



World of
Open Source

Open Source Maturity in Europe

Milestones, Opportunities,
and Pathways in 2024

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September 2024

Open Source Maturity in Europe

The understanding of digital sovereignty is evolving in Europe, with a higher emphasis on global collaboration to solve technological and organisational challenges.



Confidence in the security of OSS is high, with 73% in 2023 and 76% in 2024 believing OSS to be more secure than closed software.



74% of individual respondents cite learning and personal development as key motivators for contributing to open source.



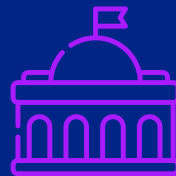
Mentorship programs are fundamental in bridging the gap for underrepresented groups, creating a more inclusive and diverse open source ecosystem.

The top three sectors that would benefit most from open source are IT (37%), government (36%), and higher education (30%).



Only 30% and 17% of organisations in the public and education sectors report having an open source strategy.

OSPOs are a key mechanism for fostering inter-organisational open source collaboration in the public sector.



82% of respondents agree that software developed with public funds should be open source, as per the 'public money, public code' principle.

Open source is increasingly seen as critical digital infrastructure, with experts calling for long-term investments in people and ecosystems.



43% of survey respondents believe AI / ML would benefit most from being open source, highlighting the growing importance of open and transparent AI development in Europe.



The EU AI Act's open source exception presents an opportunity for enhancing open collaboration on AI models, safety, & open data access.



The success of European startups is giving visibility to European talent and potential in open source AI innovation.



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Foreword

Open source has come a long way since the 1980s and is now broadly seen as key lever to enhance global cooperation and innovation. And it goes well beyond that! The open source movement has reached cities, states, and governments — and even the United Nations: The ‘OSPOs for Good’ symposium¹ took place in July 2024 at the UN Headquarters in New York; it brought together a diverse crowd of Open Source thinkers to discuss the role of OS practices and Open Source Program Offices (OSPOs) to drive forward innovation for the greater good. As emerging examples of ‘open source for good’ from across the globe were presented, it became clear that open collaboration can truly contribute to tackling global challenges, as outlined in the UN’s 17 Sustainable Development Goals, including sustainability itself, consumption, climate, diversity, and even human rights.

One of the key findings of this Linux Foundation Research report is that few organizations in the public and education sectors have an open source strategy. At Mercedes-Benz, we have been using free and open source software (FOSS) for around 20 years. During this time, FOSS became an increasingly important pillar for us, eventually culminating in a Board of Management-approved FOSS strategy in 2018. Only with such a strategy are contributors able to engage in open source in a concerted and organized fashion for the benefit of all. Thus, our recommendation is that organizations implement such a strategy for themselves as well.

As you will find in this report, open development models are seen to greatly enhance software security and quality, and learning and personal growth is a key motivator to participate

in open source. For us, the realization that FOSS is beneficial and absolutely essential for software work was also partly a grassroots movement within the company. Today, we are working hard towards being a good citizen of the worldwide open source community, striving to contribute more and more and to get better.

In the spirit of open source, we are learning by doing and hope to serve as an example for others. Mercedes-Benz is a member of several open source foundations, either directly or through our tech subsidiaries, as we believe that these foundations are doing invaluable work for the advancement of FOSS.

This report also highlights the compounding value from open source and the call for long-term investments in people and ecosystems. To support this, Mercedes-Benz sponsors selected open source conferences and projects financially. This ensures our software’s longevity and sustainability so that maintainers of crucial parts of today’s software infrastructure don’t need to do this in addition to their day jobs. We hope that more and more will follow suit — combined forces from many can lead to a significant change for the better.

One of the key pillars of our open source efforts is our Mercedes-Benz FOSS Manifesto.² It is a set of guidelines and core values which explicitly sends our employees on their open source mission, knowing well that they are fully supported by the company. We think that the FOSS Manifesto will drive forward the cultural change towards open source and profoundly impact the way in which software is developed at corporate level.

¹ <https://www.un.org/techenvoy/content/ospos-good-2024>

² <https://opensource.mercedes-benz.com/manifesto/>

Several reputed tech companies have followed our example and subsequently published their open source manifestos, a move we find absolutely amazing and indicative of their commitment to open source. At the United Nations, work is under way to publish the UN's 'Open Source Principles,' and I am convinced that such principles, coming from the UN, will have a far-reaching impact.

This report will give readers a good sense of what challenges lie ahead. Software security, safety, digital autonomy, and open source AI are but a few; and the software industry's shift from unregulated to regulated, driven by the Cyber Resilience Act, marks a pivotal change for the next three years. As you read this report, I want to thank you for being a part of the open source world. I have humbly learned that every contribution, however small it may be, counts. Mine, yours, ours, and everybody else's. At the OSPOs for Good symposium, it became particularly clear that this form of global cooperation can really help to make the world a better place. So:

See you in open source!

DR WOLFGANG GEHRING

FOSS Ambassador & OSPO Lead,
Mercedes-Benz Tech Innovation GmbH





Executive Summary

Open source software (OSS) has become integral to Europe's digital landscape. It drives innovation, fosters collaboration, and supports digital autonomy across various sectors. There is growing recognition of its value in enhancing software security, reducing lock-in, and promoting technology transfer. The open source landscape in Europe is now at a critical juncture, with strong support for open source principles but significant challenges to address.

Success will depend on coordinated efforts across multiple fronts, including sustained investment in technologies and skills development, reform of procurement practices, and clearer regulatory guidance. By leveraging its strengths and addressing these challenges, Europe has the opportunity to position itself as a global leader in open source innovation and development.

This report examines the current trends, opportunities, and challenges facing the open source ecosystem in Europe based on the Linux Foundation's annual World of Open Source survey and in-depth interviews with industry experts, policymakers, and community leaders. The key findings include the following.

Evolving open source benefits and barriers in Europe

Over the surveyed years (2022 to 2024), more than half of the respondents each year reported an increase in value from using and contributing to OSS compared to the previous year. This trend suggests a compounding effect, where the value derived from OSS grows annually. Open source offers significant benefits to individuals and organisations, including learning opportunities, cost savings, and reduced vendor lock-in. However, several barriers hinder participation and adoption, including skills gaps, organi-

sational inertia, outdated technology stacks, and procurement practices ill-suited to open source.

Open source investment priorities

The survey identifies IT, government, and higher education as the sectors that would benefit most from open source investments. There is strong support for open source as an alternative to technology monopolies and as critical digital infrastructure. Experts advocate for long-term investments in the developer communities and ecosystems that sustain OSS.

The public sector opportunity

The public sector presents a significant opportunity for open source adoption and development in Europe. There is strong support for government investment in open source, with respondents emphasising its importance for both government adoption and as a digital public good. However, challenges persist, including outdated regulations and procurement practices ill-suited to open source.

High-interest areas: Security and AI

Open source is gaining traction in security and artificial intelligence (AI). The survey reveals high trust in open source approaches for enhancing software security. In AI, there is growing momentum for open development, driven by industry trends and regulatory developments. The growing recognition of open source AI startups is giving more visibility to European talent and innovation. However, challenges remain in defining 'open source AI' and addressing safety concerns due to limited transparency and availability of key components required to study and audit open AI models.

A maturing regulatory landscape

2023 marks a watershed moment for open source in Europe, with 'free and open source software' prominently mentioned in the Cyber Resilience Act. This highlights a shift in how the European Union (EU) embraces regulation of digital products, including open source, as an instrument to foster cybersecurity and competition. However, it also introduces new complexities for the open source community to navigate. Both industry and the public sector face a skills gap in digital and open source technologies, complicating adaptation to the changing regulatory and competitive environment. There is also tension between national and European regulation and the global nature of open source collaboration, requiring careful consideration in policymaking.

Introduction

As Europe navigates the complexities of digital transformation in an increasingly interconnected world, open source has emerged as a driving force for innovation, a catalyst for collaboration, and a cornerstone of digital autonomy across the continent. A wide spectrum of sectors and technologies have felt its impact, from cutting-edge AI and cybersecurity solutions to the digitalisation of public services.

This report presents a comprehensive overview of the current trends, emerging opportunities, and persistent challenges facing the open source ecosystem in Europe based on the findings from the Linux Foundation's annual World of Open Source survey and in-depth interviews with a diverse range of stakeholders, including industry experts, policymakers, community leaders, and open source practitioners. It delves into how European stakeholders are leveraging the multifaceted benefits of open source, addressing the barriers to its adoption, and shaping policies to nurture a thriving and sustainable open source community.

Our research reveals a strong and growing commitment to open source principles across Europe. There is increasing recognition of its value in enhancing software security, driving innovation, promoting digital sovereignty, and fostering a collaborative approach to solving technological and organisational challenges. The 'public money, public code' principle is gaining traction, reflecting a shift towards greater transparency and accountability in publicly funded software development. The concept of digital

sovereignty is changing, too, with a growing recognition of the importance of participating in and fostering both regional and global open source communities.

However, the path to widespread open source adoption in various sectors is not without obstacles. Our findings highlight persistent challenges, including skills gaps, organisational inertia, and regulatory uncertainty. The recent introduction of regulations in the EU such as the Cyber Resilience Act and the AI Act, while aimed at enhancing security and trust, have also introduced new complexities for the open source community to navigate.

This report provides insights into these trends and offers actionable recommendations for fostering a more vibrant, inclusive, and resilient open source ecosystem in Europe. By examining success stories, identifying best practices, and analysing the interplay between policy, technology, and community, we seek to contribute to the ongoing dialogue about the role of open source in shaping Europe's digital future.

As we explore these themes, it becomes clear that open source is not just about technological innovation; it's about cultivating a mindset of openness, collaboration, and shared progress. This report invites open source contributors, policymakers, developers, business leaders, and citizens to engage with the opportunities and challenges presented by open source and to play an active role in harnessing its potential for the benefit of all Europeans.

