PISTOIA ALLIANCE

In partnership with Lab OF THE Future

2025 The Evolution of Labs Report

the three year overview

A Global Survey
March 2025
Closing August 2025

Colloration that delivers

Collaboration holds the key to unlocking the full potential of digital transformation to drive better outcomes for all. The Pistoia Alliance has a number of global communities that address the challenges raised in this survey including:

- Future Labs Evolution
- AI/ML
- Change Management
- FAIR for Pharma
- Quantum Computing

- Learn about Pistoia Alliance training programs
- Join the Pistoia Alliance
- Attend the Lab of the Future Congresses, supported by the Pistoia Alliance.

Executive Summary

The Pistoia Alliance, a global, not-for-profit alliance that advocates for greater collaboration in life sciences R&D, conducted its annual Lab of the Future survey in partnership with Open Pharma Research, organizer's of Lab of the Future Congress. For the third year running, the survey examined lab technology use and investment, the key benefits and barriers to adoption, and what support is needed to enable the lab of the future.

This year's survey finds that more than three quarters of life sciences labs expect to use AI within the next two years, but a lack of skills has become one of the biggest barriers to AI adoption. As a result, organizations are looking for more support to upskill their people. In the quest for better science, there is a shift in what people see as the biggest benefit of digitizing and automating the lab, from improving the efficiency and effectiveness of R&D to accelerating innovation and new breakthroughs.

"AI is evolving faster than any other lab technology, making access to skills and expertise increasingly critical if companies are to keep pace with change and apply AI successfully to accelerate R&D. Pistoia Alliance is expanding its training programs in AI and FAIR Data Governance to help the life sciences community adapt to this rapid evolution and apply AI responsibly."
Dr Becky Upton, President of the Pistoia Alliance

Key Findings

AI use continues to rise

Artificial Intelligence (AI) use continues to rise, investment in AI remains stable while skills shortages become a growing barrier to AI implementation in the lab:

- 77% expect to use AI in the next two years
- AI remains the number one investment area (63%)
- 34% cite a lack of people as a barrier to AI adoption, up from 23% in 2024

Demand is increasing for AI education

In recognition that skills have become a major bottleneck to AI adoption, respondents want help with education and training:

- 51% want best practice guides
- 45% want educational AI/ML courses
- 40% want skills training

Key Findings

Cloud adoption climbing steadily

80% now use cloud data platforms in the lab, up from 70% in 2023. This is likely driven by instrument vendors shifting software to the cloud and reduced security concerns as benefits of scale and accessibility become clearer.

ELNs most widely used technology

Adoption rose to 81% in 2025, from 66% in 2024. This may reflect a renewal cycle, with companies reinvesting in modernized platforms as they recognize that robust, digitized data foundations are essential to support AI and analytics.

Hype cools around emerging technologies

The use of digital twins, quantum computing and wearables is down with companies prioritizing practical tools like ELNs and cloud platforms. Compared to 2024:

- Adoption of digital twins has dropped from 23% to 17%
- Expected use of quantum computing in the next two years falls from 20% to 18%
- Expected use of wearables falls from 41% to 35%

Key Findings

Organizations divided in their use of robotics and automation

Half of companies (51%) expect to use robotics and automation in the lab in the next two years, down from 57% in 2024. However, further analysis around the use of robotics and fully automated labs shows penetration is greater in the demand side of pharma compared to supply.

Benefits of digitization shift from efficiency to innovation

The top benefit of digitizing and automating the lab has changed from improving the efficiency and effectiveness of R&D to accelerating innovation.

- 53% cite accelerating innovation and new breakthroughs as top benefit
- 49% cite lowering barriers to interoperability, data sharing and collaboration
- Improving the efficiency and effectiveness of R&D has dropped to third place (47%)

Barriers to ensuring the best use of lab data easing

Overall, the different barriers to making the best use of lab data have decreased in 2025.

- Data silos remains the top challenge (57%), but down 9% since 2023
- Unstructured data (43%) remains the second biggest barrier
- Cultural barriers and institutional resistance to data sharing/collaboration persist at 34%.

Key Findings

Management is holding back cross lab collaboration

While tools and systems for data sharing remain the biggest barrier to a culture of cross lab collaboration (26%), insufficient management encouragement has risen to 20%, from 7% last year.

Regulatory clarity improving

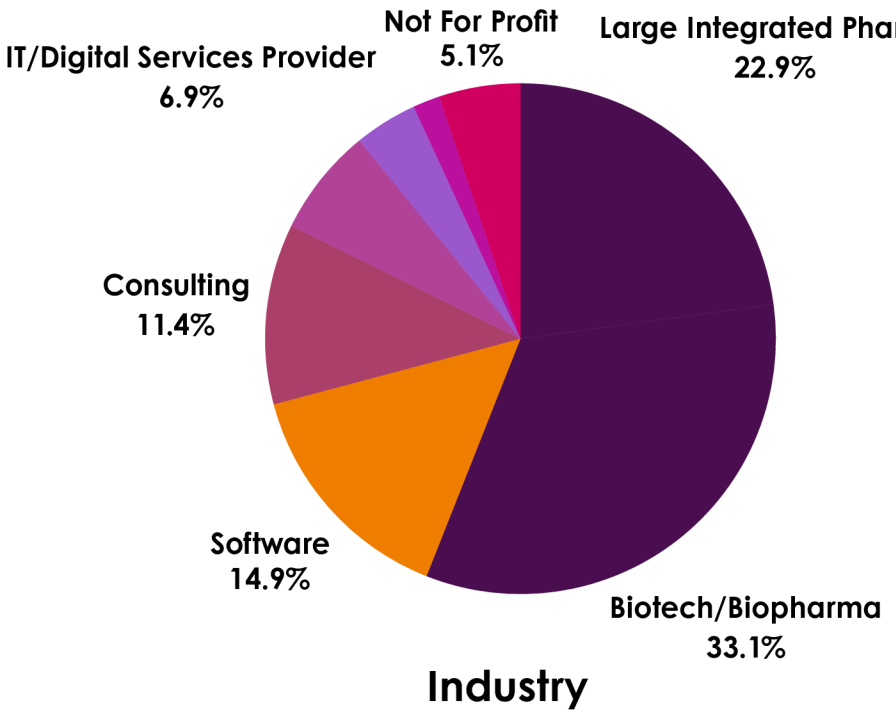
Only 9% now see regulation as a barrier to AI, down from 23% last year, suggesting clearer rules and greater confidence in compliance.

