



# 2024 Global Spotlight Insights Report

The Role of Open Source in  
Uniting Innovation, Collaboration,  
and Resilience Across Regions  
and Industries

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# 2024 Global Spotlight Insights Report

**Confidence** in open source security remains strong, with **68%** of respondents believing that **OSS is more secure** than closed source software.



A significant **79%** of respondents believe that the open source development approach leads to **better software development**.



**77%** of respondents agree that **software developed with public funds should be open source**, reflecting strong alignment with open source principles.



Nearly half of respondents remain **uncertain** about how new regulations will **impact open source** participation.

**IT & media industries** lead in both open source use and contributions, while regulated sectors such as government and healthcare show more cautious OSS engagement.



OSS contributors dedicate an **average of 9 hours per week** to open source projects.



While 50% of respondents report that their contributions to OSS are unpaid, the **biggest challenge** remains **lack of time** (63%), followed by lack of funding (34%).



Two out of five organizations employ maintainers to sustain critical OSS projects, with **74% of those organizations** deriving **high value from employing maintainers**.



**AI/ML is the leading area benefiting from open source development**, receiving the most mentions at 44%.



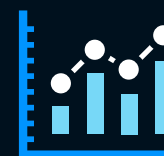
The top three industry benefits of open source are **innovation** (57%), **standards & interoperability** (57%), & **productivity** (50%).



**72% of OSS contributors are motivated by learning** and 69% by involvement in projects they find fascinating or useful.



**64% of respondents report increased business value from OSS use in 2024**, and 56% report increased benefits from OSS contributions.



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# Foreword

For centuries, experts have worked together to jointly address some of the most complex and important problems of their times, from exploring the secrets of the universe to developing new healthcare treatments. Open source is part of this long tradition of collaborative innovation. In this foreword, I'd like to cite two concrete, successful examples of collaborative innovation from my personal experiences in the IT industry.

In the early decades of the industry, vendors brought to market proprietary systems that worked well if used within the same company but were cumbersome to use across companies, especially those using another vendor's products. Just sending an e-mail using an IBM application to another user in a different institution using another vendor's application was quite cumbersome.

The Internet changed all that. The Internet started out as a collaborative project of academic and research communities sponsored by the US Department of Defense to develop a fault-tolerant computer network. By the mid-1980s the Internet was being widely used and tested within these communities. A few years later, the World Wide Web, another major collaborative project, enabled scientists around the world to seamlessly share information. Once the Internet and Web were widely embraced in the 1990s, it became no harder to send an e-mail or access information between companies as within a company. Everyone was using the same standards, including open source implementations of the key protocols.

A similar story played out with operating systems. Through the early decades of the IT industry different companies had their own proprietary operating systems, making it difficult for users and vendors to port their applications to computers from different vendors. Finally, [Linux](#) emerged in the 1990s as an open source operating system initially adopted by research and academic communities. Over time, an increasing number of companies have embraced Linux, contributed to its development, and now support hundreds of open source projects in just about all industries.

The 2024 Global Spotlight Insights Report offers us a window into how this open, collaborative revolution has evolved in the intervening three decades. Let me discuss three of the findings that I found most impressive based on my personal experiences leading the [IBM Internet initiative](#) in the 1990s and IBM's [Linux initiative](#) in the early 2000s.

A significant 79% of respondents believe that the open source development approach leads to better software development. How times have changed. In the mid-1990s, we had to work hard to convince companies that the Internet's culture of [open, collaborative innovation](#) would be necessary to conduct business in the 21st century. The work was even harder with Linux in the early 2000s because Linux wasn't well known in the commercial marketplace.

AI / ML rank as the top technologies that would benefit most from open source development. A majority of technical and management professionals now accept that open, collaborative innovation is

necessary to address the most important technologies of their times.

Confidence in open source security remains strong, with 68% of respondents believing that OSS is more secure than closed-source software. In the late 1990s we worked with a number of experts to successfully address whether open source software should be used in the development of supercomputers and other highly sensitive systems. This question is now being raised again as we consider how open source now applies to AI systems.

Let me conclude by mentioning [the impressive scope of the Linux Foundation in 2024](#). In early 2000, IBM, along with a few other companies formed a consortium to support the continued development of Linux, and founded a new non-profit organization, the [Open Source Development Labs](#), which became the Linux Foundation in 2007. I'm truly impressed how the Linux Foundation has grown over the years, with almost 1,300 company members supporting hundreds of open source projects in just about every horizontal and vertical industry. The growth of the Linux Foundation over the past 25 years truly reflects the long tradition of open collaborative innovation.

**Irving Wladawsky-Berger, MIT**

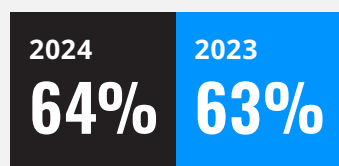
# Introduction

Open source software (OSS) has become a driving force behind innovation, collaboration, and the democratization of technology. Our 2024 World of Open Source: Global Spotlight Survey was designed to dive deep into this evolving ecosystem, offering a comprehensive analysis of how OSS is being adopted, supported, and sustained across industries and regions. This report tracks year-over-year trends and analyzes regional and industry differences in open source opportunities and challenges.

LF Research conducts this study to measure open source trends in terms of the value of its use, the benefits derived from contribution, and the priority areas of investment for organizations around the globe. We can see the increasing value from OSS as we compare year-to-year data. 64% of respondents report higher business value from OSS use since 2023, and 56% note greater benefits from contributing to open source projects. This adds to the increased value and benefits organizations reported in 2023 compared with 2022, suggesting a compounding effect on the value of OSS, where collaboration and innovation feed into one another to create sustained momentum.

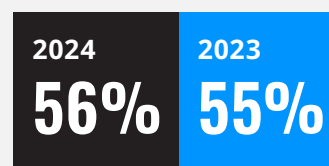
This year's report builds upon insights from previously published spotlight reports for [Europe](#) and [Japan](#), expanding to provide regional and worldwide perspectives. It uncovers regional nuances, such as North America's emphasis on structured OSS strategies, Asia-Pacific's optimism about regulatory impacts, and Europe's commitment to aligning OSS with public values. Industry-specific data shows how sectors such as financial services and healthcare navigate the dual demands of innovation and regulatory compliance.

The 2024 report also highlights the human side of open source. Contributors remain the backbone of the ecosystem, motivated by opportunities for learning and collaboration. However, the challenges they face—including time constraints, unpaid labor, and complex contribution processes—signal the need for systemic support. As open source grows in influence, these insights are critical for organizations and communities looking to maximize its potential.



**of respondents report increased business value of OSS use from last year.**

2023 WORLD OF OPEN SOURCE SURVEY, Q20, SAMPLE SIZE = 771 (DKNS EXCLUDED)  
2024 WORLD OF OPEN SOURCE SURVEY, Q33, SAMPLE SIZE = 838 (DKNS EXCLUDED)



**of respondents report increased benefits derived from OSS contributions from last year.**

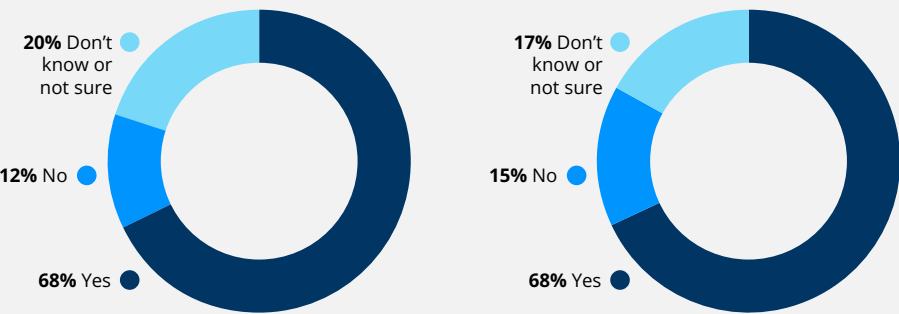
2023 WORLD OF OPEN SOURCE SURVEY, Q27, SAMPLE SIZE = 507 (DKNS EXCLUDED)  
2024 WORLD OF OPEN SOURCE SURVEY, Q39, SAMPLE SIZE = 728 (DKNS EXCLUDED)

# A shift in priorities

Figure 1 reveals that confidence in the security of open source software remains robust in 2024, with 68% of respondents affirming that OSS is more secure than closed source software—consistent with 2023’s results. However, the percentage of those unsure about OSS security has dropped from 17% in 2023 to 12% in 2024. This trend suggests a growing awareness of open source security practices, even as high-profile incidents, such as the recent XZ Utils backdoor attack, reveal vulnerabilities. The XZ Utils incident served as a reminder of the importance of knowing your maintainers and contributors, the criticality of pre-release testing, and the benefits of swift detection and resolution.

