

**PISTOIA
ALLIANCE**

What will the labs of 2030 look like?

A Global Survey May - August 2024

In partnership with

Lab OF THE
Future.

Executive Summary

The Pistoia Alliance, a global, not-for-profit alliance that advocates for greater collaboration in life sciences R&D, conducted its annual survey in partnership with Open Pharma Research, organizer's of Lab of the Future Congress. The survey among 200 R&D experts from large pharma companies to life science start-ups in Europe, the Americas and APAC, examines lab technology investment, barriers, and benefits, and aims to identify any significant changes over the past year.

The survey shows a marked increase in the use of Artificial Intelligence and Machine Learning (AI/ML) and highlights a need for greater collaboration and knowledge sharing to overcome data challenges. **68%** of respondents are currently using AI/ML in their work and **62%** say it is the top technology investment their company will be making over the next two years.

Half of respondents (**52%**) cited low quality and poorly curated datasets as the biggest barrier to AI implementation. Privacy and security concerns around data were raised by **41%** of respondents, up from **34%** in 2023, while **38%** of respondents cited data that does not adhere to FAIR (Findable, Accessible, Interoperable, Reusable) principles.

Executive Summary continued

Many opportunities were highlighted where Pistoia Alliance members would like to work together with peers to create the lab of the future. To make data FAIR at scale, respondents are calling for more data governance frameworks (**49%**), templates for standardization and metadata (**46%**), and best practice and “how-to” guides (**45%**). There has been a marked increase in the number of respondents interested in ontologies, with **51%** requesting more maintenance and management of data standards and ontologies, compared to **42%** in 2023, and **29%** want ontologies training, up from **18%** in 2023.

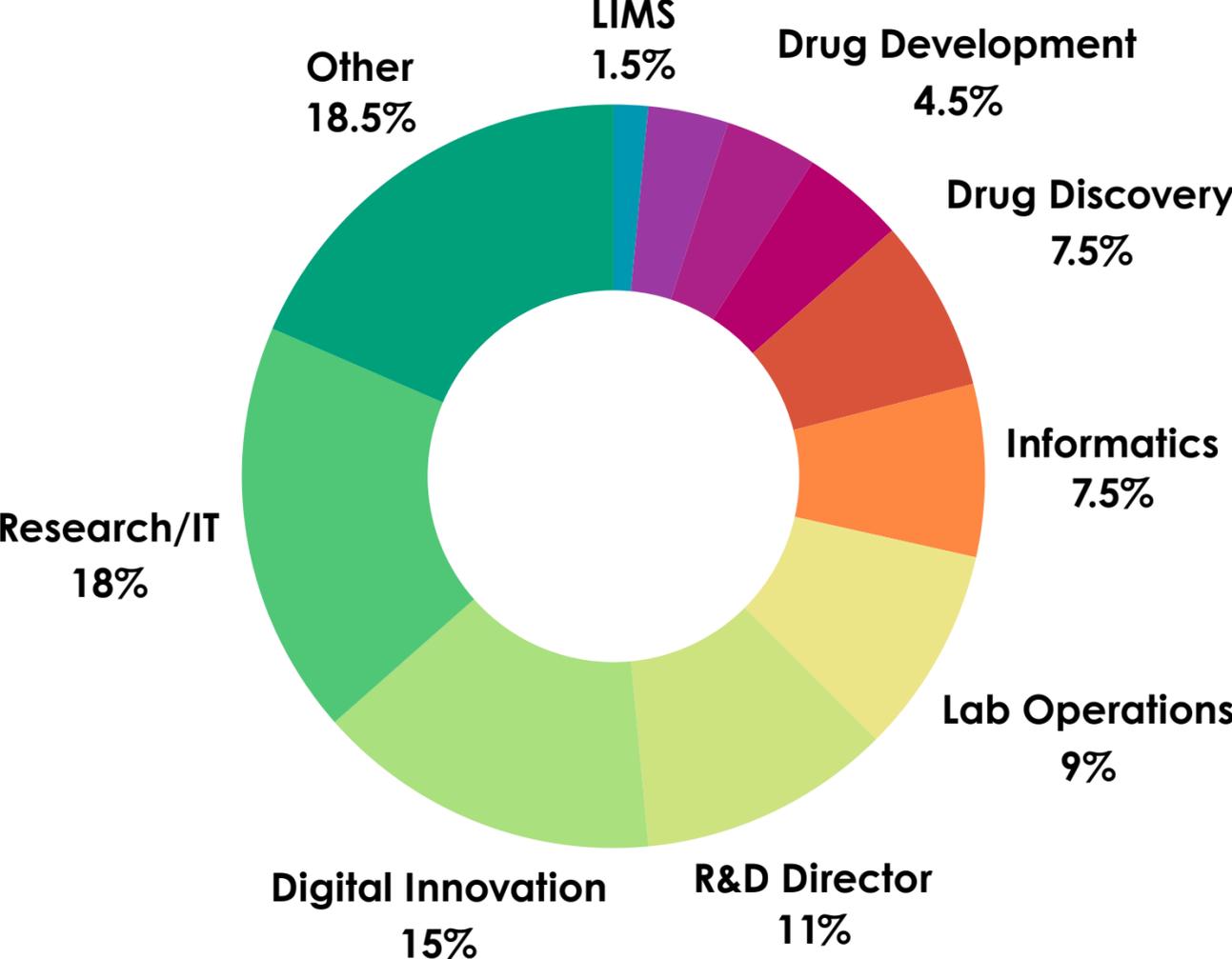
Survey Methodology

The Pistoia Alliance and Open Pharma Research conducted an online survey from May-August 2024 amongst the global R&D community spanning Europe, the Americas and APAC, to examine the adoption of emerging technologies and processes driving digital transformation, automation and laboratory efficiencies.

