Pistoia Alliance

LAB OF THE FUTURE

What will the Lab of The Future look like?

2023 Global Survey

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 a survey in partnership with Open Pharma Research organizers of Lab of the Future Congress, the expert conference series. The aim of the survey was to examine lab technology investment, barriers, and benefits.

Over 200 respondents spanning Europe, the Americas and APAC, contributed to the survey, including lab professionals and R&D experts from top pharma companies, medium enterprises, and life science start-ups.

The survey revealed that Artificial Intelligence (AI) and Machine Learning (ML) will be the top technology investment for life sciences companies (**60%**) over the next two years. While more than half of labs (**54%**) are already using AI/ML, respondents see low quality and poorly curated datasets as the biggest barrier to implementing AI.

The survey highlights the need for greater collaboration and knowledge sharing to accelerate the safe adoption of AI technologies and to improve the modern lab with technologies such as Lab Wearables, VR, AR, robotics and IoT. While such technologies were once considered futuristic, their use is set to grow considerably over the next two years.

Executive Summary continued

Many opportunities were highlighted where Pistoia Alliance members would like to work together with peers to create the next-generation laboratory environment – particularly to drive better data standards, share knowledge, and develop use cases and best practice guides. These survey findings will ensure that the Pistoia Alliance and Lab of the Future continue to foster collaboration and knowledge sharing around pressing R&D challenges, as well as helping the Pistoia Alliance to build its portfolio of pre-competitive projects and communities so that organizations large and small can work together to develop common solutions to shared challenges and opportunities.

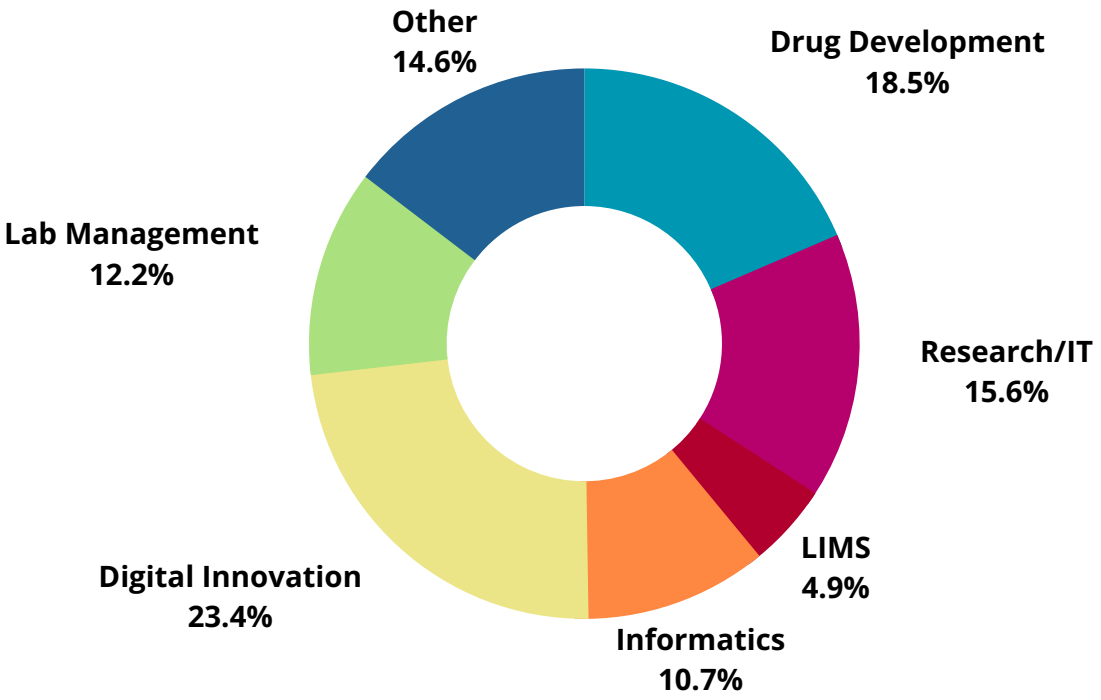
Survey Methodology

The Pistoia Alliance and Open Pharma Research conducted an online survey from June-August 2023 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.

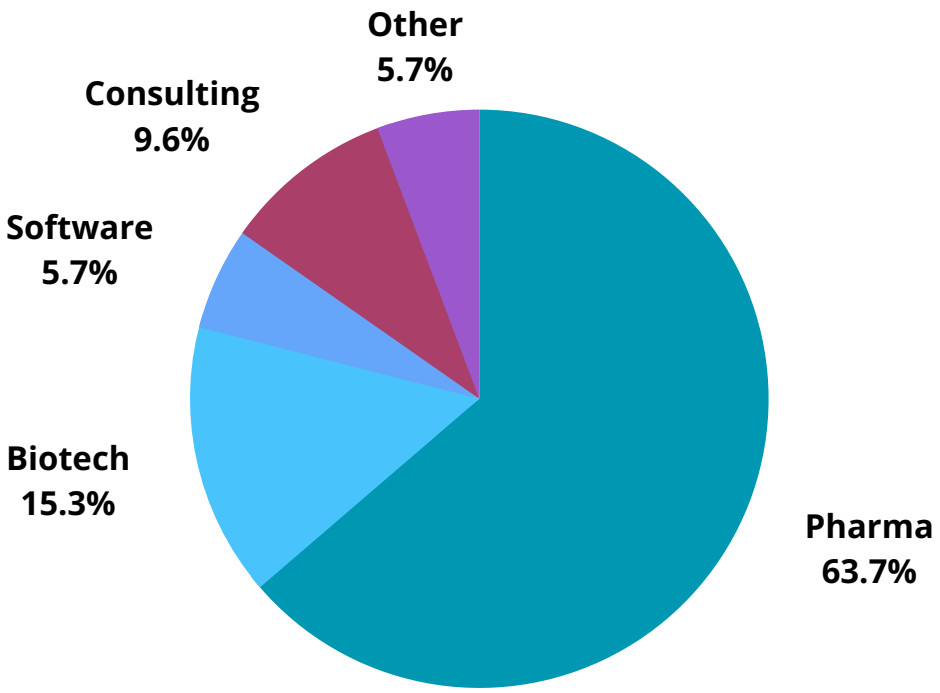
The 201 survey respondents represented a wide range of responsibilities from R&D directors and lab managers to digital innovation, informatics and lab automation experts with experience across virtually every lab environment. Pharma, biotech, and software and service companies, as well as academia and not-for-profit organizations all contributed to the survey.

