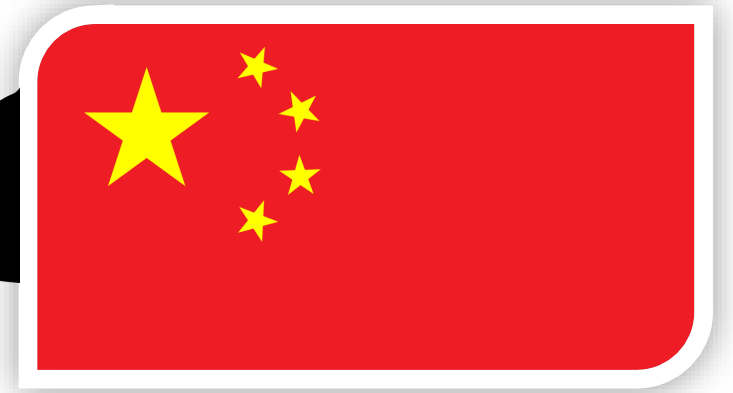
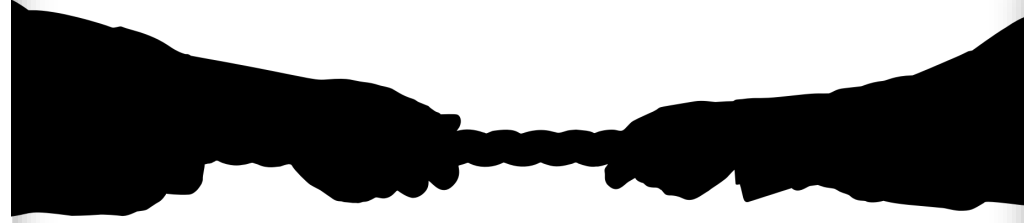
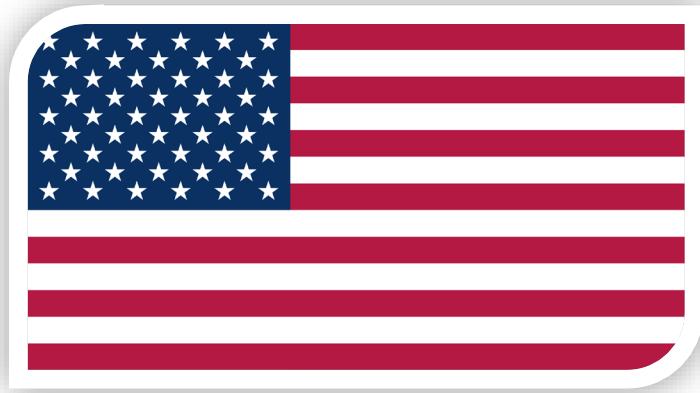


# **The Governance of Transformers: Three AI Policy Problems in the EU**

**Dr Fabian Ferrari**  
**Assistant Professor in Cultural AI**  
**Department of Media and Culture Studies**



**Europe unveils plan to become 'AI continent' with simpler rules, more infrastructure**

- 1. Why focusing on governance?**
- 2. Three EU governance problems**
- 3. Implications for LLM development**

# **1. Why focusing on governance?**

**Governance = the process of overseeing the control and direction of something**

**With AI, this is extremely difficult:**

- **Terminology (e.g., ‘foundation models’)**
- **Concentrated knowledge and expertise**
- **Regulators are often reactive and slow**
- **Dilemmas (e.g., innovation vs. safety)**

# Why does AI governance matter?

- **AI and economic competitiveness**
- **AI as a matter of national security**
- **Transformers as a key architecture**



# Ecological costs



# Hidden labour

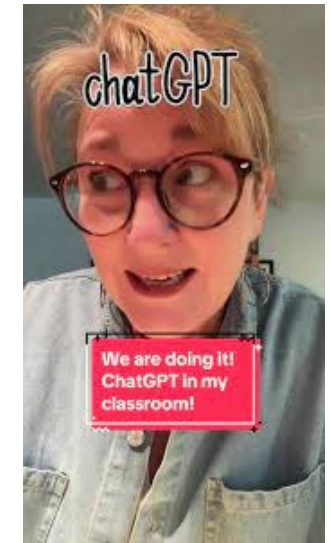
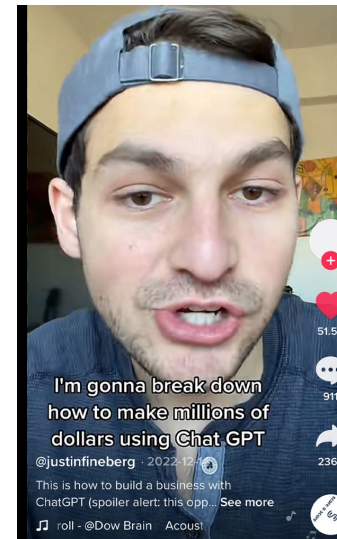


# Legal frameworks



**Transformers**





















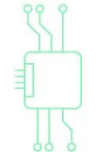







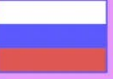
# Cultural change



## **2. Three EU governance problems**

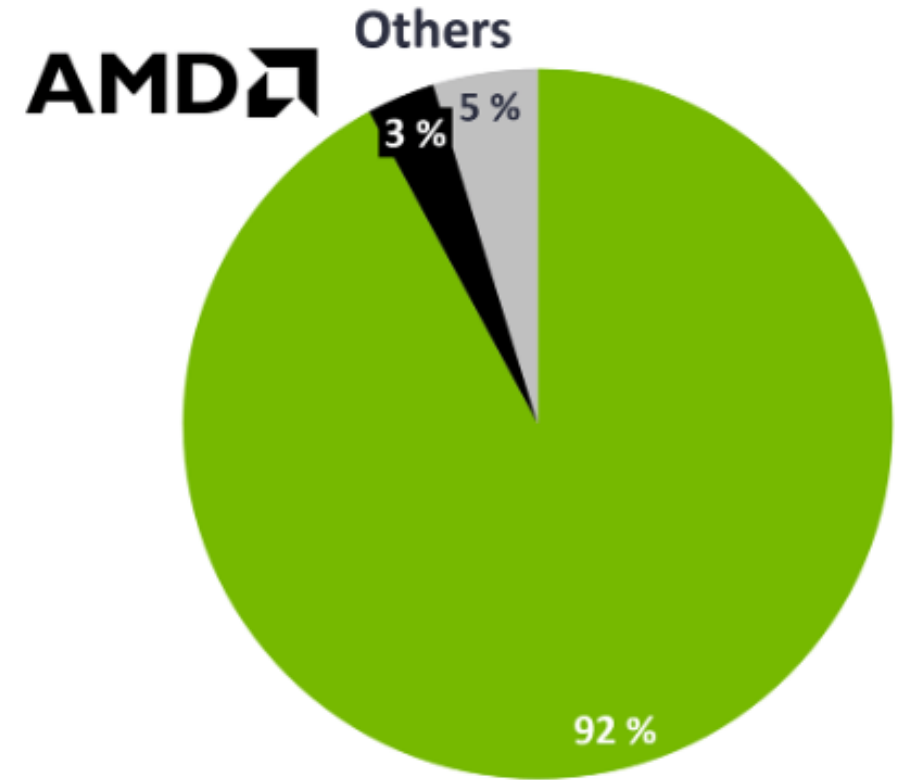
- 1. Foreign ownership of the AI stack**
- 2. Public funding, private interests**
- 3. Geopolitical trade-offs**

