



European Internet Forum

Political Leadership for Digital Society

DIGITAL TRANSFORMATION

Main features of the
Digital World towards 2040

 European Internet Forum



Digital transformation

Main features of the Digital World towards 2040



European Internet Forum



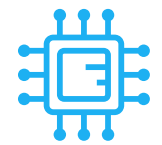
 **European Internet Forum**

The Digital World towards 2040

CHALLENGES AHEAD FOR EUROPE

Introduction

The ELF report "The Digital World Towards 2040: Challenges ahead for Europe" comprises three sections:



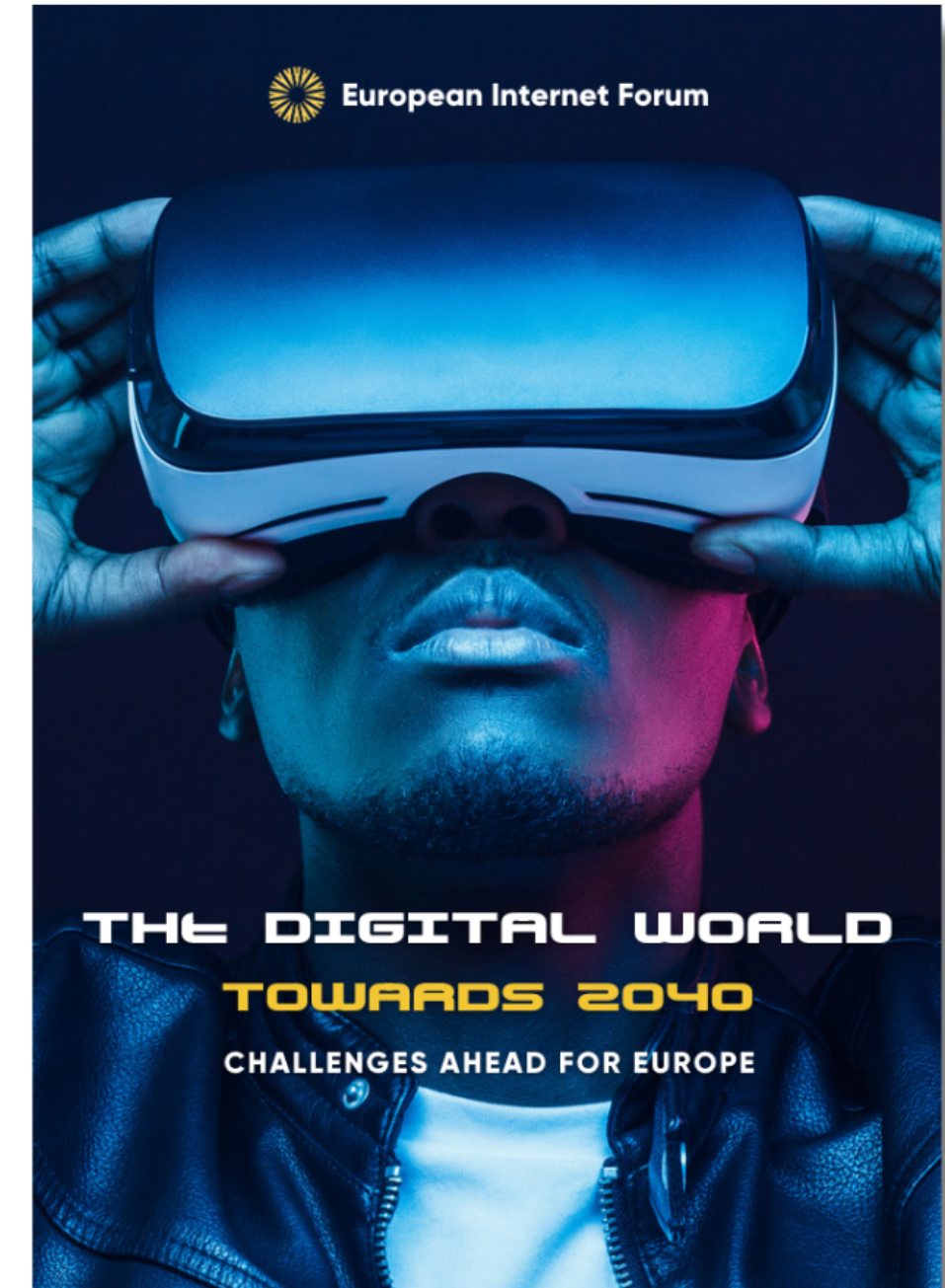
technology



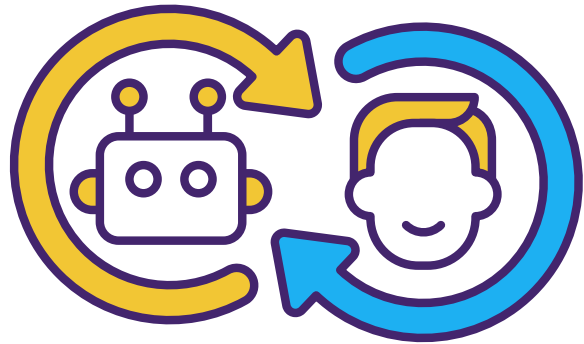
economy



society



Central paradigm



Intelligent autonomy

**where machines acquire some form of intelligence
and can collaborate autonomously with humans**



Intelligent autonomy

We break down the idea of intelligent autonomy into the following components:

- a) **Artificial Intelligence**, specifically Artificial General Intelligence
- b) **Autonomous collaboration** between humans and AI
- c) **Economic and Social impact** of intelligent autonomy
- d) Impact on **the European Union**
- e) **Broader impact** on the ecosystem, for example, sustainability



Definitions

Artificial intelligence (AI) is the ability of software to perform tasks that traditionally require human intelligence. Currently, we are in the world of narrow AI.

Narrow AI, or weak AI, refers to artificial intelligence systems that perform specific tasks or functions within a limited domain(such as setting the thermostat based on data).

Artificial General Intelligence (AGI) refers to highly autonomous systems outperforming humans at most economically valuable work. AGI goes beyond narrow AI and aims to replicate or surpass human-level intelligence across a broad spectrum of intellectual capabilities.