Collaboration on FAIR initiatives has delivered

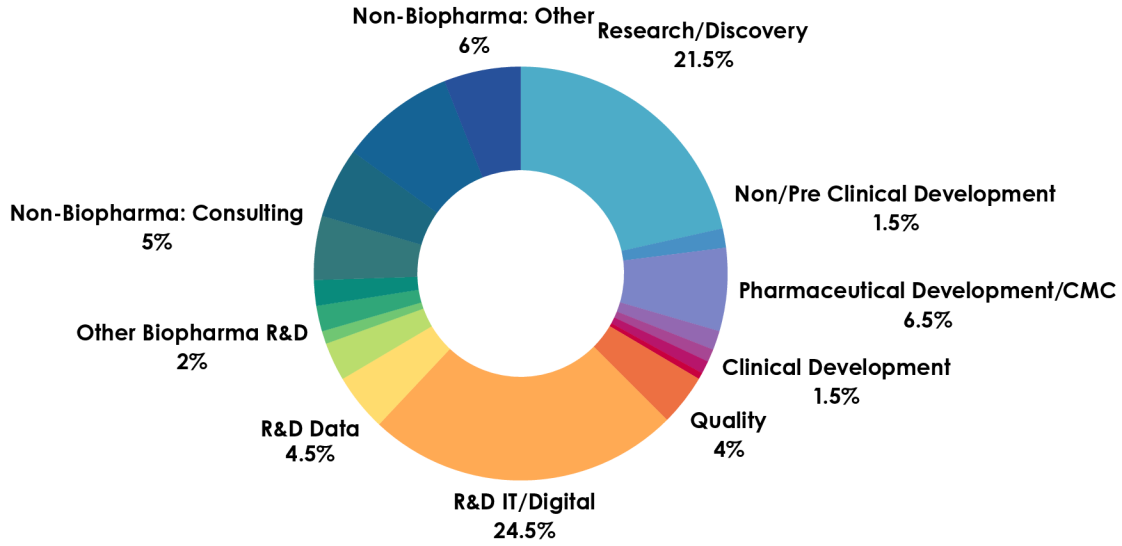
While managing data standards and ontologies remains the area where help is most needed to make data FAIR (49%); the results show there are now plenty of use cases, benchmarks and best practices in place.

"Investment is becoming more focused, with companies moving beyond using technology just to speed up processes and instead looking at how technology can enable better science. The Pistoia Alliance is supporting the industry to overcome both the cultural and technological challenges organizations face, through initiatives like our Future Labs Evolution, AI/ML and change management communities."
Dr Christian Baber, Chief Portfolio Officer, The Pistoia Alliance

