



Creating a European Tech Stack Could Cost Over 5 Trillion Euros

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Our corporate partners do not have a vote on or veto over our positions. We do not speak for individual partner companies and remain true to our stated principles even when our partners disagree.

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Introduction

Recently, calls for the development of a separate European tech stack, dubbed the “Eurostack”, have grown in Europe. On September 24th, 2024 a multi-party group of Members of the European Parliament [met](#) to discuss developing the Eurostack and the related policy framework. A December 2024 [policy study](#), partly funded by the European Parliament, detailed the Eurostack proposal, and placed it in a wider framework of efforts to reshape the European digital economy.¹ Proponents advocate for [an end](#) to an alleged reliance on U.S. technology through the public funding for [publicly owned, collectively controlled](#), and [non-profit](#) technological assets to serve European markets and consumers.

This Eurostack would be designed to provide Europeans with a set of technologies similar to what is available from U.S. companies, but based in Europe and free from market-based principles.² One can easily question the wisdom and feasibility of public ownership and management of complex, dynamic, and innovation intensive industries, the critique would be somewhat philosophical. While private ownership and free markets are [foundational to](#) the EU legal order,³ European governments often offer certain goods to the public alongside private actors. However, the viability of such an approach often comes down to a question of costs.

In order to estimate how much a European tech stack would cost, we examined the historic cost of U.S. company spending on research and development and technology infrastructure. Eurostack advocates identified particular concerns with relying on software and platform services from U.S. companies including Alphabet, Amazon, Apple, Meta, Microsoft, and Nvidia. We therefore collected data on research and development spending as well as infrastructure spending using all available 10-K statements for these companies.

- 1 The Foundation for European Progressive Studies (FEPS) “Time to build a European digital ecosystem” (December 2024), available [here](#).
- 2 “Our mission is clear—to invest in public goods and infrastructures that protect citizens’ rights, ensure European autonomy and security, support the growth of European businesses, and serve the public interest.” Francesca Bria “The Quest for European Technological Sovereignty: Building the EuroStack” (15 October 2024), available [here](#); “#EuroStack is a movement of volunteers ... pushing for a coordinated public/private initiative in Europe to create alternative assets across the digital value chain – for security, resilience and growth reasons.” C. Caffarra “The ‘Sovereign Democratic Infrastructure’ -Hyperscalers Trick. Why We Shouldn’t Fall for it, and What We Should Do Instead” (1 December 2024), available [here](#).
- 3 “The Member States and the Union shall act in accordance with the principle of an open market economy with free competition, favouring an efficient allocation of resources” Treaty on the Functioning of the European Union, Article 120, available [here](#).

Table 1
List of Companies and Earliest Years of Data

Company	Year Public	Earliest Research and Development Data	Earliest Property and Equipment Data
Alphabet	2004	2002	2003
Amazon	1997	1997	1997
Apple	1980	1992	1993
Microsoft	1986	1992	1993
Meta	2012	2010	2010
Nvidia	1999	1994	1997

Table: Kaitlyn Harger, Chamber of Progress • Source: 10-K Filing

10-K filings for these companies were accessed through the companies' investor relations websites or via Google when not readily available on investor relations websites. Both Apple and Microsoft went public in the 1980s but did not have publicly available 10-K statements until 1994, thus the estimates for these companies *underestimate* the total capital expenditure done by the companies after going public. Note that in the cases of Alphabet, Meta, and Nvidia, some values were available for years prior to the company going public. These numbers come from the earliest 10-K filing for each company, the year each company went public, which listed the data for the year of filing but also previous years.

Capital Spending Total Equivalent to Over 5 Trillion Euros

We began by examining research and development (R&D) expenses for each company. These are expenses the companies incurred historically to progress as industry leaders in innovation and technology. A European tech stack would require significant R&D investment to mirror what has been done historically by these American companies.