Survey demographics

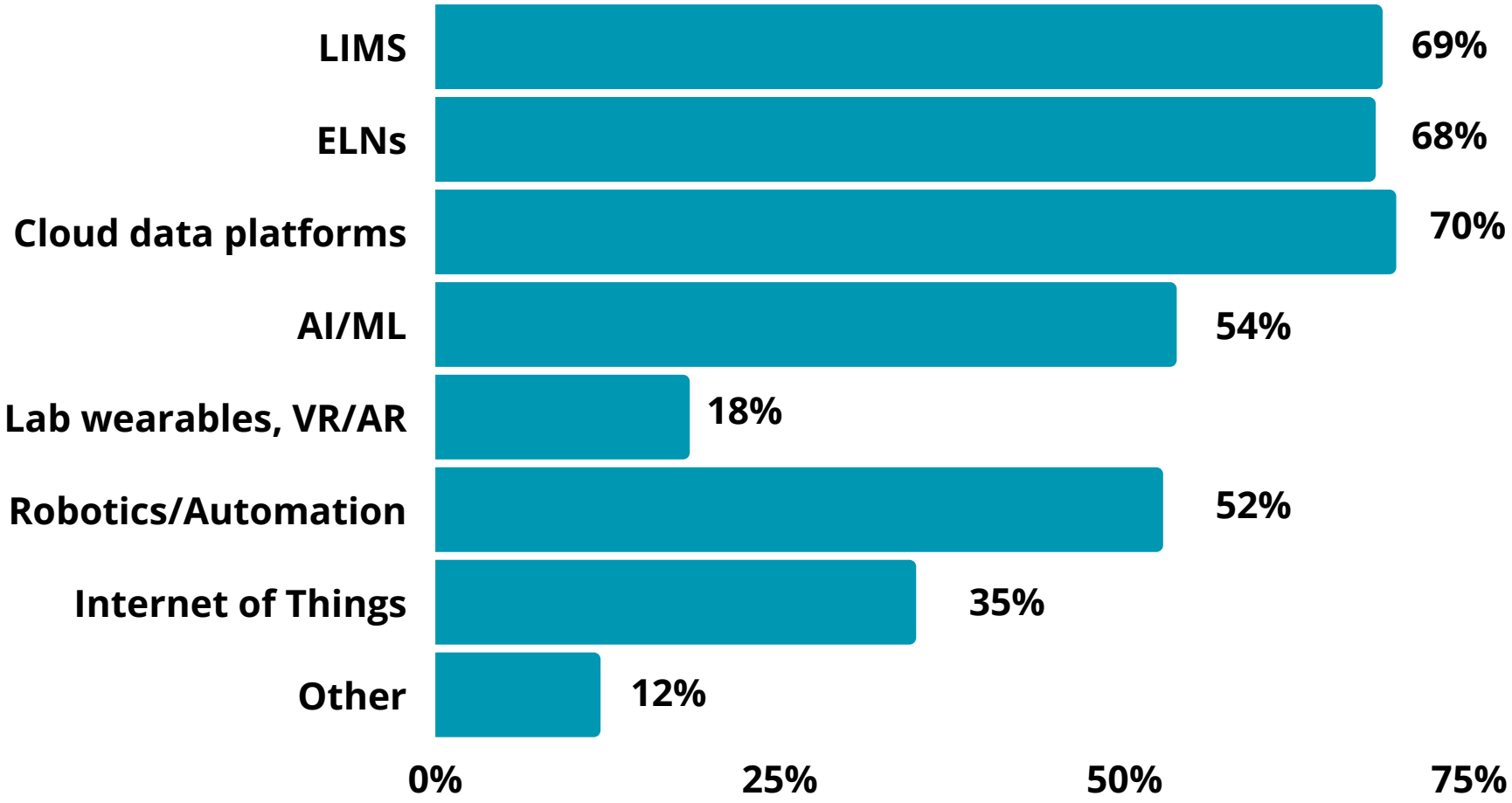
Job Role



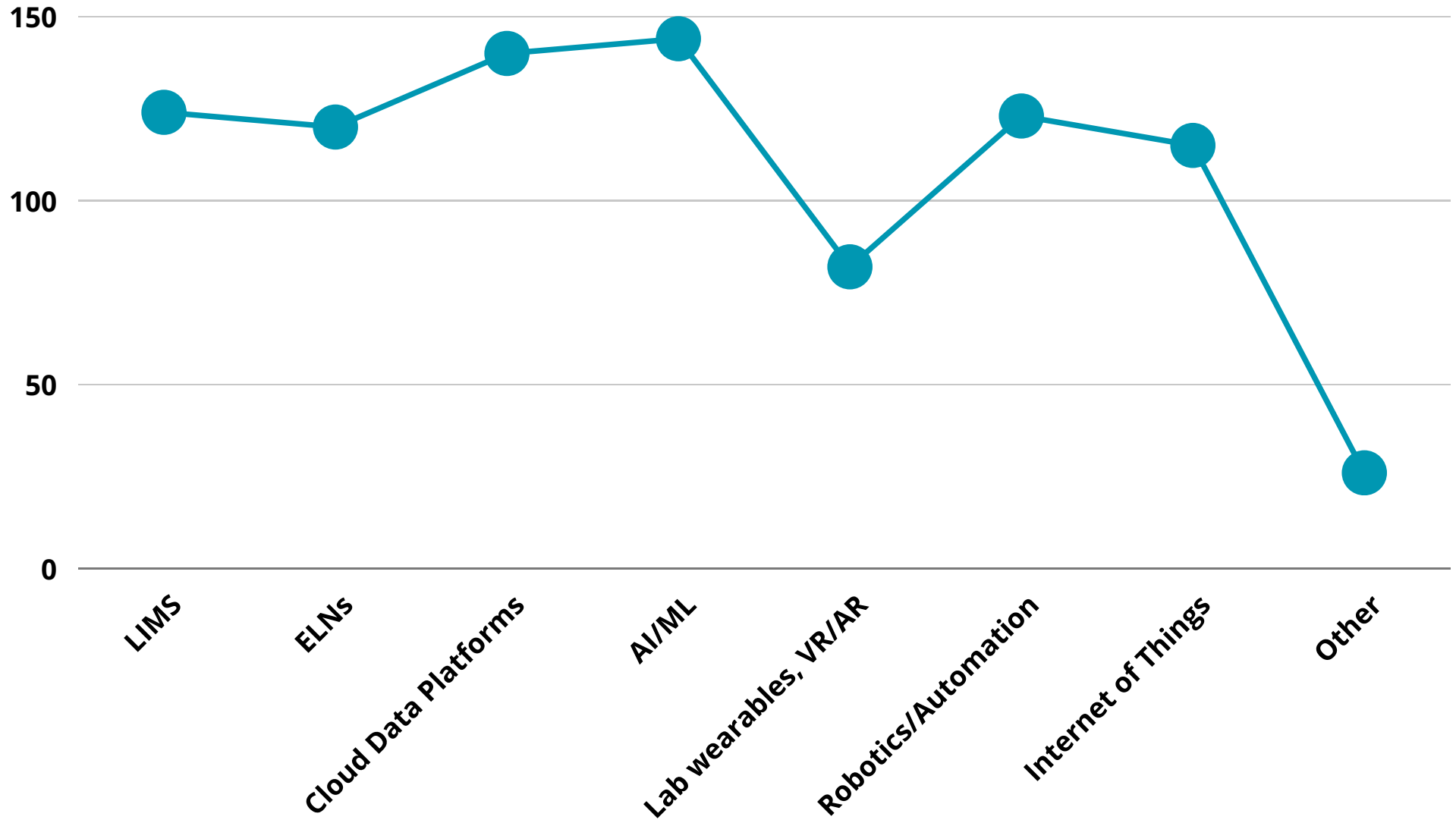
Industry



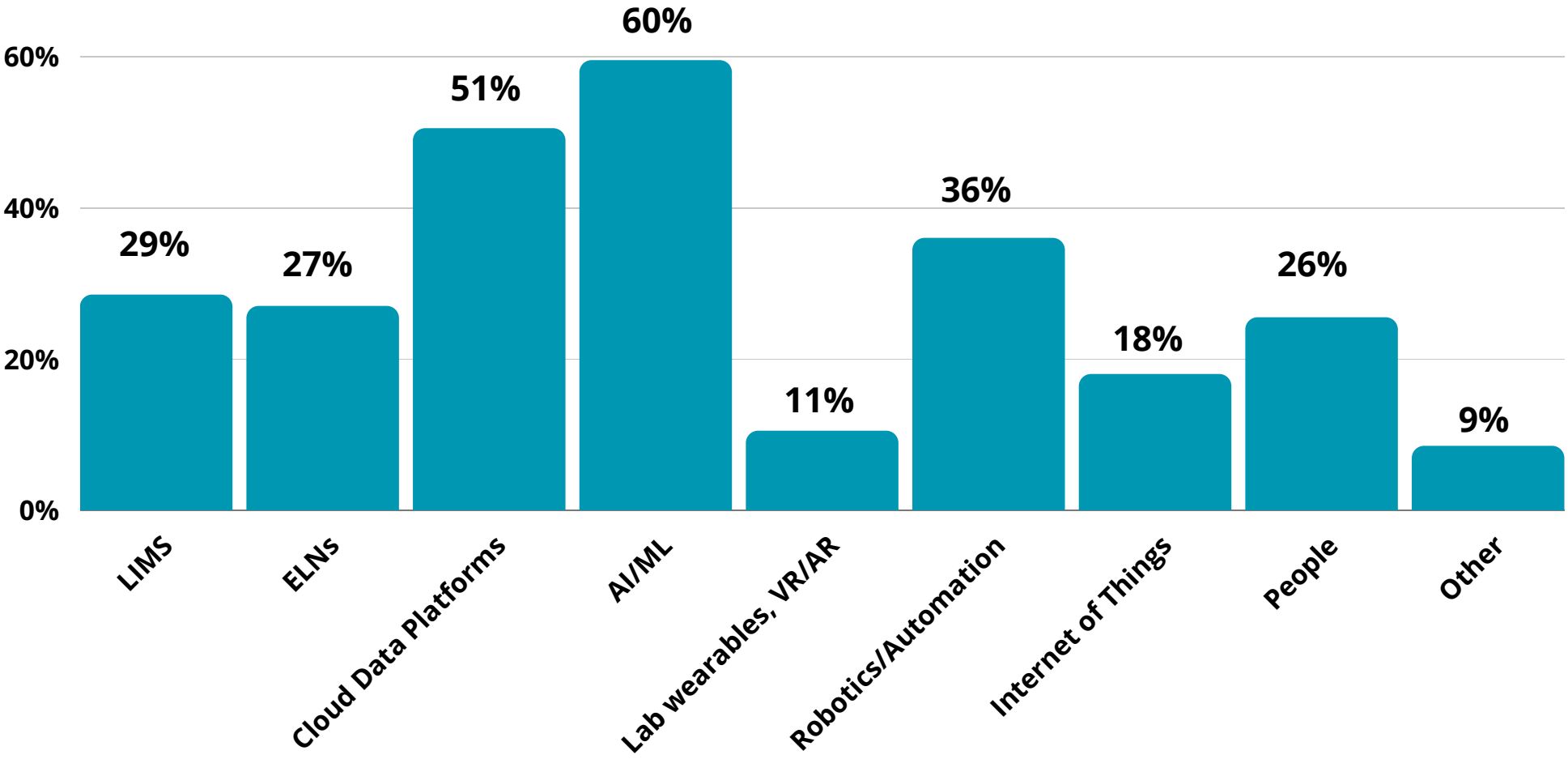
Which of the following technologies are you currently using in the lab? (Tick all that apply)