Definitions

Generative AI is AI that is typically built using large language models and is mainly designed to generate content.

Large language models (LLMs) comprise a class of AI models that can process massive amounts of unstructured text, learn the relationships between words or portions of words and generate new content based on this learning. GPT and chatGPT are examples of systems based on LLMs.

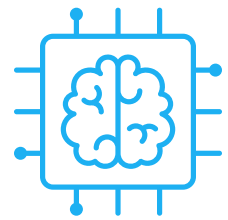


Section one: Technology

- a) Foundational technologies for AI**
- b) The role of AGI towards 2040**
- c) Automation i.e. the impact of AGI on intelligent autonomy where humans and AI collaborate on tasks.**



Section one: Technology



Foundational technologies for AI

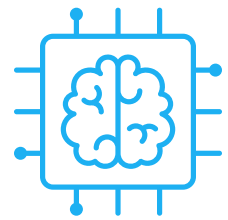
AGI and its implementation through large language models (LLMs) are the key foundational technologies that we focus on.

According to the McKinsey report, The economic potential of generative AI, this LLM-driven enhanced ability to understand natural language indicates that Generative AI and other technologies can automate work activities that absorb 60 to 70 percent of employees' time today.

Half of today's work activities could be automated between 2030 and 2060, with a midpoint in 2045.



Section one: Technology



Foundational technologies for AI

In addition, there are several technologies/ themes that will support the vision of intelligent autonomy.

Ex: Advanced materials and manufacturing; computing and communications; Energy and environment; Quantum; Biotechnology, gene technology, vaccines; Defence, space, robotics, and transportation, virtual worlds, connectivity, tokenization among others.