For the companies included in our sample, R&D typically consists of compensation expenses, office space for employees working on R&D projects, and investments in existing and new products and services. Alphabet⁴, Amazon⁵, Apple⁶, Meta⁷, and Nvidia⁸ note that increases in compensation expenses drove increases in R&D costs in their most recent filings.

4 Alphabet. (2023, December 31). *Form 10-K*. Accessed [here](#).

5 Amazon. (2023, December 31). *Form 10-K*. Accessed [here](#).

6 Apple. (2023, September 30). *Form 10-K*. Accessed [here](#).

7 Meta. (2023, December 31). *Form 10-K*. Accessed [here](#).

8 Nvidia. (2024, January 28). *Form 10-K*. Accessed [here](#).

Companies also make capital expenditures via property and equipment spending. Property and equipment investments typically include the technological infrastructure required to maintain operations. This includes infrastructure needed for data centers, servers and network equipment for computing, buildings, land, and fulfillment equipment. Alphabet⁹, Amazon¹⁰, Apple¹¹, Microsoft¹², Meta¹³, and Nvidia¹⁴ all describe these components of their property and equipment line items in their 10-K statements. Any European duplication of the tech stack of these companies would necessarily require similar expenditures.

In order to determine how much R&D and property and equipment spending the EU would need in order to replicate what has been spent historically in the U.S., we used historical data from 10-K filings. Since the EU would be spending this money in 2024, all historical dollar amounts were adjusted for inflation using the Bureau of Labor Statistics (BLS) CPI Inflation Calculator.¹⁵ These amounts were then converted to Euros using the European Central Bank's six month average exchange rate.¹⁶

The chart below shows the total estimated spending required to replicate U.S. spending on overall capital expenditures by these companies.

9 Alphabet. (2023, December 31). *Form 10-K*. Accessed [here](#).

10 Amazon. (2023, December 31). *Form 10-K*. Accessed [here](#).

11 Apple. (2023, September 30). *Form 10-K*. Accessed [here](#).

12 Microsoft. (2024, June 30). *Form 10-K*. Accessed [here](#).

13 Meta. (2023, December 31). *Form 10-K*. Accessed [here](#).

14 Nvidia. (2024, January 28). *Form 10-K*. Accessed [here](#).

15 U.S. Bureau of Labor Statistics. *CPI inflation calculator*. <https://data.bls.gov/cgi-bin/cpicalc.pl>

16 European Central Bank. (2024, October 30). https://www.ecb.europa.eu/stats/policy_and_exchange_rates/euro_reference_exchange_rates/html/eurofxref-graph-usd.en.html

Figure 1
Total Equivalent Research and Development Spending (Billions of Euros)

