Responsible and Strategic **Open Source Al Innovation** in Europe and Beyond





Roadmap

Responsible and Strategic Open Source Al Innovation in Europe and Beyond



Recommendations developed through a Stakeholder Roundtable.

Co-organized by the ETH Zurich Al Ethics and Policy Network and the Al Alliance.

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*Design inspired by the modernist principles of Massimo Vignelli and Bob Noorda

The Stakeholder Roundtable

On June 5, ETH Zurich's AI Ethics and Policy Network and the AI Alliance hosted a "Roundtable on Open Source AI". The event brought together more than 30 key stakeholders from the open source community, academia, industry and government to discuss the unique opportunities and challenges presented by open source AI. The event was held under Chatham House Rule; therefore, this report reflects key insights from the event's discussions without attribution to individual participants.

The Roundtable was both geographically and thematically grounded in Europe, taking place against the backdrop of the EU's landmark AI Act, shifting global geopolitical dynamics, and a growing emphasis on promoting interoperability and European ecosystem building to strengthen regional autonomy and reduce dependence on foreign digital technologies and infrastructure.

The central focus of the Roundtable was the strategic role open source AI could play for European developers, businesses, and public institutions. Guided by a set of core questions, participants discussed the impact of open source AI on innovation and competition, asking whether open models can meaningfully rival proprietary systems backed by vast resources and where they might hold distinct advantages. They also examined how open source AI could influence the governance of the broader AI ecosystem, including its potential to support more ethical, inclusive, and sustainable AI development. Finally, participants examined the key drivers, barriers, and trade-offs involved in advancing open source AI in Europe, considering how best to navigate tensions between transparency

and safety, openness and accountability, collaboration and control.

The Roundtable identified four priority areas for promoting responsible, strategic open source AI innovation: (a) establishing a foundational shared understanding of open source AI, (b) building a supportive ecosystem backbone. (c) driving informed regulation and agile governance, and (d) capitalizing on Europe's strategic strengths. These insights are examined in detail in the following sections alongside recommended actions. Taken together, they underscore that sustained, cross-sector collaborative efforts will be essential if Europe is to contribute to shaping the global AI landscape, realize the benefits open source AI offers, and ensure appropriate safeguards are in place.

While the actions described in this report are tailored toward the European context, they hold broader relevance, providing stakeholders in other settings with key insights and recommended actions that can be adapted to advance their own goals for fostering responsible, strategic, and sustainable open source AI.

Made Possible by

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Organizers

The AI Ethics and Policy Network is an initiative of ETH Zurich that connects leading experts to engage in global dialogue and efforts aimed at ensuring artificial intelligence is developed and used in an ethical, socially responsible, and well-governed manner.

The Al Alliance is a non-profit open research and development foundation supporting and building essential technologies for the beneficial and trusted application of Al across society and business, with particular focus on open data and model development and open source software to enable applications and agents bolstered by a broad community engagement, education and advocacy program.



Roundtable Introduction by Prof. Vayena and Dr. Ferretti, June 2025.

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Open Source Al

A Strategic Opportunity for Europe

Despite its increasing prominence in policy and industry discussions, the term "open source AI" remains poorly defined and often misunderstood. Different stakeholders continue to hold divergent views on what truly "qualifies" as open source AI, recognizing that it involves more than just sharing code. The core tension lies in how much of the code, the model weights, and the training data must be openly shared to legitimately consider a model open source. This ambiguity creates misunderstandings among practitioners, policymakers, and the public.

While much work has been done to define "open source AI" and delineate its boundaries, a clear consensus remains elusive. The Al Alliance suggests open source AI models should enable technically skilled users to understand, modify, use, and share models through varying degrees of publicly available access to training data, pre-trained weights, code, permissive licensing, and/or comprehensive documentation.² Researchers and practitioners increasingly agree, and Roundtable participants concurred, that openness in the AI innovation ecosystem exists along a spectrum, with legal, technical, and governance-related factors determining where a given model falls along that continuum.^{3,4} Understanding open source AI in this

way can enable stakeholders to leverage its practical relevance and strategic value without being unduly impeded by definitional debates.

Europe has been at the forefront of efforts to regulate and govern AI, but lags behind the US and China in key dimensions of AI innovation, including private investment, infrastructure, and large-scale commercialization, and remains heavily reliant on imported digital technologies. Its core infrastructure, particularly data and compute technologies, is largely controlled by a few US-based tech giants.

