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The State of Sovereign AI

Exploring the Role of Open Source Projects and Global Collaboration in Global AI Strategy

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The State of Sovereign AI

79% consider sovereign AI as **valuable and a strategic priority**, especially at the national **(66%)** and organizational **(47%)** levels.

Data control (72%) and **national security (69%)** are top drivers of sovereign AI interest.

82% of organizations build **customized AI solutions (90%** in U.S.), with **57%** focused on **controlling** AI capabilities and intellectual property.

Open source software **(81%)** leads as **the primary approach for sovereign AI**, followed by open standards **(65%)** and open data **(65%)**.

59% prefer **contributing to open source projects** as the primary collaboration method.

Transparency and auditability are the top open source benefits for sovereign AI **(69%)**, especially in Europe **(80%)**.

93% view global collaboration as essential for building **secure and culturally aligned** sovereign AI systems.

Global collaboration is also valuable for **foundation models (59%)** and **data resources (59%)**.

Top challenges to adopting open source AI include **data quality (44%)** and **technical expertise** shortage **(35%)**.

Top barriers to global AI collaboration include **resource constraints (35%)**, **IP concerns (34%)**, and **geopolitical tensions (28%** globally, **36%** in Asia-Pacific).

43% prefer **open source community-led governance** for sovereign AI development.

National governments **(66%)** and open source foundations **(60%)** are key stakeholders for **shaping sovereign AI's future**.

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Foreword

In little more than a decade, open source software turned cloud computing from a proprietary service into the fabric of the Internet. We now stand at the same inflection point for artificial intelligence. As Executive Director of LF AI & Data, after 15 years helping guide OpenStack and the broader OpenInfra ecosystem, I hear one question dominating boardrooms and governments alike: **How do we steer AI rather than be steered by it?**

This report responds to that question with clarity and evidence: open source is the answer.

Nearly four out of five organizations call AI sovereignty a strategic priority, and 90% cite open source as essential to achieving it. Public commitments already exceed $20 billion for sovereign-AI and sovereign-cloud initiatives across Europe, the Middle East, and Asia, and more than 40 national or sector-specific projects have been announced in the past 18 months. The movement is no longer theoretical; it is being funded and built.

Sovereignty, however, should never be confused with isolation. The survey shows a 94% consensus that global collaboration is indispensable. That is where a neutral foundation proves its worth. LF AI & Data brings together competitors, governments, and researchers to share code, audit supply chains, and set interoperable standards. Working in a neutral venue accelerates everyone's progress while allowing each participant to invest in what truly differentiates them.

Challenges remain. Uneven data quality, talent shortages, and escalating GPU costs threaten to widen the gap between AI haves and have-nots. The recommendations that follow outline practical steps: invest in open data pipelines, adopt community-led governance, and use shared evaluation frameworks to turn sovereign AI from slogan into practice.

I invite you to read, contribute, and join us in ensuring that the next decade of intelligence is open and trustworthy, guided by those who build and use it.

Mark Collier
GM, AI & Infrastructure,
The Linux Foundation

Executive summary

This study, based on a survey of 233 respondents and expert insights from industry leaders, reveals that sovereign AI (i.e., developing AI capabilities with minimal reliance on external actors) has emerged as a strategic priority for nations and organizations, with 79% of respondents considering it valuable and strategically relevant. This consensus spans major geographic regions, with 86% of U.S. respondents, 83% of European respondents, and 79% of Asia-Pacific respondents viewing it as essential. The strategic importance manifests at both national (66%) and organizational (47%) levels, with 82% of organizations already developing customized AI solutions to maintain control over their capabilities and intellectual property.

Sovereign AI is driven by several motivations:

- Data control (72%): Organizations recognize data as a strategic asset, seeking to prevent external appropriation of sensitive information or intellectual property.
- National security (69%): AI systems function as instruments of soft power, making widespread reliance on foreign AI platforms a structural vulnerability.
- Economic competitiveness (48%): Sovereign AI creates advantages through domestic capacity building and long-term innovation ecosystem development.
- Regulatory compliance and cultural alignment (44% and 31%, respectively): AI systems can align with local regulations, values, and cultural contexts.

Three pillars of openness—open source software, open standards, and open data—provide the foundation for AI sovereignty. Open source was particularly valued, with 90% of respondents viewing it as essential or very important. Key benefits of open source for sovereign AI include:

- Transparency and auditability (69%, rising to 80% in Europe)
- Security and trust (60%)
- Flexibility for customization and fine-tuning (69%)
- Innovation acceleration through collaborative development (41%)

Despite the seemingly contradictory nature of sovereignty and collaboration around open source, 94% of respondents view global collaboration as essential to achieving sovereign AI. This finding reveals that participation in shared, community-driven open source development can work as a bridge to achieve sovereign AI. Foundation models and datasets emerge as the top priorities for collaboration (both at 59%), as well as development tools and platforms (39%).

Nevertheless, the path to open source sovereign AI includes obstacles such as data quality and availability issues (44%) and technical expertise shortage (35%). Obstacles to participating in global AI development include resource constraints (35%), intellectual property concerns (34%), geopolitical tensions (28%), national security restrictions (26%), and regulatory compliance challenges (26%).

Moving forward, the future of sovereign AI governance lies in open, community-driven frameworks. Open source foundations are key stakeholders, second only to national governments, highlighting the need for nation-state oversight aligned with collaborative technical development.

Strategic recommendations include investing in open source AI infrastructure, developing sovereign AI talent, supporting open source foundations and community-driven governance models and standards, addressing data challenges, and fostering strategic international collaborations.

The research concludes that sovereign AI does not need to retreat into technological nationalism but can be an approach to maintaining autonomy while participating in global innovation networks. The apparent paradox between sovereignty and collaboration resolves through open source methodologies that enable nations and organizations to control their AI capabilities while benefiting from collective advancement. Success in sovereign AI requires recognizing that technological independence comes not from isolation but from the ability to participate in—and influence—the collaborative development of critical AI technologies.

Introduction

The term "sovereign AI" has been used to describe efforts aimed at developing AI capabilities with minimal reliance on external actors, enabling nations and organizations to retain control over their systems, data, and decision-making processes. These efforts represent a departure from the early phase of AI adoption when many organizations outsourced AI development to third parties, often overlooking issues of technological autonomy and strategic control. Sovereign AI initiatives seek to address concerns about data sovereignty, national security, economic competitiveness, and cultural alignment by developing domestically controlled AI capabilities that can operate independently of external technology providers and geopolitical constraints.

Sovereign AI manifests across diverse use cases and scales of implementation. At the national level, examples include countries developing their own large language models trained on domestic data and cultural contexts, as well as governments establishing local AI research institutes and computing infrastructure to reduce dependence on foreign cloud providers. In parallel, organizations pursue sovereign AI through initiatives when adapting and customizing AI solutions for their own needs, protecting their operational data and intellectual property, and retaining control of their AI capabilities. Sovereign AI also encompasses efforts to ensure cultural and linguistic representation, such as developing AI systems that understand local dialects, cultural nuances, and regulatory frameworks that generic, globally deployed AI systems often overlook.

This research investigates three fundamental questions about the current state and future trajectory of sovereign AI development. First, we examine the extent to which organizations and nations are prioritizing sovereign AI initiatives and the primary drivers motivating these efforts, including data control concerns, national security considerations, economic competitiveness, and regulatory compliance requirements. Second, we analyze how open source technologies and collaborative development models can enable sovereign AI capabilities, exploring the apparent paradox between sovereignty and collaboration. Third, we investigate the governance frameworks and partnership models that can best support the development of sovereign AI systems that are both domestically controlled and globally interoperable.

Through a mixed-methods approach combining quantitative survey data and qualitative expert insights, this study aims to inform policymakers, organizations, and open source communities about the strategic considerations, technical requirements, and collaborative opportunities that define the sovereign AI ecosystem. Our methodology includes an online survey of 233 qualified respondents conducted from May to June 2025, complemented by expert webinars featuring industry leaders who provided contextual depth and strategic perspectives on sovereign AI development.

This report begins by examining the strategic relevance of sovereign AI at both national and organizational levels, followed by an analysis of the key drivers motivating sovereign AI adoption. We then explore the sovereign AI blueprint, with particular focus on how open source technologies serve as the primary pathway to achieving technological autonomy while enabling continued innovation and collaboration. Third, the report investigates global collaboration patterns in open source AI development, examining how organizations can participate in international partnerships while maintaining their sovereignty objectives. Finally, we discuss next steps for sovereign AI development, including governance models, collaboration frameworks, and recommendations for addressing the challenges and opportunities identified throughout our research.

The relevance of sovereign AI

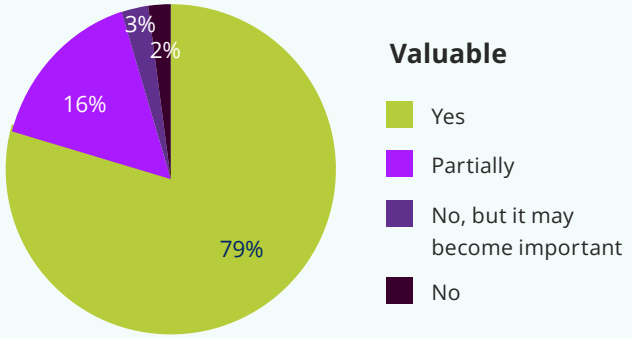
Sovereign AI holds strategic relevance at both national and organizational levels

Survey respondents were asked whether sovereign AI is a strategic priority. As shown in Figure 1, a significant majority (79%) recognize the value and strategic importance of developing AI capabilities with reduced external dependencies. This broad agreement represents a notable evolution from the perspectives that dominated the initial wave of AI adoption, when organizations approached AI through a traditional software-as-a-service lens,[1] prioritizing convenience, cost-effectiveness, and technical performance while largely overlooking the strategic implications of where AI capabilities resided and who controlled them. Many organizations deployed sensitive workloads in proprietary AI infrastructure without fully considering the implications of jurisdictional control, regulatory compliance, or geopolitical risk.

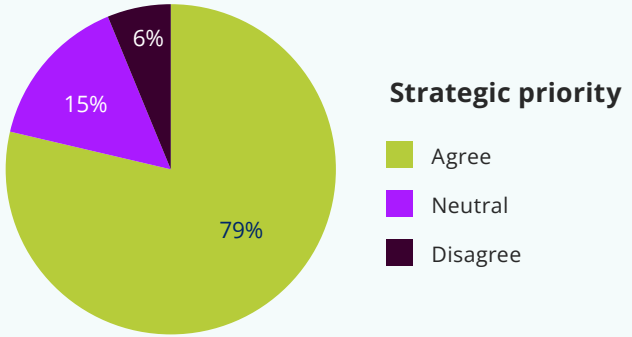
The strong emphasis on sovereign AI in our data marks a departure from this earlier mindset, signaling a recognition that long-term competitiveness, resilience, and trust depend on owning and governing core AI capabilities rather than relying entirely on external providers. This trend toward sovereign AI is consistent across regions, as shown in Table 1. In the United States, 86% of respondents view sovereign AI as valuable, while 83% of respondents in Europe consider it a strategic priority. The Asia-Pacific region also reflects strong alignment, with 79% recognizing its value and 78% treating it as a strategic priority.

FIGURE 1

79% OF THE RESPONDENTS CONSIDER SOVEREIGN AI VALUABLE AND STRATEGICALLY RELEVANT



2025 Global Collaboration in AI Survey, Q13 (“The term “Sovereign AI” has been used to describe efforts to develop AI capabilities with reduced external dependencies. Based on this definition, do you consider this approach valuable?”), aggregated responses, sample size = 233, DKNS excluded (2%)



2025 Global Collaboration in AI Survey, Q14 (“To what extent do you agree that Sovereign AI is becoming a strategic priority in your country, region, or your organization?”), aggregated responses, sample size = 233, DKNS excluded (3%)

TABLE 1

SOVEREIGN AI IS RECOGNIZED AS VALUABLE AND A STRATEGIC PRIORITY ACROSS REGIONS

REGION	VALUABLE	STRATEGIC PRIORITY
United States	86%	79%
Europe	75%	83%
Asia-Pacific	79%	78%

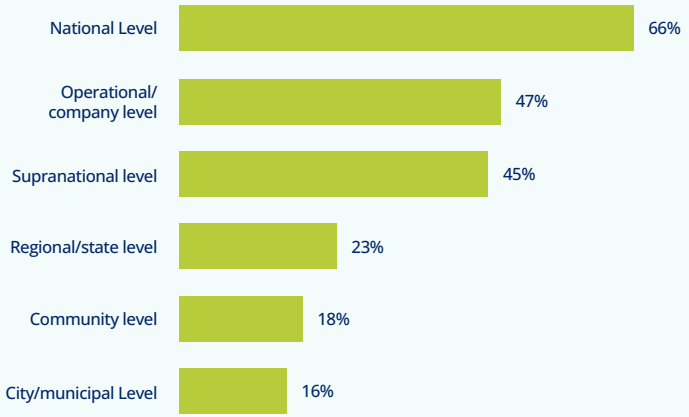
2025 Global Collaboration in AI Survey, Q13 aggregated and Q14 aggregated by Q6, Sample Size = 214, DKNS excluded (2 to 3%), other regions omitted due to insufficient representation

Respondents were also asked at which levels sovereign AI is most relevant. As shown in Figure 2, a majority (66%) emphasize its **national-level relevance**, indicating that AI capabilities are deeply tied to national infrastructure, regulatory frameworks, and strategic coordination. National governments are uniquely positioned to set data governance standards, negotiate international AI agreements, fund large-scale research initiatives, and shape the legal and economic conditions required for sovereign AI ecosystems.