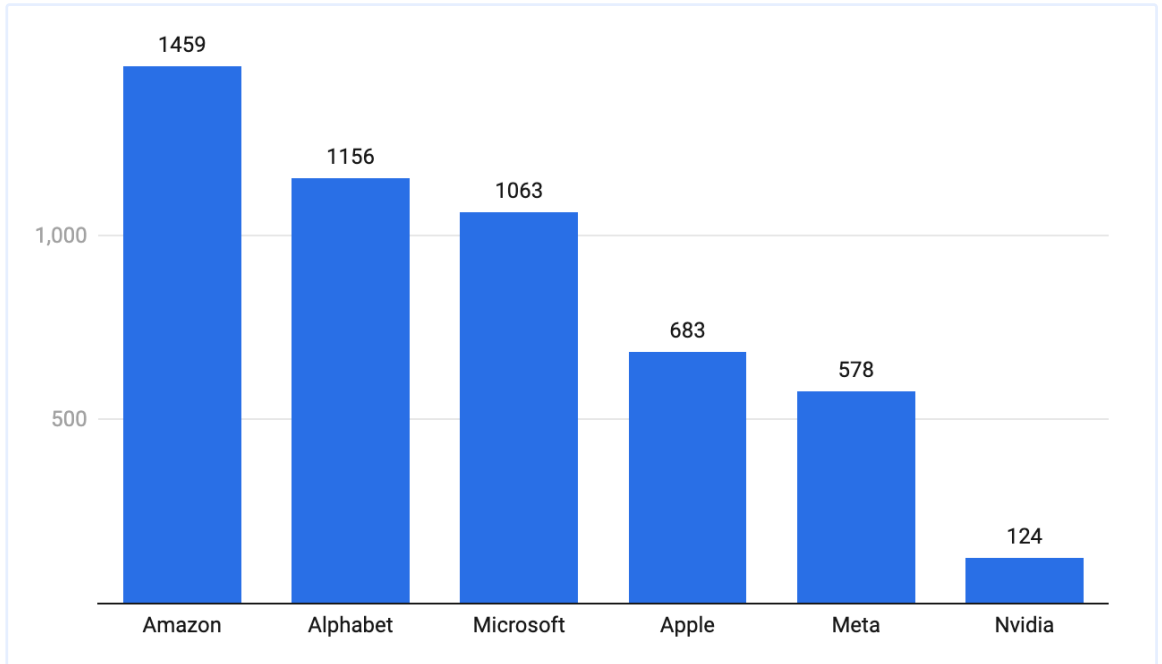


Chart: Kaitlyn Harger, Chamber of Progress - Source: 10-K Filing - Created with Datawrapper

Taken together, the estimates from Figure 1 total 5.063 trillion euros. Amazon has the largest amount of capital expenditures on research and development and property and equipment followed by Alphabet and Microsoft, all of whom spent the equivalent of over 1 trillion euros. Apple, Meta, and Nvidia spent the equivalent of less than 1 trillion euros in total but still had sizable amounts of investment in the billions.

R&D Spending Alone Equivalent to Over 1.6 Trillion Euros

The total historical R&D spending for these companies in U.S. dollars was almost \$1.8 trillion. Converting that to Euros, the total spending the EU would need to make to be equivalent to the spending in U.S. dollars by these companies is 1.6 trillion euros.

Figure 2 below shows the total R&D expenditures in billions of euros, by company, for the time period each company had available 10-K statements (see Table 1).

Figure 2
Total Equivalent Research and Development Spending (Billions of Euros)