In terms of investment priorities (Table 1), 2024 marks a shift in focus compared with the previous year. The top priority for respondents this year is investment in open source alternatives to technology monopolies (49%). This change reflects growing concern over reliance on proprietary platforms and the need for vendor-neutral solutions. Government adoption of open source remains important at 40%, showing the continued importance of OSS for public sector modernization through transparency. Better academic education on OSS has emerged as a key area in 2024 (31%), suggesting that respondents see education as critical for OSS sustainability, as we depend on the next generation of open source contributors and users.

**FIGURE 1**  
**CONFIDENCE IN OSS REMAINS HIGH**  
Percentage of respondents who believe that OSS is more secure than closed source software



2024 WORLD OF OPEN SOURCE SURVEY, Q19, SAMPLE SIZE = 1264

2023 WORLD OF OPEN SOURCE SURVEY, Q21, SAMPLE SIZE = 712

**TABLE 1**  
**FURTHER INVESTMENT**  
In which areas do you think there should be further investment in open source across your geographic region?

|    | 2024                                                    | 2023                                                                 |
|----|---------------------------------------------------------|----------------------------------------------------------------------|
| #1 | Open source alternatives to technology monopolies (49%) | Government adoption of open source (40%)                             |
| #2 | Government adoption of open source (40%)                | Better funding of the commercial open source startup ecosystem (30%) |
| #3 | Better academic education (31%)                         | Open source alternatives to technology monopolies (29%)              |

2024 WORLD OF OPEN SOURCE SURVEY, Q16, SAMPLE SIZE = 1,264, TOTAL MENTIONS = 3,373

2023 WORLD OF OPEN SOURCE SURVEY, Q41, SAMPLE SIZE = 599, TOTAL MENTIONS = 1,507

## Regional analysis

After we saw the most important changes from last year, we now move on to a regional analysis, focusing on differences in OSS use, contribution, and strategic initiatives. The regional analysis in Figure 2 shows that across all three regions, organizations demonstrate a strong commitment to open source use and contributions, along with steady progress in establishing structured open source initiatives such as OSPOs. These similarities suggest that the value of open source is universally recognized, even as regional nuances reflect differing priorities and approaches.

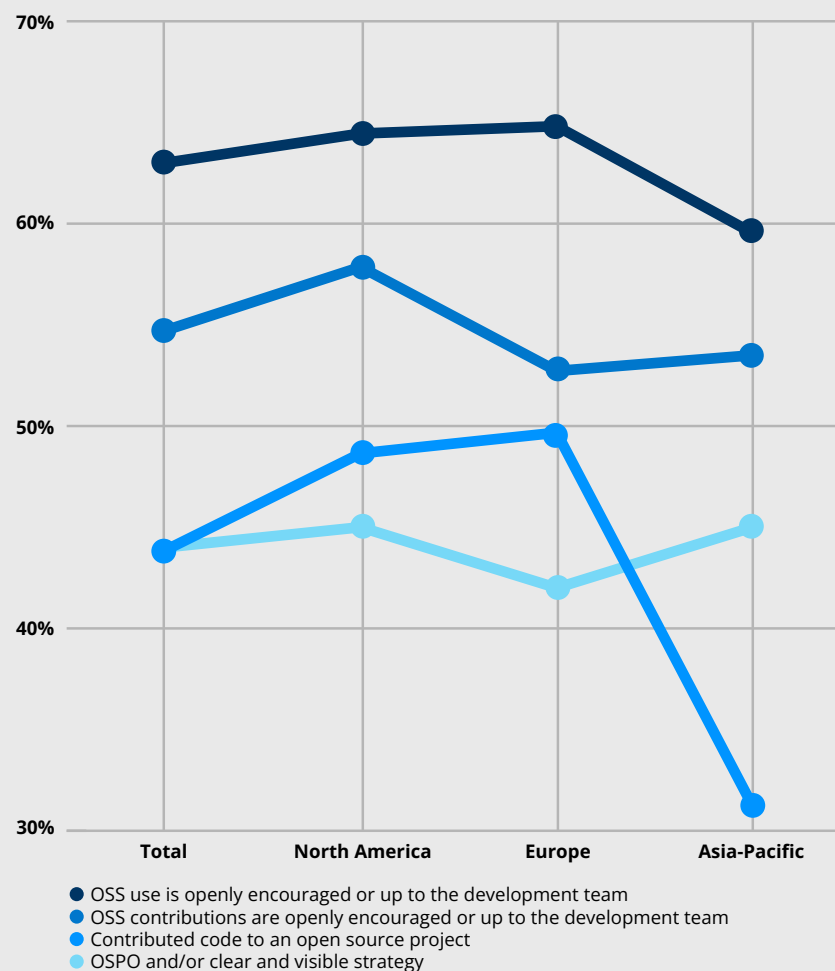
North America and Europe show near parity across most measures. Variations are minor and likely reflect statistical confidence intervals rather than a fundamental disparity in engagement.

Asia-Pacific trails slightly in most categories but is by no means an outlier. However, a noticeable gap appears in contributed code, with just 31% of organizations reporting contributions—suggesting resource constraints or region-specific challenges in prioritizing active participation.

The overarching story is one of convergence, where organizations across regions align closely in their adoption and promotion of open source practices. While regional nuances exist, they highlight opportunities for mutual learning, such as Europe's relatively higher levels of contributed code and North America's emphasis on formalized strategies.

Overall, the patterns observed in 2024 are consistent with those seen in 2023. However, due to differences in the sample composition, all measures appear to be at slightly lower percentages this year. This decline should not be interpreted as a reduced emphasis on open source but may instead reflect the variability in survey demographics.

**FIGURE 2**  
**REGIONAL BREAKDOWN OF OSS ENGAGEMENT**  
**ACROSS VARIOUS METRICS**



2024 WORLD OF OPEN SOURCE SURVEY, Q26, Q34, Q37, Q13, SAMPLE SIZE = 815-916

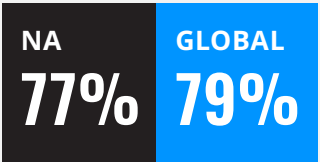
# North America

While North America demonstrates strong performance in open source engagement, there is still room for growth. A clear majority of respondents (77%) in North America believe that the open source development model leads to better software security compared with the closed model. This shared confidence gives a strong foundation for further OSS adoption in the region, especially if organizations address key areas for improvement.

For OSS use (Table 2), North American respondents point to the need for a clear and visible strategy, improved secure software development practices, and automated tooling to support OSS policies. These priorities indicate that a structured approach and improved security measures could encourage more active and confident OSS use within organizations.

On the contribution side (Table 2), there is also a clear opportunity to do more. Organizations highlight the importance of allocating employee time for OSS work, funding open source projects, and providing organization-wide education about OSS. These measures could significantly increase contributions and deepen organizational engagement with open source communities.

The data also points to a virtuous cycle: by improving secure software development practices and contributing back to OSS, organizations can directly improve OSS security. This shared responsibility could create a positive feedback loop where OSS becomes increasingly secure, further encouraging adoption and contributions and reinforcing collective accountability for maintaining high security standards.



of respondents believe that the OSS development approach leads to better software security compared to the closed approach.