# **Foreign ownership of the AI stack**

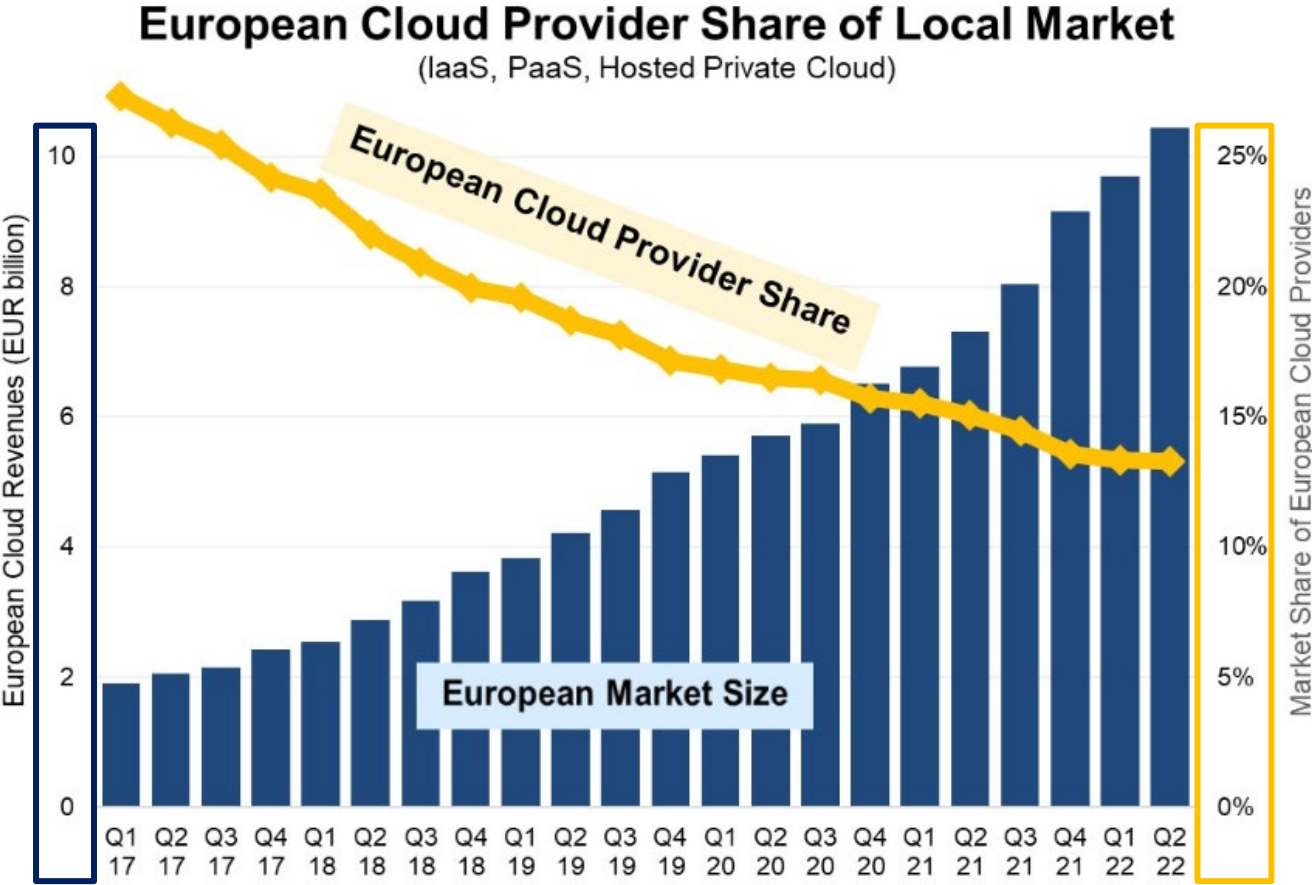
|   |   | KEY COUNTRIES  |  |   |  | KEY FIRMS  |
|---|---|--|--|---|--|--|
| <b>Data and artificial intelligence</b> |    | <br>US      |  | <br>China    |  | OpenAI, Microsoft, Google, Meta, Anthropic, XAI, Amazon, Baidu, Tencent, Alibaba, DeepSeek |
| <b>Software</b>                         |    | <br>US       | <br>China   | <br>Germany  |  | Microsoft, Apple, Alphabet, Meta, Amazon, Salesforce, SAP, ByteDance, Tencent              |
| <b>Cloud</b>                            |    | <br>US      |  | <br>China    |  | Amazon, Microsoft, Alphabet, Alibaba   |
| <b>Internet of things &amp; devices</b> |    | <br>US       | <br>China   | <br>Korea    | <br>Germany       | Amazon, Google, Apple, Samsung, Huawei, Bosch, Siemens, Xiaomi                             |
| <b>Networks</b>                         |    | <br>US       | <br>China   | <br>Europe   | <br>Japan         | Huawei, Nokia, Ericsson, ZTE, SpaceX, NEC  |
| <b>Chips</b>                            |  | <br>Taiwan | <br>Korea | <br>US     | <br>Netherlands | TSMC, Samsung, Intel, NVIDIA, AMD, ASML  |
| <b>Raw materials, energy, and water</b> |  | <br>US     | <br>China | <br>Russia |  | Chinese government (through SOEs e.g., China Rare Earth Group), ExxonMobil, Gazprom        |