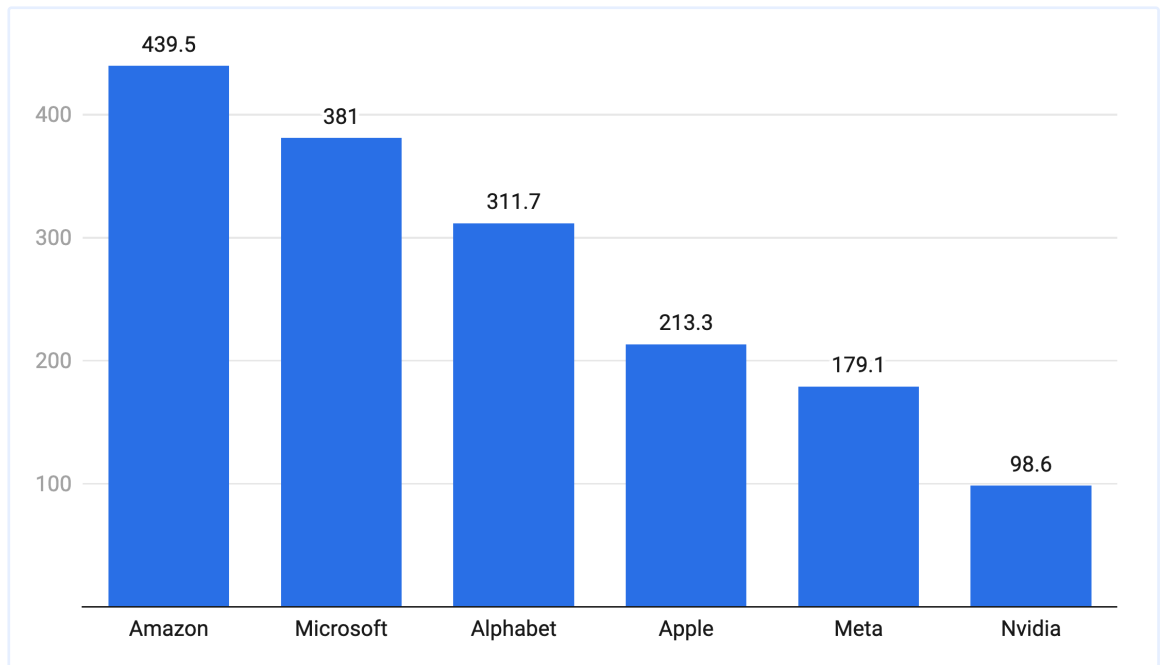


Chart: Kaitlyn Harger, Chamber of Progress - Source: 10-K Filing - Created with Datawrapper

Again, Amazon, Microsoft, and Alphabet were the largest spenders of R&D. Measured in U.S. dollars, all companies spent over 100 billion on R&D. In order to replicate that spending in Europe, the EU would need to spend a total of 1.6 trillion euros across each of these company types, solely on R&D.

Property and Equipment Spending Total Equivalent to Over 3.4 Trillion Euros

Total U.S. spending on Property and Equipment was roughly \$3.75 trillion dollars. Converting that to Euros yields a total of 3.44 trillion euros.

Figure 3 below shows the total equivalent spending for property and equipment by company.

Figure 3
Total Equivalent Property and Equipment Spending (Billions of Euros)

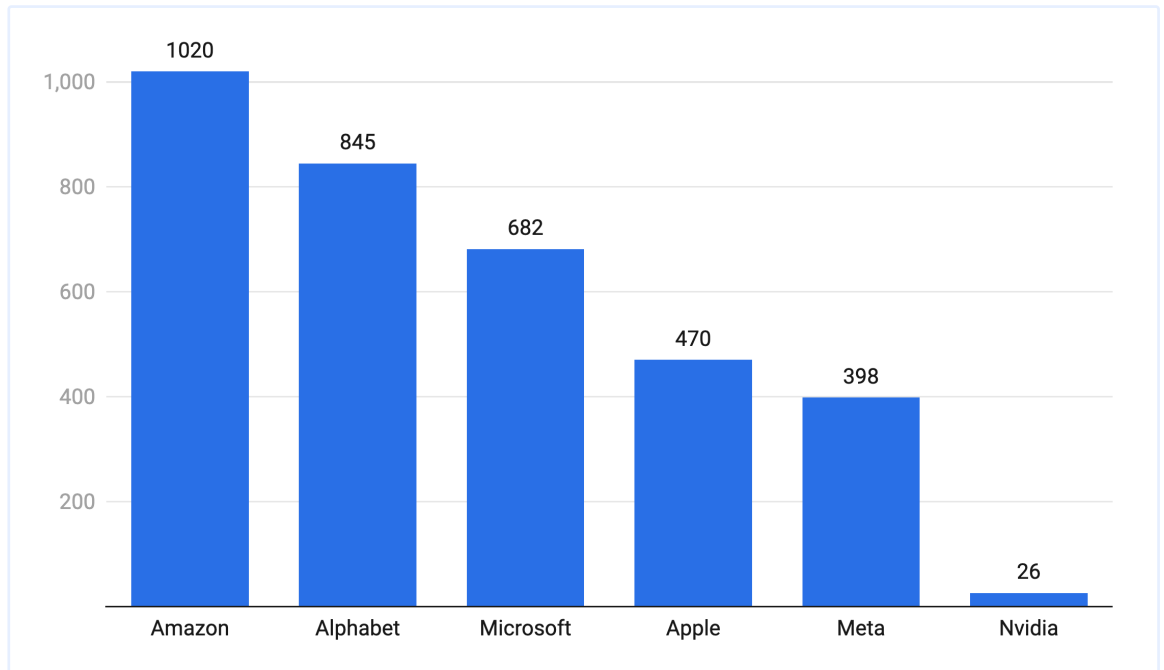


Chart: Kaitlyn Harger, Chamber of Progress • Source: 10-K Filing • Created with Datawrapper