Survey Demographics 2025



Industry



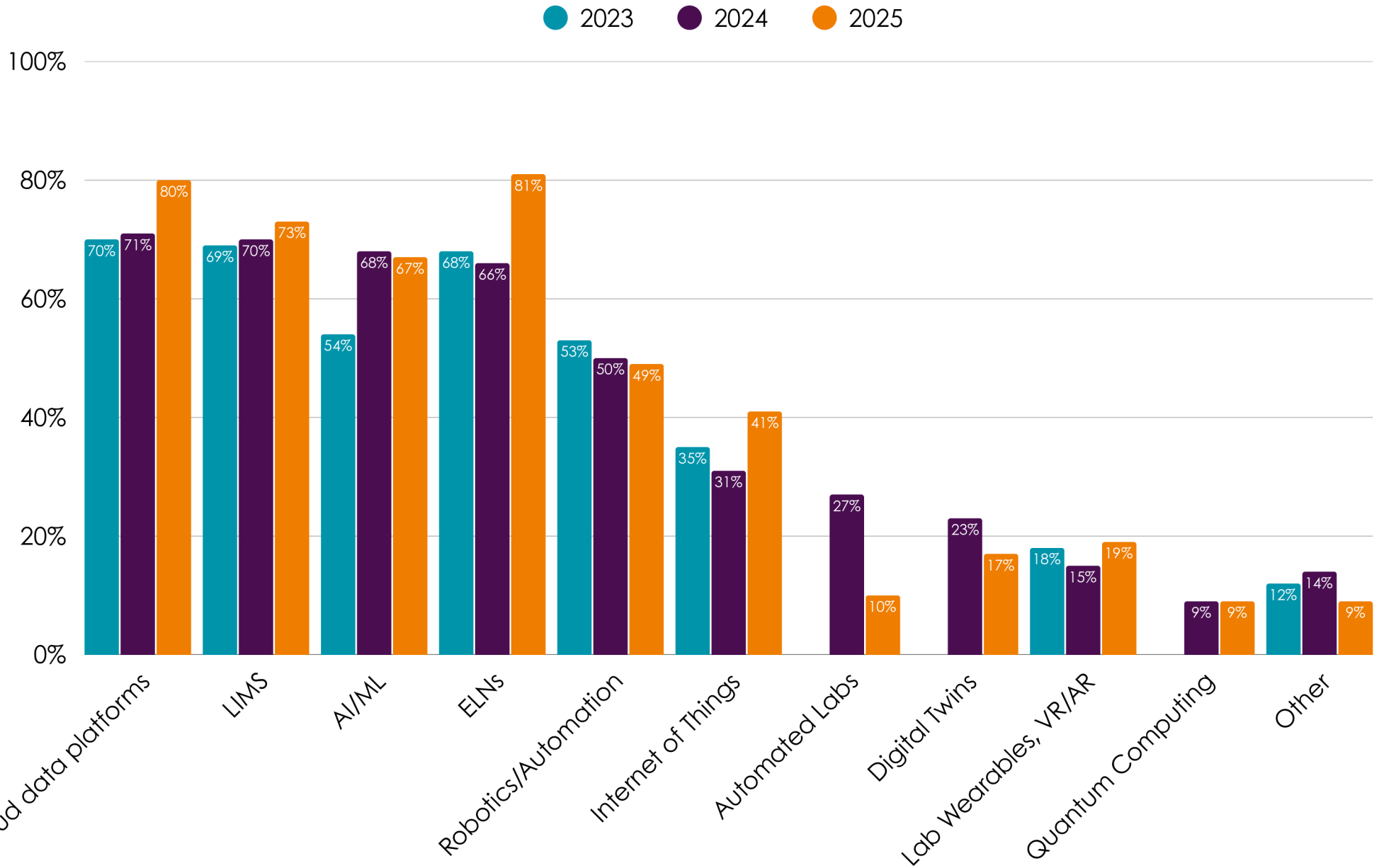
Job Role

Survey Methodology

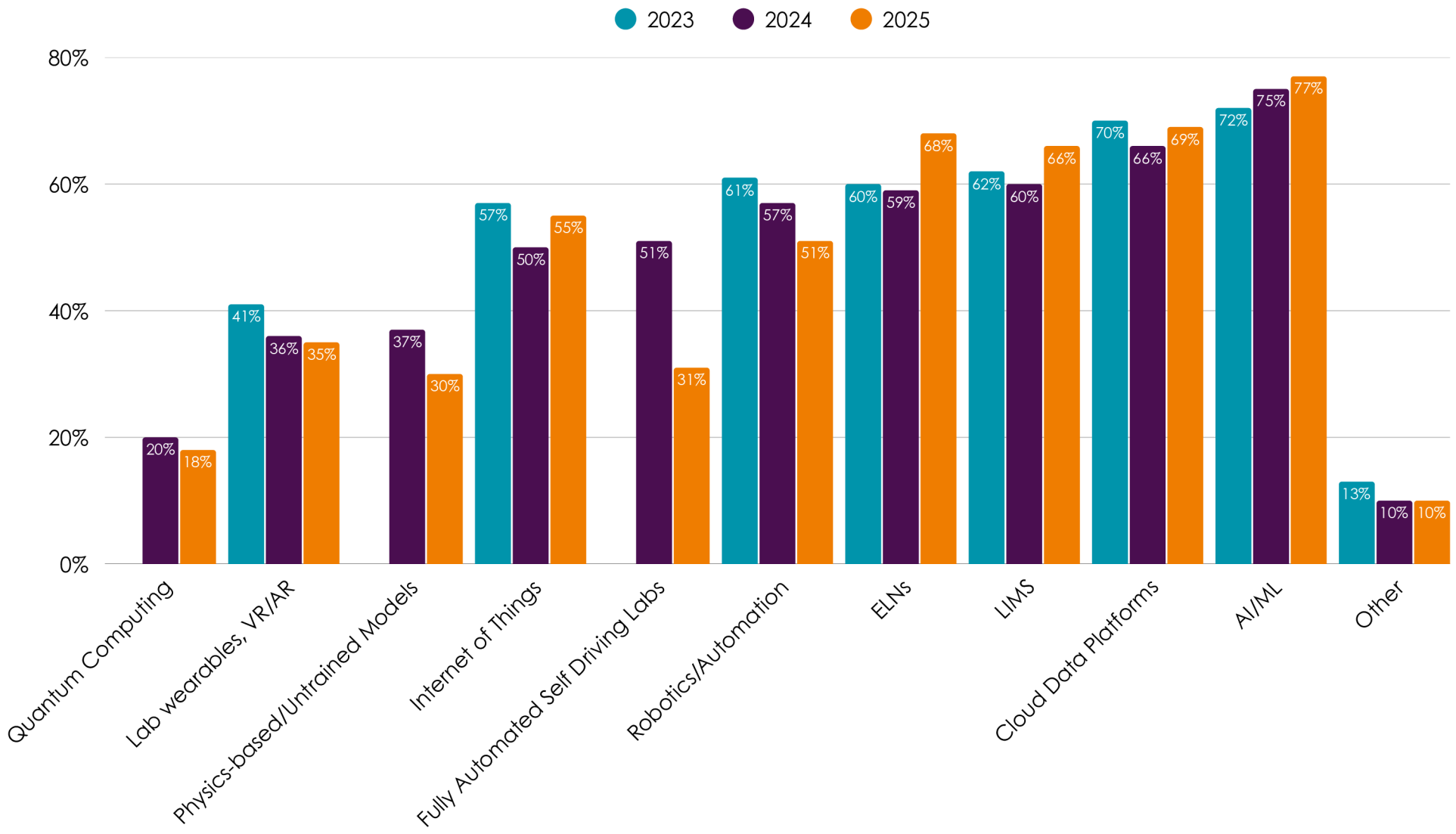
206 experts in pharma, biotech, software, services, academia and non-profits across Europe, the Americas and APAC responded to an online survey conducted from March-August 2025.

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.

