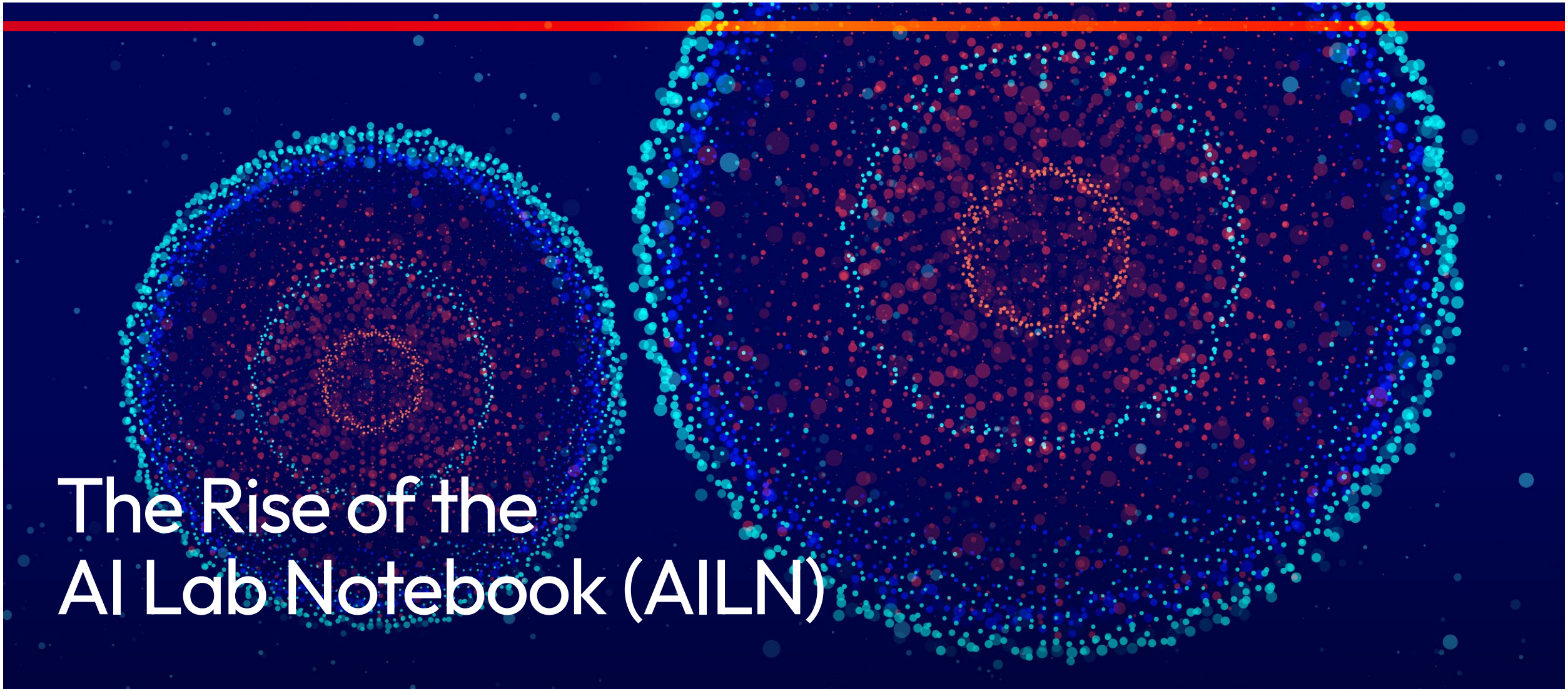
sapio sciences



The Rise of the AI Lab Notebook (AILN)

Science has outgrown second-generation ELNs

The survey highlights several ways today's ELNs are falling short

Dependency on experts

Only 7%

of scientists say they are self-sufficient at configuring assays, templates, and data types in their ELN, while **just 5%** can analyze experimental data without support.

Usability issues

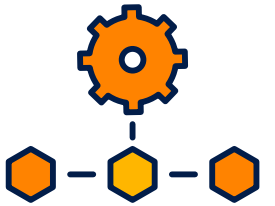
56%

of scientists say their ELN is too complex and slows them down.

Manual data movement

51%

spend too much time importing and exporting data.



