



CHOOSING A LIMS OR SAP FOR YOUR LABORATORY

INTRODUCTION

Would a LIMS or SAP better meet the needs of your company? That is the eternal debate for organizations who are thinking about upgrading their laboratory tracking software to a professional management system - analogous to the Mac vs PC conundrum on an industrial scale.

SAP is a system which has been around since the 70's and continuously being developed for sales and finance information management. Alternatively, there are a variety of LIMS, which integrate laboratory processes for efficient tracking of samples and tests. So, which one is better for your laboratory testing organization?

To aid with this important decision, we will take a look at the different systems on the market for managing laboratory operations. We will then discuss the advantages and disadvantages of each and go in-depth into their similarities and differences. Finally, we will examine how some specific needs of different laboratories might be benefitted by one or the other.

SAP IN THE LABORATORY

SAP (systems, applications, and products) is an enterprise resource planning (V) software system developed by the German company SAP SE. Originally designed to handle basic business operations, it has expanded its operations to include a broad range of business-related applications.^{1,2}

Who uses SAP?

As the software originated for business management purposes, SAP is more commonly used by personnel on that side of the company. Account managers, sales representatives, and billing staff use SAP to manage inventory, procurement, and accounting in a connected, intelligent system. Manufacturers also use SAP for supply chain tracking from receiving to shipping, and can also use machine learning to automate tasks.²

SAP unique features and benefits

Key capabilities of current SAP systems stem from its origins in business management software. SAP allows users to interface with multiple financial and operational applications, and advanced analytics can offer insights into market trends and company performance. Here is a general overview of the main features of the latest SAP system:

Finance

- Intelligent account reconciliation
- Compliance with financial reporting standards
- Currency rate monitoring
- Centralized accounting transactions
- Financial risk management with market condition analysis.

Sourcing and Procurement

- Natural language interaction functionality to create purchase requisitions
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- Automatic application of procurement policies
- Catalog-based reporting
- Centralized purchasing (over multiple subsidiaries)
- Lower costs for scaled purchasing activities across the company
- Automated invoice document recognition

Sales

- Sales order creation from quotations
- Approval workflow for credit memo requests
- Billing and invoicing integration
- Order and contract management
- Logistics and order fulfillment optimization

Professional services

- Cost-rate management
- Optimize usage of available technological resources
- Profit-center reporting
- Enhanced timesheet approval
- Timesheets for global or concurrent contracts

Enterprise portfolio and project management

- Intelligent project cost forecasting
- Project monitoring through quick queries on project data
- Transparent project timeline reporting

Manufacturing

- Quality reports with key performance indicators
- Inventory management with predictive analytics for forecasting delivery and need
- Configurable product options
- Integration with warehouse management software
- Customer demand-based supply chain management

Remote access

- Automatic data backup to cloud-based storage
- Web-based portal to access information

SAP usability

With its software integration capabilities, SAP is readily usable by accounting, sales, and manufacturing teams. The system can be accessed over the cloud through a web browser on any computer or mobile device. Centralized storage of data and documents also helps with efficiency.¹

While SAP is helpful for the administrative side of the business operations, it is not capable of overseeing all aspects of laboratory management simultaneously. As SAP does not integrate directly with most specialized laboratory equipment and software or with electronic laboratory notebooks (ELNs), labs which use SAP often end up interfacing SAP QM with a LIMS that is able to handle the more complex laboratory operations. This adds an extra confounding factor, and laboratory technicians and quality managers frequently find SAP confusing or ineffective for their purposes.²

Unlike LIMS, SAP programming is rigid and unable to be customized. Laboratory workers must learn to work with a set structure that has largely been designed for business purposes, and are unable to configure the SAP setup for their specific needs. Heavy and complex customization of the software is required to adapt the program to particular laboratory functions.³

LIMS

Most high-capacity laboratories now use a LIMS (a laboratory information management system), either homegrown or purchased, to organize the laboratory workflow and handle data. Originally simple systems for sample tracking or data management, LIMS are now able to cover a wide range of laboratory processes and integrate them all into one centralized system.^{4,5} There are a number of LIMS in the market today, with varying specs and capabilities. STARLIMS is one of the major players who offer a fully integrated LIMS solution, STARLIMS, tailored to laboratory needs.⁶

Who uses LIMS?

