THE LINUX FOUNDATION | Research

THE LINUX FOUNDATION | Europe

Canonical

World of Open Source

Open Source as Europe's Strategic Advantage

Trends, Barriers, and Priorities for the European Open Source Community amid Regulatory and Geopolitical Shifts

Cailean Osborne, PhD, The Linux Foundation
Adrienn Lawson, The Linux Foundation

Foreword by
Cédric Gégout, *Canonical*

August 2025

Open Source as Europe's Strategic Advantage

42% of organisations actively contribute to the OSS projects they depend on, while 30% use OSS but do not contribute back.

34% of European organisations maintain formal OSS strategies and only 22% have established OSPOs, compared to 37% and 28% respectively in the global sample.

28% of organisations employ full-time OSS contributors to the projects they depend on, and 81% of those organisations see high value in such investments.

The strategic value of OSS at the C-suite level is not yet sufficiently clear, with fewer executives (62%) recognising its value than other employees (86%).

Innovation, standards, and interoperability are recognised as the key benefits of open source for European industries.

69% of respondents believe their organisation's engagement with **OSS makes their organisation more competitive.**

Open source is critical to digital sovereignty, providing greater control and agency over European technology stacks.

A lesson of the EU CRA and AI Act is the **need for the OSS community to proactively engage with policy issues** that impact open source.

62% of respondents report **low familiarity with the Cyber Resilience Act,** highlighting significant gaps in regulatory awareness and readiness.

Guidance and certifications are key to educating developers and business leaders about how to prepare for new regulations like the CRA and AI Act.

Experts are calling for the creation of an **EU-level Sovereign Tech Agency** that would fund the maintenance of critical OSS, building on the German agency.

38% of respondents **prioritise investment in OSS for AI and machine learning** to support and scale Europe's vibrant open source AI ecosystem.

Contents

Foreword

As with every year, the 2025 World of Open Source research demonstrates how prevalent and vital open source software is. It's something I've witnessed personally: 20 years ago, contracts would routinely forbid use of open source tools or packages in projects. For the most part, open source was regarded as a threat to profits, safety, and IP. Today, open source is a strategic imperative, and for plenty of reasons.

First, the past has demonstrated that innovation happens best in open communities rather than behind closed doors. The innovation and transparency of open source have elevated it to a position not just of open competition with proprietary software, but to one of adoption: today, most modern code bases (even proprietary ones) contain open source software components. From large enterprises to entire governments, open source software is everywhere.

The data within this report speaks volumes. 86% of respondents agree that open source software is valuable to the future of their respective industries. This isn't just a casual endorsement; it's a recognition of the fundamental role open source plays in fostering growth and modernization across diverse sectors. Furthermore, 75% of respondents believe that open source approaches to software development lead to higher code quality — a finding that underscores the tangible benefits of open collaboration and transparency in software creation. This is challenging outdated notions, and it is a major shift in our industry. We are seeing a growing interest in digital sovereignty, particularly in Europe, where the events of the last few years are making everyone ask the inevitable question: what happens when an overseas server goes down, or a proprietary app suddenly shuts out entire countries on a geopolitical whim? That lack of certainty is driving governments everywhere to find self-reliant solutions that put the steering wheel back in their hands.

20 years ago, this was impossible — too expensive and too complex to manage. The idea of building everything from a large library of open source software would have been unthinkable for governments and large organizations. Open source became more mature, more organized, and it has changed those perspectives: it's not just more innovative; it's richer, governed, more transparent, more adaptive, more compatible, and provides a greater degree of control. Each of these points would warrant a full explanation, but the reality is that Canonical, like some other key players, stepped up, and invested time, people, and resources to help open source communities grow and build enterprise-grade software foundations.

As the report demonstrates, some 52% of respondents believe there should be even further investment in open source across their geographic region for government adoption. Moreover, a significant majority of individual

respondents identify governments as the sector that stands to benefit most from open source. Clearly, the demand for open source is more than a top-down mandate from governments.

We at Canonical have seen this firsthand through our work with organizations like UNICC, helping them build a sovereign cloud, and the European Space Agency (ESA), where the adoption of open source technologies is enabling scalability. The ESA is pushing to significantly expand the number of space missions by 2030 — automated deployments of mission-critical applications and infrastructure make it possible to get these extra rockets into space.

Yet, where there is widespread adoption, particularly at the government level, there often follows market regulation. While open source may be familiar territory to the vast majority of developers, for a public and public sector accustomed to the convenience of pre-packaged proprietary tools, it represents an entirely new paradigm. This newness necessitates certainty and reassurance. The role of new regulation, like the EU Cyber Resilience Act (CRA), becomes crucial in establishing frameworks that foster trust and provide clarity within the open source ecosystem: companies want to know it's maintained and by whom; customers want to know it's safe to use and actively monitored for emerging cyber threats. This creates new pressures in open source communities: to create software that not only works, but which works, to enterprise-grade-SLA standards, for years to come. At Canonical, we're addressing the growing demand for long-term security maintenance and **trusted software supply chains** with Ubuntu Pro.

Yet, cybersecurity and regulatory pressures continue to grow. Open source remains a mosaic of projects, many maintained by passionate developers with precious skills. When asked which certifications or security assurances would make them more likely to adopt or trust an OSS solution, a majority of respondents indicated they weren't sure. This highlights a clear need for continued investment from companies like Canonical, along with stronger standardization and clearer communication on open source security best practices.

As the data in this report confirms, open source continues to grow. The near universal interest in AI and the burgeoning desire for digital sovereignty are strengthening this shift. While security and reliability remain front of mind for users and organizations, the need for robust long-term support and expert guidance remains critical. This is at the heart of what we do at Canonical. Our mission is to provide stability, security and supportability to further cement open source's role as the foundation of our digital future.

By Cédric Gégout, *VP Product Management at Canonical*

Executive summary

This report spotlights emerging trends and priorities in the European open source software (OSS) ecosystem, drawing on a quantitative survey and 14 qualitative interviews with experts from private companies, government agencies, and non-profit organisations. The findings reveal an ecosystem in transition, where OSS adoption is widespread yet organisational open source maturity varies significantly, and where shifting geopolitical realities have elevated OSS from a technical consideration to a strategic imperative for digital sovereignty and strategic autonomy.

From adoption to strategic advantage: The open source maturity journey of European organisations

European organisations demonstrate widespread adoption of OSS; for example, 64% use it for operating systems and 55% for cloud technologies. However, beneath this surface-level adoption lies a spectrum of organisational open source maturity. While 56% of respondents recognise that the benefits of OSS exceed the costs, only 34% maintain OSS strategies and 22% have established Open Source Programme Offices (OSPOs). The findings also suggest that the strategic value of OSS at the C-suite level is not yet sufficiently clear, with fewer C-suite executives (62%) recognising its value to their organisations than other employees. In turn, this indicates an opportunity to better articulate the business case for open source in corporate strategy.

Commercial investment lags behind strategic value recognition

While European companies widely recognise several benefits of OSS, including for increasing productivity, reducing vendor lock-in, and lowering the cost of software ownership, a minority invest in sustaining the OSS projects they depend upon. For example, only 28% of companies employ full-time open source maintainers or contributors. However, 81% of those that do report seeing "very high" or "high" value from this approach. This contrast highlights untapped potential for commercial investment in OSS, from employing developers who contribute to upstream OSS projects to funding their dependencies via tools like GitHub Sponsors or thanks.dev.

Industry pioneers lead collaborative transformation

Not only do 42% of European organisations actively contribute to the OSS projects they depend on, but companies from a number of sectors and industries, including telecommunications, energy, automotive, finance, and logistics, are proactively collaborating on the development of OSS, open standards, open data, and increasingly open artificial intelligence (AI) models. These companies recognise collaboration on open technologies not only as a cost-reduction strategy but also as a catalyst for innovation, interoperability, and standardisation within their industries.

Open source as a strategic lever for digital sovereignty

The changing geopolitical landscape has fundamentally reshaped how European governments view OSS, elevating it from a technical consideration to a strategic lever for digital sovereignty. However, there are concerns that European policies and strategies that seek to strengthen sovereignty risk fragmenting the global OSS ecosystem and hindering OSS collaborations. Germany's Sovereign Tech Agency (STA) offers a promising model for reconciling this tension by funding the maintenance of critical OSS projects — an approach that serves both German government interests in ensuring the open digital infrastructure it relies on is maintained and secure, as well as global users of the funded OSS projects. Building on this success, experts are now calling for similar agencies to be established in other countries and at the EU level.

Security and the CRA take centre stage

The EU's Cyber Resilience Act (CRA) has catalysed a fundamental shift in how the OSS ecosystem approaches security, putting software supply chain transparency and accountability at the forefront of developers and decision-makers alike. However, with only 62% of survey respondents in our recent CRA awareness study reporting familiarity with the CRA, it is an urgent priority to raise awareness of the changing regulatory environment and prepare OSS developers and manufacturers for compliance. Towards this end, OSS projects and working groups are already proactively building tools, guidance, and certifications.

The open source AI opportunity for Europe

The growth of open source AI, marked in particular by the proliferation of open models that are rapidly catching up with the performance of proprietary alternatives, has catalysed both business and policy interest in open source AI as an opportunity to elevate European competitiveness in AI. Europe already boasts a vibrant open source AI research and startup ecosystem, and is well positioned to lead in developing AI technologies that reflect European values and priorities. While Europe boasts a substantial talent pool, however, experts highlight that Europe lacks the ambition and investment needed to support and scale up emerging open source AI startups.

Open source investment priorities in Europe

Looking ahead, survey respondents identify building open source alternatives to technology monopolies (55%), accelerating government adoption of OSS (52%), and investing in digital public goods (31%) as top priorities for Europe. In addition, the priority domains that should be invested in are operating systems (43%), AI and machine learning (38%), and cybersecurity (34%). In terms of priority investments within their organisations, most respondents would like to see their organisations invest more in sponsoring the OSS projects they depend on (45%), increasing upstream collaboration and contributions (37%), and the provision of training for developers (37%). Overall, these priorities reflect that the European ecosystem is eager to move beyond passive OSS consumption towards proactive engagement and investment in OSS in order to promote regional innovation, economic growth, and digital sovereignty.

Introduction

This report examines emerging trends and priorities in the European OSS ecosystem through a quantitative survey and qualitative interviews with experts from the private, public, and non-profit sectors. It finds widespread OSS adoption, yet a spectrum of open source maturity among European organisations. The evidence indicates that while most organisations recognise the benefits of OSS, a minority maintain formal OSS strategies, have established an OSPO, or employ contributors to the OSS projects they depend on. That being said, companies in a handful of sectors and industries like telecommunications, energy, and financial services are strategically collaborating on OSS, open standards, open data, and increasingly open AI models. Meanwhile, due to geopolitical shifts, OSS is increasingly recognised as a strategic lever for digital sovereignty, and policy interventions like Germany's STA and Switzerland's open source mandates for public bodies are ones that other governments could follow. In addition, the EU's CRA stablishes requirements for strengthening software security, including OSS, but OSS developers still have limited familiarity with the CRA, underscoring the urgent need for targeted education and awareness initiatives to ensure compliance readiness. Open source AI has also captured the attention of policymakers and business leaders, offering an avenue to strengthen European competitiveness in AI as well as to build AI technologies that are aligned with European values. However, investment in open source AI in Europe remains limited compared to other regions. The report concludes by outlining investment priorities for the European OSS ecosystem.

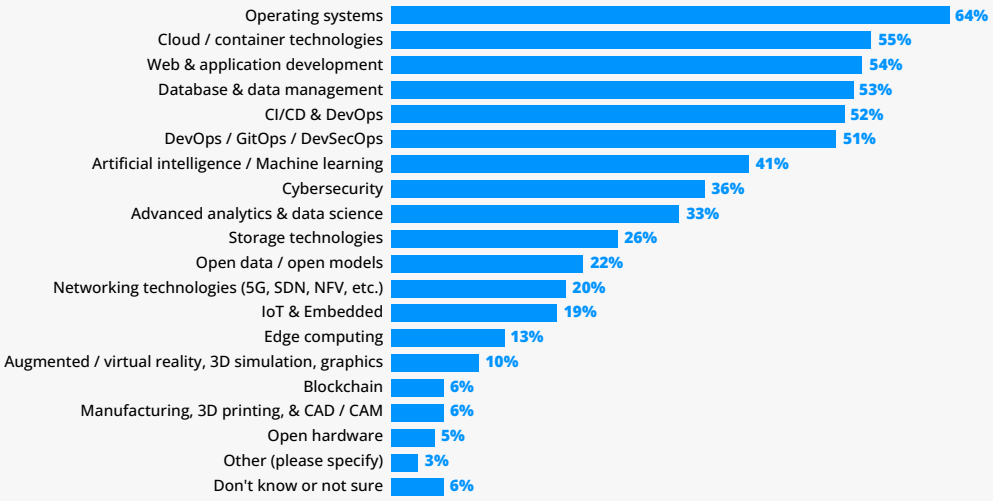
Open source trends among European organisations

The 316 European participants in this study represent a diverse cross-section of organisations across the continent. The survey captured responses from organisations ranging from micro-enterprises with fewer than 10 employees to large corporations exceeding 20,000 staff members. The sample includes IT product and service providers (39%), industry-specific end-user organizations (42%), and academic, non-profit, or governmental entities (19%). Respondents predominantly held IT-related positions (66%) and worked across various sectors, with cross-industry IT vendors representing the largest single group (29%). For detailed methodological information and demographic charts, please refer to the Methodology section.