2024 WORLD OF OPEN SOURCE SURVEY, Q20, SAMPLE SIZE = 916

TABLE 2  
FACTORS THAT COULD INCREASE OSS USE AND CONTRIBUTIONS IN NORTH AMERICA

|    | Actions for increasing OSS use                        | Actions for increasing OSS contributions                                 |
|----|-------------------------------------------------------|--------------------------------------------------------------------------|
| #1 | Developing a clear and visible OSS strategy (59%)     | Allocating employee time for open source contributions (55%)             |
| #2 | Improving how we do secure software development (56%) | Funding OSS projects (55%)                                               |
| #3 | Providing automated tooling to support policy (51%)   | Providing organization-wide education on the OSS value proposition (48%) |

2024 WORLD OF OPEN SOURCE SURVEY, Q32, Q43, SAMPLE SIZE = 319

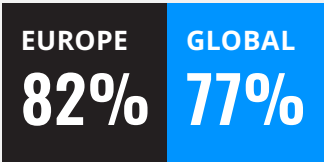
# Europe

Europe has a strong alignment with the principles of open source, with 82% of respondents agreeing that software developed using public funds should be open source. This sentiment exceeds the global average of 77% and reflects Europe’s commitment to openness, transparency, and collaboration, particularly in areas that intersect with public interest and governance.

Despite this alignment, Table 3 highlights areas where strategic action is needed to unlock the full potential of open source in the region. European organizations emphasize the importance of developing clear and visible strategies; improving secure software development practices; and enhancing legal, compliance, and security support.

On the contribution side, allocating employee time for OSS contributions and funding OSS projects are identified as critical enablers. Additionally, organization-wide education on the OSS value proposition could address gaps in understanding and encourage more active participation in open source communities.

Europe’s approach to open source is uniquely positioned to set a global example, balancing public values with strategic priorities. This alignment not only supports local economies but also strengthens the region’s ability to influence the future direction of global open source development, ensuring its continued alignment with principles of openness, accessibility, and shared progress.



**believe that software developed using public funds should be open source.**

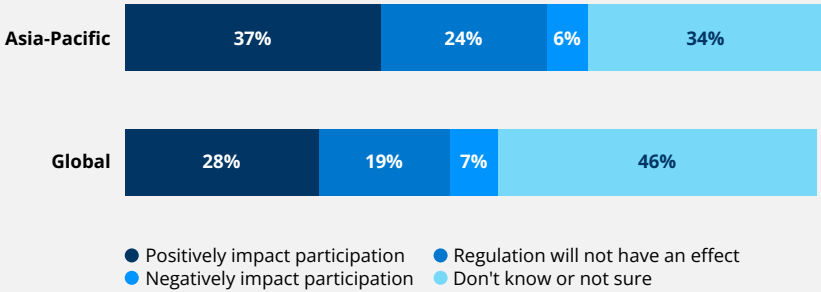
2024 WORLD OF OPEN SOURCE SURVEY, Q18, SAMPLE SIZE = 916

**TABLE 3**  
**FACTORS THAT COULD INCREASE OSS USE AND CONTRIBUTIONS IN EUROPE**

|    | Actions for increasing OSS use                         | Actions for increasing OSS contributions                                 |
|----|--------------------------------------------------------|--------------------------------------------------------------------------|
| #1 | Developing a clear and visible OSS strategy (54%)      | Allocating employee time for open source contributions (57%)             |
| #2 | Improving how we do secure software development (49%)  | Funding OSS projects (55%)                                               |
| #3 | Improving legal, compliance, or security support (48%) | Providing organization-wide education on the OSS value proposition (52%) |

2024 WORLD OF OPEN SOURCE SURVEY, Q32, Q43, SAMPLE SIZE = 328

**FIGURE 3**  
**IMPACT OF NEW SOFTWARE REGULATIONS ON OPEN SOURCE PARTICIPATION**



2024 WORLD OF OPEN SOURCE SURVEY, Q25, SAMPLE SIZE = 916

**TABLE 4**  
**FACTORS THAT COULD INCREASE OSS USE AND CONTRIBUTIONS IN ASIA-PACIFIC**

|    | Actions for increasing OSS use                        | Actions for increasing OSS contributions                                 |
|----|-------------------------------------------------------|--------------------------------------------------------------------------|
| #1 | Developing a clear and visible OSS strategy (51%)     | Providing organization-wide education on the OSS value proposition (52%) |
| #2 | Improving how we do secure software development (49%) | Providing clear policies to employees (50%)                              |
| #3 | Improving or supporting training and guidance (49%)   | Allocating employee time for open source contributions (48%)             |

2024 WORLD OF OPEN SOURCE SURVEY, Q32, Q43, SAMPLE SIZE = 269

## Asia-Pacific

The 2024 survey results show Asia-Pacific’s cautious yet optimistic outlook on open source engagement. While regulatory uncertainty remains a global theme, Asia-Pacific respondents are the least unsure compared with other regions, with only 34% expressing uncertainty about the impact of new regulations—lower than the global average (Figure 3). Furthermore, 37% of respondents in the region believe that global regulatory changes will positively influence open source participation, making Asia-Pacific the most optimistic region. This optimism may stem from the region’s proactive government initiatives; focus on digital transformation; and leadership in emerging technologies such as 5G, IoT, and AI. New regulations are likely viewed as an opportunity to provide clearer frameworks for scaling OSS adoption and improving interoperability and security.

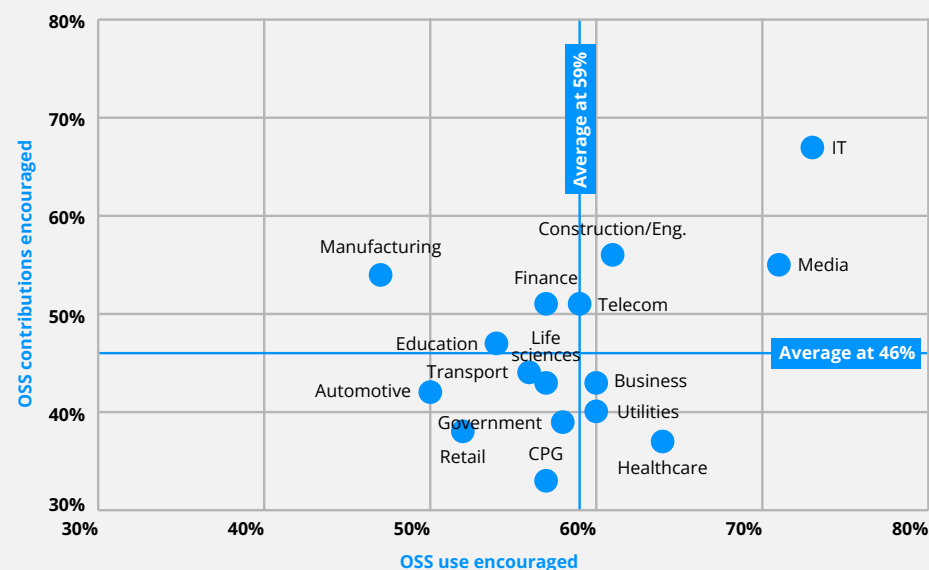
To drive open source adoption further (Table 4), Asia-Pacific respondents emphasize the need for a clear and visible strategy, alongside investments in secure software development practices and training and guidance. These priorities reflect the importance of structured frameworks and skills development to foster confidence in OSS usage across organizations. Proactive steps in these areas would position the region to align open source practices with its fast-evolving fast evolving global regulatory and technological environments impacting the region.

On the contribution side (Table 4), respondents identify several critical enablers, including organization-wide education about the value of OSS, clear policies for employee contributions, and the allocation employee time for OSS contributions. By addressing resource constraints and knowledge gaps, these measures could encourage greater participation in open source communities, enabling organizations to transition from cautious engagement to active contribution.

## Industry analysis

After zooming in to the regions, we now turn to the different industries represented in the survey. Figure 4 gives us a window into OSS policies within organizations by laying out how different sectors balance their engagement with open source. The x-axis shows the percentage of organizations where open source use is actively encouraged, while the y-axis indicates the percentage of organizations that promote open source contributions.