LIMS is the go-to system for laboratory personnel. Laboratory technicians prefer to use a LIMS because of their lab-centric design and compatibility with specialized laboratory equipment. Lab managers also find LIMS helpful since they are capable of overseeing all operations of the testing facility simultaneously.^{4,6}

Organizations involved in research and development in particular use LIMS because SAP QM does not handle lab functions beyond basic quality testing. IT personnel who manage laboratory equipment and computers benefit from the compatibility of LIMS with a variety of instrumentation.

Unique features and benefits

As there are many LIMS on the market, not every LIMS is going to have the same list of perks and capabilities. However, there are a number of features which are common among some, if not all, LIMS software packages. Here is a rundown on the most common LIMS features:^{5,6}

Sample management

- Compatible with barcode scanners and printers
- Automated sample login
- Manual entry or file import for sample data
- Batch assignment and tracking
- Storage management and mapping tools
- Sample history reporting

Scheduling

- Automated testing or maintenance schedules
- Events calendar for timing sample batches and equipment use
- Continuous monitoring of sampling points
- Visibility of SOPs
- Notifications to relevant users of test timing, result availability, and equipment downtime

Equipment management

- Integration of lab equipment and operational software
- Real-time data acquisition
- Equipment status monitoring
- Automated workflow steps
- Incorporates GMP and other regulatory guidelines into processes

Result entry

- Automatic processing of results
- Incorporation of duplicate samples
- Automatic downloads of results into multiple compatible formats
- Batches, tests, samples, and results can be linked to external files

Reporting tools

- Automatic report generation based on a customizable template
- Interactive graphs and charts
- Reports automatically printed, faxed, or emailed to

users or clients

- Print labels based on results
- Integration of results with ELN

Remote access

- Monitor data, reports, inventory, equipment status, and schedules

Individualized access

- Equipment may be made accessible only to trained or certified technicians
- Reports and data only viewable by appropriate users
- Automated messaging to relevant personnel, such as equipment users or projects workers
- Track who has used specific equipment or accessed particular files
- Traceability of system and user transactions applied to samples, test results, batches, as well as chain of custody of samples and inventory.

LIMS usability

With the number of available LIMS types, the friendliness of the user interface varies widely. They offer the unique ability to integrate specialized testing equipment and processes into one program. LIMS also make it easy to access, analyze, and interpret data and to locate and retrieve samples and other associated laboratory records. Some LIMS integrate well with ELNs for improved recordkeeping, but others do not.^{5,6}

While LIMS are excellent for supervising experimental procedures and results, most are confined to the scope of laboratory operations. Other tasks, such as operational billing and procurement, must be handled separately.

COMPARING AND CONTRASTING SAP AND LIMS

Key similarities and differences

Both SAP and LIMS manage data by providing a centralized location for file and information storage. Integration of software and instruments are also features of both, though the types of compatible instruments differ based on the intended application. Extra data security is guaranteed in each by automatic backups to cloud-based storage networks and routine software updates. Sample tracking, scheduling, and batch results are available in either SAP or a LIMS, along with pre-set conditions incorporated to follow regulatory guidelines. Inventory management is available in either as well.³

The main differences between SAP and LIMS, as mentioned earlier, are due to the different purposes for which they were originally designed. SAP is adept at administrative functions such as billing, invoice processing, purchasing, procurement and human resources management. Conversely, LIMS specializes in laboratory workflows, with enhanced integration capabilities with testing equipment and analytical programs for processing test results. For lab workers, a LIMS will have a more intuitive user interface and will be more streamlined with experimental and quality control laboratory process and procedures.^{2,3}

Implementation - consider what happens before the system is running

Depending on the supplier and the efficiency of an organization, implementation of a LIMS can take from a few months to over a year. Larger systems with greater numbers of users will naturally take longer to implement, while being proactive and organized will reduce the implementation time. Some suppliers provide pre-configured workflows for laboratory instruments and procedures, which saves considerable time when setting up initially.^{2,3}

SAP implementation is an extremely lengthy and complex process, sometimes lasting for years. Virtually all employees must be involved in the setup, from IT technicians to managers to the actual end users. Typically, this entails a massive interruption to company operations and a significant adjustment for workers to the new changes.³

Multiple stories exist of large companies that have ultimately abandoned SAP after several years and significant amounts of money into the implementation process. German supermarket chain Lidl, for example, recently cancelled their SAP implementation seven years into the process after spending €500 million on the system. Its inflexibility could not adapt to the needs of the rapidly expanding company, and rewrites of the code to allow it to work with Lidl's pre-existing processes made the software unstable. Ultimately, the long time and the increasing complications led Lidl to cut their losses and revert to their old inventory management program.^{7,8}

Which situations are better suited by SAP or LIMS

Your organization's software preference likely will depend on what its key activities or currently unmet needs are.