FIGURE 1

In which of the following areas does your organization use OSS?

SELECT ALL THAT APPLY | 2025 World of Open Source Survey, Q27, Sample Size = 316, Total Mentions = 1,819



Significant OSS adoption among European organisations

OSS is used widely by organisations in Europe. As Figure 1 shows, the three areas where OSS is used the most are operating systems (64%), cloud and container technologies (55%), and web and application development (54%). OSS is also widely used for AI and machine learning (41%), data science and advanced analytics (33%), and cybersecurity (36%).

Growing awareness of the benefits of open source

Awareness of the benefits of OSS is high. As Figure 2 shows, 56% of survey respondents say their organisation's view of OSS is that the benefits either exceed or greatly exceed the costs. The most frequent benefits that organisations experience thanks to their use of OSS are higher productivity (63%), reduced vendor lock-in (62%), and lower cost of software ownership (58%), as Figure 3 shows. In addition, 75% of respondents believe that OSS development leads to higher quality software and 69% believe their organisation's engagement with OSS makes their organisation more competitive, as shown in Tables A1-A2 in the Appendix.

Looking to the future, 58% of survey respondents identified innovation as the area of their industry that would benefit most from OSS investment, demonstrating that organisations view OSS not merely as a means to cut costs but as a catalyst for innovation (Figure 4). In second place, 54% believe OSS investment would most benefit industry standards and interoperability development, highlighting the strategic importance of OSS for mitigating vendor lock-in and maintaining technical flexibility. Transparency (49%) and collaboration (48%) are additional areas where OSS would benefit the respondents' industries. This reflects the growing recognition among European organisations of the benefits of the open and collaborative development model of OSS for fostering innovation beyond organisational boundaries.

Philippe Ensarguet, VP of Engineering at Orange and Board Member at Linux Foundation Europe, reinforces these observations, arguing that, "The benefits of open source include standardisation, collaborative and community-driven innovation, cost-effectiveness, faster time to market via accelerated deployment, and it also provides an answer to the geopolitical challenges that we are facing. If you rely on specific vendors, you could be at risk and one way to mitigate this is to focus on open source." This perspective underscores how OSS serves as a strategic hedge against risks of vendor discontinuation, where organisations dependent on proprietary solutions could face operational disruption if vendors cease support, withdraw from markets, or become subject to geopolitical restrictions.

FIGURE 2

Thinking about costs and benefits, which of the following best describes your organization's view of OSS?

SELECT ONE | 2025 World of Open Source Survey, Q23, Sample Size = 316 (Europe only)

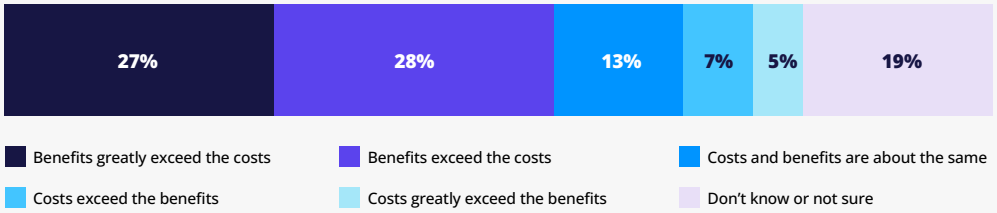


FIGURE 3

How often does using OSS deliver the following benefits in your organization?

SELECT ONE RESPONSE PER ROW | 2025 World of Open Source Survey, Q28, Sample Size = 316 (Europe only)

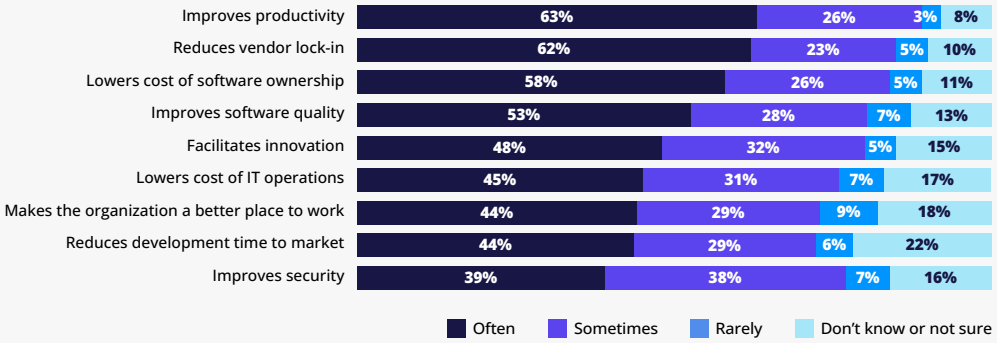
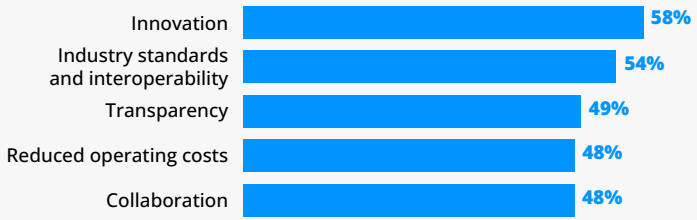


FIGURE 4

Which aspects of your industry do you think would most benefit from open source?

SELECT ALL THAT APPLY | 2025 World of Open Source Survey, Q21, Sample size = 316, Total mentions = 1,331 (Europe only, top five shown)



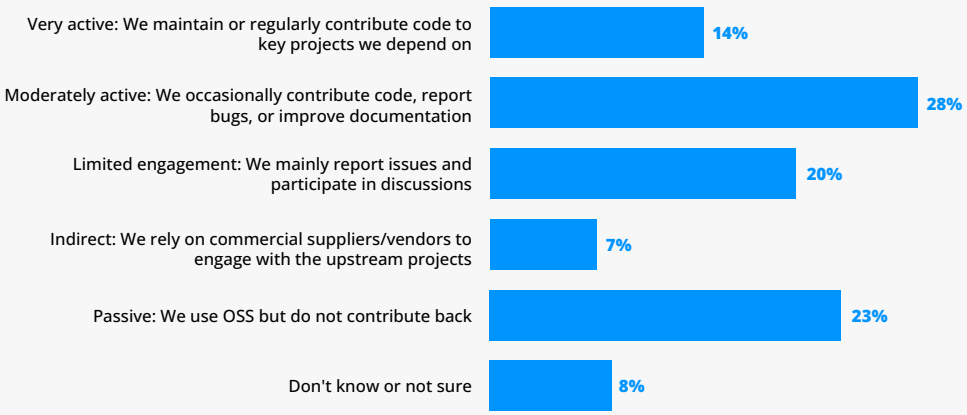
European organisations exhibit a spectrum of open source maturity levels

While European organisations show a growing awareness of the benefits of OSS, in practice they exhibit a spectrum of open source maturity levels.[1] Figure 5 shows that 14% are very active and 28% are moderately active in contributing to the OSS projects they depend on, while 30% of organisations are passive consumers who use OSS but do not contribute back or rely on third-parties.

FIGURE 5

Which of the following best describes your organization's engagement with OSS projects?

SELECT ONE | Source: 2025 World of Open Source Survey, Q36, Sample Size = 316 (Europe only)

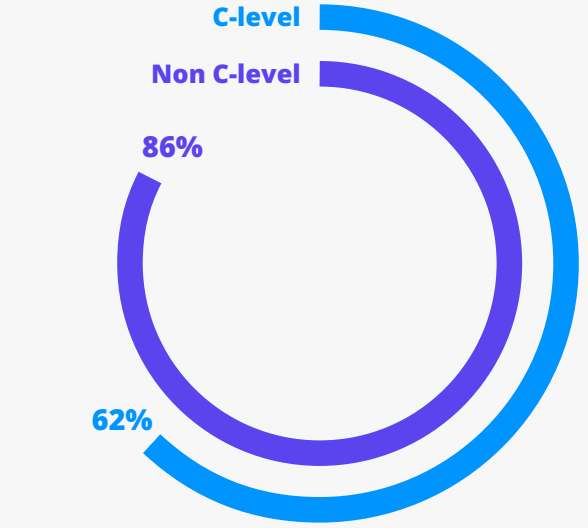


Awareness levels vary within organisations. In particular, fewer C-level executives (62%) recognise the value of open source to their organisation's future compared to non-C-level employees (86%), as shown in Figure 6. This 24% delta suggests that the strategic value of OSS at the C-suite level may not yet be sufficiently clear, and an opportunity to better articulate the business case for OSS to senior decision-makers.

FIGURE 6

To what extent do you agree or disagree that OSS is valuable to the future of your organization?

% OF THOSE AGREEING | Source: Source: 2025 World of Open Source Survey, Q19, Sample Size = 316 (Europe only)



1 As noted in FINOS's Open Source Maturity Model (OSMM), an organisation's open source maturity concerns their level of open source practices and can be evaluated across 5 levels, ranging from ad-hoc use of OSS to leadership and strategic advantage. An organisation's open source maturing represents not only a technical evolution but also a cultural transformation that affects how companies approach software development, talent acquisition, and market positioning, among others. https://osr.finos.org/docs/bok/osmm/introduction

Organisations also show low levels of strategic planning and resourcing for OSS. As shown in Figure 7, only 34% of organisations maintain a formal OSS strategy and 22% have established an OSPO. These low numbers suggest that many organisations in Europe still approach OSS in an ad hoc manner, missing opportunities for strategic engagement with OSS.

FIGURE 7

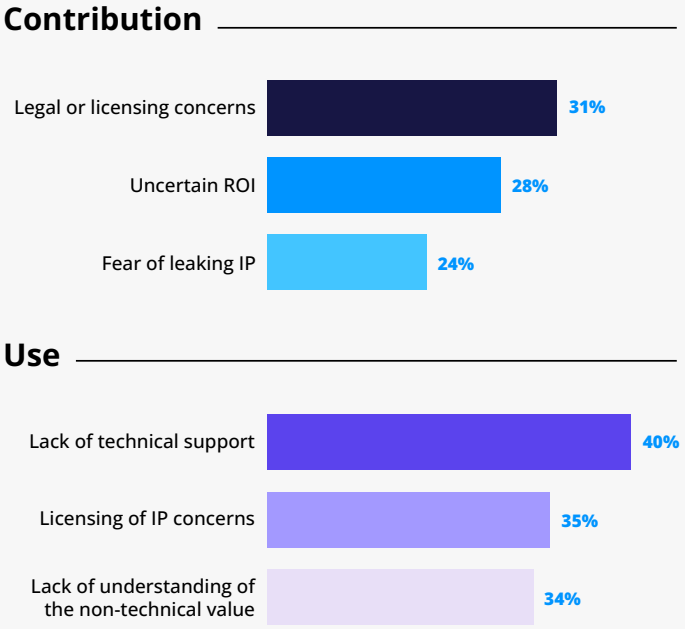
Which of the following actions has your organization engaged in regarding OSS?

SELECT ALL THAT APPLY | Source: 2025 World of Open Source Survey, Q12, Sample Size = 316, Total mentions = 568 (Europe only)

FIGURE 8

Which of the following factors limit OSS use/contributions in your organization?

SELECT ALL THAT APPLY | 2025 World of Open Source Survey, Q44, Q29, Sample Size = 316, Total Mentions = 525, 746 (Europe only, top three shown)



Key barriers to OSS adoption and contribution

A combination of economic, legal, and technical barriers limit organisations' adoption of and contributions to OSS projects. As Figure 8 shows, the key barriers for OSS adoption are the lack of technical support (40%), licensing and intellectual property concerns (35%), and a lack of understanding of the non-technical value of OSS (34%). Meanwhile the key barriers for contributions to OSS projects are legal and licensing concerns (31%), uncertainty about the return on investment (ROI) of contributing to OSS projects (28%), and the fear of leaking proprietary intellectual property (24%).

Several experts validated these barriers. Indeed, a major challenge is the low levels of understanding of OSS among senior decision-makers, where such understanding is essential for strategic planning and investment decisions. Yann Lechelle, CEO of Probabl, points out that there is limited recognition of OSS as fundamental software infrastructure rather than merely a collection of free tools, arguing that, "The private sector needs to acknowledge that open source is fundamentally invisible software infrastructure that all their solution providers depend on." Similarly, Jon Seager, VP of Engineering at Canonical, highlights limited understanding as

a key barrier to OSS contributions: "Senior decision-makers often still don't want to be the person that signs off on open-sourcing code. It's important that we can ensure that decision-makers understand open source and education will be absolutely key."

Another challenge for organisations concerns uncertainty about the ROI of OSS contributions. Lucian Balea, Deputy Director of R&D and Open Source Director at Réseau de Transport d'Electricité (RTE), argues that there is often an operational focus on short-term returns that an organisation can derive from their engagement with OSS, while the strongest benefits tend to accrue over extended timeframes. In addition, without standardised frameworks for measuring the ROI of OSS contributions, developers or managers often struggle to communicate the ROI of their OSS activity to decision-makers in the financial language that they understand.

Concerns about the security of OSS and the need for dependency management support create additional barriers to OSS adoption. Organisations accustomed to vendor-supported proprietary solutions often struggle with the distributed maintenance roles and responsibilities in the OSS ecosystem. These concerns, while legitimate, frequently stem from inadequate understanding of security practices among OSS maintainers or the market of OSS support services.

In addition, the shift from procurer to participant in an OSS collaboration is not only a technical challenge but also a cultural one for organisations. Balea explains, "This shift is not straightforward because organisations that are used to buying software off the shelf do not have an acculturated internal software development workforce. They need to transform their software acquisition practices, either by internalising software development skills and learning OSS best practices, or by surrounding themselves with OSS service providers and adapting their procurement practices accordingly, or by a mix of both."