**FIGURE 4**  
**ENCOURAGEMENT OF OSS USE VS.**  
**CONTRIBUTIONS ACROSS INDUSTRIES**



2024 WORLD OF OPEN SOURCE SURVEY, X = Q26, Y = Q34, DATA POINTS = Q11,  
SAMPLE SIZE = 885 (ONLY INDUSTRIES WITH N>15 ARE SHOWN, DKNS EXCLUDED)

The vertical line at 59% shows the overall average percentage of organizations with permissive OSS use policies. And the horizontal line at 46% show the proportion of organizations with permissive contribution policies. The chart shows that IT and media sectors are highly supportive of both open source use and contributions. Although in IT, contributions are encouraged more. Positioned in the upper-right quadrant, these industries leverage open source to drive rapid innovation and agility, benefiting from a culture that values collaboration and continuous development. Their open policies reflect a strategic emphasis on speed, flexibility, and competitive differentiation, with OSS as a core enabler.

In contrast, industries like finance, telecom, and construction/engineering cluster near the middle, indicating moderate encouragement for both open source use and contributions. These sectors recognize the value of open source for cost savings and technology advancements but operate within regulatory frameworks that demand caution. Their balanced approach reflects an attempt to capitalize on open source while carefully managing risks associated with compliance and security.

The government, retail, consumer packaged goods (CPG), and automotive sectors fall into the lower-left quadrant, maintaining stricter policies on both OSS use and contributions. These highly regulated industries face significant constraints related to data privacy, security, and compliance, limiting their ability to engage with open source fully. However, as these sectors adopt more digital solutions, they may need to reevaluate their policies to leverage the cost-efficiency, interoperability, and innovation potential of OSS.

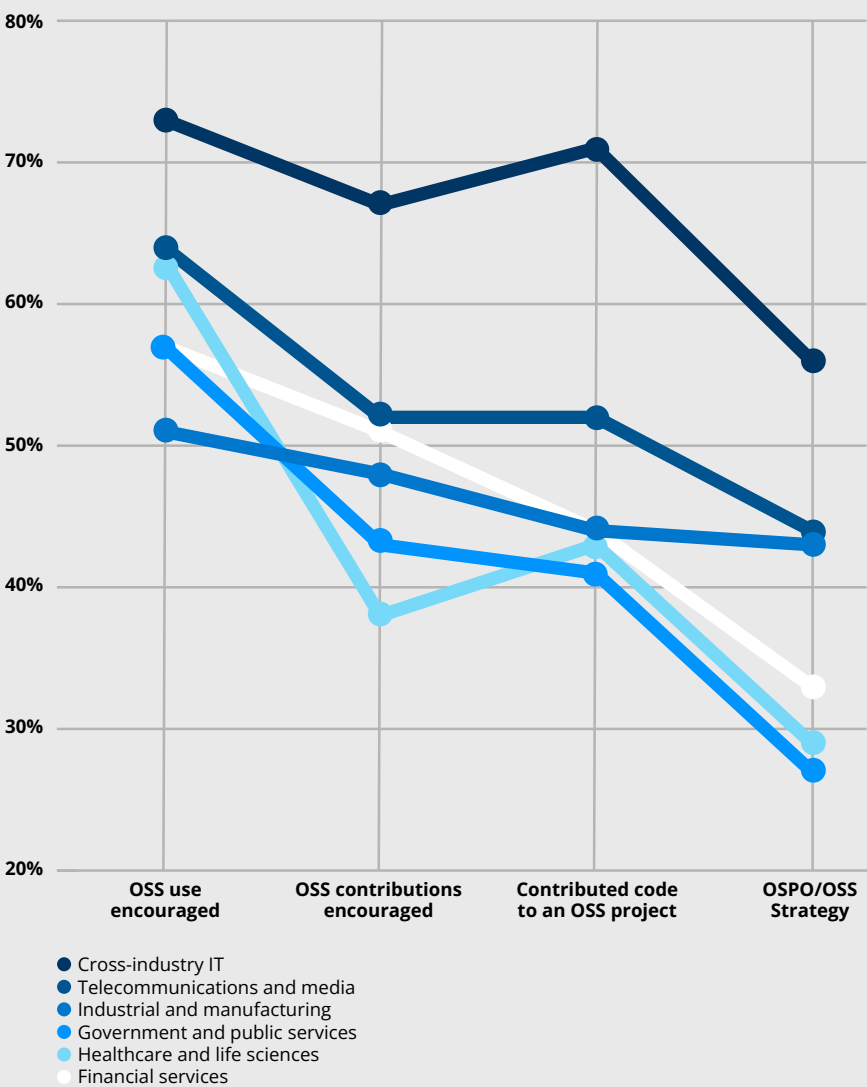
Overall, this analysis suggests that while open source is broadly valuable, its adoption and contribution are heavily influenced by industry-specific requirements. Sectors with restrictive policies may benefit from exploring more flexible OSS strategies to remain competitive, reduce costs, and accelerate innovation.

# Industry analysis II

Building on the previous analysis of open source use and contribution policies, Figure 5 delves deeper into how actively different industries engage with open source through specific practices. We merged the industry categories into five sectors. The data shows that cross-industry IT and telecommunications and media lead in overall open source adoption, with high levels of encouragement for OSS use, significant contributions to projects, and the presence of OSPOs or formal strategies. This high engagement reflects the strategic importance of open source in these sectors, where innovation, interoperability, and rapid deployment are competitive priorities.

In contrast, the government and public services, healthcare and life sciences, and financial services sectors show a more cautious approach. While many organizations in these industries allow OSS use, fewer actively encourage contributions, and a minority have established OSPOs or visible open source strategies. This more restrictive stance may be due to regulatory constraints, security concerns, and intellectual property (IP) considerations. Without formal OSS programs or strategies, these sectors may struggle to fully leverage open source’s benefits, such as cost savings, more rapid innovation, and accelerated development. In the next pages, we will zoom into these five sectors to better understand their unique positions.

FIGURE 5  
OSS ENGAGEMENT METRICS BY INDUSTRY SECTOR



2024 WORLD OF OPEN SOURCE SURVEY, Q26, Q34, Q37, Q13,  
SAMPLE SIZE = 850-884 (DKNS EXCLUDED)

# Cross-industry IT

Table 5 reveals that industries are increasingly turning to open source to drive innovation, establish standards, and reduce development costs. Artificial intelligence and machine learning (AI/ML) emerge as the areas seen to benefit most from open source, with 50% of respondents noting its transformative potential. Operating systems and cloud/container technologies also rank high, underscoring their reliance on collaborative development to meet complex and evolving requirements.

High adoption rates for open source technologies in operating systems, cloud and containers, and CI/CD pipelines illustrate the foundational role OSS now plays across IT infrastructure.

Widespread use of open source in DevOps/GitOps practices reflects a broader trend: organizations are increasingly relying on OSS to accelerate development cycles, enhance reliability, and support flexible, scalable architectures.

To realize these benefits, the IT industry must prioritize sustainable funding models and foster collaborative ecosystems that make it easier for companies to contribute code and resources. By doing so, organizations can help ensure the longevity and security of the OSS projects they rely on while also strengthening their competitive edge through shared innovation and cost efficiencies.

## Industry aspects that benefit most from open source

### 1. INDUSTRY STANDARDS AND INTEROPERABILITY 62%

Clear potential for OSS to become the unifying force across complex, multi-vendor environments.

### 2. INNOVATION 59%

OSS provides a unique environment where diverse contributors can experiment and advance cutting-edge technologies.

### 3. REDUCED PRODUCT DEVELOPMENT COSTS 53%

OSS allows companies to build on existing, community-tested solutions rather than reinventing the wheel.