Key developments since 2023

The World of Open Source: Europe Spotlight report, now in its third year since beginning in 2022, consistently demonstrates that organisations recognise the increasing value of engaging with OSS. As shown in Figure 1, over the three surveyed years—2022, 2023, and 2024—more than half of the respondents each year reported seeing an increased business value from using OSS compared to the previous year. This year an even higher percentage of organisations (64%) reported a rise in business value from the year before. This indicates a compounding effect, where the value derived from OSS grows each year. Similarly, the benefits from contributions are also on the rise, with 52% of respondents in recent surveys reporting increased benefits compared to prior years.

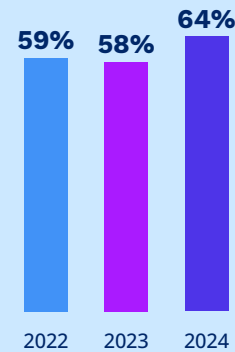
Figure 2 shows that in 2023, the aspects of the industry that benefited most from OSS included increased productivity (62%), catalysed innovation (61%), and reduced operating costs (60%). The aspects most appreciated in 2024 have shifted slightly, reflecting changing priorities rather than a decrease in benefits derived from these areas. Annual events and evolving trends within the industry influence this shift. Industry standards and interoperability (66%), innovation (66%), and productivity (55%) rank highest in 2024.

Confidence in the security of OSS remains high in 2024 as demonstrated by our data in Figure 3. In 2023, 73% of respondents believed OSS to be more secure than closed source software, and this number increased to 76% in 2024. These trends could show increasing confidence in OSS, not just in terms of security, but also in how it contributes to business value and operational effectiveness within European organisations.

FIGURE 1
ANNUAL INCREASE IN PERCEIVED BUSINESS VALUE AND BENEFITS FROM OSS USE AND CONTRIBUTION

Over the last year, how has the business value your organisation derives from OSS use changed?
(select one)

% of respondents who answered 'Increased':



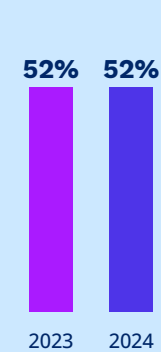
2022 World of Open Source Survey (Europe), Q16, Sample Size = 615 (DKNS excluded)

2023 World of Open Source Survey (Europe), Q20, Sample Size = 205 (DKNS excluded)

2024 World of Open Source Survey (Europe), Q33, Sample Size = 248 (DKNS excluded)

Over the last year, has the overall benefits your organisation derives from OSS contributions changed?
(select one)

% of respondents who answered 'Increased':



This question was not yet asked in 2022.

2023 World of Open Source Survey (Europe), Q27, Sample Size = 170 (DKNS excluded)

2024 World of Open Source Survey (Europe), Q39, Sample Size = 214 (DKNS excluded)

FIGURE 2

TOP INDUSTRY BENEFITS FROM OSS IN 2023 AND 2024: SHIFTING PRIORITIES AND KEY AREAS

Which aspects of your industry do you think would most benefit from open source? (select all that apply)

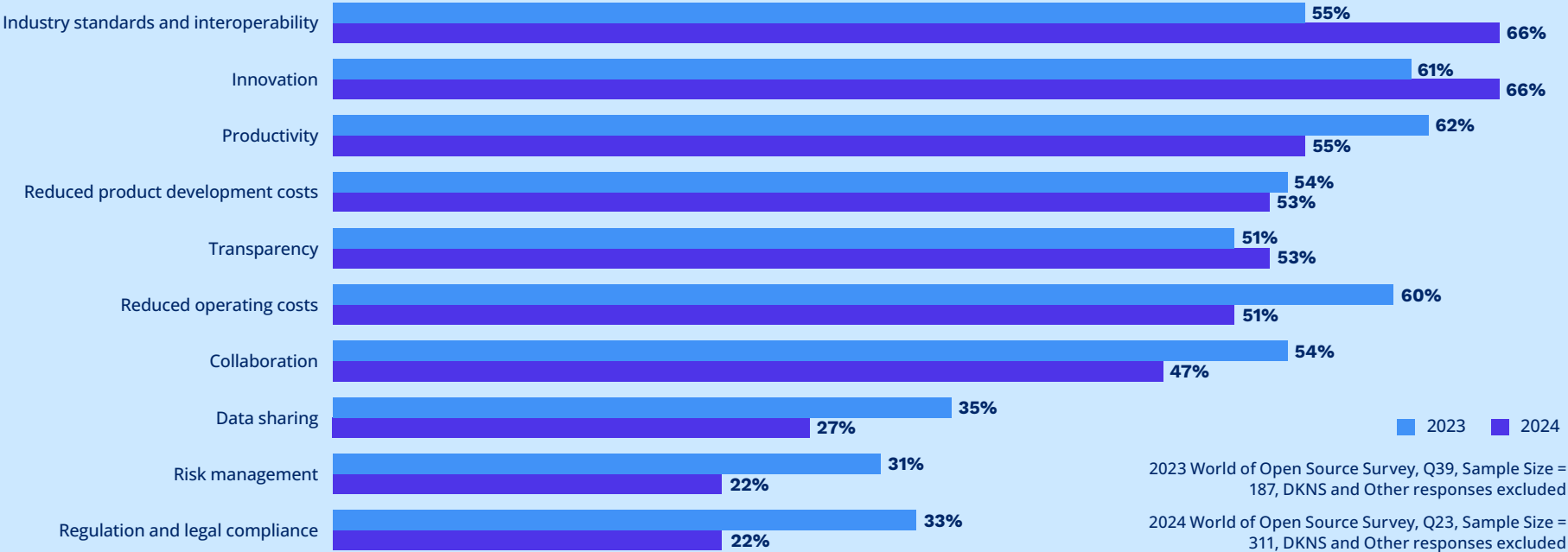
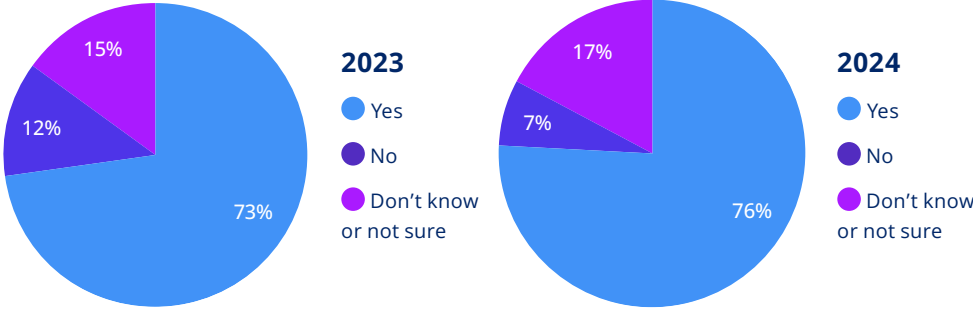


FIGURE 3
CONFIDENCE IN THE SECURITY OF OSS REMAINS HIGH IN 2024

Do you believe that OSS is more secure than closed source software? (select one)

2023 World of Open Source Survey, Q21, Sample Size = 237
 2024 World of Open Source Survey, Q19, Sample Size = 328



Leveraging key benefits of open source and addressing barriers to its use

The survey and interviews illustrate that open source offers significant benefits to individuals and organisations, including learning opportunities, cost savings, and reduced vendor lock-in. However, several barriers hinder participation and adoption, including skills gaps, organisational inertia, outdated technology stacks, and procurement practices that are not suitable for open source. Addressing these challenges requires a multifaceted approach, encompassing education, mentorship, cultural shifts, and policy reforms. By leveraging the benefits and systematically addressing the barriers, Europe can support the further growth

of a vibrant and inclusive open source ecosystem that aligns with its values and drives innovation across sectors.

Key benefits and drivers for both individuals and organisations

The survey results show a strong commitment among community members to engage deeply in open source projects. As shown in Figure 4, 74% of respondents cite learning and personal development as key motivators for contributing. In 2023, this

FIGURE 4

KEY MOTIVATORS FOR CONTRIBUTING TO OSS PROJECTS

How influential are the following factors when considering whether or not to contribute your personal time to OSS projects? (select one response per row)

Percentage of respondents who answered 'Very influential':



2023 World of Open Source Survey (Europe), Q34, Sample Size = 209, (respondents who answered 'Extremely or Very influential')

2024 World of Open Source Survey (Europe), Q47, Sample Size = 180, (answered by those who actively participate in OSS projects in Q44)

motivator was also the top influencing factor, although a lower percentage of respondents, 62%, indicated it. In 2024, another significant motivator emerged, with 68% of respondents attracted to projects they find fascinating or use regularly, an option not included in the 2023 survey.

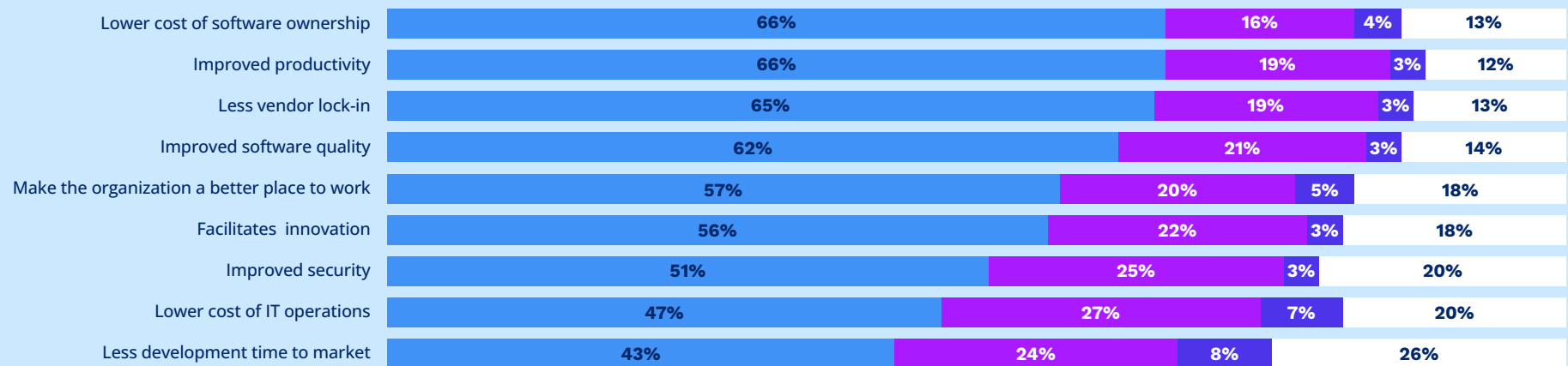
The social aspects of open source further support this enthusiasm, with 59% of respondents indicating that the enjoyment of collaboration with peers and the community is a very influential factor in 2024. The interviewees reinforce these findings. Speaking to the emerging open source AI community, Jennifer Ding from the Alan Turing Institute in the UK highlights that grassroots

initiatives, such as the Hugging Face BigScience Workshop and Cohere for AI's Expedition Aya, offer valuable upskilling and learning opportunities for students and experienced practitioners alike and enable wider participation in the development of AI models.