Amazon spent the most on property and equipment, spending over \$1 trillion U.S. dollars. According to Amazon’s 10-K statement from 2023, Property includes buildings, land owned, lease arrangements, and finance lease arrangements.¹⁷ Equipment includes assets like servers, networking equipment, heavy equipment, and other fulfillment equipment.¹⁸

This would require European spending of 1.02 trillion euros to be equivalent. The EU would need to spend 845 billion euros to replicate Alphabet’s spending, 682 billion euros to replicate Microsoft’s spending, 470 billion euros to replicate Apple’s spending, 398 billion euros for replicating Meta’s spending, and 26 billion euros to replicate Nvidia’s spending.

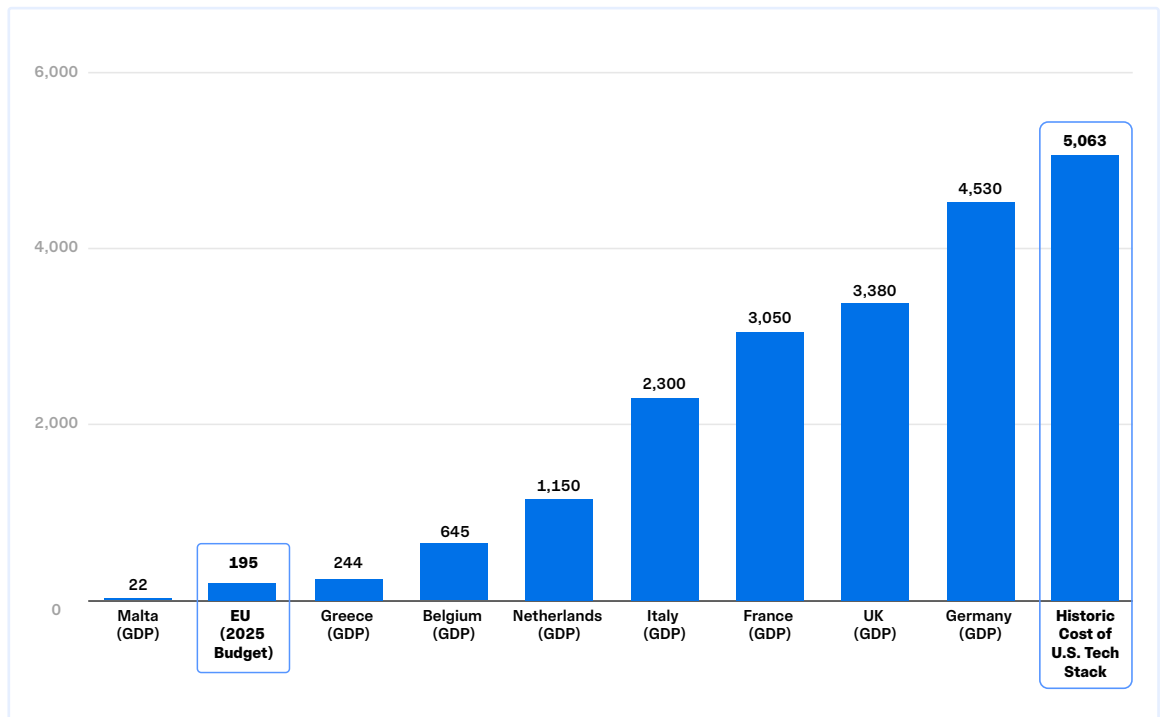
¹⁷ Amazon. (2023, December 31). *Form 10-K*. Accessed [here](#).