"The trickiest point is to articulate the internal short-term priorities with the need to take time to interact with the community. Interacting with the community takes time because we need to understand what others want to do and rethink our developments to meet a wider range of needs. That means that the projects need to reserve some bandwidth and time to deviate from the most straightforward way to fulfill internal needs, and engage with the community in an effective collaboration. So, it has a cost in the short term. However, what we realised is that there is a payback in the mid-term because the project benefits from external points of view, usage in different contexts, features contributed by third parties, and a design that is necessarily more modular and scalable. After a few years, the collaborative approach appeared to be more efficient and successful."

– Lucian Balea, Deputy Director of R&D and Open Source Director at Réseau de Transport d'Electricité (RTE)

Key enablers of organisational OSS adoption and contribution

The vital role of OSS leadership and strategies

Top-down championing of OSS by senior decision-makers, particularly in the C-suite, and the implementation of a formal OSS strategy are key enablers of organisational OSS adoption and contributions. Most respondents (34%) believe that developing a clear and visible OSS strategy would be the investment that would most increase OSS use in their organisation, as Figure 9 shows; and most respondents (42%) believe that allocating employee working time to OSS contributions would be the investment that would most increase OSS contributions by their organisation, as Figure 10 shows. Philippe Ensarguet endorses these observations, highlighting that being an "open source first company" is empowering for employees, allowing them to be "do-ers" and gain recognition for their contributions versus simply integrating procured software.

FIGURE 9

Which of the following investments would most increase OSS use in your organization?

SELECT UP TO THREE RESPONSES | 2025 World of Open Source Survey, Q30, Sample Size = 316, Total Mentions = 655

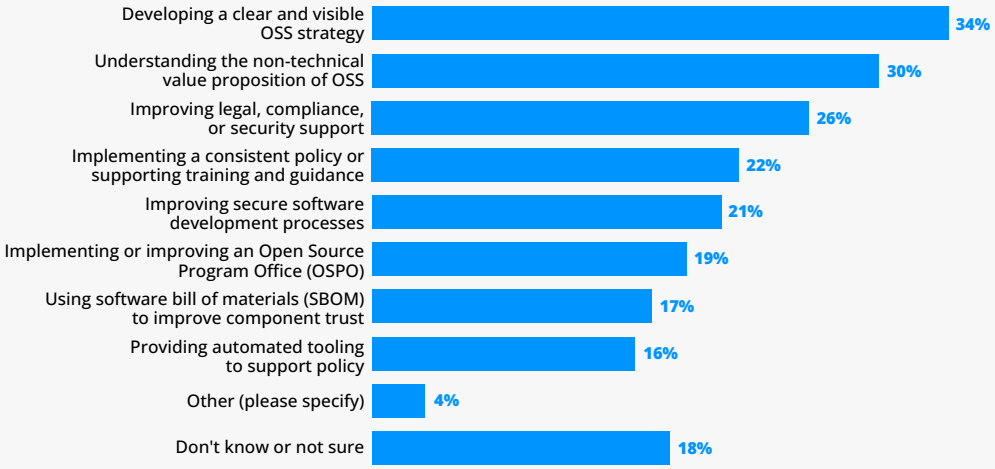
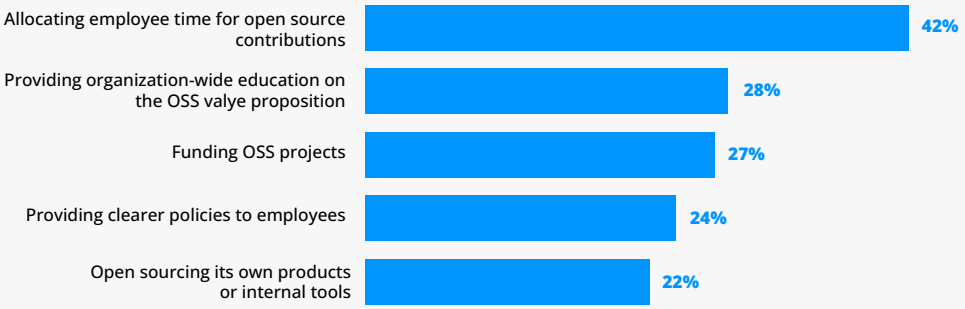


FIGURE 10

Which of the following investments would most increase OSS contributions in your organization?

SELECT UP TO THREE RESPONSES | 2025 World of Open Source Survey, Q45, Sample size = 316, Total mentions = 661 (Europe, top five shown)

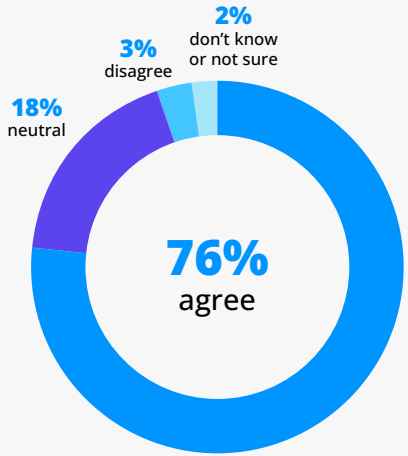


A bonus of having an OSS-friendly posture is its implications for internal culture and talent recruitment. Figure 11 shows that 76% of respondents say that engaging in OSS projects better positions their organisation to attract technical talent. Balea echoes this finding, arguing that organisations that publicly embrace OSS find themselves better positioned to attract top-tier technical talent, as well as attract and retain talent in organisations in non IT-native sectors. Ensarguet highlights that it is a signal to software developers that if they were to work there they'd not just fall into an integrator role, but rather they'd be empowered to build cutting-edge technologies. This empowerment creates a virtuous cycle where talented developers gravitate towards open source-friendly organisations, enhancing these companies' technical capabilities and open source maturity.

FIGURE 11

To what extent do you agree or disagree that engaging in open source projects better positions your organization to attract technical talent?

SELECT ONE | 2025 World of Open Source Survey, Q17, Sample size = 316 (Europe only)



OSPOs

OSPOs are key enablers of organizational OSS use and contributions by acting as centres of expertise that bridge technical, legal, and business considerations. Nearly a fifth of respondents (19%) believe that creating an OSPO would increase OSS use in their organisation (Figure 9). Their responsibilities span multiple areas, from championing OSS and educating developers and business leaders about OSS to providing legal guidance and managing relationships with external projects and communities, among others. The roles and activities of OSPOs are also evolving with changing industry needs, notes Dr. Dawn Foster, Director of Data Science at the CHAOSS project. For example, OSPOs are increasingly focusing on educating developers about security best practices and software supply chain management.

"The value of having an open source focus is the opportunity of personal development for your employees. It is a positive message that you bring as a CTO when you are building your team, putting on the table that you are an open-source first company and that the guys and the ladies that you are recruiting would be participating in those open source projects. It is very differentiating."

– Philippe Ensarguet, VP of Engineering at Orange and Board Member at Linux Foundation Europe

Education, training, and mentorship

Education is a fundamental lever for raising awareness and training skills across organisational levels and career stages. 37% of respondents say that if their organisation were to invest more in OSS in the next year, they would prioritise investments in training for developers on OSS consumption and contribution (see Figure 20 in the "Open source investment priorities" section). This reflects the understanding that organisational engagement with OSS requires more than just consuming software. It demands skills in community engagement, contribution workflows, collaborative development, security best practices, and licensing know-how, among others.

Several experts highlight that effective education spans multiple formats, including formal training and certifications, mentorship programmes, community meetups, and introductory courses. James McLeod, Open Source Program Lead at NatWest Group, highlights that open source education extends beyond technical training, encompassing non-technical skills and topics, such as how to build a cultural understanding or strategic awareness of the benefits of open source within your organisation. For example, in financial services, "the whole culture of open source has to be explained and understood. Not only do you have to explain the 'how', e.g. how to make a PR, but also the 'why'." This dual focus on technical and non-technical education is essential, McLeod explains, because engineers, who are at different career stages, bring varying levels of experience with the open source method of software engineering. While recent graduates are typically already experienced in open source, others may lack this experience and require accessible education that teaches them not only practical implementation but also the underlying philosophy and practices of collaborative development in open source.

Mentorship is also an effective enabler for participation in OSS projects, addressing the unwritten cultural norms that can make community engagement challenging for newcomers. Dr. Dawn Foster highlights that "one of the most effective things to do is mentorship programmes" because they provide connections with experienced practitioners who can guide newcomers through the complex social dynamics of open source communities. The value of mentorship lies not just in technical guidance but in helping

individuals build skills and relationships necessary for meaningful participation. This interpersonal dimension is crucial because, as Foster notes, much of open source culture consists of "unwritten cultural norms" that can only be effectively transmitted through direct interaction with experienced community members.

"The need for education around open source is always going to be there. In financial services, you have engineers at different phases of their careers with different experiences and relationships to the open source method of software engineering. The whole culture of open source has to be explained and understood. Not only do you have to explain the "how", like how to make a PR, but also the "why." So, being an open source influencer or advocate means not only ensuring safe consumption of open source, but also advocating for why engineers should use and contribute back. You always need to be advocating and leading by example. You really have to carry the water and chop the wood. You need to show people how to do it and explain why."

–James McLeod, Open Source Program Lead at NatWest Group

Successful OSS education also requires sustained, systematic approaches rather than one-off initiatives. McLeod emphasises that "community meetups need to be continuous. You can't do one meetup and expect to educate everybody. You need to have a series and you need to have other people working with you in order to be able to maintain it." This principle of sustained engagement extends to broader educational efforts, where advocates must continually demonstrate value and "lead by example" to build organisational cultures that embrace open source principles. McLeod points out that the educational challenge is ongoing because organisations constantly onboard new talent with diverse backgrounds and varying levels of familiarity, requiring persistent advocacy and demonstration of both the practical benefits and strategic importance of OSS engagement.

Educating diverse stakeholders about open source can be scaled to societal levels. Paloma Oliveira, Technologist at the STA, points to the example of a citizen education programme in Brazil, where "we used to have this intentional decentralised program bringing digital education to every single little city that you could go to and there they taught you the very basics: how can you turn on your computer, how can you use office tools like libreOffice, how do you connect to internet, with a focus on the elderly and kids." Oliveira advocates that European governments should implement similar education programmes for the European population, raising understanding of OSS not solely as a technology, but as a social and political tool that underpins our digital democracies and societies.

Enterprise-grade solutions and support services

The role of vendors providing support services stands out as crucial for open source adoption by organisations. For example, 26% of organisations say that improved security support would increase their OSS use, as Figure 9 shows. Above all, paid support for OSS is essential in mission-critical workloads (53%), systems handling sensitive data (40%), and cloud infrastructure (38%), as shown in Figure 12. The top expectations from paid support are long-term support guarantees (54%) and rapid security patching (53%), as

FIGURE 12

In which environments would you consider paid support for OSS to be essential?

SELECT ALL THAT APPLY | Source: 2025 World of Open Source Survey, Q35, Sample size = 316, Total mentions = 739 (Europe only, top 3 shown)

Figure 13 shows. These expectations highlight a gap between what OSS projects typically provide and what enterprises need for production deployment. The fact that these expectations are held by most organisations suggests that there's substantial market demand for vendors who can provide dependency management, security monitoring, and long-term maintenance commitments.

FIGURE 13

What are your top expectations from a support provider when using open source technologies in production?

SELECT UP TO THREE RESPONSES | Source: 2025 World of Open Source Survey, Q32 (top 2 shown), Sample size = 316 (Europe only)

Companies like Canonical and NextCloud are examples of European companies that provide enterprise-grade open source solutions with appropriate support structures, including dependency management, security updates, long-term support commitments, and integration services that enable organisations to adopt OSS with confidence.

Canonical demonstrates this approach through its 12-year support commitment for container images. As Jon Seager explains, this extended timeframe exemplifies the long-term thinking required to bridge the gap between typical OSS development cycles and the operational requirements of enterprise and regulated environments.

Similarly, NextCloud's Enterprise subscriptions provide users of its open source content collaboration platform with direct access to engineering expertise for integration, migration, training, and security support.

These models show how European companies can successfully combine open source innovation with the enterprise-grade support that organisations require for mission-critical deployments.

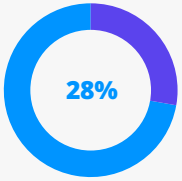
Enterprise trends

Commercial investments in open source

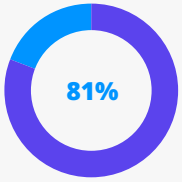
Companies invest in OSS through various mechanisms, including employing OSS contributors and maintainers, FOSS Funds, and sponsoring foundations, among others. However, despite the critical importance of OSS to companies, commercial investments in OSS remain limited. For example, as Figure 14 shows, only 28% of companies employ full-time contributors or maintainers as a means to sustain OSS projects vital to their business operations. However, among those organisations that do make such investments, the value proposition is clear, with 81% of respondents seeing "high" or "very high" value from this approach.

FIGURE 14

Source: Source: 2025 World of Open Source Survey, Q42, Q43 Sample Size = 242, 88 (Europe only)



of organizations employ full-time OSS maintainers or contributors as a means to sustain OSS projects vital to their business



of those who do so, see "very high" or "high" value derived from employing them

This stark contrast between limited investments in employing OSS contributors or maintainers and the high value of this investment suggests significant untapped potential for commercial investment in OSS. The challenge is moving the remaining 72% of organisations from recognising the benefits of OSS to investing in its maintenance and long-term sustainability.