Configuration difficulties

71%

of scientists say ELNs are hard to configure or adapt.

From passive documenting to active science

The rise of the AI lab notebook (AILN)

We digitized the lab, but we did not make it intelligent. ELNs solved the paper problem, yet many scientists still turn to manual processes or public AI tools to interpret results and decide what to do next. This flipbook shares what **150 lab professionals say about passive ELNs, shadow AI and the shift to an AI lab notebook** that functions more like a research partner than a filing cabinet.

A view from the bench

We spoke to **150 life sciences professionals** who run experiments and work inside ELNs across biopharma R&D, manufacturing, diagnostics and CROs. Every respondent works in a lab-based organization and personally uses an ELN, so their feedback reflects real workflows, not abstract theory.

Key stats

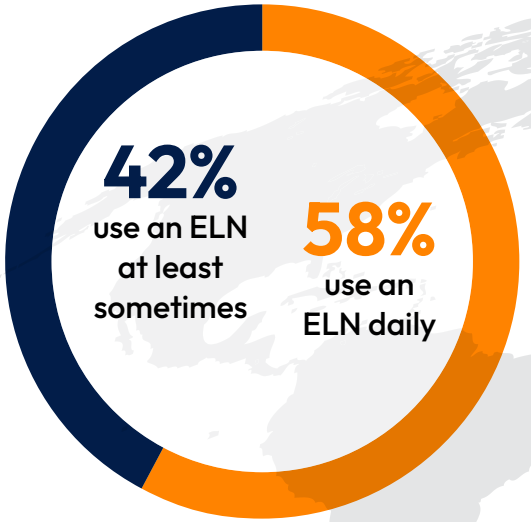
150 lab professionals

100% personally conduct lab work

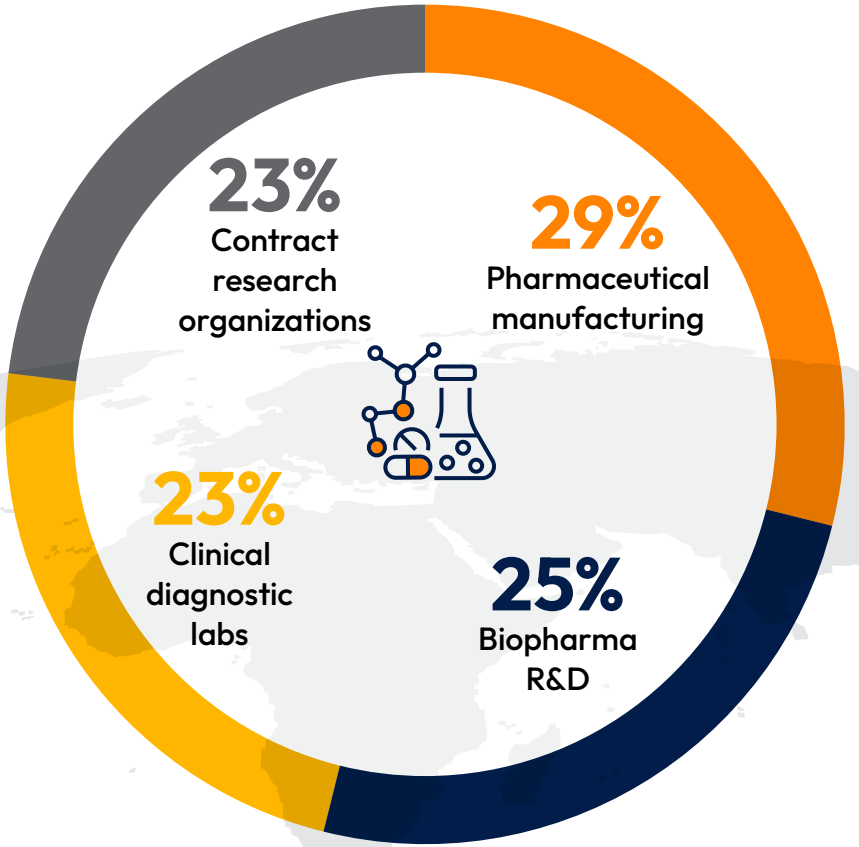
100% personally use an ELN

50% USA; **50%** Europe

ELN usage



Sector mix



Key findings and the lab maturity scale

- ELNs are valued as infrastructure but often behave like digital filing cabinets, with 81% saying their ELN helps record data, not interpret it.
- Scientists still repeat experiments because they cannot find or reuse previous results, with 65% saying they rerun work for this reason.
- Shadow AI is widespread, with 97% using some form of AI for lab work and 77% using public generative AI tools.
- Public generative AI is helpful but general purpose and not tuned to lab work, as only 27% say it meets their scientific needs very well.
- Scientists want the ELN to become an intelligent research partner, with 99% agreeing it should support hypothesis generation and experimental design.
- Trust, transparency and governance will decide which AI powered ELNs get adopted, with 81% saying they would only trust AI suggestions if they can review the underlying science and evidence.

Where labs sit today

From passive ELN to active AI lab notebook

The maturity scale describes how AI and ELNs are used in labs today. At one end sit passive labs, where the ELN records work but rarely influences it. In the middle are shadow labs, where public AI tools sit alongside the ELN but outside governance and assurances of accuracy or precision. At the leading edge are active labs, where an AI lab notebook starts to connect instruments, plans, designs, and analyzes experiments as a governed research partner and co-scientist.

Lab maturity scale

Passive lab

ELN is efficient for record keeping, but scientists repeat work and rely on specialists to configure templates and interpret results.

STAGE 1

Shadow lab

ELN stays passive, so scientists bring in public generative AI through personal accounts to help with interpretation and planning. Insight improves, governance weakens.

STAGE 2

Active lab

In an active lab, an AI lab notebook acts as a co-scientist. It helps interpret results and surface patterns and also helps drive workflow, turning designs into executable work in the lab and closing the loop between design, act and analyze within compliant processes.