¹⁸ To some extent Amazon’s property and equipment spending would be related to its retail business, which Euro stack proponents may not deem as necessitating European duplication. If all of Amazon’s property and equipment spending were related to its retail business and none were duplicated as part of the Euro stack, the estimated cost of the Euro stack would still be 4.044 trillion euros.

Cost of European Tech Stack Larger Than GDPs and EU Budget

Next, we compared the 5.063 trillion euro cost of replicating historical U.S. spending on R&D and property and equipment to EU R&D spending, the EU budget, and the GDPs of some European countries. According to the European Commission, in 2022 Europe spent 2.27% of its GDP on research and development expenditures, a total of 363 billion euros.¹⁹ The cost of replicating the historical spend on the U.S. tech stack, including both R&D and property and equipment, would be almost 14 times what the EU spent on R&D in 2022. Figure 4 below shows a comparison of the magnitude of the projected cost of the European Tech Stack (assuming it is equal to the historic cost of the U.S. tech stack) compared to the other categories.

Figure 4
Projected Cost of European Tech Stack vs. EU Budget and National GDPs (Billions of Euros)



Source: GDPs from <https://data.worldbank.org/>, EU Budget from <https://www.consilium.europa.eu/en/infographics/2025-eu-budget/>

Note that the expenditure required would be higher than the GDPs of Malta, Greece, Belgium, the Netherlands, Italy, France, the United Kingdom, and Germany. The tech stack would also cost over 25 times the 2025 budget of the EU.²⁰ Overall, the cost of replicating U.S. spending on technological infrastructure by these companies is sizable.

¹⁹ *Statistics explained*. R&D expenditure - Statistics Explained. Available [here](#).

²⁰ EU Budget from <https://www.consilium.europa.eu/en/infographics/2025-eu-budget/>

Implications

The above data demonstrates the tremendous scale of the technological investments made by existing industry leaders, and provides a window into the cost implications of duplicating these assets. While one may choose to set-aside the philosophical questions underpinning the Eurostack proposal, the practical implications of such massive investments should not be ignored.

- 1. First, and most obvious, the financial cost is massive.** Even if significant portions of the investment can be duplicated today for far lower cost, Europe would need to massively increase R&D expenditures across the region. Doing so with public resources would impose an unprecedented new burden on taxpayers. It would also mean diverting resources from far more productive pursuits, like future technologies where European companies could still differentiate themselves and become market leaders.
- 2. Second, the human cost would be equally huge.** Leading U.S. tech companies employ hundreds of thousands of engineers for the development and maintenance of existing technology platforms. And yet many of the brightest technologists leave these companies to start new companies and solve new problems. Supporting European talent to focus on pioneering new technologies and solving global challenges would better position Europe as a leader in the next wave of innovation, rather than duplicating existing technologies that are competitively available.
- 3. Third, dedicating vital European resources to subsidise services for which there is no apparent demand, risks setting Europe even further behind.** In particular, several of the Eurostack supporters have demanded a number of conditions for “acceptable” Eurostack services (e.g. open-source, interoperable, data localisation),²¹ which in many instances would depart from market-based principles and market demand. If consumers aren’t demanding open-source search engines, interoperable social-media, or geo-fenced cloud-services, and the market hasn’t arrived at these solutions independently, one has to question whether forcing European businesses to supply these services will be sustainable without massive and continued public subsidy.
- 4. Finally, one has to also consider the extent to which this kind of approach has been tested and has failed in the past.** Europe has a history of ambitious, top-down industrial policies aimed at subsidizing rivals in strategic technologies, often with disappointing results. The Human Brain Project, intended to position Europe as a leader in artificial intelligence research, has failed to achieve its goals in part because of its over-centralized management and lack of practical breakthroughs. Similarly, Ariane, Europe’s heavily subsidized space launch program, struggles to

