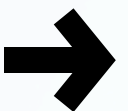


2025

State of the Lab: Inventory & Sample Management

Current Practices, Emerging Trends, and What Scientists Really Want



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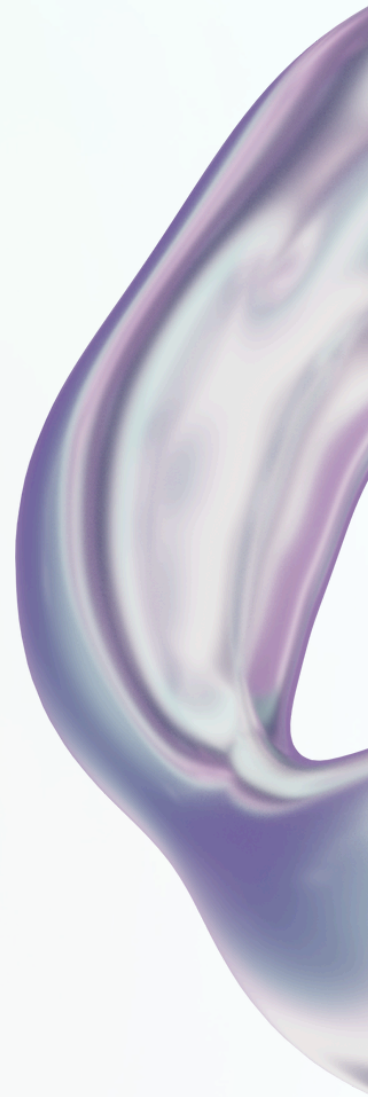
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Introduction

Laboratories in industry are facing increasing demands to operate faster and more accurately. With patent cliffs looming, innovation moving faster than ever, and batch deadlines always approaching, the pressures on lab operations have never been higher.

In this State of the Lab report, we set out to understand how labs are adapting. How are they tracking inventory and samples in real time? What technologies are they adopting — or avoiding? And what root causes are slowing down their operations?

From our survey of professionals across R&D, QC, Process Development, and other lab operations, a clear picture emerged: many labs still manage critical materials manually — relying on spreadsheets, paper logs, and word-of-mouth — even as their work grows in complexity. It's not uncommon to see inventory outages or disconnected tracking in these settings. Despite this, most labs still lack digital systems that could prevent these issues.

However, a shift is happening. A select group of labs are modernizing, replacing manual workflows with automated digital tools. For example, some now forecast reagent needs before shortages occur; others are digitizing sample tracking and audit trails. These early adopters — from biotech startups to pharma giants — are laying the groundwork for quicker lab operations via automation.

We see a growing divide between labs that have embraced modern infrastructure and those relying on outdated systems. This report captures the voices of scientists, engineers, analysts, and managers — and reveals what they actually want: to simplify their work and free up valuable time to focus on their science.

After all, they didn't spend years building expertise just to be bogged down by outdated processes.

Executive Summary

Present State: Manual Methods Still Dominate

77%

of respondents utilize spreadsheets (Excel, Google Sheets) to track and manage inventory



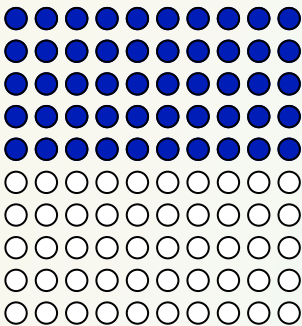
70%

of respondents reported fragmented tracking, relying on multiple systems and methods



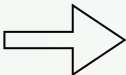
36%

of respondents **do not** receive any electronic alerts for low stock or expiring reagents