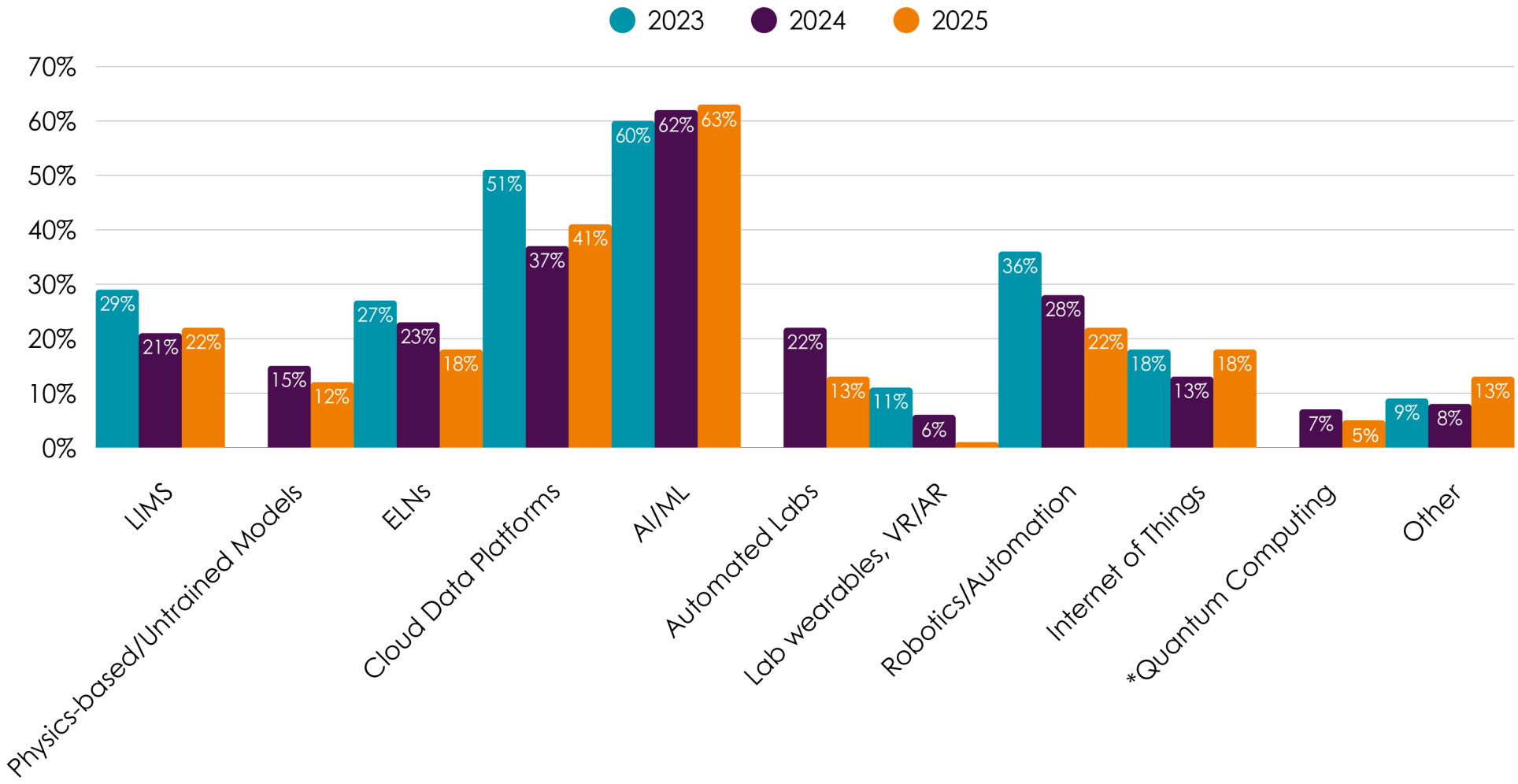
Which of the following technologies is/are your company currently using in the lab? (Tick all that apply)



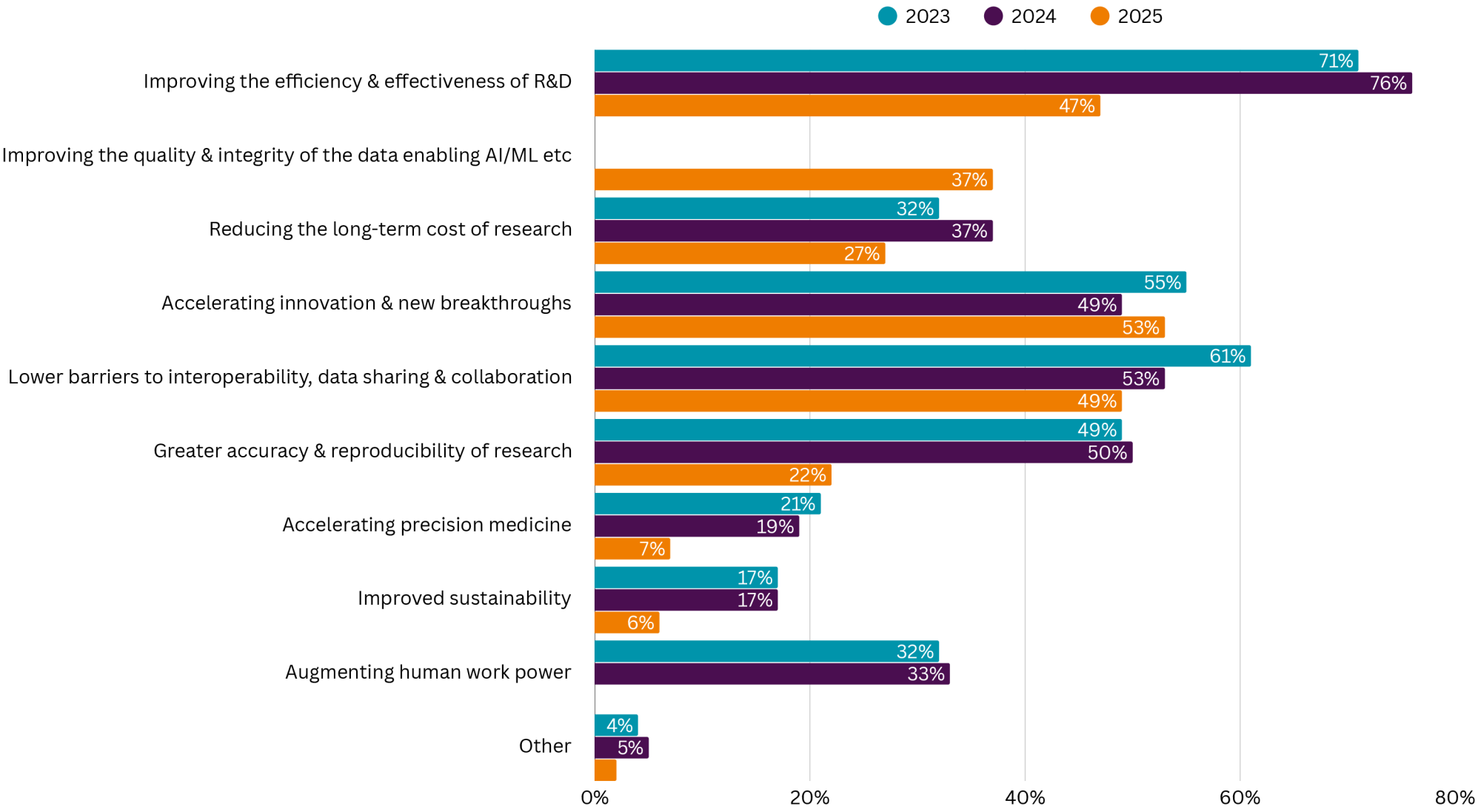
Which of the following technologies **do you expect** your company to be using in the lab in the next two years? (individual responses tick all that apply)