Which of the following technologies DO YOU EXPECT to be using in the lab in the next two years (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)



Survey insights

- Artificial Intelligence (AI) and Machine Learning (ML) will be the top technology investment for life sciences companies over the next two years (**60%**) with more than half (**54%**) of labs already using AL/ML.

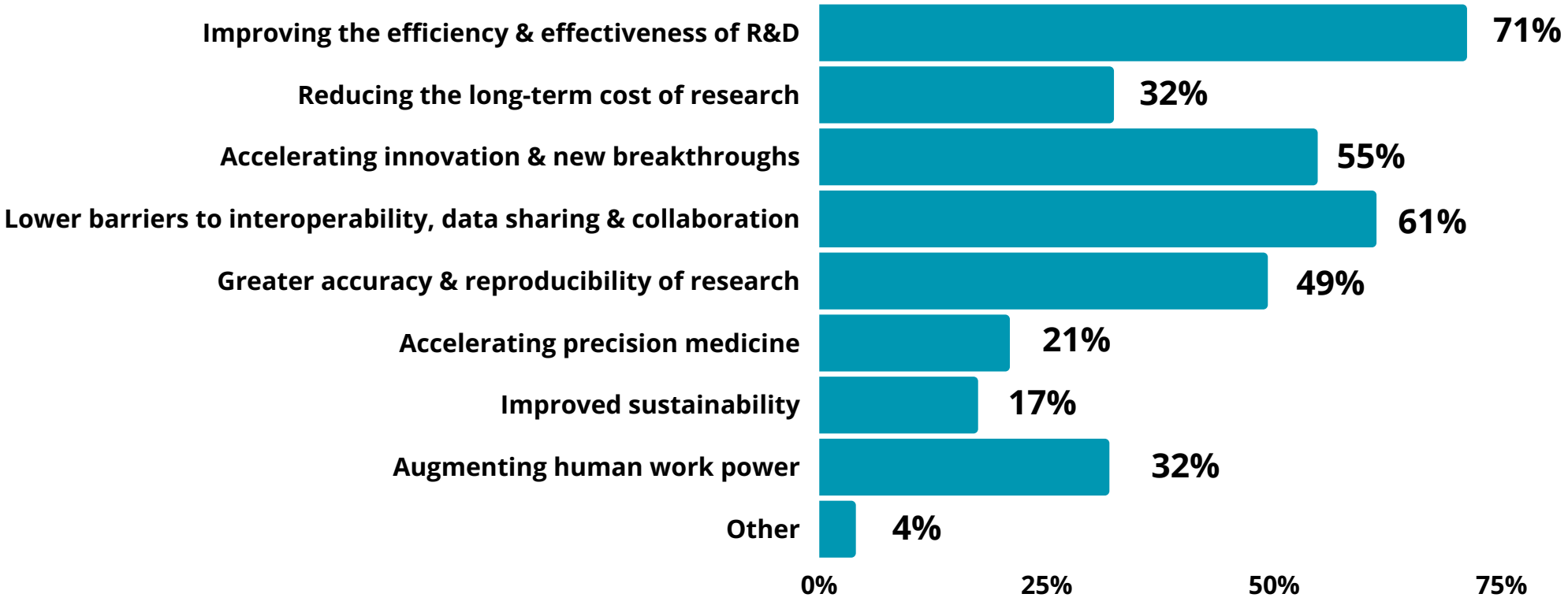
- Cloud computing platforms are the next top investment priority **(51%)** with **70%** of organisations already using these essential platforms for the modern lab.