2024 WORLD OF OPEN SOURCE SURVEY, Q23, SAMPLE SIZE = 381

TABLE 5  
KEY OPEN SOURCE TECHNOLOGIES IN IT

| Most benefit from open source | Greatest uses of open source | Most OSS contributions      |
|-------------------------------|------------------------------|-----------------------------|
| 1. AI / ML (50%)              | 1. Operating systems (65%)   | 1. Cloud / containers (33%) |
| 2. Operating systems (33%)    | 2. Cloud / containers (62%)  | 2. CI / CD (30%)            |
| 3. Cloud / containers (30%)   | 3. CI / CD (61%)             | 3. Web & app dev (28%)      |
| 4. DevOps / GitOps (19%)      | 4. DevOps / GitOps (55%)     | 4. Operating systems (28%)  |
| 5. CI / CD (19%)              | 5. Web & app dev (54%)       | 5. DevOps / GitOps (26%)    |

2024 WORLD OF OPEN SOURCE SURVEY, Q14, Q29, Q36,  
SAMPLE SIZES = 381, 378, 378 RESPECTIVELY

# Telecommunications and media

Table 6 reveals that telecommunications and media companies see substantial value in open source, particularly for advancing AI/ML, with 44% identifying this as the area that would benefit most. Cloud and container technologies and operating systems follow closely, reflecting their critical role in supporting scalable infrastructure and efficient service delivery in this sector.

Open source adoption is highest in cloud and container technologies and operating systems, followed closely by CI/CD tools. This high rate of adoption suggests that telecom and media companies rely on open source to enable continuous deployment, improve operational efficiency, and respond rapidly to market demands.

Contribution rates are highest in cloud and containers and CI/CD, underscoring the sector’s commitment to projects that streamline deployment processes and improve network performance.

Looking ahead, telecommunications and media organizations that actively invest in and contribute to open source stand to benefit from improved innovation cycles, operational efficiencies, and transparency. As these industries continue to rely on open source for both infrastructure and advanced applications, they have the opportunity to shape the direction of OSS projects that align closely with their strategic goals.

## Industry aspects that benefit most from open source

### 1. INNOVATION 61%

Collaborative development accelerates breakthroughs that would be challenging to achieve in isolation.

### 2. PRODUCTIVITY 56%

OSS allows companies to leverage pre-built solutions and focus internal resources on differentiation.

### 3. TRANSPARENCY 53%

Critical for building trust with customers in a highly scrutinized industry.

2024 WORLD OF OPEN SOURCE SURVEY, Q23, SAMPLE SIZE = 103

TABLE 6  
KEY OPEN SOURCE TECHNOLOGIES IN  
TELECOM AND MEDIA

| Most benefit from open source | Greatest uses of open source | Most OSS contributions      |
|-------------------------------|------------------------------|-----------------------------|
| 1. AI / ML (44%)              | 1. Cloud / containers (60%)  | 1. Cloud / containers (25%) |
| 2. Cloud / containers (34%)   | 2. Operating systems (60%)   | 2. CI / CD (22%)            |
| 3. Operating systems (34%)    | 3. CI / CD (57%)             | 3. Networking (22%)         |
| 4. DevOps / GitOps (28%)      | 4. DevOps / GitOps (57%)     | 4. Web & app dev (19%)      |
| 5. Cybersecurity (21%)        | 5. Web & app dev (49%)       | 5. DevOps / GitOps (17%)    |

2024 WORLD OF OPEN SOURCE SURVEY, Q14, Q29, Q36,  
SAMPLE SIZES = 103, 102, 99 RESPECTIVELY

# Industrial and manufacturing

Table 7 indicates that the industrial and manufacturing sector sees substantial value in open source for foundational technologies. Respondents believe that operating systems, AI/ML, and cybersecurity would benefit most from open source, underscoring the importance of secure, adaptable, and efficient software in industrial applications. Open source adoption is highest for operating systems, followed by CI/CD tools and database management, reflecting the reliance on OSS for both infrastructure and automation processes.

Contribution rates are highest for operating systems and IoT/embedded systems. These areas are critical to industrial IoT and automation. This suggests that companies are investing resources to improve open source technologies that align closely with their needs in connected devices and reliable operating environments.

However, several barriers limit the sector’s adoption and contribution to open source. 56% of respondents cite a lack of understanding of the non-technical value proposition of OSS, indicating that many industrial organizations struggle to see how OSS can support broader business objectives, not just technical functions. Additionally, licensing and IP concerns are significant, with over half of respondents citing these as barriers to use and nearly as many concerned about legal issues when contributing. Quality concerns over OSS components and uncertainty about return on investment further complicate engagement in open source, as organizations in this sector prioritize reliability and ROI.

TABLE 7  
KEY OPEN SOURCE TECHNOLOGIES IN INDUSTRIAL AND MANUFACTURING ORGANIZATIONS

| Most benefit from open source     | Greatest uses of open source | Most OSS contributions      |
|-----------------------------------|------------------------------|-----------------------------|
| 1. Operating systems (37%)        | 1. Operating systems (52%)   | 1. Operating systems (23%)  |
| 2. AI / ML (33%)                  | 2. CI / CD (37%)             | 2. IoT / Embedded (21%)     |
| 3. Cybersecurity (30%)            | 3. Database management (36%) | 3. Cloud / containers (17%) |
| 4. Analytics / Data science (23%) | 4. DevOps / GitOps (35%)     | 4. DevOps / GitOps (15%)    |
| 5. IoT / Embedded (23%)           | 5. Web & app dev (31%)       | 5. CI / CD (14%)            |

2024 WORLD OF OPEN SOURCE SURVEY, Q14, Q29, Q36, SAMPLE SIZES = 101, 99, 94 RESPECTIVELY

TABLE 8  
MOST CITED BARRIERS TO OSS USE AND CONTRIBUTIONS

|    | Barriers to use                                                      | Barriers to contribution                      |
|----|----------------------------------------------------------------------|-----------------------------------------------|
| #1 | A lack of understanding of the non-technical value proposition (56%) | Legal or licensing concerns (46%)             |
| #2 | Licensing of intellectual property (IP) concerns (54%)               | A fear of leaking intellectual property (45%) |
| #3 | Concerns about the quality of OSS components (47%)                   | A clear lack of return on investment (32%)    |

2024 WORLD OF OPEN SOURCE SURVEY, Q31, Q42, SAMPLE SIZE = 101

# Government and public services

Table 9 shows how the government and public services sector leverages OSS technologies. 47% of respondents identified AI/ML as the area with the most to gain from OSS, followed by operating systems and analytics/data science. These priorities reflect a growing interest in open source to support data-driven decision-making, improve cybersecurity, and enable scalable, cost-effective digital infrastructure.

Adoption rates are highest for operating systems, with 56% of respondents using open source in this area, followed by web and application development. Contributions, however, remain relatively limited, with web development and operating systems seeing the most engagement from the public sector. This indicates a focus on leveraging OSS for internal efficiency and public-facing

digital services, while contributions back to the community are constrained by specific challenges.

Key barriers limit OSS adoption and contribution in government. 52% of respondents cite a lack of understanding of the non-technical value proposition as a major hurdle. Additionally, 49% report a lack of clear policies or training on how to adopt OSS, highlighting the need for structured guidance to support effective and compliant OSS use. Legal and licensing concerns further complicate engagement in OSS, as public agencies often face strict regulatory and IP requirements. Moving forward, government agencies can benefit from clearer policies, training, and frameworks that address these legal and operational challenges.

TABLE 9  
KEY OPEN SOURCE TECHNOLOGIES IN GOVERNMENT AND PUBLIC SERVICES

| Most benefit from open source     | Greatest uses of open source | Most OSS contributions      |
|-----------------------------------|------------------------------|-----------------------------|
| 1. AI / ML (47%)                  | 1. Operating systems (56%)   | 1. Web & app dev (20%)      |
| 2. Operating systems (37%)        | 2. Web & app dev (45%)       | 2. Operating systems (19%)  |
| 3. Analytics / Data science (30%) | 3. Database management (41%) | 3. AI / ML (16%)            |
| 4. Cybersecurity (26%)            | 4. Cloud / containers (35%)  | 4. Cybersecurity (14%)      |
| 5. Cloud / containers (19%)       | 5. DevOps / GitOps (34%)     | 5. Cloud / containers (12%) |

2024 WORLD OF OPEN SOURCE SURVEY, Q14, Q29, Q36, SAMPLE SIZES = 150, 147, 143 RESPECTIVELY

TABLE 10  
MOST CITED BARRIERS TO OSS USE AND CONTRIBUTIONS

|    | Barriers to use                                                                      | Barriers to contribution                     |
|----|--------------------------------------------------------------------------------------|----------------------------------------------|
| #1 | A lack of understanding of the non-technical value proposition (52%)                 | A lack of policy or training materials (37%) |
| #2 | A lack of a clear policy or supporting training and guidance on how to use OSS (49%) | Legal or licensing concerns (36%)            |
| #3 | Licensing of intellectual property (IP) concerns (41%)                               | Technology constraints and challenges (31%)  |

2024 WORLD OF OPEN SOURCE SURVEY, Q31, Q42, SAMPLE SIZE = 150

# Healthcare and life sciences

Table 11 highlights the value of open source in healthcare and life sciences, particularly in AI/ML, with 37% of respondents identifying it as the area which would most benefit from open source. This is followed by cybersecurity and analytics/data science, reflecting a focus on using open source to support critical advancements in data-driven healthcare and to strengthen security in highly regulated environments.