FIGURE 2

RESPONDENTS RECOGNIZE SOVEREIGN AI AS RELEVANT AT BOTH NATIONAL (66%) AND ORGANIZATIONAL (47%) LEVELS

At which level(s) do you believe Sovereign AI is most relevant? (select all that apply)



2025 Global Collaboration in AI Survey, Q15, Sample Size = 233, Total Mentions = 483, DNKS excluded (7%)

The recognition of **organizational-level sovereign AI** relevance (47%) reflects the growing awareness that sovereign AI directly influences operational autonomy, competitive positioning, and long-term strategic flexibility in organizations (Figure 2). As observed in Appendix A1, the importance of organizational-level sovereign AI is even higher in Europe (55%), reflecting the continent's regulatory environment, where compliance with frameworks such as GDPR and the AI Act reinforces the strategic value of domestically controlled AI in reducing compliance risk and strengthening competitiveness in privacy-conscious markets.

The consensus on the value and importance of sovereign AI indicates that decision-makers increasingly view AI systems as dependencies that directly impact operational autonomy, data sovereignty, and strategic flexibility. Organizations are no longer merely asking, "Which AI solution performs best?" but rather, "Which AI solutions preserve our decision-making autonomy and align with our institutional values?" This shift reflects a maturation in AI governance, where technical capabilities are now assessed within broader frameworks that include geopolitical risk, regulatory compliance, and long-term strategic independence. Our results suggest we are witnessing the early stages of a major architectural transition toward domestically controlled AI capabilities and institutional autonomy, which could reshape AI adoption over the coming decade.

We already see organizations customizing AI models as one of the foundational steps toward sovereign AI, with this customization typically occurring on top of open source frameworks, tools, and base foundation models, highlighting the role that open source infrastructure plays in enabling institutional control over AI capabilities. In the next section, we explain how organizations customize AI solutions and examine the role that open source plays in this customization process and, as such, in sovereign AI development.

Drivers of sovereign AI

The previous section provides empirical evidence that nations and organizations are pursuing customized and sovereign AI systems. In this section, we discuss the reasons for this activity at both operational and strategic levels.

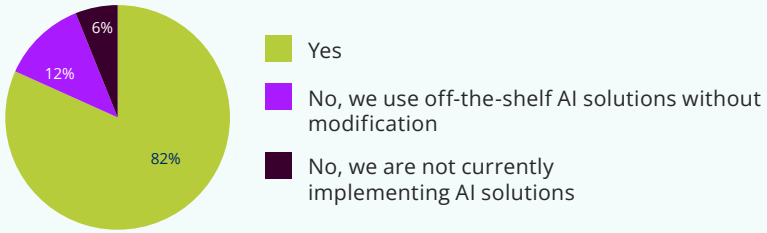
To what extent are organizations pursuing custom AI solutions?

At an operational level, respondents were asked whether their organizations are developing custom AI solutions. As shown in Figure 3, the vast majority of organizations (82%) are developing customized AI solutions. Figure 4 reveals that this trend is particularly pronounced in the U.S. and among larger organizations, although it remains strong across all regions and organization sizes. This widespread trend of customization reflects a recognition that one-size-fits-all AI systems cannot sufficiently address organizations' diverse needs, values, and regulatory requirements.

FIGURE 3

82% OF ORGANIZATIONS ARE DEVELOPING CUSTOMIZED AI SOLUTIONS

Is your organization developing customized AI solutions?



2025 Global Collaboration in AI Survey, Q28, Sample Size = 206, answered only by Q3 = "Employed", DKNS excluded (4%)

FIGURE 4

THE EMPHASIS ON CUSTOMIZED AI IS STRONGEST IN THE U.S. AND AMONG LARGE ORGANIZATIONS

Regions

United States
90%

Europe
86%

Asia-Pacific
72%

Organization sizes

1 to 49 employees
Small Organizations
65%

50 to 1k employees
Medium Organizations
71%

1k to 10k employees
Large Organizations
92%

10k or more employees
Enterprise Organizations
92%

2025 Global Collaboration in AI Survey, Q28, Sample Size = 206, answered only by Q3 = "Employed," DKNS excluded (4%), grouped by Q6 and Q12, other regions omitted due to insufficient representation

For nations pursuing sovereign AI strategies, this organizational need of customized solutions validates the importance of maintaining domestic AI capabilities rather than depending entirely on foreign technologies that may embed different values or create potential vulnerabilities. The proliferation of customized AI development also demonstrates that the technical infrastructure and expertise for creating tailored AI solutions are becoming more relevant, making capacity building in AI more relevant to organizations and countries wanting to maintain control over their critical AI systems.

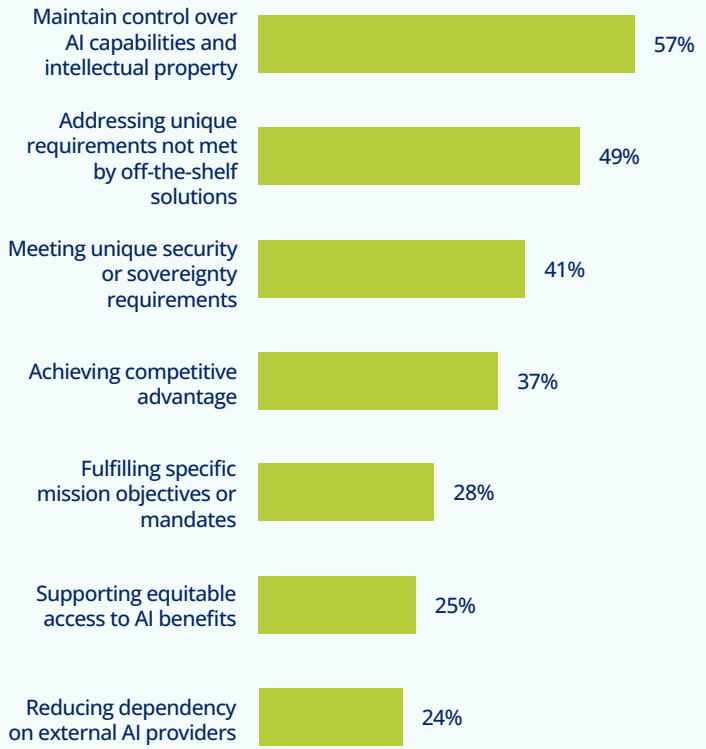
Motivations for operational customization

According to the survey respondents, the leading driver of customization is **maintaining control over AI capabilities and intellectual property** (57%) (see Figure 5). This demonstrates that organizations view AI not just as a productivity tool but as a core strategic asset. This reflects an understanding that AI capabilities, once developed, become embedded knowledge that can be leveraged across multiple use cases, markets, and future innovations. Unlike traditional software implementations, where switching costs are primarily operational, AI systems create intellectual property that compounds over time—the data insights, model architectures, and optimization techniques developed through custom solutions become proprietary advantages that external providers cannot replicate or revoke. Additionally, respondents expressed concerns over potential intellectual property litigation associated with third-party AI solutions, reinforcing their preference for customization to mitigate legal risks.

FIGURE 5

TOP MOTIVATIONS FOR BUILDING CUSTOM AI SOLUTIONS

What are your organization's motivations for building its own custom AI systems or solutions? (select up to three responses)



2025 Global Collaboration in AI Survey, Q29, Sample Size = 154, Total Mentions = 403, answered only by Q3 = "Employed" and Q28 = "Developing customized solutions", DKNS excluded (1%)

The second-highest motivation, **addressing unique requirements not met by off-the-shelf solutions** (49%), reveals the limitation of commoditized AI in meeting complex organizational needs. Despite the widespread marketing of universal AI platforms, many organizations are encountering significant gaps between generic capabilities and their specific operational contexts, regulatory constraints, and strategic goals. The prominence of this factor suggests that customization is not merely a preference but a necessity, particularly for organizations operating in specialized domains or managing unique data structures that are incompatible with mass-market AI infrastructure. This challenges the assumption that AI systems can be broadly applied without substantial adaptation, highlighting the strategic value of tailored solutions.

The relatively high frequency of **security or sovereignty requirements** (41%) and **competitive advantage** motivations (37%) demonstrates how organizations are simultaneously addressing protective and proactive strategic considerations through AI customization. On the protective side, the emphasis on security reflects growing concerns about data control, which are now driving concrete decisions to build and tailor AI systems internally. On the proactive side, the focus on competitive advantage signals a strategic investment in market differentiation and long-term value creation. These findings suggest that sovereign AI capabilities are becoming more important than the short-term operational efficiencies offered by external, one-size-fits-all solutions.

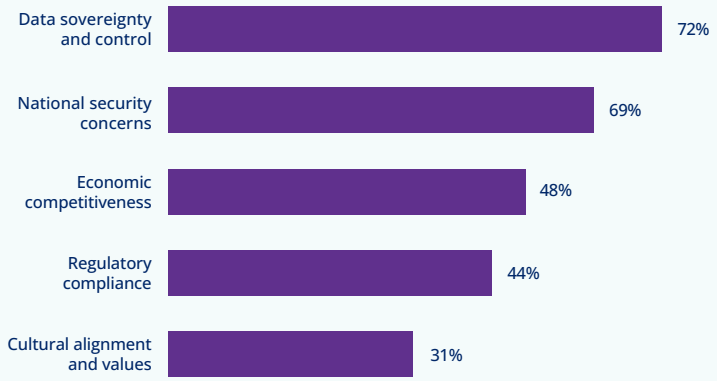
Strategic motivations for sovereign AI

Survey respondents not only described their motivations for customization but also shared their perspectives on the broader strategic drivers behind sovereign AI adoption. Figure 6 presents the five most frequently cited reasons fueling this strategic interest.

FIGURE 6

KEY INTEREST DRIVERS IN SOVEREIGN AI

In your opinion, what is driving interest in Sovereign AI? (select all that apply)



2025 Global Collaboration in AI Survey, Q16,
Sample Size = 233, Total Mentions = 607, DKNS excluded (3%)

Data control as a strategic asset

As illustrated in Figure 6, the prominence of **data sovereignty and control** concerns (72%) reflects a general recognition that AI models trained on organizational data can create undesired dependencies and risk. Even after contractual relationships, external providers may retain insights derived from proprietary datasets, posing long-term competitive and security risks. The procurer also has to trust that the provider cannot access their data, which is no longer such a given, according to Vincent Caldeira, CTO of Red Hat in APAC: *"Until recently, there was a blind confidence in a lot of the global providers of infrastructure that they would not access or disclose the data. And a lot of this myth was dispelled when people realized that they could easily be compelled by their regulator in their home country to access and disclose it."*

Concerns around leaks and breached privacy laws create hesitation, and *"this is where a country or organization says, 'I want to deploy my own data centers. I want to deploy my AI within my premises. I don't want my data to be leaked beyond,'"* explained Eugene Cheah, CEO of Featherless AI. A senior leader at a global chip manufacturer confirmed this trend, explaining how various states in the U.S. are investing in data centers to keep their data in-state.

This broad interest suggests that control over training data is not just a privacy concern—it's a strategic asset. Sovereign AI ensures that the value generated from data remains within the organization or national ecosystem, preventing external appropriation of sensitive information and intellectual property. As Mark Collier, General Manager of AI & Infrastructure at the Linux Foundation, argued, *"In terms of the big drivers of AI sovereignty, it is about control and knowing where your data is."*

Security concerns

The emphasis on **national security concerns** (69%) reflects a broad societal recognition that AI systems function as instruments of soft power, where dominant platforms shape global information flows, decision-making frameworks, and technological standards in ways that can fundamentally alter the geopolitical balance (Figure 6).

Security concerns also exist at the compute level, given the need to access computing resources to actually drive use cases. As Caldeira explained, *"We see a huge dependency in the ability to drive and participate in the AI boom by the access to compute. And also, ultimately, by the access to energy."* He noted that Korea, China, and other countries are seeking to build their own chips to reduce dependency on foreign hardware providers. Reducing foreign dependence in this way gives countries the assurance to run their models without geopolitical or other concerns disrupting their access.

This need for national independence and autonomy was a clear theme throughout the webinars. Participants spoke about how the existing power imbalances and over-reliance on very few players are top of mind for sovereign AI activity: *"Igniting autonomy and agency serves as a pivotal driving force for sovereign AI development,"* as stated by Dr. Qin Wang, Senior Research Fellow at the Institute of Industrial Economics and Professor at the University of Chinese Academy of Social Sciences.

To counter security concerns requires this sovereignty mindset. *"There's a lot of fear… AI is so powerful, are we afraid of being dependent on one company?"* Collier appealed to the group. He continued, *"But, the more positive way to think about that is independence and agency… and the more powerful AI becomes, the more important transparency is."* Taking hold of the technology and moving it out of the hands of a major company increases the ability for transparency and helps localize it with the end user. Emily Chen, Co-Founder of KAIYUANSHE, brought the conversation back to those end users: *"The AI of the future does not belong to any company but to every country and its people."*

Building economic advantage through sovereign AI

Economic competitiveness (48%) also emerges as a key motivation for sovereign AI, revealing that sovereign AI capabilities can create advantages that foreign AI services cannot match. Beyond immediate operational benefits, sovereign AI initiatives can generate cascading economic effects that strengthen entire national innovation ecosystems.