- The use of robotics is on the rise. Over half of respondents (**53%**) are currently using robotics/automation technologies and over a third (**36%**) said their organization plans to make it a top investment focus.

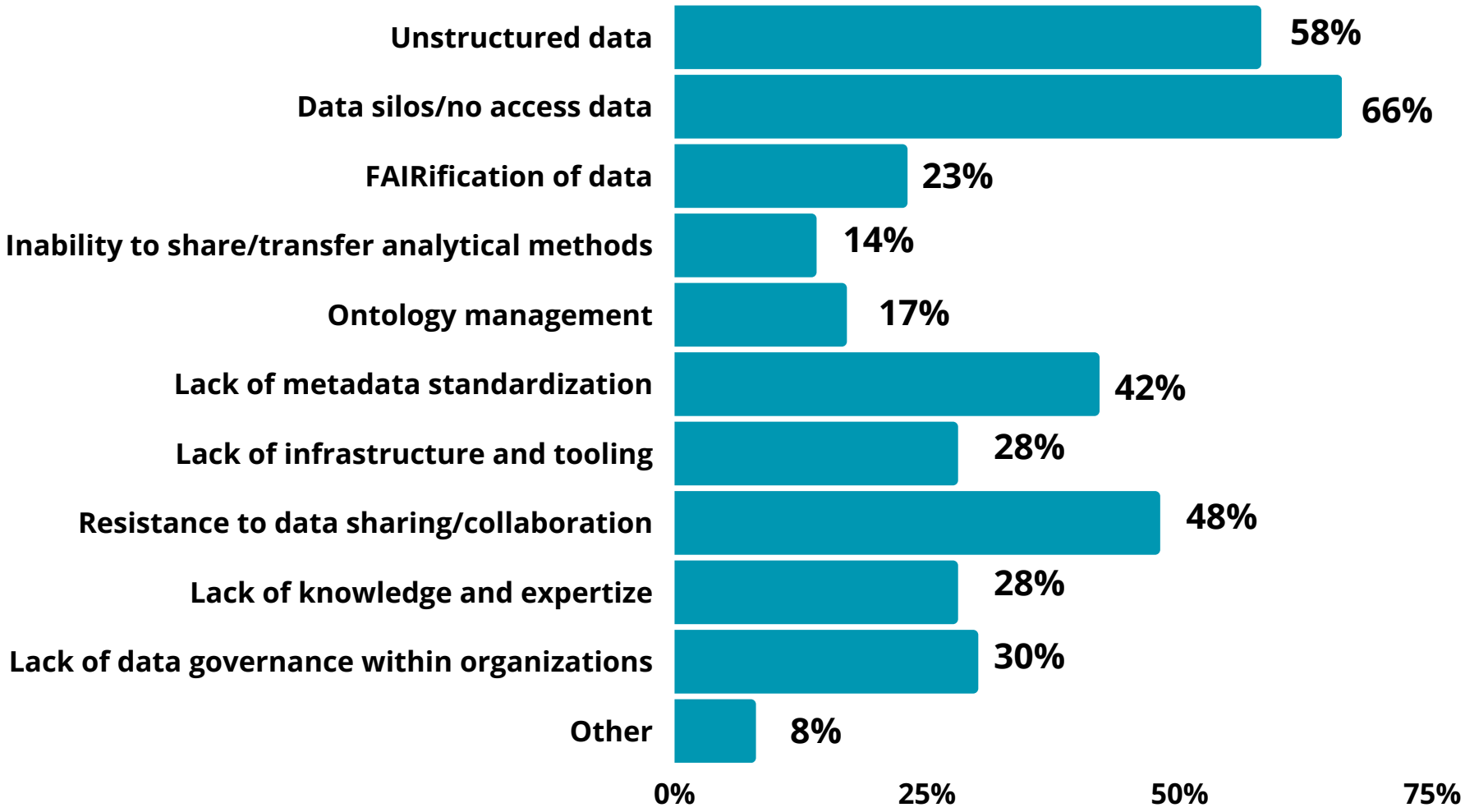
- IoT is no longer nascent in the lab environment with **57%** of organizations expecting to be using IoT in the next two years.

- Wearables, virtual reality, and augmented reality technologies often used to create immersive experiences are all set to be a key feature of the lab of the future. **41%** of respondents expect to be using such equipment in the next two years, although investment in lab wearables and VR/AR is not seen as a top priority.