There is a strong recognition of the benefits of open source for organisations, which further demonstrates how it opens the market for competition. Figure 5 shows how 66% of survey respondents report that using OSS often leads to lower costs in software ownership, with 47% noting reduced IT operations costs, which is particularly beneficial for startups and smaller companies looking to reduce expenses. Furthermore, 66% and 43% of respondents

FIGURE 5 OSS LOWERS COST AND IMPROVES PRODUCTIVITY, SOFTWARE QUALITY, AND SECURITY

How often does using OSS deliver the following benefits in your organisation? (select one response per row)



2023 World of Open Source Survey (Europe), Q34, Sample Size = 209, (respondents who answered 'Extremely or Very influential')

2024 World of Open Source Survey (Europe), Q47, Sample Size = 180, (answered by those who actively participate in OSS projects in Q44)

Often Sometimes
Rarely Don't know or not sure

respectively have observed improved productivity and faster development times, enabling a faster market entry. Moreover, 65% and 62% of respondents appreciate the reduced dependency on specific vendors and improved software quality that open source offers. This allows more freedom to adapt software or change providers without facing significant challenges. Monique Calisti, CEO of Martel Innovate, points out, however, that the main challenges in breaking out of lock-in situations depend on the specific sectors and cannot be generalised. The survey also shows that 56% of respondents recognise open source as a stimulus for innovation through its collaborative approach to technology development.

Beyond technical benefits, open source contributes to broader societal values. Monique observes that 'openness principles match European values', as they foster participation and increase transparency as well as the contestability of markets by lowering some key entry barriers. Paloma Oliveira, a growth engineer at Sauce Labs and FOSS advocate, adds, 'Open source collaboration is more than just about software; it teaches you a way of living and working together, and this is one of the main benefits for Europe'.

However, it's important to note the global nature of open source benefits. Timo Perälä from Nokia emphasises that we should not look at open source as a regional phenomenon; rather, our approach should be global. He feels that if open source is a global phenomenon rather than regional, the focus, promotion and support that Linux Foundation Europe provides to the European open source landscape is especially valuable. Similarly, Tony Shannon, head of digital services at the government of Ireland, cautions against creating a 'moat around European innovation' and stresses that the best OSS does not obey borders. While we should be looking to foster open source development in Europe, we must be mindful that we cannot control it within Europe and that we benefit from global contributions and collaboration.

Addressing obstacles for individuals and organisations

Despite the high interest in participation, individual contributors and organisations across sectors face several hurdles. The most common obstacle is the lack of time due to personal or professional commitments, affecting 73% of the participants (Figure 6). A lack of organisational policies inhibits some source activity during working hours. Thomas Steenbergen, an open source practitioner and expert, emphasises that in many European companies, either due to a lack of organisational policies permitting open source contributions or due to overly cumbersome policies, developers often contribute to OSS in their personal time rather than as part of their work duties. Other significant challenges include difficulties with understanding project guidelines (33%) and the fear of negative feedback (31%).

Skills and knowledge gaps

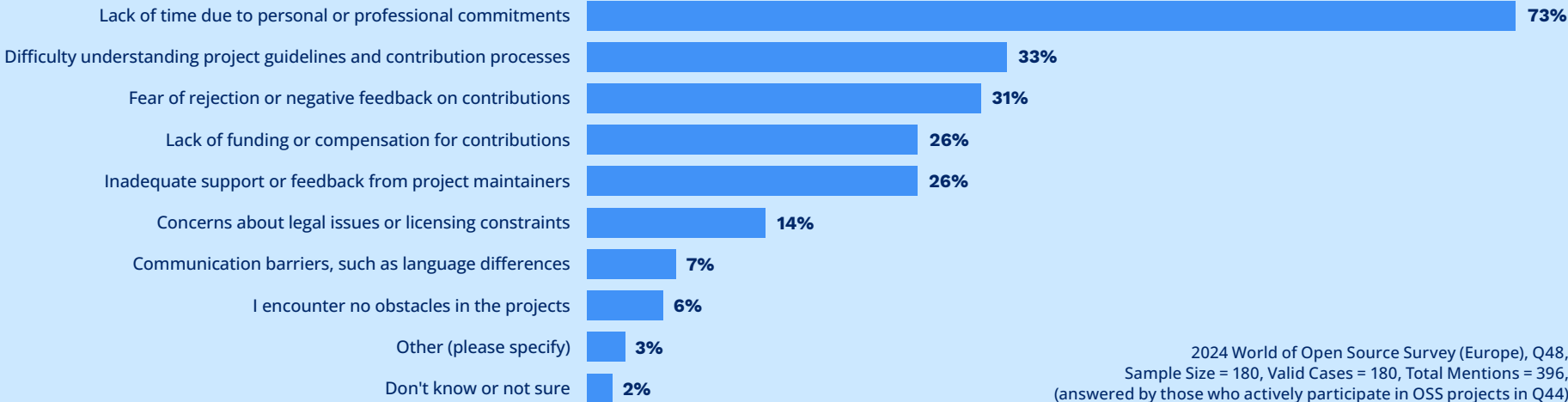
Interviewees point to a remaining skill and capacity gap that hinders participation in open source development, which is in part technical and in part cultural. Participating in distributed development and collective decision-making is a way of thinking and working that both individuals and organisations must learn. Interviews highlighted that these gaps are particularly prominent in the public sector and non-digital native sectors such as manufacturing, automotive, and finance. Codified processes in regulated industries such as healthcare, pharmaceuticals, or biotech rarely consider open development practices.

In addition to technical skills gaps, other barriers to participation remain, which limit the perspectives and talent that contribute to open source. Paloma Oliveira highlights language as a major barrier in Europe, noting that Europe is the home to many languages and cultural differences, yet the English lingua franca and norms can be challenging for contributors. 'The English dominance is problematic. It creates language barriers and

FIGURE 6

LACK OF TIME IS THE NUMBER ONE OBSTACLE WHEN CONTRIBUTING TO OSS PROJECTS

What obstacles do you encounter when contributing to OSS projects? (select all that apply)



2024 World of Open Source Survey (Europe), Q48, Sample Size = 180, Valid Cases = 180, Total Mentions = 396, (answered by those who actively participate in OSS projects in Q44)

prevents many contributors from participating equally, as they must express themselves in a non-native language, which can cause misunderstandings and conflicts', she explains.

The interviewees highlighted the importance of outreach and mentorship for addressing knowledge and skills gaps. For example, drawing on her experience at **PyLadies**, Oliveira emphasises the crucial role of mentorship and creating tailor-made spaces to bridge the gaps that the community needs instead of repeating models that only work for a few. She highlights that collaboration, feeling safe and supported, and having role models go a long way in fostering inclusivity. Such initiatives are key to addressing barriers to open source's

diversity problem. According to Oliveira, communities such as **PyLadies** provide both technical and emotional support to marginalised and underrepresented genders, including but not limited to non-binary people, trans people, and women, to become active participants and leaders in the Python and wider open source community.

Catering to the broader life circumstances of potential contributors can also be an effective way to facilitate participation and equip newcomers with open source skills and know-how. Oliveira points to the family-friendly arrangements at the annual **COSCU**P conference in Taiwan, which provides spaces and activities for families. This allows parents to participate without sacrificing

family responsibilities and educates both children and grandparents about the many ways to become involved beyond coding, ensuring the inclusion of both parents and the next generation.

Organisational inertia and cultural resistance

A significant obstacle to open source adoption lies in resistant organisational cultures, which is a particular challenge in sectors traditionally resistant to openness, such as finance. Open source is often mistakenly viewed as merely a technical matter when in fact, 'it is a cultural change—it is a change maker and needs to be approached in a multidimensional strategy', Monique explains. There is a clear need for a holistic approach to open source adoption, one that addresses not just technological implementation but also organisational culture and mindset.

A major obstacle is that few major companies in Europe originated as software houses, and, despite the significance of software for remaining competitive in the digital economy, many companies do not see software as their core competency. Daniel Izquierdo Cortázar from Bitergia pinpoints the crux of the issue: 'The main barrier to contributing is the mindset of decision-makers in European companies, where traditionally software was not seen as a valuable asset.' Both in the public and private sectors, organisations tend to outsource and procure software development, creating dependencies on software vendors and a culture that is unfriendly to open source, as we discuss in more detail in the next section.

This cultural resistance is compounded by a lack of understanding of the value and mechanics of open source. According to Ulf Timerdahl from Föreningen Sambruk, misconceptions, including myths about the lack of management structures in open source projects and concerns over scalability and support, often hinder open source approaches to digital transformation in the Swedish public sector. To address these obstacles, Jacco Brouwer from the Dutch Association of Municipalities advocates for a shift

towards a more entrepreneurial approach in the public sector: 'We need to adopt an entrepreneurial mindset, which is lacking. We need to start executing, doing, experimenting, learning, and learning from failure'.

Persistent outsourcing and procurement processes

A significant obstacle to open source adoption in Europe is the prevalence of outdated technology stacks in many organisations. Thomas Steenbergen highlights this issue, noting that 'many European companies are not traditional software houses; originally, that was not seen as a core competence, so a lot of them have not invested in keeping their stacks modern and up to date or hiring / retaining top tech talent'. This lack of investment and missing on software as a core competency has led to a culture of outsourcing software needs to IT vendors.