Against this backdrop, open source AI offers a strategic opportunity for European innovators and enterprises of all sizes to achieve progress without the substantial capital investments and prohibitive technical costs typically required to build proprietary models. It can lower barriers to entry and support the development of applications that reflect social needs, embody local values, and are inclusive and transparent. Building in the open accelerates innovation by enabling collective problem-solving, fosters co-creation and broad community involvement, decentralizes technological control, and makes it easier to customize tools to diverse contexts and specific local challenges.

Open source Al is critical for strengthening Europe's Al capabilities, fostering homegrown innovation, & democratizing governance of the models (...)

- Roundtable Participants, 2025

However, open source Al also presents distinct challenges that must be addressed to fully realize its potential. Public and private sector leaders often cite concerns around heightened risks, with open source models perceived as less secure and trustworthy compared to proprietary ones, due to differences in oversight, accountability, and quality control mechanisms. Another key concern is the viability and sustainability of open models, especially in Europe, as many initiatives lack access to large pools of capital, stable funding, and formal support structures. The introduction of DeepSeek demonstrated that breakthrough innovation does not always require enormous budgets. This disruptive development has intensified the AI race and offers Europe a renewed opportunity to capitalize on its strengths, thereby facilitating market-driven innovation and private-sector leadership.

Importantly, 'openness' alone does not inherently lead to more inclusive participation and equitable outcomes, especially in an environment increasingly defined by concentrated capital, infrastructural dominance and the strategic use of transparency to reinforce existing power structures.⁵ Realizing the potential of open source AI to promote a more equitable, thriving European innovation ecosystem requires wellaligned and coordinated governance systems, proactive investment, and policy environments designed to broaden access and ensure equitable benefits.

In this context of geopolitical instability and overreliance on hyperscale firms, Europe has both a practical and an ethical imperative to leverage the benefits of open source AI in pursuit of greater autonomy while enabling innovation responsive to regional values such as fundamental rights, privacy, and accountability. Open source is not merely a technical or ideological choice – for Europe, it is increasingly seen as a pragmatic and strategic approach. Participants overwhelmingly concluded that open source AI is critical for strengthening Europe's AI capabilities, fostering homegrown innovation, and democratizing governance of the models and data that will shape the "Al age".

To fully capitalize on the strategic potential of open source AI, Roundtable participants emphasized the priority areas and actions outlined in the following

- The Open Source Al Definition 1.0. (2025). Open Source Initiative. Retrieved March 25, 2025, from https://opensource.org/ai/open-source-
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Fully Open

Fully Closed

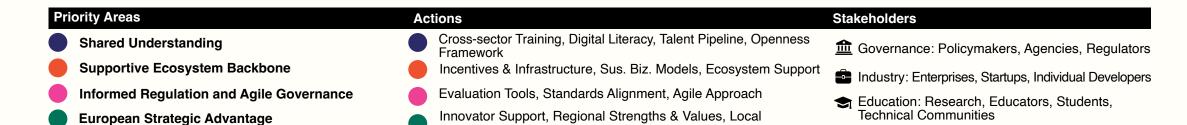
No access, modification, or use of any system components, including data, code, and documentation.

Unrestricted access, modification, and use of various system components. including data, code, and documentation.

Figure 1. Illustration of the spectrum of AI openness, ranging from fully closed to fully open source. It shows how different aspects of an AI model's development, such as its code and training data, can be shared to varying degrees.

Roadmap

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Shared

Understanding

Enhancing cross-sectoral literacy for open source Al

A solid shared foundational understanding is critical for enabling meaningful technical, policy, and ethics conversations about open source AI. This foundation rests on two pillars: knowledge and clear conceptual frameworks. Lack of foundational technical knowledge and solid digital literacy amongst regulators and politicians impedes the promotion of sustainable open source ecosystems and the drafting of informed regulation. These gaps also limit understanding of realistic security risks and undermine the ability to adapt governance frameworks as needed. Likewise, a lack of awareness within technical communities of policy and ethics concerns related to open source AI can undermine regulatory goals and lead to mismatched attempts to address challenges.

To inform current policymakers, develop common language with technologists, and build capacity in the long term, it is critical to enhance education and awareness regarding technical and governance aspects of AI, open source, and data. Practically, this will require a combination of immediate awareness-building initiatives and long-term capacity-building efforts. To realize the opportunities presented by open source AI now, decision makers must be able to understand at a fundamental level the technical, ethical, and policy opportunities and tradeoffs with which they are faced. Longer-term educational initiatives will help ensure future innovators, policymakers, and members of the public develop the necessary cross-sectoral competencies to empower continued open source AI leadership.

