance the prospects of development and progress for society in virtually all domains.

IMPACT ON DEMOCRATIC PROCESSES

In this optimistic scenario looking ahead to 2035, predictions about the negative impacts of AI in terms of misinformation and the manipulation of democratic processes do not come to pass. In fact, innovative advanced AI models make it possible to **detect and counter** fake news and deepfakes on the internet and social media, **protecting the public** from external manipulation attempts. This includes the development of new, highly effective **digital watermarking systems** that can identify in real time when hackers attempt to spread disinformation using AI. Once identified, the relevant government agencies, such as VIGINUM in France and its counterparts

196 This provides a very valuable transition period allowing the international community to continue using fossil fuel infrastructure, while awaiting the complete transition towards renewables.

in other countries, can quickly block them and neutralize their threat online. Just as today, the cat-and-mouse game between those responsible for protecting online information and potential hackers will continue. Nevertheless, thanks to close collaboration between governments and industry players - particularly through joint boards and public-private partnerships that enable them to work closely together - government agencies are able, for the most part, to remain one step ahead technologically. This requires **rigorous regulation** that incorporates security mechanisms from the very design phase of AI models, ensuring their **auditability** and the continuous **correction of biases** throughout the models' entire lifecycle. For these reasons, in this optimistic scenario, AI used wisely and responsibly helps better **protect democracies** in Europe and around the world, thereby reducing the impact of disinformation campaigns on electoral processes. This helps **curb the rise of populism** and political extremism in elections at all levels, thereby favoring moderate political parties, buttressing democracies from within. Distinguishing between true and false information available online becomes easier and more straightforward, reducing the potential for political manipulation. As a result, the degree of polarization among the electorate decreases significantly, enabling the resurgence of moderate political parties and reducing internal divisions within democracies around the world.

IMPACT ON SOCIETY AS A WHOLE

In this optimistic scenario, the acceleration of AI technological development leads to **major advances** in **medicine** and **scientific research** by 2035. Advanced AI models make it possible to accomplish in a matter of days or weeks what humans used to take years or even decades to do, particularly when it comes to compiling, processing, and analyzing massive amounts of data. As a result, scientific research is spurred on exponentially, creating a ripple effect where a major discovery in one field leads to another in a related field, creating a self-reinforcing cycle that accelerates and gains momentum. Sam Altman's promise that AI will cure cancer becomes a reality, leading to the discovery of numerous new drugs and treatments that can cure diseases long considered incurable or difficult to treat. **AI helps to extend life expectancy and improve the quality of life** around the world. As a result, humanity is able to live better and longer in good health, improving happiness and well-being indices. This is all the more true since, under this scenario, AI is used wisely by governments to resolve a number of societal problems.

The spectacular advances made in medicine are replicated in most scientific fields, enabling humanity to enter a phase of **unprecedented technological progress**. For example, AI makes it possible to develop new, accessible systems for filtering water and for making agriculture more resilient and productive while lowering costs,[197] thereby reducing hunger and thirst in developing countries. In developed nations, dexterous robots programmed with advanced AI enable the mass construction of new housing at a lower cost and more quickly than human labor, significantly reducing the number of homeless people or those living in substandard housing. In this optimistic scenario, governments in most developed countries, as well as in many developing nations, succeed in establishing **rigorous national regulatory frameworks**, as well as a **global governance system** under the auspices of the UN, enabling the **responsible development of AI**. The European AI Act encourages comparable laws in countries around the world, with a global charter ratified by the General Assembly and even by the UN Security Council, where AI is regulated in an ethical manner. Certain types of high-risk AI are banned entirely, and others posing significant risks are strictly regulated, with severe penalties at the international, regional, and national levels in cases of non-compliance. The international community manages to **maintain control over the technology**, and AI thus remains under human

197 For water, this includes new techniques in terms of water purification and desalination. Regarding agriculture, this encompasses innovations (machinery, fertilizers) to make crops more resilient, particularly against droughts, as well as to increase crop yields and thus the quantity of food produced.

oversight and is used to serve the well-being and progress of humanity as a whole.

2 . Pessimistic Scenario by 2035

IMPACT ON THE ECONOMY, WORK AND SKILLS

This second, **pessimistic** scenario stands in **stark contrast** to the first, optimistic scenario, except that both are based on the assumption of a continuous acceleration in the technological development of AI by 2035. In this second scenario, **humans are gradually replaced by machines in most sectors**, as companies find themselves caught in a vicious cycle of globalized competition. This forces them to prioritize efficiency and speed to cut costs relative to their competitors; since AI has become far more efficient in terms of speed and results in virtually every field, **humans are gradually rendered obsolete**. This includes the most vulnerable white-collar jobs mentioned earlier in the study (administration and office support, marketing, translators, or web designers, etc.), where AI becomes so much faster and more efficient that these jobs almost completely disappear by 2035. This profoundly disrupts the labor market with **massive job losses** in the service sector, particularly in key areas such as market and non-market services that previously employed large numbers of people (banking, finance, insurance, real estate/hospitality, etc.). Only senior executives, shareholders, and certain highly specialized or technical professions are able to survive this veritable 'tsunami' of job losses.[198] Even in those cases, **AI profoundly transforms the nature of jobs and skills**, with an increasingly prominent role for machines and a steadily diminishing one for humans. Because of gains in efficiency and competitiveness, we even witness the emergence of scenarios where management is entirely handled by new AI models equipped with reasoning capabilities. This leads to situations where agentic AI directs and makes decisions over other AI systems within companies and government agencies, with **humans having lost their role and their relevance in the labor market.**[199]

Furthermore, due to ongoing technological advances, AI begins to replace humans in sectors previously considered immune to automation, particularly manual labor and jobs involving interpersonal or *soft skills*. Under this scenario, new robotic AI models acquire a certain level of manual dexterity that allows them to interact with their environment in three dimensions, enabling them to perform tasks previously deemed impossible. They even begin to rival humans in terms of efficiency and speed in trades such as plumbing, masonry, carpentry, and gardening. Similarly, personal and healthcare services - including counseling and psychological support - and even teachers in education who are supposed to impart values and serve as moral guides, face competition from highly advanced AIs capable of accurately mimicking human emotions. Even if humans are not completely replaced, this **profoundly disrupts professions** in these sectors. Such a situation leads to rising **mass unemployment** not only in developed countries but also in developing ones, **significantly increasing inequality and poverty**, and generating serious **global social unrest** that governments struggle to contain.

IMPACT ON THE ENVIRONMENT

Due to the accelerating pace of technological development, **new AI models will become increasingly energy-intensive** over the next decade, reaching a **critical point by 2035**. This leads to extreme scenarios where entire regions within certain countries face regular **large-scale blackouts** or power outages, as electrical grids cannot meet the massive energy demand of

198 Hence, in this pessimistic scenario, it is primarily the big tech CEOs who benefit from the AI revolution by continuing to enrich themselves at the expense of society as a whole.

199 On this matter, and as indicated in Appendix One, it is noteworthy how the survey reveals a unanimous rejection of AI as a fully autonomous decision-maker by 2035, with support instead for a hybrid committee model involving human oversight.

advanced AI models. Governments must make difficult choices regarding electricity allocation, and due to pressure from lobbyists, certain public services that are ostensibly essential are sometimes sacrificed in the name of competitiveness. Transportation, law enforcement, government agencies, even hospitals and schools increasingly face major power outages, preventing them from providing consistent services to the public. Citizens themselves are confronted with difficult situations, whereby certain less-affluent neighborhoods in cities, as well as some rural areas, no longer have regular access to electricity, leading to significant health and safety risks. Globally, AI's electricity consumption continues to grow exponentially and reaches a critical threshold by 2035, becoming by far the most energy-intensive sector and thus the primary source of GHG emissions, far surpassing transportation, heating, agriculture, or buildings (the top polluters in 2026). Technical advances in renewable energy are insufficient to offset such an increase, leading to a **significant rise in GHG emissions** in most countries around the world.

Thus, the crucial decade (2026-35) during which emissions must be reduced to set the international community on a positive trajectory toward carbon neutrality by 2050 ends up being a complete failure, with the opposite scenario looming, involving a substantial increase in emissions over this period. Achieving the **Paris Agreement's goals** to limit global warming below 2°C by the end of the century **becomes impossible**, rendering the Agreement obsolete. Following Trump's lead in the United States, more and more countries choose to withdraw from the Accord out of concern for competitiveness, so as not to hinder the technological development of AI. Consequently, in this pessimistic scenario, we witness an **acceleration of the effects of climate change**, which occur sooner than scientists predicted and lead to an increase in the frequency and intensity of **extreme weather events**. This includes hurricanes, tornadoes, typhoons, storms and droughts, as well as rising sea levels, causing **catastrophic damage** to civilian populations in countries around the world. To meet the massive demand for electricity, more and more governments opt for nuclear energy, sometimes in haste and without implementing appropriate safety measures. In addition to significantly increasing the volume of nuclear waste with negative environmental impacts, this leads to a rise in the number of **nuclear power plant accidents**, such as those at Chernobyl or Fukushima. This situation is exacerbated by extreme weather events driven by the acceleration of climate change, making nuclear power plants more vulnerable, and causing disasters with numerous **civilian casualties**.

IMPACT ON DEMOCRATIC PROCESSES

In this pessimistic scenario, new advanced AI models contribute to the **proliferation of disinformation** and the manipulation of electoral processes, **weakening democracies** by 2035. Despite advances in technologies to detect online misinformation, such as digital watermarking, governments **fail to implement sufficiently strict regulations** to control content on the internet and social media, such as system auditability and bias correction, largely due to pressure from industry lobbies. Governments and companies are unable to establish robust public-private partnerships to integrate security mechanisms from the design phase of AI models, leading to a failure to correct online biases and ensure system traceability. In this pessimistic scenario, it is therefore **hackers** who gain the upper hand over national cybersecurity agencies and manage to outpace them, with the cat-and-mouse game clearly turning in their favor before reaching a critical point in 2035. Public authorities thus completely **lose control over the Internet and social media**, with serious consequences in terms of the amplification of online disinformation. Without regulatory constraints to limit their actions, hackers have free rein to amplify both the number and scale of fake news and deepfakes on the Internet, using new advanced AI models capable of autonomously launching large-scale misinformation campaigns. In this pessimistic scenario, **democracies are undermined from within** by massive manipulation of public opinion through online disinformation, where distinguishing between truth and falsehood becomes nearly impossible. This exacerbates the level of **polari-**

zation among the electorate and fuels the rise of anti-establishment parties, resulting in the election of populist figures from the political extremes to lead major democracies in Europe, North America, and elsewhere. These leaders implement semi-authoritarian policy platforms that **weaken democracy and civil liberties**. This situation contributes to the deterioration of democratic regimes worldwide, with a shift toward **illiberal democracies**, where elections are still held but checks and balances have been significantly eroded.