STAGE 3

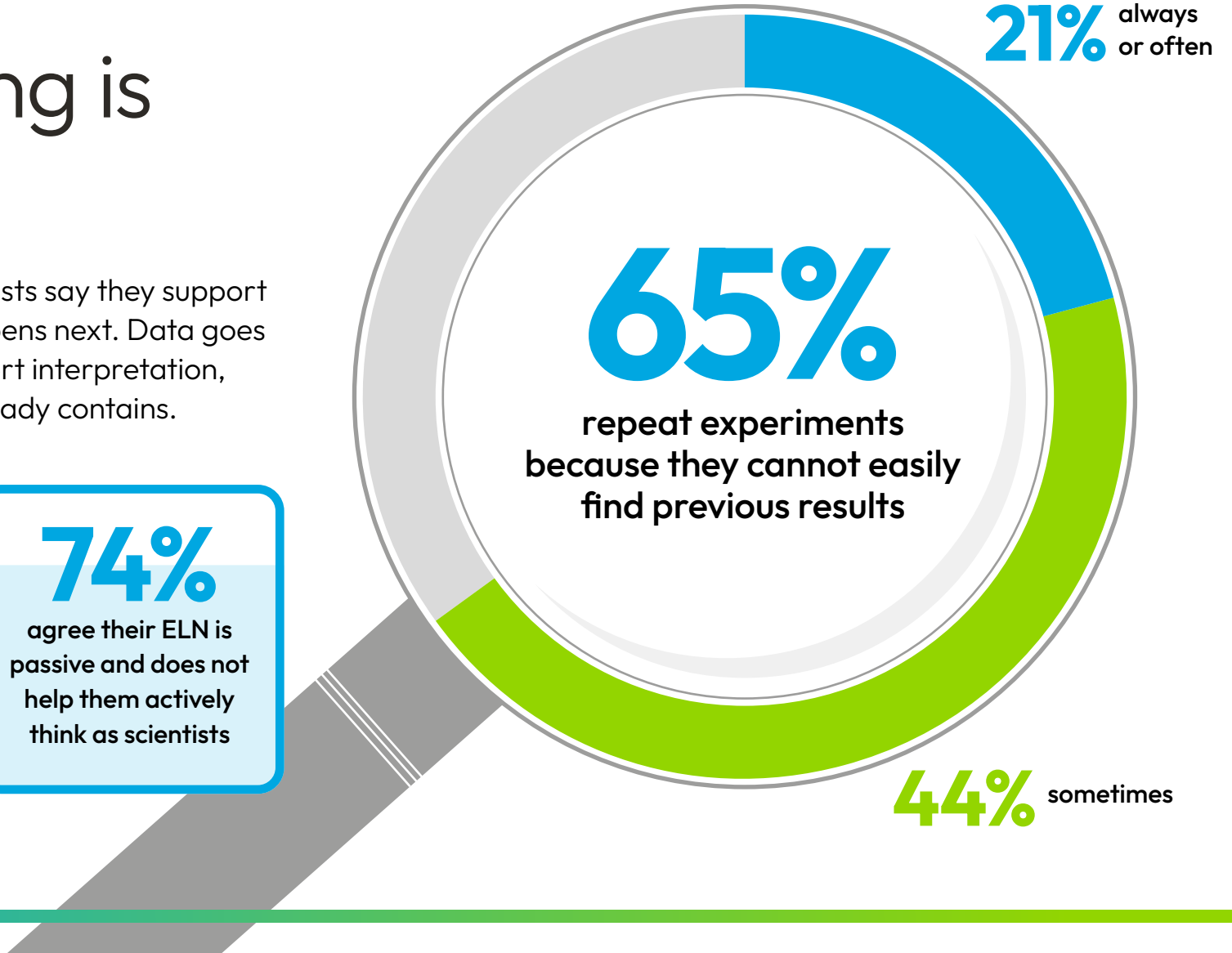
When documenting is not enough

ELNs have largely replaced paper, and most scientists say they support efficient documentation. The problem is what happens next. Data goes in but often does not come back in ways that support interpretation, design or reuse, so teams repeat work the ELN already contains.

62%
say their current ELN allows them to work efficiently

81%
agree their ELN helps record data, but not interpret it

74%
agree their ELN is passive and does not help them actively think as scientists



Sapio's take

Traditional ELNs focus on recording experimental outputs. The AI Lab Notebook supports scientific workflows, including hypothesis generation, experimental planning, and analytical reasoning.