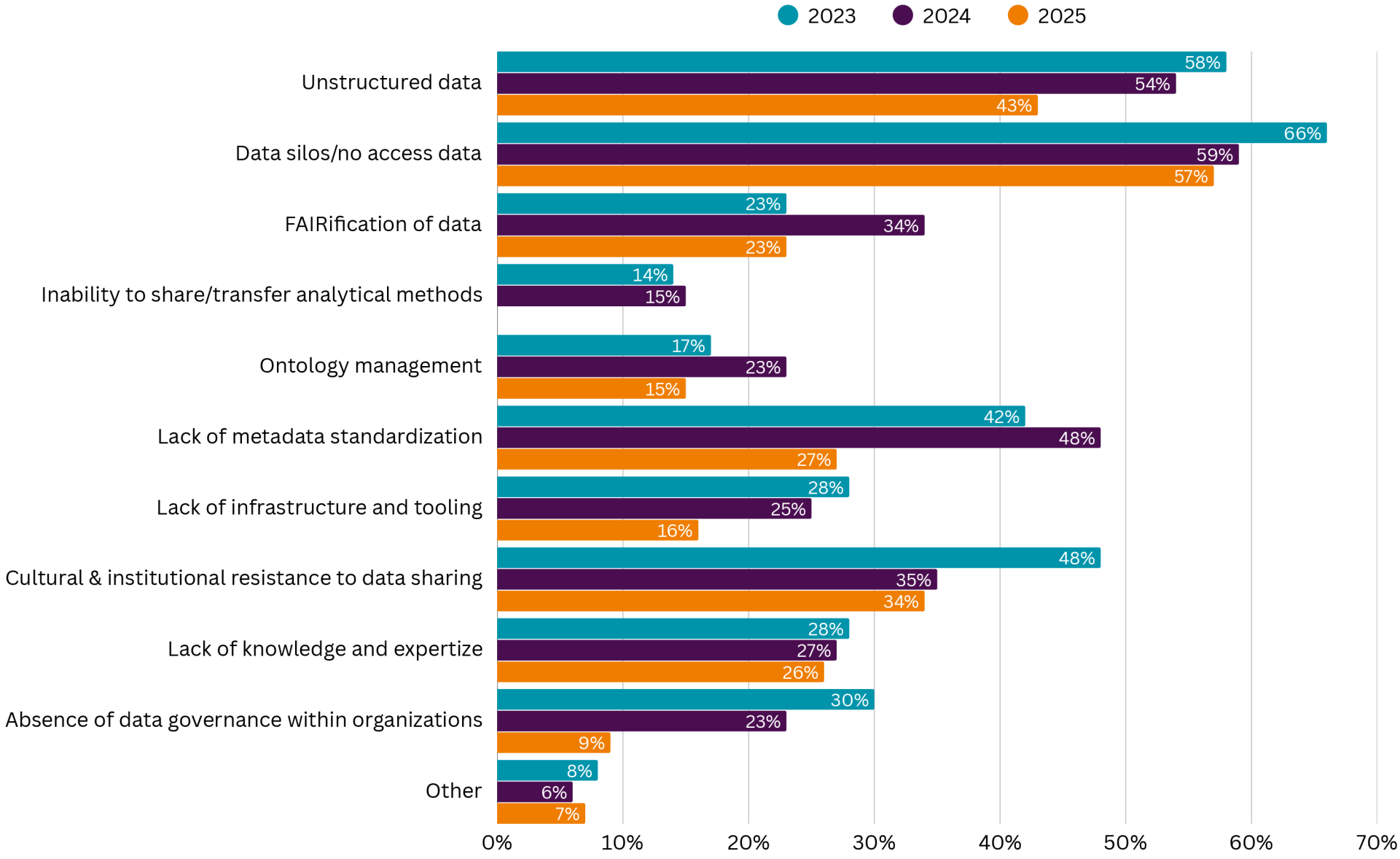
In which area(s) is your organization planning to make the most **investments** in the next two years? (Tick your top three)