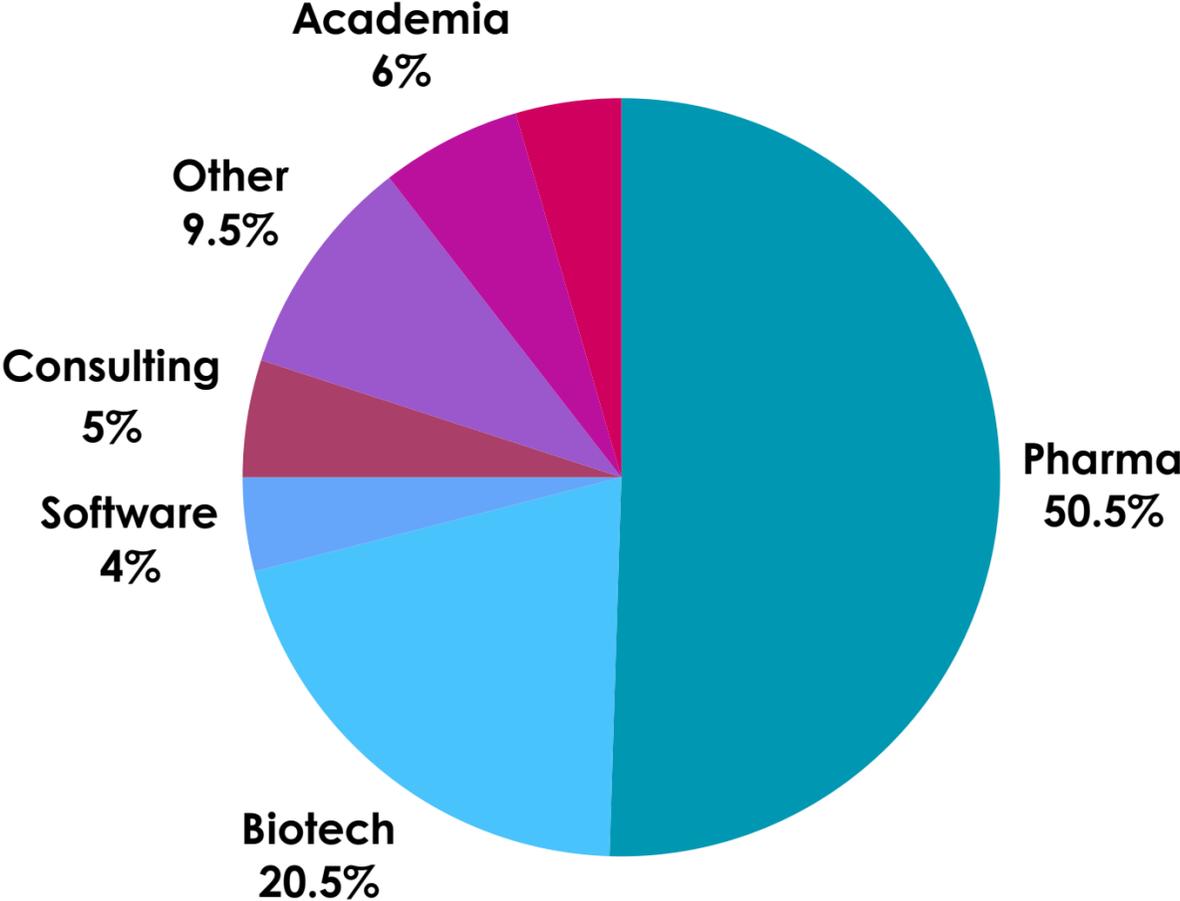
The 200 survey respondents represented a wide range of responsibilities from R&D directors and lab managers to digital innovation, informatics and lab automation experts with experience across virtually every lab environment. Pharma, biotech, and software and service companies, as well as academia and not-for-profit organizations all contributed to the survey.