IMPACT ON SOCIETY AS A WHOLE

For these reasons, this pessimistic scenario exacerbates societal problems and conflicts by 2035. The onset of **mass unemployment** due to AI disrupts societies around the world. Governments worldwide struggle to manage a **situation that rapidly spirals out of control**. Options include introducing public pensions to address the surge in new unemployed workers, notably attempts to implement a universal basic income (UBI), funded by taxes on AI and robots. Although these measures are good ideas in principle, they become difficult to implement in the context of mass unemployment, where governments are unable to tax companies sufficiently due to pressure from lobby groups. The funds raised are insufficient to finance public pensions and the UBI due to an exponential increase in the number of job seekers. In this pessimistic scenario, AI not only leads to a **forced march toward a post-work society** where a majority of citizens are no longer employed, but also toward **widespread social precariousness**, because governments lack the resources to fund the necessary social transfers.[200] Consequently, this results in a significant worsening of poverty and inequality, with a corresponding rise in **delinquency** and **crime**, as more and more people turn toward illegal activities as the only way to sustain their basic needs. In this worst-case scenario, certain developing countries, which were already fragile to begin with, collapse completely and descend into **anarchy**.

In developed countries, social tensions intensify, reaching a critical level by 2035. In some cases, this contributes to the **collapse of democratic regimes**, already severely weakened by the rise of disinformation, which veer toward illiberalism or even a form of semi-authoritarianism as the only way to avoid anarchy.

In this pessimistic scenario, the acceleration of climate change caused by advanced, highly energy-intensive AI models, contributes to exacerbating these sources of tension within countries, as well as tensions between nations. This is particularly true due to the increasing scarcity of natural resources (notably water), especially in regions like sub-Saharan Africa, the Middle East or the Indus River basin, which have historically been highly vulnerable to droughts. This situation creates an explosive mix of circumstances, triggering a **risk of armed conflict** in these volatile regions where governments are unable to cope with such mounting existential challenges. International and geopolitical instability correspondingly increase, leading nations to turn inward as nationalism surges. This results in a **collapse of frameworks for international collaboration** in most fields (ISO standards, UN agreements, inter-regional coalitions) - including AI. Thus, the international community fails to establish rigorous global governance frameworks for the responsible development of AI. **Humanity loses control over the technology**, with potentially serious political, economic, and social consequences that only exacerbate the problems mentioned above. This leads to unprecedented crises that **jeopardize the future of human civilization**.

200 This is all the more concerning since governments are already heavily indebted at the outset in 2026.

3 • Intermediate or Mixed Scenario by 2035

I IMPACT ON THE ECONOMY, WORK AND SKILLS

The third proposed scenario is a **hybrid** or **intermediate one**, as it incorporates elements from both the first and second scenarios. It is intended to be **realistic**, as the impacts of AI by 2035 will in all likelihood be mixed, combining certain positive elements with other more negative aspects. Furthermore, this intermediate scenario is based on the assumption that even though AI technological progress will likely continue, **certain limits** could be reached, both technologically (lack of new data) and in terms of energy (not enough electricity to power advanced AI models). This would cause a **relative slowdown in the pace of AI development**, especially compared to the early years (2022–26).[201] Such a slowdown would result in less extreme and more nuanced impacts of AI on society, thereby corroborating this third scenario. In the latter, **AI has mixed effects** on work, occupations, and skills. On the one hand, the technology **boosts productivity** in many sectors vital to the economy, while also creating new jobs in AI-related fields such as computer science and data management. Governments invest in AI skills training, enabling workers in certain sectors to enhance their performance by using the technology to increase their work speed and productivity. This generates significant benefits for the economy at the national and global levels, stimulating **economic growth** and increasing GDP. On the other hand, a **significant number of jobs are automated**, and job losses begin to accelerate by 2035, with the balance between job creation and destruction becoming increasingly difficult to discern.

Even when jobs do not disappear entirely, white-collar professions are often profoundly transformed by technology, and many executives struggle to adapt quickly enough to these significant upheavals. Thus, rather than signaling the end of work, **AI transforms the labor market by 2035** much like the industrial revolutions of previous centuries, creating jobs in some sectors, eliminating them in others, and profoundly altering the nature of professions and the skills required in most fields. In addition, it is primarily young graduates entering the job market who face the greatest difficulty integrating into the workforce, as new advanced AI models are able to perform most of the repetitive tasks previously assigned to interns. This contributes to **rising youth unemployment**, while creating new jobs for certain more experienced and technical profiles. Despite government policies to support professional retraining in sectors where AI drives expansion, a significant percentage of older workers **fail to adapt to this new technological revolution** and are left behind in the labor market, either permanently losing their jobs or being relegated to low-paying roles. For these reasons, the effects of AI could end up being **paradoxical**, simultaneously driving **increases in productivity** and global economic growth in terms of GDP, while also **increasing social inequalities** within countries.[202] In doing so, AI merely reinforces **trends that are already visible worldwide in 2026** and have been evident for the past few decades in a number of countries, starting with the United States. Even though American GDP has risen significantly since the 1980s, social inequalities have widened considerably over the same period,[203] with a highly unequal distribution of the fruits of this growth.[204] According to this intermediate scenario, the AI revolution could contribute to exporting this **neoliberal** American economic

201 These early years were marked by a great enthusiasm generated by the new technology.

202 As noted in Appendix One, one point of consensus in the survey relates to deep concerns about the risk of increased social inequality due to AI.

203 By 2035, those "left behind by the AI revolution" will be added to those "left behind by globalization".

204 These social inequalities in the United States and elsewhere can be measured using the Gini Coefficient.

model to other countries, including in Europe where social inequalities have not previously increased as much as in the US.[205] This mixed scenario therefore presents both **advantages** and **disadvantages**.

IMPACT ON THE ENVIRONMENT

In this intermediate scenario, AI enables significant **technological advances** in the field of **renewable energy** and **low-carbon technologies**, including carbon capture and storage techniques. This enhances the competitiveness of these technologies relative to fossil fuels by increasing their efficiency and reducing their costs. Thus, market forces encourage companies worldwide to **accelerate their decarbonization**, facilitating the implementation of NDCs by governments as the economic impacts are reduced, or even positive in some cases. This yields tangible benefits in terms of GHG reductions by 2035, helping the international community move closer to the **Paris Agreement**'s goals in certain areas and sectors. Nevertheless, in this mixed scenario, the flip side of the coin involves, unsurprisingly, a significant increase in GHG emissions within other sectors, due to an **ever-increasing energy consumption from new AI models**. While advances brought about by AI in the development of low-carbon technologies help mitigate this phenomenon to some extent, they do not fully offset the significant increase in emissions across a number of key sectors. Thus, the **overall environmental impact of AI ends up being mixed**. Due to pressure from lobby groups, the balance tends to tip toward increased emissions, even if the overall picture remains nuanced. This is all the more true since many governments opt for nuclear power as an easy solution for AI development, leading to an increase in nuclear waste with negative environmental impacts, not to mention security risks.

For these reasons, AI could have **paradoxical consequences** on the implementation of the Paris Agreement by 2035. On the one hand, advances in low-carbon technologies generate genuine enthusiasm, encouraging governments to **raise their level of ambition in the NDCs** they submit during the COP process. On paper, the aggregation of all NDCs enables the international community, for the first time, to achieve a trajectory sufficient to limit global warming **below the 2°C threshold** by the end of the century. This milestone, reached at COP40 in 2035, is celebrated as a major turning point in the implementation of the Paris Agreement, sparking great hope. However, the significant increase in GHG emissions in a number of critical sectors, due to new AI models that are increasingly energy-intensive, means that the implementation of these new, more ambitious NDCs remains illusory in practice and amounts to little more than **greenwashing**. Paradoxically, AI leads to a rise in the level of ambition for NDCs, but without concrete follow-up in terms of implementation, and the gap between the two becomes increasingly noticeable by 2035. In this regard, **AI merely exacerbates trends already visible in 2026**, where the latest round of NDCs submitted by governments at COP30 in November 2025 certainly reflected an increase in overall aspirations on paper, but without being followed up by concrete policies at the national level. In this intermediate scenario, we therefore witness an **acceleration of the effects of climate change**, even though this unfolds **more moderately** compared to the second, pessimistic scenario.

IMPACT ON DEMOCRATIC PROCESSES

In this intermediate scenario, AI has a **mixed impact** on democratic systems by 2035. On the negative side, AI contributes to **amplifying disinformation campaigns**, with an increase in fake news and deepfakes on the internet which exacerbate attempts to manipulate electoral processes. At the same time, **effective and rigorous regulations** are implemented to counter and better control misinformation on the internet and social media in certain countries, such as France and in Europe, but not in others.

205 Historically, the EU has promoted a more balanced economic and social model which helps reduce social inequalities, compared to the neoliberal system in the United States. See: Hay and Wincott (2012), Hay and Payne (2015).

In the United States, for example, the neoliberal-inspired culture of **economic *laissez-faire***, combined with pressure from lobbyists, prevents the implementation of appropriate regulation in this area. Like the US, a number of other democracies, such as the United Kingdom or Australia, influenced by the culture of economic laissez-faire and out of a concern for competitiveness, prefer not to implement overly strict regulations that could hinder innovation. Other democracies like Japan, Canada or South Korea tend to **follow the European model**, while BRICS such as Brazil and South Africa, or Mexico struggle to follow this model. Nevertheless, certain countries are plagued by corruption and **lack the resources or infrastructure** necessary to regulate content on the internet and social media. In European countries, plus Japan, Canada, and South Korea - which have managed to implement **sufficiently rigorous legislation** - the cat-and-mouse game turns in the government's favor. These countries use advanced AI techniques such as digital watermarks, along with strict regulations to ensure the auditability of systems and the continuous correction of biases, in order to effectively combat online disinformation. This helps to reduce manipulation of electoral systems, lowering the level of polarization and divisions within these democracies, while favoring moderate political parties. Conversely, in countries that have not implemented sufficiently robust laws in this area - whether due to a lack of resources or political will - online disinformation is amplified, and the cat-and-mouse game plays out to the hackers' advantage. This leads to serious consequences in terms of **polarization**, with the rise of populism and political extremism, **weakening democracy from the inside**.