While these numbers are low, several experts highlight examples of European companies, from startups to large enterprises, that hire teams dedicated to OSS maintenance or fund such maintenance in novel ways. For example, Probabl, a spin-off of the scikit-learn project, the popular Python library for machine learning, employs a team that develops, maintains, and sustains OSS libraries for data science, including scikit-learn, skore, and skrub.

Meanwhile Canonical launched a "giving back" fund in April 2025, which is committed to donating $120,000 over 12 months to smaller OSS projects that they depend on using thanks.dev. Jon Seager explains that this financial support for their core dependencies adds to their other contributions to OSS, which include employing developers who contribute to upstream projects and sponsoring OSS foundations. However, Seager points out that in the grand scheme of things it is insufficient that only a handful of companies are making such investments, and calls on other companies to follow suit and invest in their core dependencies.

A handful of sectors and industries are leading the way

Companies in a number of trailblazer industries — including telecommunications, energy, and financial services — have embraced OSS as a strategic advantage, where they not only contribute to OSS projects that they depend on but proactively collaborate together on the development of OSS, open standards, open data, and increasingly also on open AI models.

Miriam Seyffarth, Head of Political Communications at the Open Source Business Alliance, highlights that the manufacturing, automotive, and logistics sectors are increasingly collaborating on OSS. For example, logistics companies are realising the benefits of building open standards for software that is being used for the organisation of international goods transport, and are collaborating at the Open Logistics Foundation to develop OSS and open standards for supply chain management and efficiency.

"The European industries or sectors leading the way in open source, I would say, are goods-producing industries like automotive, which become more and more aware of their dependencies on proprietary software. For example, Mercedes and Volkswagen are not only increasingly using open source, but collaborating more and more with each other in different contexts."

– Miriam Seyffarth, Head of Political Communications at the Open Source Business Alliance

Financial services

Several experts point to the finance industry as a role model of strategic open source collaborations between financial services institutions, from multinational banks to FinTech companies. For example, Philippe Ensarguet expresses his "good surprise" at the increasing number of new banks and insurance companies that are embracing OSS, contrasting this with the historically closed nature of the banking ecosystem. "This shows that even in a highly regulated industry like banking, surrounded by vertical vendors for decades, this transformation is happening, too," he explains. James McLeod of NatWest Group highlights the vital role of the Fintech Open Source Foundation (FINOS), which facilitates collaborations between financial services institutions on OSS, open standards, and open resources for financial LLMs.

Energy

The energy sector is experiencing a gradual but significant shift toward open source collaboration, driven by the unprecedented technological demands of the renewable energy transition. Lucian Balea of RTE explains that while "it's not the major trend yet, awareness is increasing," and the sector is witnessing growing recognition that traditional software procurement models are inadequate for current innovation requirements. He notes that "5 years ago RTE and Alliander were alone but now we see more and more utilities joining, like HydroQuebec, and concrete OSS collaborations emerging, for example at LF Energy."

This transformation stems from fundamental changes in the energy sector. As Balea explains, "the traditional way of procuring software is not working as the end users would expect because it's not having the pace of innovation that is required." The industry faces "massive acceleration with the growth of renewables with electric mobility coming in with more complexity to deal with"

and “aging assets that we need to replace.” These pressures have catalysed collaboration through LF Energy, which hosts projects addressing critical infrastructure needs, from software-defined automation platforms like SEAPATH to AI initiatives such as GridFM for developing specialised foundation models for energy applications.

The energy sector’s collaborative approach extends to emerging technologies, with AI becoming “a hot topic” in energy applications according to Balea. Projects like OpenSynth focus on producing synthetic data to overcome data sharing barriers, while GridFM develops specialised models for climate modeling and grid analysis. Balea emphasises that “given the resource requirements in AI development, there is huge potential for collaboration on such base technologies… which enable industrial users to join forces and build on top of foundational assets to develop customized AI solutions.” This collaborative framework has become sufficiently mature that projects can now be strategically hosted in different regions, with the PowSyBl project recently moving to European hosting at LF Europe “due to the fact that this project was growing in Europe and was addressing specific European use cases and related to European regulations.”

Challenges facing open source startups

Europe’s open source startup ecosystem demonstrates remarkable vitality, particularly in the AI sector. Paris has emerged as an open source startup hub, with startups like Mistral AI, Probabl, and Plakar exemplifying the talent and entrepreneurial spirit of France and more broadly Europe’s open source community. However, the European innovation finance ecosystem presents substantial barriers to the scaling up of open source startups. Philippe Ensarguet argues that while Europe has talent, many promising European open source startups find themselves seeking seed venture capital in the USA due to the lack of ambitious venture capital in Europe. This pattern represents both a loss of promising companies to foreign investors and a missed opportunity for European capital to proactively support open source startups. Ensarguet emphasises that creating the investment conditions and ecosystem support to scale up open source startups should be a strategic priority for European investors and policymakers alike.

Government and policy trends

The open source imperative for digital sovereignty

The changing geopolitical landscape has accelerated the debate about the urgency of strengthening digital sovereignty and strategic autonomy in Europe. In particular, there is a growing recognition of Europe's dependence on foreign technology providers. As Yann Lechelle, CEO of Probabl, argues: "Europe is feeling the crunch when it comes to digital sovereignty (or lack of). It is now acutely aware of its dependencies that have become unbearable." Experts also warn that a "digital blackout" is no longer a science fiction scenario, where trade restrictions could result in dominant software vendors limiting or even shutting down access to their products or services, resulting in severe operational disruption for European business and governments alike.

> "Open source contributes to digital sovereignty goals because it gives you control over your own destiny."
>
> – Dr. Dawn Foster, Director of Data Science, the CHAOSS project.

The changing geopolitical landscape has also elevated OSS from a technical consideration to a strategic lever in policy discussions about digital sovereignty. Miriam Seyffarth of the Open Source Business Alliance argues that, "digital sovereignty can only be achieved with open source," providing greater control and agency to European governments over their technology stacks. Dr. Dawn Foster similarly argues that, "open source contributes to digital sovereignty goals because it gives you control over your own destiny." Philippe Ensarguet adds that, "The changing geopolitical landscape has underscored the importance of open source: relying solely on vendors from specific regions could pose risks, and that open source offers a way to mitigate these concerns."

Several experts express concern that European policies and strategies seeking to strengthen digital sovereignty could risk fragmenting the global OSS ecosystem by focusing on building and buying only European software when it is the collaborative, borderless nature of OSS that makes the ecosystem innovative and resilient. As Lucian Balea puts it, "Understanding how we can combine sovereignty considerations with global collaboration is a key priority."

Tony Shannon, Head of Digital Services in the Government of Ireland, echoes this concern, arguing that walls should not be put up around the European OSS ecosystem as OSS development does not obey borders. European governments should encourage OSS development in Europe, while recognising that OSS cannot be controlled within Europe and Europe benefits from global contributions and collaborations.

Similarly, Katharina Meyer, Executive Director of the Digital Infrastructure Insights Fund, warns that "as politics increasingly recognise open source's strategic value, its politicisation risks eclipsing its historic core strengths. Long-term progress demands implementation rooted in democratic principles: expert-driven feedback loops, community self-organisation, and normative motivations beyond market or geopolitical logics."

Miriam Seyffarth adds that true sovereignty requires building up the capabilities to develop, modify, and control technology at its most fundamental levels which open source gives everyone the tools for, rather than focus on the geographical location of the

developers or a company where the software is built. She explains that, "We won't reach digital sovereignty with the approach of 'buy or build European' alone. It makes sense to build tech locally and to thus strengthen the local IT industry, but it's not enough because the dependencies may be the same whether a proprietary software is built locally or elsewhere. The important part is the control over the software that open source licenses are granting. The open source technology does not necessarily have to be built in Europe. It's more important that it's open source at all and that people are using open standards."

Investing in open digital infrastructure

Public funding for OSS is increasingly viewed as essential for European digital sovereignty and competitiveness. Survey respondents recognise this priority, with 31% identifying investments in OSS as digital public goods as the third most important investment area (see Figure 17 in the "Open source investment priorities" section).

> "We are strengthening the digital infrastructure that powers our democracies and economies, funding it, nurturing it, making it resilient, keeping it open, and respecting users' freedom."
>
> – Paloma Oliveira, Technologist at the Sovereign Tech Agency

European initiatives such as the European Commission's Next Generation Internet programme and Germany's STA are examples of European funding. Felix Reda, Director of Developer Policy at GitHub emphasises that "governments should treat open source basic technologies (that is tech to build tech, open source software that is a common dependency across different companies and administrations, such as libraries, programming languages etc.) as a public infrastructure." Reda adds, "Like physical infrastructure, the public hand needs to invest in its maintenance and modernization. The German STA is the first government project I am aware of that takes on this challenge, but it is orders of magnitude too small to meet the need. Its model should be replicated by the EU and governments across the globe."

The German government is widely recognised as being ahead of the curve in investing in maintenance — and, especially, maintainers — of foundational open source infrastructure. The STA recognises that investing in the maintenance of critical OSS benefits not only Germany but creates positive externalities for other governments and organisations that rely on these same technologies. As Paloma Oliveira of the STA argues, "We are strengthening the digital infrastructure that powers our democracies and economies, funding it, nurturing it, making it resilient, keeping it open, and respecting users' freedom." Dr. Dawn Foster adds that, "Germany has been a hotbed of open source activity for quite some time, but I think things like the STA have really kicked that up a notch. Their funding of critical digital infrastructure is different to what we did before, which was mainly to fund new innovation."

Building on the success of the German model, experts are now calling for the creation of an EU-wide agency. Nicholas Gates, Senior Policy Advisor at OpenForum Europe, explains a proposal for the creation of a Sovereign Tech Fund (STF) at the EU level by OpenForum Europe, Fraunhofer ISI, and European University Institute: "A mission-driven approach to addressing this chronic underinvestment in open source maintenance—building on the precedent of the German STF—recognises that this is infrastructure we all depend on. It is not just another technology choice but a strategic national and global asset that requires sustained and coordinated investment. Given its history with

open source-led innovation and open standards, Europe is well-positioned to lead on investing in this open digital infrastructure."

Gates envisions the EU STF as a model for global leadership in open source investment, arguing it would demonstrate "what a structural transformation might look like for conceptualising and investing in digital infrastructure and the people behind it." He describes this approach as "a 'rising tide that lifts all boats', strengthening global open source collaboration and broader forms of digital collaboration, while also demonstrating a third way for Europe to secure its infrastructure, innovate, and compete."

"Like physical infrastructure, the public hand needs to invest in its maintenance and modernization. The German STA is the first government project I am aware of that takes on this challenge, but it is orders of magnitude too small to meet the need. Its model should be replicated by the EU and governments across the globe."

– Felix Reda, Director of Developer Policy at GitHub

"By building an EU STF, the EU can demonstrate leadership in open source to the rest of the world, demonstrating what a structural transformation might look like for conceptualising and investing in digital infrastructure and the people behind it. This will be a 'rising tide that lifts all boats', strengthening global open source collaboration and broader forms of digital collaboration, while also demonstrating a third way for Europe to secure its infrastructure, innovate, and compete. Investing now will strengthen Europe's digital sovereignty ambitions, giving the bloc autonomy and choice when building and deploying European public and industrial infrastructures. A failure to invest now risks leaving Europe trapped in the status quo, undercutting its pursuit of digital sovereignty by reinforcing dependencies that weaken security, innovation, and competitiveness."

– Nicholas Gates, Senior Policy Advisor at OpenForum Europe

Translating this vision into reality requires concrete steps and coordinated action. Gates explains that to achieve meaningful progress over the next 12 months, establishing dedicated EU-wide funding streams through the Multiannual Financial Framework (MFF) negotiations must be the priority, involving consultation with EU Member States and industry to explore both centralised and decentralised versions of the EU-STF. This requires coordinated advocacy efforts targeting EU policymakers, MFF negotiators, Member States, and industry stakeholders. During this critical period, Gates argues, "it will be incumbent on the European Commission and the European Parliament to listen, and to prioritise finding common ground between the calls for open digital infrastructure and tech sovereignty investments—which are not in competition, but mutually reinforcing."

However, securing funding is only part of the solution. Structural barriers in how governments purchase technology also need addressing. Miriam Seyffarth argues that public funding itself is not enough and must be accompanied by a reform of procurement regulation that creates a systematic preference for open source solutions within government. When the government shows a clear demand and preference for open source solutions, the supply-side will soon adjust accordingly. Switzerland's open source mandate for software developed by or for public bodies is a concrete example for other European governments to follow.

Investing in open source research and innovation

While infrastructure investment addresses existing dependencies, several experts argue that Europe also needs to adopt ambitious strategies that invest in open source as a strategic asset for enhancing its global competitiveness in emerging technologies. For example, Yann Lechelle advocates that, "Adopting radical openness as policy would bring many benefits including increased resilience (corporate, national and European) as well as much needed price pressure against oligopolistic players." For Lechelle, "radical openness as policy" entails leveraging and investing

"A strong European governance needs to steer member states into a radical adoption and support of open source, which may be our only hope to catch up as digital challengers to the US and China."

– Yann Lechelle, CEO of Probabl

in five interconnected pillars of openness — open source, open science, open standards, open data, and open weights — as strategic tools that can level the playing field in technology development, stimulate local innovation, support European startups, and reclaim control of the technology stack that European organisations depend on.