Section one: Technology



The role of AGI towards 2040

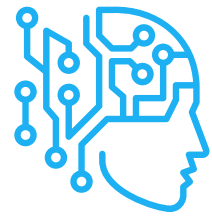
These elements are significant because collectively, they point to a scenario that AI could be a peer in human collaboration - challenging the idea that AI will only perform routine tasks.

The two elements that impact the timelines of Intelligent Autonomy are:

- a) Evolution of LLMs themselves especially in terms of the number of parameters
- b) Ability of AGI to reason



Section one: Technology



The role of AGI towards 2040

LLM models are **increasing exponentially** in size i.e. number of parameters.

BERT (2018) has 240 million parameters

GPT-2 (2019) has 1.5 billion parameters

GPT-3 (2020) has 175B parameters

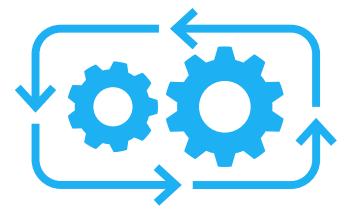
GPT-4 (2023) has 1.76 trillion parameters

The **ability of AGI to reason** is a complex and significant topic of research.

Long term scenarios ex Robots with **human-level consciousness** in 50 years.



Section one: Technology



Automation

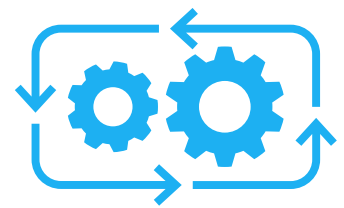
Automation doesn't replace jobs in itself.

Process mining combined with the internet of things, low-code, citizen developers help to make the transition to automation. Developers no longer do development exclusively.

Artificial Intelligence becomes an enabling function to process automation in a tiered fashion, i.e. from, initially, just getting data from a sensor to complex simulations of processes as digital twins.



Section one: Technology



Automation

The impact of AI and automation leading up to 2040 can be understood in delegating more and more decisions to AI.

TODAY

NARROW AI

AI takes simple decisions in specific domains

IN THE WORLD OF

AGI

AI takes more and more decisions, multiple domains, can act semi-autonomously

IN THE WORLD OF

SUPERHUMAN AI

AI becomes autonomous, pervasive, connected, and perhaps emergent. Decisions can be taken by AI at a systemic scale



Section two: Economy

- 1) **Geopolitics considerations** of Intelligent Autonomy
- 2) **Macroeconomic impact** of Intelligent Autonomy
- 3) **Regulation and policy implications** of Intelligent Autonomy
- 4) **Work and Productivity** - Impact on Jobs and Employment
- 5) Significance of AGI to solve **systemic problems like sustainability**



Section two: Economy

1. Geopolitical considerations of Intelligent Autonomy

- The evolution of society is also shaped by **essential human nature** e.g. emotional intelligence, as key differentiator
- The **emotional architecture** of our communities and societies has stayed the same over centuries and millennia - and it is likely to do so over the next 20 years.
- The culture of AI is essential e.g. **the EU and the USA are likely to adopt the democratic model.**
- Typically, politicians operate in short cycles but **longer cycles are at play** here for intellectual property, copyrights, patents, artistic rights, etc.



Section two: Economy

2. The macroeconomic impact of Intelligent Autonomy

- The impact on countries will also be significant.
- **Responsible AI** strategies or guidelines.



Section two: Economy

3. Regulation and policy implications of Intelligent Autonomy

There are possibly seven ways to regulate AI globally

- A legally binding AI treaty like the Council of Europe
- The OECD AI principles
- The Global Partnership on AI
- The EU's AI Act
- Technical industry standards
- The United Nations
- An entirely new body specifically for AI regulation

adapted from MIT Technology Review



Section two: Economy

4. Work and productivity – Impact on Jobs and employment

Generative AI's impact to productivity could add

\$2.6 – \$4.4 trillion annually

across the 63 use cases analyzed by McKinsey



This would increase the **impact of all artificial intelligence by 15 to 40%**



Section two: Economy

4. Work and productivity – Impact on Jobs and employment

Generative AI use cases could deliver falls across four areas:

Customer operations, marketing and sales, software engineering, and R&D.