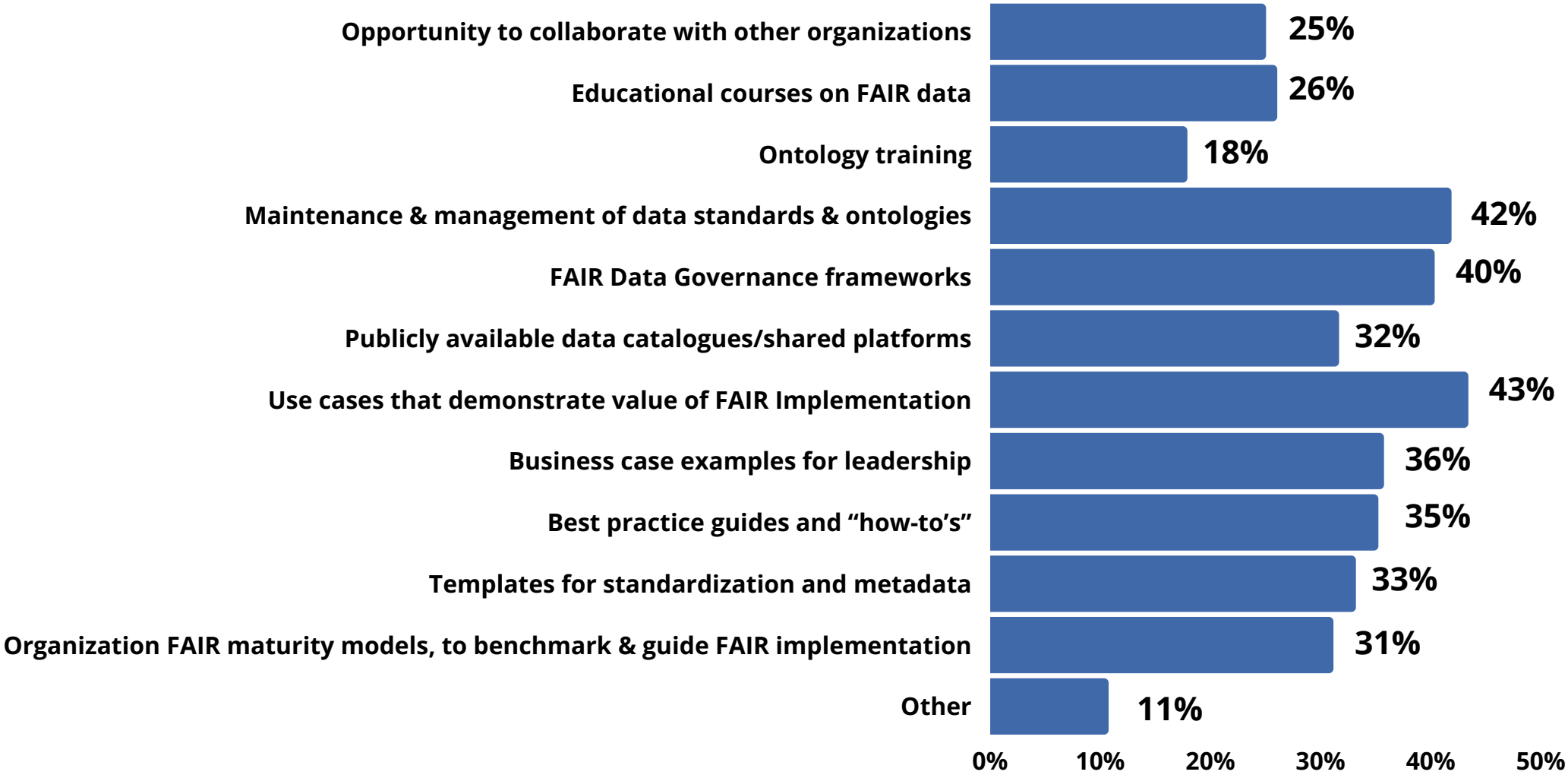
What do think are the biggest benefits of digitalizing and automating the lab? (Tick your top three)



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)