In authoritarian states, strict censorship systems enable nearly full control of online content and social media. Advanced AI technologies are used by these regimes to **increase surveillance of their populations**, particularly through the use of facial recognition and social scoring, which serve to intensify the level of control. Hence, it is clear that in this intermediate scenario, AI has **mixed effects** overall on democratic processes in countries around the world, even though the balance leans more toward the **weakening of freedoms**. Apart from the EU[206] and democratic partner states, few countries in the world are capable, even with the necessary political will, of implementing sufficiently rigorous rules to effectively contain online disinformation. As a result, in most cases, AI continues to **weaken certain democracies from within** by amplifying disinformation and the manipulation of electoral processes. For dictatorships, the technology even provides them with new, highly effective tools to increase their control over populations. Once again, according to this scenario, AI would only **reinforce by 2035 many trends already visible today in 2026**, whereby democracies are weakened, dictatorships strengthened, and freedoms on the decline in many regions around the world.

IMPACT ON SOCIETY AS A WHOLE

In this mixed scenario, AI enables **significant advances in science and medicine** by 2035, helping to improve peoples' life expectancy and quality of life. However, the new treatments made available by AI are expensive and often unaffordable, thereby exacerbating inequalities.[207] **AI does not deliver the expected miracles**, such as the complete cure for cancer promised by Sam Altman, even though it enables the development of new, more effective drugs. While technological breakthroughs in AI make it possible to find new solutions to certain societal problems, such as those related to agriculture and access to drinking water in developing countries, we are far from the miracle solutions described in the first optimistic scenario, and many problems persist. AI also contributes to exacerbating a number of **societal challenges** without, however, descending into the catastrophes of the second pessimistic scenario. **School dropout rates rise**

206 Even in Europe, the current process of simplifying digital legislation (*Digital Omnibus* - see above) risks undermining the EU's ability to effectively combat disinformation.

207 Furthermore, the benefits would be concentrated in countries that have been able to invest sufficiently in AI-enhanced medical infrastructure, and less so in developing countries.

in developed countries, especially among disadvantaged communities, with widespread use of AI as a substitute for teachers due to the lower costs involved, as education with human teachers becomes an expensive luxury accessible only to the elite.[208] This intensifies the difficulties young people face in entering the labor market, precisely at a time when AI is profoundly transforming professions by 2035, leading to a decrease in the number of entry-level positions and contributing to a **rise in youth unemployment**. Furthermore, as explained before, despite policies to support professional retraining in sectors where AI creates new jobs, a significant portion of the population may fail to adapt and find their place in this new labor market, where AI plays a major role. These various factors contribute to **increased precariousness and social inequality** across different sections of the population, with a corresponding rise in delinquency and crime. Even by implementing measures like taxing AI, governments still struggle to finance public pensions for those left behind by the AI revolution; this exacerbates **public debt** and further weakens state finances. In other poorer nations that lack the same social safety nets, or in countries like the United States with a neoliberal orientation, the societal impacts are even more pronounced, weakening political systems while **exacerbating tensions and polarization**.

Finally, the establishment of effective governance frameworks at the national level in several countries helps maintain a degree of control over AI. The EU is in a strong position to collaborate with other countries that have implemented similar measures, notably Canada and Japan. This leads to the creation of **bilateral** and **multilateral frameworks** based on **ISO standards**, with the aim of better regulating AI and promoting its responsible use. Nevertheless, global governance through the UN system remains problematic, largely due to persistent **Sino-American rivalry over AI**, as these two major powers refuse to sincerely engage in multilateral processes for fear that this might compromise their competitive advantage. Therefore, **no binding global regulatory framework** on AI is established under this scenario, with only non-binding resolutions passed by the UN General Assembly, which are primarily symbolic in scope. Thanks to the relative **slowdown** in AI technological development (see above), humanity manages, with some difficulty, to **maintain a certain degree of control over the technology**, even though the absence of rigorous global governance frameworks - and national ones in many countries - weakens this control and leads to the emergence of **vulnerabilities that are cause for concern** for the future. Once again, this intermediate scenario for 2035 illustrates a **reinforcement of many trends already visible in 2026** regarding AI, which are likely to intensify over the next decade.

208 Students, of course, do not have the same level of motivation to learn with an AI as they do with the intellectual and emotional stimulation provided by human interaction.

Conclusion

In conclusion, the AI technology revolution will **profoundly transform society by 2035**. This includes impacts on the economy, work, professions and skills; on the environment in terms of the ecological footprint; on democratic processes due to misinformation exacerbated by AI; and on society more broadly, particularly scientific and medical research, education, and social inequalities. Given these profound transformations, this paper has highlighted the fundamental importance of **keeping humans in the loop through regulation**, in order to **define limits and maintain control** over the technology. The study has presented an overview of the current state of affairs and short-term prospective scenarios (2026–28 timeframe) on human-AI coexistence, followed by an analysis of the resulting systemic risks and applicable regulatory mechanisms, while proposing operational recommendations for businesses and policymakers. The final section has provided a transposition of these elements into three contrasting medium-term scenarios (optimistic, pessimistic, and intermediate/mixed) looking ahead to 2035. The study proposes concrete solutions to regain control over AI, divided into seven main areas of action, including the mobilization of an **additional €100 billion by 2030** for socio-economic protection, and an **additional €300 billion by 2035** for digital sovereignty:

1. **Protecting economic sectors impacted by AI:** Requiring employers to maintain their workers' employability, establishing ethics and digital oversight committees, non-substitution clauses in collective bargaining agreements, a digital dividend and sectoral retraining funds, reduced working hours and, in the medium term, a Universal Basic Income. All of this can be financed by AI-driven productivity gains, notably a robot tax and sovereign technology funds.

2. **Support AI training and human augmentation:** a Human Augmentation tax credit, funding for paid AI conversion leave, a European AI skills passport, mandatory sector-specific micro-credentials, and the right to algorithmic transparency in the workplace. Creation of a Human Augmentation Index as a condition for access to public procurement, with the integration of AI into a new Fifth Freedom of the European single market dedicated to education, research, and innovation.

3. **Strengthen European digital sovereignty:** A Digital Sovereign Fund (€30 billion/year) to bolster EU infrastructure, European preference in public procurement, relocalization of chip production (accelerated *Chips Act*), pooling of strategic data (Data Union), support for Open Source (€4 billion/year), and a Capital Markets Union.

4. **Curbing misinformation exacerbated by AI:** Mandatory algorithmic passport for high-risk models, real-time cross-platform alert system, secure data sandboxes managed by the European AI Office, and enhanced digital watermarking.

5. **Reduce the environmental impacts of AI:** Right to environmental audit, proportional digital carbon tax, water quotas per computing unit (teraflop), standardization of more energy-efficient SLM models, and creation of a Repairability and Sustainability Index for AI infrastructure.

6. **Enhance AI regulations:** Annual update of the AI Act's risk categories without a legislative procedure, expansion of "unacceptable" risks (biometrics, facial recognition), integration of societal impacts (manipulation of democratic processes), reinforcement of third-party compliance assessments, as well as enhanced security (physical and cyber) for data centers, modeled after nuclear power plants.

7. **Pragmatic global governance of AI with multi-level mechanisms:** In the absence of a binding global treaty in the short term, the EU must rely on ISO standards by systematically integrating them, as well as on its position as the largest single market to develop bilateral and multilateral frameworks to disseminate internationally its standards on the ethical use of AI.

Furthermore, the aim of this Conclusion is to **broaden the discussion** about the impacts of AI on society over the long run, by 2050 or 2100, by addressing the question of how to prepare society for the potential arrival of Artificial General Intelligence (AGI) and the resulting **technological singularity.** In all three scenarios, even the pessimistic one, this study is based on the assumption that **AGI and technological singularity will not be achieved by 2035.** Although some predict the opposite, the scientific consensus today is either that these ultimate technologies are impossible to develop even with major technical breakthroughs, or that AGI and the singularity will not be achieved for at least several more decades.[209] Although there is no agreement on the precise definition of these concepts, AGI is often described as a single interconnected machine system possessing **intelligence equal to that of humans**, capable of performing all the intellectual tasks that humans can perform, including learning, reasoning, and adapting to new situations. For these reasons, AGI could theoretically possess a **form of consciousness.** This is sometimes presented as the precursor to superintelligence (*Artificial Super Intelligence* – ASI), which surpasses human intelligence in all areas and could potentially accomplish feats beyond human comprehension.[210] Thus, the concept of the "technological singularity" derives from the advent of AGI and subsequently ASI, marking a **historic tipping point** where technological growth becomes uncontrollable because **AI improves itself autonomously**, thereby bringing about unpredictable and irreversible changes for human civilization, leading to a **civilizational shift.**

With AI capable of surpassing humans in all cognitive and physical tasks (through advanced robotics), the concept of work as a pillar of social identity could disappear. This would necessitate either **massive redistribution** (through a Universal Basic Income, for example) or risk **deep social divisions** and revolutions; if productivity is ensured by machines, the redistribution of wealth will no longer be able to occur through wages. We may need to transition from a society centered on humans and their productivity to a **society centered on meaning, art and interpersonal relationships**, as well as a **complex coexistence between humans and machines.** In an optimistic scenario, AGI or ASI could help solve existential challenges such as climate change through a radical optimization of resources, including AI-controlled nuclear fusion or the eradication of most diseases. AI might decipher the mechanisms of aging and create personalized gene therapies in real time, causing a leap in life expectancy, possibly leading to overpopulation and lack of equitable access to this extended lifespan. The greatest challenge would be ensuring that the goals of a superintelligence remain **aligned with human values.** Indeed, a highly intelligent AI does not need to be malicious in order to be dangerous; it need only be indifferent to humanity's needs to trigger catastrophe. In a more optimistic scenario, we may be heading toward a **merger between humans and machines by the end of the century** through an advanced brain-machine interface (such as *Neuralink*) to prevent humans

209 Sheng (2025), Fjelland (2020).

210 https://www.ibm.com/think/topics/artificial-general-intelligence

from being left behind and becoming obsolete. This would involve direct communication with AI, redefining what it means to be human, and thus driving a **forced march towards the next major stage of evolution**.