This challenge is particularly noticeable in the public sector, where the prevalent procurement culture favours established vendors and can make it difficult for open source solutions to compete. Per Persson from the Sundsvall municipality in Sweden highlights the challenge of 'vendor inertia', noting the difficulty in getting established software vendors to change their licenses and willingness to pivot their business models to support open source adoption in the public sector. He emphasises that a key priority is 'to figure out how we get vendors who traditionally sell licenses to open up their software', proposing that governments can use their purchasing power to pressure vendors to open their software and change their business models.

There is also a mismatch between EU procurement law, which ensures fair competition between different vendors, and the collaborative nature of open source development. Fiona Krakenbürger from the Sovereign Tech Fund (STF) explained that procurement law could be better adapted to the realities of OSS development, especially for the infrastructure technologies that the STF supports. In many cases, a single person maintains these



technologies, evading common market and competition logic. In addition, public procurement of software must have a legally-established prioritization of OSS to strengthen open source in public administration. Similarly, there are concerns about the opportunities for small open source companies, whose voices are often diluted in procurement processes. Daniel Izquierdo Cortázar proposes that governments could promote policies that reduce the bureaucratic processes for small companies to help level the playing field for smaller open source providers.

FIGURE 7

THE TOP THREE SECTORS THAT WOULD MOST BENEFIT FROM OPEN SOURCE: IT, GOVERNMENT, AND HIGHER EDUCATION

Which sectors do you think would most benefit from investing in open source? (select between one and three responses)



Where open source needs investments

Open source investments promise significant benefits across various sectors, with IT, government, and higher education identified as the top potential beneficiaries. However, the survey and interviews highlight that there is still a noticeable gap between recognising these benefits in theory and implementing effective strategies in practice. In addition, the survey reveals strong support for open source as an alternative to technology monopolies and as critical digital infrastructure. To capitalise on these opportunities, experts advocate for long-term investments in the developer communities and ecosystems that sustain OSS.

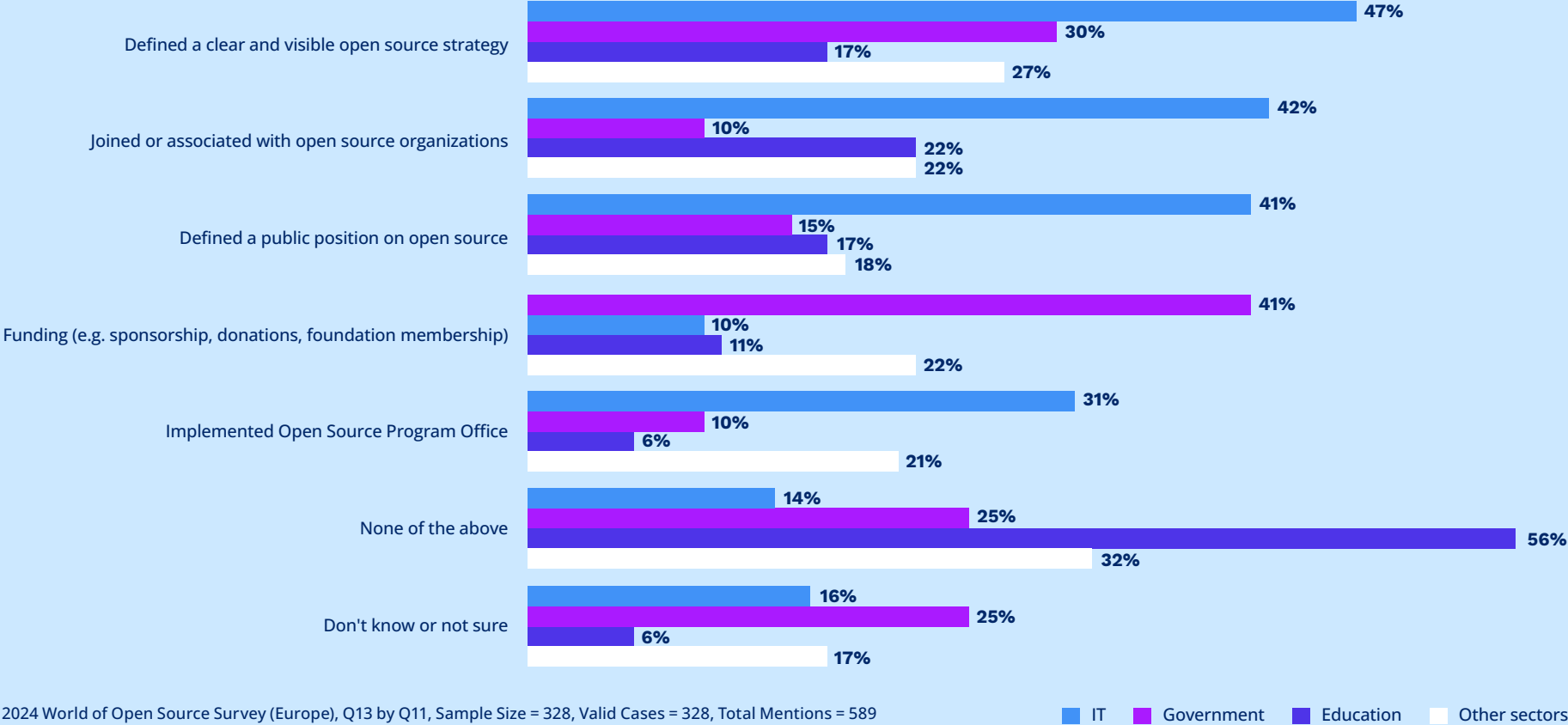
Sectors that would benefit the most from open source investments

Figure 7 shows the five sectors that will benefit the most from investing in open source: information technology (37%), government at the federal or national level (36%), higher education (30%), government at the state or local level (24%), and healthcare (22%). The question limited respondents to three choices, so the data highlights current priorities instead of relative importance. It identifies the sectors with the most urgent needs according to our respondents. Despite this acute recognition, actual engagement and support for open source vary significantly across these sectors.

There is a stark contrast between the proactive stance of the IT sector and the more hesitant approaches of the government and education sectors (see Figure 8). While 47% of IT organisations reported having a clear open source strategy, only 30% of public sector and 17% of education sector organisations could say the same (Figure 8). This disparity indicates a significant opportunity

FIGURE 8
OPEN SOURCE ADOPTION IN THE IT, GOVERNMENT, AND EDUCATION SECTORS

Which of the following actions has your organization engaged in regarding OSS? (select all that apply) by
 Which of the following best describes your organization’s primary sector? (select one)



for better strategic planning and implementation in these latter sectors. Several interviewees discussed the opportunity for educational institutions to introduce and promote open source

courses that teach the next generations about the various roles they can play in open source projects, whether they are computer science or humanities majors.

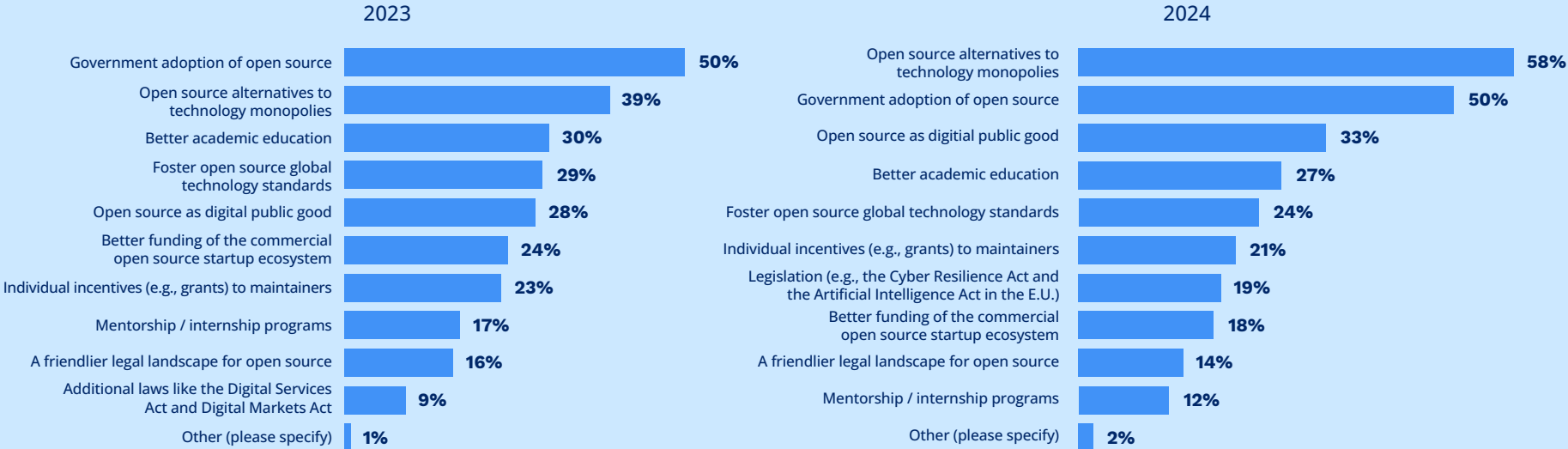
The potential for open source extends beyond these sectors. Interviewees highlight a growing realisation among non-digital native industries about the value of open source in addressing ecosystem-level challenges, such as the energy sector, where supply chains involve multiple parties working together. However, many companies are still in the early stages, focusing on writing strategy documents and experimentation. Others noted the increasing adoption of open source in highly regulated industries like automotive and finance, which were previously resistant to open source adoption.

Areas that would benefit the most from open source investments

The survey reveals that investment in open source as an alternative to technology monopolies has emerged as the top priority, with 58% of respondents perceiving this as the top priority for open source investments in 2024 compared to 39% in 2023 (Figure 9). This sentiment reflects a strong belief that open source can provide a balance to the control that large tech companies hold, offering solutions that are open and

FIGURE 9
AREAS THAT SHOULD RECEIVE FURTHER INVESTMENT IN OPEN SOURCE

In which areas do you think there should be further investment in open source across your geographic region? (select between one and three responses)



2023 World of Open Source Survey, Q41, Sample Size = 197, Valid Cases = 197, Total Mentions = 510, DKNS responses excluded
 2024 World of Open Source Survey, Q16, Sample Size = 321, Valid Cases = 321, Total Mentions = 890, DKNS responses excluded

customisable. This is particularly relevant in Europe, given the EU's focus on digital autonomy. Half of the respondents in both years support government adoption of open source, showing its persistent place as a priority for further investment.