Domestic AI providers are better positioned to tailor solutions to local market conditions, regulatory frameworks, and cultural preferences, while simultaneously building national expertise that strengthens the broader innovation ecosystem. *"Sovereign AI is an economic development imperative and workforce development imperative. If a state, a country, a city, a university, wants to compete globally, it has to move from a trend to a strategic requirement,"* according to a senior leader at a global chip manufacturer.

From another lens, sovereign AI systems allow for greater access to the economic value that is and will continue to be generated by AI. *"The future of economic output around the world is going to be tied to and generated by AI,"* Collier pointed out. *"It would be a concerning outcome for many people if the only way you could get access is in systems controlled by three or four companies, and say, two or three countries in the world."* AI sovereignty democratizes access to economic growth.

Compliance and cultural alignment also drive sovereignty

Regulatory compliance (44%) and **cultural alignment** (31%) further demonstrate the comprehensive nature of sovereignty considerations in AI adoption. Achieving full regulatory compliance at the point of adoption often demands complete visibility into AI model behaviors, training data provenance, and decision-making processes—capabilities that are frequently obscured in third-party AI services.

Cultural alignment through localization is a significant driver for sovereign AI efforts. *"As low as it sounds, language is the first barrier,"* explained Cheah. Although some models may understand different languages, they are not built on the foundations of those cultures and norms outside of where the developers are based. As a result, *"cultural nuance starts to fall apart."* This is critical—as Richard Sikang Bian, Head of Open Source and Director of Strategy and Growth at the Ant Group, stated, *"Culture is basically a shared agreement or consensus that forms the core of what a group values."* Without this core, the tool becomes ineffective; with it, the model enshrines the country's views, values, and norms. According to Bian, *"the key question is: Do we have diversified data to ensure the training process is culturally well-represented?"* Access to local data becomes critical.

> *"Nation states want security, economic independence, cultural preservation. Cities and regions want responsive public services, smart infrastructure, local jobs. Organizations and enterprises want efficiency, IP control, regulatory alignment. But more than anything across the board, I think the motivation is the same: control over AI and control over the future."*

Customization is not just a national or governmental concern but organizational as well. Cheah gave an example of a group of Korean companies that fine-tuned a model so that their contractors could ask specific questions about health and safety construction guidelines. He joked, *"None of us will ever need this, except for these five companies… that is an example of sovereign AI playing out at the language level, and then—because these companies are rather sensitive about their data—at the privacy level, and then subsequently at the needs level."* Localizing AI is an important driver of sovereignty, *"giving nations, regions, industries the autonomy to shape AI systems around their values, languages, and regulations,"* according to a senior leader at a global chip manufacturer. They wrapped up the drivers succinctly: *"Nation states want security, economic independence, cultural preservation. Cities and regions want responsive public services, smart infrastructure, local jobs. Organizations and enterprises want efficiency, IP control, regulatory alignment. But more than anything across the board, I think the motivation is the same: control over AI and control over the future."*

The sovereign AI blueprint

Knowing the extent to which organizations and governments are pursuing sovereign AI and why, the question becomes—how do we make sovereign AI a reality? Survey and webinar participants are clearly stating: open source is the key.

Open source as the primary path to sovereign AI

Open source is considered the highest priority for sovereign AI development for 90% of survey respondents, with 45% considering it essential (see Figure 7). This preference for open source is consistent across regions (see Appendix A2).

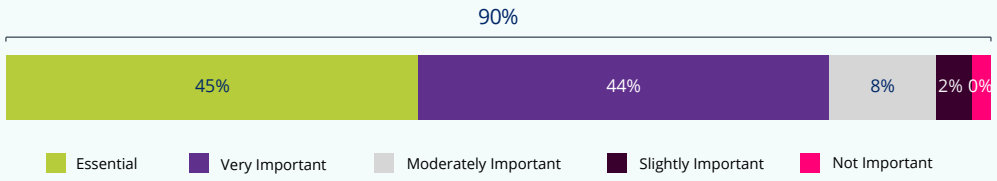
Webinar participants shared the essentialism of open source to sovereign AI, *"as it is a vital foundation to the cloud and many other technologies,"* stated Colin Eberhardt, CTO of Scott Logic. Dr. Minghui Zhou, Tenured Full Professor and Vice Dean of Peking University, echoed this sentiment, stating, *"from a longer-term perspective, the global trend toward open development is irreversible—it is the only path to building a shared future for humanity."*

Figure 8 breaks down which aspects of openness are most important to sovereign AI. **Open source software** (81%) is the primary vehicle for sovereign AI development. As Dr. Zhou stated, *"Open source holds great potential across multiple dimensions, including in the foundational AI technology stack, especially foundation models."* Open source provides a strong foundation for sovereign AI because it eliminates the black box problem inherent in commercial AI solutions. Organizations can examine, understand, and modify every component of their AI stack without relying on vendor documentation or facing licensing restrictions that could limit future flexibility. This approach also mitigates vendor lock-in and supports the development of in-house expertise, which aligns with the primary drivers for sovereign AI, as previously discussed.

FIGURE 7

NEARLY ALL ORGANIZATIONS VIEW OPEN SOURCE AS ESSENTIAL OR VERY IMPORTANT FOR SOVEREIGN AI DEVELOPMENT

How important is open source to the development of Sovereign AI systems? (select one)

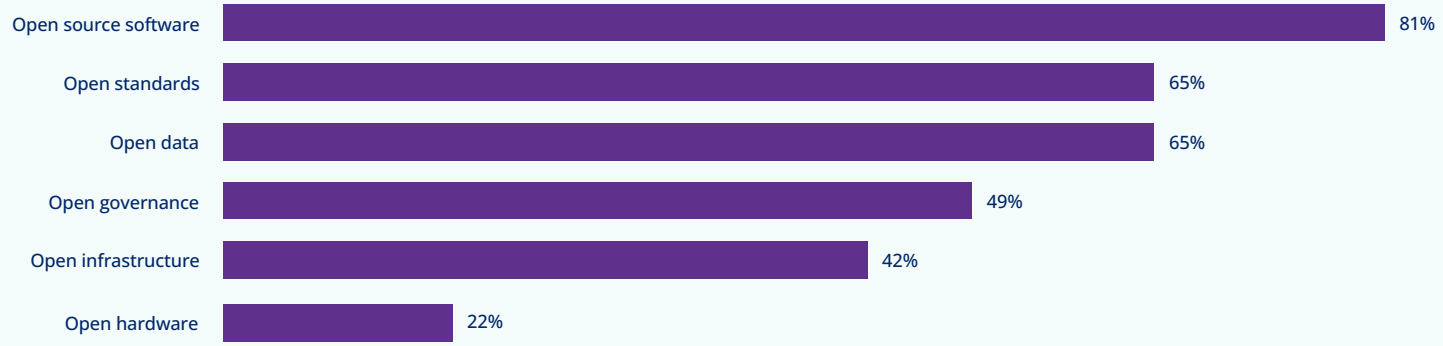


2025 Global Collaboration in AI Survey, Q17, Sample Size = 223, DKNS excluded (2%)

FIGURE 8

OPEN SOURCE SOFTWARE DOMINATES AS THE PREFERRED APPROACH FOR ADVANCING SOVEREIGN AI

Which open approaches do you believe are most critical to advancing Sovereign AI? (select all that apply)



2025 Global Collaboration in AI Survey, Q19, Sample Size = 223, Total Mentions = 722, DKNS excluded (1%)

Survey respondents also ranked **open standards** (65%) highly (see Figure 8). Open standards can enable sovereign AI systems to integrate seamlessly with other technologies, avoiding proprietary protocols that could create new forms of dependencies and lock-in. Beyond the software stack, AI infrastructure relies on a "protocol of interaction," as explained by Caldeira. "We see the emergence of standards, like model context protocol, which the industry is starting to adopt to define how AI agents could talk to each other in a kind of standardized and secure manner." Jerry Cuomo, IBM Fellow, pointed to the fluctuating market as an important time for standards and protocols. *"This is not a time to get locked in [to a specific AI tool] … So, any protocol that's going to buffer you is going to be really important so that you're not stuck with a piece of code that is hardwired to some technology of today."* Standards and protocols are key to a framework *"that includes infrastructure, policy, workforce, and governance,"* according to Lucie-Aimée Kaffee, E.U. Policy Lead and Applied Researcher at Hugging Face, and which *"ultimately has to be open by design, so that any country, region, community can plug in and build forward."* We refer the reader to the Linux Foundation Report on the state of open standards for a broader perspective on open standards in the industry.[2]

Open data (65%) tied with open standards as an enabler of sovereign AI (see Figure 8). Open data ensures that organizations are not dependent on datasets that external entities control, which could limit access, introduce bias, or restrict innovation.

Together, these preferences reflect a recognition that true sovereignty extends beyond control over AI models—it requires autonomy over the entire technological stack and data pipeline. This holistic approach to openness indicates that organizations understand sovereignty not as vendor substitution but as systemic independence.

"These preferences reflect a recognition that true sovereignty extends beyond control over AI models—it requires autonomy over the entire technological stack and data pipeline. This holistic approach to openness indicates that organizations understand sovereignty not as vendor substitution but as systemic independence."

Common open source AI technologies

Respondents reported which open source AI technologies are adopted by their organizations, as observed in Figure 9. AI and machine learning development frameworks provide foundational software for building, training, and fine-tuning models and were frequently cited by respondents. Deep learning frameworks dominate this category, with PyTorch leading at 71% adoption, reflecting its popularity. *"If you look at some of the key libraries that a data scientist or an engineer needs to train or tune a model, you will find PyTorch,"* Caldeira pointed out. TensorFlow / Keras maintains a strong presence at 55%, demonstrating the continued relevance of Google's ecosystem despite PyTorch's growth. Traditional machine learning remains important, with scikit-learn used by 31% of organizations for classical ML tasks. The widespread adoption of transformer-based models is evident in the 47% adoption of Hugging Face Transformers, a platform that serves as a central hub for pre-trained models and tools. Application frameworks such as LangChain / LlamaIndex show a 37% adoption for building applications powered by Large Language Models, particularly for Retrieval-Augmented Generation (RAG) systems. In addition, the use of tools for LLM evaluation (e.g., LM Evaluation Harness, lighteval, Inspect) in 24% of organizations reflects a growing priority on measuring model performance, alignment, and safety.

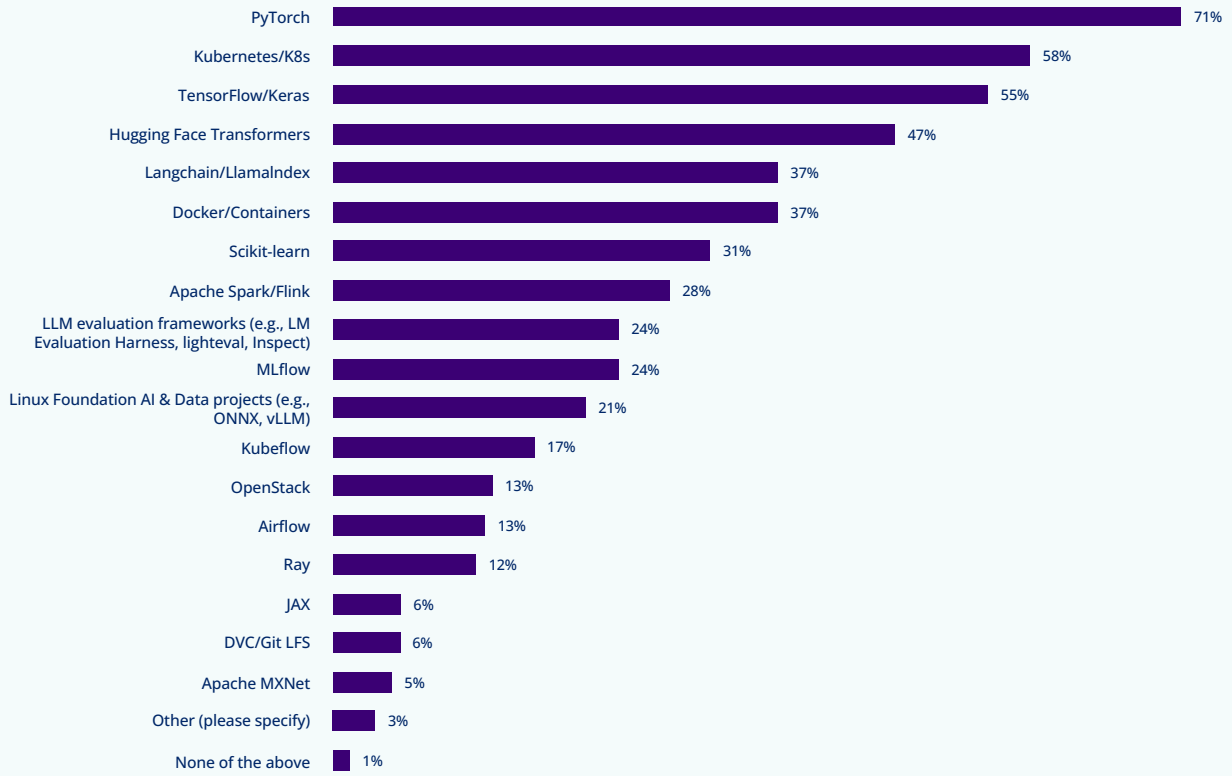
Respondents also cited AI infrastructure and operations tools, which help organizations operationalize and scale AI systems by automating deployment, monitoring, and management across complex, distributed computing environments. Kubernetes dominates this category at 58% adoption, serving as the foundational orchestration platform for containerized ML workloads, model serving, and GPU resource management. Docker / Containers usage at 37% reinforces the importance of containerization strategies for reproducible ML deployments. Addressing the challenges of large-scale data processing and feature engineering, 28% of organizations use distributed computing frameworks such as Apache Spark and Apache Flink. Tools such as Kubeflow (17%) represent ML-specific workflow orchestration platforms built on Kubernetes, while MLflow (24%) supports experiment tracking and model lifecycle management across development pipelines. Linux Foundation AI & Data projects,[3] including ONNX and vLLM, show 21% adoption. Webinar participants discussed their use of OpenStack, which the top 10 banks in France use, according to Collier, *"driven very much by digital sovereignty, needing to know where their data is stored, who has access, and the governance that they need to comply with and the local laws."*

At the ecosystem level, webinar participants discussed two projects. Caldeira mentioned the Model Openness Framework, which he argues is a *"fundamentally sound approach to the supply chain of AI at the component level, to create a disclosure and an openness and trust around how models are actually built."* Eberhardt and others also reinforced the value of Hugging Face in building an ecosystem of open source AI experimentation, teaching, and learning.