These scenarios for 2050 or even 2100 are, of course, the stuff of science fiction, and there is no guarantee that they will come to pass. However, the very fact that they are conceivable underscores once again the fundamental importance of **keeping humans in the loop** of the AI technological revolution, by **regulating and setting limits to maintain control**, as explained throughout this study. The goal is to ensure that technology can be used to **enhance humanity's well-being**, rather than heralding its end or triggering unprecedented cataclysms.[211] As Stephen Hawking stated: "Success in creating AI could be the biggest event in the history of our civilization. But it could also be the last – unless we learn how to avoid the risks."[212]

211 Indeed, as indicated in Appendix One, one of the most striking findings of the survey remains the fear of losing control over AI by 2035. Regardless of the population surveyed, there is broad consensus on the need to maintain effective human control over AI. The central message of the survey is clear: the future of AI will depend as much on technology as on governance and society's ability to define and enforce limits in the public interest.

212 Hawking *et al.* (2014).

Bibliography

- Barichella A. (2026). *Threats, Prospects and Policy Approaches for the Twin Digital and Energy Transitions*, in Barichella A. (Editor-in-Chief) and Yada J. (2026). *The Palgrave Handbook of Cybersecurity, Technologies and Energy Transitions*. Palgrave Macmillan.
- Barichella A. (2025). "Addressing fragmentation to create a common EU framework for a true Digital Single Market: a case study of the cybersecurity sector," in *Why Europe needs a true Digital Single Market*. Vodafone Vision Paper.
- Barichella A. (2023a). *Regulating artificial intelligence at the EU level: obstacles and prospects*. Policy Paper No. 294 – Jacques Delors Institute.
- Barichella A. (2023b). "Cybersecurity and Data Protection in the Power Sector: Challenges, Perspectives and Policy Approaches", in Considine J., Cote S., Cook D. and Wood G. (Eds.), *A Research Agenda for Energy Politics*. Edward Elgar Publishing – Research Agenda series.
- Barichella A. (2022). *Cyberattacks in Russia's hybrid war against Ukraine and its ramifications for Europe*. Policy Paper No. 281 – Jacques Delors Institute.
- Badshah N. (2026), *Teenager died after asking ChatGPT for 'most successful' way to take his life, inquest told*. The Guardian.
- Bellan R. (2025), *Sam Altman says ChatGPT has hit 800M weekly active users*, TechCrunch.
- Blind K. *et al.* (2021). The impact of Open Source Software and Hardware on technological independence, competitiveness, and innovation in the EU economy. European Commission – Final Study Report.
- Blum J., *Nuclear fusion, the 'holy grail' of power, was always 30 years away—now it's a matter of when, not if, fusion comes online to power AI*. Fortune, October 2, 2025.
- Bick A. *et al.* (2026), *Why Does AI Adoption Differ So Much across Countries?*, *St. Louis Federal Reserve Bank On the Economy*.
- Challapally A. *et al.* (2025), *The GenAI Divide: State of AI in Business 2025*, MIT NANDA.
- Dastin J. and Nellis S. (2023). *Focus: For tech giants, AI like Bing and Bard poses a billion-dollar search problem*. Reuters, February 22, 2023.
- Desarnaud G. (2017). *Cyber Attacks and Energy Infrastructures: Anticipating Risks*. Ifri Studies, Ifri.
- Draghi, M. (2024). *The Draghi Report on the Future of European Competitiveness. Part A: A Competitiveness Strategy for Europe*.
- Draghi, M. (2024). *The Draghi Report on the Future of European Competitiveness. Part B: In-depth Analysis and Recommendations.*
- Emerson G. *et al.* (2026), *AI Will Reshape More Jobs Than It Replaces*, Boston Consulting Group.
- Fjelland R. (2020). "Why general artificial intelligence will not be realized." *Humanities and Social Sciences Communications*, 7, 10.
- Frank N. (2026), *Thinking Small: How Small Language Models Could Lessen the AI Energy Burden*, Virginia Tech.
- George A. L. and Bennett A. (2005), *Case Studies and Theory Development in the Social Sciences*. The MIT Press.
- Hatzius J. *et al.* (2023), *The Potentially Large Effects of Artificial Intelligence on Economic Growth*, Goldman Sachs - Global Economics Analyst.
- Hawking S. *et al.*, *Stephen Hawking: 'Transcendence looks at the implications of artificial intelligence - but are we taking AI seriously enough?*, The Independent, May 1, 2014.
- Hay C. and Payne A. (2015), *Civic Capitalism*, Polity Press.

- Hay C. and Wincott D. (2012). *The Political Economy of European Welfare Capitalism* (21st Century Europe). Palgrave Macmillan.
- Hu K. (2023), *ChatGPT sets record for fastest-growing user base*, Reuters.
- International Energy Agency (2024), *Energy and AI*. World Energy Outlook Special Report.
- International Energy Agency (2025), *Energy and AI*. World Energy Outlook Special Report.
- International Labour Organization (2026), *Employment and Social Trends – World of Work Series*.
- Jahangir R., *What's Behind Europe's Push to "Simplify" Tech Regulation?*, Tech Policy Press, April 24, 2025.
- Kenny R. (2025), *Report on Water Use in AI and Data Centers*, UK Government Publishing Service.
- Lazaro Cabrera L. *Europe's Deregulatory Turn Puts the AI Act at Risk*. Tech Policy Press, June 3, 2025.
- Letta E. (2025). *Much More Than A Market: Speed, Security, Solidarity. Empowering the Single Market to deliver a sustainable future and prosperity for all EU citizens.*
- Liu Y. and Wang H. (2024). *Who on Earth Is Using Generative AI? Global Trends and Shifts in 2025*. Policy Research Working Paper, World Bank.
- May B. and Badawy Y., *Evidence of an AI-driven shakeup of job markets is patchy*, Global Research Briefing - Oxford Economics.
- Murray C. (2025), *Why AI 'Hallucinations' Are Worse Than Ever*, Forbes.
- Nathan A., Grimberg J., and Rhodes A. (2024), *Gen AI: Too Much Spend, Too Little Benefit?*, Global Macro Research: Issue 129.
- Porębski A. and Figura J. (2025). "There is no such thing as conscious artificial intelligence". *Humanities and Social Sciences Communications*, 12, 1647.
- Ren S. (2023), *How much water does AI consume? The public deserves to know*, OECD AI Observatory.
- Electricity Transmission Network (RTE – 2024), *2024 Electricity Report: Key Findings*.
- Ryseff J., De Bruhl B., and Newberry S. J. (2024), *The Root Causes of Failure for Artificial Intelligence Projects and How They Can Succeed*, Research Report – Rand Corporation.
- Schenker, J., *"How AI Will Help Bring Fusion from the Lab to the Grid by the 2030s*." World Economic Forum, December 12, 2025.
- General Secretariat for Defense and National Security – French Republic, *French National Cybersecurity Strategy 2026–30*.
- Sheng H. (2025). "Why Can't Artificial General Intelligence Be Achieved?" *Journal of Historical Archaeology & Anthropological Sciences*, 10(2):43–47.
- Sajadieh S. et al. (2026), *Artificial Intelligence Index Annual Report 2026*. Institute for Human-Centered AI (HAI), Stanford University.
- Shumailov I. et al. (2024). "AI models collapse when trained on recursively generated data". *Nature* 631, 755–759.
- Wimmers, A. J. et al. (2025). "Power generation from nuclear fusion not expected in the foreseeable future: Applied research developing dynamically," *Deutsches Institut für Wirtschaftsforschung* (DIW), Vol. 15, Issue 14/15, 90–95.
- Wood D. *et al.* (2025), *Sovereign AI: Own your AI future, From managing risk to accelerating growth*, Accenture.
- Worland, J. *"The IMF's Kristalina Georgieva on the AI 'Tsunami' Hitting Jobs*." Time, January 15, 2026.
- World Economic Forum (2025), *Future of Jobs Report – Insight Report.*

WEBSITES:

- Aissa A. B., *OpenClaw Bug: When the AI Agent Deletes a Meta Executive's Emails*, Numerama, February 24, 2026: https://www.numerama.com/cyberguerre/2186121-bug-openclaw-quand-lagent-ia-efface-les-mails-dune-directrice-de-meta.html
- BBC News, *ChatGPT boss says government regulation of AI is 'crucial'*: https://www.bbc.com/news/live/world-us-canada-65610337
- BusinessStats, *Artificial Intelligence (AI) Worldwide – Statistics & Facts 2026*: https://businesstats.com/artificial-intelligence-ai-worldwide-statistics/?hl=fr-FR#
- Eadicicco L. and Duffy C., *Meta to cut 10% of staff as it pours billions into AI*, CNN Business: https://edition.cnn.com/2026/04/23/tech/meta-layoffs-10-percent-staff-ai