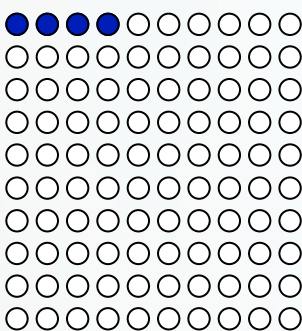
50%

of respondents indicated they reorder supplies daily or weekly



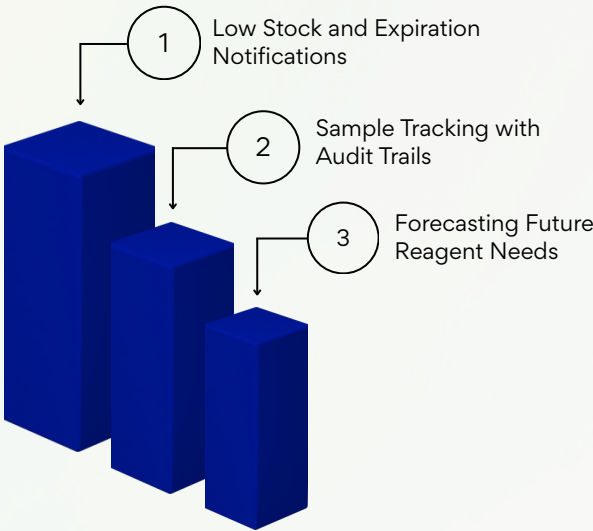
4%

of respondents use an automated reordering system



Future State: Many Labs Are Ready for Inventory Automation

Most Desired Automated Features



How Valuable Would Each Be?

An Inventory System That Minimizes or Eliminates Manual Input

95%

The Automatic Reordering of Low Stock and Expiring Reagents

80%

Responded Either “Extremely Valuable” or “Somewhat Valuable”

1

Survey Results

“[Inefficient inventory management] is taking away significant time from scientists... which is necessary for lab operations, but pulls scientific staff away from ultimately what they are there to do.”

- Associate Director, Cell Sciences

Methods & Demographics

Between March 26 and April 19th, 2025, Labtools.AI partnered with students in the Master of Microbial Biotechnology Program at North Carolina State University to conduct a survey focused on inventory and sample management practices in scientific laboratories. The objective was to better understand the tools, workflows, and pain points that labs face when managing reagents, inventory, equipment, and other laboratory samples.

A total of 53 professionals participated in the survey. Respondents held a range of roles that included Scientists, Analysts, Engineers, Managers, and Directors across functions such as R&D, Process Development, Quality Control, etc. Additional representation came from supply chain and procurement personnel. Participants were contacted via LinkedIn outreach, professional networks, and academic associations.

Examples of respondents' employers included: Altis Biosystems, Amgen, AskBio, Astellas, bioMérieux, CSL Seqirus, Foundation Medicine, Fujifilm Diosynth Biotechnologies, Grifols, GSK, IQVIA Laboratories, KBI Biopharma, Kriya Therapeutics, LabCorp, Life Edit Therapeutics, Lilly, MilliporeSigma, NC State Biomanufacturing Center, Novartis, Novo Nordisk, Precision Biosciences, Procter & Gamble, Resilience, Targan.

51%

of respondents represented scientific & analytical staff, an additional 22% represented process development (Engineers, MSAT, etc.)

49%

of the professionals surveyed had **≥7** years of experience, with an average of **8** years

60%

of respondents identified themselves as responsible for placing inventory orders

22%

of respondents held leadership roles (director, manager, supervisor, etc.)

70% of respondents reported using multiple systems and methods to manage their inventory.

Many professionals are still heavily reliant on spreadsheets (77%) and manual input (51%) to manage inventory. Although more advanced systems like laboratory information management systems (34%) or outsourced inventory platforms (23%) are available, their adoption remains low, for tracking supplies. When asked about managing reorders, respondents reported similar methods. However, the data reveals that these processes often remain disconnected and non-automated (e.g. filling out spreadsheets for procurement to view and re-order). Reordering is a frequent activity: 50% of participants are placing new orders daily or weekly. Yet, only 4% indicated that their lab uses any form of automated ordering system. This suggests that while reagent and consumable reordering is constant, most inventory and ordering workflows are still handled manually or semi-manually.