Is your science stuck in someone else's workflow?

In many labs, scientists are still waiting on IT tickets before they can run or adjust standard assays, calling on analysts for data insights and acting as human middleware, manually moving files between disconnected systems and tools. The result is growing queues in IT and data teams and fragmented workflows that slow discovery.

Key stats

67%

rely on IT or informatics experts to configure ELN assays or templates more than 25% of the time

67%

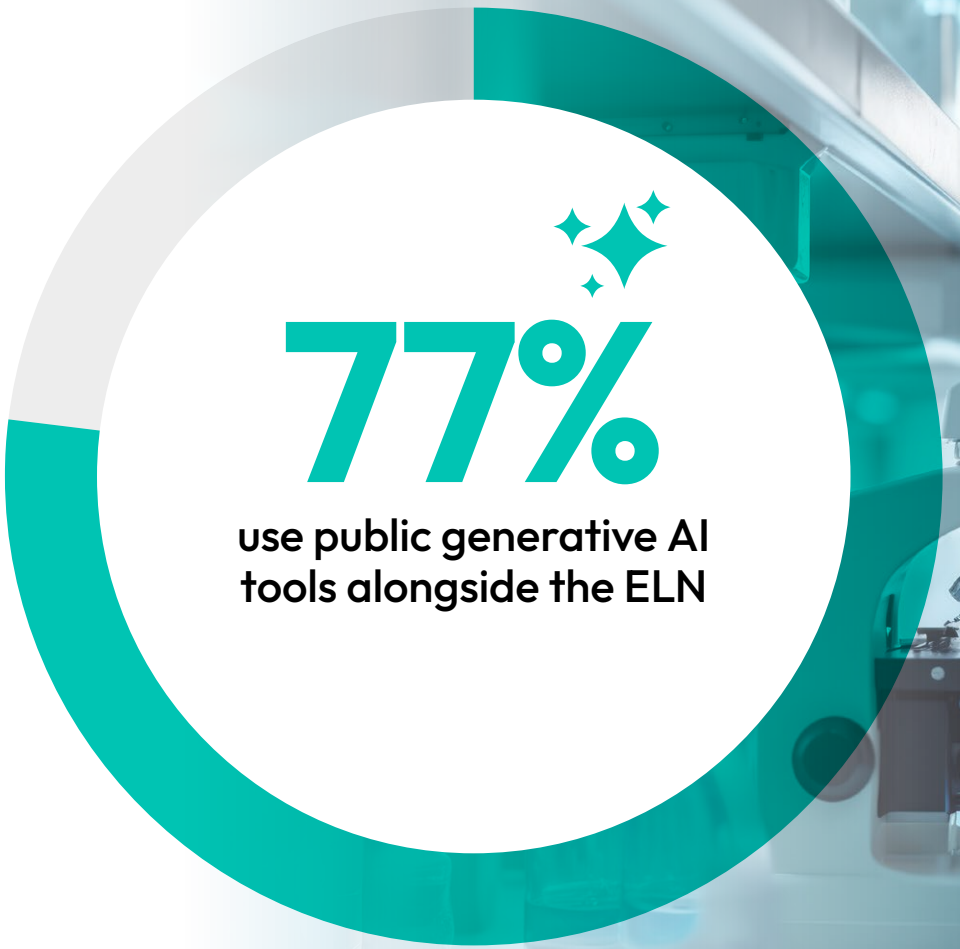
rely on data scientists or biostatisticians to interpret ELN results more than 25% of the time

