Position Paper

Numeum contribution to the European Commission Call for Evidence on Open Digital Ecosystems

Executive summary

The European Commission aims to boost European technological sovereignty by leveraging open-source technologies. Building on its 2020–2023 Open Source Software Strategy, the Commission plans to strengthen support for open digital ecosystems through a new strategic approach. While Europe benefits from a strong and mature open-source ecosystem, it still lacks a comprehensive industrial policy to support the development and adoption of open-source technologies across governments and *companies*.

The potential of open-source to boost competitiveness and reduce dependencies is widely recognised. Leveraging open-source technologies therefore appears to be a key asset for the EU's global digital and innovation strategy.

Numeum represents 2,500 digital companies in France, from start-ups and SMEs to large industrial and services groups. Many of our members in the service and the software industry are open-source players. Their input is highly valuable in identifying key barriers and developing strategic recommendations supporting open-source development and adoption across Europe.

Numeum welcomes the Commission's initiative and recognises the importance of setting a new open-source strategy. Numeum stands ready to support European institutions in further discussions and in contributing to the development of this strategy.

Our Contribution

1) Strengths and weaknesses of the EU open-source sector

The European Union benefits from a strong and mature open-source ecosystem, with 18.5 million contributors representing 15.4% of the global total[1]. In terms of adoption, open-source components are part of all technological frameworks, and open-source technologies are used by almost all organisations: in France, nine out of ten public organisations and eight out of ten private companies rely on open-source technologies[2]. The total estimated value of publicly available open-source code is €8.8 trillion[3], generating between €65 and €95 billion annually for EU GDP. A 10% increase in contributions could generate up to €100 billion in additional economic growth[4].

Despite these strengths, the European open-source ecosystem faces structural weaknesses that threaten its long-term sustainability.

(i) Key barriers to adoption, maintenance and secure use

Limited visibility and understanding.

- Many companies and public administrations still lack a clear understanding of open-source solutions, their governance models, and the role of integrators and service providers. This knowledge gap often leads decision-makers to favour well-known proprietary solutions, even when open-source alternatives are technically and economically superior.

Insufficient long-term funding for open-source components.

- Although open-source is widely used and delivers significant economic value, it remains under-recognised as a strategic asset among public and private actors, often leading to underinvestment and insufficient support.

Contribution limited to a small number of actors

- While public and private organisations are major consumers of open-source software, only a limited number actively contribute to its development. As a

[1] The Value of Open-source Software, Harvard Business School (2024)
[2] Open-source Monitor France, Markess-CNLL-Numeum-Systematic Report (2023)
[3] The Value of Open-source Software, Harvard Business School (2024)
[4] Study about the impact of open-source software and hardware on technological independence, competitiveness and innovation in the EU economy, European Commission (2021)

result, many critical components depend on a small group of maintainers, creating risks related to sustainability, security, and long-term resilience. Consuming open-source without contributing back is unsustainable in the long term, creates structural dependencies and limits Europe's ability to influence project roadmaps that are critical to its digital infrastructure.

(ii) Barriers to sustainable contributions

Lack of effective public policies and incentives

- Open-source contributions should be considered a strategic investment. European public administrations and companies should actively contribute to the open-source projects that are critical to their technical infrastructure.

Insufficient integration of open-source in education and training

- Open-source is still inadequately covered in computer science and engineering curricula. As a result, skill levels are uneven, and many graduates lack the practical knowledge required to work on or contribute to open-source infrastructures such as Linux or core middleware components.

Regulatory uncertainty.

- Certain regulatory frameworks, particularly those related to liability, are not well adapted to the collaborative and decentralised nature of open-source development. This uncertainty can discourage voluntary contributions, especially when code is co-developed and redistributed by diverse actors without traditional contractual relationships.

2) Added value of open source for the public and private sectors

Open-source refers to a legal framework for software development based on access to source code and licensing schemes that allow any holder of a copy of the software the rights to use, modify, and redistribute the work. Open-source is generally associated with an open, collaborative, and decentralized development model. Open-source delivers significant added value across multiple dimensions:

Cost efficiency, competition and reduced lock-in:

- Open-source mitigates dependency on single vendors and reduces lock-in risks. By enabling portability and interoperability, it strengthens competition among suppliers, lowers switching costs, and protects organisations from unilateral pricing or contractual changes.

Security, transparency and trust:

- The open and auditable nature of open-source code enables thorough security assessments, including by cybersecurity authorities when required.
    - For example: transparency regarding code, contributors and development processes enhances trust and facilitates compliance with cybersecurity and regulatory frameworks (e.g. the use of SBOMs for CRA compliance).

Innovation and agility

- Open-source accelerates innovation by enabling the reuse of existing components, the mutualisation of development efforts and rapid experimentation. Organisations can focus their resources on high value-added use cases rather than rebuilding foundational technologies.
    - For example: in AI, open-source models enable fine-tuning, reuse and adaptation to specific cultural, linguistic or sectoral contexts without retraining models from scratch. Thus, open-source is also a way to favour frugal innovation using frameworks and models that have already been developed or trained.
    - For example: in the automotive sector, particularly in Software-Defined Vehicles, open-source components enable manufacturers to build shared, non-differentiating layers, while focusing their resources on high value-added services.

Accessibility

- Open-source solutions often include accessibility features developed by contributors or enable their development. As such, open source is an essential resource for people with specific accessibility needs.
    - For example: LibreOffice offers several APIs, such as the Java Accessibility API (JAA) and the UNO Accessibility API (UAA) delivering accessibility features.