Most Common Inventory Tracking Methods

Spreadsheets (Excel, Google Sheets)



Manual Input



Lab Information Management System



Outsourced System or Software



↳ Note: Respondents could select multiple tracking methods.

50%

of respondents indicated they reorder supplies either daily or weekly

4%

use an automated ordering system

Most Desired Inventory Management Features

1

Automated Stock Alerts

2

Sample Tracking with Audit Trails

3

Forecasting Future Reagent Needs

100% of respondents ranked one or more of these three features in their top 3 priorities

Survey respondents were asked to rank the features they believe would have the greatest impact on their lab's inventory and sample management workflows. Three themes emerged with strong consensus. At the top of the list was automated stock alerts, reflecting concern about preventable stockouts. As previously stated, many labs continue to rely on spreadsheets or informal systems that offer no real-time visibility into low inventory levels. Despite this,

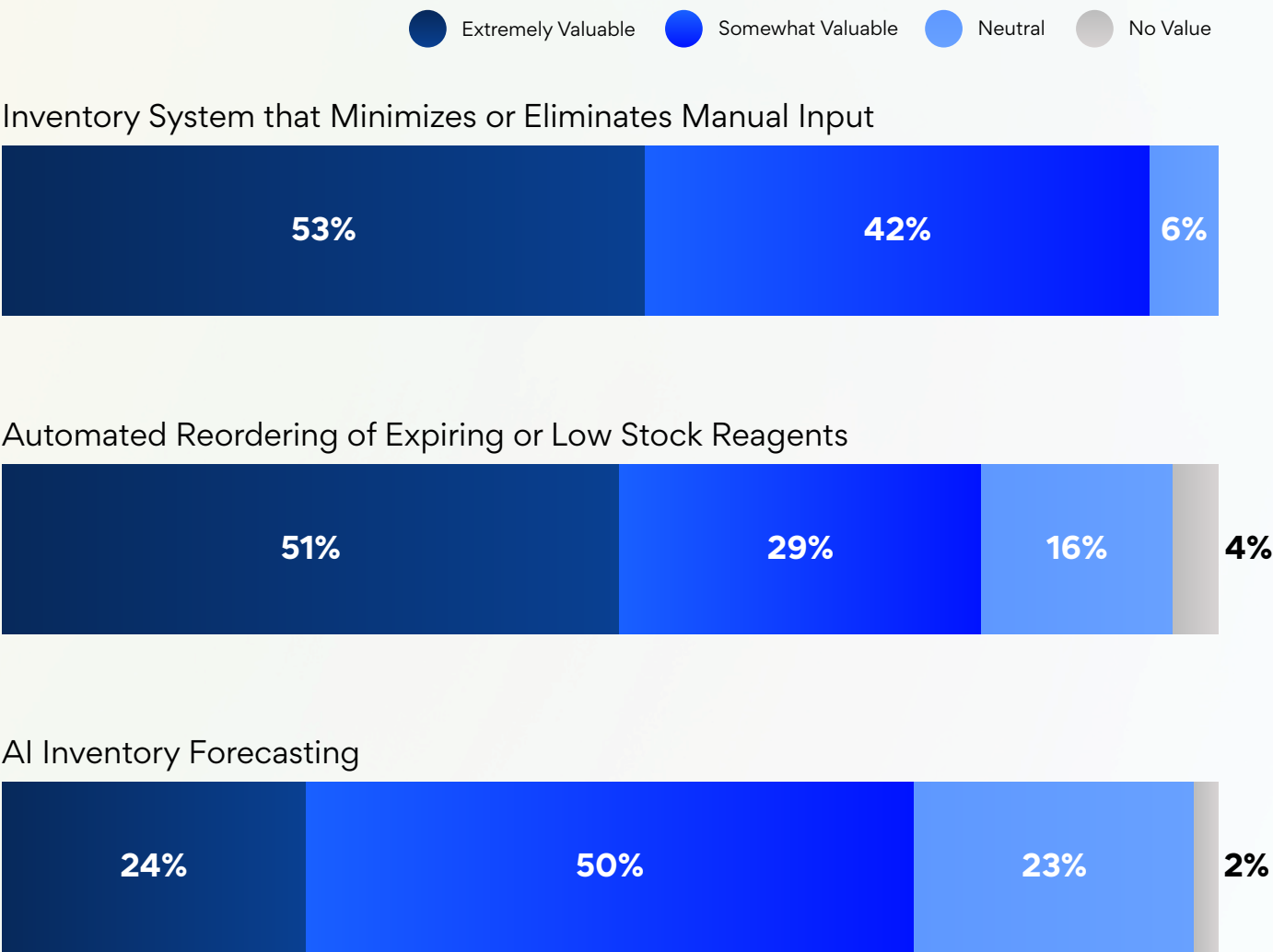
36% of respondents currently do not receive any electronic alerts or notifications when reagents are low on stock or set to expire.