- Eurostat, *Unemployment rates in the euro area and the EU*, October 2025: https://ec.europa.eu/eurostat/fr/web/products-euro-indicators/w/3-02122025-bp#estat-in-page-nav-heading-0
- Eurostat, *20% of EU enterprises use AI technologies*, December 2025: https://ec.europa.eu/eurostat/web/products-eurostat-news/w/ddn-20251211-2
- FranceNum, *The portal for the digital transformation of businesses*: https://www.francenum.gouv.fr/formations/quest-ce-que-le-cloud-computing-ou-informatique-en-nuage-7-minutes-pour-comprendre#:~:text=The%20use%20of%20cloud%20computing,local%20or%20a%20personal%20computer
- Crédit Agricole Group, *Political and Economic Context – United States*: https://international.groupecreditagricole.com/fr/accompagnement-a-l-international/etats-unis/contexte-economique#:~:text=The%20U.S.%20economy%20is%20essentially,the%20most%20liquid%20in%20the%20world.
- Hays K., *Thousands lose their jobs in deep cuts at tech giant Oracle*. BBC News, April 1,, 2026: https://www.bbc.com/news/articles/cm296jzzl9yo
- IBM, *What is artificial general intelligence (AGI)?*: https://www.ibm.com/think/topics/artificial-general-intelligence
- Digital Industry, *The service sector in Europe: dynamics and current challenges*: https://www.industrie-numerique.com/le-secteur-tertiaire-en-europe-dynamique-et-enjeux-actuels/
- INSEE Statistics, *How many unemployed people are there in France?* : https://www.insee.fr/fr/statistiques/4805248#graphique-chomage-g1-fr
- INSEE Statistics, *Employment, Unemployment, and Earned Income* (2025 Edition): https://www.insee.fr/fr/statistiques/8376826?sommaire=8376908
- Islam F. and Clun R., *Google boss says trillion-dollar AI investment boom has 'elements of irrationality'*. BBC News World, November 18, 2025: https://www.bbc.com/news/articles/cwy7vrd8k4eo
- Kuznia R., Gordon A., and Lavandera E., *"You're not rushing. You're just ready:" Parents say ChatGPT encouraged son to kill himself*, CNN investigates: https://edition.cnn.com/2025/11/06/us/openai-chatgpt-suicide-lawsuit-invs-vis
- Le Monde, *OpenAI, Microsoft face lawsuit over ChatGPT's alleged role in a murder-suicide*, December 12, 2025: https://www.lemonde.fr/en/pixels/article/2025/12/12/open-ai-microsoft-face-lawsuit-over-chatgpt-s-alleged-role-in-a-murder-suicide_6748404_13.html
- Mount Sinai, *New Study Links Altered Cellular States to Brain Structure*, Press Release, January 22, 2026: https://www.mountsinai.org/about/newsroom/2026/new-study-links-altered-cellular-states-to-brain-structure
- Trading Economics, *China Unemployment Rate*: https://tradingeconomics.com/china/unemployment-rate
- US Bureau of Labor Statistics, *Civilian Unemployment Rate*: https://www.bls.gov/charts/employment-situation/civilian-unemployment-rate.htm
- World Population Review, *Gini Coefficient by Country 2026*: https://worldpopulationreview.com/country-rankings/gini-coefficient-by-country

LIST OF INDIVIDUALS INTERVIEWED FOR THIS STUDY:

1. **Claudia RODA (France):** Professor of Computer Science at the American University of Paris, holder of the UNESCO Chair on Artificial Intelligence and Human Rights, February 16, 2026.

2. **Ivan KULCHYTSKYY (Ukraine):** President of the NGO Agency of European Innovations (Ukraine), February 20, 2026.

3. **Nazar PODOLCHAK (Ukraine):** Head of the Science Park at Lviv National Polytechnic University (Ukraine), February 25, 2026.

4. **Régis CHATELLIER (France):** Head of Studies and Prospective Research for the National Commission on Informatics and Civil Liberties (CNIL – France), March 2, 2026.

5. **Johnny DESCHAMPS (France):** Professor at the Chemistry and Processes Unit (UCP), Institut Polytechnique de Paris (IPP), March 4, 2026.

6. **Pagona TSORMPATZOUDI (United Kingdom):** Director of Privacy/Data Protection & AI Governance at Mastercard, March 11, 2026.

7. **Susan NESBITT (United States):** CEO - The Cantellus Group, Human Data Red Team Research - OpenAI, April 3 and 10, 2026.

8. **Antonio KUNG (France):** Co-founder and Board Member - Trialog (France), April 7, 2026.

9. **Hynd REMITA (France):** Research Director at the Institute of Physical Chemistry, Paris-Saclay University/CNRS (France), April 8, 2026.

10. **Nathan HEATH (United States):** AI Safety and Security Officer for Anthropic and OpenAI, April 23, 2026.

11. **Alexandru GEORGESCU (Romania):** Researcher in cybersecurity and critical infrastructure protection at the *National Institute for Research & Development in Informatics* (ICI) in Bucharest, April 24, 2026.

12. **Alvaro ARTIGAS (France):** Research Associate at the Center for European Studies and Comparative Politics (CEE), Sciences Po Paris, May 8, 2026.

Appendices

1 . APPENDIX 1: Comparative Analysis of Survey Results

I 1. INTRODUCTION AND METHODOLOGY

A survey was conducted among a broad panel of participants from various sectors in France, Europe, and internationally. This survey is based on a questionnaire of approximately thirty questions with several possible response types, notably agreement levels ranging from 0 to 5,[213] enabling large-scale quantitative data processing. The survey was conducted over three months (February to May 2026), yielding a wide range of data with a total of 460 responses. The questions covered all the topics and themes addressed in this study and were divided into four parts:

1. Preliminary questions on the profile of respondents.
2. Questions about the impacts of AI on work, occupations and skills.
3. Questions on the role of political governance and AI regulation.
4. Questions on the broader impacts of AI on society.

The central focus of the survey is the question about keeping humans in the decision-making loop, understood as the ability to regulate, control, and set limits on AI while preserving human oversight.[214] For linguistic and operational reasons, three parallel versions of the same questionnaire were administered to distinct audiences:

Survey version	Associated network	Number of respondents	Sectoral focus
Jacques Delors Institute Survey – Francophone Network	French-speaking professionals within the Jacques Delors Institute (JDI) network	327 respondents	Very broad sectoral spectrum (companies, international institutions, public administrations, universities, think tanks, NGOs, etc.).
Jacques Delors Institute Survey – English-speaking network	English-speaking professionals within the Jacques Delors Institute network, broader international reach	96 respondents	Similar to the French-speaking version but with a strong emphasis on universities/ research, NGOs, and international organizations
CRiP Network Survey	Members of the Club of Infrastructure, Technology and IT Production Managers (CRiP)	37 respondents	Business leaders, Chief Information Officers (CIOs), or Chief Technology Officers (CTOs) in the IT, banking, industrial, energy, and other sectors

213 With 0 indicating complete disagreement and 5 indicating complete agreement.

214 This Appendix is not intended to present all survey results, but only to provide an overall analysis.

The difference in sample size is notable: the French-language JDI survey is by far the one that garnered the most responses and is the most representative, with 327 respondents, compared to 96 for the English-language version and 37 for the CRiP version. Despite these disparities, the trends observed are remarkably consistent across most major themes. Given the graphical nature of the results (primarily histograms), the analysis is conducted comparatively to examine the dominant trends, convergences, and divergences among the three groups regarding the various questions.

2. AI AND WORK: TRANSFORMATION RATHER THAN REPLACEMENT

– AI as an indispensable tool (Q4):

The three panels agree on one point: AI is already perceived as an important tool in today's labor market, with scores concentrated between 3 and 5 on a scale of 0 to 5. The CRiP panel, composed of IT and digital infrastructure professionals, displays the strongest conviction - scores of 4 and 5 are more pronounced here - which is consistent with their daily proximity to technological tools.

Convergence

The three surveys largely agree on a nuanced view of AI's impact on the labor market. They agree that AI is already a significant tool, even if perceptions about its "indispensable" nature vary by sector.

– Job creation vs. job loss (Q5):

The majority of respondents reject the doomsday scenario of massive job destruction in the short term; the "somewhat disagree" or "it depends" options dominate in all three surveys. The question of whether new jobs will compensate for lost ones elicits the most skepticism across all three panels. The responses "don't really agree" and "don't agree at all" dominate, with one significant nuance: the "it depends" response also garners a significant share of the votes, a sign of analytical caution rather than categorical rejection. The more academic English-speaking JDI panel appears slightly more nuanced in its responses.

– Job Transformation and Training (Q6):

It is on this question that the three groups express the strongest and most positive convergence. Scores are overwhelmingly concentrated around 4 and 5, indicating broad agreement that the main challenge is not massive job loss but rather the transformation of the nature of jobs, and that the appropriate response lies in training for AI skills. This conviction is particularly strong in the CRiP panel, where IT departments are at the forefront of this transformation.

Key Point

Training in AI skills emerges as the top priority across all three panels. This is the clearest consensus in the entire survey, and it is directly linked to the issue of keeping humans in the loop.

– Will AI users replace those who do not use it? (Q7):

One of the most widely agreed-upon questions in the entire survey, the assertion that professionals proficient in AI will gradually replace those who do not use it, garners very high agreement across all three panels (scores concentrated between 3 and 5). CRiP members, who face these challenges daily within their organizations, express an even stronger conviction, followed by the French-speaking JDI panel, while the English-speaking group appears slightly more polarized. This result reflects a shared sense of urgency regarding the need to train workers and the need for an active skills development policy.

– The End of Work by 2035? (Q8):

The vision of "an end to work" by 2035 is met with much greater caution. The distributions are more spread out, with a concentration around the median values (2-3), suggesting neither rejection nor acceptance. The more technically oriented CRiP group is slightly less pessimistic about this extreme scenario. This reflects deep uncertainty regarding the medium-term effects

of AI, further highlighting the importance of governance and human oversight.

3. AI GOVERNANCE: KEEPING HUMANS IN THE LOOP

– Hybrid decision-making committees today (Q9):

The question of partial management of an entity by AI via a hybrid committee with **continued human oversight** elicits a moderately positive response. Scores range mainly between 2 and 4 across the three groups. The CRiP panel tends to be slightly more open to this scenario, perhaps due to their experience with automated decision-making systems in IT, suggesting that digital practitioners already perceive this development as realistic and underway. In contrast, the French-speaking JDI group shows moderate agreement (scores centered around 2/3), while the English-speaking panel is more favorable, possibly due to a more developed culture of technology governance.

An important point

The majority of respondents accept the idea of AI in the decision-making loop provided that human control and oversight are maintained - this is precisely the definition of "human-in-the-loop." A structural tension is emerging between recognition of AI's potential and the fear of losing human control over its decisions.

– AI decision-makers by 2035 (Q10):

The scenario of AI as a fully autonomous decision-maker by 2035 is clearly rejected by all three panels, with scores concentrated at the lower end of the scale (0–2). This result is one of the most consistent and decisive in the survey. Resistance is slightly stronger in the French-speaking JDI group and in the CRiP panel, two groups closely tied to regulatory bodies and operational realities.