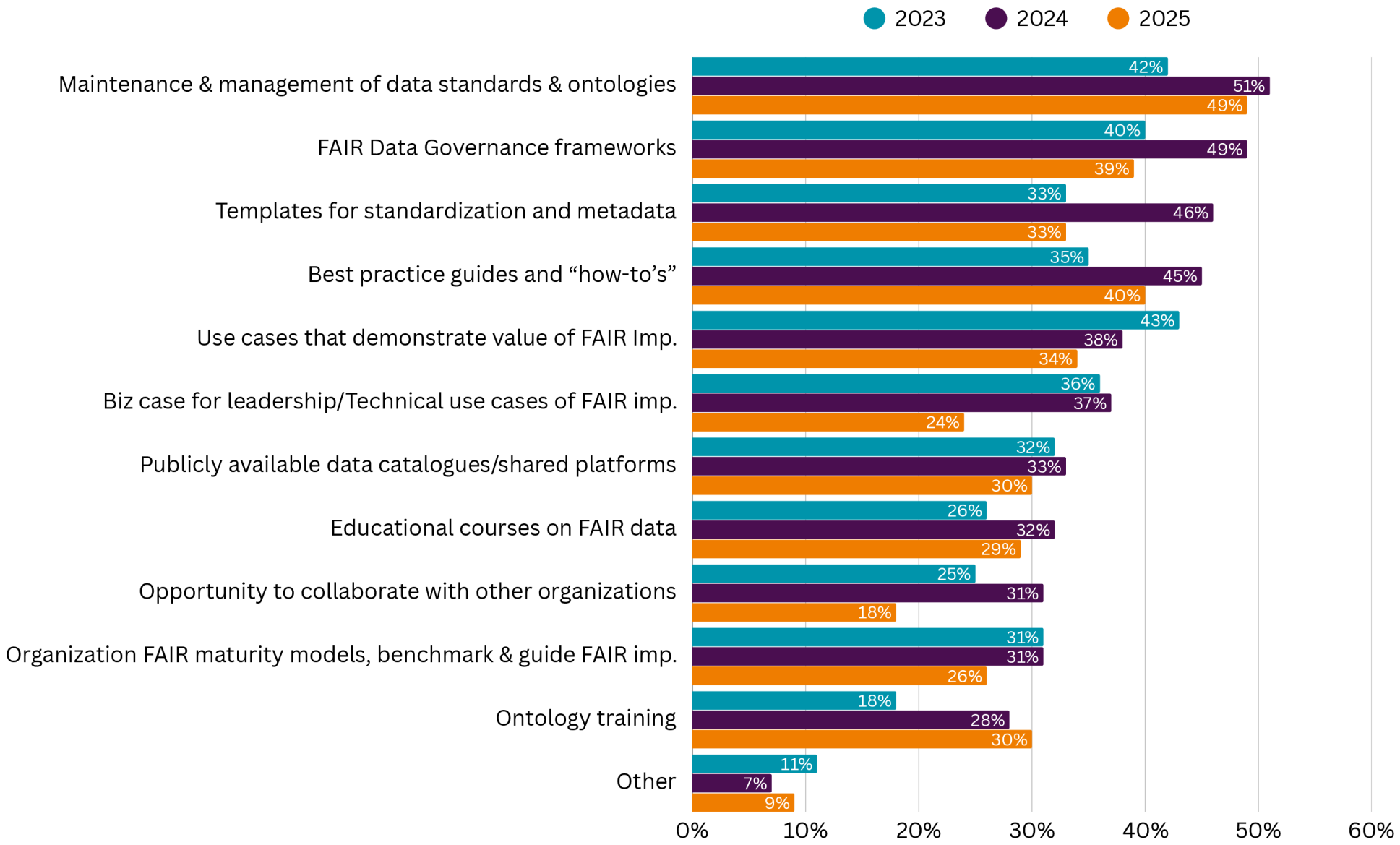
What do think are the biggest **benefits** of digitalizing and **automating** the lab? (Tick your top three)



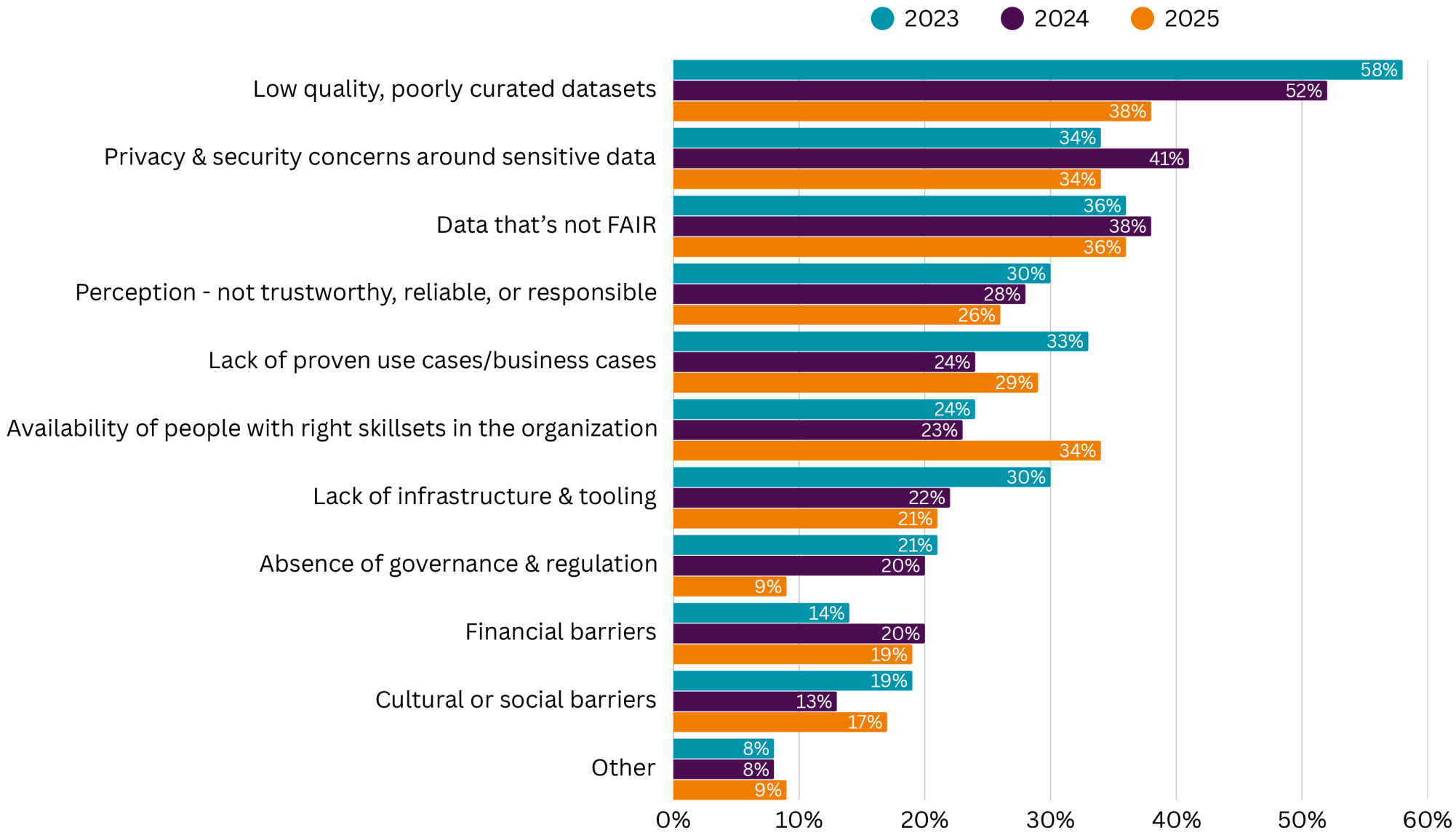
What are the **biggest barriers** to making the best use of lab data? (Select your top three)