The view that open source alternatives need further investment is also the case in the dynamic AI sector. Jennifer Ding highlights that the growing open source AI ecosystem has facilitated alternative AI model development pathways that offer access to AI models beyond a handful of proprietary options. While there is often a perception that AI innovation does not take place in Europe, this presents a PR opportunity to showcase Europe's talent and potential, building on the growing recognition of open source AI startups in France such as HuggingFace and MistralAI, which are giving more visibility to European talent and style of innovation.

In addition, there's a growing consensus on the need for long-term investment in open source digital infrastructure, with interviewees pointing to developments such as the creation of the STF in Germany and the establishment of Open Source Program Offices (OSPOs) in governments and the European Commission. Fiona Krakenbürger from the STF explains, 'We see digital infrastructure the same way we see physical infrastructure—there need to be meaningful, long-term investments'. Beyond investments, Adriana Groh from the STF advocates for establishing a government agency for digital infrastructure like the STF that has the mandate and powers to invest in the maintenance of digital infrastructure, of course including open source.

Beyond investments in open source as purely technological artefacts, governments are increasingly recognising the importance of investing in people to sustain and grow open source ecosystems. For example, the STF is currently **piloting a fellowship programme for maintainers** focused on investing in the people who maintain our open digital infrastructure. The fellowship programme aims to explore what it could look like if a public entity employs or contracts maintainers to work on various open source technologies important in the public interest, acknowledging that many maintainers are not limited to a single repository but are often embedded in a broader ecosystem. This pilot expects to provide insights into new models of public sector support for open source sustainability, with a focus on fostering future generations.

As countries in Europe take different approaches, the interviewees underline the merits of EU-level strategies and coordination. For example, Bastien Guerry from the Free Software Unit in DINUM highlights the need for an EU-level OSS industrial strategy and argues that each member state should propose a clear way to invest in the European open source industry. The challenge lies in translating this recognised potential into concrete strategies and implementations in the public sector.

The public sector open source opportunity

The public sector presents a significant opportunity for open source adoption and development in Europe. The survey findings indicate strong support for government investment in open source, with respondents emphasising its importance both for government adoption and as a digital public good. However, challenges persist, including outdated regulations, procurement practices ill-suited to open source, and barriers to inter-organisational and international collaboration. As governments increasingly recognise open source as a lever for digital democracy and sovereignty, there is a growing call for practical action, coordinated strategies, and innovative approaches to realise the full potential of open source in the public sector.

Appetite for greater governmental investment in open source

The survey findings underscore the widespread belief that governments should invest in open source, with 49% and 34% of respondents believing that government adoption of open source and supporting open source as digital public goods are priorities that should receive further investment.

Several interviewees highlight that the transparency inherent in open source collaboration aligns well with European values, noting that Germany and France are leading the way in OSS contribution and adoption, followed by the Netherlands, the UK, and others. For example, in Germany, the Zentrum Digitale Souveränität (or ZenDis) invests in open source development for the public administration, facilitating use, reuse, and contributions by hosting repositories on the **CoDE platform**, while the STF is funding critical OSS maintenance. In France, the central government's OSPO, established in 2021, has implemented a comprehensive strategy for open source. This

includes supporting all public sector organisations to use and publish open source on the **socle interministériel de logiciels libres**, as well as developing and sharing open source tools for French civil servants on the **CodeGouv** platform, among others.

In Denmark, Rasmus Frey, chief executive and secretary of the OS2 network, reports that OSPOs are gaining traction as an institutional mechanism for facilitating an open source-friendly culture within the public sector. He cites a **study** by Sachiko Muto and Johan Linåker, funded by the Danish Agency for Digitalisation, which found that governments ranking highly in the UN digital index have OSS strategies and / or OSPOs, underlining the value of open source strategies and implementation in government.

However, outdated regulations and infrastructure, as well as the underrepresentation of open source in public procurement processes, are major challenges to open source adoption and contribution. The EU Interoperable Europe Act adopted in 2024 represents a regulatory push for more EU public sector interoperability and accelerating the digital transition of the public sector. Reflecting on the survey findings, Tony Shannon emphasises the need for practical action, stating, 'The European Commission really needs to understand how to take this message and do something practical with it. The digital decade won't really realise its ambitions unless we get much more practical and results-oriented with open source'.

Public money, public code: Building open source public services

The survey reveals overwhelming support for the principle championed by the Free Software Foundation Europe that software developed with **public money should be released as public code**, with 82% of respondents agreeing that software developed using public funds should be open source (Figure 10). This strong consensus reflects a growing push towards transparency and accountability in government spending, emphasising that if the public pays for software development, the resulting software should be accessible to all.

This principle is being put into practice across Europe, with various governments adopting innovative approaches to open source digital services. Tony Shannon highlights that more and more governments and intergovernmental institutions such as the OECD are oriented towards life events. The government of Ireland is taking a similar approach, aligning life events with an open source building block approach that encourages peer

review and knowledge sharing within the public sector, with the focus of building excellent public services for citizens for ‘cradle-to-grave’ life events.

The adoption of open source in government digital services is increasingly seen as a key lever for digital democracy. Adriana Groh points out a recent shift in the discourse: ‘There was always talk about security, then we talked about why [open source is] important also for innovation and competition, and now I hear more and more about why it’s actually a democratic question: who makes decisions, who is involved, and who gets to participate?’ Maria Dalhage from the Swedish Public Employment Service echoes this perspective and explains that Sweden widely recognises open source as an enabler of transparency in the processes for government decisions affecting citizens and therefore of public trust in government institutions.

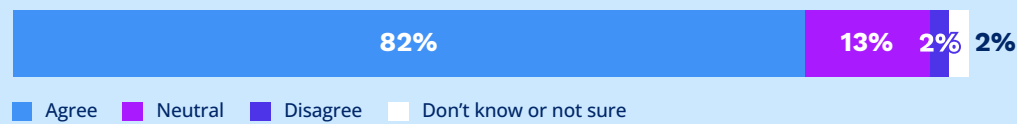
The concept of digital autonomy has been gaining more and more traction in Europe. Daniel Izquierdo Cortázar argues that OSS provides the transparency necessary for companies and governments to make informed decisions, which is crucial for maintaining digital sovereignty. Meanwhile, Fiona Krakenbürger points out that the understanding of digital sovereignty is evolving in Europe, noting that it increasingly involves an understanding of ‘being a part of the community and participating actively’ in open source development.

Many respondents hope for more intra- and inter-organisational open source collaboration in the public sector. Several successful examples of inter-organisational collaboration demonstrate the potential benefits of this approach. For example, three Swedish government agencies—Arbetsförmedlingen (the Public Employment Service), Skolverket (the National Agency for Education), and eHälsomyndigheten (the eHealth Agency)—are collaborating on the same design system as a means to improve accessibility to essential government services and lower the

FIGURE 10

82% OF RESPONDENTS AGREE THAT SOFTWARE DEVELOPED USING PUBLIC FUNDS SHOULD BE OPEN SOURCE

Do you agree or disagree that software developed using public funds should be open source? (select one)



2024 World of Open Source Survey (Europe), Q18, Sample Size = 328

workload for each agency's development team. Similarly, Bastien Guerry emphasises the benefits of open source mutualisation between government ministries, providing an example from France, where the Ministry of Finance has a tender with companies that support open source bug-fixing and custom development. This approach acts as a form of insurance for open source, allowing ministries to adopt open source and fix bugs that come their way.

At the municipal level, collaboration is crucial to overcoming common challenges. For example, Ulf Timerdahl explains that in Sweden there is a general awareness of the benefits of open source at the municipal level, but budget constraints and the misconception that open source lacks management structures hold back its adoption. Similar to the OS2 network in Denmark, Föreningen Sambruk has tackled this obstacle by brokering open source collaboration on technological problems faced across municipalities. Now around 50% of the 290 municipalities participate in the Sambruk network, and the size of the open source projects ranges from two to 50 municipalities. Ulf Timerdahl highlights three key lessons from the Swedish experience. First, when municipalities join forces, they combine their capacity and resources, opening doors to in-house software development that otherwise would not be possible alone. Second, it is essential to tackle the myth of unmanageability by designing and implementing governance

structures that work for all participants. Third, it is key to make the governance structure simple, lean, and understandable to all involved—not just the experts who already bought in.

On the international front, Karel Rietveld from Belastingdienst Nederland points out that current approaches are fragmented and do not scale to the EU level, calling for more coordination between member states. OSPOs are viewed as one means towards this end. For example, Bastien Guerry advocates for fostering an EU OSPO network for OSPOs of EU member states. Similarly, Rasmus Frey contends that we should not get too fixated on OSPOs. 'It needs to be more than organising an office with two people and ticking a box. Ideally, every government agency and municipal government should have OSPOs that interconnect with each other. Just creating an OSPO is not a quick fix; it has to be a network of OSPOs'.

Meanwhile, Maria Dalhage recommends that all public sector entities implement the [standard for public code](#) developed by the Foundation for Public Code, stating, 'It's not enough to dump your code on the internet and expect something to happen; this standard makes adoption and collaboration easy between governments'. Dalhage continues that effective governance models are still in their infancy and suggests there is much to learn from how public agencies work with open data, such as national catalogues and metadata standards.

The open source opportunity in high-interest areas: Security and AI

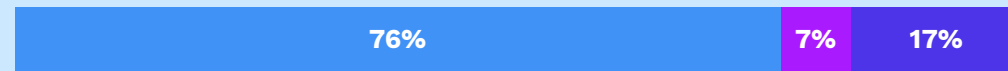
Open source is gaining significant traction, particularly in high-interest areas such as security, AI, and cloud technologies. The survey highlights high levels of trust in open source approaches for enhancing software security, while the AI sector sees growing

momentum and interest in open source, driven by both industry trends and regulatory developments. However, challenges persist in defining 'open source AI', and safety concerns hold back the adoption of open models.