Survey demographics 2024

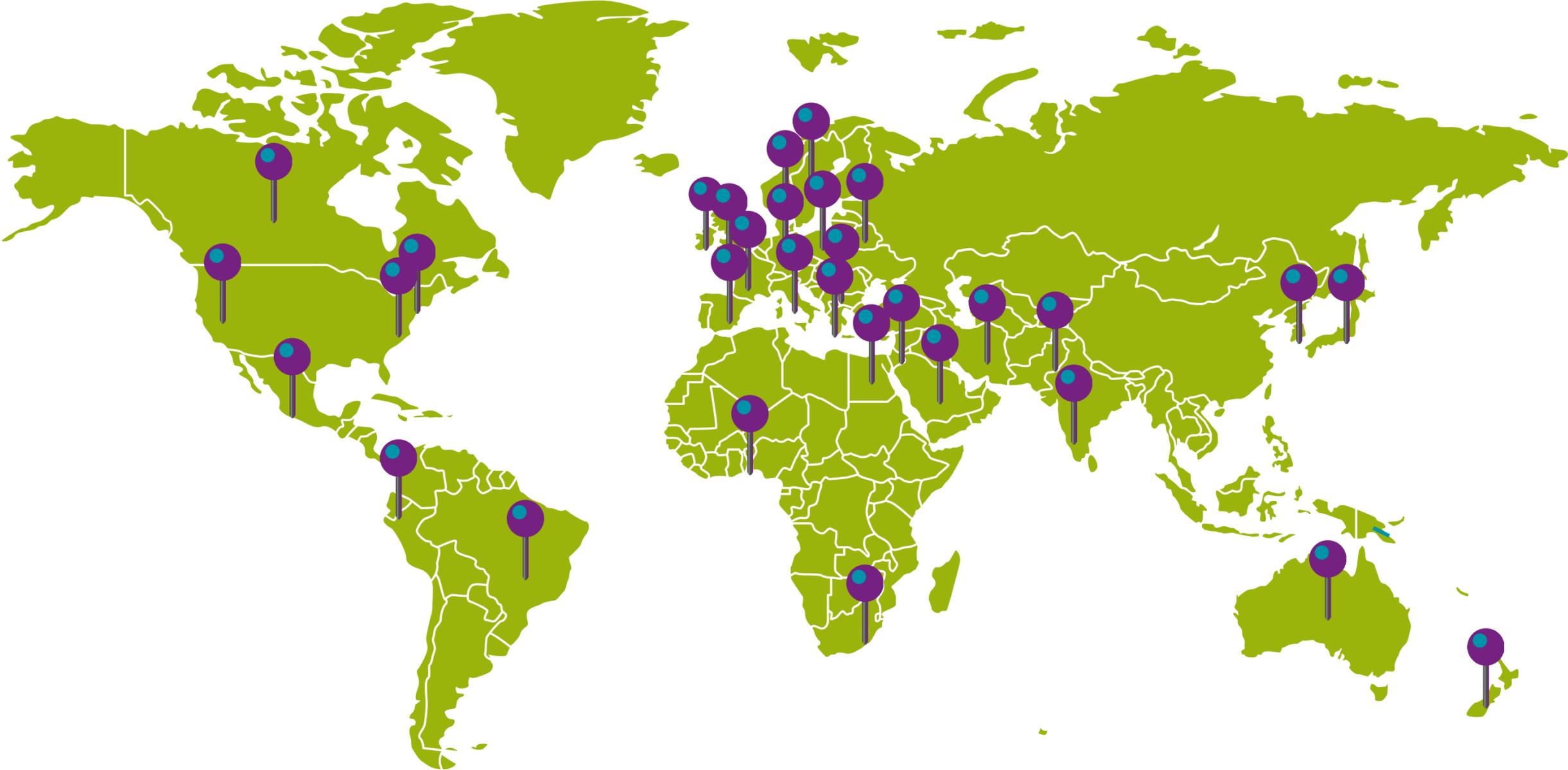
Job Role



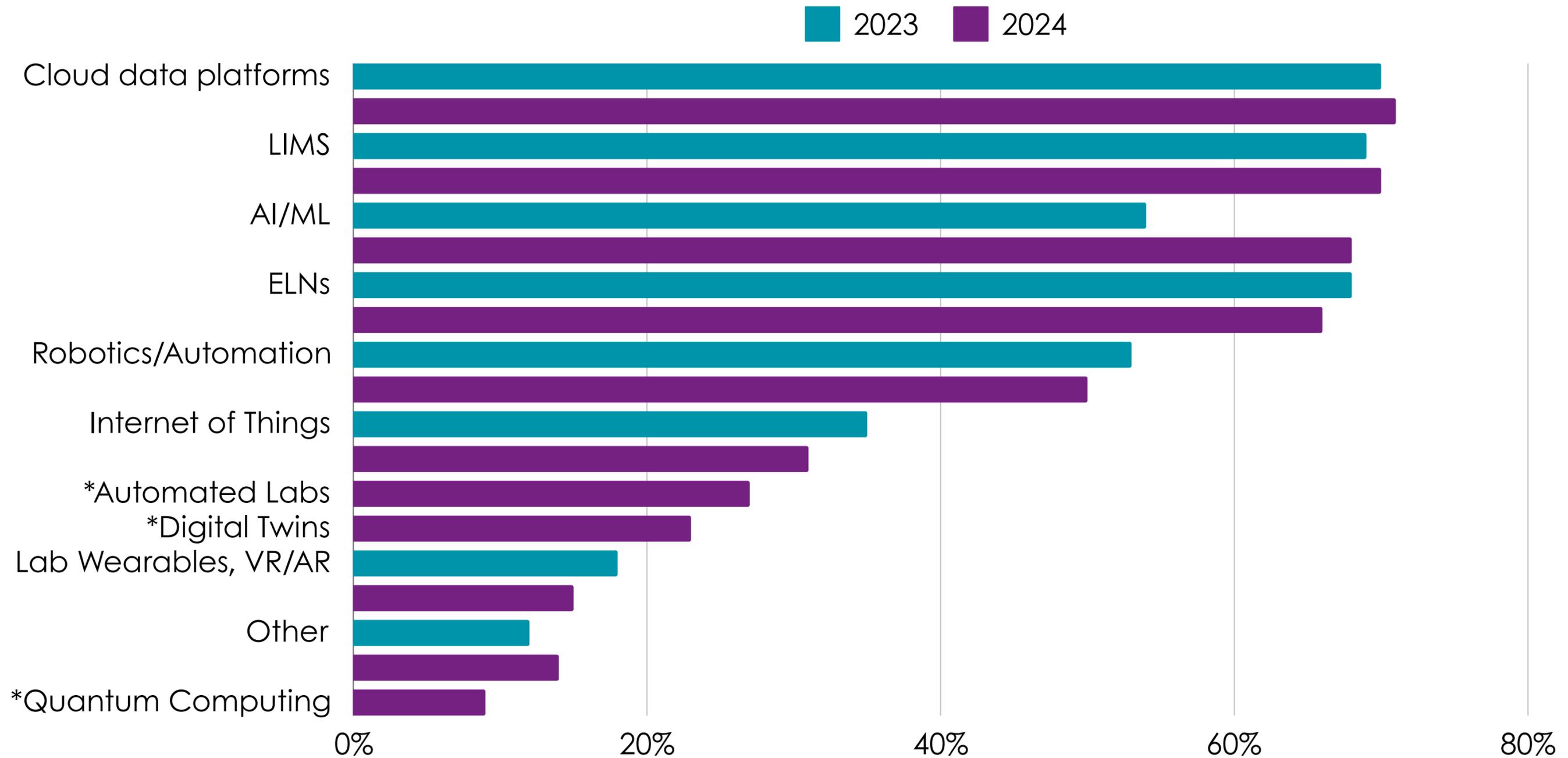
Industry



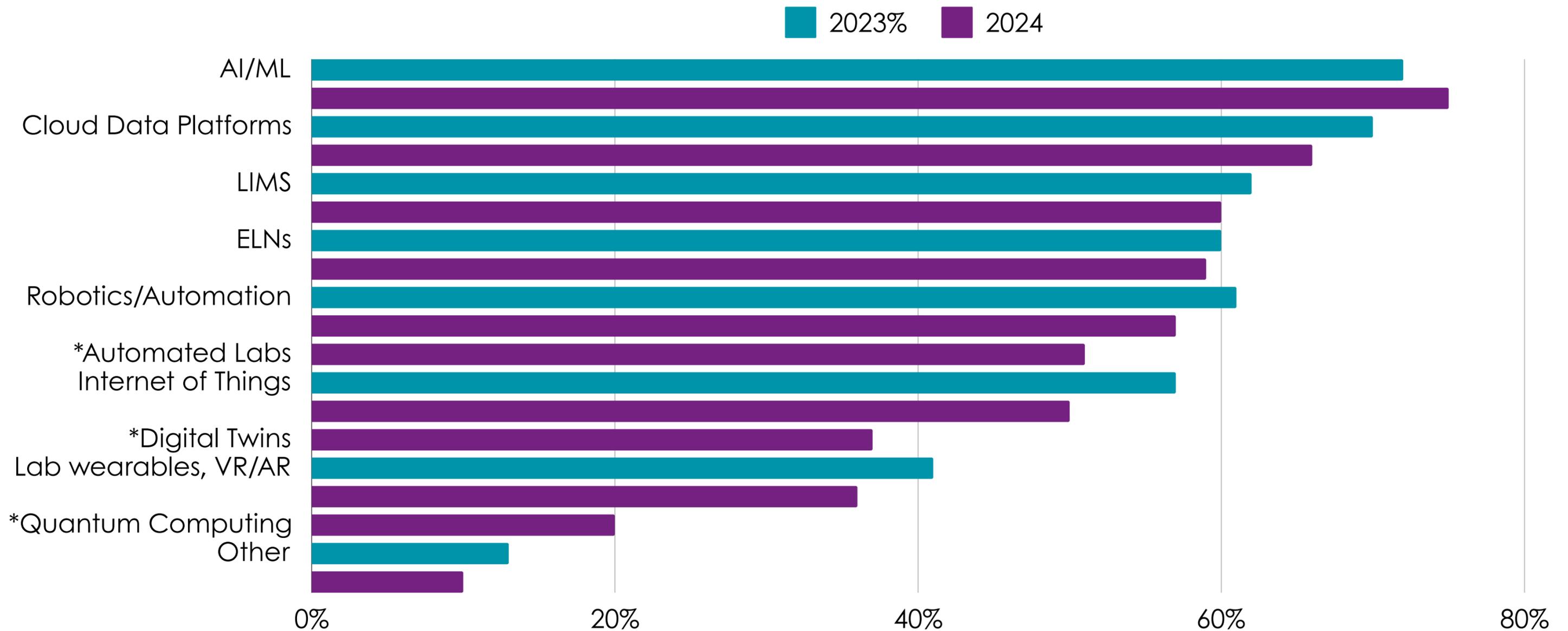
Survey demographics - by location



Which of the following technologies is your company currently using in the lab? (Tick all that apply)