51%

agree they spend too much time importing and exporting data between the ELN and other tools

Shadow AI in the lab

When answers do not live in the ELN, scientists open a new tab. Public AI tools are already part of lab work. The question is not if AI will be used, but where it lives and who controls it.



Shadow AI is the norm, not the exception

AI is already in the lab, it just has not been through formal governance or approval. Almost every respondent uses AI to support lab work, and most reach for public generative AI tools. Many do this with personal accounts, outside IT visibility, so there is a real risk that sensitive data moves into consumer apps without formal oversight.

Key stats

97%
use some kind of AI tool to support lab work, only 3% use none

77%
use public generative AI tools such as ChatGPT, Claude or Gemini

45%
use public generative AI with accounts they created themselves

32%
use public generative AI via company-managed logins

Sapio's take

Shadow AI is a signal of unmet need. Blocking it without offering alternatives slows science. Access to the right tools, backed by corporate diligence, needs to be provided. Digital and IT teams need to bring AI into governed lab tools that understand science and respect compliance.

Governance gap: 45% of scientists using public generative AI do so with personal accounts that may sit entirely outside IT oversight.

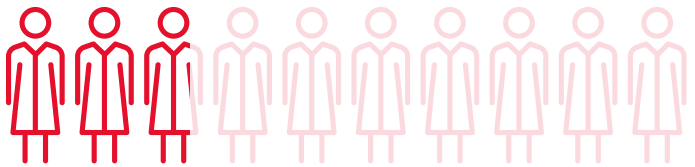
AI speaks your language, but not your science

Scientists turn to public generative AI because it is available. It helps with drafting and summarizing, but it does not know the lab's assays, instruments or private data. Generic models are good generalists, but the lab needs a specialist.

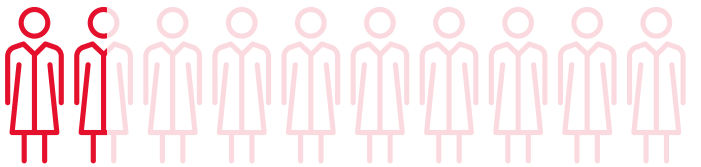
Sapio's take

Today's public AI tools are not grounded in deep scientific context or specialist workflows. They only become credible co-scientists when they are built around scientific data and integrated with lab systems in ways that support regulated work.

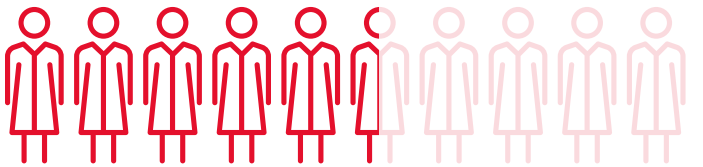
27% say current generative AI tools meet their scientific needs very well



15% say they are poorly suited to scientific tasks and workflows



55% say they work somewhat well, useful for some tasks but not others



The mandate from the bench

Scientists do not want a faster place to type. They want an ELN that acts as an intelligent research partner, seeing patterns in data, connecting experiments and helping decide what to do next. They expect instant analysis, clear visualization and natural language prompts that sit on top of existing workflows.