Open source adoption is strongest in foundational technologies, with operating systems as the top use case, followed closely by cloud and container solutions, DevOps/GitOps, and CI/CD tools. Contributions, however, are more limited; the highest participation is in AI/ML and analytics/data science, areas where collaboration can drive meaningful innovation in medical research and diagnostics.

Despite the potential, significant barriers limit open source use and contributions in this sector. 53% of respondents cite a lack of understanding of OSS's non-technical value, suggesting that many healthcare organizations struggle to see how open source aligns with their strategic goals. Security concerns are also prominent, with 49% worried about the safety of OSS components, reflecting the industry's strict requirements for data protection. Additionally, the absence of clear policies on OSS adoption and legal or licensing concerns are major obstacles, which hinder contributions due to fears of IP risks.

TABLE 11  
KEY OPEN SOURCE TECHNOLOGIES  
IN HEALTHCARE

| Most benefit from open source     | Greatest uses of open source | Most OSS contributions            |
|-----------------------------------|------------------------------|-----------------------------------|
| 1. AI / ML (37%)                  | 1. Operating systems (45%)   | 1. AI / ML (22%)                  |
| 2. Cybersecurity (34%)            | 2. Cloud / containers (40%)  | 2. Analytics / Data science (17%) |
| 3. Analytics / data science (27%) | 3. DevOps / GitOps (40%)     | 3. Web & app dev (15%)            |
| 4. Operating systems (25%)        | 4. CI / CD (40%)             | 4. Cloud / containers (13%)       |
| 5. Cloud / containers (24%)       | 5. Database management (38%) | 5. Database management (13%)      |

2024 WORLD OF OPEN SOURCE SURVEY, Q14, Q29, Q36, SAMPLE SIZES = 59, 58, 54 RESPECTIVELY

TABLE 12  
MOST CITED BARRIERS TO OSS USE  
AND CONTRIBUTIONS

|    | Barriers to use                                                                      | Barriers to contribution                      |
|----|--------------------------------------------------------------------------------------|-----------------------------------------------|
| #1 | A lack of understanding of the non-technical value proposition (53%)                 | A lack of policy or training materials (42%)  |
| #2 | A lack of a clear policy or supporting training and guidance on how to use OSS (49%) | Legal or licensing concerns (39%)             |
| #3 | Licensing of intellectual property (IP) concerns (47%)                               | A fear of leaking intellectual property (39%) |

2024 WORLD OF OPEN SOURCE SURVEY, Q31, Q42, SAMPLE SIZE = 59

# Financial services

Table 13 shows how the financial services sector leverages open source technologies. Again AI/ML was identified as the area that would most benefit from open source. Cybersecurity and analytics/data science are also high priorities, reflecting the sector’s focus on data-driven insights and improved security in a highly regulated environment.

Open source adoption is particularly high in CI/CD tools, used by 67% of respondents, followed by cloud and container technologies and DevOps/GitOps. These adoption rates suggest that financial institutions rely on OSS for efficient, scalable development and deployment processes, supporting both agile development and robust infrastructure. The primary areas of OSS contribution are

in DevOps/GitOps and CI/CD, showing a focus on projects that streamline software delivery and improve operational efficiency.

By actively supporting open source projects that align with these priorities, financial services organizations can not only optimize operations but also lead in innovation across areas such as sustainable finance, decentralized finance, and RegTech. Contribution to OSS projects can further accelerate the creation of interoperable tools and frameworks that benefit the entire industry, fostering shared progress and collaboration. In this way, open source becomes both a driver of technological advancement and a cornerstone for long-term competitive advantage in financial services.

## Industry aspects that benefit most from open source

### 1. INDUSTRY STANDARDS AND INTEROPERABILITY 59%

Critical for navigating complex regulatory environments and ensuring seamless interactions across systems.

### 2. REDUCED DEVELOPMENT COSTS 54%

Leverage community-driven solutions and avoid duplicative R&D expenses.

### 3. INNOVATION 53%

Essential for accelerating technological advancements and enabling the sector to adapt to emerging trends.

2024 WORLD OF OPEN SOURCE SURVEY, Q23, SAMPLE SIZE = 90

TABLE 13  
KEY OPEN SOURCE TECHNOLOGIES IN FINANCIAL SERVICES

| Most benefit from open source | Greatest uses of open source | Most OSS contributions      |
|-------------------------------|------------------------------|-----------------------------|
| 1. AI / ML (46%)              | 1. CI / CD (67%)             | 1. DevOps / GitOps (23%)    |
| 2. Cloud / containers (36%)   | 2. Cloud / containers (62%)  | 2. CI / CD (22%)            |
| 3. CI / CD (32%)              | 3. DevOps / GitOps (52%)     | 3. Web & app dev (21%)      |
| 4. DevOps / GitOps (30%)      | 4. Web & app dev (51%)       | 4. Cloud / containers (21%) |
| 5. Cybersecurity (27%)        | 5. Operating systems (46%)   | 5. AI / ML (17%)            |

2024 WORLD OF OPEN SOURCE SURVEY, Q14, Q29, Q36,  
SAMPLE SIZES = 90, 87, 82 RESPECTIVELY

# OSS contributors

The survey reveals significant engagement in open source contributions, with 52% of respondents actively involved in OSS projects. On average, these contributors dedicate around nine hours per week to open source activities, with time commitments varying widely. Some contributors spend as few as one to four hours weekly, while others commit over 40 hours, reflecting the diversity in contributors’ availability and the intensity of their involvement.

The survey reveals that open source contributors are primarily motivated by opportunities for learning, personal development, and community engagement. 72% of respondents view OSS as a platform for skill-building and practical experience beyond traditional education, while 69% are driven by a desire to work on projects they find personally interesting or regularly use. Additionally, 58% appreciate the collaborative aspect of open source, which allows them to connect with and work alongside peers with shared interests.

However, contributors face significant challenges, the most common being time constraints due to personal commitments, cited by 63% of respondents. This suggests a need for more flexible contribution models. Financial limitations are also notable, with 34% indicating a lack of funding or compensation. Additionally, 33% of contributors report difficulties navigating project guidelines and processes.

52%

of respondents contribute to open source projects from our sample.

9 HOURS

per week is the average time our respondents spend on open source projects, from as low as 1–4 hours a week to more than 40 hours a week.