# Foreign ownership of the AI stack

- No EU processor technology in world's top 500 high-performance computers
- Large-scale computing = large-scale subsidization of Nvidia as leading provider
- GPU export controls dangers



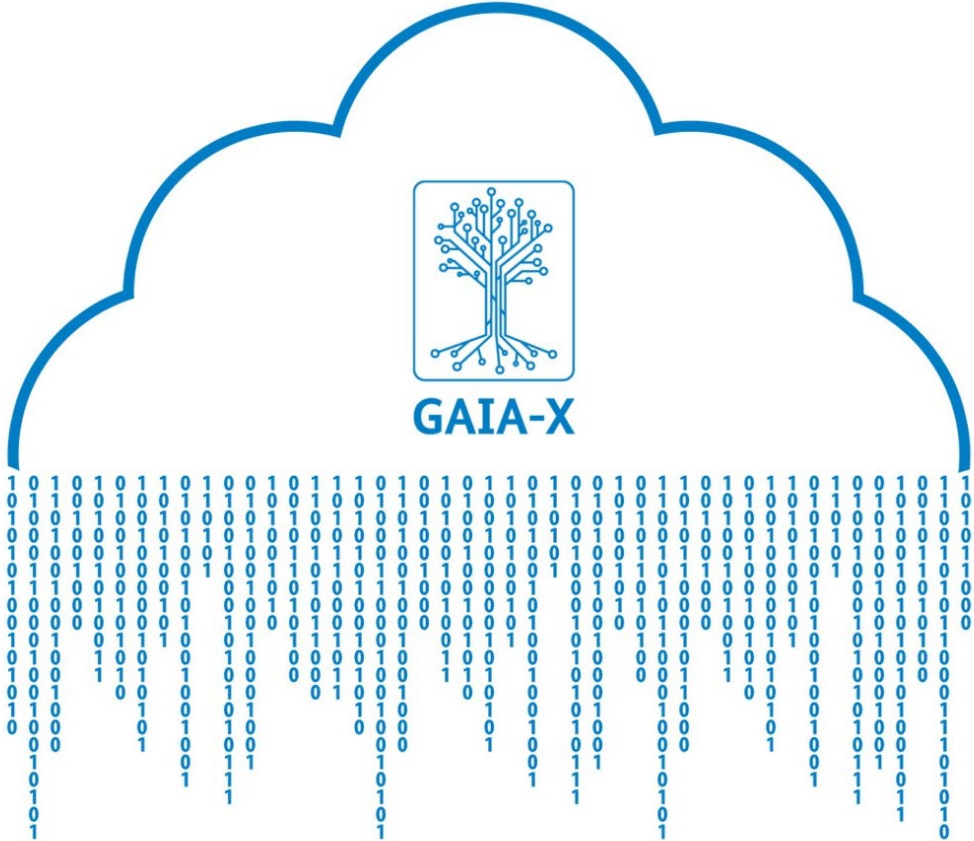
# The EU cloud computing paradox



Source: Synergy Research Group

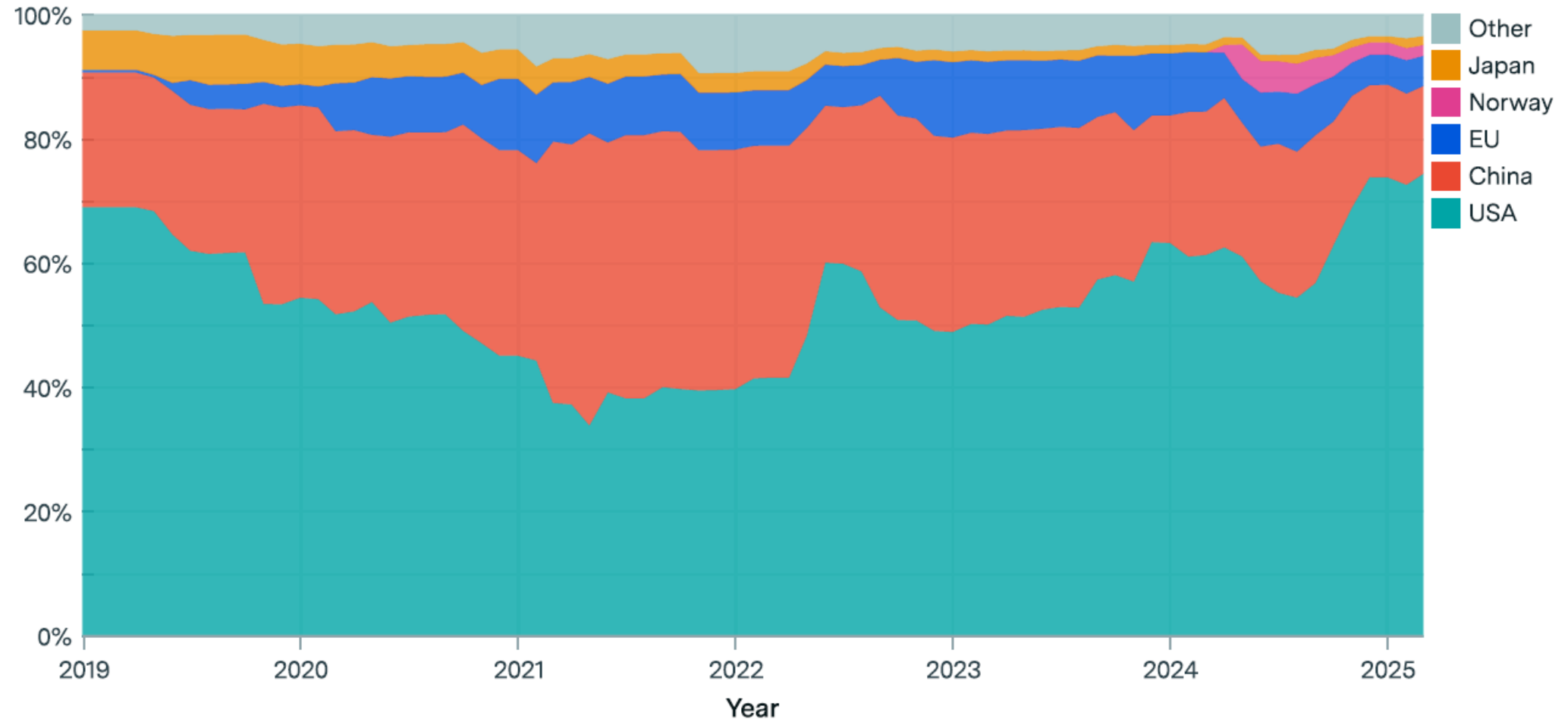
EU cloud market

EU provider share



72% of the EU cloud market

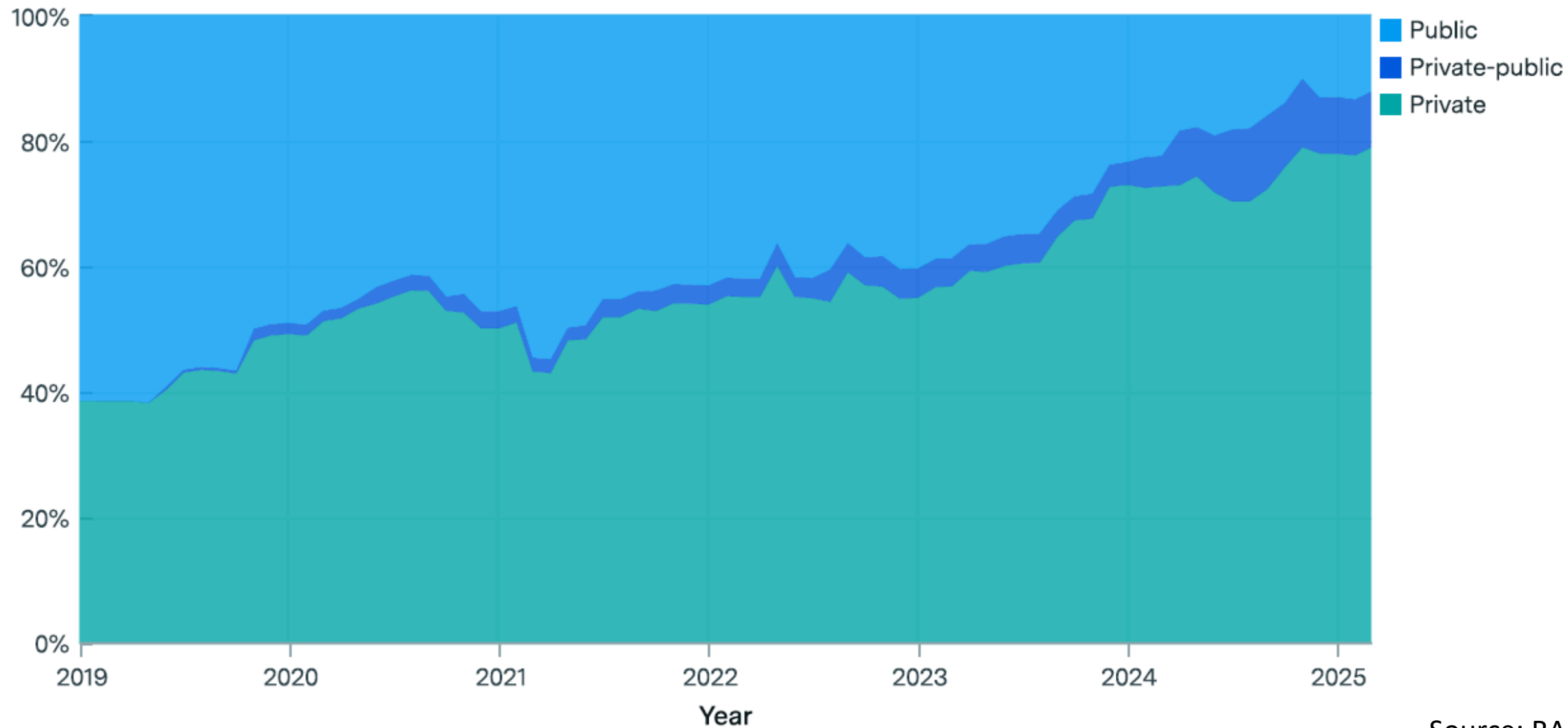
### Share of aggregate performance (16-bit FLOP/s)



Our dataset covers an estimated 10–20% of global aggregate AI supercomputer performance as of March 2025. While coverage varies across companies, sectors, and hardware types due to uneven public reporting, we believe the overall distribution remains broadly representative. Future country shares may change dramatically as exponential growth continues in both AI chip performance and production volume.

# Share of aggregate AI supercomputer performance by public/private sector over time

Share of aggregate performance (16-bit FLOP/s)



**Public funding, private interests**

# The EU and AI sovereignty

PRESS RELEASE | 16 November 2023 | Brussels

## Commission opens access to EU supercomputers to speed up artificial intelligence development



02 November 2023

**The Netherlands starts realisation GPT-NL, its own open AI-language model**

ARTIFICIAL INTELLIGENCE • STARTUPS • VENTURE

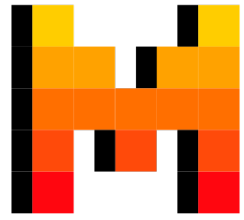
## European OpenAI Competitor Aleph Alpha Raises \$500M

Chris Metinko November 6, 2023

### *Mistral, French A.I. Start-Up, Is Valued at \$2 Billion in Funding Round*

The company has publicly released its latest technology so people can build their own chatbots. Rivals like OpenAI and Google argue that approach can be dangerous.