FIGURE 9

OPEN SOURCE TECHNOLOGIES THAT ORGANIZATIONS HAVE ADOPTED

Which of the following open source tools, frameworks, or platforms does your organization use for AI development and deployment? (select all that apply)



2025 Global Collaboration in AI Survey, Q31, Sample Size = 154, Total Mentions = 737, answered only by Q3 = "Employed" and Q28 = "Developing customized solutions", DKNS excluded (7%)

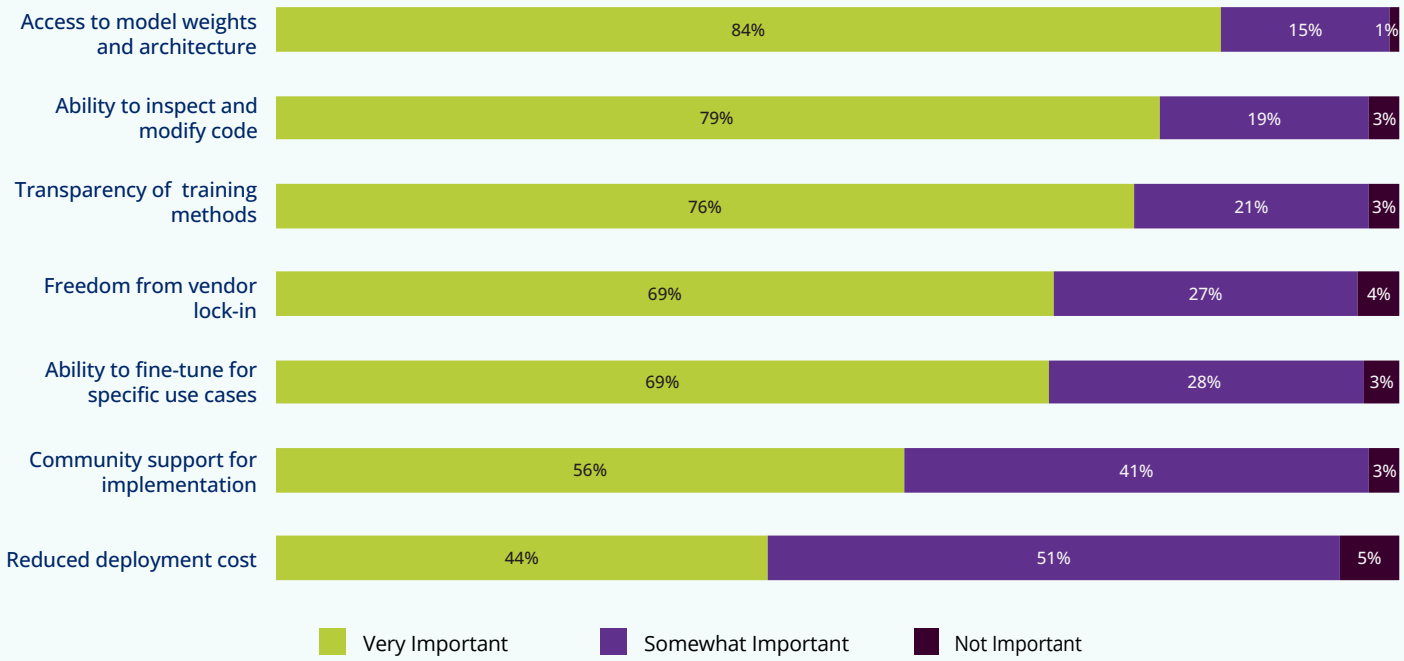
Sovereign AI and the core principles of open source

Various principles of open source are very important for achieving sovereign AI, including transparency, cost reductions, lack of vendor lock-in, and adaptability. As we see in Figure 10, **access to model weights and architecture** leads at 84%, indicating a recognition among organizations that these elements are fundamental to understanding and governing model behavior. AI models, at their core, are mathematical systems whose underlying parameters govern their outputs. Without access to model weights, organizations operate black boxes, unable to verify behavior, identify vulnerabilities, or ensure system integrity. Sovereign AI depends on the ability to independently audit, test, and modify models. This level of access shifts AI from a service-based relationship to true technological ownership, empowering organizations to develop internal expertise and maintain control over their AI systems rather than relying on third-party solutions.

FIGURE 10

THE ROLE OF OPEN SOURCE IN SOVEREIGN AI

How important are the following aspects of open source for achieving sovereign AI?



2025 Global Collaboration in AI Survey, Q20, Sample Size = 223, DKNS excluded (1% to 6%)

The need for **code inspection capabilities** (79%) and **transparency in training methods** (76%) demonstrates that organizations recognize AI sovereignty as requiring end-to-end visibility across the entire development pipeline. Organizations appear to understand that hidden training processes could embed biases, vulnerabilities, or dependencies that only become apparent under specific conditions, making transparency a security requirement rather than merely a technical preference. The implications extend beyond immediate functionality to long-term strategic autonomy, as organizations with complete system visibility can evolve their AI capabilities independently rather than being constrained by external development roadmaps or architectural decisions.

Interestingly, **reduced deployment costs** (44%) rank lowest among the benefits of open source for sovereign AI. While it is a common assumption that organizations turn to open source primarily to reduce expenses, our findings suggest otherwise: the real value of open source in the context of AI sovereignty lies in strategic autonomy and technical control. Moreover, implementing open source sovereign AI systems often involves significant investments in infrastructure, talent, and operations that can actually exceed the costs of proprietary alternatives in the short term.

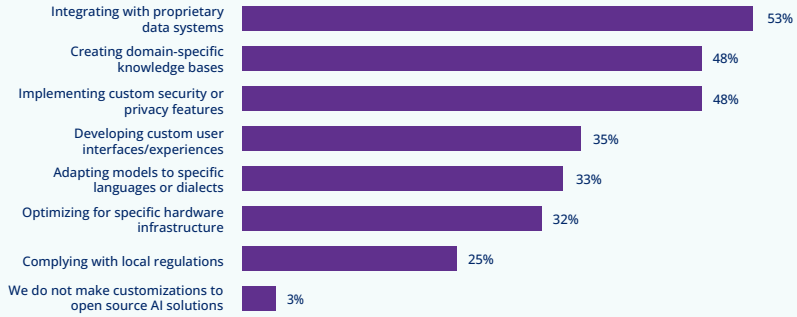
Flexibility and adaptability

Respondents strongly value open source AI's customization capabilities, with 69% rating fine-tuning for specific use cases as very important (Figure 10). The most common form of customization (Figure 11), **integrating with proprietary data systems** (53%), signals a strategic effort to make AI systems context-aware and organization-specific, transforming AI into an extension of organizations' internal knowledge, infrastructure, and institutional logic. The prevalence of other forms of customization, such as creating domain-specific knowledge bases (48%), implementing custom security or privacy features (48%), developing custom user interfaces and experiences (35%), adapting models to specific languages and dialects (33%), optimizing for specific hardware infrastructure (32%), and complying with local regulations (25%) further illustrates that open source enables the construction of sovereign AI around the unique needs, expertise, and risk profiles of each organization. The fact that only 3% report making no customizations suggests that out-of-the-box AI is rarely sufficient for integrating effectively into an organization's existing infrastructure, data, and operational logic.

FIGURE 11

ORGANIZATIONS LEVERAGE OPEN SOURCE FLEXIBILITY TO CREATE AI SYSTEMS TAILORED TO OPERATIONAL CONTEXTS AND COMPLIANCE NEEDS

What types of customizations does your organization make to open source AI systems or solutions? (select all that apply)



2025 Global Collaboration in AI Survey, Q30, Sample Size = 154, Total Mentions = 422, answered only by Q3 = "Employed" and Q28 = "Developing customized solutions", DKNS excluded (3%)

Control goes hand in hand with flexibility. As Collier argued, *"In the lens of sovereignties, open source is very, very critical to that, because it gives you that sovereignty, it gives you that agency and control."* The ability to adapt and customize open source software provides a government or organization with control over the inputs, outputs, and governance of their models.

Accountability and trustworthiness

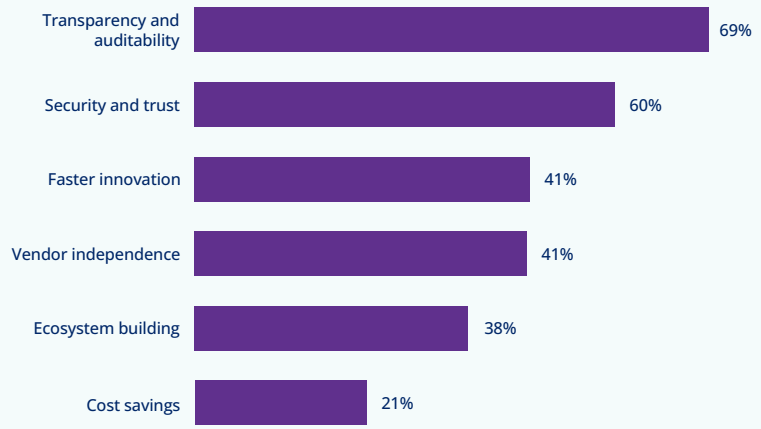
Figure 12 reveals additional benefits of open source for sovereign AI efforts. Nearly 70% of respondents identified **transparency and auditability** as the primary benefit (80% in Europe, as observed in Figure 13). Open access to training code, model architectures, and development processes allows independent researchers to examine how AI systems are built, helping to uncover potential biases, methodological flaws, or embedded assumptions. This level of visibility also facilitates the creation of audit trails via version control, offering a documented record of how models evolve over time and who contributed to their development. Caldeira highlighted the value of supply chain transparency through open source at every level of AI development, including *"transparency in the process of building a model, and also down to the component level—you need to understand the data sets that are used. You need to understand the libraries, the training code, the tuning code, the evaluation code, the synthetic data that you use to tune your model or to evaluate some of the results."*

Closely following, 60% of respondents cited **security and trust** as a key benefit, reinforcing the broader theme that open source promotes confidence through visibility and collective oversight. By enabling community-driven review and validation, open source creates a more robust and diverse foundation for trustworthy AI systems, ultimately leading to greater adoption. As Anni Lai, Head of Open Source Operations at Futurewei, explained, *"Building AI with open source tools, open data, and transparent practices invites diverse voices and ideas—fostering scrutiny, collaboration, and continuous improvement. Openness builds trust, and trust drives adoption. For any country or region aiming to scale its sovereign AI efforts, openness will be a critical enabler."*

FIGURE 12

TRANSPARENCY AND AUDITABILITY (69%) AND SECURITY AND TRUST (60%) ARE SEEN AS THE TOP BENEFITS OF OPEN SOURCE FOR SOVEREIGN AI

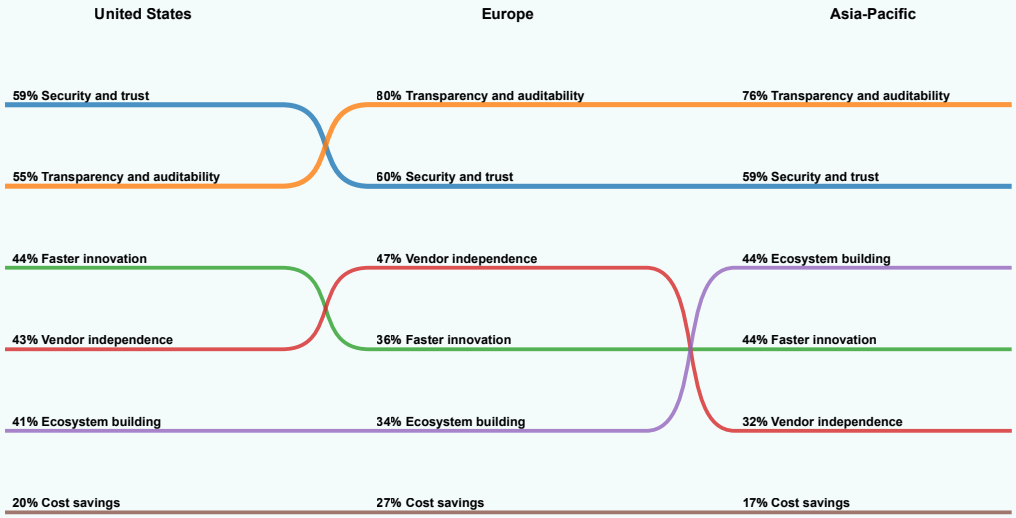
What benefits does open source offer to Sovereign AI efforts? (select up to three responses)



2025 Global Collaboration in AI Survey, Q18,
Sample Size = 223, Total Mentions = 605, DKNS excluded (0%)

FIGURE 13

TRANSPARENCY AND AUDITABILITY ARE ESPECIALLY RELEVANT IN EUROPE AND ASIA-PACIFIC



2025 Global Collaboration in AI Survey, Q18 by Q6, Sample Size = 204, Total Mentions = 559, other regions omitted due to insufficient representation.