Sample tracking with audit trails ranked second, with respondents emphasizing the importance of traceability and documentation. Whether for compliance or reproducibility, knowing exactly where a sample is — and how it has been handled — is essential in heavily regulated GxP environments. In third place was forecasting future reagent needs. With the high reagent demand tied to batch releases or lengthy experiments, it's evident why many labs want to plan ahead.

Perceived Value of Automated Inventory Features

In addition to ranking feature priorities, participants were asked how valuable they found specific automated capabilities. 95% of respondents saw value in systems that reduce or completely eliminate manual input. Automated reordering, driven by triggers for low stock and upcoming expiration, was valued by 80%, while future inventory forecasting was seen as beneficial by 74%.

What does this show? Labs are signaling a clear readiness for automation, with strong appetite for tools that reduce manual workload.



↳ Note: Percentages may not sum to exactly 100% due to rounding.

2

Regulatory & Quality Considerations

“It’s a long process to fully integrate [new software], because it must be GxP compliant and also the migration of hundreds of materials across multiple sites.”

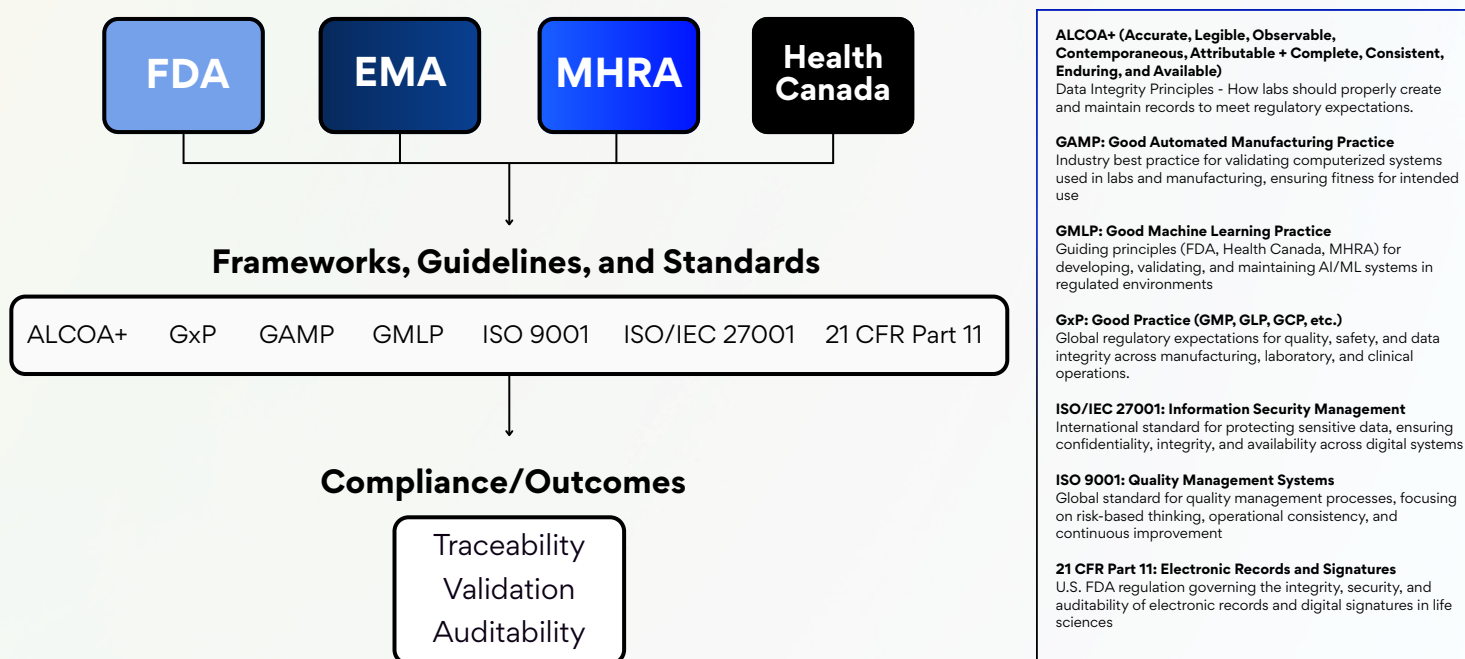
- Manager, Process Development

Regulatory Frameworks Guiding Innovation