SAP may work for an organization that desires:

- An integrated supply chain
- Intelligent billing, invoicing, and procurement
- Results only from quality testing

LIMS may be a better fit for your lab if it needs:

- A high degree of adaptability
- Management of all laboratory activities and its associated processes
- Storage of metadata as well as raw data
- Real-time lab processing
- Intelligent instrument integration
- Training records
- Lab Instrument calibration and maintenance
- Ability to set up stability studies

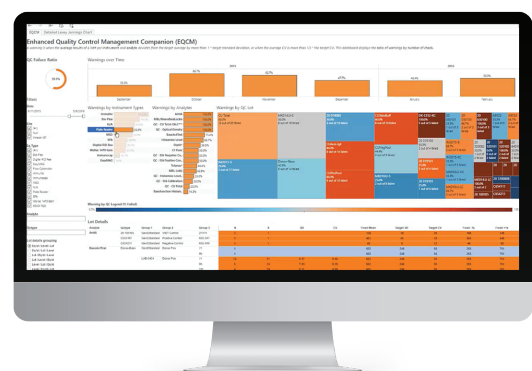
For the purposes of a laboratory-intensive organization or for laboratories with more specialized applications, LIMS provides the functions required for your lab operations.

INTERFACING SAP WITH A LIMS

Some companies that already have an established LIMS or SAP and wish to implement the other may end up integrating SAP with their LIMS. Several LIMS now come with the ability to integrate directly with SAP QM. This allows data to be shared between one system and the other, so SAP QM can manage the administrative functions while the LIMS handles lab operations. In this situation, it will be necessary to determine which of the two systems will be the "master," responsible for storing the information and setting the data specifications, while the other will be subservient.⁹

STARLIMS - the best of both worlds?

One of the most powerful LIMS on the market is STARLIMS from STARLIMS. Not only is STARLIMS capable of fully integrating with SAP, it also goes beyond typical LIMS functions to provide many of the unique services of SAP. STARLIMS interfaces with SAP QM which, along with standard web services for external applications, allows for a smooth link to other equipment and informatics programs and laboratory systems.¹⁰



Like SAP, STARLIMS can track inventories, manage client accounts associated with the laboratory operations. With all laboratory applications within one system, STARLIMS can link lab financial measures to inventory and lab activities, and can identify where resources are being used wisely, or are excessive or in need.

An individualized, secure cloud-based portal enables lab managers, workers, and clients to access the data, schedules, and sample and equipment statuses that are applicable to them from virtually anywhere in the world all through one application. Intuitive design and intelligent graphical reports enable anyone within the company's structure to quickly have visibility to the laboratory operations through STARLIMS, from financial officers to IT personnel to laboratory technicians. STARLIMS is unique because contrary to many other LIMS vendors that rely on third party solutions to provide a complete solution, STARLIMS provides a fully integrated solution which includes a Laboratory Information Management System (LIMS), an Electronic Laboratory Notebook (ELN), Scientific Data Management System (SDMS) and Advanced Analytics capabilities. Furthermore, STARLIMS provides mobility application and hosting services, all of which can be configured to the laboratory's operational needs.

THE DECISION IS YOURS

Understanding the basics of how SAP and LIMS work and what each is capable of, you can have a better idea of which one might better serve your laboratory. Both systems serve their own business purpose, and at the same time can interface and complement each other. For most laboratories, a LIMS will cover the needs of laboratory management and testing procedures. If you are a large, high-capacity laboratory with complex testing and financial operations, you might need the benefits of both. Fortunately, STARLIMS is an easy-to-implement option for whatever your organization's needs might be.

Capable of integrating with existing LIMS and ELNs or SAP QM, while providing an in house ELN and array of features that meet and exceed those of individual LIMS or SAP, STARLIMS is always a sound choice. STARLIMS can help your lab achieve optimal lab performance and efficiency.

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