This strategic approach to openness is already being implemented in various forms across Europe. For example, France exemplifies leadership in investing public funds into the commercialisation of OSS projects rooted in Europe. For example, ambitious public investment announced in France's AI strategy and implemented by the French Tech Souveraineté Fund played a crucial role, alongside investments from individual contributors and venture capital firms, in the founding of Probabl as a spinoff of the scikit-learn project, whose mission is the development, maintenance, and sustainability of OSS projects and communities in data science.

Beyond supporting commercial spinoffs, experts advocate for open source mandates in public research grants. Lucian Balea argues that, "Public programs to support research and innovation with public funding are not prescriptive enough regarding the use of open source licenses for the disseminations of results. This is not the most efficient use of public money because the uptake of the results is impeded and they cannot be easily reused by another program to build on top of them and benefit from additive innovation." Similarly, Dr. Lucie-Aimée Kaffee, EU Policy Lead and Applied Researcher at Hugging Face, argues that, "we should be able to reuse the products that we are funding and to have the most diverse ecosystem possible." The principle of open source mandates recognises that taxpayer-funded research should generate public goods rather than proprietary solutions that limit broader societal benefit.

The need for more open source advocacy at the policy table

Several experts underline the need for more open source advocacy in policy circles. Felix Reda argues that, "Although OSS is getting a lot more airtime in political speeches than it used to, and policymakers are increasingly paying attention to open source concerns when passing regulation such as the Cyber Resilience Act, what we are still missing is policy action … [that] actively advances open source."

In addition, the historical neglect of open source considerations in policy development reflects a limited understanding of OSS among policymakers and regulators. Balea notes that the CRA, in its initial versions, "could have had a very negative impact" on OSS development, while Dr. Kaffee comments that, "open source AI has been an afterthought in AI policy. We do not only want to have open source AI as a side effect of AI development, but we want it as a main focus and our policies should benefit the creation of open source AI."

"Open source AI has been an afterthought in AI policy. We do not only want to have open source AI as a side effect of AI development. We want it to be a main focus and our public policies should benefit the creation of open source AI."

– Dr. Lucie-Aimée Kaffee, EU Policy Lead and Applied Researcher at Hugging Face

A critical step towards more policy action is increasing the presence of open source advocates at the policy table. Balea argues that while targeted advocacy with lawmakers resulted in the redrafting of the CRA to account for the dynamics of OSS development and introduce exemptions to mitigate an unmanageable burden on OSS developers, "The question is whether we can get awareness of open source to a level so that regulations are drafted in a manner that benefits rather than harms open source, and there is still a long way to go." Towards this end, Miriam Seyffarth and Dr. Kaffee call for more open advocates to "be at the policy table" and "engage in policy development processes" in Brussels and other European capitals.

Katharina Meyer highlights that the provision of empirical research on the development, maintenance, and governance of open source digital infrastructure is crucial to effective open source advocacy, contributing to evidence base that open source advocates can draw on and informing evidence-based policy interventions. In particular, Meyer argues that, "It is essential to show where open models succeed and where market logic falls short. Strategic decisions should increasingly draw on research from DIIF, LF Research, and others."

"The question is whether we can get awareness of open source to a level so that regulations are drafted in a manner that benefits rather than harms open source, and there is still a long way to go."

– Lucian Balea, Deputy Director of R&D and Open Source Director at RTE

Meanwhile, Paloma Oliveira highlights that policy advocacy should focus on raising awareness that OSS is not only a technological tool, but also a social and political one. As Oliveira put it: "OSS has always been bigger than software. It's about securing the critical infrastructure our societies depend on, not allowing it to be controlled by a handful of corporate gatekeepers. It's about democratizing access to the building blocks of the digital infrastructure that mediates every single aspect of our lives."

The open source digital transformation of the public sector

OSS adoption by governments is widely viewed as a strategic priority for their digital transformation initiatives, with 52% of survey respondents indicating that government adoption of OSS is an important investment area (Figure 17). Public administrations at local, regional, national, and European levels are making steady progress in their digital transformation journeys, with open source increasingly recognised for its strategic advantages in terms of interoperability, vendor independence, and technological sovereignty.

The Centre for Digital Sovereignty (or ZenDis) in Germany and Free Software Unit under DINUM in France were highlighted as noteworthy government bodies that are building OSS to support an open source digital transformation of the public sector. ZenDIS develops solutions such as the OpenCode platform for public sector software and OpenDesk, an office and collaboration suite for government use, while La Suite provides a collection of OSS tools for the public sector, including instant messaging, email, documents, spreadsheets, and video-conferencing.

These bodies are also leading important advocacy work to raise awareness about digital sovereignty challenges for the public administration. Paloma Oliveira of the STA highlights how ZenDIS effectively uses statistics about the federal government's IT contracts to demonstrate the scale of dependence on technology giants and the lack of digital sovereignty. For example, they point out publicly that 96% of federal agencies use Microsoft Office

and Microsoft Windows. Another powerful statistic is that while 13.6 billion euros have been committed through IT framework agreements between the German federal government and its ten largest contractual partners since 2023, only 0.5% of federal spending on software and related services in 2023 was directed toward open source solutions.

However, significant barriers remain for OSS adoption in the digital transformation of public administrations. Public procurement systems often favour established proprietary vendors, whilst lack of internal competence and understanding at political and senior decision-maker levels creates resistance to OSS alternatives. Tony Shannon from the Irish Government adds that, "there is more talk than action," and, "the digital decade won't really realise its ambitions unless we really get much more practical and results orientated with open source."

Meanwhile, in Poland, Ryszard Łuczyn, Deputy Director of the Department of Projects and Strategy in Government of Poland, explains, "Until recently, open source was not officially acknowledged as a priority by the Polish administration... There is a general lack of knowledge about open source, including the potential for cost reduction and ways to securely implement open solutions. A key answer to these problems will be the creation of an OSPO, which is envisioned by the draft Digitalisation Strategy. After its creation, the OSPO will be able to share best practices within the administration and organise training for public officials."

For detailed insights into how European governments at various levels, from municipalities to national or federal governments to the European Commission, are adopting or building OSS for the open source digital transformation of the public administration, we recommend reading our comprehensive "The European Public Sector Open Source Opportunity" report.[2]

"The digital decade won't really realise its ambitions unless we really get much more practical and results orientated with open source."

– Tony Shannon, Head of Digital Services at the Government of Ireland

2 Cailean Osborne, Mirko Boehm, and Ana Jimenez Santamaria, "The European Public Sector Open Source Opportunity: Challenges and Recommendations for Europe's Open Source Future," foreword by Gabriele Columbro, The Linux Foundation, September 2023. **https://www.linuxfoundation.org/research/european-public-sector-opportunity?hsLang=en**

Cybersecurity trends

Awareness and readiness for the EU's CRA

The cybersecurity landscape has been fundamentally altered by the enactment of the EU's CRA, which establishes new requirements for the security of products with digital elements, including OSS, that are sold in the European single market, and has put the security of OSS on the map for policymakers and business leaders alike.

"There's been a big shift in open source toward thinking about security in a more holistic way and how it impacts the whole supply chain beyond just the individual components. In the previous few years, there were some big vulnerabilities creating a wave of issues around security, which has made us consider security in a way that we hadn't been before, which is as part of a more holistic supply chain. When you think about security, it's not just securing your own infrastructure. It's not just securing your own application. It's about understanding the security implications of all of the dependency chains, which is from a supply chain perspective. So, it's something that a lot of us are thinking about in ways that we hadn't before. This has been a real turning point in open source."

– Dr. Dawn Foster, Director of Data Science at the CHAOSS Project

However, awareness of the CRA and its implications for OSS developers is low, with 62% of respondents reporting low familiarity with the CRA according to a CRA report we conducted in March 2025.[3] There is evidently room for improvement in CRA awareness and readiness in both Europe and beyond, as the CRA's extraterritorial reach means that organisations outside of Europe will also need to comply with the regulation to maintain market access.

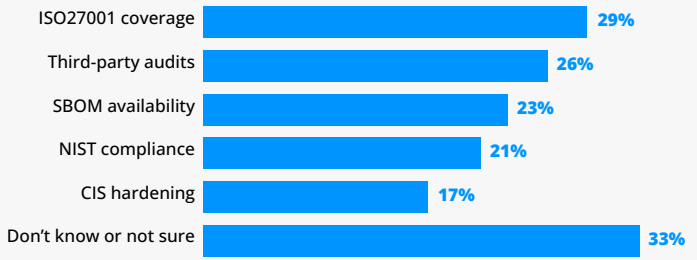
Similarly, awareness of cybersecurity best practices is low, with 33% of respondents saying that they do not know or are not sure which certifications or assurances that would make them more likely to adopt or trust an OSS solution. That being said, as Figure 15 shows, ISO27001 coverage (29%), third-party audits (26%), and the availability of a software bill of materials (SBOM) (23%) are the most likely to inspire confidence in an OSS project's security.

Our CRA report also sheds light on the current level of adoption of security best practices among OSS developers. Among

FIGURE 15

Which certifications or assurances would make you more likely to adopt or trust an OSS solution?

Source: 2025 World of Open Source Survey, Q26, Sample Size = 316, Total mentions = 674 (Europe only, top 5 shown)



3 Adrienn Lawson, Stephen Hendrick, "Unaware and Uncertain: The Stark Realities of Cyber Resilience Act Readiness in Open Source," foreword by Christopher (CRob) Robinson, The Linux Foundation, March 2025. https://www.linuxfoundation.org/research/cra-readiness

manufacturers, 34% currently produce SBOMs for all products, with an additional 25% producing them for some products. The report reveals that organisations with higher engagement levels to open source software are leading this adoption, with highly engaged manufacturers being more likely to produce SBOMs across all of their products (43%) compared to passive consumers of open source (2%). Additionally, 59% of steward organizations use automated dependency tracking tools, while 32% maintain comprehensive SBOMs, indicating that fundamental infrastructure for security transparency is being established, where formal steward organisations host and support open source projects.

Nevertheless, several experts highlight that the OSS community has made significant progress in OSS security in the last year. For example, Miriam Seyffarth highlights that a variety of stakeholders have pulled their weight to improve security practices in the ecosystem.

For example, the Open Source Security Foundation (OpenSSF) contributes to cybersecurity best practices through initiatives like the OpenSSF Scorecard, AlphaOmega project, and Global Cyber Policy Working Group. Similarly, the Eclipse Foundation's Open Regulatory Compliance Working Group develops and maintains community resources designed to demystify the CRA and provide practical guidance. In addition, various organisations have published practical research on security best practices and interventions, from our report that maps OSS security best practices and CRA requirements for OSS stewards[4] to the STA's funding of research on the effectiveness of bug bounties as funding interventions for enhancing OSS security.[5]

The direct and indirect effects of the CRA for OSS security

Several experts highlight that the CRA's requirement for manufacturers to produce an SBOM at the request of market surveillance authorities is a significant development for security. Philippe Ensarguet argues that, "In the telco industry, it is hard to get SBOMs for procured software but you can only defend yourself against what you know. So, the CRA making SBOMs compulsory for vendors is a significant step." The requirement is expected to illuminate the extensive use of OSS in commercial products, as well as reveal previously hidden security vulnerabilities. The requirement was also praised as a catalyst for both adoption and further development of SBOMs and related open source security tools. For example, Jon Seager from Canonical notes that the implementation of SBOMs will reveal the complexity of creating meaningful SBOMs, and expects that it will drive much needed innovation in open source SBOM tooling and processes.

Jon Seager speculates that the CRA will have a number of second-order effects beyond the immediate compliance requirements. For example, it is encouraging vendors to adopt a supply chain security perspective, which will illuminate the scale of the cybersecurity challenge, as well as a more long-term perspective

4 Mirko Boehm, Hilary Carter, and Cailean Osborne, "Pathways to Cybersecurity Best Practices in Open Source: How the Civil Infrastructure Platform, Yocto Project, and Zephyr Project are Closing the Gap to Meeting the Requirements of the Cyber Resilience Act," Foreword by Miriam Seyffarth, The Linux Foundation, March 2025. https://www.linuxfoundation.org/research/cra-compliance-best-practices

5 Ryan Ellis and Jaikrishna Bollampalli, "Bug Bounties and FOSS: Opportunities, Risks, and a Path Forward," Sovereign Tech Agency, 2024. https://www.sovereign.tech/publications/bug-bounties-and-foss

of how they will manage their software dependencies and cybersecurity responsibilities. Seager commented, "I think the CRA will force vendors to think more carefully about how products are kept alive. You can't simply abandon infrastructure where there is an obligation to keep products updated and secure, especially when they're connected to the internet."

Education on the CRA

Given the low levels of awareness and readiness for the CRA, the need to educate various stakeholders, from developers to business leaders, about open source security best practices and supply chain security management has become urgently apparent.

Educational resources are vital for increasing readiness for CRA compliance. Ensarguet highlights the value of certifications like the OpenSSF's "Understanding the EU CRA (LFEL1001)" certification for providing an accessible entry point for various stakeholders, from developers to business leaders, to learn the fundamentals of the CRA. Ensarguet said, "I did the CRA certification by OpenSSF and I really love the format. It's super informative. I think that using the Linux Foundation training, having a module dedicated and making signs around could be a good way to do the promotion for open source AI."

James McLeod highlights the efforts of stakeholders in the open source community, who are providing resources online and delivering CRA 101 presentations at OSS conferences and meetups, where they explain the CRA in layman's terms to "engineers who are not as close to the legal coalface." McLeod mentioned the example of a keynote on "Cutting Through the Fog: Clarifying CRA Compliance in Cloud Native" given by Eddie Knight, OSPO Lead at Sonatype, and Michael Lieberman, CTO at Kusari, at KubeCon Europe 2025.