It can automate work activities that absorb **60** to **70 percent** of employees' time today.

Half of today's work activities could be **automated** between **2030** and **2060**, with a midpoint in 2045.



Section two: Economy

4. Work and productivity – Impact on Jobs and employment

The impact of Intelligent Autonomy spans areas like job displacement, new job opportunities, job enrichment, ethical considerations, etc.

Where Intelligent Autonomy could benefit humanity:

human creativity

labour productivity

healthcare

fundamental research

education – skilling and reskilling

personalised education – AI tutors

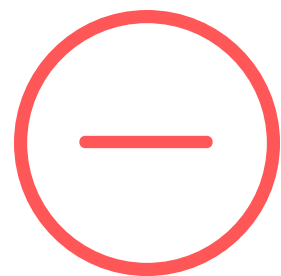
Lifelong Learning Mindset

combined productivity gains

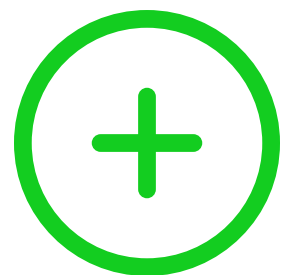


Section two: Economy

5. Significance of AGI to solve systemic problems like sustainability



There is a broad perception that the development of AI algorithms negatively impacts the environment, especially due to the use of vast amounts of data utilising very high computing capabilities.



On the other hand, AI can be a part of the solution in reducing emissions' impact and achieving the overall sustainability goals, including net-zero and ESG.

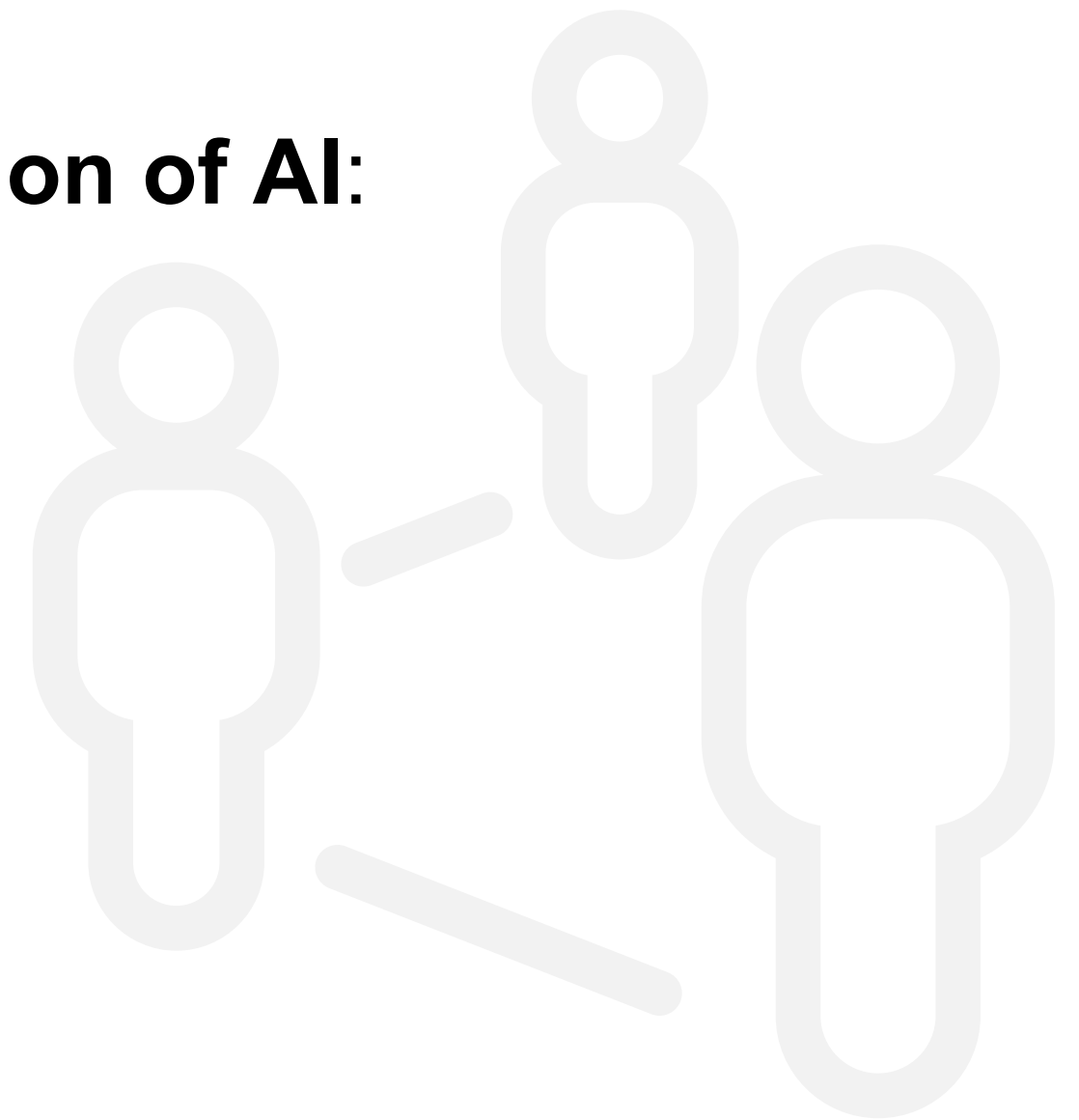
Large-scale simulations are widely used in various scientific fields to study complex systems, understand phenomena, and make predictions, including on **environmental impact**.