Roundtable participants noted that another critical aspect of establishing cross-sectoral shared understanding of open source AI is to map the

landscape and clarify the terminology used. This would support a unified vision of the open source AI environment, without necessitating alignment on a singular, possibly elusive, definition. Clarifying and mapping the open source AI landscape would support more consistent communication, policy alignment, and transparency across research, development, and deployment. This would equip stakeholders with the insights needed to appreciate the technological, policy, and business implications of choices to develop or utilize models falling at different points along the spectrum.



Stakeholder Roundtable Panel Discussion, June 2025



Actions

Implement cross-sector training

Implement training programs to build fundamental digital and Al fluency among policymakers, and raise awareness of ethical and policy issues among technical and business stakeholders through joint conferences, roundtables, and other similar forums.

Boost the talent pipeline

Foster cross-disciplinary educational initiatives in academia to impact the talent development pipeline.

Support digital literacy

Strengthen technical education and digital literacy requirements across primary and secondary education to build long-term capacity.

Develop openness framework

Integrate learnings from technical and non-technical communities to develop clear frameworks for categorization and reporting on openness (e.g., an ontology of openness), building on existing efforts such as the European Open Source Al Index.¹

Outcomes

- Policymakers with stronger technical fluency.
- Heightened awareness of ethics in technical communities.
- A future workforce with foundational skills to support responsible Al development.
- More robust baseline of digital competency across society.

- Consistent terminology to facilitate collaboration.
- Shared understanding across technical and non-technical communities.

 European Open Source Al Index. (2025). The Index. European Open Source Al Index. Retrieved October 11, 2025, from https://osai-index.eu/the-index?type=text&view=grid

Supportive

Ecosystem Backbone



To fully realize the benefits of open source AI, Europe must invest in the surrounding ecosystem, including compute infrastructure, data access, research, skills development, venture capital, and public-private collaboration. Roundtable participants emphasized anchoring this regional ecosystem in openness and interoperability, highlighting that open and interoperable innovation promotes autonomy and informed design, deployment, and governance decisions at individual, institutional, and regional levels. A supportive ecosystem is key to empowering lasting open innovation.

Building such an ecosystem to facilitate and support open source AI innovation requires coordinated efforts across sectors spanning the entire AI innovation lifecycle. This means not only developing infrastructure, but also ensuring developers have access to usable open data and that Europe can attract and retain the technical talent needed to drive sustained innovation. The EU's AI Factories initiative, which aims to provide local infrastructure-layer support for European SMEs and startups, is taking steps in this direction.

Economic incentives are also essential and could be integrated across the entire value chain through, for example, co-financed infrastructure, investment credits, and direct grants. A strategic, lasting shift in funding models, alongside the creation of national foundations and accelerators, can help anchor sustainable open source ecosystems and reduce the outflow of talent and capital.²

Beyond infrastructure and funding, a robust open source AI ecosystem requires directing innovation toward societal priorities and needs. This, in turn,

requires engagement with diverse stakeholders across the pipeline to ensure value alignment in developing, deploying, and using open source AI. Prioritizing the societal impact of innovation, through, for example, alternative sustainable revenue models, success metrics, or other approaches can help ensure the open source AI ecosystem is both successful and responsible. Innovative regulatory efforts, examined in greater depth below, are likewise essential. Effective governance of open source AI requires multidimensional ecosystem building that leverages regulation and incentives to create beneficial market conditions and sustain technical capacity while promoting high-level ethical and value alignment.



Actions

Establish incentives and infrastructure

Establish incentives for investment in and development of open innovation and enabling infrastructure as a public good, for example, by ensuring access to quality data through the use of Common European Data Spaces, described in the EU data strategy.³

Promote sustainable business models

Promote sustainable business models that encourage openness while ensuring economic viability, such as differentiated licensing models that enable open access for research purposes, but require controlled or paid access for commercial use.

Ensure ecosystem support

Ensure the full ecosystem is supported through sustained investment in infrastructure, quality resources, and impact-driven innovation, including measures such as tax credits and other incentives to encourage SMEs participation.