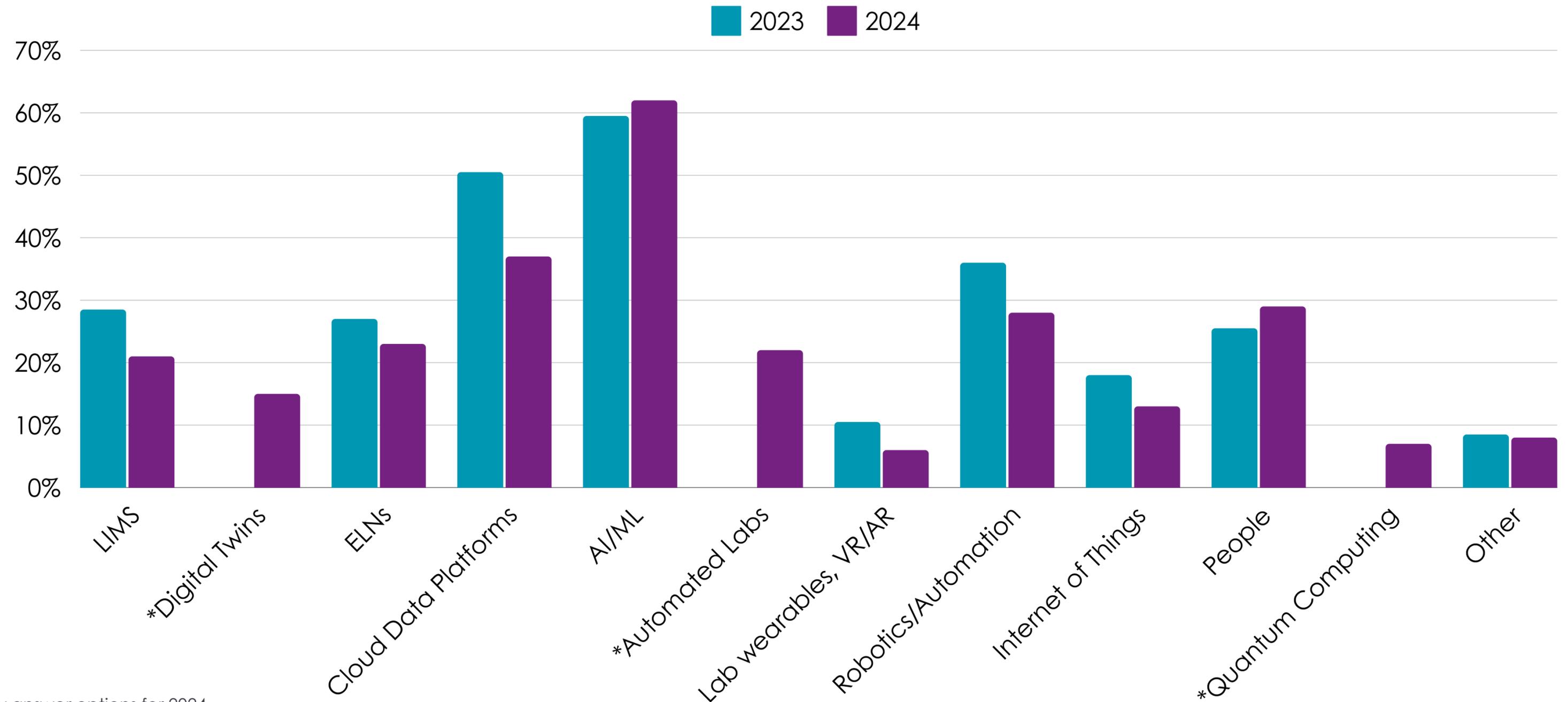


Which of the following technologies DO YOU EXPECT your company be using in the lab in the next two years (individual responses tick all that apply)



*new answer options for 2024

In which area(s) is your organization planning to make the most investments in the next two years? (Tick your top three)