As Artificial Intelligence (AI) and automation reshape laboratory operations, regulatory oversight is becoming a central consideration in the development of digital lab systems. Innovation frequently outpaces regulatory rules and guidelines, so these systems and technologies must align with relevant regulations such as 21 CFR Part 11, and also follow best practice guidelines and frameworks like Good Automated Manufacturing Practice (GAMP), Good Machine Learning Practice (GMLP), and other GxP standards.

Regulatory bodies are becoming increasingly attentive to how labs structure and monitor their data, especially as machine learning and automation are used to facilitate decision-making. GMLP outlines practices such as ensuring high-quality training data, conducting rigorous system testing, and documenting algorithmic behavior. To remain compliant, laboratories should validate their digital systems with these principles in mind. This would include documenting AI and automation workflows clearly and continuously monitoring for data integrity issues.

Labtools.AI was developed to align with these expectations. Its design supports GxP compliance, GAMP validation guidelines, and 21 CFR Part 11 requirements for electronic records. The platform also adheres to ISO 9001 for quality management and ISO/IEC 27001 for information security, helping laboratories simplify their processes while maintaining full compliance.



Embedding Quality into Digital Lab Operations

As operations scale internally, labs must keep up with growing sample volumes, fast turnovers, and even multi-site coordination. Once they adopt more automation and digital tracking, robust internal quality systems are essential to maintaining their success by minimizing operational errors and maintaining audit readiness.