21 “Commit significant investment towards public digital infrastructure based on free and open source software and the digital commons.” The Balanced Economy Project, IT for Change and People vs. Big Tech, “Beyond Big Tech: A framework for building a new and fair digital economy” (September 2024), available [here](#); see also Francesca Bria “The Quest for European Technological Sovereignty: Building the EuroStack” (15 October 2024), available [here](#); The Foundation for European Progressive Studies (FEPS) “Time to build a European digital ecosystem” (December 2024), available [here](#).

remain competitive in the face of market-driven competitors like SpaceX. Gaia-X, Europe's attempt to build a "sovereign" cloud infrastructure, also faltered due to bureaucratic delays and limited market adoption. Quero, envisioned as a European alternative to Google Search, failed to gain traction entirely, highlighting the challenges of publicly funded solutions that lack competitive advantages.²² These examples illustrate the importance of refining Europe's approach to industrial policy, focusing on targeted support for new, high-potential technologies rather than replicating existing tools for which there is no unmet market demand.

Conclusion

As European policymakers consider the merits of the Eurostack proposal, in its various incarnations, they should closely consider the costs and practical implications of making such investments, particularly with public funds. Nevertheless, €5 trillion would be a small price to pay for Europe's digital sovereignty. But would replacing existing foreign technologies with European ones truly achieve that?

Foreign imports of goods and services provide massive benefits to European society. Where digital technologies carry the risk of harm, these risks are addressed with fine-tuned regulations, many of which are already in place.²³ So why do we need precious European resources to be spent to develop duplicate technologies? If the purpose is animated by a protectionist intent, or a vision of how market forces *should* operate, then European policymakers should be wide-eyed about the costs, and the long-term implications.

The truth is, we don't actually know what Europe's tech sovereignty will look like, the only thing we know for certain is that it will need to be ushered in by Europe's entrepreneurs and engineers. Grand visions like the Eurostack may offer an idealised plan for Europe's digital economy, but Europe's future tech-champions will likely not emerge from top-down government-led industrial programmes, as shown by past experiences. Rather than duplicating the tech of today, Europe's sovereignty and competitiveness will best be fueled by nurturing the tech of tomorrow - technology that reflects Europe's values and ingenuity, meets global challenges, and reshapes markets in ways we cannot yet fully imagine.

This future will not be built by centralized blueprints or state-driven replication efforts but by empowering Europe's entrepreneurs and creating an ecosystem where European companies can scale globally and lead in shaping tomorrow's technologies. To achieve this, policy making could better support the ingenuity and ambition of Europe's entrepreneurs, for example, by removing administrative friction, reducing regulatory complexity, and encouraging new innovations.

²² A less serious example would be the expenses related to the Global Gateway metaverse gala. Euronews "The EU threw a 'gala' launch party for its €387,000 metaverse - and just '6 people' showed up" (2 December 2022), available [here](#).

²³ Bruegel "A dataset on EU legislation for the digital world" (6 June 2024), available [here](#).

With the right focus, Europe can lead on emerging areas such as artificial intelligence, quantum computing, robotics, and sustainable technologies. This may prove more valuable for her sovereignty than duplicating what is already freely available. In the end, sovereignty in the digital age should not be about building walls or cutting ties; it should be about creating an environment where Europe's brightest minds can build the tools and solutions that the world will follow.

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Kaitlyn Harger, Ph.D., is Senior Economist at the Chamber of Progress. Her most recent work is focused on the impacts of technology policy and regulation on consumers and businesses. Prior to joining Chamber of Progress, Kaitlyn served as an Economist for Oregon's Legislative Branch, examining the impact of proposed legislation on tax revenue. She also spent time in academia as an Assistant Professor of Economics. Kaitlyn has over eleven years experience in policy evaluation and economic analysis. Her research focuses on applied microeconomics and she has seven publications in peer-reviewed journals.



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Kay has written numerous reports, papers, and articles on law and policy. He was nominated for the Concurrences Antitrust Writing Awards in 2022 and 2023. He speaks regularly at competition and digital conferences, and has lectured on competition law at several European universities.