Outcomes

- Greater European digital sovereignty and autonomy.
- More interoperable and less fragmented Al development.
- Stronger cross-sector collaboration.
- Financially sustainable open source Al initiatives.
- Broader engagement of diverse stakeholders through hybrid licensing and funding.
- Strong innovation ecosystem aligned with societal priorities.
- Stable support for SMEs and startups through targeted incentives.
 - EuroHPC JU GB Decision 14.2025. Revision of the EuroHPC JU Access Policy (Amendment No 4). (2025). EuroHPC Joint Undertaking.
 - Brock, A. (2022). 'Business and Revenue Models and Commercial Agreements', in Amanda Brock (ed.), Open Source Law, Policy and Practice, 2nd edn (Oxford, 2022; online edn, Oxford Academic, 17 Nov. 2022), https://doi.org/10.1093/ oso/9780198862345.003.0016.
- 3. A European strategy for data. (2020). European 13

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Informed Regulation & Agile Governance

Tailoring regulation and governance for open source AI

Policy debates continue to unfold around how best to regulate AI, with open source AI requiring dedicated attention, as distinct regulatory levers come into play. Uncertainty remains about how open source AI fits into both existing and emerging legal frameworks. It is important to recognize that open source AI is not directly comparable with more traditional open source software. While the latter is guided by tenets of fully understandable, adaptable, and available source code, these principles do not translate neatly onto AI systems, for which massive amounts of training data and black box architecture may limit downstream developers' ability to fully understand or modify system behavior.^{1,2}

Today, stakeholders across sectors find it hard to operationalize open source AI due to a lack of clarity around risks and standards, and fragmentation in existing regulatory schemes. For example, the EU AI Act, which came into force in 2024, contains an exception for models released under free and open source licenses.³ However, the Act defines open source AI narrowly, meaning that even some models that are distributed under free and open source licenses may still fall within its scope. The implications of this restrictive definition mean that downstream developers relying on models touted as "open" may be subject to unanticipated and possibly prohibitive compliance burdens.

Open source AI may also face sector-specific hurdles, making one-size-fits-all regulatory approaches ineffective, especially when intervening early in the development pipeline. Current regulatory requirements applied at the model development stage often clash with the nature of open source AI; open source AI developers typically release models without maintaining

ongoing oversight into how they are used downstream. To address this, regulation should distinguish between different stages in the development pipeline. Broad and far-reaching regulatory compliance requirements could guide open source developers, while more detailed, sector-specific rules could apply to those who deploy these models to build real-world applications. Targeted, sector-specific rules may better reflect the actual risk profile of specific use cases and would therefore be more effective in achieving the regulatory goals within each field of application.

Beyond regulation, agile and multi-level governance mechanisms and tools are needed to help steward the development of values-driven, safe, and trustworthy open source Al. The Al governance tool landscape is vibrant and growing, including an expansive array of practical and procedural guidelines, audit frameworks, documentation templates, selfassessments, technical tools, etc., intended to support developers' and deployers' efforts toward ethical alignment and compliance. However, lack of external validation of such tools and barriers to their implementation in practice can obfuscate and hinder their effectiveness.4 Similarly, fair data principles and standards exist, but are not always upheld in practice. Strong, strategic international partnerships can drive alignment on standards and guidelines for security which will enable confident public and private sector adoption of open source Al. To ensure governance efforts are more robust, it is crucial to ensure approaches are agile and responsive to developing needs in the ecosystem.



Actions

Develop evaluation tools

Develop benchmarks and practical tools for evaluating open source AI, such as guidance on due diligence or use-case relevant risk mitigations through cross-sectoral and international collaboration, and ensure regulatory and governance developments inform them.

Promote standards alignment

Promote alignment between standards and industry practice through partnerships in the codevelopment of best practices for responsible open source AI.

Adopt an agile governance approach

Adopt an agile and responsive approach to the governance of open source AI fostering interdisciplinary and international consensus on standards and practical tools to aid governance implementation.

Outcomes

- Safer and more trustworthy open source Al.
- Clearer guidance for developers and deployers.
- Consistent understanding and implementation of best practices.
- Greater trust and adoption of open source Al.
- Flexible, future-proof governance.
- Strong international and interdisciplinary coordination.

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- 4. Kijewski, S., Ronchi, E., & Vayena, E. (2024). The rise of checkbox AI ethics: A review. AI and Ethics. https://doi.org/10.1007/s43681-024-00563-x

European

Strategic Advantage

Capitalize on Europe's strengths for open source Al

Europe is already taking important steps to support open source AI, and its innovation ecosystem offers a strong foundation for further progress. The region has unique strengths that can facilitate the development of distinctly competitive open source AI. Specifically, these include a multilingual environment, high degree of sectoral expertise, robust and collaborative research infrastructure, high-quality and accessible institutional datasets, and strong privacy protections. These factors make Europe uniquely well suited for robust academic, industry, and government partnerships that can increase capacity, enable cross-sectoral learning, and strengthen talent pipelines.