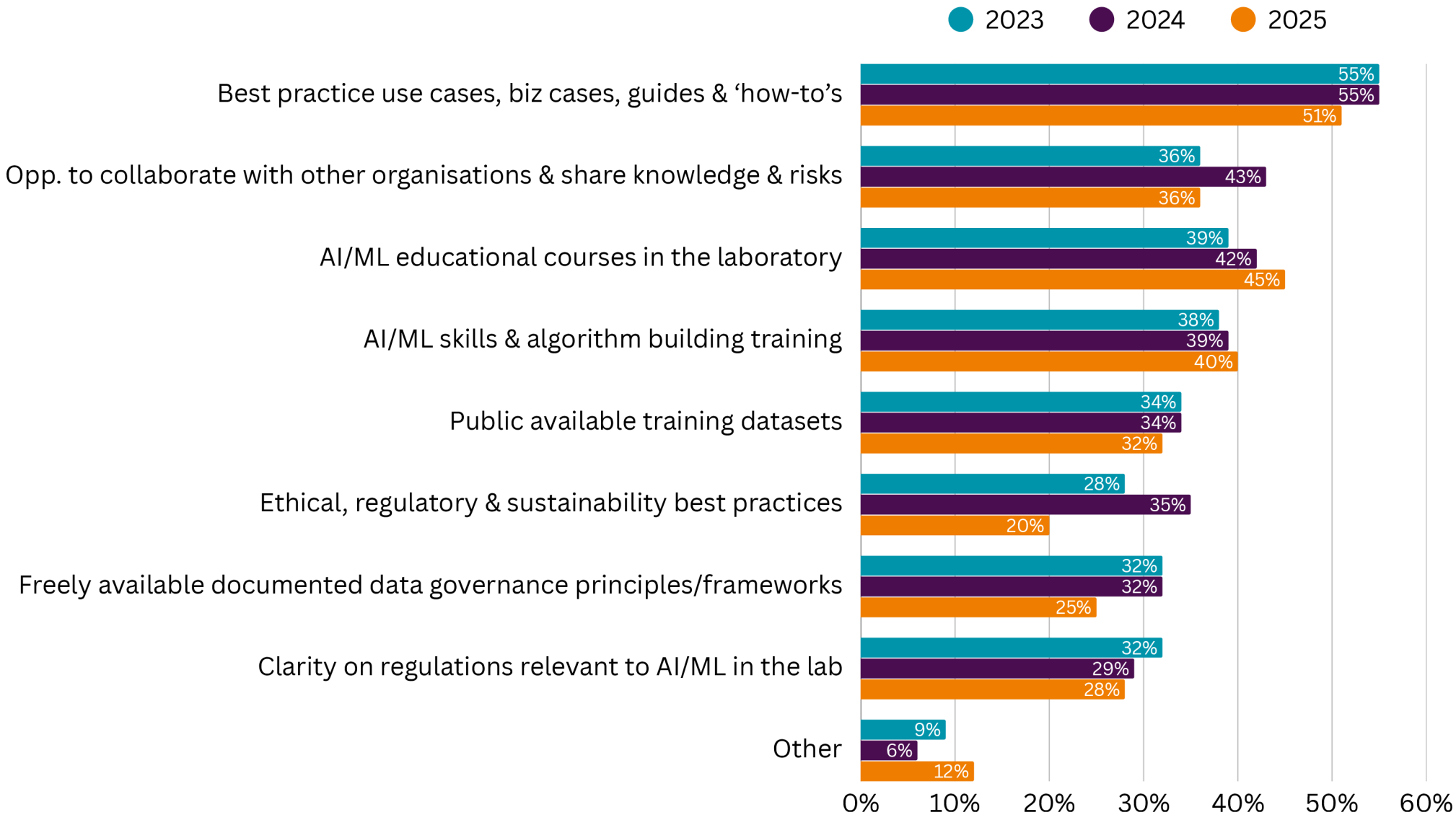
What help do you **need** to make data FAIR (findable, accessible, interoperable and reusable) at scale within your organization? (Tick all that apply)



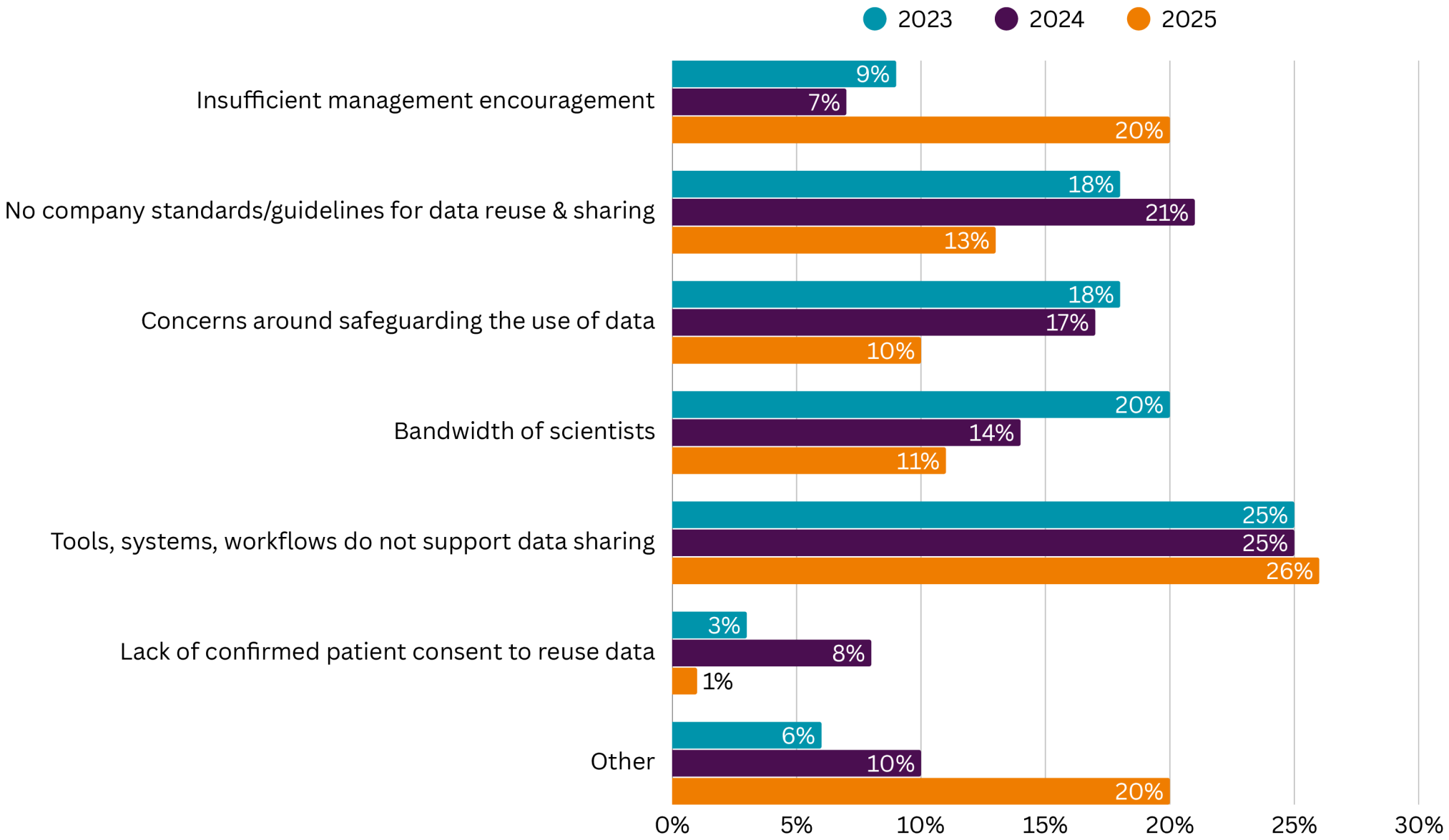
What are the biggest **barriers to implementing AI/ML** at scale within the laboratory environment? (Tick your top three)