# Closed software ecosystems



**MISTRAL  
AI\_**



CoreWeave



- **Cuda software as industry standard (lock-in effects)**
- **Partnerships and acquisitions (e.g., Microsoft/Mistral)**
- **Ecosystem power**

# AI factories and AI gigafactories



- Public-private partnerships
- Use by SMEs & start-ups, labelled as “largest public AI investment in the world”

**15 EU AI factories: ~25,000 GPUs**  
**5 EU Gigafactories: 100,000 GPUs**

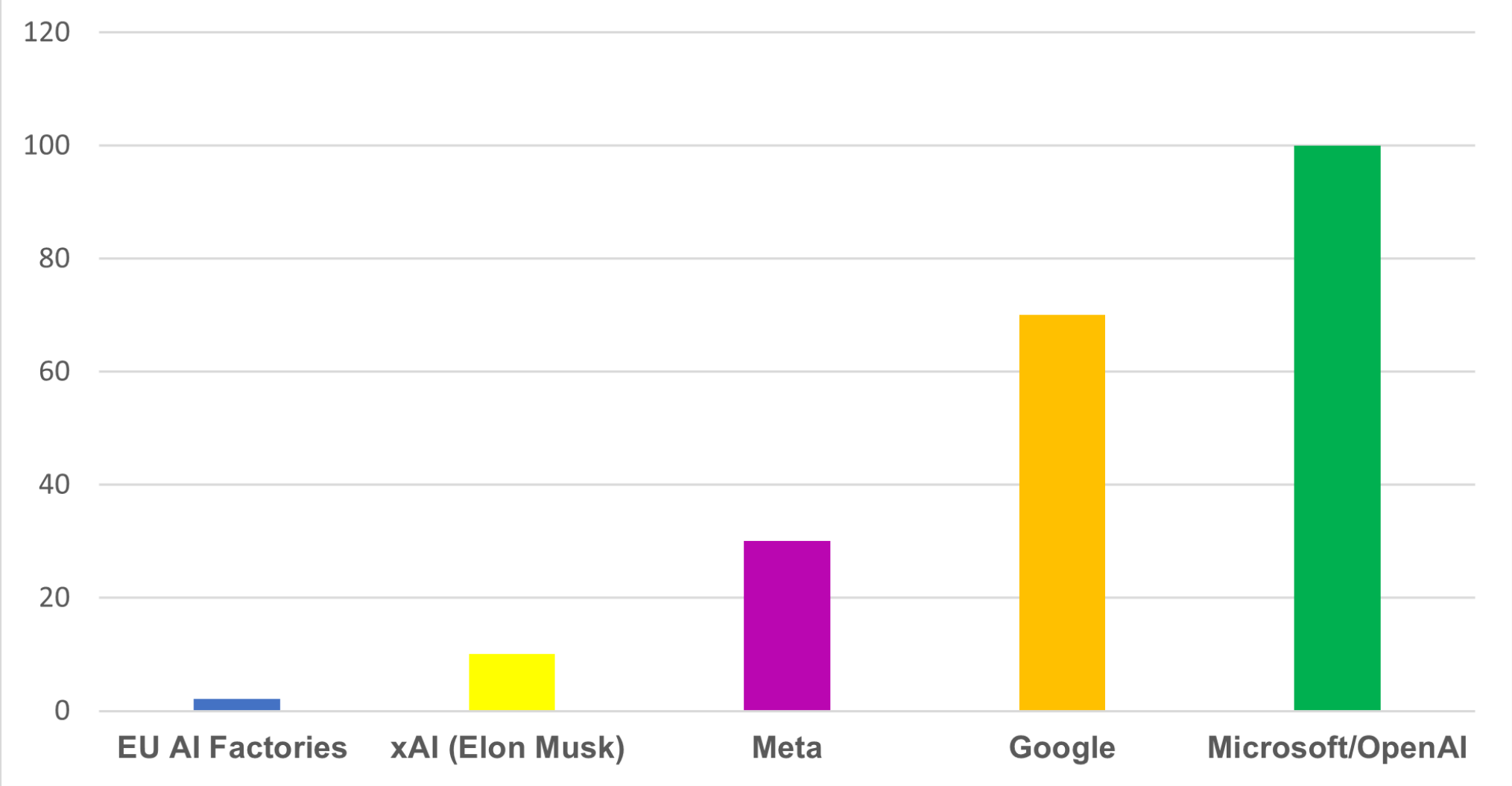
- **Meta: >1,300,000 GPUs**
- **OpenAI: >1,000,000 GPUs**

Switzerland's participation is contingent upon the ratification of its accession to Horizon Europe.

The boundaries and names shown and the designations used on this map do not imply official endorsement or acceptance by the European Union. This designation shall not be construed as recognition of a State of Palestine and is without prejudice to the individual positions of the Member States on this issue.

Administrative boundaries: © EuroGeographics © OpenStreetMap  
Cartography: Eurostat - IMAGE, 05/2025