2024 WORLD OF OPEN SOURCE SURVEY, Q44, SAMPLE SIZE = 1,264  
2024 WORLD OF OPEN SOURCE SURVEY, Q45, SAMPLE SIZE = 604 (DKNS EXCLUDED)

TABLE 14  
MOST CITED MOTIVATORS AND CHALLENGES WHEN CONTRIBUTING TO OSS

| Top motivators |                                                                    | Top challenges |                                                                        |
|----------------|--------------------------------------------------------------------|----------------|------------------------------------------------------------------------|
| 72%            | Learning and personal development                                  | 63%            | Lack of time due to personal commitments                               |
| 69%            | Involvement in a project I find fascinating and / or use regularly | 34%            | Lack of funding or compensation for contributions                      |
| 58%            | Enjoyment in working with my peers and the community               | 33%            | Difficulty understanding project guidelines and contribution processes |

2024 WORLD OF OPEN SOURCE SURVEY, Q47, SAMPLE SIZE = 661  
2024 WORLD OF OPEN SOURCE SURVEY, Q48, SAMPLE SIZE = 661,  
VALID CASES = 661, TOTAL MENTIONS = 1,519

# OSS funding

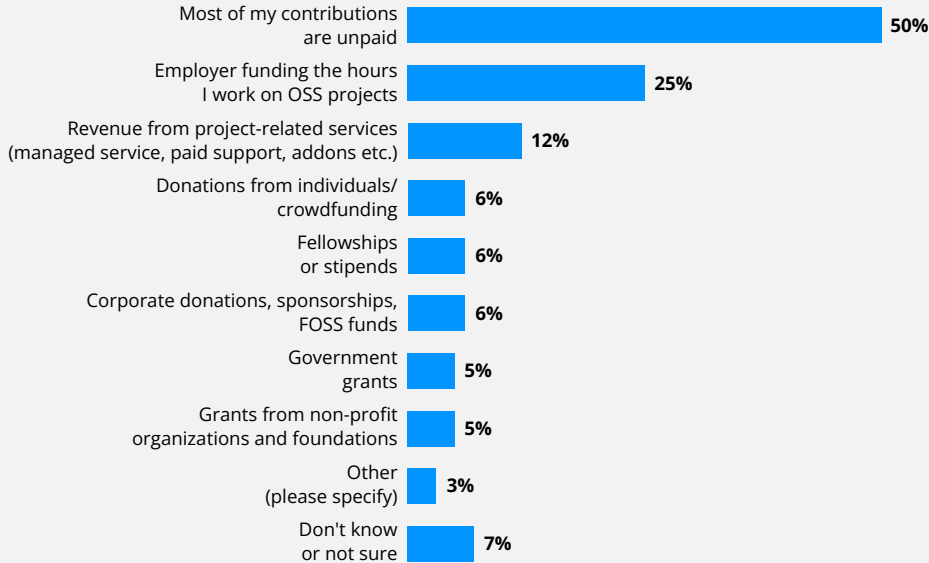
Figure 6 shows the funding landscape for OSS contributions. Half of all respondents report that most of their contributions are unpaid, revealing the prevalence of volunteer-driven work in the OSS community.

Among those who do receive financial support, employer funding is the most common source, with 25% reporting that their employers cover hours worked on OSS projects. Additional funding sources, including project-related revenue, individual donations, and fellowships, each account for 6% to 12% of responses.

From an organizational perspective, 37% of companies employ OSS maintainers to support projects essential to their business, with 74% of those organizations recognizing substantial value in employing maintainers.

This data suggests that while unpaid contributions are widespread, there is a growing trend of organizations directly investing in OSS to sustain critical software and drive mutual benefit.

**FIGURE 6**  
**PRIMARY SOURCES OF FUNDING FOR OSS CONTRIBUTIONS**



2024 WORLD OF OPEN SOURCE SURVEY, Q46, SAMPLE SIZE = 661, VALID CASES = 661, TOTAL MENTIONS = 830, RESPONDENTS WERE ABLE TO SELECT MULTIPLE RESPONSES EXCEPT WHEN "UNPAID" IS SELECTED

37%

Almost 2 in 5 organizations employ OSS maintainers as a means to sustain OSS projects that are vital to their business.

2024 WORLD OF OPEN SOURCE SURVEY, Q40, SAMPLE SIZE = 755 (DKNS EXCLUDED)  
2024 WORLD OF OPEN SOURCE SURVEY, Q41, SAMPLE SIZE = 264 (DKNS EXCLUDED)

74%

of those say that they derive high value from employing maintainers.

# Methodology

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. The research team stratified data collection by company size and

organization type. The stratification design allowed 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 they 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.

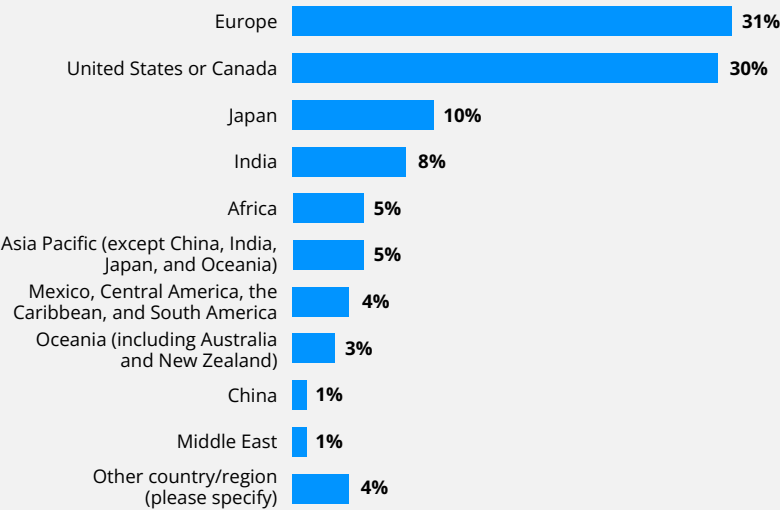
Some of the analyses in this report exclude DKNS responses. This is because the data missing can be classified as either missing at random or missing completely at random. Excluding DKNS data from a question does not change the distribution of data (counts) for the other responses, but it does change 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 7 illustrates the geographic distribution of the global survey. Respondents were asked to identify the region where their corporate headquarters is located (Q7). 31% of the sample came from respondents working in European-headquartered organizations, while another 30% came from organizations 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; their share of the sample is 10%. Asia-Pacific comprises 23%. We did receive input from other regions but at a lower rate.

FIGURE 7  
IN WHAT COUNTRY OR REGION DOES YOUR ORGANIZATION 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)

The charts in Figure 8 shows the professional role of respondents and company size as measured by number of employees. The top chart shows that approximately 71% of respondents were in IT roles. The bottom chart shows that the size of the organizations surveyed ranges from microbusinesses with 1-10 employees to large organizations with more than 20,000 employees. The type of organization is shown in the top chart of Figure 9. Organizations where the primary revenue comes from IT products and services comprised 46% of the sample. This included hardware and software vendors, system integrators, cloud service providers, etc. 38% of the sample included industry-specific end-user organizations. We also received surveys completed by respondents from academic, non-profit, or governmental organizations (17%). In the bottom chart, respondents were able to report the industry their organizations are part of. Most respondents work for cross-industry IT vendors (36%), but a variety of industries are represented in the sample. This industry question was used to analyze industry trends in the report.

Survey data: Data.World access

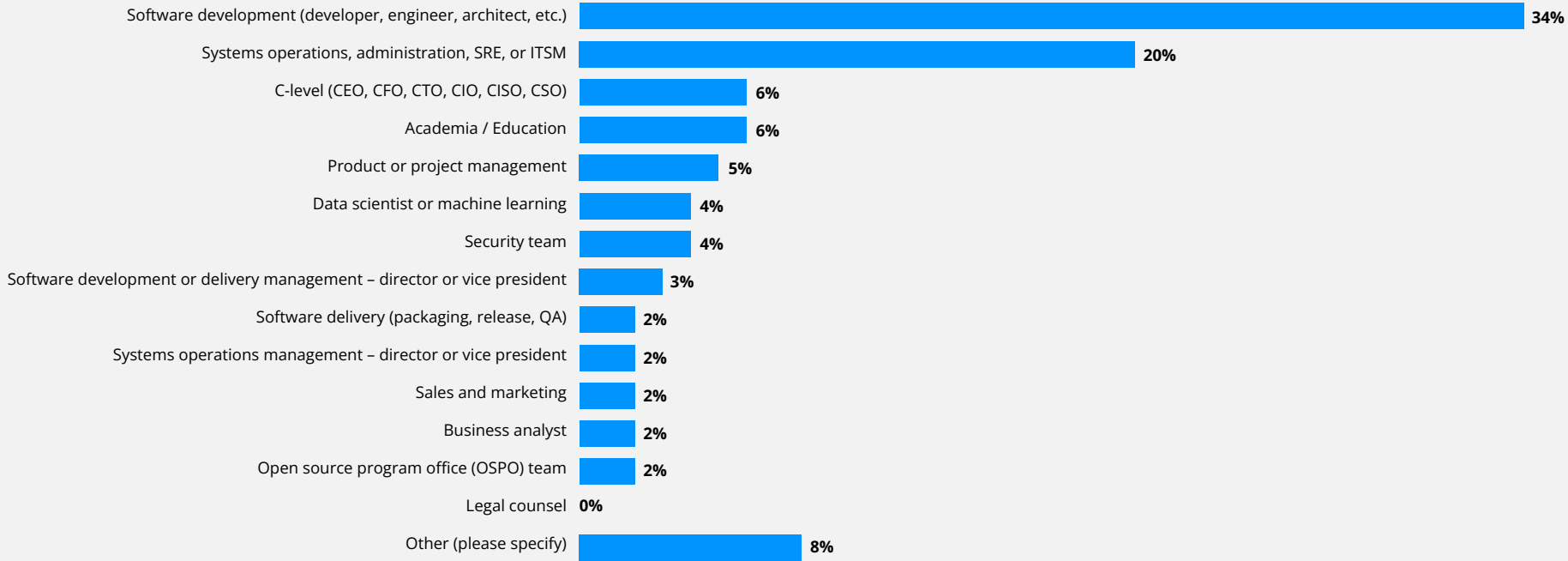
Linux Foundation Research makes each of its empirical project datasets available on Data.World. Included in this dataset are the survey instrument, raw survey data, screening and filtering criteria, and frequency charts for each question in the survey. Linux Foundation Research datasets, including this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