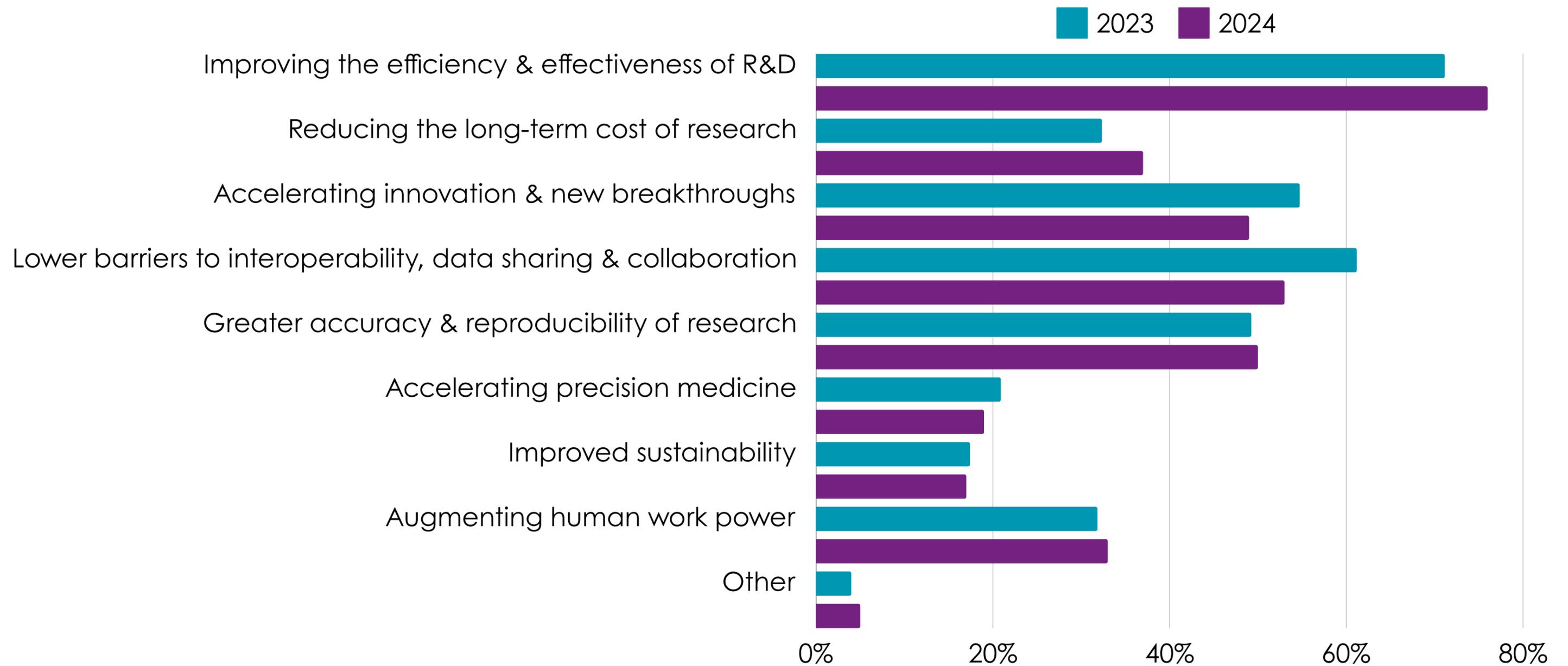


*new answer options for 2024

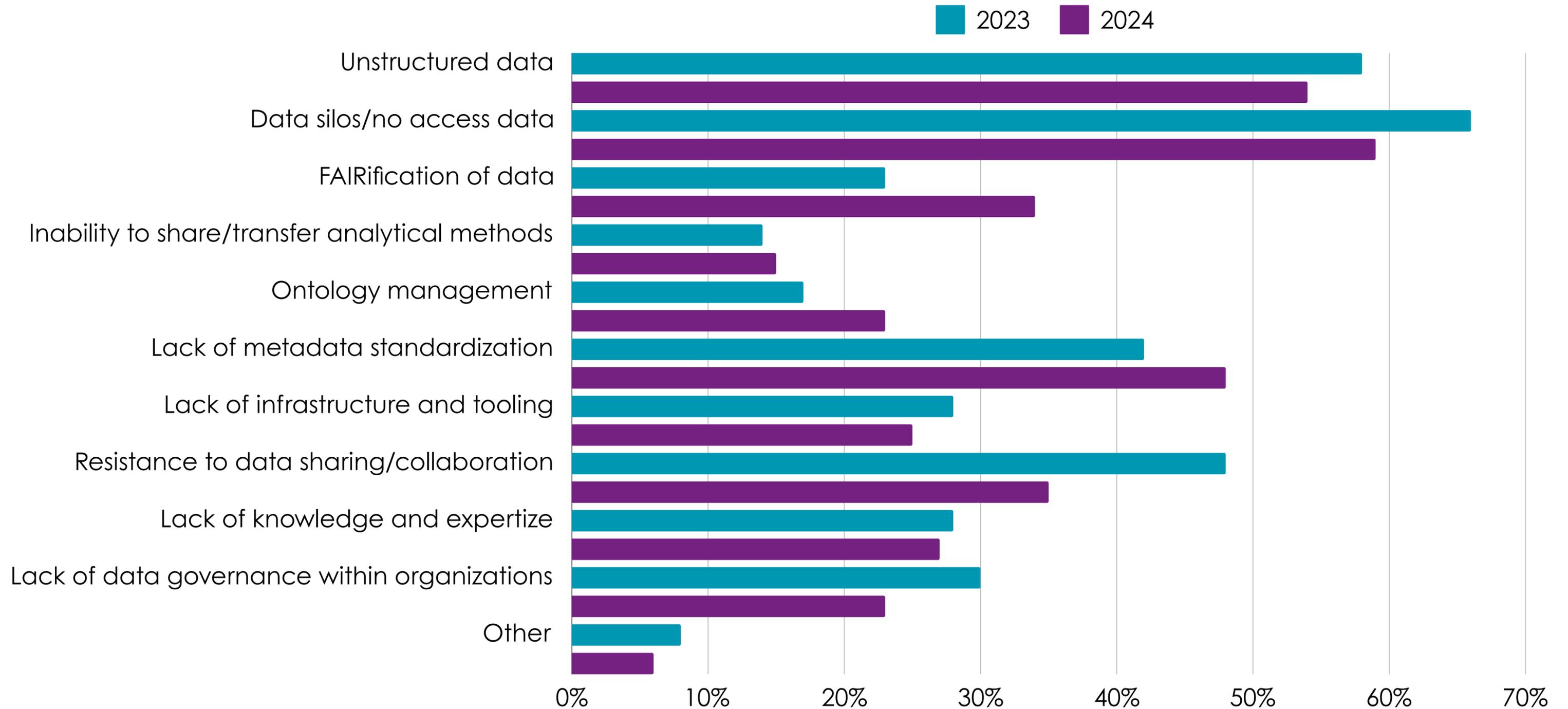
Survey insights

- Artificial Intelligence and Machine Learning (AI/ML) are once again the top technology investments for life sciences companies over the next two years (**62%**) as companies move away from infrastructure investments such as ELNS and LIMS. **68%** of respondents are already using AI/ML in their labs, up from **54%** last year.
- Emerging technologies including robotics for automation, quantum computing and digital twins are all set to grow in use over the next two years, with digital twins set to show the most significant increase in use, rising from **23%** to **37%**.
- It is encouraging to see companies prioritizing investment in their people over the next two years, up from **26%** in last year's survey to **29%** this year, and this is further reflected in the survey by an increased demand for educational and training resources and interventions.