Sapio's take

The mandate from the bench is clear: an AI lab notebook that works with the scientists, not around them. Its role is to turn the hypothesize, design, plan, act and analyze loop into a connected workflow across instruments, data and analysis, not just provide an AI veneer on top.

99%

agree ELNs should act as intelligent research partners that support hypothesis generation and experimental design

97%

agree AI powered ELNs will make scientific work more efficient and insightful

96%

agree future ELNs should help interpret data, not just capture it

96%

say instant AI driven data analysis and visualization would be useful

95%

want AI text prompts to simplify the ELN interface

The trust equation, augmentation not automation

In a lab setting, blind trust in AI is not adequate. Scientists want to see the evidence behind suggestions and are alert to how automation could reshape skills and careers, from entry-level learning to demand for senior expertise. Any AI lab notebook has to amplify scientists, removing routine work while keeping them firmly in the loop and in control.

Key stats

81%
say they would trust AI suggestions only if they can review the underlying science and evidence

47%
worry AI will impact learning and career opportunities for entry-level scientists

40%
worry AI will remove the need for senior-level scientists

17%
worry AI will take their own job

Focus AI on the fundamentals

When they look to the next 12 months, scientists focus on basics, not sci-fi. They want AI that can sit on top of current work, make sense of results without a separate data science project and connect instruments, ELNs and analysis tools without endless manual exports. Analysis and connectivity are the foundations of the AI lab notebook.

Key stats – Top AI capabilities for the next 12 months

52%

choose analyze and interpret results, highlighting trends, anomalies and relationships

45%

choose connect data across instruments, ELN and analysis tools to reduce manual work

39%

choose intelligent experiment planning and design

39%

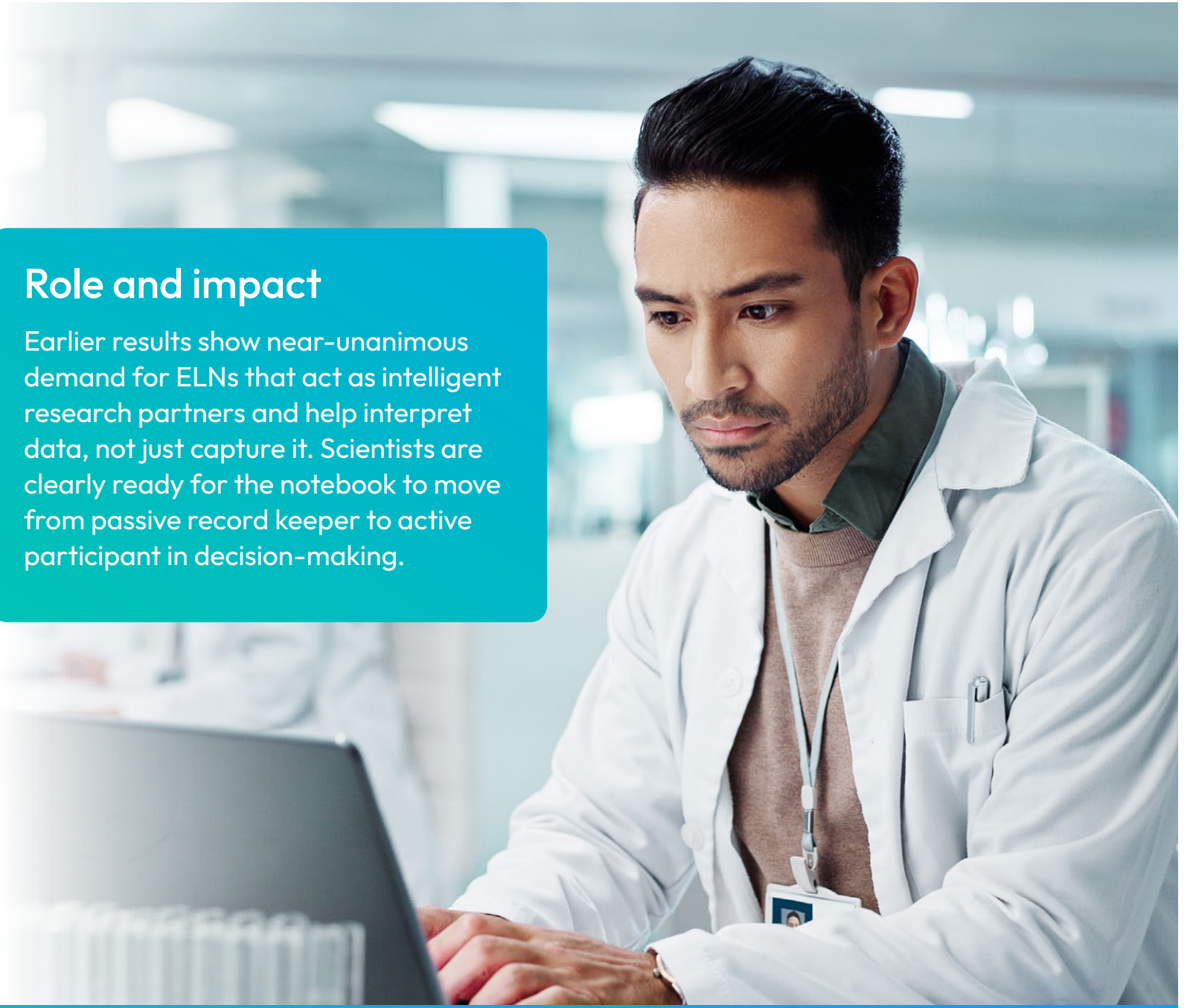
choose generate novel insights by linking structured and unstructured lab data