FIGURE 11

PARTICIPANTS CONSIDER OSS MORE SECURE THAN CLOSED SOURCE, AND THE OPEN SOURCE APPROACH TO SOFTWARE DEVELOPMENT IS BETTER FOR SECURITY THAN THE CLOSED APPROACH

Do you believe that OSS is more secure than closed source software? (select one)



■ Agree ■ Neutral ■ Disagree

2024 World of Open Source Survey (Europe), Q19, Sample Size = 328

Do you believe that an open source approach to software development leads to better software security compared with a closed source approach to software development? (select one)



■ Yes ■ No ■ Don't know or not sure

2024 World of Open Source Survey (Europe), Q20, Sample Size = 328

The need for open source to enhance software security

The survey reveals a strong preference for OSS in terms of security among European developers and IT professionals, with 76% of survey respondents believing OSS to be more secure than closed source alternatives (Figure 11). Even more striking, 88% feel that an open source approach to development enhances software security more than closed source methods. This high level of trust in open source approaches suggests a significant opportunity for the open source community to lead in security innovation.

However, industry experts highlight that enhancing the security of software delivery and life cycles remains a key priority. Karel Rietveld from Belastingdienst Nederland notes that while the Open Source Security Foundation is doing commendable work, it remains a challenging field.

Experts commend the increased scrutiny of software security from legislators. Stefano Maffuli from the Open Source Initiative emphasises that regulators are shifting their approach towards software engineering, formulating real responsibilities for what is developed and deployed in the market. This shift applies to both open source developers and the ecosystem as a whole. He stresses the importance of the implementation phase and the development of new standards and best practices over the next three years, calling for multidisciplinary collaboration to shape a future of secure open source development led by community interests.

The need for openness in AI

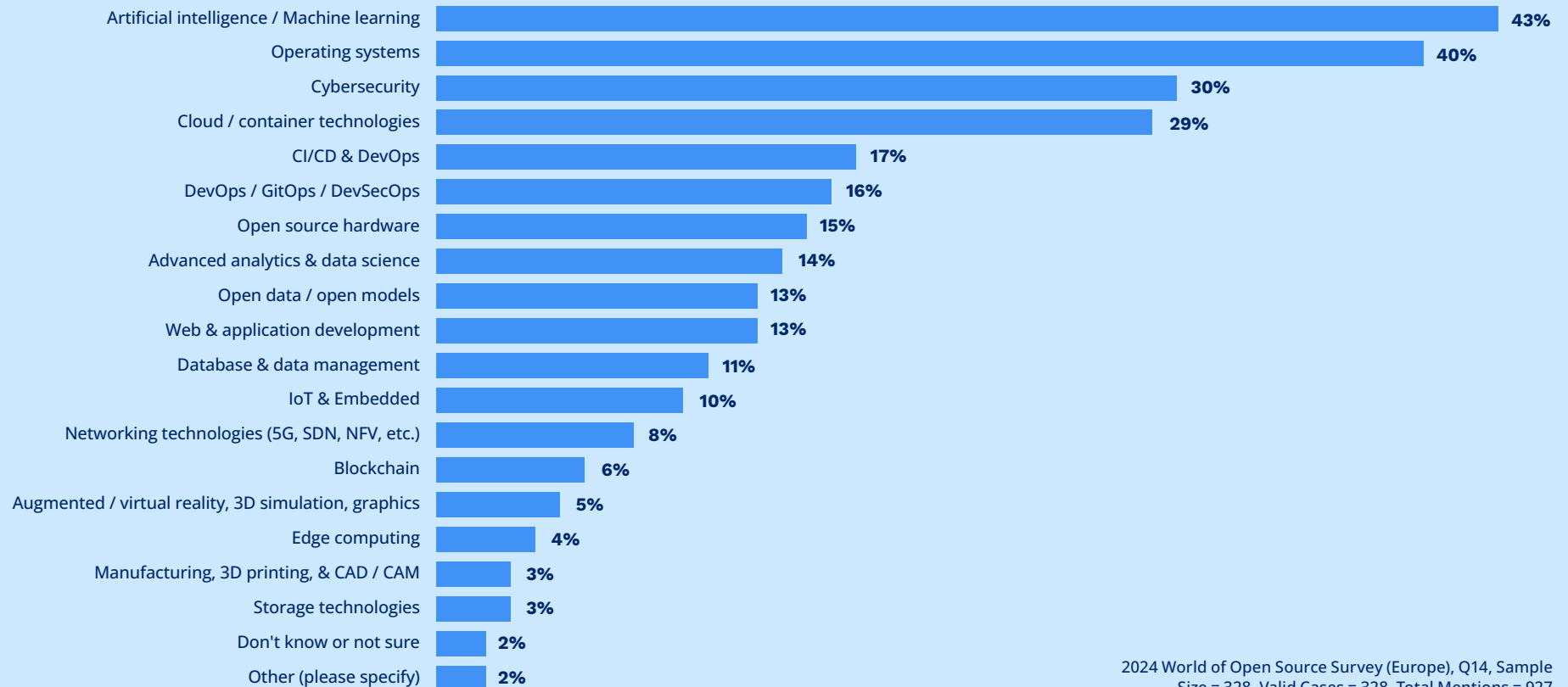
The survey findings indicate a strong interest in open source AI and machine learning (AI / ML) technologies. As shown in Figure 12, some 43% of survey respondents believe AI / ML

would benefit most from being open source, ranking these technologies highest compared to operating systems (40%), cybersecurity (30%), and cloud or container technologies (29%).

FIGURE 12

AI/ML AND OPERATING SYSTEMS ARE THE TECHNOLOGIES THAT WOULD MOST BENEFIT FROM BEING OPEN SOURCE

Which technologies do you believe would benefit the most from being open source? (select between one and three responses)



2024 World of Open Source Survey (Europe), Q14, Sample Size = 328, Valid Cases = 328, Total Mentions = 927

This high ranking of AI / ML reflects the current spotlight on these technologies and presents an opportunity to explore the European emphasis on open source AI. Several interviewees highlighted that open sourcing AI presents a path to prevent power concentration, build trust in AI development, and democratise the governance of this increasingly impactful technology. Stefano Maffuli from the OSI argues that given its impact on everyday life ‘AI needs to be open’, and users and anyone affected by AI systems should have some control and agency over the technology. If we fail to open source AI, ‘we risk concentrating powers in the hands of a few because of how the whole stack is unevenly distributed’, he explained. However, currently, corporate secrecy shrouds impactful AI systems, undermining trust in responsible design, development, and governance. The risk-based approach applied by the EU AI Act attempts to mitigate this issue.

The emerging open source AI community is bubbling with the participation of diverse stakeholders, including developers and researchers who are working on defining and measuring open source AI, companies that are using open source AI as a differentiator, policymakers taking an interest in open source AI to foster more innovation, and global initiatives such as the **BigScience Project** that are pioneering the development of open large language models (LLMs) and open training datasets. However, Jennifer Ding notes that disagreements about what qualifies as ‘open source AI’ have created divisions, risking to block collaborations between different communities of practice when the focus should be on fostering collaboration and exchange of expertise.

On the regulatory front, Maffuli points out that the AI Act is driving the urgency to define ‘open source AI’. This legislation contains special exclusions for free and open source AI systems, necessitating a clear definition. Mer Joyce from Do Big Good and facilitator of the OSI’s ‘defining open source AI’ co-design process notes there is strong disagreement about how one should define ‘open

source AI’, and their iterative process has sought to gather input and build consensus among the diverse members of the global open source AI community.

Government involvement in open source AI is also gaining traction, with countries such as the UK and France taking proactive roles in supporting open source AI development. In the UK, the recently established AI Safety Institute has open sourced **Inspect**, a framework for LLM evaluations, and invited researchers and developers to adopt and contribute to it in the interest of enhancing AI safety. Meanwhile, the French government is actively funding the development of Python libraries for data science via its **national AI strategy** and supported the community-driven BigScience project by providing it with a public grant to leverage a state-owned supercomputer to train its BLOOM model. These examples illustrate the different ways in which governments can support the open source AI ecosystem rather than focusing on building sovereign LLMs, highlights Jennifer Ding. Fiona Krakenbürger emphasises that while political leaders are directing attention to AI, it is important to not forget about the developer communities who build the infrastructure and tools that underpin much of cutting-edge AI research and development, such as the Python community.

The adoption of open source AI faces distinct challenges in both the private and public sectors in Europe. In the private sector, Thomas Steenbergen highlights that the lack of AI Software Bills of Materials for all components means that organisations often do not know what data is used to train their models, hampering IT security teams’ ability to conduct necessary due diligence. In the public sector, Bastien Guerry emphasises that the risks associated with implementing open source AI models in government services are substantial, and the consequences of errors can be far more severe than in the private sector. Therefore, enhancing transparency and safety are key priorities to realise the benefits promised by open source AI. Despite these challenges, there are encouraging examples of public

sector innovation with open source AI. For example, in Sweden, the Sundsvall Municipality has worked with a local startup to develop an AI platform that uses both closed and open source

AI models to improve efficiency in internal tasks and enhance citizen services, demonstrating that public sector organisations can successfully implement open source AI solutions.

Increasing regulation of digital products including open source

This year marks an important watershed moment for the open source ecosystem in Europe. For the first time, a major EU regulation, the Cyber Resilience Act (CRA), prominently mentions 'free and open source software'. There is explicit regulation for organisations that are 'systematically providing support on a sustained basis for the development of...free and OSS,' separate from manufacturers. The CRA sets a precedent in that it correctly defines that communities that release OSS do not make commercial products available in the EU market. Instead, it requires manufacturers to apply due diligence as they consume open source components from upstream projects, integrate them into their commercial products, and make those products available. Combined with a mandatory support period for security fixes of (in most cases) at least five years, this encourages manufacturers to engage with the upstream communities that maintain the open source components critical to their products.

The CRA is only one new piece of legislation in a whole set that will shape the EU market for digital products. On the one hand, this highlights a welcome shift in how the EU embraces regulation of digital products, including open source, as an instrument to foster cybersecurity and competition. On the other hand, open source communities will need to adapt to the new regulatory environment. This causes both uncertainty and friction. In particular, the EU sets a high bar for open source governance and transparency when defining the role of OSS stewards, while at the same time placing most obligations clearly on the manufacturers of monetised products.