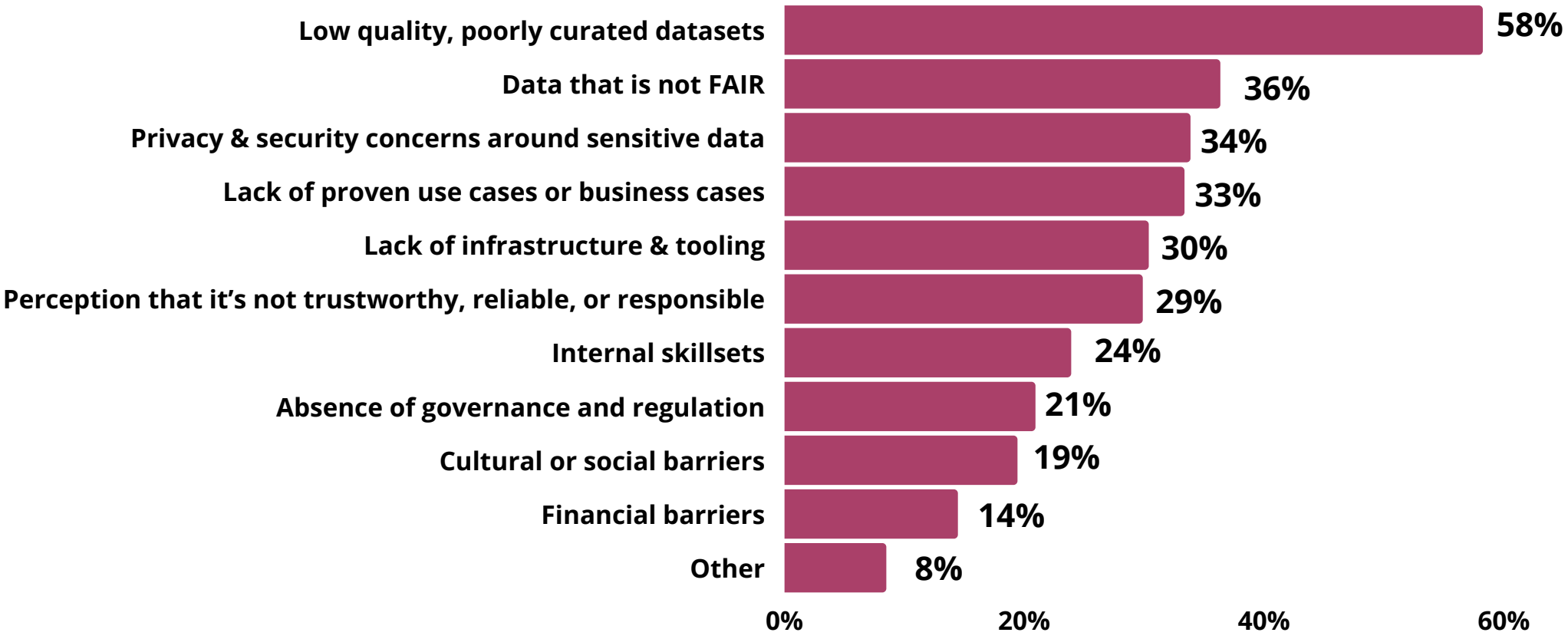
Survey insights

- Improving the efficiency and effectiveness of R&D is seen as the top benefit of digitalising and automating the lab (**71%**), followed by lowering the barriers to interoperability, data sharing and collaboration (**61%**) and accelerating innovation and new breakthroughs (**55%**).

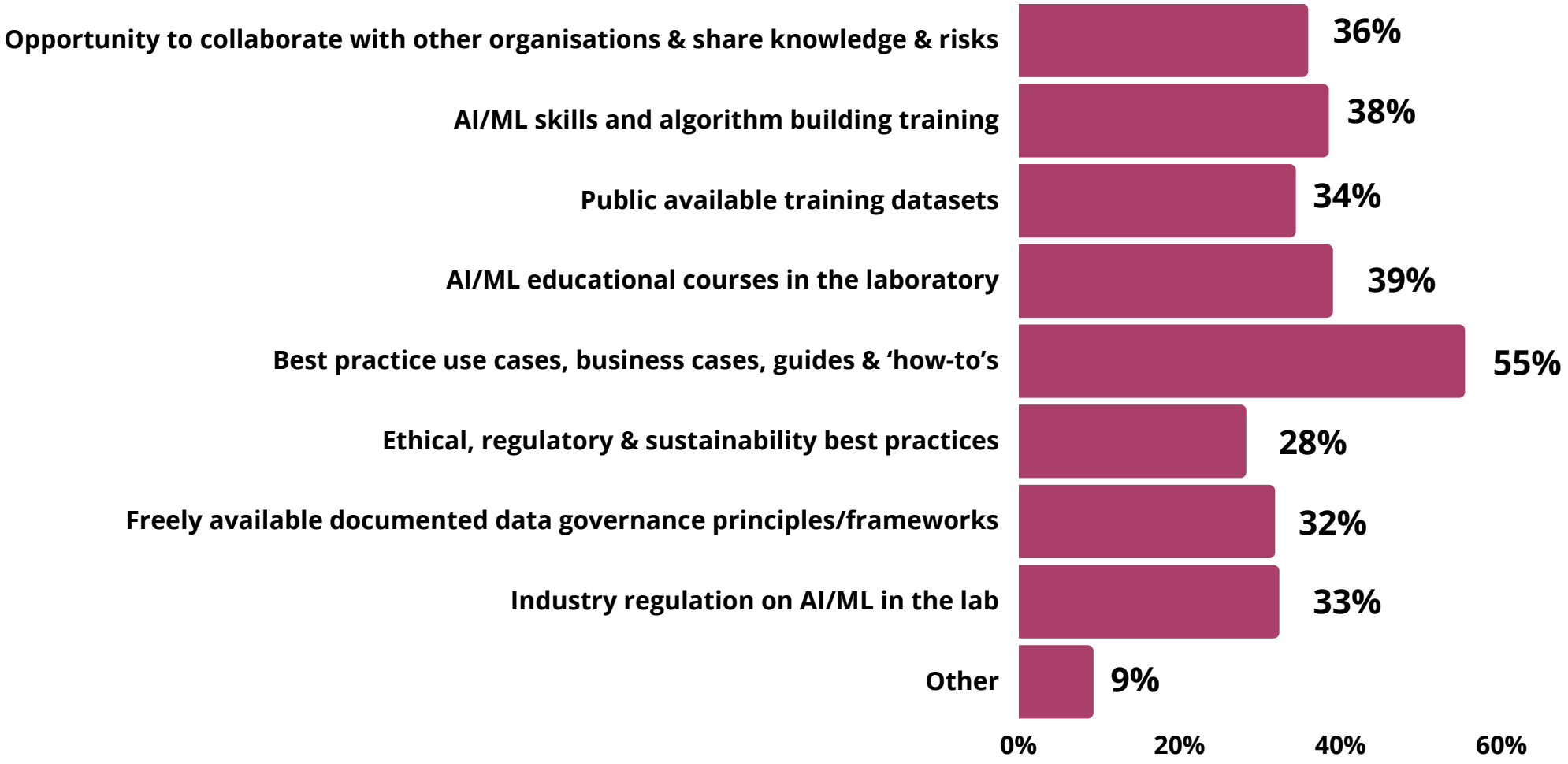
- Data silos (**66%**) and unstructured data (**58%**) along with cultural barriers and institutional resistance to data sharing and collaboration (**48%**) are holding organizations back in making the best use of their experimental data.

- Organizations are looking for help in making data FAIR (Findable, Accessible, Interoperable and Reusable) – in particular they want use cases that demonstrate the value of FAIR implementation (**43%**), support with maintenance and management of data standards and ontologies (**42%**), and FAIR Data Governance frameworks (**40%**).