Innovation

Open source also provides the environment for **faster innovation** (41%) in sovereign AI by enabling organizations to leverage collective advances and focus their resources on context-specific improvements or individual applications (see Figure 12). As *"a permissionless form of innovation,"* Collier said, open source collaboration creates positive feedback loops where contributions from diverse organizations with different use cases and expertise areas enhance the overall ecosystem, leading to faster identification of bugs, performance optimizations, and breakthrough techniques. Caldeira endorses open source as the reason for AI innovation today: *"All those libraries that people have been using for use-case-driven AI, they are pretty much all open source. So, it's almost impossible to do AI today without using some open source technologies."* Open source also provides an environment for experimentation, which Cuomo believes is essential for teaching, learning, and mitigating negative externalities. It is also an important aspect of competition in this space, according to Marc Lijour, FinTech innovation at Exaion and adjunct faculty at the International Business University (IBU): *"If you want a chance to catch up, you have to keep collaborating. You have to keep rubbing elbows. You have to keep sharing things… That's the only way you can catch up. And it's not getting slower, it's getting faster."*

Vendor independence (41%) and **cost savings** (21%) are also important aspects of innovation through open source. By eliminating reliance on proprietary AI systems under external control, this creates flexibility and sustainability to develop and maintain solutions according to a less restrictive license at a lower cost. The relatively lower ranking of cost savings is particularly noteworthy and consistent with the observations in Figure 11, challenging conventional assumptions about the motivations for open source adoption.

Challenges of using open source for sovereign AI

Respondents also reported their challenges in customizing AI solutions using open source components, as Figure 14 shows. These challenges have significant regional differences, as detailed in Figure 15.

Data quality and availability (44%) represent the primary bottleneck because datasets are often proprietary, sensitive, or expensive to create and curate. While open source provides

accessible model architectures and training frameworks, the performance of AI systems fundamentally depends on having large volumes of clean, representative, and well-labeled data that matches the specific use case and domain requirements. Organizations frequently struggle to obtain data due to privacy regulations, data silos within institutions, or the substantial cost of and expertise required for data collection, cleaning, and annotation. Even when datasets are publicly available, they may suffer from quality issues such as bias, mislabeling, outdated information, or poor coverage of edge cases, leading to AI systems that perform well on benchmarks but fail in real-world applications. This data challenge is particularly acute for specialized domains or underrepresented use cases where existing open datasets may be inadequate, forcing organizations to invest significantly in data acquisition and preparation.

> *"Open source operates as a bridge, not a fence, but while open source software has already operated as an effective bridge, the same level of access doesn't exist on the data side. [The absence of] open data license and ownership verification are the two major blockers."*

As Kaffee pointed out, the challenges with data are not new. She suggested, *"Can we learn something from existing projects that do open data?… I think that's a really important discussion to be had, how can we create the models that we want to create in the context we want, with the values that we want?"* Without this, development cannot properly progress. Bian also discussed this obstacle and the requirement to address it. *"Open source operates as a bridge, not a fence, but while open source software has already operated as an effective bridge, the same level of access doesn't exist on the data side. [The absence of] open data license and ownership verification are the two major blockers."*

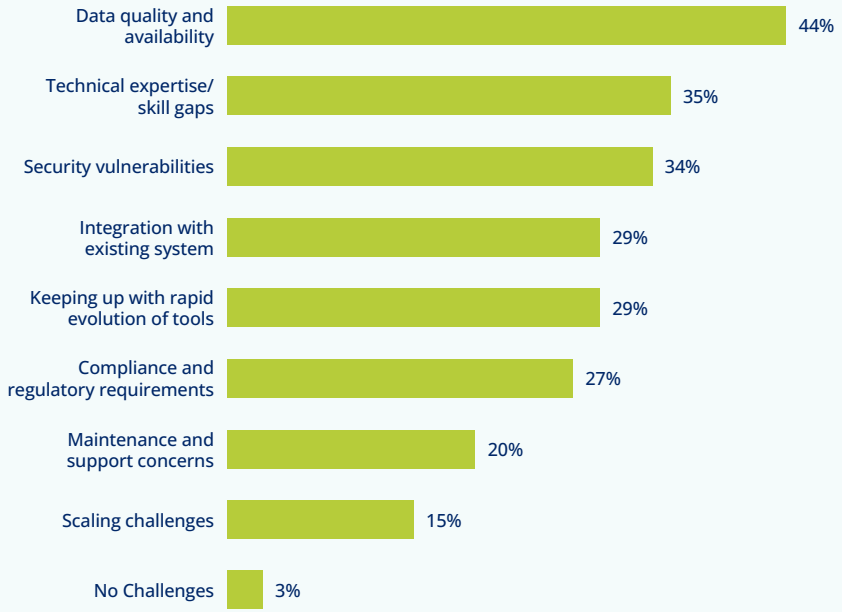
The **shortage of technical expertise** (35%) also poses a barrier to effectively leveraging open source AI components, mirroring the broader talent crisis documented in the Linux Foundation's 2025 State of Tech Talent report.[4] This report reveals that 68% of organizations are understaffed in AI and ML engineering, and 44% cite a lack of skilled workforce as a primary challenge for adopting new technologies, such as AI. Organizations frequently struggle to find personnel who can properly configure distributed training systems or adapt research-oriented codebases for production environments, exactly the type of specialized expertise that the report shows is in critically short supply across the technology sector. Upskilling the existing workforce emerges as the most effective solution, with the Tech Talent report showing that 72% of organizations choose this approach over external hiring as it takes 38% less time and is more effective for talent retention. This skills gap is also unequal across countries and geographies, which could further embed inequalities if not better addressed at the local level.

A number of webinar participants emphasized the need for training. Eberhardt argued that it is the most important thing to be investing in now, *"whether you're a private company and you're investing in the learning and development of your people, whether you're a government investing in the schools and universities."* He stated that AI is *"a difficult technology to grasp and understand, but it's incredibly powerful—and the key to unlocking the value there simply has to be education."* A senior leader at a global chip manufacturer agreed, qualifying that sovereign AI talent *"means bringing AI education to new places. If that doesn't happen, you're kind of losing the fight."*

FIGURE 14

CHALLENGES TO OSS AI DEVELOPMENT INCLUDE DATA QUALITY (44%) AND LACK OF TECHNICAL SKILLS (35%)

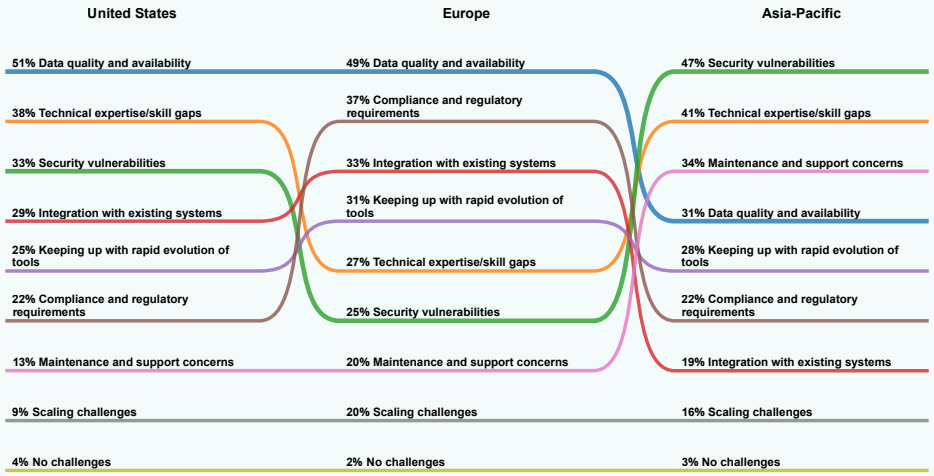
What challenges does your organization face when customizing or building AI solutions with open source components? (select up to three responses)



2025 Global Collaboration in AI Survey, Q32, Sample Size = 150, Total Mentions = 344, answered only by Q3 = “Employed” and Q28 = “Developing customized solutions”, DKNS excluded (5%)

FIGURE 15

REGIONAL DIFFERENCES FOR CHALLENGES TO OSS AI DEVELOPMENT



2025 Global Collaboration in AI Survey, Q32 vs Q6, Sample Size = 144, Total Mentions = 331, answered only by Q3 = “Employed” and Q28 = “Developing customized solutions”, DKNS excluded (5%), other regions omitted due to insufficient representation

Global AI collaboration

Despite involving essentially local initiatives, sovereign AI presents a global challenge that requires international coordination. As Wang observes, *"sovereign AI development confronts the paradox of 'bridges vs. fences'"*—nations must balance their desire for technological independence with the need for collaborative innovation. This inherent tension makes *"the establishment of reciprocal international cooperation mechanisms to bridge this gap a long-term and critical challenge."*

The path forward lies in finding common ground across cultural and national boundaries. While implementation approaches may vary, *"so much of [this effort] is about what's the common ground, what's the common set of problems we're trying to solve,"* according to Collier. *"We can drive much better innovation when we work across borders and companies and break down those barriers."* For a senior leader at a global chip manufacturer, global collaboration serves multiple purposes beyond mere innovation. They emphasized that incorporating diverse voices, perspectives, and cultures makes solutions to global technology challenges stronger, more secure, and more effective. This diversity builds trust, a critical element often overlooked in purely technical discussions.

> *"Open source is the best model we have for collaborating across borders. Open source allows us to share technology while also managing to maintain our different opinions, ideals, and standards. It's an amazing tool in our toolbox."*

Open source emerges as a particularly promising model for navigating these complex dynamics. As Collier argued, *"open source is the best model we have for collaborating across borders."* Open source allows us to share technology *"while also managing to maintain our different opinions, ideals, and standards. It's an amazing tool in our toolbox,"* stated Eberhardt. Chen envisioned this collaborative approach enabling *"the future of sovereign AI [to] thrive in diverse cultures and achieve shared success through global open source collaboration."*

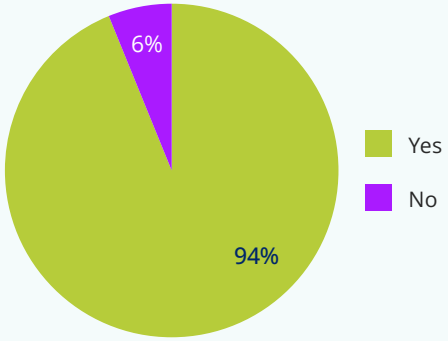
Global collaboration on open source AI technology is essential

As observed in Figures 16 and 17, the vast majority (94%) of respondents view global collaboration on open source AI technology important. This consensus is particularly strong among smaller organizations (100%) and IT providers (99%). Such broad agreement reflects the idea that open source approaches catalyze an explosion of innovation across a distributed network of global contributors. The rapid evolution following LLaMA's open source release exemplifies this dynamic: within months, the community had developed specialized variants for coding, creative writing, and dozens of languages—adaptations that would likely have required years for Meta's internal team to produce independently. Moreover, as observed in Figure 18, most respondents (93%) agree that open collaboration is essential for building secure and culturally aligned sovereign AI systems, with nearly half (48%) strongly agreeing with this principle.

FIGURE 16

GLOBAL CONSENSUS ON OPEN SOURCE AI COLLABORATION

Is global collaboration on open source AI technology important to you or your organization?

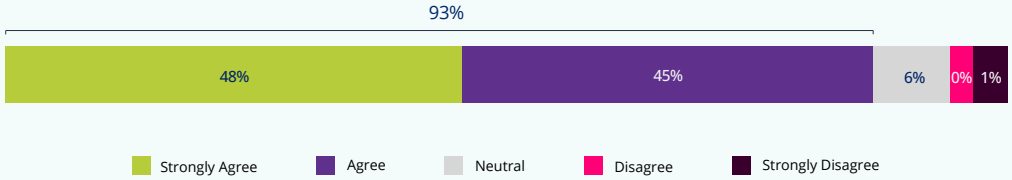


2025 Global Collaboration in AI Survey, Q21, Sample Size = 223, DKNS excluded (13%)

FIGURE 18

OPEN COLLABORATION IS A FOUNDATION FOR SECURE AND CULTURALLY RELEVANT SOVEREIGN AI

To what extent do you agree with the following statement: *"Open collaboration is essential to building secure and culturally aligned Sovereign AI systems."*



2025 Global Collaboration in AI Survey, Q25, Sample Size = 180, answered only by Q21 = "Important", DKNS excluded (2%)

FIGURE 17

CONSENSUS OF GLOBAL COLLABORATION BY ORGANIZATION SIZE AND TYPE

Organization size

1 to 49 employees

100%

50 to 1k employees

98%

1k to 10k employees

94%

10k or more employees

91%

Organization type

IT Providers

Technology services

99%

IT End Users

Service consumers

91%

Modern AI systems have grown so complex and resource intensive that they now exceed the development capabilities of any single organization or nation. These systems require diverse training data, varied testing environments, and iterative refinement across different cultural and technical contexts—benefits that naturally emerge from global open source collaboration. Even tech giants such as Google and Microsoft have discovered that their most successful AI initiatives, from TensorFlow to PyTorch, thrive through open collaboration rather than proprietary development. This network effect creates a virtuous cycle: the more organizations contribute to open AI frameworks, the more valuable those frameworks become, attracting even more contributors and benefiting everyone, including the initial creator. The next generation of AI breakthroughs—from artificial general intelligence to quantum-AI hybrid systems—will require resources and expertise that exceed even today's massive investments. No single organization, regardless of size, has the capacity to tackle these challenges alone.