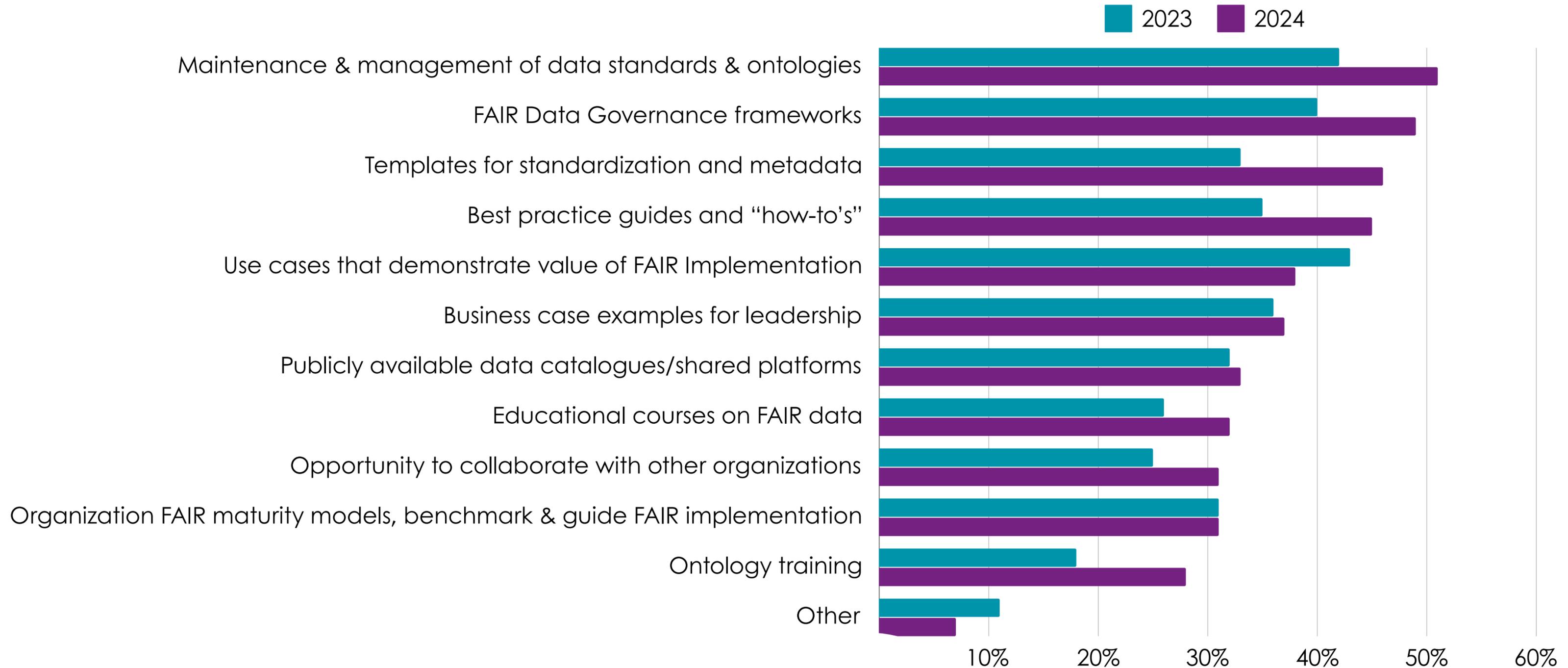
What do think are the biggest benefits of digitalizing and automating the lab? (Tick your top three)



What are the biggest barriers to making the best use of experimental data? (Tick your top three)



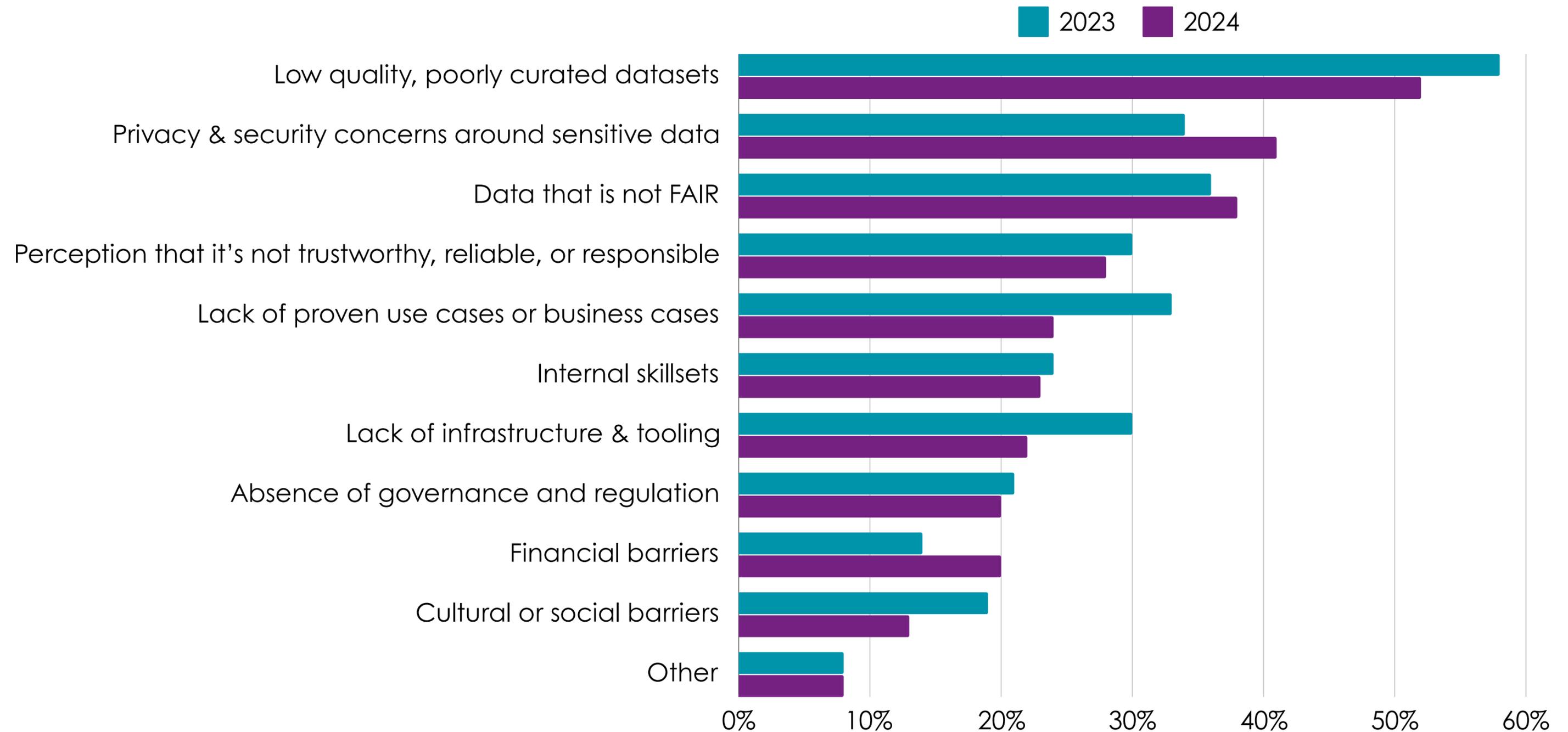
What help do you need to make data FAIR (findable, accessible, interoperable and reusable) at scale within your organization? (Tick all that apply)