# AI infrastructure spending (in billion \$)

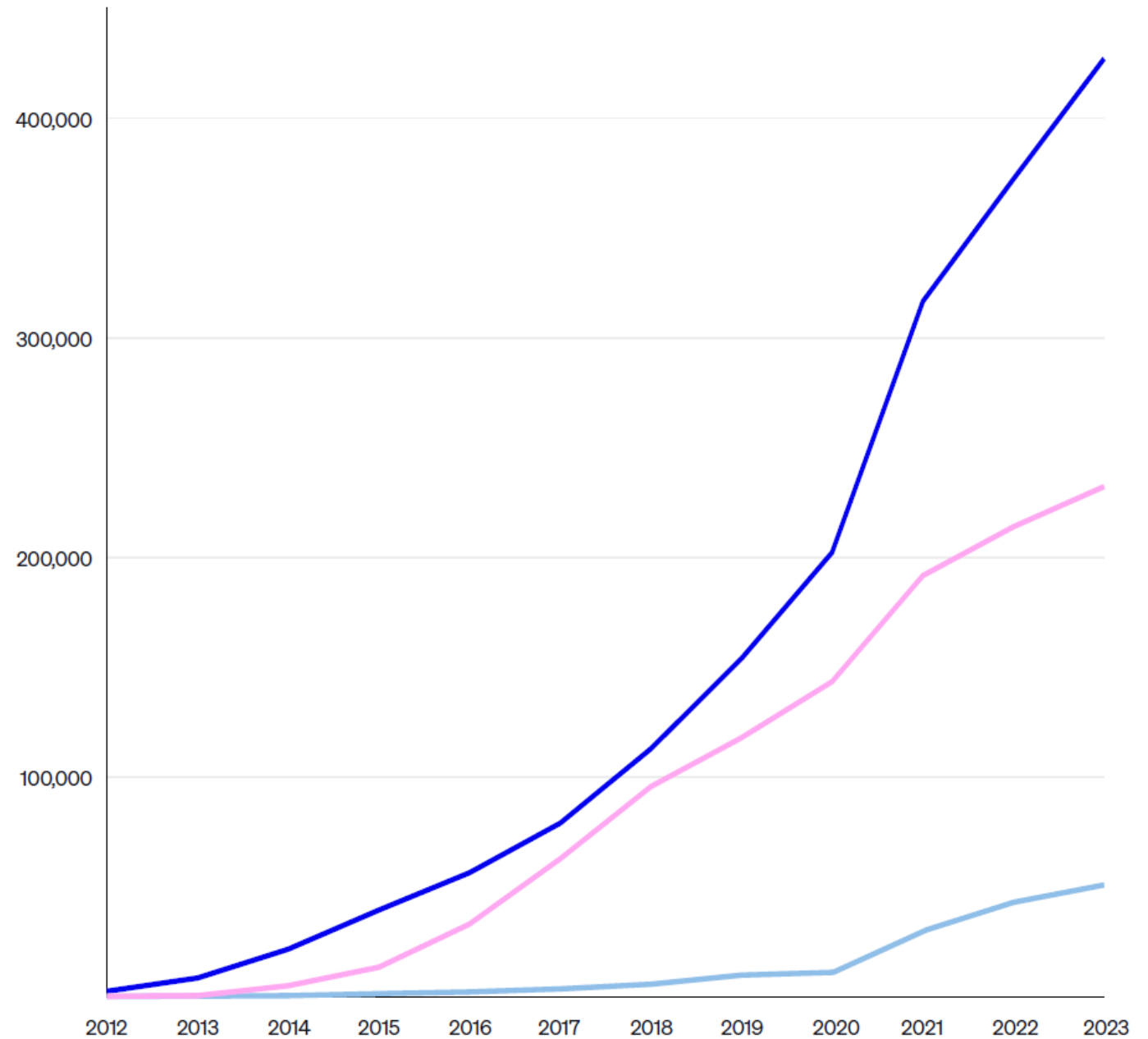


# Mind the (investment) gap

In million dollars

Cumulative sum of investments in AI startups by region, in million U.S. dollars

- United States
- China
- EU



## Source

POLITICO analysis based on [OECD.AI](#) data, 2024

# Public funding, private interests



Supported by    Institute for Innovation and Public Purpose  
Commissioned by 



POLICY STUDY  
December 2024

## TIME TO BUILD A EUROPEAN DIGITAL ECOSYSTEM

RECOMMENDATIONS FOR THE EU'S  
DIGITAL POLICY

Francesca Bria, Johnny Ryan, Sophie Bloemen,  
Matthias Pfeffer, Leevi Saari, Fabian Ferrari, José  
van Dijck, Antal van den Bosch, Annarosa Pesole.

Edited by Gerard Rinse Oosterwijk, Marie Hasdenteufel and  
Justin Nogarede

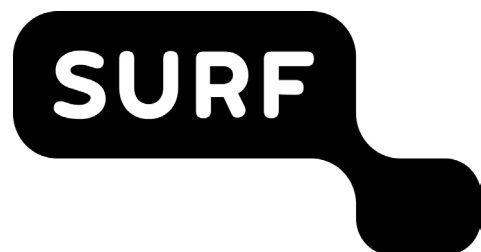
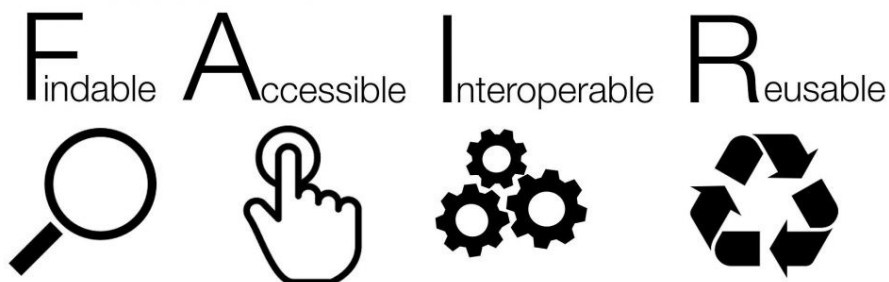


   
FOUNDATION FOR EUROPEAN  
PROGRESSIVE STUDIES

- ***Sovereign AI*** by itself is not a socially beneficial purpose or end goal
- No framework to check if public AI investments benefit society at large

→ **Need for benchmark!**

# Public money, public conditions?



- **Common practice in research funding: no compliance with FAIR conditions, no money**
- **Embedding public values *by design*, not as afterthought**
- **Role of public values in AI infrastructure funding?**

# Who owns the means of LLM production?

## Public

- **Maximum control over procurement policies (e.g., role of chips or GPUs)**
- **Maximum control over access & use policies, strategic management of compute resources**

→ **Key problem: Risks of a planned economy**

## Public-Private

- **Limited control over procurement and use policies (e.g., role of consortia)**
- **Private investments come with strings attached: vendor lock-in, licensing, profit expectations**

→ **Key problem: Public-private value tensions**

## Private

- **No public control over procurement and use policies (i.e., dependency)**
- **No long-term public governance rights, unclear societal returns on public investments**