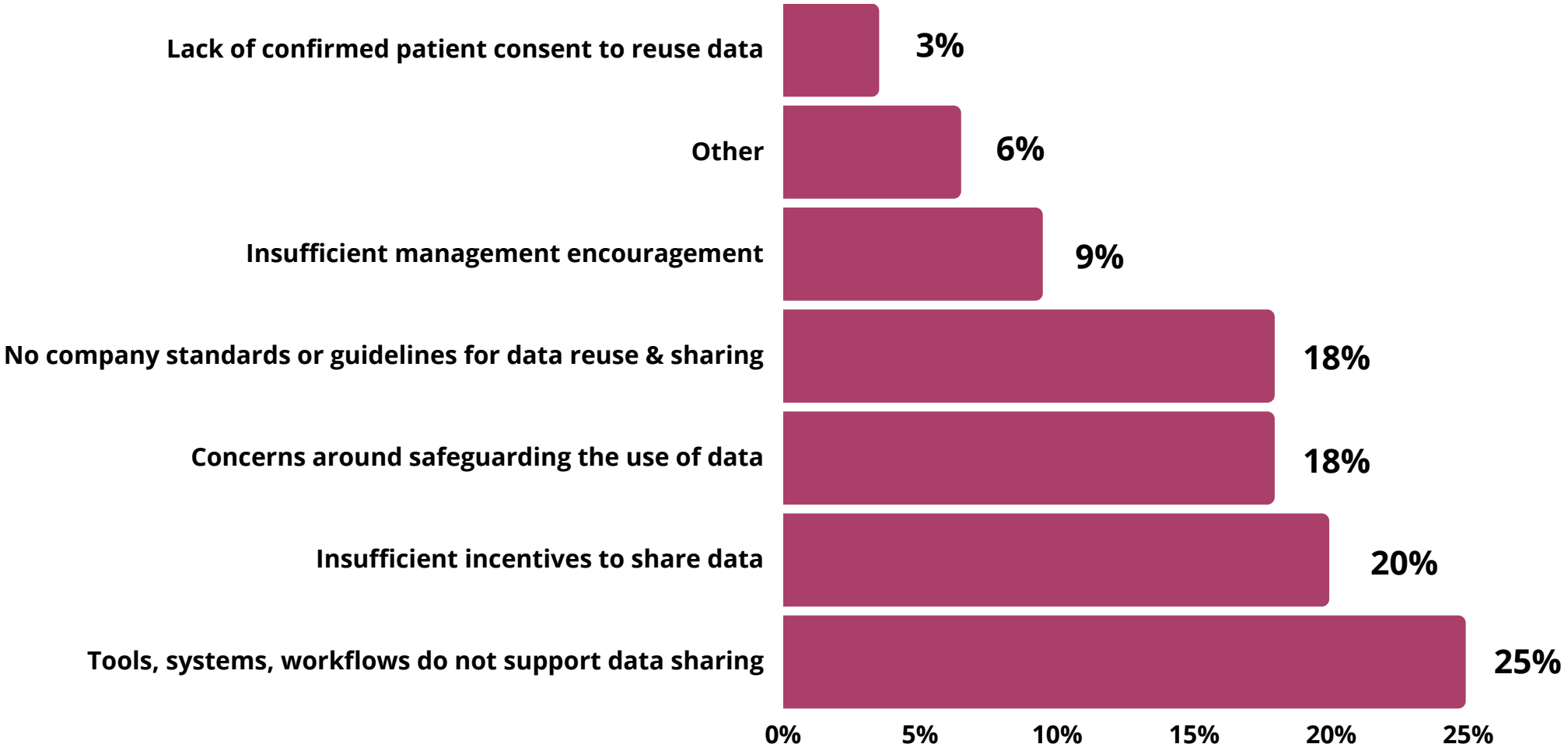
What are the biggest barriers to implementing AI/ML at scale within the laboratory environment? (Tick your top three)



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

- The survey reveals a need for greater collaboration and knowledge sharing to accelerate safe adoption of AI technologies.

- Low quality and poorly curated datasets are the number one barrier (**58%**) to implementing AI, followed by data that does not adhere to the FAIR principles (Findable, Accessible, Interoperable, Reusable) (**36%**).

- Privacy and security concerns around data were also raised as a challenge by **34%** of respondents, as well as the perception that AI is not trustworthy, reliable, or responsible (**30%**).

- More than half (**55%**) of respondents said that best practices, business use cases, and 'how-to-guides' would help them integrate AI/ML in the lab; **39%** would like more educational courses and **36%** said they would like the opportunity to collaborate with other organizations to share AI knowledge and risks.

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

Find out more about Pistoia Alliance membership including education and networking opportunities and participate in our collaborative projects and communities including:

- AI/ML Community of Experts
- Lab of the Future Community of Experts
- IDMP Ontology project
- Methods Hub project
- FAIR Implementation project

Attend the Lab of the Future annual conferences, supported by the Pistoia Alliance:

- Lab of the Future Europe, September 26-27, 2023
- Lab of the Future USA, March 11-12, 2023

About Pistoia Alliance

- The Pistoia Alliance is a global, not-for-profit alliance that advocates for greater collaboration in life sciences R&D. Our mission is to lower the barriers to innovation through pre-competitive collaboration. We bring together stakeholders from industry, academia, and government. Our members work together on projects and in our specialist, communities using our proven framework for open innovation to transform R&D and generate better outcomes for all.

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.

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Thank you