This new environment will require an evolved relationship between the communities that develop critical components, many of which are hosted at open source foundations or incorporated communities, and downstream manufacturers. For small, volunteer-driven communities, difficulties may arise from the need to live up to the governance and transparency requirements. Developers of small and early-stage projects may find it harder to achieve widespread adoption. It will be important to keep the pathways open for the wild experimentation and release-early-release-often approaches that drive the innovativeness of the open source ecosystem.

Regulatory guidance should mitigate uncertainty in the open source community

The EU aims to shape the internal market to be a fertile ground for digital innovation that is at the same time competitive and operates according to European values. A balanced approach is necessary to safeguard the innovativeness of the open source ecosystem while at the same time providing stricter guardrails for manufacturers.

The AI Act strikes this balance between managing the risks of AI applications and enabling the collaborative development of open source or foundational AI models by including exemptions for open source models. This underlines the importance of a widely accepted definition of what constitutes open source AI, which

is still a work in progress. The Open Source Initiative has made progress on the Open Source AI Definition, as well as with the release of the **Model Openness Framework** and the associated **Model Openness Tool** by LF AI & Data Foundation. However, the debate is not over. Without a definition, there is indiscriminate use of 'open source AI' for systems that are not open for use, study, modification, or distribution by anyone for any purpose, which conflicts with basic freedoms protected in open source licensing and needs to be resolved with priority.

The CRA aims to improve the cybersecurity of digital products offered in the EU. It goes further than the AI Act in recognizing the role of OSS stewards as distinct from manufacturers. How this will impact the open source development process and the motivation of diverse participants to contribute can currently only be estimated. For example, interviewees pointed out that the CRA creates uncertainties, especially for small European companies that manufacture software.

The survey reveals substantial uncertainty about the impact of new regulations on open source participation. As shown in Figure 13, half of the respondents express uncertainty about how emerging regulations such as the CRA and AI Act will affect their organisations' involvement in open source. Only 23% believe these regulations will positively impact participation, while 8% foresee a negative effect, and 19% of respondents predict no impact.

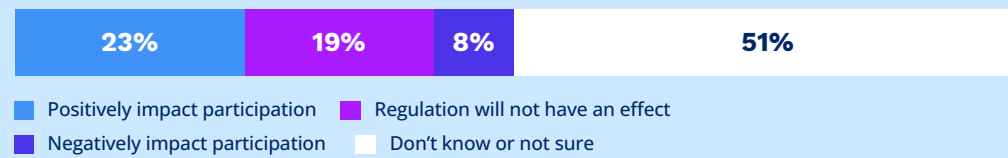
This uncertainty calls for governmental clarity and guidance regarding the regulation of OSS. Government bodies should step in and provide clear and structured policies that support the growth of open source. By doing so, governments can help reduce doubts. Such a proactive engagement is crucial to ensure that open source continues to be a vibrant and integral part of Europe's digital economy. Amanda Brock from OpenUK points out, however, that 'governments and policy makers will choose their role and policies, but to have a voice and ensure that it is heard, the open source ecosystem must build up the right influence and community representation to those policy makers through experienced individuals with good understanding of open source, its ecosystem and nuances but also importantly with experience of how to engage with the public sector and political policy makers and who understand how to shape policy. Otherwise we have a real danger that policy is not only bad for open source but for the future of our economies and citizens.'

Mitigating the digital skill gap

Both industry as well as the public sector are facing a skills gap when it comes to digital and open source technologies. The recent regulatory pushes add to the industry-wide open source skill gap discussed above. It complicates the adaptation to the changing regulatory and competitive environment. Regulatory initiatives that will have an impact on the open source ecosystem like the Interoperable Europe Act, NIS2, or the Data Act all require a build-up of expertise in the public sector and private industry.

FIGURE 13 HALF OF RESPONDENTS ARE UNCERTAIN ON HOW REGULATION WILL AFFECT OPEN SOURCE PARTICIPATION

To what extent will new regulations of the software industry impact your organization's open source participation? (e.g., Cyber Resilience Act, AI Act) (select one)



■ Positively impact participation ■ Regulation will not have an effect
■ Negatively impact participation ■ Don't know or not sure

2024 World of Open Source Survey (Europe), Q25, Sample Size = 328

Other innovations require the development of new skills as well. Next to cloud technology and AI / ML, the greatest opportunities for OSS-based growth and innovation for Europe are high-performance computing, open hardware technologies like RISC-V, and the automotive and energy sectors. All in all, this means that talent continues to be a limiting factor to growth and innovation.

As society grows to be more knowledge-driven, it is not surprising that the demand for the rapid and continuous development of new skills grows. Open source participation offers a proven mechanism for knowledge transfer and learning, especially in emerging technologies. Learning and personal development are the number one benefit and driver of participation (Figure 4).

Regulation and the global nature of open source collaboration

The U.S. and the UK opted for a different approach to regulating AI by establishing AI Safety institutes. Common to these approaches is the need to mitigate the risks that stem from the disruptive innovations offered by AI applications. However, no matter where in the world new AI businesses become successful, they all build on a common set of foundational open source AI technologies like PyTorch.

A major concern is the tension between national and European regulation and the global nature of open source collaboration. Interviewees caution regulators to recognise that OSS defies borders. However, leveraging the importance of the EU internal market, manufacturers and regulators outside the EU often adopt European regulation, shaping supply chains globally (the 'Brussels Effect'). The success of regulatory initiatives like the CRA or AI Act will depend on the capability of the EU to create an even playing field between European and global manufacturers as well as between proprietary and open source development models.

In general, interviewees felt that ambitious regulatory initiatives to develop the EU internal market should be combined with governmental investments in the development and adoption of key open source technologies. For them, this approach is key to addressing societal challenges such as digital sovereignty, sustainability, and digital democracy. This will require closer collaboration between policymakers and the open source community. Stefano Maffulli of the Open Source Initiative stated: 'I'd like to see more people engaging with EU regulators through groups or foundations. It is worth educating policymakers about OSS challenges and priorities. They hear a lot from lobbyists, but OSS developers don't have the same representation'.

The potential impact of these recent regulatory initiatives on the open source ecosystem has a welcome side effect: Many open source code hosting organisations started to collaborate to provide feedback and input. In return, policymakers increasingly recognised the pro-competitive and innovative impact of open source collaboration. Today, many open source communities have a stronger voice in Europe, stating that further deepening the relationship with policymakers is one of their key goals.

Conclusion

The open source landscape in Europe is at a critical juncture of growth and maturity. Our research reveals a strong foundation of support for open source principles and practices, with significant opportunities for growth and innovation across various sectors. The increasing recognition of open source as crucial digital infrastructure, comparable to physical infrastructure such as roads and bridges, marks a pivotal moment in European digital innovation and policymaking.

However, realising the full potential of open source in Europe requires addressing several key challenges. These include bridging skills gaps, overcoming organisational resistance to change, fostering diversity and participation among the next generations, adapting procurement practices, and navigating an evolving regulatory landscape. The recent regulatory initiatives, such as the CRA and AI Act, while aiming to enhance security and trust, also introduce uncertainties that the open source community must navigate.

Looking ahead, the success of open source in Europe will depend on coordinated efforts across multiple fronts. This includes sustained investment in open source technologies and skills development, reform of procurement practices to better accommodate open source models, and clearer regulatory guidance that balances innovation with security and ethical considerations.

The collaborative nature of open source aligns well with European values of transparency, cooperation, and digital autonomy. By leveraging these strengths and addressing the challenges identified in this report, Europe continues to have the opportunity to position itself as a global leader in open source innovation and development.

As open source continues to evolve and permeate various aspects of the digital economy, its impact on Europe's technological landscape, economic competitiveness, and societal well-being will only grow. The path forward requires continued dialogue, collaboration, and strategic investment to ensure that open source remains a driving force in Europe's digital future.



About this study

Methodology

The research employed a mixed methods approach, combining a quantitative survey and 22 qualitative interviews. The methodology is explained below.

Survey design

The 2024 World of Open Source: Global Spotlight Survey included 48 questions on the themes of open source use, contribution, value, and sustainability. For information about access to the 2024 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 what perspective they can speak for.
- The respondent needed to be able to identify their employment status.

A total of 2,222 candidates started the global survey, 958 did not finish the survey or were disqualified due to our screening criteria, and 1,264 answered all questions of the survey. The margin of error for this sample size was $\pm 2.32\%$ at a 90% confidence level. Regarding the data filtered for Europe and

included in this report, 328 European respondents completed the survey. The margin of error for the European data is $\pm 4.56\%$ 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. This is done because the data missing can be classified as either missing at random or missing completely at random. 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 14 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. 31% of the sample came from respondents working in European headquartered organisations, while another 30% from organisations based in the United States or Canada. 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.

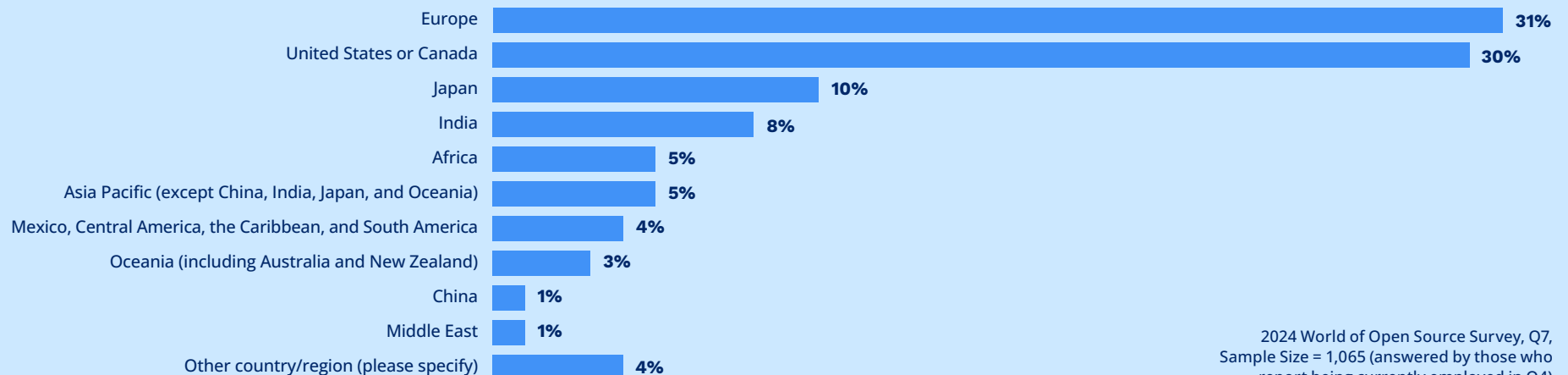
The chart in Figure 15 shows the professional role of respondents and company size as measured by number of employees. The left-hand chart shows that approximately 68% of respondents were in IT roles. The right-hand chart shows that the size of the organisations surveyed ranges from microbusinesses with 1 to 10 employees to large organisations with more than 20,000 employees.