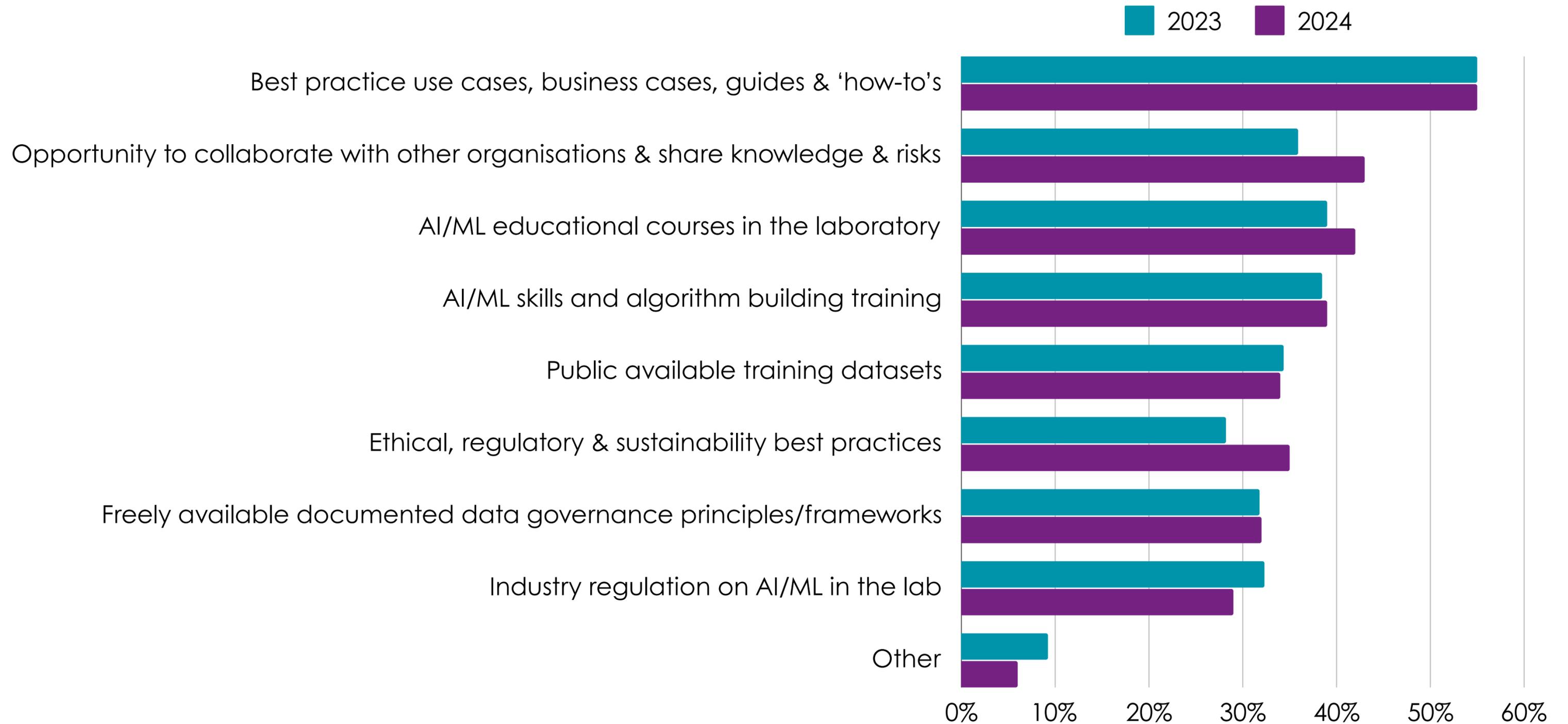
Survey insights

- Once again, this year, improving the efficiency and effectiveness of R&D is seen as the top benefit of digitalizing and automating the lab – up from **71%** to **76%**, followed by lowering the barriers to interoperability, data sharing and collaboration (**53%**) and accelerating innovation and new breakthroughs (**49%**).
- While data silos (**59%**) and unstructured data (**54%**) remain the top two barriers holding organizations back from making the best use of experimental data, cultural barriers and institutional resistance to data sharing and collaboration has dropped from third position from **48%** in 2023 to **35%** this year, indicating that people have become more collaborative.
- Data not being FAIR (Findable, Accessible, Interoperable and Reusable) as a key barrier is up from **23%** last year to **34%** this year. Respondents are calling for more data governance frameworks (**49%**), templates for standardization and metadata (**46%**) and best practice guides (**45%**) to move their labs forwards. Ontologies are becoming more important with **51%** of respondents asking for more maintenance and management of data standards and ontologies (up from **42%**), while **29%** want ontology training (up from **18%**).

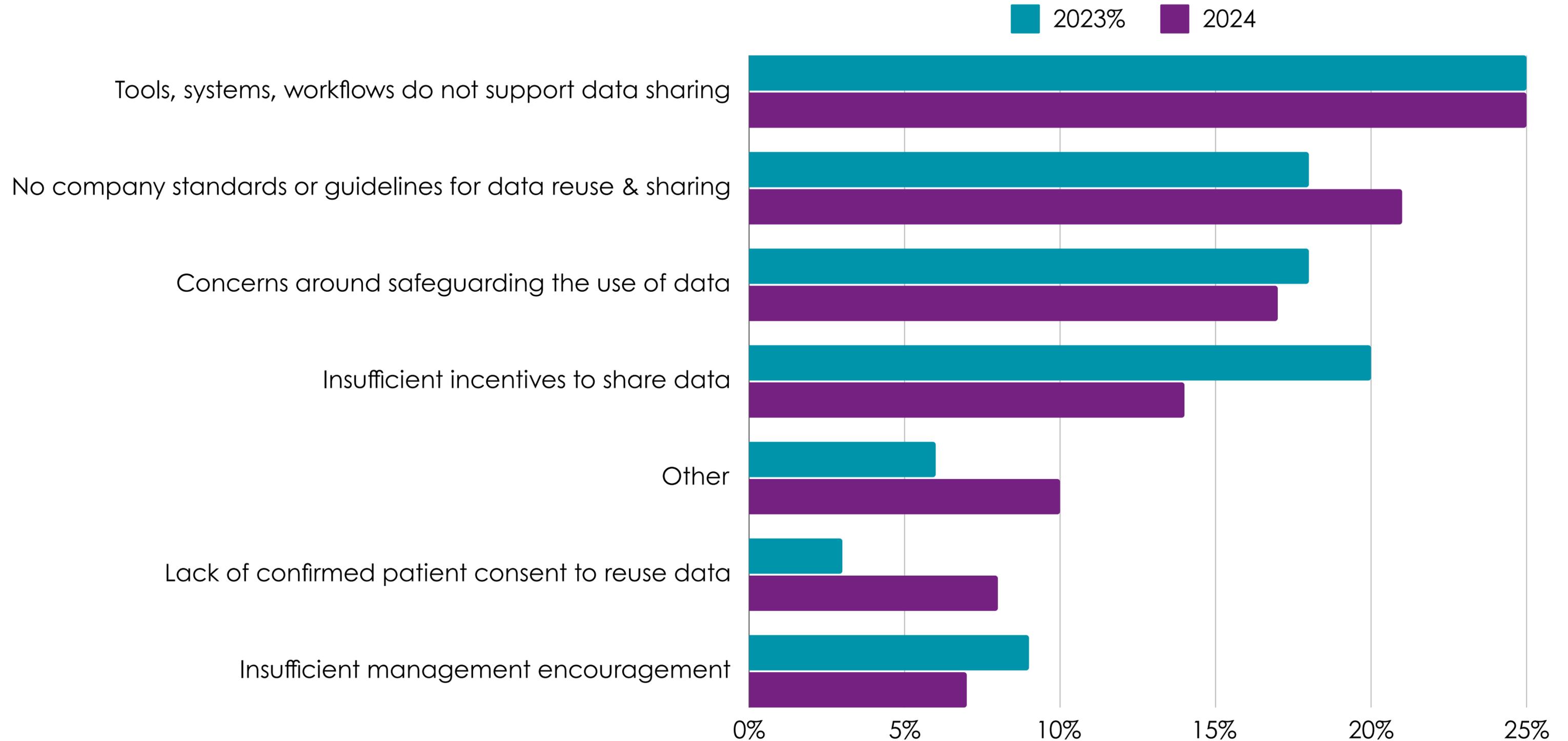
What are the biggest barriers to implementing AI/ML at scale within the laboratory environment? (Tick your top three)