Section three: Socio-political

We divide societies into **three** parts in terms of **adoption of AI**:

- 1) **Early Adopters of AI (High Adoption);**
- 2) **Moderate Adopters of AI (Medium Adoption);**
- 3) **Late Adopters of AI (Low Adoption)**



Section three: Socio-political

We also consider **AI adoption by authoritarianism** as

- 1) AI-Advanced Democracies**
- 2) AI-Controlled Authoritarian Regimes**
- 3) AI-Resistant Communities**
- 4) AI-Dependent Developing Nations**
- 5) Hybrid Societies**
- 6) Liberal/democracies that adopt centralised standardisation**



Section three: Socio-political

Societies based on AI adoption

1) Early Adopters of AI (High Adoption)

High-Adoption Societies

- **Governance:** Highly efficient, data-driven decision-making.
- **Economic Structure:** Transition towards AI-augmented or automated labor.
- **Social Mobility:** Potentially reduced, unless there's a focus on re-skilling.
- **Privacy:** Likely diminished due to pervasive data collection.
- **Inequality:** Risk of increase if benefits of AI are not broadly distributed.
- **Political Stability:** High, if transition is managed well; low, if not.



Section three: Socio-political

Societies based on AI adoption

2) Moderate Adopters of AI (Medium Adoption)

Moderate-Adoption Societies

- **Governance:** Mixture of traditional and AI-assisted governance.
- **Economic Structure:** Semi-automated with human-AI collaboration.
- **Social Mobility:** Moderate, some avenues for re-skilling.
- **Privacy:** Balanced approach, some safeguards in place.
- **Inequality:** Varies, potentially less than in high-adoption societies.
- **Political Stability:** Generally stable but subject to socio-economic pressures.