→ **Key problem: Logic of shareholder interest**

# **Geopolitical trade-offs**

# Emerging digital trade wars

**Digital Services Act**

**Digital Markets Act**

**AI Act**

**Europe was a world leader in A.I. regulation. Will Trump change that?**

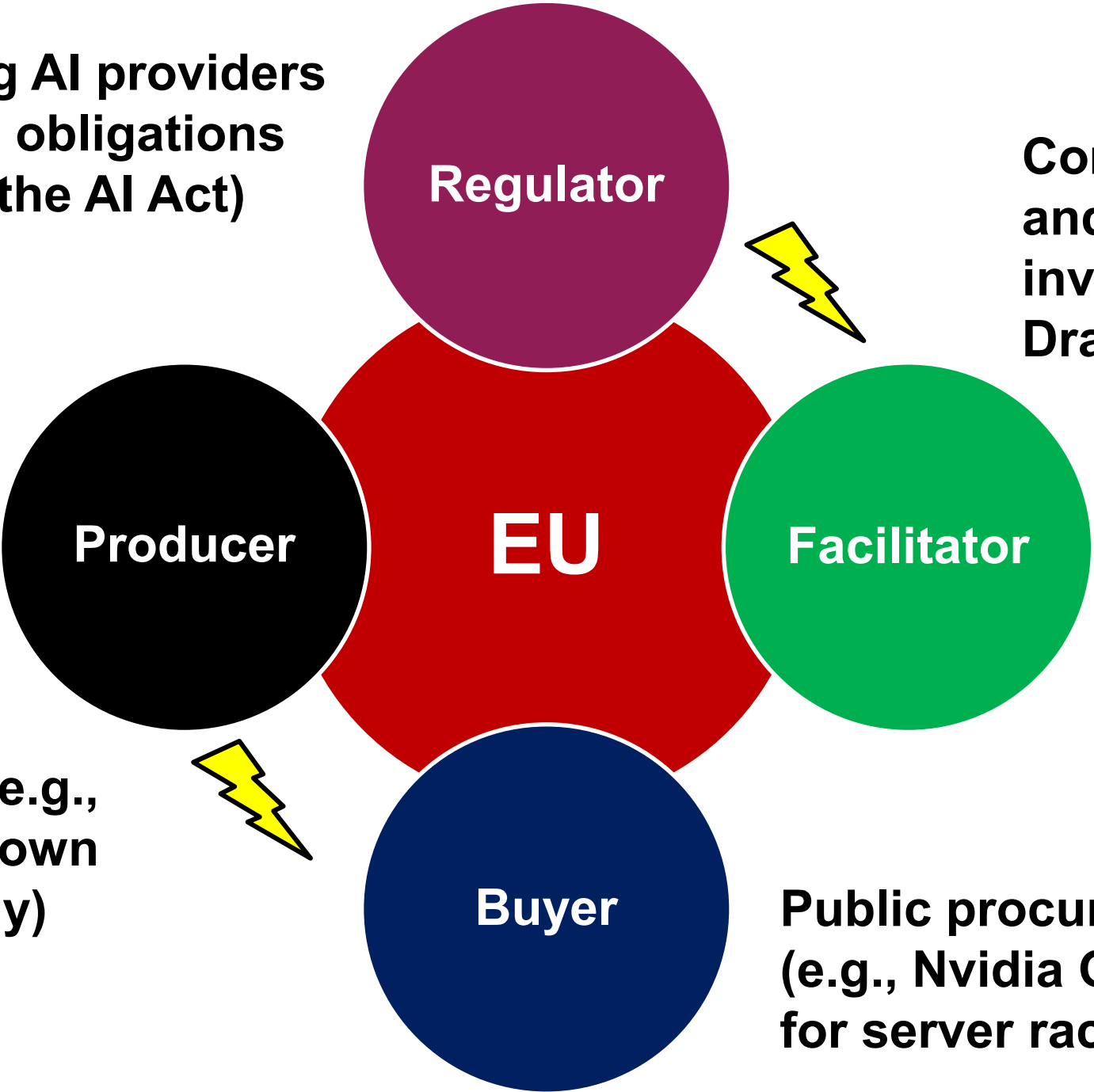
**Trump orders trade chief to revive tariff retaliation against digital taxes**

**EU prepares to hit Big Tech in retaliation for Donald Trump's tariffs**



**Restricting AI providers  
(e.g., legal obligations  
as part of the AI Act)**

**Competitiveness  
and attracting AI  
investments (e.g.,  
Draghi Report)**



**State-owned AI  
infrastructure (e.g.,  
lack of homegrown  
GPU technology)**

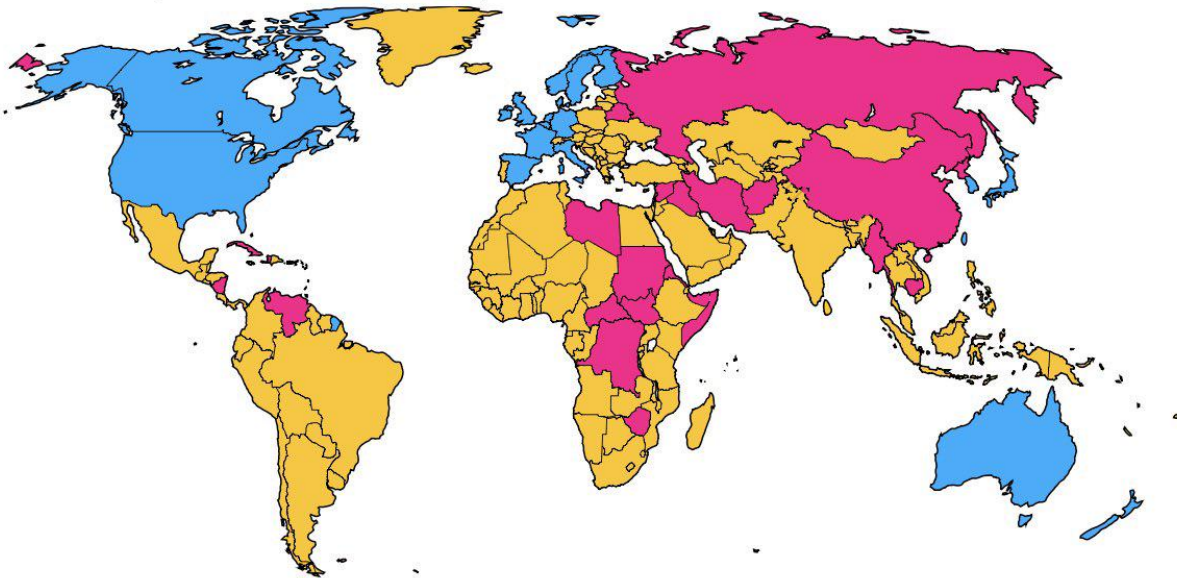
**Public procurement  
(e.g., Nvidia GPUs  
for server racks)**

# The EU's developer dilemma

## US to Curb Global Chip Shipments

Most markets will face new restrictions on data center development

■ Tier 1 (Most permissive) ■ Tier 2  
■ Tier 3 (Most restrictive)



Source: Bloomberg reporting

Note: Mapped data show level of restrictions on chip shipments for distinct markets

Bloomberg

- **Chips and compute power as geopolitical leverage to achieve foreign policy aims**
- **Build on US stack: fast, but geopolitically exposed**
- **Build on EU stack: state subsidized but a change in workflows and capability**