What support would you like to help you integrate AI/ML within the laboratory environment? (Tick all that apply)



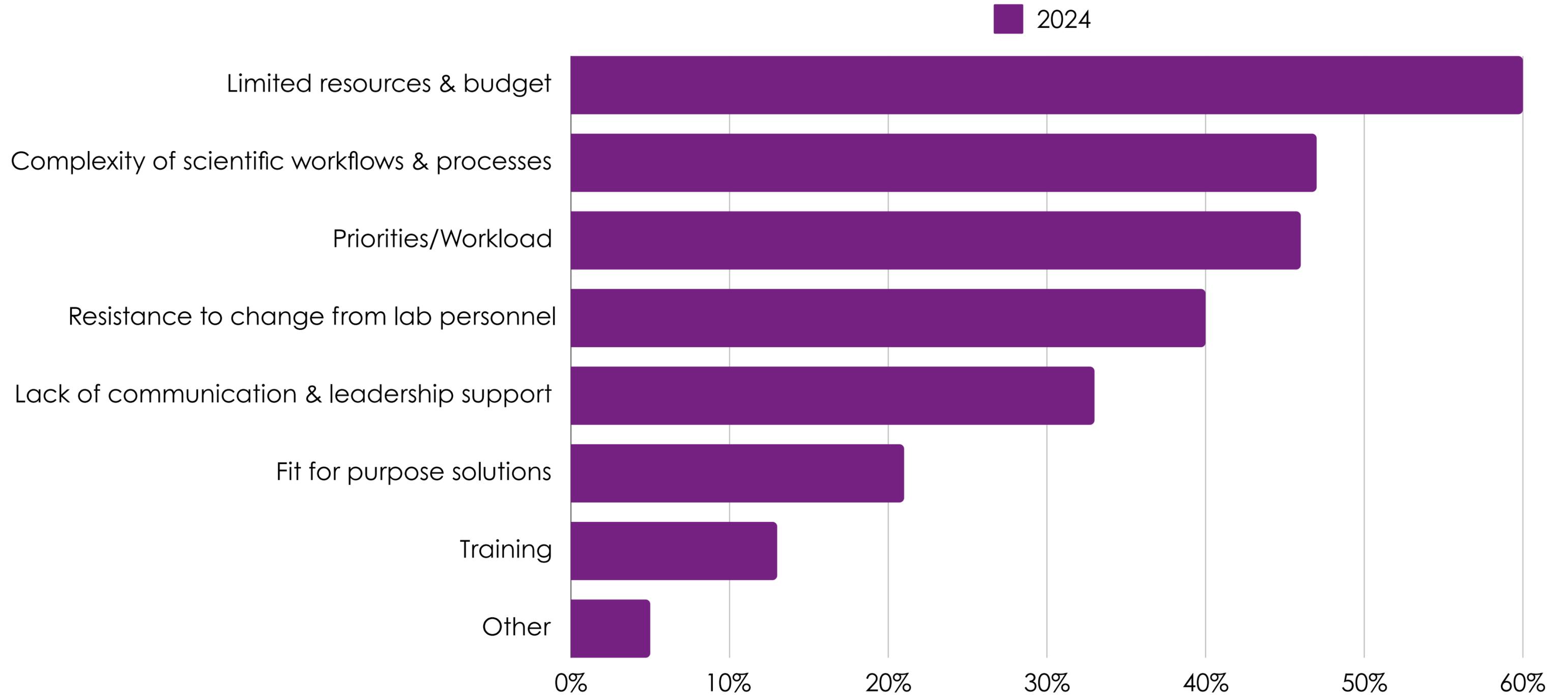
What is the single biggest barrier preventing a culture of cross lab collaboration?



Survey insights

- This year's survey clearly shows that AI is being delivered. Low quality and poorly curated datasets remain the biggest barrier (**52%**) while not having FAIR data continues to be a significant challenge for **38%** of respondents. There has been an increase in respondents citing financial barriers to AI adoption, up from **14%** in 2023 to **20%** in 2024, although encouragingly for R&D most organizations are still planning to invest in AI/ML.
- Companies still need a lot of help in integrating AI/ML into their laboratory environments. The number one ask is for best practice guides (**55%**). Next is the opportunity to collaborate with other organizations and share knowledge and risks, up from **36%** to **43%** this year. Education remains key - **42%** of respondents would like training courses on AI/ML in the lab.
- It's encouraging to see in this year's survey that cross lab collaboration is not being restricted by incentives to share data (down from **20%** last year to **14%** citing incentives as a barrier in 2024). People are collaborating although a lack of tools, systems and/or workflows to support data sharing are still holding efforts back for **25%** of respondents.

What do you perceive as the primary challenges in implementing change in R&D labs (Tick Your Top Three)



How to get involved with shaping the lab of the future in life science R&D

The Pistoia Alliance supports the challenges raised in this survey through a number of active global initiatives including:

- A new Lab of the Future Community of Experts which is being driven by the Pistoia Alliance and a newly formed steering committee of R&D leaders from nine major pharmaceutical companies
- AI/ML Community of Experts
- Quantum Computing Community
- IDMP Ontology project
- Pharmaceutical CMC Process Ontology
- Pharma General Ontology
- FAIR Implementation project
- Learn about our General Ontology Training

Find out more about Pistoia Alliance membership which includes education and networking opportunities and the opportunity to participate in our collaborative projects and communities.

Attend the Lab of the Future Congresses, supported by the Pistoia Alliance.

About Pistoia Alliance

- The Pistoia Alliance is a global, not-for-profit alliance that brings together the biopharmaceutical ecosystem, powering collaboration to drive innovation and new breakthroughs. More than 200 members from across the entire biopharma ecosystem collaborate to solve common challenges, sharing expertise and R&D resources, to move the industry forwards and ensure better outcomes for all. Our members benefit from our program of educational events and training and work together on projects and in our specialist communities using our proven framework for open innovation to transform R&D.

About Lab of the Future Congress

- The Lab of the Future Congress run by Open Pharma Research Ltd creates leading business congresses for and in collaboration with the life science sector. Events that inform, inspire, challenge and most importantly, are a platform for driving change in our industry.



Thank you