Defining the AI lab notebook (AILN)

Scientists describe an AI lab notebook that sits at the center of the lab, connecting instruments, data and analytics and turning the familiar scientific loop of hypothesize, design, plan, act and analyze into a continuous, AI assisted cycle. In active labs, the AI lab notebook delivers richer, faster analysis and helps drive workflow, turning designs into executable work in the lab and positioning a governed co-scientist at the core of research.

Role and impact

Earlier results show near-unanimous demand for ELNs that act as intelligent research partners and help interpret data, not just capture it. Scientists are clearly ready for the notebook to move from passive record keeper to active participant in decision-making.



The capabilities of a modern AI lab notebook

Sapio's take

The AI lab notebook is not a distant vision. These capabilities are in reach today when AI is embedded inside a modern ELN that is instrument aware, data aware and designed to operate within validation and compliance frameworks.

52%

choose analyze and interpret results as a top AI capability for the next 12 months, highlighting demand for faster, richer insight

45%

choose connect data across instruments, ELN and analysis tools to reduce manual work, underlining the need for seamless data flow

79%

want AI driven SOP execution directly from protocols, showing that scientists also expect the notebook to help run the work, not just report on it

From insight to action

Sapio's take

You cannot stop AI from arriving in the lab. Your choice is whether it enters only as an uncontrolled public chatbot or as a governed, enterprise-grade co-scientist that supports a trustworthy lab-in-the-loop philosophy.

How to move from passive to active

Shifting from a passive ELN to a lab-in-the-loop AI notebook is a journey, not a single cutover. The right moves depend on whether your lab is still mainly passive, already deep into shadow AI or starting to adopt active capabilities. Use the maturity scale as a lens, then focus on practical steps that bring the lab closer to the center of the hypothesize, design, plan, act and analyze cycle.

The strategic checklist

To escape the passive lab, fix the flow

Stop optimizing for data entry. Find where your ELN creates queues and repeat work, then pilot AI driven interpretation inside the ELN so results feed back into design and planning.

To tame the shadow lab, confront the reality

Clarify your stance on public AI. Identify where personal accounts are being used and which questions they are handling, then pull your highest value scientific use cases into a governed ELN so AI lives inside the lab workflow, not in an unmanaged side channel.

To build the active lab, focus on the foundation

Resist chasing sci-fi features. Invest in an AI lab notebook that provides an expert co-scientist, interprets results in context and connects instruments and analytics so data flows automatically, and treat it as core lab-in-the-loop infrastructure.

The labs that move first will set the pace for the next decade of discovery.

Those who delay risk being left behind.

Learn more about Sapio's AI Lab Notebook (AILN)

Sapio ELaiN

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