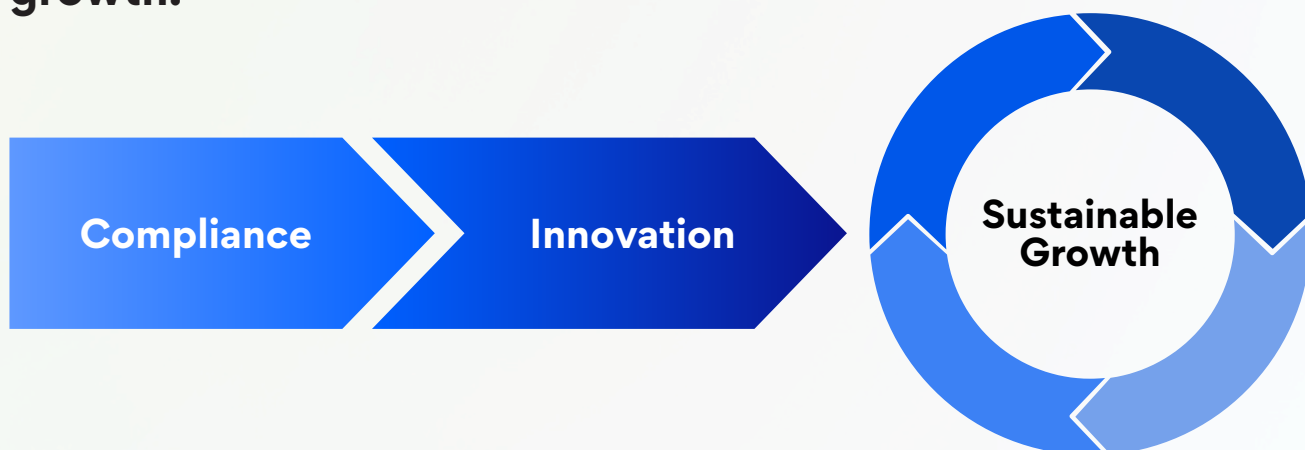
Labtools.AI is structured to support proactive Quality Management Systems (QMS). Its core capabilities—batch and lot tracking, real-time audit trails, quick system integrations, and easy data importing and exporting—are embedded into the platform to promote traceability and integrate compliance practices into daily workflows.

The platform offers integrations with over 100 systems through a unified API, which allows for the direct data capture from instruments/equipment and the simultaneous transfer to a LIMS and secure cloud storage without any custom development. Integrations with Labguru, Benchling, Labbit, CloudLIMS, and others support continuous data continuity across inventory, samples, and experimental records.

Additional quality-enabling features include calibration and predictive maintenance scheduling to anticipate servicing needs. LabTrackerz™ Tags can also be linked to experiments or instruments, enabling immediate run tracking and establishing real-time audit trails.

Data management within Labtools.AI is guided by ALCOA+ and supports FAIR principles (Findable, Accessible, Interoperable, and Reusable), ensuring that laboratory records meet both internal quality assurance standards and external regulatory expectations.

Innovation must be driven with [regulation in mind](#).
Labtools.AI recognizes this as an opportunity for sustainable growth.



3

The Inventory Management Landscape

“We were engaged with decentralized ways of managing our inventory and this caused a lot of headaches about ordering. Each team had their own cadence for orders, and staff often had to borrow consumables from different teams because supplies were back-ordered.”

- Process Development Scientist

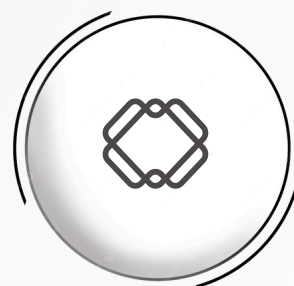
Modernizing Lab Inventory Management

As reported, 77% stated they track inventory using manual spreadsheets, and another 70% rely on multiple disconnected systems. While platforms like Labguru, Quartzy, and SciNote offer partial solutions for inventory management, they often require significant manual input and lack full automation or workflow insights. LabTrackerz by Labtools.AI addresses these gaps by providing unified tracking, forecasting, and compliance tools — while maintaining the flexibility to integrate seamlessly with many existing systems.

Features	LabTrackerz	LabGuru	Quartzy	Scinote
Inventory Management	Automatic	Manual	Manual	Manual
Cloud Based Access	✓	✓	✓	✓
Reporting & Exporting	✓	✓	Limited	Limited
Scalability/Flexibility	✓	✓	Limited	Limited
Audit Trails & Compliance Tracking	✓	Limited		
Transparent Pricing	✓	✓		
Vendor Neutral	✓			
Automated Forecast Stockouts	✓			
Integrable with Labtools.AI	★	✓	✓	✓

LabTrackerz

A Labtools.AI product, LabTrackerz is an AI-powered inventory and sample tracking platform built for modern laboratories. At its core is a small, flexible tag you can easily apply to samples, reagents, and instruments — enabling instant tap-to-track updates, predictive inventory forecasting, and simplified compliance monitoring. Designed to integrate with your existing systems, LabTrackerz modernizes lab operations without disrupting your workflows.