The type of organisation is shown in the top chart of Figure 16. Organisations where the primary revenue comes from IT

FIGURE 14

REGIONAL DISTRIBUTION OF THE 2024 WORLD OF OPEN SOURCE: GLOBAL SPOTLIGHT SURVEY RESPONDENTS

In what country or region does your organisation have its headquarters? (select one)



2024 World of Open Source Survey, Q7,
Sample Size = 1,065 (answered by those who
report being currently employed in Q4)

products and services composed 43% of the sample. This could include hardware and software vendors, system integrators, cloud service providers, etc. 41% of the sample included industry-specific end-user organisations. We also received surveys completed from academic, non-profit, or governmental organisations (16%).

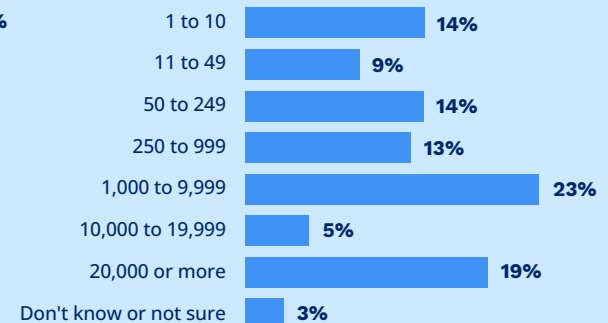
In the bottom chart, respondents were able to report the industry their organisations are part of. Most respondents work for cross-industry IT vendors (32%), but a variety of industries are represented in the sample.

FIGURE 15 SELECTED DEMOGRAPHICS FROM THE 2024 WORLD OF OPEN SOURCE: GLOBAL SPOTLIGHT SURVEY FOR THE EUROPEAN REGION

Professionally, which role do you most closely identify with? (select one)



Please estimate how many employees your organisation has worldwide. (select one)



LEFT: 2024 World of Open Source Survey (Europe), Q6, Sample Size = 328

RIGHT: 2024 World of Open Source Survey (Europe), Q12, Sample Size = 328

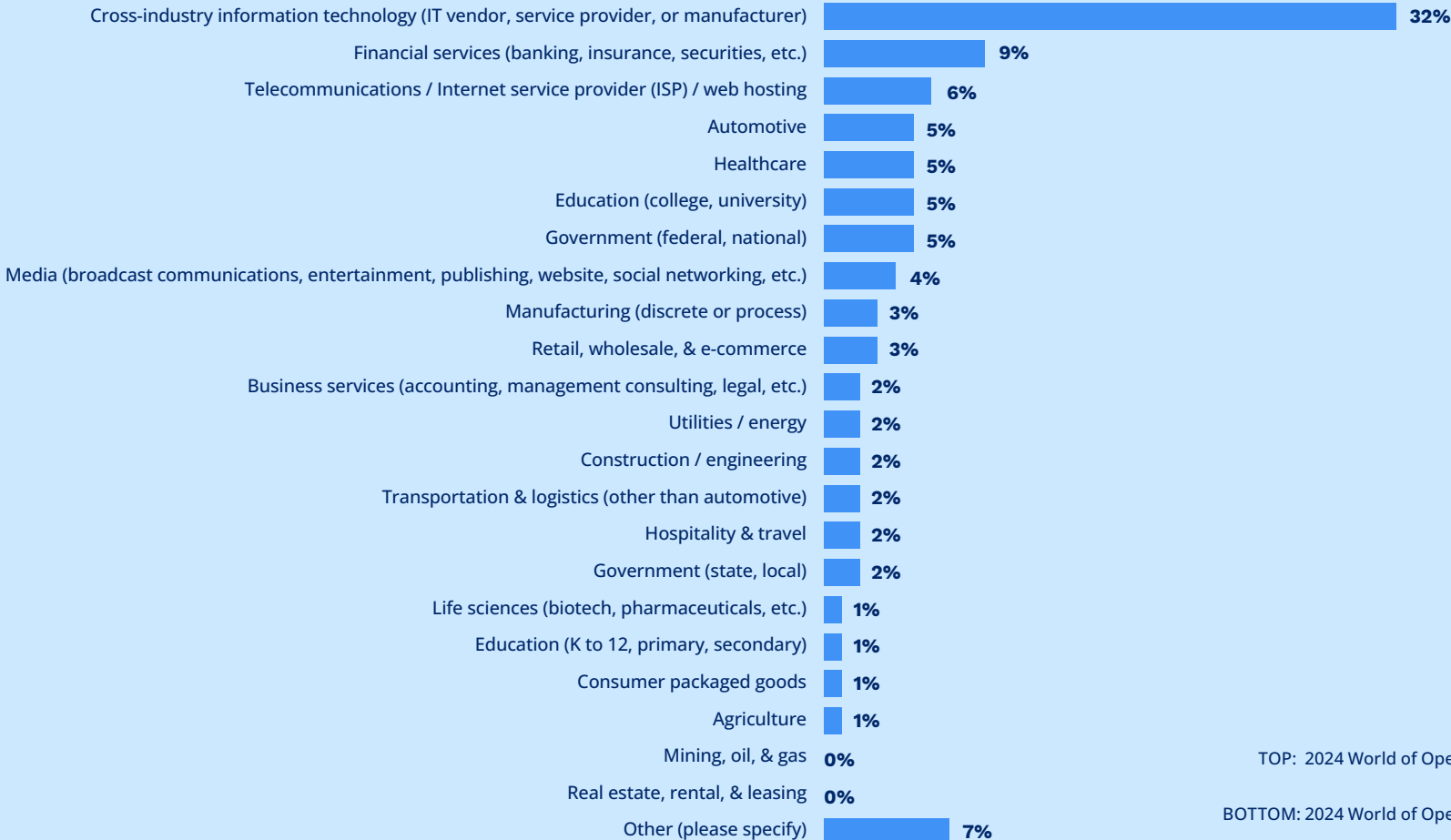
FIGURE 16

SELECTED DEMOGRAPHICS FROM THE 2024 WORLD OF OPEN SOURCE: GLOBAL SPOTLIGHT SURVEY FOR THE EUROPEAN REGION

Which type of company or entity do you work for? (select one)



Which of the following best describes your organisation’s primary industry? (select one)



TOP: 2024 World of Open Source Survey (Europe), Q6, Sample Size = 328
 BOTTOM: 2024 World of Open Source Survey (Europe), Q12, Sample Size = 328



Survey data: Data.World

Linux Foundation Research makes each of its empirical project datasets available on Data.World. Included in this dataset are the survey instrument, raw survey data, screening and filtering criteria, and frequency charts for each question in the survey. Linux Foundation Research datasets, including this project, can be found at data.world/thelinuxfoundation. Access to Linux Foundation datasets is free but does require you to create a data.world account.

Qualitative interviews

We conducted 22 semi-structured interviews with experts from various sectors across 13 European countries. To ensure diverse perspectives, we interviewed 11 experts from the public sector (50%), 7 experts from the private sector (32%), 3 experts from non-profit organisations (14%), and 1 expert from academia (5%). Of the 22 interviewees, 14 were male (63.64%) and 8 were female (36%). The interviewees represented a broad geographical range, including Denmark, Finland, France, Germany, Ireland, Italy, the Netherlands, Norway, Spain, Sweden, Switzerland, the UK, and the USA. However, we acknowledge the lack of representation from Eastern Europe as a limitation. We analysed the interview data using thematic analysis.

About the Authors

Dr Mirko Boehm

Dr Mirko Boehm is a free and OSS contributor, community manager, licensing expert, and researcher, with contributions to major open source projects such as the KDE Desktop (since 1997, including several years on the KDE e.V. board), the Open Invention Network, the Open Source Initiative, and others. He is a visiting lecturer and researcher on free and OSS at the Technical University of Berlin. Mirko Boehm has a wide range of experience as an entrepreneur, corporate manager, software developer, and German Air Force officer. He joined the LF in June 2023 as senior director for community development for LF Europe, where he focuses on driving engagement and collaboration between all European open source stakeholders. Mirko speaks English and German and lives in the Berlin area.

Cailean Osborne

Cailean Osborne is a researcher at the Linux Foundation and a PhD candidate in social data science at the University of Oxford. At the Linux Foundation, Cailean leads research projects on diverse open source trends and policy topics. His PhD concerns the political economy of open source AI, and in his free time he is a contributor to scikit-learn and the OSI's 'Defining Open Source AI' initiative. In 2023-2024, Cailean was a visiting researcher at Peking University's Open Source Software Data Analytics Lab in Beijing, China. Previously, Cailean worked in AI policy at the UK Government and was a UK government delegate at the OECD's Global Partnership on AI and the Council of Europe's Committee on AI.

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Adrienn Lawson is a data analyst at the Linux Foundation. Adrienn obtained a master's degree in social data science from the University of Oxford. She is responsible for survey

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Acknowledgements

The authors express their gratitude to those who generously participated in qualitative interviews and the survey. We would also like to thank all individuals who contribute their time and effort to maintaining a vibrant open source ecosystem in Europe and beyond.



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To reference this work, please cite as follows: Mirko Boehm, Cailean Osborne, and Adrienn Lawson, "Open Source Maturity in Europe: Milestones, Opportunities, and Pathways in 2024," foreword by Wolfgang Gehring, The Linux Foundation, September 2024.