# **3. Implications for LLM development**

# Generative AI and the EU AI Act

## The AI Act takes a risk-based approach

|  |  |  |   |
|--|--|--|---|
| <p><b>Prohibited</b><br/>Contravene Union Values<br/>(e.g. Fundamental Rights)</p> | <p>Art. 5<br/><b>Unacceptable Risk</b></p> | <p><b>Examples of prohibited AI systems:</b></p> <ul style="list-style-type: none"> <li>- Behavioral manipulation</li> <li>- Exploitation of vulnerable characteristics of people</li> <li>- Social scoring by public authorities</li> <li>- Real-time remote biometric identification for law enforcement purposes</li> </ul> | <p><b>Non-compliance:</b><br/>Up to €35 million<br/>or 7% of global<br/>annual turnover</p>   |
| <p>High Risk to Health,<br/>Safety, Environment<br/>and Fundamental<br/>Rights</p> | <p>Art. 6<br/><b>High Risk</b></p>         | <p><b>Examples of high-risk AI systems:</b></p> <ul style="list-style-type: none"> <li>- Evaluation of eligibility to credit, health or life insurance or public benefits</li> <li>- Analyses of job applications or evaluation of candidates</li> </ul>   | <p><b>Non-compliance:</b><br/>Up to €15 million<br/>or 3% of global<br/>annual turnover</p>   |
| <p>Risk of<br/>Impersonation<br/>or Deception</p>                                  | <p>Art. 52<br/><b>Limited Risk</b></p>     | <p><b>Examples of limited-risk AI systems:</b></p> <ul style="list-style-type: none"> <li>- AI systems that interact with consumers</li> <li>- Generative AI*: AI systems generating or manipulating content (image, audio or video)</li> </ul>  | <p><b>Non-compliance:</b><br/>Up to €15 million<br/>or 1.5% of global<br/>annual turnover</p> |
| <p>No<br/>High<br/>Risk</p>  | <p>Art. 69<br/><b>Minimal Risk</b></p>     | <p><b>Examples of minimal-risk AI systems:</b></p> <ul style="list-style-type: none"> <li>- Spam filter</li> <li>- AI-enabled video games</li> </ul>   | <p><b>Non-compliance:</b><br/>Not applicable</p>  |

# GPAI models and high-impact GPAI models

## CLASSIFICATION

## KEY REQUIREMENTS (*non-exhaustive list*) <sup>(a)</sup>

### ALL GPAI MODELS AND SYSTEMS

Large models and systems capable of competently performing a wide range of distinctive tasks, such generating video, text, images or computer code, or conversing.

- Transparency obligations before market placement, including:
  - Drawing up technical documentation for downstream providers
  - Complying with EU copyright law and disseminating detailed summaries about the content used in training
  - Watermarking AI generated or manipulated content

### HIGH-IMPACT GPAI MODELS

Foundation models trained with large amount of data and with advanced complexity, capabilities, and performance well above the average, which can disseminate systemic risks along the value chain.

- Complying with all requirements applicable to all GPAI models and systems
- Conducting model evaluations
- Assessing and mitigating systemic risks
- Conducting adversarial testing
- Reporting of serious incidents to the EU Commissions
- Ensuring sufficient cybersecurity protection
- Reporting on energy efficiency

- Designation criteria:
  - FLOPs<sup>(a)</sup> > 10~25 for computing used in training (to be kept under review).
  - Other qualitative / quantitative criteria (e.g. number of business users).


# The Lack of Language Model Transparency

## Evaluated Public Summaries

Below is an overview of the evaluation with each model assigned a grade. **A+** is the highest grade and **F** the lowest, with **!** shown for missing summaries. Click the model name to go to the detailed evaluation page which has more information, a link to the summary, and our evaluation notes. You can also see a [detailed overview](#) of scores for each section of the public summary.

| Model                                  | Provider            | Transparency | Usefulness |
|--|---------------------|--------------|------------|
| <a href="#">Apertus</a>                | Swiss AI Initiative | A            | A+         |
| <a href="#">Demo</a>                   | Demo org            | A            | A+         |
| <a href="#">Bria 3.2</a>               | Bria AI             | B+           | A          |
| <a href="#">SmolLM3-3B</a>             | HuggingFace         | B+           | B+         |
| <a href="#">Bielik v3 11B Instruct</a> | SpeakLeash          | B+           | C+         |
| <a href="#">Phi-4</a>                  | Microsoft           | D            | F          |
| <a href="#">Claude Sonnet 4.5</a>      | Anthropic           | !            | !          |
| <a href="#">Gemini 2.5 Flash Image</a> | Google              | !            | !          |
| <a href="#">GPT-5</a>                  | OpenAI              | !            | !          |
| <a href="#">GPT-OSS</a>                | OpenAI              | !            | !          |
| <a href="#">Sora 2</a>                 | OpenAI              | !            | !          |

### A Quality Assessment Framework for GPAI Model Public Summaries required by AI Act Article 53(1)(d)

Dick A. H. Blankvoort, Harshvardhan J. Pandit, Maximilian Gahntz  
ACM Conference on Fairness, Accountability, and Transparency (FAccT), 2026. (open-access)  


Associated Media:

- Website: [Project website with analysis of public summaries](#)
- Data & Repo: [Github](#)
- Editorial: [\(Tech Policy Press\) How Big AI Developers are Skirting a Mandate for Training Data Transparency](#)

PERSPECTIVE


## How Big AI Developers are Skirting a Mandate for Training Data Transparency

DICK BLANKVOORT, HARSHVARDHAN PANDIT, MAXIMILIAN GAHNTZ / MAR 4, 2026

TECH

## Researchers have trouble finding AI training data summaries

Information required under the EU's AI rules is not only often missing, per a Mozilla-funded study, it's hard to locate

Maximilian Henning  Euractiv

# AI Act Pressure Points for LLM Development

## Before training

- Document data sources from day one, retroactive compliance is tricky
- Respect TDM opt-outs and robots.txt

## Before release

- Publish a training data summary Article 53(1)d
- High-impact models face evaluations, incident reporting, cybersecurity

## After release

- Ongoing reporting to the EU AI Office
- Energy efficiency disclosure
- Systemic risk monitoring (if high-impact model)

# **Conclusion and discussion questions**

- **Can you build “sovereign” EU AI models while structurally depending on foreign hardware, foreign software, and foreign capital?**
- **Is the EU over-regulating AI? Is it preventing innovation that could rival the US and China?**
- **How will LLMs be leveraged geopolitically?**

# Questions?



Utrecht  
University

Sharing science,  
*shaping tomorrow*



**f.i.ferrari@uu.nl**



**fabianlferrari**