Why Single-Purpose Tools Fall Short

Beyond inventory systems, many labs use platforms focused on equipment scheduling, procurement, or scientific workflows. However, these single-purpose tools often lack the ability to address all these needs in a single location. LabTrackerz bridges these gaps by unifying such features across all systems and workflows.

Features	LabTrackerz	Benchling	Clustermarket	LabViva
Mobile Access	✓	✓	✓	✓
Inventory Management	✓	✓	Limited	✓
Flexible Pricing for Small Labs	✓	Enterprise-Tier	✓	✓
Compliance Support	✓	✓	Limited	✓
Equipment Scheduling	✓		✓	
Tap-to-Track Capabilities	✓			
Procurement Integration	✓			✓
Automated Stock Reordering	✓			
Integrable With Labtools.AI	★	✓	✓	✓

LabTrackerz delivers key advantages that traditional systems miss:

Instant Tap-to-Track Updates: Quickly capture inventory movements and experiment tracking with a simple tap.

Automated Inventory Management: Reduces manual data entry, freeing up scientist time for higher-value work.

AI-Powered Forecasting: Predicts stockouts before they happen, minimizing operational disruptions.

Built-In Compliance Support: Real-time audit trails and GxP-aligned features make audit readiness seamless.

Vendor-Neutral Flexibility: Integrates with 100+ existing platforms with no vendor lock-in.

Scalable Design: Supports small research teams and global enterprises alike, growing as lab operations expand.

Benchling

Great ELN. Overkill for inventory.

- ✚ Top-tier digital notebooks & protocols
- ✚ Complex setup
- ✚ Expensive for small teams

Clustermarket

Great for booking. Not built for tracking.

- ✚ Equipment scheduling
- ✚ No AI, no forecasting
- ✚ No consumables tracking

LabViva

Strong on procurement. Limited on equipment reordering.

- ✚ Automatically selects most competitive equipment pricing
- ✚ No automated reordering

Conclusion

The survey reveals a clear inflection point: while scientific demands have evolved, the operational infrastructure hasn't always kept pace. Today, 77% of respondents still rely on spreadsheets or manual methods to track inventory — even as research, quality control, and process development grow more complex. Automation is sparse as only 4% have adopted automated reordering. Inefficient inventory management creates more than logistical headaches — it pulls scientists away from critical work, slowing innovation just when expectations are rising.

But there's real desire for change. An overwhelming number of professionals we surveyed ranked automation features like stock alerts, audit-ready tracking, and forecasting among their highest priorities. Digital systems are no longer a nice-to-have; they're becoming essential for sustainable growth and compliance.

Labtools.AI is designed to close these operational gaps. By combining tap-to-track inventory updates, predictive forecasting, real-time audit trails, and vendor-neutral integrations, it helps labs modernize without starting from scratch.

Laboratories that embrace intelligent inventory systems today will be better positioned to minimize risk, stay compliant, and put more focus where it really belongs — on discovery and innovation.

Track smarter, innovate faster.



About Us

Labtools.AI is an AI-first platform for scientific laboratories, headquartered in Research Triangle Park, North Carolina, that unifies inventory management, scheduling, and no-code machine-learning in one secure cloud stack. Labs using Labtools.AI report up to 70% fewer stock-outs, 80% less model-development time, and connectivity to 100+ instruments, ELNs, and LIMS through a single API. Built by AWS-certified engineers and backed by Vitality Robotics, the platform pairs enterprise-grade security with rapid deployment, so scientists can focus on discovery while Labtools.AI handles the data plumbing.

This report was designed and generated by students in the Master of Microbial Biotechnology Program at North Carolina State University

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