– Game-changer with the arrival of agentic AI (Q11):

The arrival of agentic AI – capable of making autonomous decisions and optimizing itself in real time – is perceived as a significant paradigm shift by a majority across the three panels ("strongly agree" and "somewhat agree" dominate). This underscores that respondents anticipate that this type of AI will represent a qualitative break from current systems. The CRiP group, faced with the infrastructure implications of such systems, is particularly sensitive to this issue. This recognition further amplifies the perceived need for a robust oversight framework; it is precisely on this point that the issue of human oversight becomes most acute.

– Bias, Auditability and Transparency (Q17):

The three panels are in broad agreement that algorithmic bias, auditability, and system transparency constitute major obstacles to the development of responsible AI. The English-speaking JDI group (which is more academic) and the CRiP group (which is more technical) are particularly sensitive to these issues. This observation directly underpins the need for robust human oversight mechanisms.

4. REGULATION AND DIGITAL SOVEREIGNTY

– Are French and European laws sufficient? (Q18):

The question of whether French and European regulations (particularly the AI Act) are adequate in addressing the challenges of bias and auditability elicited mostly skeptical responses across the three panels. Scores are concentrated between 1 and 3, indicating a widely held view that current legislation, while necessary, remains insufficient. The English-speaking group, more familiar with international standards, is perhaps slightly more critical.

– Worker Protection and Reskilling (Q19):

Perceptions are even more negative regarding the ability of France and the EU to protect workers in vulnerable sectors. All three panels show distributions heavily skewed toward low scores (0–2), indicating a perceived lack of active public policy regarding AI-related reskilling.

– Excessive Regulation? (Q21):

On regulatory issues, the three surveys reveal a nuanced position. Contrary to what one might expect from a panel of professionals, the argument that excessive regulation hinders innovation elicits mixed and moderate opinions, with scores centered around 2-3. The CRiP group is slightly more receptive to this argument, reflecting CIOs' concerns regarding compliance constraints. JDI respondents (both French and English-speaking), who are closer to institutions, are more skeptical of this criticism. This tension between necessary regulation and the risk of stifling innovation is a recurring theme throughout the debate on human oversight over AI.

– EU Technological Dependency (Q22):

Dependency on American and Chinese AI technologies is viewed as problematic, with high scores across all three groups (3-5). The CRiP panel and the French-speaking JDI group are particularly concerned about the lack of European industry leaders. This convergence is remarkable: it transcends sectoral and national differences to establish a consensus on the need for European technological sovereignty as a prerequisite for collective human control.

Strong consensus

The three panels agree on the need for European digital champions and deem current policies for protecting workers from AI to be insufficient, two conditions that are inseparable from effective human governance.

– Ban on high-risk AI (Q23):

In line with the European AI Act, the three panels broadly support a ban on AI systems that manipulate decisions or classify social behaviors. Scores are concentrated around 4 and 5, with particularly strong agreement in the CRiP group, which deals with information system security issues. This position reflects a consensus on the need for red lines to protect fundamental rights and uphold human dignity and autonomy in the face of AI.

– Data centers regulated like nuclear power plants (Q24):

This more radical proposal leads to a wider distribution of scores (1-4). It elicits slightly stronger agreement among JDI respondents than among CRiP members, perhaps because the latter have a better grasp of the operational constraints of such regulation. The nuclear metaphor – strict regulation with safety protocols and risk thresholds – is gaining traction, but without garnering widespread support.

5. SOCIETAL RISKS AND ENVIRONMENTAL IMPACTS

– Environmental impacts of AI (Q20):

There is very broad agreement on the systematic inclusion of AI's environmental impact in energy transition policies at the national and European levels. The responses "strongly agree" and "somewhat agree" dominate, particularly in the JDI panels. The CRiP group, which is more focused on IT operations, is slightly more nuanced but remains largely in favor. This consensus aligns with the growing awareness of extensive data center consumption of water and energy; this result underscores that AI sustainability is now a cross-cutting concern, rather than a marginal one.

– Disinformation and Democratic Processes (Q27):

The risk that AI will exacerbate disinformation campaigns and undermine democratic processes is perceived as high across all three groups (scores between 3 and 5). The French-speaking JDI panel and the English-speaking group, which are closer to political and academic institutions, are the most concerned. This risk is directly linked to the issue of human control; unregulated AI in the information space poses a threat to democratic deliberation itself.

– Scientific Advances and Health (Q28):

Contrary to prevailing concerns, all three panels express marked optimism regarding AI's ability to generate significant advances in scientific research and health. The responses "strongly agree" and "somewhat agree" dominate across all three groups, with a notable convergence. This positive outlook represents one of the few areas of clear enthusiasm throughout the survey. It is one of the questions where agreement is strongest and most consistent.

– Social Inequalities (Q30):

The risk that AI will exacerbate social inequalities, with productivity gains benefiting mainly a minority of tech entrepreneurs, is perceived as "likely" or "very likely" across all three groups, with scores concentrated between 3 and 5. Nevertheless, while CRiP members express more nuanced views on this topic, JDI respondents, particularly French-speaking ones, show a greater concern for the distributive justice of AI benefits.

6. MAINTAINING HUMAN CONTROL BY 2035

– Societal transformation through human-AI collaboration (Q26):

There is near unanimous agreement on the idea that human-AI collaboration will transform society (scores concentrated between 4 and 5). This is one of the most consistent distributions across the entire survey. Such a shared conviction underscores the urgency of the governance and regulatory issues addressed in the remainder of the questionnaire.

– Interface architectures and "kill switches" (Q31):

The question of whether interface architectures, usability, and security mechanisms (including "kill switches") can promote human control over advanced AI is viewed positively by all three groups, with scores ranging from 3 to 4, indicating that these tools are perceived as useful. The CRiP group is the most supportive of these technical mechanisms, which fall within their area of expertise. However, they are not considered a panacea; the absence of scores heavily concentrated at 5 suggests that respondents believe technical solutions alone are insufficient and must be part of a broader regulatory framework, corroborating the necessity of keeping humans in the loop.

Practical Implications

Respondents trust technical solutions (interfaces, "kill switches") to maintain human control in the short term, but express growing doubts for the medium term, particularly with the emergence of agentic AI.

– Global Digital Governance (Q25):

The feasibility of global governance incorporating multilevel mechanisms (sanctions, ISO standards, UN agreements) receives a mixed but optimistic reception across all three groups. "Somewhat agree" responses dominate, but "it depends" also garners a significant share, reflecting a realistic view of geopolitical challenges. The English-speaking panel, which is more institutional and international in nature, is slightly more confident in the feasibility of such mechanisms.

– Risk of losing control by 2035 (Q32):

This question is one of the most revealing indicators in the entire questionnaire. All three panels express significant, cross-cutting concern about the risk of losing human control over AI by 2035,

with potentially serious social, economic and political consequences. The distributions show scores between 3 and 5, though they do not reach the consensus seen in questions about scientific benefits or technological dependence. The CRiP group is slightly less alarmist, perhaps due to their confidence in technical solutions. The English-speaking JDI group is the most concerned, while French-speaking JDI respondents, more numerous and sectorally diverse, show a slightly wider distribution, but the overall trend remains one of concern.

7. CONCLUSION: CONVERGENCES, DIVERGENCES AND RECOMMENDATIONS

– Major Convergences Among the Three Panels

- The transformation of jobs rather than their elimination is the strongest consensus across the entire survey. Training in AI skills should be a top priority.
- The unanimous rejection of AI as a fully autonomous decision-maker by 2035, and support for a hybrid decision-making model with human oversight.
- Agentic AI is perceived as a paradigm shift, reinforcing the urgency of human control mechanisms.
- Bias, auditability, and transparency are the main obstacles to responsible AI.
- The EU's technological dependence on the US and China is a problem that calls for the creation of European digital champions.
- Optimism regarding medical and scientific applications of AI coexists with deep concerns about inequality and misinformation.

– Differences and Specificities by Panel

- The CRiP group (CIOs/CTOs) stands out for its greater openness to hybrid decision-making committees, a particular sensitivity to infrastructure security issues (Q24), and relative confidence in technical solutions. Its operational pragmatism makes it slightly less alarmist regarding loss of control over AI in the long term.
- The English-speaking JDI panel, which is more academic and international, expresses a stronger concern about the risks of losing control by 2035 and loss of fundamental rights in the face of misinformation. It is also more supportive of multilateral global governance.
- The French-speaking JDI group, the largest and most diverse, reflects a tension between enthusiasm for the benefits of AI and concern about social inequalities and worker protection.

– Recommendations for keeping humans in the loop

The combined results of the three panels present a coherent roadmap centered around six key axes:

Identified Priorities	Operational recommendations	Timeline
Training and skill development	Top priority identified across all three panels. Develop AI training programs at all levels, from entry-level employees to senior executives.	Short term (1–3 years)
Technical control architectures	Invest in 'kill switches', monitoring interfaces, and auditability mechanisms.	Short term (1–3 years)
Full implementation and consolidation of the AI Act	All three panels consider current regulations to be insufficient. Accelerate and consolidate implementation of the AI Act at the European and national levels.	Short to medium term (3–5 years)
Strengthening worker protections	The three panels also consider it necessary to enhance workers' rights and protections in sectors vulnerable to automation.	Short to medium term (3–5 years)

Identified Priorities	Operational recommendations	Timeline
European digital sovereignty	Strong consensus on the need to foster European champions in the digital sector. Need for a coordinated industrial policy at the EU level.	Medium term (5–10 years)
Multilateral global governance	ISO mechanisms, UN, and interregional coalitions. Priority for AI systems with significant transnational impact (disinformation, health, finance).	Medium term (5–10 years)

– Conclusion: A Consensus on the Imperative of Human Oversight

Ultimately, the three panels converge in a coherent vision: AI is a rapid and profound revolution that must be guided rather than endured. Keeping humans in the loop does not mean stifling innovation, but rather establishing the technical, regulatory, educational and geopolitical conditions for an AI that remains a tool serving human choices rather than a substitute for democratic deliberation. A comparative analysis of these three surveys highlights one central conclusion: regardless of the panel, there is **broad consensus on the need to maintain effective human control over AI**. This consensus does not reflect a rejection of AI, whose potential benefits are widely recognized, but rather a demand for governance.