FIGURE 8

PROFESSIONALLY, WHICH ROLE DO YOU MOST CLOSELY IDENTIFY WITH?

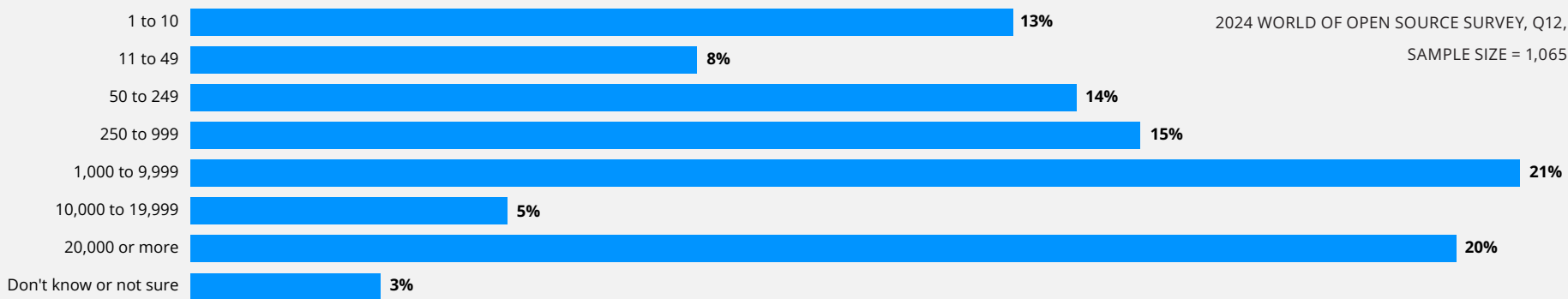
2024 WORLD OF OPEN SOURCE SURVEY, Q6,  
SAMPLE SIZE = 1,089

(select one)



PLEASE ESTIMATE HOW MANY EMPLOYEES YOUR ORGANIZATION HAS WORLDWIDE.

(select one)



2024 WORLD OF OPEN SOURCE SURVEY, Q12,  
SAMPLE SIZE = 1,065

FIGURE 9

WHICH TYPE OF COMPANY OR ENTITY DO YOU WORK FOR?

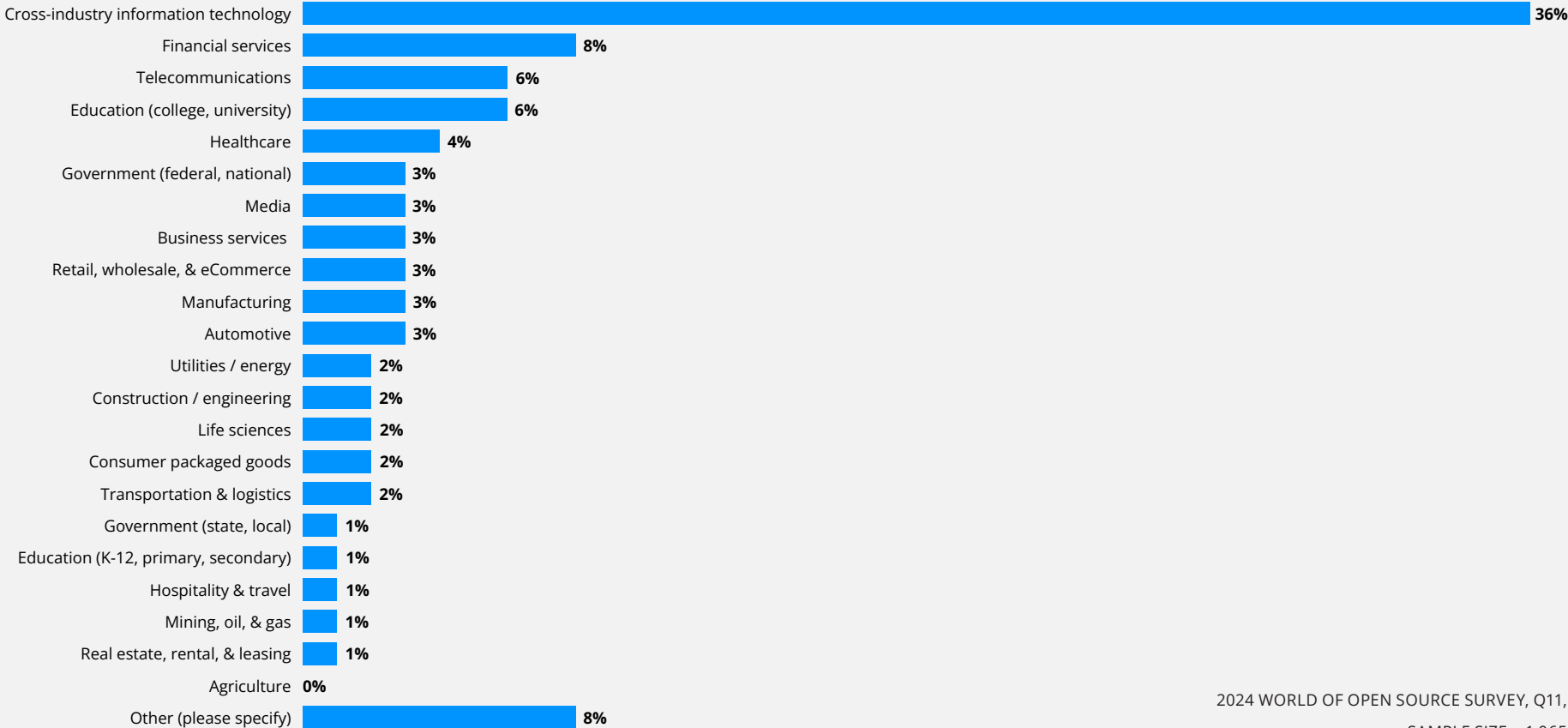
2024 WORLD OF OPEN SOURCE SURVEY, Q8,  
SAMPLE SIZE = 1,065

(select one)



WHICH OF THE FOLLOWING BEST DESCRIBES YOUR ORGANIZATION'S PRIMARY INDUSTRY?

(select one)



2024 WORLD OF OPEN SOURCE SURVEY, Q11,  
SAMPLE SIZE = 1,065

## About the author

**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 development, analysis, and report writing. Adrienn has previously conducted research at the University of Oxford, the Budapest Institute for Policy Analysis, and the U.K.'s Office for National Statistics. She has a strong fascination with the collective power of open source collaboration within geographically dispersed communities. Additionally, she is most interested in researching trends and solutions for challenges related to open source software funding, sustainability, and supporting developers in their pursuit of responsible technological advancement.

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