Section three: Socio-political

Societies based on AI adoption

3) Late Adopters of AI (Low Adoption)

Low-Adoption Societies

- **Governance:** Largely traditional, less efficient.
- **Economic Structure:** Human-centric labor, less automation.
- **Social Mobility:** Relatively high due to low automation → [linked article](#)
- **Privacy:** More preserved due to less data collection.
- **Inequality:** Less tech-driven inequality, but potentially other forms.
- **Political Stability:** Stable if economy is strong; risks if lagging behind.



Section three: Socio-political

Societies based on AI adoption and authoritarianism

1) AI-Advanced Democracies

Socio-Economic Characteristics:

- **Education:** Investment in education is paramount, specifically targeting skills needed in an AI-driven landscape such as coding, data science, and AI ethics.
- **Wealth Distribution:** While there's potential for inequality due to AI automating certain jobs, countermeasures like Universal Basic Income (UBI) could be implemented to maintain social stability.

Political Characteristics:

- **Transparency:** These democracies are likely to employ AI in enhancing governmental transparency and public participation.
- **Policy Making:** Decision-making processes will be heavily data-driven, leveraging AI analytics for more efficient and adaptable policies.



Section three: Socio-political

Societies based on AI adoption and authoritarianism

2) AI-Controlled Authoritarian Regimes

Socio-Economic Characteristics:

- **Surveillance:** Society would be heavily monitored using AI-driven surveillance technologies, such as facial recognition and behavior analysis.
- **Economic Centralization:** The state would use AI to guide economic development, possibly stifling innovation and suppressing dissent.

Political Characteristics:

- **Control:** AI will be a powerful tool for these regimes to monitor, predict, and suppress political opposition.
- **Global Positioning:** AI capabilities may also be used aggressively for geopolitical advantage, such as in cyber warfare or information manipulation.



Section three: Socio-political

Societies based on AI adoption and authoritarianism

3) AI-Resistant Communities

Socio-Economic Characteristics:

- **Traditional Economies:** These communities would depend more on agriculture, craftsmanship, and local resources.
- **Community Cohesion:** Expect strong community bonds and a more homogeneous culture, largely unaffected by global AI trends.

Political Characteristics:

- **Skepticism:** There will be a general skepticism towards technology and a leaning towards traditional forms of governance.
- **Localized Governance:** Community-driven decisions will be common, often avoiding technological solutions.



Section three: Socio-political

Societies based on AI adoption and authoritarianism

4) AI-Dependent Developing Nations

Socio-Economic Characteristics:

- **Economic Vulnerability:** Over-reliance on AI technologies provided by developed nations could make these countries susceptible to external economic pressures.
- **Service Access:** While AI could significantly improve access to essential services like healthcare and education, the human element may be lost.

Political Characteristics:

- **Dependency:** These nations may become politically beholden to countries that provide AI infrastructure and expertise.
- **Limited Autonomy:** Governance models may be imported, leading to a reduced sense of self-determination.



Section three: Socio-political

Societies based on AI adoption and authoritarianism

5) Hybrid Societies

Socio-Economic Characteristics:

- **Mixed Economies:** A blend of traditional and AI-augmented sectors would coexist, creating a unique economic landscape.
- **Diverse Skillset:** The population would likely possess a mixture of traditional skills and knowledge in AI-related fields.

Political Characteristics:

- **Decentralized Governance:** While central governance might remain traditional, local authorities could adopt AI for specific sectors like healthcare or public services.
- **Regulatory Challenges:** Managing a society with varying levels of AI adoption could pose unique regulatory issues.



Section three: Socio-political

Societies based on AI adoption and authoritarianism

6) Liberal/democracies that adopt centralised standardisation

This includes countries like South Korea who have centralised planning for standards



Section four: Next steps

fall 2023

Social and political implications

Based on EIF members' contributions, more issues will be incorporated. The socio-political section of the report will also cover education, a key factor for future proofing against the impact of AI.

The report will be finalised by the end of the year and published in early 2024. If you wish to receive a copy, e-mail us at **secretariat@internetforum.eu**