Global collaboration is especially valuable for models and data

The AI industry's collaborative nature is most evident in **foundation models** and **datasets**, with 59% of respondents identifying these as the primary areas of cooperation (Figure 19). The focus on these areas reveals that breakthrough capabilities require not only advanced algorithms but also access to sophisticated pre-trained models and comprehensive, high-quality datasets. DeepMind's AlphaFold exemplifies this dynamic—the protein structure prediction breakthrough relied on shared resources such as the Protein Data Bank (PDB).[5]

Development tools and platforms rank third at 39%, reflecting the industry's recognition that shared infrastructure accelerates innovation across the entire AI ecosystem. The success of open source frameworks such as PyTorch and TensorFlow demonstrates the value of the collaborative approach. The shared investment in these foundational tools allows individual organizations to focus their resources on building innovative applications rather than recreating basic infrastructure. Moreover, standardization around common frameworks facilitates knowledge transfer, reduces development time, and enables easier collaboration among organizations, as teams can work with familiar tools and shared codebases regardless of their institutional affiliation.

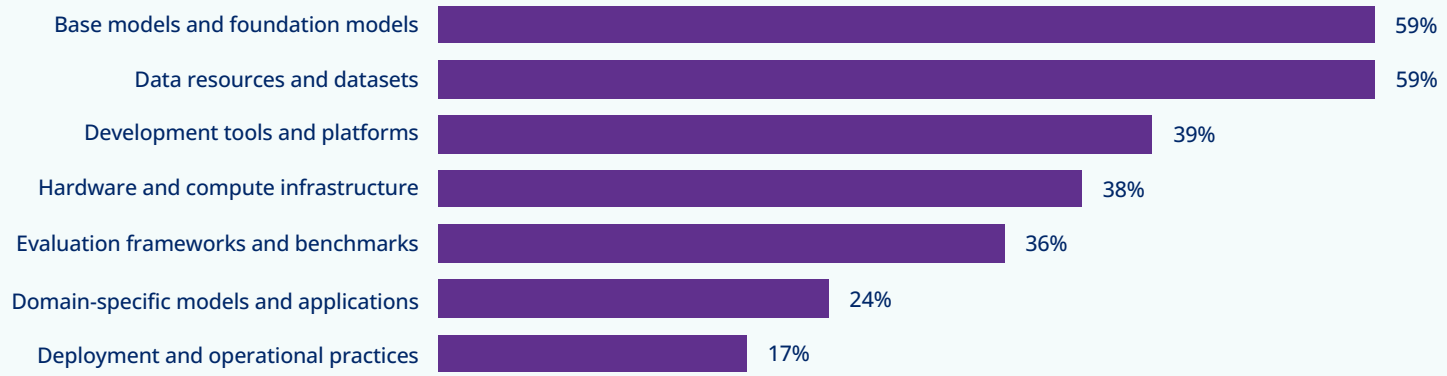
Hardware and computing infrastructure follow at 38%, revealing the practical constraints and strategic considerations around physical resources. The enormous computational demands of training, fine-tuning, and deploying AI models have led to the development of high-end hardware that is prohibitively expensive for most organizations to purchase and maintain independently. In response, many cloud computing providers now offer shared infrastructure specifically optimized for AI workloads. Academic institutions and research organizations often pool resources through consortia or grants to access such infrastructure. Even tech giants engage in strategic partnerships around hardware—the limited access to AI chips has fostered an ecosystem where even competitors must collaborate to ensure access and drive innovation in AI hardware development and deployment.[6]

At 36%, **evaluation frameworks** highlight the need for standardized methods of assessing AI system performance, safety, and reliability across diverse applications. The complexity of modern AI systems—particularly large language models and multimodal systems—has outpaced traditional evaluation methods, creating demand for comprehensive benchmarks that can reliably measure capabilities, identify limitations, and detect potential risks. Collaborative efforts such as the HELM[7] (Holistic Evaluation of Language Models) project from Stanford, which provides standardized testing across dozens of tasks and metrics, exemplify how shared evaluation frameworks benefit the entire field. Organizations recognize that developing robust evaluation methodologies requires diverse perspectives, extensive testing datasets, and domain expertise, benefiting from global collaboration. Moreover, shared evaluation frameworks enable more meaningful comparisons across AI systems and facilitate regulatory compliance and safety certification, as governments and standards bodies increasingly require consistent, validated methods for assessing AI system behavior before deployment in critical applications such as healthcare, autonomous vehicles, and financial services.

FIGURE 19

FOUNDATION MODELS AND DATASETS EMERGE AS THE TOP PRIORITIES FOR AI COLLABORATION

At which levels of the AI stack is global collaboration most valuable? (select up to three responses)



2025 Global Collaboration in AI Survey, Q22, Sample Size = 180, Total Mentions = 495, answered only by Q21 = “Important”, excluded options with low response rates

Next steps for sovereign AI

As organizations pursue sovereign AI capabilities, the path forward requires strategic collaboration that balances autonomy with collective advancement. This section examines how organizations can participate in international AI partnerships while maintaining their autonomy, the obstacles they face in pursuing such collaboration, and the governance models that best support community-driven sovereign AI development.

Different forms of global collaboration

Contributing to open source projects emerges as the most favored participation approach in global AI collaboration, as 59% of respondents indicated (Figure 20). As demonstrated earlier in our findings, organizations are already heavily invested in open source frameworks. The willingness to contribute back to open source projects and tools indicates that organizations recognize their sovereign AI capabilities are fundamentally dependent on the health and advancement of this shared infrastructure. By contributing code, documentation, bug fixes, and feature enhancements to established projects, organizations not only advance their own capabilities but also ensure that the open source tools they rely on continue to evolve in directions that support their sovereignty objectives. Moreover, contributing organizations often gain privileged insight into development roadmaps and architectural decisions, providing them with strategic advantages in planning their own sovereign AI initiatives. Kaffee indicated that the focus should be on supporting existing initiatives, *"rather than running a parallel, policy-driven initiative."*

Creating shared technical standards for AI systems emerges as the second priority at 45%, reflecting the importance of interoperability in sovereign AI development. This finding directly connects to our earlier research showing that 65% of respondents identified open standards as essential enablers of sovereign AI development (Figure 8). The emphasis on shared technical standards addresses a fundamental challenge: Organizations seeking sovereignty cannot afford to create isolated systems that cannot communicate with broader AI ecosystems. Instead, they require standardized protocols that enable their sovereign AI systems to integrate seamlessly with other technologies while avoiding proprietary protocols that could create new forms of dependencies and lock-in. To support seamless and resource-effective implementations, *"it is essential to build a multi-layered, diversified global AI governance framework, which can enable diverse organizations to form networks, engage in deep and frequent interactions, and adapt to the rapid evolution of AI,"* stated Wang.

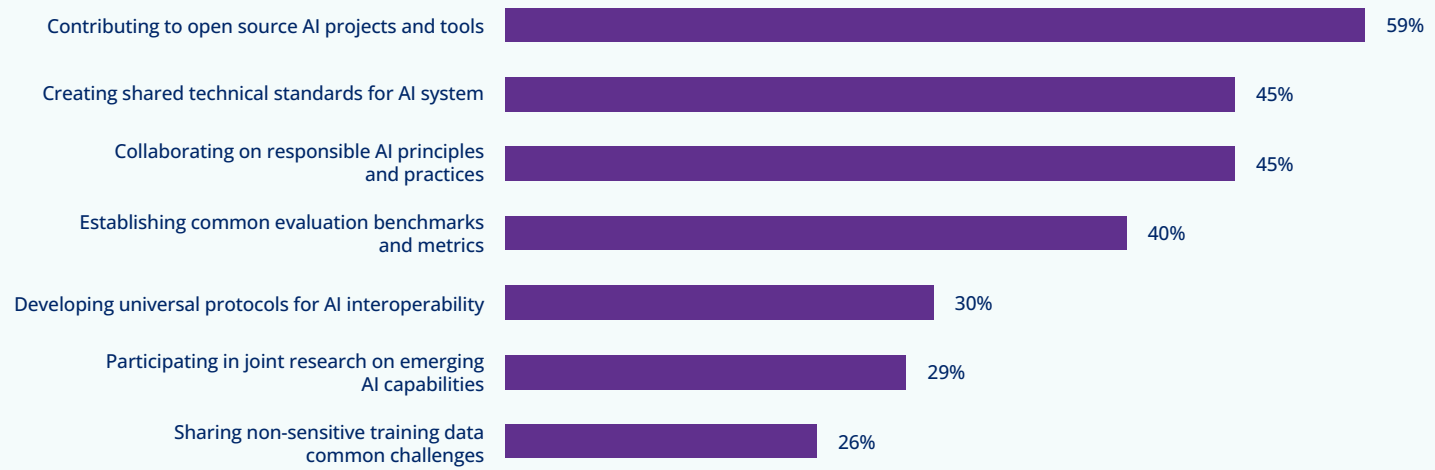
Collaborating on responsible AI also ranks at 45%, directly addressing the cultural alignment concerns identified by 31% of respondents as a driver of sovereign AI interest. This collaborative approach to AI ethics also aligns with our finding that 93% of respondents agree that open collaboration is essential to building secure and culturally aligned sovereign AI systems (Figure 18). The emphasis on collaborative development of responsible AI principles indicates that organizations view ethical alignment as a shared challenge requiring collective solutions rather than isolated approaches. Lijour reminded us that this challenge rests on collaboration with academia, enterprises, startups, and government.

The lower percentage for **data sharing** (26%) conflicts with the previous finding about the importance of shared data resources and datasets. Data sharing may involve complex legal, privacy, and competitive considerations that still need to be addressed to enable broader collaboration and ensure equitable access to the high-quality data required for training and evaluating AI systems. Until these barriers are addressed—through policy frameworks, technical safeguards, and trust-building initiatives—data sharing will likely remain a limiting factor in global AI development.

FIGURE 20

PRIMARY FORMS OF GLOBAL AI COLLABORATION PREFERRED BY RESPONDENTS

Which of these forms of global AI collaboration would you or your organization be most likely to participate in? (select up to three responses)



2025 Global Collaboration in AI Survey, Q23, Sample Size = 180,
Total Mentions = 481, answered only by Q21 = "Important", DKNS excluded (4%)

Obstacles to global AI partnerships

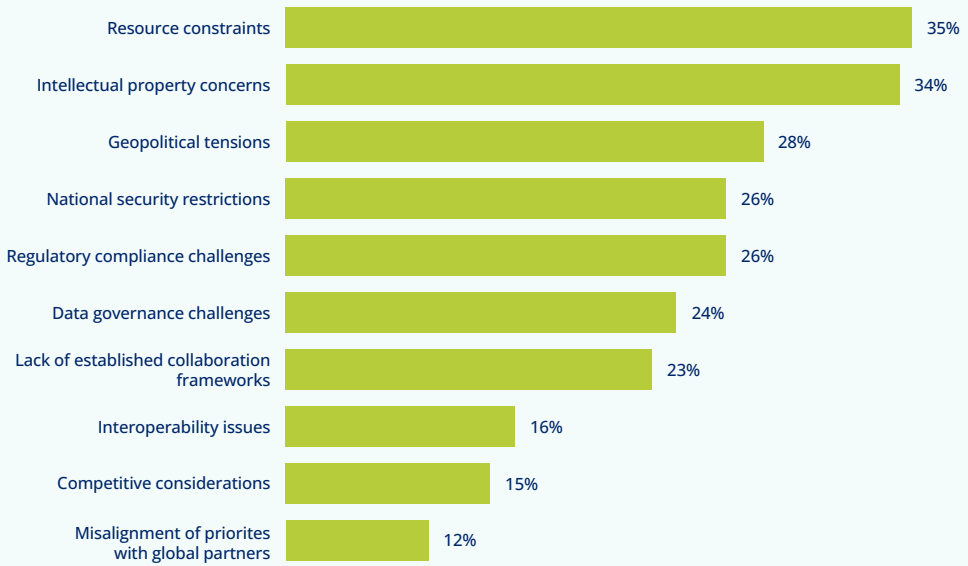
Figure 21 reveals the obstacles preventing respondents from participating more actively in global AI collaboration, and Figure 22 presents the regional breakdown. **Resource constraints** (35%) emerge as the most significant barrier, reflecting significant gaps in financial resources, technical infrastructure, or specialized talent. When participation is limited by resource availability, the resulting AI systems may reflect the priorities and perspectives of only the most well-resourced actors, potentially limiting innovation and perpetuating existing inequalities.