3) Concrete EU-level measures to support the open-source ecosystem

A coherent and ambitious EU strategy is required to fully leverage open-source for technological sovereignty and cybersecurity.

Establish a European industrial policy for open-source

- Recognise open-source as a strategic industrial asset for Europe's technological competitiveness and strategic autonomy.

- Shift from a consumption-based approach to a contribution-based strategy, in which public funding and procurement actively support upstream contributions.

- Preserve a global support for open-source without restricting policies based on geographical location, ensuring Europe benefits from the €8.8 trillion global value of open-source rather than creating silos.
    - True strategic autonomy is defined by digital agency i.e., the right to inspect, modify and exit rather than the geographic origin of the code.

- Establish coordinated and structured interactions with the leading global open-source foundations and organisations hosting open-source projects.

- Harmonise the Single Market for open-source services by removing cross-border administrative friction so that European SMEs can scale service-based business models across all 27 Member States.
    - It involves improving public sector understanding of open-source governance and intellectual property models as well as promoting international recognition of open-source standards and certifications (e.g., Common Criteria).

Support communities in maintaining critical components

- Identify and support critical open-source components used in European public and private infrastructures.

- Provide long-term funding mechanisms to ensure continuous contribution, maintenance, security updates and effective governance.

- Build on and scale existing initiatives aimed at auditing and securing open-source software used by public institutions.
    - European and national cybersecurity agencies should collaborate with the open-source ecosystem to audit and secure core open-source components. France has been leading the way with ANSSI closely working with some open-source providers.

Incentivise contributions by administrations and companies

- Support and invest in the creation of OSPOs (Open-source Program Offices[5]) in public administrations and large industries to structure open-source governance, strengthen contributions and maximize long-term strategic value.

- Enable and encourage public servants to contribute to open-source communities as part of their professional activities.

- Introduce fiscal incentives for private companies contributing to open-source projects.

- Develop clear governance and coordination structures at EU level, involving research institutions, administrations and industry.

Leverage public data and research

- Reinforce open data policies specifically for sectorial and theme-specific datasets.
    - Public research acts as a key factor in constituting niche datasets that are high value for companies (these datasets are notably useful in the field of AI). Support to public research in this area should be increased.

Education and skills

- Make open source a core component of computer science and engineering curricula in public education.

- Support continuous professional training on open-source development, security and community governance.

- Promote awareness-raising and trainings on open-source for non-technical profiles (e.g. lawyers that have to understand open-source licence)

Regulatory and standardisation alignment

- Ensure that EU regulations (cybersecurity, AI, liability) take into account the specificities of open-source in order to avoid discouraging voluntary contributions.
    - For example, the Cyber Resilience Act (CRA) still fails to adequately address the specific characteristics of open source. Although liability applies only to open-source products provided through commercial

[5] An Open-source Program Office (OSPO) is a dedicated internal unit within an organisation (public or private) that coordinates, governs and scales open-source activities.

activities, this distinction does not reflect well the realities of open-source development and distribution i.e. could donations exceeding development costs be considered a commercial activity? Moreover, the CRA, initially designed for physical products, struggles to apply to open-source digital good: does each copy of a piece of software constitute a distinct product placed on the market, or does a "child" copy inherit the market placement date of the "master" copy?

- Promote open-source solutions as reference implementations for European standards and interoperability frameworks.

- Favour the integration of open-source experts and open-source foundations into standardisation bodies such as CEN-CENELEC and ETSI to ensure that European standards are compatible with open-source licences and principles.

Public Procurement

- Promote open-source in public procurement especially for critical infrastructure in order to reduce dependencies and favour the development of European open-source suppliers.

- Clarify open-source software warranties in public procurement by proposing a Shared Responsibility framework: product warranties are not compatible with community-provided open-source code and create a structural barrier to its adoption in public procurement. However, maintenance and support services (SLAs) can be provided by companies with a dedicated contract.

4) Priority technology areas

Open-source should be supported across all technology domains due to the benefits it can bring to the European digital and innovation ecosystem. However, two areas require particular attention.

Artificial Intelligence: open-source AI is essential to foster innovation, competitiveness and reduce dependencies.

- Priority should be given to supporting the development of open-source AI: this includes open-source datasets for training models, open-source models, training and inference and software.
- Moreover, open-source AI favours auditability which is essential for ensuring trusted adoption in critical infrastructure.

Cloud and edge computing: support open-source cloud and edge infrastructure is essential to reduce Europe digital dependencies.

- Europe needs an open-source stack including virtualisation, operating systems and orchestration, to manage massive edge-to-cloud data safely and independently.

5) Sectors with the highest potential impact

Open source, generally speaking, leads to increased competitiveness and cyber resilience. Its adoption should therefore benefit all sectors. However, four sectors could benefit the most under the framework of the next strategy.

Public sector

- Public institutions benefit from using open-source solutions that reduce dependency. Moreover, the public sector can lead by example, using public procurement to encourage the broad adoption of open-source solution and helping the business-development of open-source actors.

Critical infrastructures

- Open source is crucial for reducing dependencies and ensuring transparency, thereby enhancing global security and resilience.

SMEs and startups

- Open-source lowers barriers to entry, reduces development costs, and accelerates innovation.

Mobility and automotive

- The transition to Software-Defined Vehicles requires massive amounts of code. Sharing non-differentiating open-source software stacks accelerate innovation and reduces costs for European manufacturers facing global competition.