The differences between the groups are more a matter of degree than of nature. CRiP members, who are deeply immersed in the digital transformation of their organizations, tend to view AI as already indispensable and adopt a more pragmatic stance on hybrid governance. JDI respondents, who are closer to academic and institutional circles, place greater emphasis on systemic risks and regulatory requirements. The most striking convergence remains the fear of losing control by 2035: it is precisely this risk that, in the respondents' view, justifies the entire regulatory framework, from the AI Act to ISO standards and technical emergency mechanisms. The central message of these surveys is clear: the future of AI will be determined as much by technology as by governance and society's ability to define and enforce limits in the public interest.

Despite the comprehensiveness of the panels, these results are not intended to be universally applicable. There are certain limitations in terms of generalizability, since the vast majority of the sample comes from the Jacques Delors Institute's network, which includes international institutions, public administrations, universities, think tanks, and NGOs. Although the sample of CRiP members broadens the spectrum of opinion to include the private sector and the business world, they are less well represented in terms of the number of responses compared to other sectors. Another limitation is the geographical focus on Europe in all three versions of the survey.

2 . APPENDIX 2 :

Disclaimer: Drafting a comprehensive legislative proposal is an exhaustive task that goes beyond the scope of this study. For these reasons, the objective of this Appendix is to offer concrete application for solutions developed in the study, in order to provide a more realistic foundation for the policy recommendations. The two proposals below are therefore intended to afford food for thought that could potentially form a preliminary basis for draft legislation in the future, but must under no circumstances be considered or treated as authentic legislative proposals in and of themselves. For this reason, financial amounts are not specified (indicated as 'XXX').

. LEGISLATIVE PROPOSALS

Artificial Intelligence, Worker Protection and Training

I DOCUMENT I

Proposal for a European Union Directive

I DOCUMENT II

Proposed French law for transposition and supplementary measures

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I DOCUMENT I

PROPOSAL FOR A DIRECTIVE OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL *on the protection of workers from automation through artificial intelligence, vocational training, and the financing of the digital transition*

The European Parliament and the Council of the European Union, having regard to Articles 153 (workers' rights), 166 (vocational training), 114 (internal market), and 173 (industrial policy) of the Treaty on the Functioning of the European Union (TFEU), have adopted this Directive.

The Directive complies with the principle of subsidiarity: it establishes common minimum requirements while leaving Member States the flexibility to maintain or introduce more favorable provisions.

– CHAPTER I – SUBJECT MATTER, SCOPE AND DEFINITIONS

- Article 1 – Subject Matter

This Directive establishes a minimum common framework aimed at: (i) protecting workers whose jobs are at risk of substantial automation by artificial intelligence (AI) systems; (ii) support their right to lifelong training and employability; (iii) ensure the transparency of algorithms deployed in the workplace; (iv) finance the digital transition through harmonized tax mechanisms.

- Article 2 – Scope

This Directive applies to any employer established in the European Union that deploys AI systems capable of automating, monitoring, or evaluating tasks performed by employees or persons in a similar position. It applies without prejudice to more favorable provisions in force in the Member States.

- Article 3 – Definitions

- "AI system with an impact on employment": any system within the meaning of Regulation (EU) 2024/1689 (European AI Regulation) whose deployment results in or is likely to result in the elimination, transformation, or automated monitoring of at least 20% of the tasks of a job position.
- "Obligation to Maintain Employability" (Upskilling Obligation): a legal obligation on the employer to ensure access to a certified training program for any worker whose job is affected by automation by more than 50%.
- "Human Augmentation": an approach whereby AI assists the worker without replacing their critical decisions or their relationships with third parties.
- "European Digital Transition Fund": a European financial mechanism dedicated to funding retraining leave and long-term training programs.

— CHAPTER II – WORKERS' RIGHTS AND EMPLOYERS' OBLIGATIONS

• Article 4 – Obligation to Maintain Employability

Any company employing 50 or more employees is required, prior to any deployment of an AI system that impacts employment, to:

- identify the positions affected by automation of more than 50% of tasks;
- offer an individualized skills development pathway toward higher-value-added roles (design, supervision, complex customer relations) supported by AI;
- allocate a percentage of the total payroll, set by Member States within the range of 0.5% to 1.5%, to fund these training programs.

This obligation applies in particular to young graduates at the start of their careers, as well as to workers aged 55 or older.

• Article 5 – Right to Algorithmic Transparency

Prior to any deployment or substantial update of an AI system as defined in Article 3, the employer shall publish a 'Skills Impact Notice' specifying:

- the human skills enhanced by the AI system;
- those likely to atrophy or be replaced;
- the compensatory training offered.

Employee representatives shall have a right to prior consultation with a minimum notice period of 60 days. Member States may provide for a temporary right of objection by works councils in the event of an insufficient risk assessment.

• Article 6 – Digital Oversight Committees

In companies with 50 or more employees, a digital oversight committee composed of equal numbers of management and employee representatives conducts an annual audit of AI use, verifies compliance with the obligation to maintain employability, and ensures that AI is not used to completely replace human decision-making.

• Article 7 – European Human Enhancement Index

The European Commission establishes a public index ranking companies with more than 250 employees based on their ability to maintain employment while integrating AI. Companies with the highest ratings receive priority access to European public procurement and funding from structural funds.

— CHAPTER III – VOCATIONAL TRAINING AND EUROPEAN AI SKILLS PASSPORT

• Article 8 – European AI Skills Passport

The Commission shall establish an interoperable certification system throughout the European Union, the 'European AI Skills Passport', based on the updated DigComp (*Digital Competence Framework*). This passport certifies a worker's ability to collaborate with AI systems and facilitates professional mobility toward augmented roles. It is automatically recognized in all Member States.

• Article 9 – European Digital Transition Fund

A European Digital Transition Fund, modeled on the Just Transition Fund, is established with a multiannual budget of at least XXX billion euros by 2030. This fund finances:

- 'AI conversion leave' lasting 6 to 12 months for workers whose jobs are at risk of automation for more than 50% of their tasks, paid at 90% of the reference gross salary for the first month, and 70% for the following months;
- mandatory sector-specific micro-credentials in strategic fields: healthcare, finance, law, cybersecurity, and digital infrastructure;
- transition allowances for workers awaiting retraining.

Half of the funding (50%) will come from the EU budget, including the Multiannual Financial Framework and joint borrowing mechanisms (based on the *NextGenerationEU* model). The other half will come from a mix of co-financing by Member States, private capital (investors/venture capital), as well as new resources (AI/data taxes), the fiscal mechanisms for which are

detailed in Chapter IV. Each Member State will be free to determine the exact breakdown of the components of this second half of the funding.

- Article 10 – Fifth Freedom of the EU Internal Market – Education, Research and Innovation

The European Commission is invited to propose, within 18 months of the entry into force of this Directive, a legislative initiative to be adopted by the European Parliament and the Council of the European Union establishing a fifth fundamental freedom of the internal market, specifically dedicated to the free movement of knowledge, certified training programs, and research data, including those related to AI.

– CHAPTER IV – TAXATION AND FINANCING

- Article 11 – Harmonized Tax Framework

Member States shall adopt, in accordance with their fiscal sovereignty and the rules on state aid, at least one of the following measures to finance the digital transition:

- a levy on productivity gains resulting from automation, in the form of a corporate income tax surcharge applied to companies whose revenue-to-workforce ratio exceeds a sector-specific threshold defined by decree;
- the elimination or gradual reduction of tax benefits related to the accelerated depreciation of AI software that replaces human labor;
- a proportional tax on data usage—the more data an AI uses for training and operation, the higher the fee the company pays—to redistribute the value created by AI toward the public good;
- a 'usage tax' or wage equivalence, treating AI as a virtual employee. The company pays a tax equivalent to the social security contributions it would have paid if a human were in the position, with the aim of maintaining funding for social protection (pensions, healthcare).

The Commission will present, no later than January 1, 2028, a proposal for a common tax base for the European Union with a view to enhanced harmonization.

- Article 12 – Human Enhancement Tax Credit

Member States may establish a specific tax credit for companies that invest in AI tools designed to assist workers (cobotics, coding copilots, diagnostic support tools) rather than in full automation systems. This credit is conditional upon proof of certified training for all employees concerned.

– CHAPTER V – MONITORING MECHANISMS AND SANCTIONS

- Article 13 – Competent National Authorities

Each Member State shall designate a competent national authority responsible for monitoring the application of this Directive. This authority shall coordinate its actions with the European Commission, as well as with the European Labor Authority (ELA) and the European AI Office under the AI Regulation.

- Article 14 – Sanctions

Member States shall provide for effective, proportionate and dissuasive sanctions. Financial penalties for violations of the obligation to maintain employability (Article 4) or the right to algorithmic transparency (Article 5) shall not be less than:

- 0.5% of global annual turnover for a first violation;
- 1% for a repeat violation within 3 years.

In the event of a serious breach, Member States may provide for the suspension of the right to use the AI system in question until compliance is achieved.

- Article 15 – Remedies and Protection of Whistleblowers

Workers have the right to bring individual or collective legal action before the competent courts in the event of a violation of their rights under this Directive. Workers' representatives who report a violation of this Directive are entitled to the protections provided for in Directive (EU)

2019/1937 on the protection of persons who report breaches of European Union law.

– CHAPTER VI – TIMELINE FOR IMPLEMENTATION

• Article 16 – Transposition and Implementation

Member States shall transpose this Directive in accordance with the following timetable:

- No later than X, 2027: Transposition into national law of Articles 4 (employability), 5 (transparency), and 13 (supervisory authorities).
- No later than X, 2028: Establishment of digital oversight committees (Article 6), launch of the European AI Skills Passport (Article 8), and adoption of the first national tax measures (Article 11).
- No later than X, 2030: Full operationalization of the European Digital Transition Fund (Article 9), publication of the European Human Augmentation Index (Article 7), and enhanced tax harmonization (Article 11, paragraph 3).

The Commission shall conduct an evaluation of the Directive by December 31, 2030, and, if necessary, propose revisions in light of technological developments.