Addressing these disparities requires several strategic approaches: organizations must reprioritize resources based on understanding the importance and benefits of open AI collaboration, while the broader community needs shared infrastructure initiatives and capacity-building programs that can democratize access to AI collaboration opportunities. Collaboration around training materials will lessen the talent squeeze while also democratizing the development of AI infrastructure, governance mechanisms, and standards. As a senior leader at a global chip manufacturer emphasized, education *"needs to be at the top [of the priority list]. People need to understand what sovereign AI even is, so they can be more well informed and be part of the conversation to help influence the motivations that others may have."*

FIGURE 21

MOST SIGNIFICANT BARRIERS TO GLOBAL AI COLLABORATION

What barriers prevent you or your organization from participating more actively in global AI collaboration? (select up to three responses)

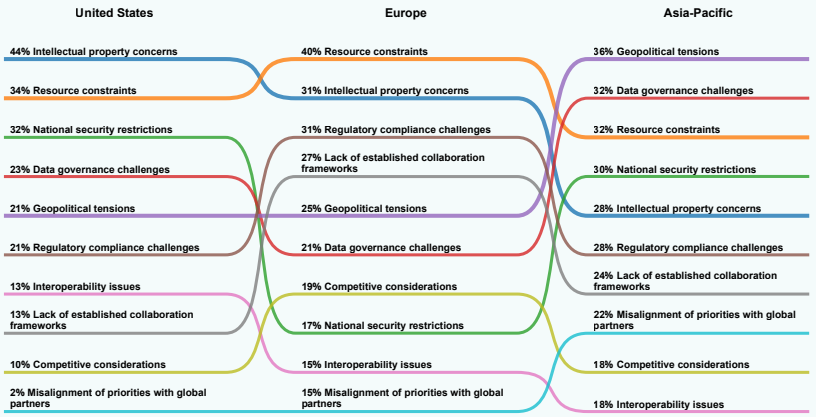


2025 Global Collaboration in AI Survey, Q24, Sample Size = 180, Total Mentions = 421, answered only by Q21 = "Important", DKNS excluded (4%), options with low response rates omitted

FIGURE 22

REGIONAL BREAKDOWN OF THE BARRIERS TO GLOBAL AI COLLABORATION

What barriers prevent you or your organization from participating more actively in global AI collaboration? (select up to three responses)



2025 Global Collaboration in AI Survey, Q24 vs Q6, Sample Size = 168, Total Mentions = 390, answered only by Q21 = "Important", DKNS excluded (4%), options with low response rates omitted

Intellectual property concerns follow closely, affecting 34% of respondents. Organizations often hesitate to share proprietary algorithms, datasets, or research findings due to fears of losing competitive advantages or facing patent disputes. However, these concerns can often be mitigated through open standards frameworks, which balance innovation protection with shared progress. As highlighted in The State of Open Standards research,[8] open standards—especially those with clear, royalty-free licensing and transparent development processes—foster interoperability, reduce IP-related friction, and promote wider adoption. Rather than reinforcing silos, open standards enable organizations to contribute collaboratively while safeguarding legitimate interests. Establishing shared IP agreements, leveraging patent non-aggression communities, and adopting extensible, openly published specifications can allow organizations to participate in the AI ecosystem without compromising their competitive position. This approach transforms IP management from a defensive posture into a strategic enabler of innovation and market growth.

Geopolitical tensions, national security restrictions, and regulatory compliance challenges also pose significant barriers to global AI collaboration, affecting 28%, 26%, and 26% of respondents, respectively (see Figure 21). Government regulations around technologies, export controls, and classified research create legal barriers that prevent organizations from engaging in international collaboration. Security agencies frequently view AI technologies as strategically sensitive, leading to restrictions on sharing research, participating in joint projects with foreign entities, or attending international conferences. Organizations must navigate a patchwork of privacy laws, algorithmic accountability standards, and sector-specific regulations that vary significantly between countries, creating uncertainty about legal liability and operational requirements for collaborative projects. While legitimate security concerns and regulatory protections must be addressed, addressing these barriers requires diplomatic efforts to establish AI collaboration as a shared global priority. It should be coupled with policies that distinguish between genuinely sensitive applications and civilian research, along with harmonized regulatory frameworks, trusted researcher programs, and secure collaboration platforms that enable international collaboration. All this, while maintaining appropriate security safeguards and compliance standards.

Open source, community-led governance for sovereign AI

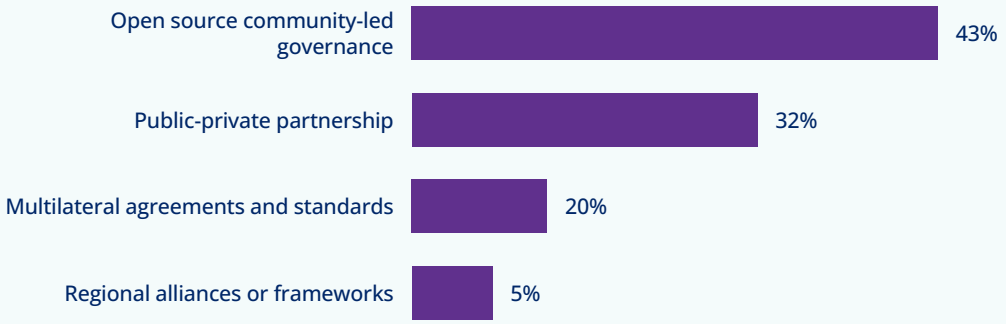
Bottom-up, community-led governance is a key aspect of sovereign AI. As Wang simply stated, *"sovereign AI is a verb, not a noun—it requires collective participation and construction."* The future of sovereign AI governance lies in open, community-driven frameworks rather than traditional institutional control. Among the governance models presented in Figure 23, open source community-led approaches dominate with 43% support—significantly outpacing public-private partnerships (32%) and multilateral agreements (20%). As Wang stated, we must *"unleash bottom-up forces to drive sovereign AI development. It is crucial to fully stimulate the potential of global open source communities and other innovative organizational forms."*

> *"Sovereign AI is a verb, not a noun—it requires collective participation and construction."*

FIGURE 23

OPEN SOURCE BEST SUPPORTS SOVEREIGN AI DEVELOPMENT

What kind of global cooperation model do you believe would best support Sovereign AI development? (select one)



2025 Global Collaboration in AI Survey, Q27, Sample Size = 180, answered only by Q21 = "Important", DKNS excluded (2%)

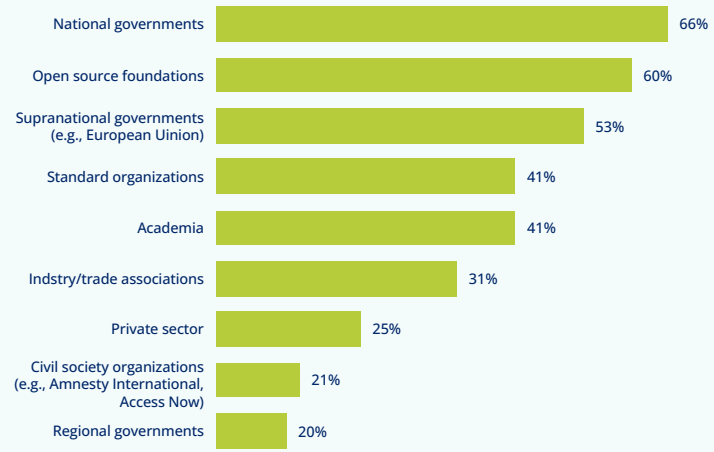
Figure 24 reinforces this decentralized vision by highlighting open source foundations (60%) as key stakeholders in this process, second only to national governments (66%). Open source foundations are specially praised in Europe and Asia-Pacific (67% vs. 44% in the United States, see Appendix A3). While national oversight is still seen as critical—possibly due to data sovereignty and geopolitical interests—there is widespread recognition that sovereign AI cannot be built without the collaborative frameworks, technical credibility, and cross-border innovation that open source foundations bring. The *"Cambrian explosion"* of open source AI projects, with their own visions and dependencies, creates a complexity that *"foundations have an important role to play, in helping tame, or coordinate, or get people together and convene around it,"* according to Collier.

Therefore, successful AI sovereignty requires hybrid approaches where nation-states co-create policies with open source stakeholders, academia, and standard-setting bodies. Countries and organizations that fail to engage with open source ecosystems risk falling behind not just technologically but in legitimacy and trust. *"That is the number one benefit, really, that we can provide as stewards or coordinators of all this activity,"* Collier stated. Open source ecosystems provide the convening space to reduce redundancies, innovate, enhance security, and benefit from collective momentum.

FIGURE 24

NATIONAL GOVERNMENTS AND OPEN SOURCE FOUNDATIONS SHOULD LEAD THE DEVELOPMENT OF SOVEREIGN AI

Which stakeholders should be most involved in shaping the future of Sovereign AI? (select all that apply)



2025 Global Collaboration in AI Survey, Q26, Sample Size = 180, Total Mentions = 641, answered only by Q21 = "Important", DKNS excluded (2%)

Conclusion

Our findings evidence the strategic importance of sovereign AI development through open source collaboration. Most respondents from our survey consider sovereign AI valuable and strategically relevant, driven primarily by concerns over data control and national security, with 82% of organizations already developing customized AI solutions to maintain control over their capabilities and intellectual property. Open source emerges as the dominant pathway to achieving sovereign AI, primarily because it enables transparency and auditability, security and trust, and the flexibility needed for customization without vendor lock-in. Perhaps most significantly, 94% of respondents recognize that global collaboration on open source AI technology is essential, with 93% agreeing that open collaboration is fundamental to building secure and culturally aligned sovereign AI systems, suggesting that sovereign AI must be achieved not through isolation but through participation in shared, community-driven development.

Key recommendations include:

- **Invest in open source AI infrastructure:** Organizations and governments should prioritize contributions to and adoption of open source AI frameworks, models, and tools as the foundation for sovereign capabilities, focusing on projects that provide transparency, auditability, and freedom from vendor dependencies.
- **Develop sovereign AI talent through education:** Organizations and governments should address the critical skills shortage by investing in comprehensive AI education programs, upskilling their existing workforce, and creating specialized training focused on open source AI technologies and governance.
- **Establish community-led governance frameworks:** Organizations and governments should support open source foundations and community-driven governance models that enable collaborative development while maintaining sovereignty, rather than relying solely on top-down institutional control.
- **Create shared standards and protocols:** The industry must collaborate to develop open technical standards that enable sovereign AI systems to interoperate without creating new dependencies, focusing on areas such as model evaluation, data sharing protocols, and security frameworks.
- **Address data quality and availability challenges:** The community must develop collaborative approaches to creating high-quality, diverse datasets through open data initiatives, data sharing consortiums, and community-driven annotation efforts to overcome the data quality issues identified in this report.
- **Foster strategic international collaboration:** Governments must establish diplomatic and policy frameworks that enable global AI collaboration while addressing legitimate security concerns, focusing on civilian research, academic partnerships, and shared infrastructure initiatives that benefit all participants while maintaining appropriate safeguards.

As the window for establishing sovereign AI capabilities narrows, we invite readers to review the Resources section below for ways to move forward with these recommendations. Organizations and nations that fail to invest in open source AI infrastructure, talent development, and collaborative governance frameworks risk finding themselves permanently dependent on external providers for their most critical technological capabilities. The path forward demands immediate action to build the foundations for sovereign AI through open source collaboration.

Methodology and demographics

This research project is based on empirical data collected in a global survey and in three separate webinars.

About the webinars

In the spring of 2025, the Linux Foundation and Futurewei hosted three webinars and invited four to five experts per webinar who work in various locations around the world—primarily Europe, North America, and APAC—to share their perspectives on the topic of open source AI. The webinars followed a question guide, were recorded and transcribed, and were then coded for major themes and patterns that emerged in the discussion. Each quotation included in the report was approved by the individual to whom it is attributed. The webinars are available on the LF AI & Data YouTube channel.[9]

About the survey

This study is based on an online survey conducted by Linux Foundation Research from May to June 2025. The survey aimed to understand the perspectives on global collaboration and sovereign AI. We broadly advertised the survey to Linux Foundation subscribers, members, partner communities, and social media. To mitigate sampling biases, we also hired a panel provider. We addressed data quality through prescreening, survey screening questions, consistency checks, and data quality review. After the data quality filtering, our final sample comprised 233 valid responses.

The survey included 32 questions that addressed screening, respondent demographics, the state of sovereign AI, the role of open source in sovereign AI, a shared vision for global collaboration, and custom AI solutions in organizations. The dataset driving the analysis in this report and survey frequencies is available on data.world (see below).

The target audience included respondents who met the following criteria:

- Must be using or considering using AI
- Must pass an attention check question
- Must be employed, self-employed, or previously employed

A total of 443 respondents began the survey, and 279 completed it. After data quality screening, the analyzed data set comprised 233 responses. The margin of error for this sample size is +/- 5.4% at a 90% confidence level and +/- 6.4% at a 95% confidence level. The data was primarily segmented by region, organization size, and industry.

Although respondents had to answer nearly all questions in the survey, a provision was made for respondents who were unable to answer a question. This is accomplished by adding a "Don't know or not sure" (DKNS) response to the list of responses for every question. 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 who answered the DKNS is known. This approach has the advantage of displaying the exact distribution of the collected data. The challenge with this approach is that it can distort the distribution of valid responses (i.e., responses where respondents could answer the question). Therefore, most of the analyses in this report exclude DKNS responses. This is because we can classify the missing data as either missing at random (MAR) or missing completely at random (MCAR). Excluding DKNS data from a question does not alter the distribution of data

(counts) for the other responses; however, 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 indicates "DKNS responses excluded from the analysis."