In addition, Jon Seager shares his advice: "The number one thing is to understand what you are putting in your software. Thinking hard about dependencies that you add to your software, where they come from, and what your plan is to maintain them is a good first set of questions to start getting in the mindset of how to manage risk over time."

> "The number one thing is to understand what you are putting in your software. Thinking hard about dependencies that you add to your software, where they come from, and what your plan is to maintain them is a good first set of questions to start getting in the mindset of how to manage risk over time... The more of other people's software you are shipping, the more risk you are at, irrespective of whether you're shipping software from people you trust, it's still exposure. It's about understanding who your market is, who your user is, and how to balance the risk and convenience of adding external dependencies to your code."
>
> –Jon Seager, VP of Engineering at Canonical

Open source AI trends

Open source AI goes mainstream

In the last year, open source AI became a household name. One might say that DeepSeek's release of its powerful open models in January 2025 represented the "ChatGPT moment" for open source AI. The DeepSeek headlines catalysed unprecedented interest from policymakers and business leaders in open source AI, viewing it as a strategic opportunity for Europe to compete in AI and build AI technologies that align with European values and priorities.

Dr. Kaffee from Hugging Face points out that Europe already boasts a vibrant open source AI community, encompassing academic researchers, grassroots initiatives, startups, and large enterprises, who have been spearheading diverse projects and innovations, such as building training datasets, evaluation benchmarks, leaderboards, and models for European languages and cultures. For example, projects like OpenLLM Europe and OpenGPT-X have developed performant open models in all 24 official EU languages.

European governments are also contributing to open source AI. The UK AI Security Institute released Inspect, an open source framework for evaluating the performance and safety of LLMs for various tasks, including coding, agentic tasks, reasoning, and multi-modal understanding. Meanwhile, the French government launched a "LLM Leaderboard for the French language" on Hugging Face, which provides a comprehensive and transparent assessment of the performance, capabilities, and limitations of LLMs in French. In Germany, the Federal Ministry of Economics and Climate Protection (BMWK) funded the aforementioned OpenGPT-X project, a collaboration of ten partners from business, research and the media to build sovereign, open LLMs for German and European languages and use cases, such as the Teuken 7B model which is performant in all 24 official EU languages.

The European open source AI community has also embraced the trend towards smaller, more specialised AI models that are demonstrating rapidly catching up with the performance levels of their larger counterparts. Small models offer distinct advantages in terms of customisability, specialisation for specific tasks, and environmental sustainability—considerations that align well with European values around efficiency and environmental responsibility. For example, Lucian Balea explains that energy companies are collaborating together on models for specific tasks that are common in the energy sector, such as load forecasting for energy grids (LF Energy OpenSTEF project) or power flow optimization solvers leveraging graph neural networks.

Key challenges and priorities for Europe's open source AI community

Challenges for the open source AI community

Experts highlighted challenges that the open source AI community in Europe, as well as globally, are currently navigating. These challenges span technical, regulatory, financial, and cultural dimensions, creating barriers that limit the full potential of open source AI development and adoption.

Limited openness of key components beyond model weights, such as training code and data, present significant challenges

to open source AI development processes. For example, Philippe Ensarguet explains that the limited openness of "open source" models beyond weights creates substantial barriers to transparency, auditing, and reproducibility.

The phenomenon of "openwashing" in AI — where organisations claim that their models, released under restrictive licenses, are open source — was highlighted as another obstacle for the community. Miriam Seyffarth explains that openwashing undermines trust in open source claims and creates confusion about what constitutes truly open AI systems or models.

Academic researchers often find themselves at a disadvantage compared to well-resourced commercial labs to participate in state-of-the-art AI research and development owing to the substantial computational and financial resources required. Similarly, grassroots initiatives face resource constraints and often operate with minimal funding despite making significant contributions to open source AI development and education.

Regulatory unawareness and unpreparedness, particularly regarding AI Act obligations for the providers of open source general-purpose AI models, creates additional challenges for open source AI developers. Dr. Kaffee argues that the complexity of the AI Act and its implications for open source AI developers necessitates clearer guidance to help developers navigate compliance requirements and understand their obligations when developing and releasing open source AI models.

Lastly, the innovation finance ecosystem presents challenges for ambitious open source AI startups, with many promising startups seeking seed funding in the USA due to the lack of investment in Europe. Ensarguet argues that this pattern represents both a loss of promising companies and a missed opportunity for European investors to participate in the open source AI opportunity. "We have the talent, but we are not investing ambitiously in it," he explains. To change the status quo, there is a need to raise awareness of the competitiveness of open source business models in the European venture capital ecosystem.

Priorities for the open source AI community

Experts proposed promising pathways forward for strengthening Europe's position in open source AI across different stakeholder groups.

Central to these recommendations is the principle of promoting openness, resource sharing, and collaboration in AI R&D, which benefits researchers, grassroots initiatives, and startups alike. Dr. Kaffee highlights that the ecosystem benefits significantly when resources are shared, democratising innovation at the forefront of AI. She encourages the European community to "continue innovating and sharing resources, continue integrating with people from different fields to create models in their areas of expertise, think about what are the languages and tasks that are specific to your needs that you want AI for and contribute to the many models that are there, and think about how to make your models more specialised, make them smaller, make them less resource intensive so they can more widely be reused."

For all stakeholders, a priority is to raise awareness of the changing regulatory environment for open source AI development following the enactment of the AI Act, and to prepare for compliance. For example, the AI Act's obligations for the providers of general-purpose AI models apply on 3 August 2025, including those that are released under a "free or open source license," and open source AI developers must understand what these obligations may mean for them and accordingly what they need to do to comply.

Governments in Europe can support the European open source

AI community by building on the aforementioned approaches: developing open source frameworks for safe AI development like the UK AI Security Institute's Inspect LLM evaluation framework; funding open source AI development like Germany's funding of OpenGPT-X, a collaboration of 10 partners that resulted in the Teuken 7B model that is performant in all 24 EU languages; and investing in OSS project spinoffs, such as France's investment in Probabl, a spinoff of the scikit-learn project.

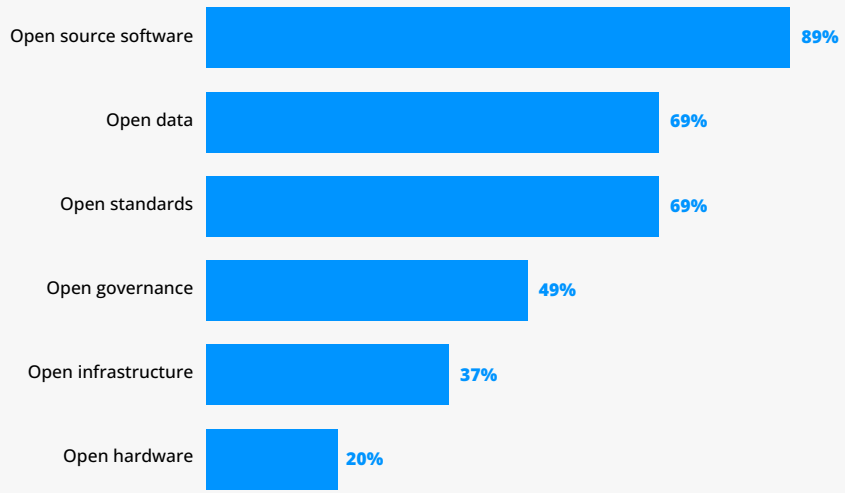
Building on these examples, Dr. Kaffee calls for governments to introduce open source mandates in public research grants and provide subsidies for public research infrastructure. Yann Lechelle argues that European governments should adopt "openness as policy" and invest in five interconnected pillars of openness in AI — open source, open science, open standards, open data, and open weights — as strategic tools to challenge the market power of global giants, promote innovation, and support regional champions.

Our report on global collaboration in AI echoes this argument, finding that European stakeholders believe that open technologies will play a key role in building sovereign AI technologies. As Figure 16 shows, respondents put OSS as the most important approach to sovereign AI (89%), followed by open data (69%), open standards (69%), open governance (49%), open infrastructure (37%), and open hardware (20%).

FIGURE 16

Which open approaches do you believe are most critical to advancing Sovereign AI?

SELECT ALL THAT APPLY | Source: 2025 Global Collaboration in AI Survey, Q19, Sample Size = 70, Total Mentions = 232 (Europe only)



Open source investment priorities

Looking to the future, the survey shines a light on priority investments for the European open source ecosystem. Above all, the respondents believe there should be investment in building open source alternatives to technology monopolies (55%), government adoption of open source (52%), and open source as digital public goods (31%), as Figure 17 shows. With regards to technology domains that should be invested in, the respondents prioritise operating systems (43%), AI and machine learning (38%), and cybersecurity (34%), as Figure 18 shows. The sectors and industries that would benefit the most from OSS investments are federal or national governments (44%), higher education (35%), and information technology (32%), as Figure 19 shows. Finally, the respondents would most like to see their organisations invest more in sponsoring OSS projects they depend on (45%), increasing upstream collaboration and contributions (37%), and open source training for developers (37%), as Figure 20 shows.

These findings strongly align with expert recommendations throughout this report, particularly calls for creating an EU STF and adopting "openness as policy." The emphasis on government adoption, digital public goods, and cybersecurity validates proposals for systematic public investment in the maintenance and security of open digital infrastructure, while the focus on domains like AI and machine learning supports arguments for investing in open source to enhance European competitiveness and facilitate regional innovation in emerging technologies.

FIGURE 17

In which areas do you think there should be further investment in open source across your geographic region?

SELECT UP TO THREE RESPONSES | Source: 2025 World of Open Source Survey, Q15, Sample Size = 316, Total mentions = 888 (Europe only)

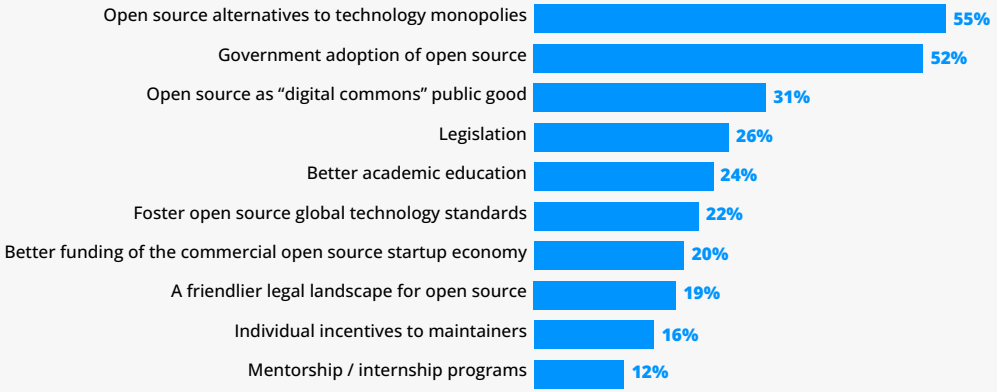


FIGURE 18

Which technologies do you believe would benefit the most from being open source?

SELECT UP TO THREE RESPONSES | Source: 2025 World of Open Source Survey, Q13, Sample Size = 316, Total mentions = 902 (Europe only, top ten shown)

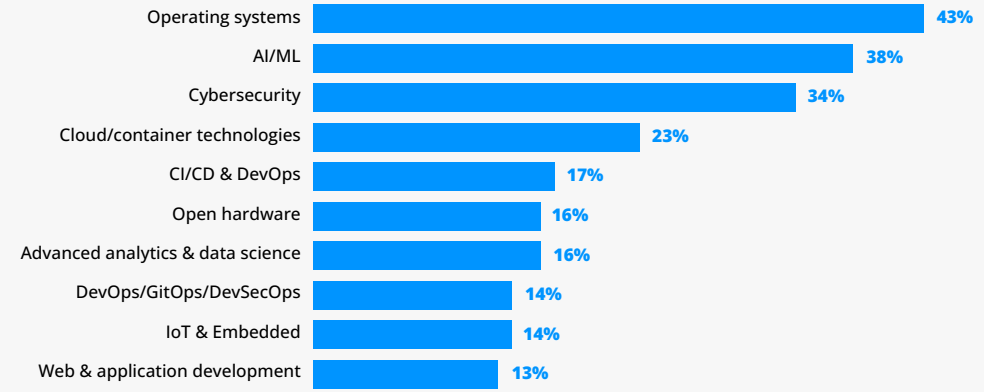


FIGURE 19

Which industries do you think would most benefit from investing in open source?