Europe can build upon these assets to overcome capacity and infrastructure hurdles by, for example, further leveraging research infrastructure to build networks that connect and combine compute clusters, maximizing collective capacity. Ongoing efforts such as the AI Factories initiative can be expanded, and public-private partnerships can also be leveraged to build sustainable, energy-efficient AI infrastructure, models, and applications. These initiatives also present an opportunity to embed European and democratic values not just into AI applications, but throughout the full AI lifecycle from development to deployment, use, and maintenance.

However, as Roundtable participants highlighted, there is a risk that certain factors that enable open source Al innovation may disproportionately benefit larger companies with more resources at their disposal, potentially undermining the competitiveness of smaller companies and SMEs. To enable a thriving, more

competitive innovation ecosystem, it is crucial to create the conditions for companies of all sizes to benefit from Europe's strategic strengths. For example, making open data useful and equitably accessible to open source innovators of all sizes remains a practical governance challenge. Innovative business models such as a tiered access approach to data with different requirements for research, public, and private sector actors, along with incentives at the data producer level for curating usable open datasets could help address this.

Open source AI also offers a strategic opportunity for Europe to strengthen European digital sovereignty by increasing regional technical resilience and local control over models and data. While open source AI relies on collaboration and shared infrastructure, the technical capacity of the European ecosystem could be enhanced by promoting links between the research and industry sectors and increasing development of accelerators and model adaptation centers. These efforts would highlight the competitive strengths of Europe's open source AI ecosystem while supporting values-aligned local development and enabling greater self-reliance.



Actions

Support local and regional innovators

Consider supporting local and regional open source Al alternatives through government procurement efforts and public funding schemes.

Capitalize on regional strengths & values

Promote the development of applications that capitalize on and highlight Europe's competitive strengths and reflect regional needs and values, leveraging multilingual capabilities and sectoral expertise.

Focus on local procurement

Create opportunities for smaller innovators to flourish by leveraging community-based partnerships focused on highlighting European differentiators and addressing gaps in capacity, particularly for smaller innovators.

Outcomes

Stronger European innovation capacity and digital autonomy.

Al solutions that reflect European values, multilingual capabilities, and sectoral expertise.

Greater alignment between Al innovation and regional societal needs.

More equitable participation of SMEs and smaller innovators in the Al ecosystem.



Looking Ahead

A Strategic Opportunity for Europe

A vision for responsible and strategic open source Al innovation depends on building strong, well-resourced collaborative networks and infrastructure.

The priorities that emerged from the Roundtable indicate that seizing the strategic opportunities of open source AI and building a thriving, competitive ecosystem in Europe will require coordinated, cross-sectoral effort. A recent report by the Linux Foundation confirms this view, finding that a strong majority of European stakeholders see open source software, open data, and open standards as vital for advancing sovereign AI efforts. This alignment suggests the need and readiness for concrete actions by stakeholders across policy, industry, academia, and civil society to achieve these outcomes.

Key recurring themes framed the discussions at the Roundtable. These included enhancing cross-cutting technical understanding and digital literacy through education, promoting full-lifecycle innovation that targets societal impact, developing multi-stakeholder partnerships to foster collaboration, learning, and alignment, and strengthening European digital autonomy. These themes illustrate a vision for responsible and strategic open source Al innovation that depends on building strong, well-resourced collaborative networks and infrastructure. Achieving this requires sustained investment, shared responsibility,

and a commitment to openness – not just as a technical choice, but as a strategic path toward responsible and sustainable innovation.

 Osborne, C. & Lawson, A. (2025). "Open Source as Europe's Strategic Advantage: Trends, Barriers, and Priorities for the European Open Source Community amid Regulatory and Geopolitical Shifts", The Linux Foundation.

Glossary of Terms

Ecosystem Backbone

Infrastructure, talent, funding, and collaborations supporting

Agile Covernance

Flexible, adaptive regulation and oversight that responds to emerging AI risks.

SME (Small and Medium-sized Enterprise)

Smaller companies needing tailored support to compete in Al innovation.

Tiered Access / Differentiated Licensing

Controlled access models for AI or data, balancing openness and commercial use.

Cross-sector Collaboration

Joint efforts between academia, industry, government, and civil society to advance AI innovation.