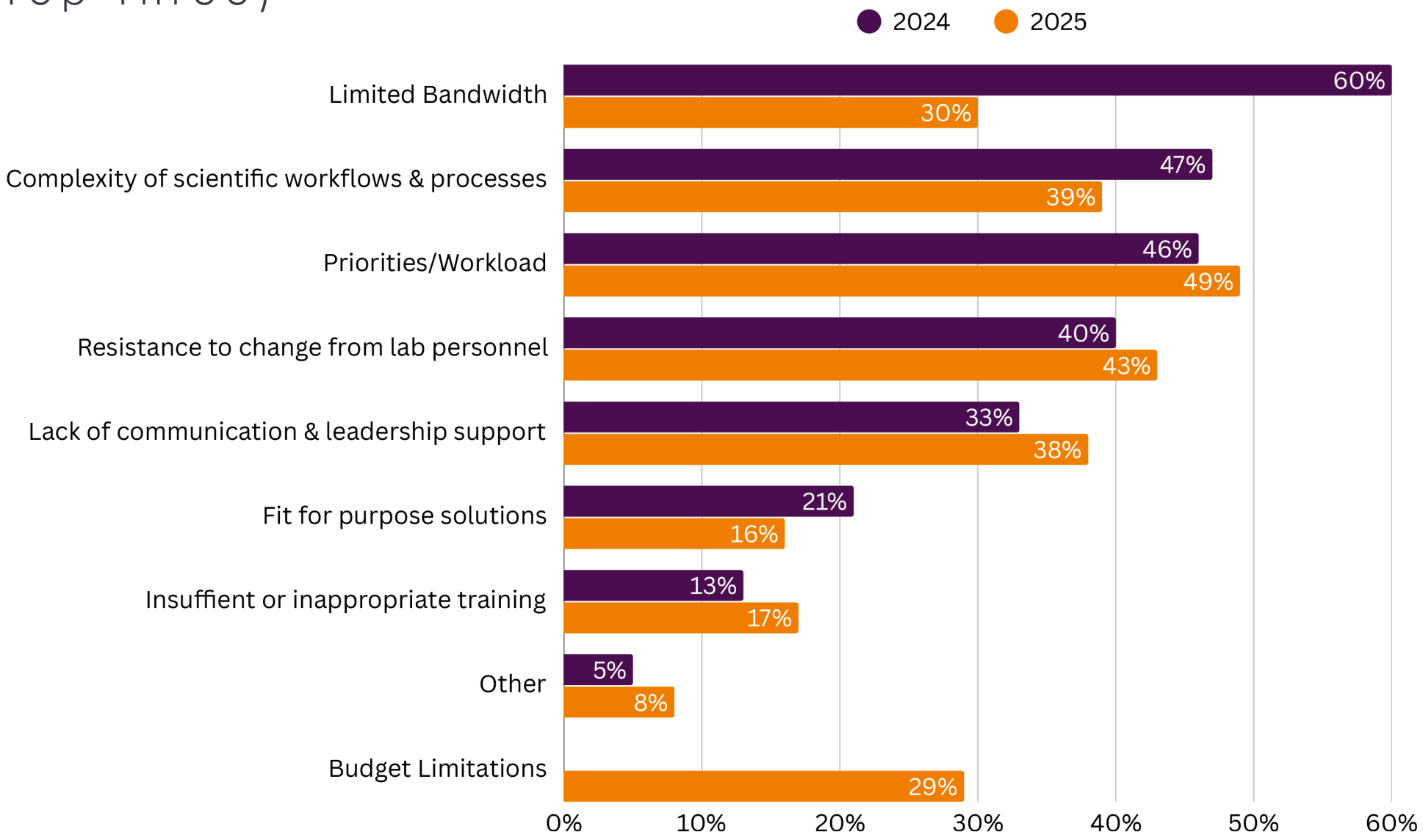
What support would you like to **help** you **integrate AI/ML** within the laboratory environment? (Tick all that apply)



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



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



PISTOIA ALLIANCE

In partnership with

Lab OF THE Future

For all partnership enquiries please contact
catherine.maskell@pistoiaalliance.org

For press enquiries please contact
tanya.randall@pistoiaalliance.org