SELECT UP TO THREE RESPONSES | Source: 2025 World of Open Source Survey, Q14, Sample Size = 316, Total mentions = 865 (Europe only, top five shown)

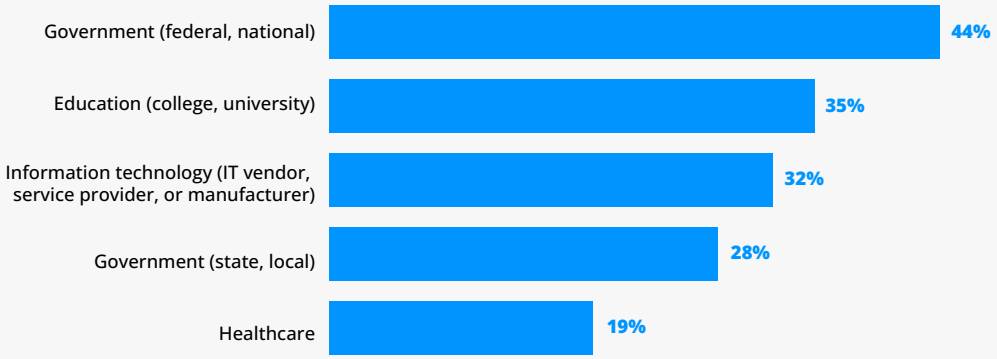
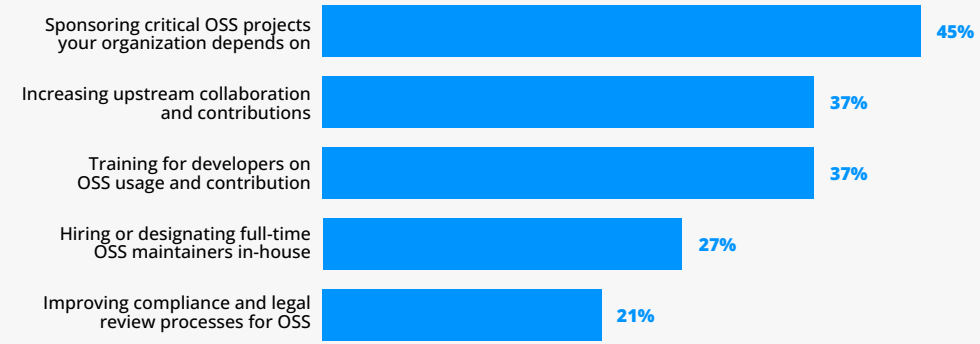


FIGURE 20

If your organization were to invest more in OSS over the next year, what would you prioritize funding or resourcing?

SELECT UP TO THREE RESPONSES | Source: 2025 World of Open Source Survey, Q22, Sample Size = 316, Total mentions = 653 (Europe only, top five shown)



Conclusion

European organisations demonstrate widespread OSS adoption yet significant strategic gaps remain between the recognition of the benefits of OSS and investments in OSS. This report reveals clear investment priorities that reflect Europe's ambition to move beyond passive consumption of OSS: building open source alternatives to technology monopolies, accelerating government adoption of OSS, and investing in the provision of OSS as digital public goods. In particular, the key technology domains where respondents would like to see more investments are operating systems, AI and machine learning, and cybersecurity. With the changing geopolitical landscape elevating OSS from a mere technical consideration to a strategic lever for digital sovereignty, it is timely that European organisations evolve from passive consumers to strategic leaders in OSS. The pathway forward demands coordinated investments in the maintenance of critical open digital infrastructure, targeted advocacy for policies and industrial strategies that boldly embrace open source, and proactive participation in the global OSS ecosystem.

Methodology

Survey

The research employed a mixed methods approach, combining a quantitative survey and 14 qualitative interviews. The methodology is explained below.

Survey design

The 2025 World of Open Source: Global Spotlight Survey included 45 questions on the themes of open source use, contribution, value, and sustainability. The survey was in the field in May 2025. For information about access to the 2025 World of Open Source: Global Spotlight project and survey instrument, see the Data. World access heading below.

Survey screening involved the use of four variables to validate the respondent. The respondent needed to answer all of the demographic questions.

- The respondent had to be at least somewhat familiar with the concept of OSS.
- The respondent needed to self-identify as a real person willing to share their OSS experience and perceptions.
- The respondent needed to be able to identify their employment status and represent an organization.

A total of 1,790 candidates started the global survey, 939 did not finish the survey or were disqualified due to our screening criteria, and 851 answered all questions of the survey. The margin of error for this sample size was ± 2.8% at a 90% confidence level. Regarding the data filtered for Europe and included in this report, 316 respondents completed the survey, who work for an organization that is headquartered in Europe. The margin of error for the European data is ± 4.7% at the 90% confidence level. The research team stratified data collection by company size and organisation type. The stratification was designed to allow segmentation by these variables, and other variables correlated with these.

Although respondents had to answer nearly all questions in the survey, there were times when the respondents were unable to answer a question because it was outside the scope of their role or experience. For this reason, we added a “Don’t know or not sure” (DKNS) response to the list of responses for nearly all questions. However, this creates a variety of analytical challenges.

One approach was to treat a DKNS just like any other response so that the percentage of respondents that answered the DKNS is known. The advantage of this approach is that it reports the exact distribution of data collected. The challenge with this approach is that it can distort the distribution of valid responses, i.e. responses where respondents could answer the question. Some of the analyses in this report exclude DKNS responses.

Excluding DKNS data from a question does not change the distribution of data (counts) for the other responses, but it does change the size of the denominator used to calculate the percentage of responses across the remaining responses. This has the effect of

proportionally increasing the percentage values of the remaining responses. Where we have elected to exclude DKNS data, the

footnote for the figure includes the phrase 'DKNS responses excluded'.

The percentage values in this report may not total exactly 100% due to rounding.

Survey demographics

The demographic data in Figure 21 illustrate the geographic distribution of the global survey. Respondents were asked to identify the region where their corporate headquarters is located. This question was used to filter the data to only include organisations from Europe in this Europe Spotlight report. 29% of the sample came from respondents working in organisations headquartered in the European Union, 6% in the UK and 2% in other non-EU European countries. While another 27% from organisations based in the United States. We focused efforts on gathering a sufficient sample from Japan to create a Japan Spotlight report from the survey results. We did receive input from other regions but at a lower rate.

The chart in Figure 22 shows the professional role of respondents and company size as measured by number of employees. The left-hand chart shows that approximately 66% of respondents were in IT roles. The right-hand chart shows that the size of the organisations surveyed ranges from microbusinesses with 1 to 10 employees to large organisations with more than 20,000 employees.

FIGURE 21: REGIONAL DISTRIBUTION OF THE 2025 WORLD OF OPEN SOURCE: GLOBAL SPOTLIGHT SURVEY RESPONDENTS

In what country or region does your organization have its headquarters?

SELECT ONE | Source: 2025 World of Open Source Survey, Q6, Sample size = 851

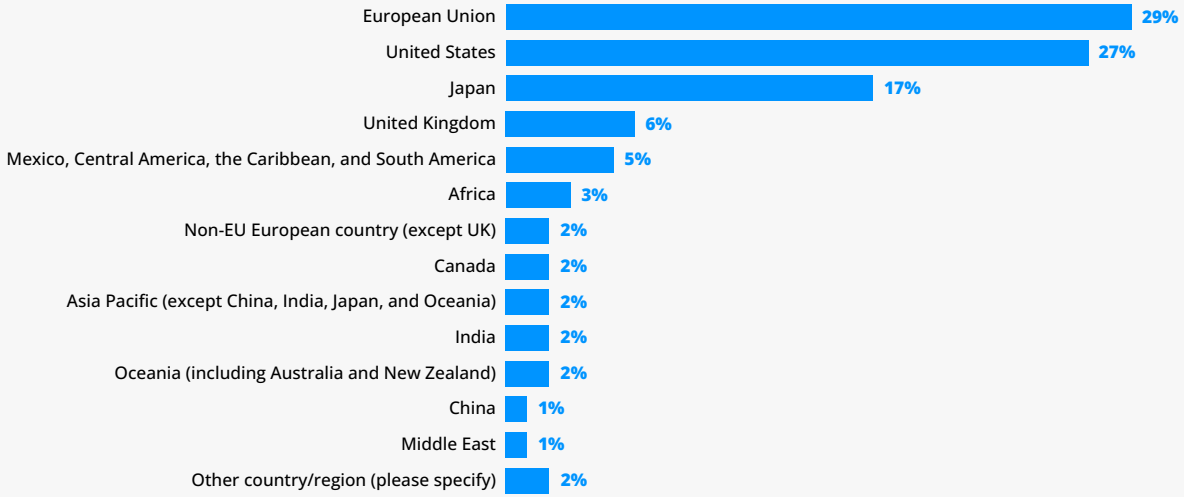
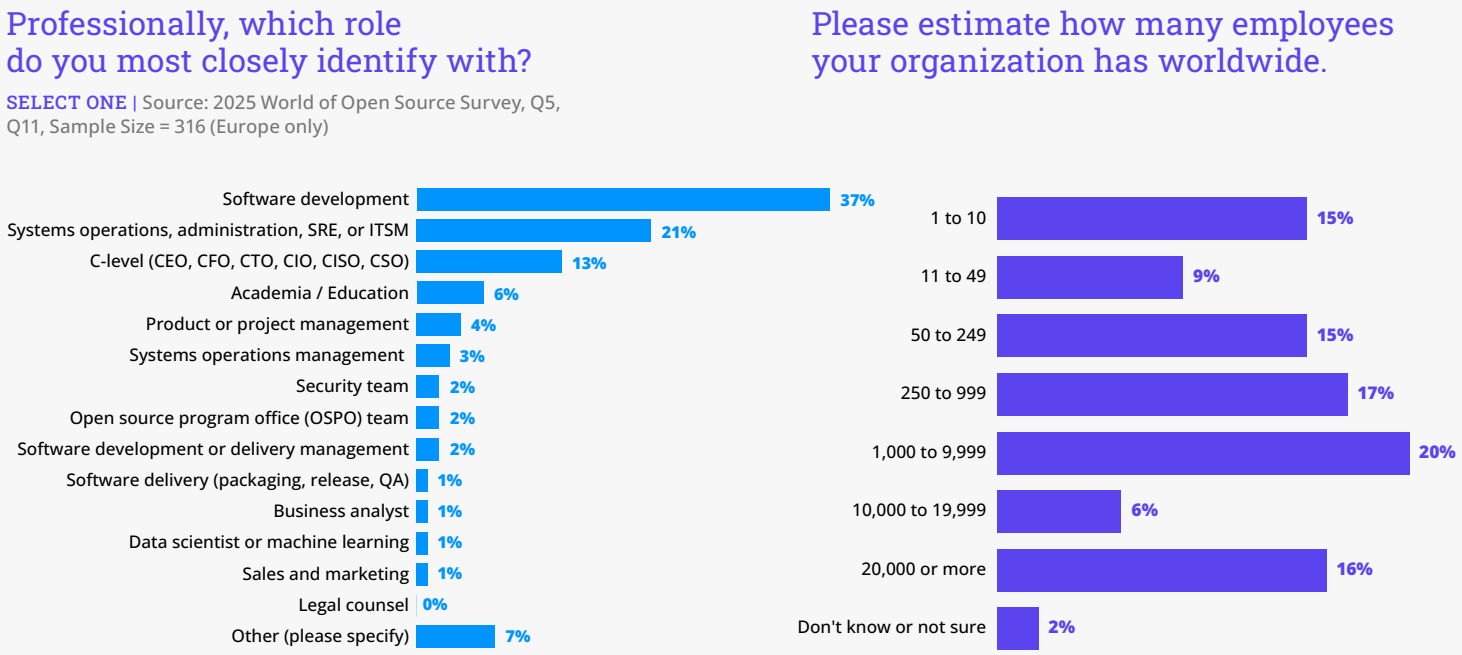


FIGURE 22: SELECTED DEMOGRAPHICS FROM THE 2025 WORLD OF OPEN SOURCE: GLOBAL SPOTLIGHT SURVEY FOR THE EUROPEAN REGION



The type of organisation is shown in the left-hand chart of Figure 23. Organisations where the primary revenue comes from IT products and services composed 39% of the sample. This could include hardware and software vendors, system integrators, cloud service providers, etc. 42% of the sample included industry-specific end-user organisations. We also received surveys completed from academic, non-profit, or governmental organisations (19%).

In the right-hand chart, respondents were able to report the industry their organisations are part of. Most respondents work for cross-industry IT vendors (29%), but a variety of industries are represented in the sample.

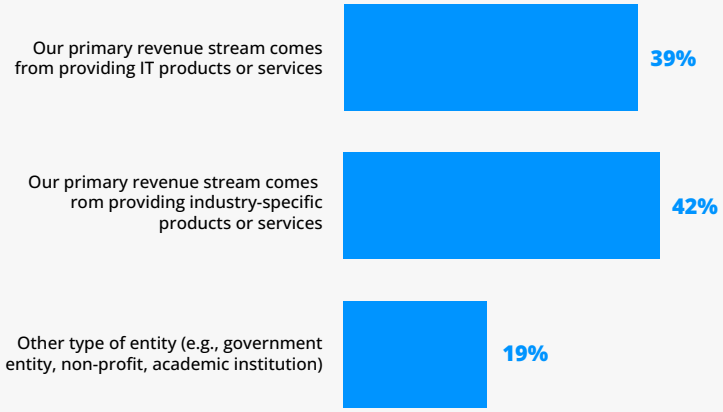
Interviews

To complement the quantitative findings, we conducted 14 semi-structured interviews with experts from diverse sectors and countries in Europe. The interview sample comprised eight respondents from the private sector, three from the public sector, and four from non-profit organisations. The respondents came from eight countries, including Germany, Austria, the United Kingdom, Ireland, France, and Poland. The interviews were conducted digitally via videoconference or email between May and June 2025.

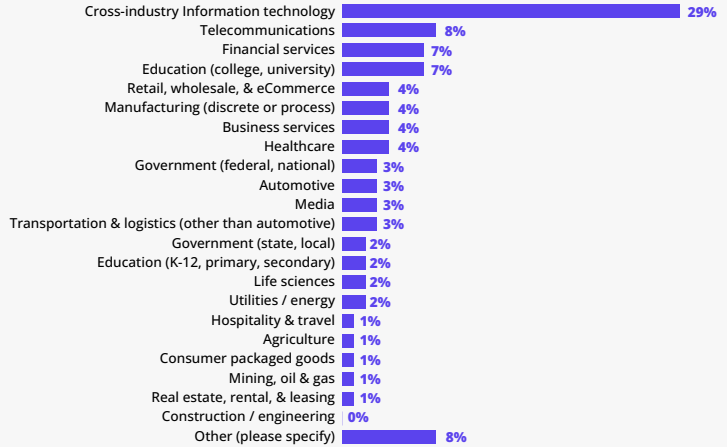
FIGURE 23: SELECTED DEMOGRAPHICS FROM THE 2025 WORLD OF OPEN SOURCE: GLOBAL SPOTLIGHT SURVEY FOR THE EUROPEAN REGION

Which type of company or entity do you work for?