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

Data.World access

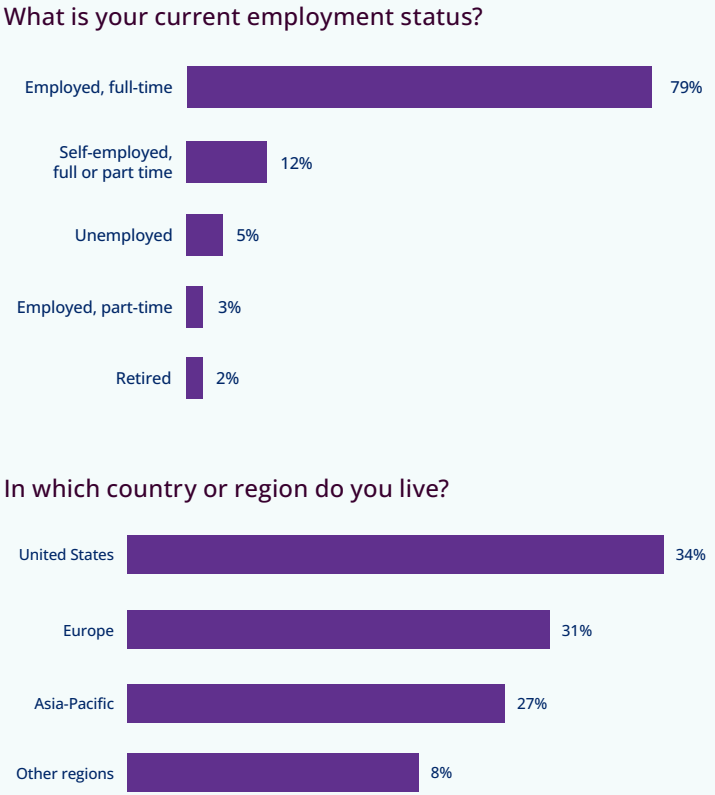
LF Research makes each of its empirical project datasets available on Data.World (http://data.world/thelinuxfoundation). Included in this dataset are the survey instrument, raw survey data, screening and filtering criteria, and frequency charts for each question in the survey. Access to Linux Foundation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

Respondent demographics

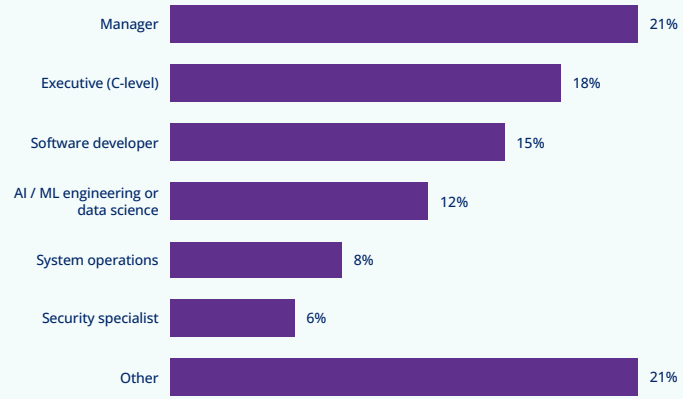
Figure 25 presents the respondent demographics. Most respondents (79%) are employed full-time, with an additional 12% being self-employed. Geographically, respondents are concentrated in the United States (34%), Europe (31%), and Asia-Pacific (27%). In this report, we focus on these regions since we did not get enough representation for the others. Professionally, the sample includes a diverse mix of roles, with managers representing the largest group (21%), followed by executives at the C-level (18%) and software developers (15%). AI / ML engineering and data science professionals comprise 12% of the sample. The respondents work across organizations of varying sizes, with the largest concentration (36%) in mid-sized companies of 1,000 to 9,999 employees, followed by smaller organizations of 50 to 999 employees (22%) and companies with 1 to 49 employees (21%). Industry-wise, respondents are distributed among information technology organizations (42%), IT end-user organizations (41%), and other organizations (15%).

FIGURE 25

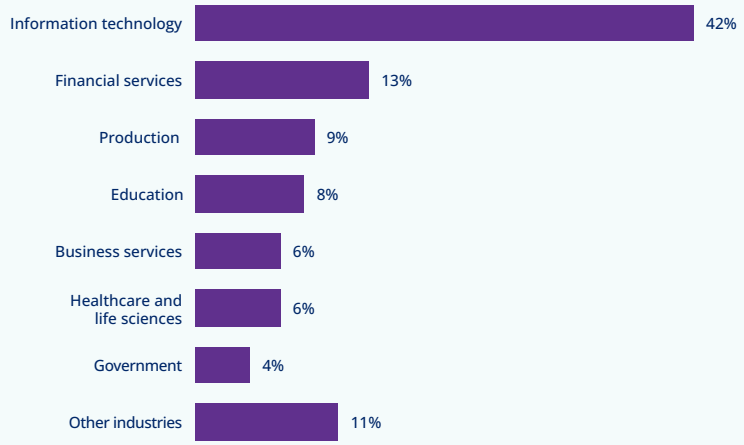
RESPONDENT DEMOGRAPHICS



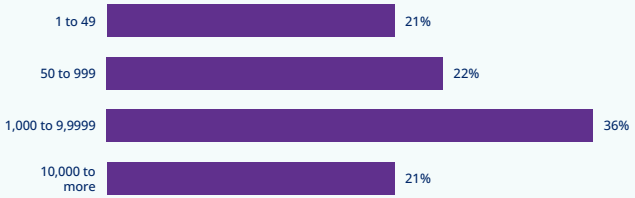
What is your primary job function?



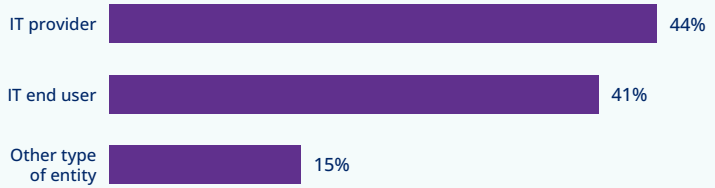
Which of the following best describes your organization's primary industry?



Please estimate how many total employees are in the organization you work for.



Which option best describes the organization you work for?



2025 Global Collaboration in AI Survey, Q3, Q6, Q7, Q12, Q11, Q8, Sample Size = 233

Some demographics have been regrouped to facilitate a more insightful analysis. For the original source data and study frequencies, please see the Data.World dataset and access as described above.

About the Authors

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ANNI LAI is a longtime open source community builder, advocate, and evangelist. With nearly a decade of active involvement in the global open source ecosystem, she has supported developer communities across more than 40 countries and five continents. She currently serves as Co-Chair of the Generative AI Commons and an elected board member of LF AI & Data, and she also advises LF Europe, GOSIM, and KAIYUANSHE and leads the Open Source Operations at Futurewei. Anni is a passionate believer that AI should serve the global population—rooted in ethics, trust, and openness. Anni holds a B.A. and an M.S. in Computer Science from Rutgers University and San José State University, respectively.

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

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- Mark Collier, *GM, AI & Infrastructure, The Linux Foundation*
- Jerry Cuomo, *IBM Fellow*
- Colin Eberhardt, *CTO, Scott Logic*
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Resources

Getting started on contributing to open source AI projects:

- The **Model Openness Framework (MOF)**, developed by the Linux Foundation, is a classification system for machine learning models that rates their level of completeness and openness. This definitional framework provides AI model users and procurers with a tool to guide their decision-making around model choice and development.
- Other AI-related open source projects referenced in this report include **OpenStack**, **PyTorch**, and **Kubernetes**.
- A comprehensive list of open source AI projects is available on the **LF AI & Data website**.
- **OpenMDW License** is a license specifically crafted for machine learning models.
- **Hugging Face** hosts millions of AI tools and models that are open for collaboration and community engagement.

How to develop sovereign AI talent through education:
LF Education provides a number of free and low-cost courses on the topic of AI.

- **Ethics in AI and Data Science (LFS112)**
- **Data and AI Fundamentals (LFS115x)**
- **Machine Learning & AI Introduction (RXM402)**
- **PyTorch and Deep Learning for Decision Makers (LFS116)**
- **PyTorch Essentials: An Applications-First Approach (LFD273)**
- **Ethical Principles for Conversational AI (LFS118)**
- **Conversational AI: Ensuring Compliance and Mitigating Risks (LFS120)**

Further reading on Open Source AI:

- Lucie-Aimée Kaffee and Yacine Jernite, "Open Source AI: A Cornerstone of Digital Sovereignty," June 2025, **https://huggingface.co/blog/frimelle/sovereignty-and-open-source**
- Matt White, Ibrahim Haddad, Cailean Osborne, Xiao-Yang Yanglet Liu, Ahmed Abdelmonsef, Sachin Varghese, and Arnaud Le Hors, "The Model Openness Framework: Promoting Completeness and Openness for Reproducibility, Transparency, and Usability in Artificial Intelligence," 2024, **https://arxiv.org/abs/2403.13784**

- Cailean Osborne, “What Open Source Developers Need to Know about the EU AI Act,” April 2025, **https://linuxfoundation.eu/newsroom/ai-act-explainer**
- Anna Hermansen and Cailean Osborne, “The Economic and Workforce Impacts of Open Source AI: Insights from Industry, Academia, and Open Source Research Publications,” The Linux Foundation, May 2025, **https://www.linuxfoundation.org/research/economic-impacts-of-open-source-ai?hsLang=en**
- Adrienn Lawson, Stephen Hendrick, Nancy Rausch, Jeffrey Sica, Marco Gerosa, “Shaping the Future of Generative AI: The Impact of Open Source Innovation,” foreword by Hilary Carter, The Linux Foundation, November 2024, **https://www.linuxfoundation.org/research/gen-ai-2024?hsLang=en**
- The U.K. AI Security Institute open sourced Inspect, an open source framework for LLM evaluations. See more: **https://inspect.aisi.org.uk/**
- France announces €32 million of funding for scikit-learn, a Python library for machine learning, and the development of OSS for data science in its national AI strategy, 2021, **https://www.economie.gouv.fr/actualites/strategie-nationale-intelligence-artificielle**
- LLM Leaderboard for the French language on Hugging Face, **https://huggingface.co/spaces/fr-gouv-coordination-ia/llm_leaderboard_fr#/**
- OpenUK, “AI Openness Update: From Agentic to Public Good in 2025,” 2025, **https://openuk.uk/stateofopen/publicgoodai/**

Appendix

APPENDIX A1

AT WHICH LEVEL(S) DO YOU BELIEVE SOVEREIGN AI IS MOST RELEVANT? (SELECT ALL THAT APPLY)	UNITED STATES	EUROPE	ASIA-PACIFIC
National level	65%	70%	68%
Supranational level	47%	52%	39%
Organizational/company level	42%	55%	42%
Regional/state level	31%	19%	16%
Community level	12%	22%	18%
City/municipal level	14%	17%	11%

2025 Tech Talent, Q24, Sample Size = 556, Total Mentions = 1,811, DKNS excluded (5%), other regions omitted due to insufficient representation

APPENDIX A2

WHICH OPEN APPROACHES DO YOU BELIEVE ARE MOST CRITICAL TO ADVANCING SOVEREIGN AI? (SELECT ALL THAT APPLY)	UNITED STATES	EUROPE	ASIA-PACIFIC
Open source software	72%	89%	86%
Open data	65%	69%	67%
Open standards	55%	69%	78%
Open governance	51%	49%	45%
Open infrastructure	38%	37%	52%
Open hardware	15%	20%	34%

2025 Global Collaboration in AI Survey, Q19 vs Q6, Sample Size = 223, Total Mentions = 722, DKNS excluded (1%), other regions omitted due to insufficient representation

APPENDIX A3

WHICH STAKEHOLDERS SHOULD BE MOST INVOLVED IN SHAPING THE FUTURE OF SOVEREIGN AI? (SELECT ALL THAT APPLY)	UNITED STATES	EUROPE	ASIA-PACIFIC
National governments	65%	71%	65%
Open source foundations	44%	67%	67%
Supranational governments (e.g., European Union)	44%	55%	61%
Standards organizations	27%	49%	51%
Academia	25%	49%	45%
Industry / trade associations	32%	27%	31%
Private sector	27%	27%	20%
Regional governments	27%	22%	12%
Civil society organizations (e.g., Amnesty International, Access Now)	22%	22%	18%

2025 Global Collaboration in AI Survey, Q26 vs Q6, Sample Size = 168, Total Mentions = 590, answered only by Q21 = “Important”, DKNS excluded (0-3%), other regions omitted due to insufficient representation

Endnotes

1 https://market.us/report/ai-api-market/

2 https://www.linuxfoundation.org/research/state-of-open-standards-2024

3 https://lfaidata.foundation/projects/

4 https://www.linuxfoundation.org/research/open-source-jobs-report-2025

5 https://www.nature.com/articles/d41586-024-03423-0

6 https://uxlfoundation.org/

7 https://crfm.stanford.edu/helm/

8 https://www.linuxfoundation.org/research/state-of-open-standards-2024

9 https://youtube.com/playlist?list=PLPnJ_u0AKgW9BfptmER1Hj0v23wyrlbE8&si=kFFPOUJmjvRpwJRW

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Our mission is Developing Innovations to Benefit an Intelligent and Digital Society via Open Source, Standardization, and Collaboration within Ecosystems.

Our experts have actively engaged in standards programs for the past two decades. Through this work, we participate in developing next-generation wireless technologies and networks and building open ecosystems through open application platforms for ICT systems.

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LF AI & DATA

The LF AI & Data Foundation, a Linux Foundation project, accelerates and sustains the growth of open source AI, data, and analytics projects. Backed by the world's leading technology companies, LF AI & Data provides a neutral space for collaboration and innovation in AI development. Learn more at **https://lfaidata.foundation**

THE LINUX FOUNDATION | Research

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

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youtube.com/user/TheLinuxFoundation

github.com/LF-Engineering

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