• Article 19 – Entry into Force

This Directive shall enter into force on the twentieth day following that of its publication in the *Official Journal of the European Union*.

• Article 20 – Addressees

This Directive is addressed to the Member States.

Done in Strasbourg, on X.
For the European Parliament
For the Council

I DOCUMENT II

PROPOSAL FOR A FRENCH LAW *on the adaptation of French labor law to artificial intelligence, the protection of workers, vocational training, and digital taxation*

The National Assembly and the Senate have adopted, in light of Decision X of the Constitutional Council, and the President of the Republic hereby promulgates the following law:

This law transposes Directive (EU) on the protection of workers from automation through artificial intelligence, vocational training, and the financing of the digital transition. It implements, within the framework of national competences, complementary measures relating to labor law, taxation, collective bargaining, and vocational training. It is consistent with the constitutional framework and the principle of worker participation guaranteed by the eighth paragraph of the Preamble to the 1946 Constitution.

– TITLE I – PROTECTION OF WORKERS IN THE FACE OF AUTOMATION

• Article 1 – AI Guarantee of Employability – Obligation to Retain

Following Article L. 6321-1 of the Labor Code, an Article L. 6321-2 is inserted, worded as follows:

"In companies with at least 50 employees, when an artificial intelligence system is likely to automate more than 50% of the tasks of a position, the employer is required to develop, in consultation with employee representatives, an individualized plan to maintain employability. This plan must include, at a minimum, access to certification training for roles in supervision, design, or complex AI-assisted customer relations. To this end, the employer shall allocate at least 1% of the total payroll in the companies concerned."

This obligation applies primarily to young graduates at the start of their careers, as well as to workers aged 55 or older, for whom the employer must present a specific program to the Social and Economic Committee (*Comité social et économique* - CSE).

- Article 2 – Digital Oversight Committees

In companies with at least 50 employees, the Social and Economic Committee shall, in addition to its current responsibilities, exercise the powers of a digital oversight committee. In this capacity, it:

- is consulted at least 60 days prior to any deployment or substantial update of an AI system that impacts working conditions or jobs;
- receives an annual audit report on the use of AI in the company, including an assessment of its impact on employment and worker autonomy;
- may exercise a temporary right of objection for 30 days, renewable once, if the risk assessment is deemed insufficient; in the event of a persistent disagreement, the matter is referred to the Regional Directorate for the Economy, Employment, Labor, and Solidarity (*Direction régionale de l'économie, de l'emploi, du travail et des solidarités* - DREETS).

- Article 3 – Technological Non-Substitution Clause

An obligation to negotiate, every three years, a technological non-substitution clause in professional sectors and in companies with at least 50 employees is inserted into the section of the Labor Code (Section L. 2242) relating to mandatory company-level negotiations. This clause ensures that AI systems may only be used to handle additional volumes or low value-added tasks, with critical decisions and complex human interactions remaining the exclusive responsibility of trained workers.

- Article 4 – Right to algorithmic transparency in the workplace

Prior to any deployment of an AI system in the workplace, the employer must provide each affected employee and employee representatives with a 'Skills Impact Statement' specifying the human skills that will be enhanced, those at risk of obsolescence, and the training offered as compensation. This statement is added to the employee's file and is enforceable in the event of a labor dispute.

- Article 5 – Reduction of working hours and sharing of productivity gains

Industry-wide and company-level agreements may provide, as part of negotiations on working hours and compensation, for a reduction in working hours without a reduction in pay when measurable productivity gains result from the deployment of AI systems. The time freed up may be allocated primarily to training programs leading to certification. The methodology for calculating productivity gains is defined by decree of the Council of State (*Conseil d'État*).

– TITLE II – VOCATIONAL TRAINING AND RETRAINING

- Article 6 – National Digital Transition Fund

A National Digital Transition Fund is hereby established, managed by *France Compétences* in collaboration with the skills operators (*Opérateurs de compétences* - OPCO), and funded by employer contributions and the tax revenues provided for in Title III. This fund finances:

- 'AI conversion leave' lasting 6 to 12 months for workers whose jobs are at risk, paid at 90% of the reference gross salary for the first month, and then 70% for the following months, based on an individual agreement concluded with the employer and validated by the DREETS;
- transition benefits for job seekers whose positions have been eliminated due to automation;
- long-term training programs in identified growth sectors: healthcare and biotechnology, cybersecurity, digital infrastructure, personal services, and skilled manual trades.

- Article 7 – Mandatory Sector-Specific Micro-Credentials

In the banking, insurance, legal, and healthcare sectors, AI-specific micro-credentials are made mandatory by sector-wide agreements approved by the Ministry of Labor. The list of affected sectors is updated annually by decree. For example, an architect using generative AI tools in the course of their work must complete a module on ethics and the management of

AI-assisted design to retain their professional signing authority.

- Article 8 – National AI Skills Passport

In conjunction with the European AI Skills Passport established by the Directive, a National AI Skills Passport is created that is interoperable with the Personal Training Account (*Compte personnel de formation* - CPF) and the Prevention Passport. The National Passport certifies training completed and certifications obtained in the field of human-AI collaboration. Its recognition in recruitment procedures within national public procurement is mandatory for tenders exceeding XXX euros.

- Article 9 – Training Targeted at Expanding Sectors

The public employment service (*France Travail*), in collaboration with regional councils, is developing a training program specifically geared toward sectors in which AI creates new employment opportunities. The following sectors have been identified as priorities:

- healthcare and biotechnology: bioinformaticians, specialists in genomic medicine, experts in augmented radiological diagnostics;
- cybersecurity and algorithmic ethics: AI ethicists, algorithmic compliance officers, predictive cyberdefense analysts;
- digital infrastructure and data management: data center engineers, network edge IT solution architects, data engineers;
- personal services, education, and skilled manual trades, whose added value is enhanced by AI due to the irreplaceable nature of interpersonal skills and complex physical movements involved in these professions.

– TITLE III – DIGITAL TAXATION AND FINANCING

- Article 10 – Social Contribution on Automation Gains

An additional corporate income tax contribution is hereby established in the General Tax Code, applicable to companies whose ratio of consolidated revenue to the number of employees exceeds, by sector, a threshold set by decree. This contribution is based on the portion of profit attributable to automation, assessed according to a standardized method established by ministerial order. The proceeds are allocated to the National Digital Transition Fund (Article 6).

- Article 11 – Elimination of Tax Benefits for Substitutive Automation

The accelerated depreciation provided for in Article 39 A of the General Tax Code is excluded for software and AI systems whose primary purpose is the net elimination of jobs, as documented in the Skills Impact Statement (Article 4). Companies benefiting from a training tax credit (Article 12) may not combine this benefit with accelerated depreciation on the same AI investments.

- Article 12 – Human Capital Tax Credit

Companies that invest in AI systems designed to assist workers without replacing them (cobotics, coding copilots, medical diagnosis support tools) are eligible for a tax credit of 30% of eligible expenses, capped at XXX euros per year. This credit is contingent upon providing proof of certification training for all affected employees and submitting an annual report to the Social and Economic Committee (CSE).

- Article 13 – Data Usage Fee

Companies whose revenue from the training or commercial operation of AI models exceeds XXX million euros annually in France shall pay a fee proportional to the value of the data collected within the national territory. The proceeds from this fee shall be allocated in part to the National

Digital Transition Fund and in part to the state budget to finance the national cybersecurity strategy.

– TITLE IV – HUMAN ENHANCEMENT INDEX AND TRANSPARENCY

- Article 14 – National Human Enhancement Index

Based on the model of the gender equality index, a public national human augmentation index is established. Companies with at least 250 employees are assigned a score on a scale of 0 to 100 by the national AI regulatory authority established as part of the implementation of Regulation (EU) 2024/1689 on AI. This score is calculated according to criteria established by decree, taking into account workforce retention, training efforts, the quality of social dialogue regarding AI, and the application of the non-substitution clause, and must be published annually by the companies concerned. Companies rated above 75/100 receive priority access to national public procurement contracts and a 5% reduction on their automation social contribution.

– TITLE V – MONITORING MECHANISMS AND SANCTIONS

- Article 15 – Supervisory Authority

The DREETS are responsible for monitoring the application of this law. They act in coordination with the labor inspectorate, the CNIL (National Commission on Informatics and Liberty - *Commission nationale de l'informatique et des libertés*) for matters concerning personal data, and the national AI regulatory authority established as part of the implementation of the European AI Regulation. An annual report about monitoring the law's application is submitted to the National Assembly and the Senate.

- Article 16 – Administrative Sanctions

Failure to comply with the obligation to maintain employability (Article 1), to consult the CSE (Article 2), or to submit the impact notice (Article 4) is punishable by:

- formal notice to comply within three months;
- if compliance is not achieved, an administrative fine of 0.5% of the total payroll for a first violation and 1% in the event of a repeat violation within 3 years;
- suspension of the right to deploy the relevant AI system until compliance is achieved, as ordered by the DREETS.

- Article 17 – Labor Law Sanctions and Protection of Representatives

Any dismissal or adverse action against an employee or employee representative due to the exercise of their rights under this law is null and void. Employee representatives are entitled to the expanded protection provided by whistleblower legislation when they report a violation.

– TITLE VI – IMPLEMENTATION SCHEDULE

- Article 18 – Entry into Force

The provisions of this Act shall enter into force according to the following schedule:

- Upon promulgation (2026): Articles 2 (supervisory committees), 4 (algorithmic transparency), and 12 (human enhancement tax credit).
- No later than X, 2027: Articles 1 (obligation to maintain employability), 3 (non-substitution clause), 6 (National Fund), 8 (National AI Passport), and 15 (penalties).
- No later than X, 2028: Articles 7 (sector-specific micro-credentials), 9 (sector-specific training), 10 (automation social contribution), 11 (review of tax benefits), 13 (data fee), and 14 (human augmentation index).
- No later than X, 2029: full implementation of all provisions; submission of an evaluation report to Parliament, including, if necessary, proposals for revision.

- Article 19 – Regulatory Provisions

The decrees of the Council of State necessary for the implementation of this Act shall be published within 12 months of its promulgation for provisions taking effect in 2026–2027, and

within 24 months for provisions taking effect in 2028–2029.

This Act shall be enforced as a law of the State.

Done in Paris, on X

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