SELECT ONE | Source: 2025 World of Open Source Survey, Q5, Q7, Q10, Sample Size = 316 (Europe only)



Which of the following best describes your organization's primary industry?



Resources

Open source maturity of organisations

- The TODO Group maintains resources that provide guidance regarding OSPOs, including the OSPO book, guides, and a 101 course. See more: todogroup.org

- FINOS provides a number of resources that support organisations in the financial services sector to engage with and contribute to the OSS ecosystem, such as the Open Source Readiness (OSR) handbook, training materials, and the OSR knowledge base. While the resources focus on the financial services sector, they apply more broadly to other sectors, too. See more: osr.finos.org/docs/bok/introduction

Public sector leadership in OSS adoption and development

- The Centre for Digital Sovereignty (Zentrum für Digitale Souveränität or ZenDis) in the German government is a central coordinating body for the promotion of OSS in the public administration in Germany. It builds OSS for the public administration, including the OpenCode platform for public sector software and OpenDesk, an office and collaboration suite for government use. See more: www.zendis.de

- The Free Software Unit under DINUM in the French government assists government agencies in increasing their use of OSS and supporting their efforts to publish source code. La Suite provides a collection of OSS tools for the public sector, including instant messaging, email, documents, spreadsheets, and video-conferencing. See more: code.gouv.fr/en and lasuite.numerique.gouv.fr/en

- The OS2 network in Denmark is a collaboration among public authorities that create, share, and maintain OSS solutions with the help of private IT suppliers. It is their philosophy that using open methods and sharing software can solve the common needs of the public sector in collaboration. See more: www.os2.eu

- The European Commission's Open Source Observatory (OSOR) provides a hub where the OSS community can come together to publish news, find out about events, find relevant OSS solutions and read about the use of OSS in public administrations across and beyond Europe. It also develops national-level reports about open source policies in each European country, case studies, and organises a variety of workshops for the European public sector, including OSOR Awards. See more: interoperable-europe.ec.europa.eu/collection/open-source-observatory-osor

- Cailean Osborne, Mirko Boehm, and Ana Jimenez Santamaria, "The European Public Sector Open Source Opportunity: Challenges and Recommendations for Europe's Open Source Future," foreword by Gabriele Columbro, The Linux Foundation, September 2023. www.linuxfoundation.org/research/european-public-sector-opportunity

Meeting points between the open source and policy worlds

- OpenForum Europe (OFE) is a not-for-profit, Brussels-based independent think tank that explains the merits of openness in computing to policymakers and communities across Europe. It supports an independent global network of OpenForum Academy Fellows and hosts a research-focused OpenForum Academy Symposium gathering global researchers focused on open source, policy, and technology impact. OpenForum Europe works closely with the European Commission, the European Parliament, and national and local governments. Every year, OFE hosts the EU Open Source Policy Summit, a unique event that bridges the gap between the highest level of European policymaking with representatives of open source communities and businesses. See more: summit.openforumeurope.org

Funding for OSS

- GitHub Sponsors allows the developer community to financially support the OSS projects they depend on, directly on GitHub, github.com/sponsors

- GitHub Secure Open Source Fund, resources.github.com/github-secure-open-source-fund

- thanks.dev is a platform that automatically distributes monthly donations from companies and developers across their open source dependency tree, making it easy to financially support the maintainers of all the projects they rely on rather than just the most popular ones. See more: thanks.dev/static/why

- Ben Hoyt, "Canonical + thanks.dev = giving back to open source developers", May 2025, canonical.com/blog/canonical-thanks-dev-giving-back-to-open-source-developers

- The Sovereign Tech Agency in Germany invests in the development, improvement, and maintenance of the open digital infrastructure of our economy and society. It comprises several programs, including the Sovereign Tech Fund which funds critical OSS projects, the Sovereign Tech Resilience program which supports security maintenance of critical OSS projects, and a maintainer-in-residence fellowship program which funds maintainers of critical OSS projects. See more: www.sovereign.tech

- The NGI initiative by the European Commission is a public funding initiative under Horizon Europe, which supports research and development of open internet technologies that support an Internet of Trust. The NGI initiative provided €140 million in funding to over 1,200 projects between 2019 and 2024, and has an additional budget of €32 million allocated for 2024–2027. See more: ngi.eu
- The Digital Infrastructure Insights Fund is a multi-funder initiative by Ford Foundation, Alfred P. Sloan Foundation, Omidyar Network, Schmidt Futures and Open Collective, which funds research that seeks to lead to a better understanding how open digital infrastructure is built and deployed. See more: infrastructureinsights.fund
- Sam Boysel, Frank Nagle, Hilary Carter, Anna Hermansen, Kevin Crosby, Jeff Luszcz, Stephanie Lincoln, Daniel Yue, Manuel Hoffmann, Alexander Staub. "2024 Open Source Software Funding Report". November 2024. opensourcefundingsurvey2024.com
- Cailean Osborne, Paul Sharratt, Dawn Foster, and Mirko Boehm, "A Toolkit for Measuring the Impacts of Public Funding on Open Source Software Development", November 2024, arxiv.org/abs/2411.06027

Cybersecurity and CRA readiness

- OpenSSF Global Cyber Policy Working Group, github.com/ossf/wg-globalcyberpolicy
- Understanding the EU Cyber Resilience Act (CRA) (LFEL1001), training.linuxfoundation.org/express-learning/understanding-the-eu-cyber-resilience-act-cra-lfel1001
- Alpha-Omega is an associated project of the OpenSSF that is funded by Microsoft, Google, and Amazon with the mission to protect society by catalysing sustainable security improvements to the most critical OSS projects and ecosystems. See more: alpha-omega.dev
- The Eclipse Foundation's Open Regulatory Compliance Working Group (ORCWG) develops and maintains community resources designed to demystify the CRA and provide practical guidance. See more: orcwg.org
- Adrienn Lawson, Stephen Hendrick, "Unaware and Uncertain: The Stark Realities of Cyber Resilience Act Readiness in Open Source," foreword by Christopher (CRob) Robinson, The Linux Foundation, March 2025. www.linuxfoundation.org/research/cra-readiness
- Mirko Boehm, Hilary Carter, and Cailean Osborne, "Pathways to Cybersecurity Best Practices in Open Source: How the Civil Infrastructure Platform, Yocto Project, and Zephyr Project are Closing the Gap

to Meeting the Requirements of the Cyber Resilience Act," Foreword by Miriam Seyffarth, The Linux Foundation, March 2025. www.linuxfoundation.org/research/cra-compliance-best-practices

Open source AI

- Lucie-Aimée Kaffee and Yacine Jernite, "Open Source AI: A Cornerstone of Digital Sovereignty", June 2025, huggingface.co/blog/frimelle/sovereignty-and-open-source

- Matt White, Ibrahim Haddad, Cailean Osborne, Xiao-Yang Yanglet Liu, Ahmed Abdelmonsef, Sachin Varghese, and Arnaud Le Hors, "The Model Openness Framework: Promoting Completeness and Openness for Reproducibility, Transparency, and Usability in Artificial Intelligence", 2024, arxiv.org/abs/2403.13784

- Cailean Osborne, "What Open Source Developers Need to Know about the EU AI Act", April 2025, linuxfoundation.eu/newsroom/ai-act-explainer

- Anna Hermansen and Cailean Osborne, "The Economic and Workforce Impacts of Open Source AI: Insights from Industry, Academia, and Open Source Research Publications," The Linux Foundation, May 2025, www.linuxfoundation.org/research/economic-impacts-of-open-source-ai?hsLang=en

- Adrienn Lawson, Stephen Hendrick, Nancy Rausch, Jeffrey Sica, Marco Gerosa, "Shaping the Future of Generative AI: The Impact of Open Source Innovation," foreword by Hilary Carter, The Linux Foundation, November 2024, www.linuxfoundation.org/research/gen-ai-2024?hsLang=en

- The UK AI Security Institute open-sourced Inspect, an open source framework for LLM evaluations. See more: inspect.aisi.org.uk

- France announces €32 million of funding for scikit-learn, a Python library for machine learning, and the development of OSS for data science in its national AI strategy. 2021. www.economie.gouv.fr/actualites/strategie-nationale-intelligence-artificielle

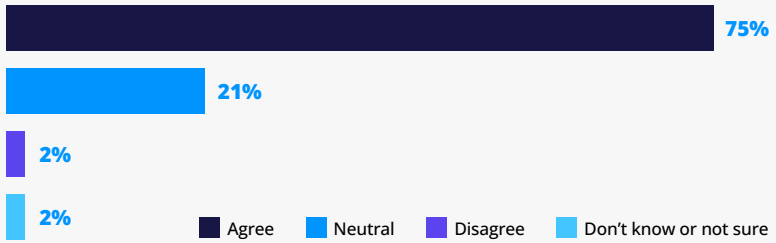
- LLM Leaderboard for the French language on Hugging Face. huggingface.co/spaces/fr-gouv-coordination-ia/llm_leaderboard_fr#

- OpenUK, "AI Openness Update: From Agentic to Public Good in 2025," 2025, openuk.uk/stateofopen/publicgoodai

Appendix

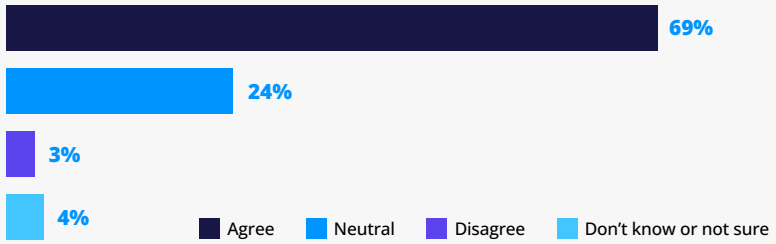
A1: To what extent do you agree or disagree that an open source approach to software development leads to higher code quality?

SELECT ONE | Source: 2025 World of Open Source Survey, Sample Size = 316 (Europe only)



A2: To what extent do you agree or disagree that engaging in open source projects makes your organization more competitive?

SELECT ONE | Source: 2025 World of Open Source Survey, Sample Size = 316 (Europe only)



About the authors

Cailean Osborne, PhD is a Senior Researcher at the Linux Foundation, where he leads strategic research, advocacy, and the development of community resources to support the growth of open source AI ecosystems. Previously, as the International Policy Lead at the UK Government's Centre for Data Ethics and Innovation, he co-authored the UK's AI Strategy and led engagements on AI governance with global governments and intergovernmental institutions. He has a PhD in Social Data Science from the University of Oxford, where he specialised in the political economy of open source AI. During his PhD, he was a visiting researcher at the Open Source Software Data Analytics Lab at Peking University. He is based in Berlin, Germany.

Adrienn Lawson serves as Director of Quantitative Research at the Linux Foundation, where she leads data-driven initiatives to understand open source ecosystems. With expertise in social data science from the University of Oxford and a background spanning academic and governmental research, she brings methodological rigor to analyzing distributed collaboration networks. At the Linux Foundation, Adrienn leads a team conducting cross-sectional research across industry verticals and geographic regions to provide comprehensive insights into open source dynamics. Her work encompasses empirical investigations into regulatory compliance, the implications of AI, and sustainable funding models. She produces evidence-based recommendations that inform strategic decision-making within the open source community.

Acknowledgments

This report would not be possible without the support of Canonical. We thank all the people who participated in the survey. Special thanks to Linux Foundation colleagues and external experts for their involvement in the various stages of the research process: Hilary Carter, Anna Hermansen, Mirko Böhm, Philippe Ensarguet, Lucian Balea, Paloma Oliveira, Dr. Lucie-Aimée Kaffee, James McLeod, Dr. Dawn Foster, Miriam Seyffarth, Tony Shannon, Jon Seager, Felix Reda, Yann Lechelle, Katharina Meyer, Ryszard Łuczyn, and Nicholas Gates.

twitter.com/linuxfoundation

facebook.com/TheLinuxFoundation

linkedin.com/company/the-linux-foundation

youtube.com/user/TheLinuxFoundation

github.com/LF-Engineering

August 2025

To reference this work, please cite as follows: Cailean Osborne and Adrienn Lawson, "Open Source as Europe's Strategic Advantage: Trends, Barriers, and Priorities for the European Open Source Community amid Regulatory and Geopolitical Shifts", foreword by Cédric Gégout, The Linux Foundation, August 2025.

Canonical

Canonical, the publisher of Ubuntu, provides open source security, support and services. Our portfolio covers critical systems, from the smallest devices to the largest clouds, from the kernel to containers, from databases to AI. With customers that include top tech brands, emerging startups, governments and home users, Canonical delivers trusted open source for everyone.

Learn more at canonical.com

THE LINUX FOUNDATION | Research

Founded in 2021, Linux Foundation Research explores the growing scale of open source collaboration, providing insight into emerging technology trends, best practices, and the global impact of open source projects. By leveraging project databases and networks and committing to best practices in quantitative and qualitative methodologies, Linux Foundation Research is creating the go-to library for open source insights for the benefit of organizations worldwide.