



Laboratory Information Management System (LIMS) – A Tool to Gain Laboratory Productivity

- Dr. Ashes Ganguly

The business today is getting increasingly pressured to be more productive and efficient with less traditional resources. If we look at a typical production process, for instance, the level of automation and optimization that has permeated into the production floor is quite astounding. Major players in the process optimization market like Honeywell, Invensys, and Yokogawa Marex have had a tremendous impact in bringing to the market the automation and optimization solutions to streamline the production floor. The other ends of the spectrum are the back-office transaction oriented processes like Inventory Management, Materials Management, Financials and so on. While they do not affect the actual production process directly, but automating these processes help the organization immensely in terms of streamlining their entire operations.

However, one of the areas of a production process that has traditionally been neglected in terms of automation and information management is the laboratory. A laboratory is central for not just the quality of the intermediary and end products of the plant, but its role is paramount for new product developments and process improvements. Now that the rest of the plant is becoming more efficient with the implementation of process control, automation, and optimization packages, the time given to labs for test result preparation and distribution has shrunk significantly. For instance, in process industry, the results of each individual unit for a batch are critical for the next step of the process. Therefore, efficiency and track ability of processing laboratory samples is becoming paramount in the operation of these plants. Unless the results of some intermediaries are distributed quickly to the production floor, the production

Market Dynamics in India

- ⇒ LIMS market is in a nascent stage.
- ⇒ The market is estimated around US\$ 5 million with an expected growth rate of 15– 20 % per year.
- ⇒ Major Players : Labvantage Solutions, Star LIMS, Labware, Thermo Scientific, Perkin Elmer and Novatech.
- ⇒ Indigenous LIMS providers such as Caliber Systems, Ocimum Biosystems and Oasis LIMS have 15-20% market share.

process can be impeded because of lack of availability of sample results. The information content held by the labs is critical for the rest of the plant, and quick dissemination of that information throughout the plant is essential for an efficient running of the plant.

Therefore a lab's ability to process data quickly and its ability to disseminate that information efficiently throughout the plant is vital for the success of the production process. This distribution of information without making time-consuming phone-calls or writing memos or through other such traditional means has significant value to the plant production process, as well as in management.

Laboratory Information Management System (LIMS) can help in managing the information flow within the lab and can be the modus operandi of connecting the lab with the rest of the organization. For instance, imagine all the information that is generated in a lab. It starts from sample request to sample registration, collection, assigning tests to samples, assigning properties to those tests, recording results, generating reports

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and Certificate of Analysis, etc. Currently, in most labs, all of that information is in an isolated pockets in the forms of lab notebooks, logs, manual reports, Excel spreadsheets and so on. Therefore, if after a month of a sample result publication, the lab needs to track every step of the sample's path in the lab, it would be a tedious and often impossible task. This form of hardship in tracking sample information can lead to grave danger in terms of quality processes adhered by a lab. With the help of a LIMS, managing all this information becomes an easy and natural process as these applications are developed specifically having these criteria in view.

Background & Objectives

- Ø The management and administration of data is often the key to competitive advantage.
- Ø Information is a crucial capital asset of any business, none more so than within the modern laboratory environment.
- Ø The commercial prospects of the operation are directly related to the successful management of its information resource.
- Ø LIMS are not just about running a more efficient laboratory: it is a mission-critical component of a successful commercial laboratory in quality control, process control and R&D environments.
- Ø LIMS is the conduit for information from the minutiae of data from lab instrumentation, back to the controlled environment managed by the operator, and on into enterprise-wide process control systems.
- Ø When used strategically within a corporate Information Management and IT structure, LIMS can provide the crucial link between the laboratory and the wider operations of the business.

Bridging the Gap between ERP and Laboratory

The Quality Module of an ERP cannot be a LIMS! It does some functions that a LIMS does but it is not that product. Quality module is more of a decision implementer that acts as a warehouse of quantitative (and to a limited extent, qualitative) data. Its function can be limited to the warehouse of data (indeed, it can be switched off) or it can force very rigid and precise control when all of its functionality is in use (the module can make automatic usage decisions for inventory), but this usually greatly increases the complexity of implementation.

The QM module is not a LIMS, and SAP will be the first to say that. That is why SAP created a LIMS interface to the QM module. The QM module is designed to summarize quality data on SAP Batches. Once the quality data is brought into the QM module, that data can be used in SAP SD for Batch allocation, and in QM for producing Certificates of Analysis. The QM module does have some workflow and simple data entry capabilities, and this has led some companies to try to use it as a LIMS. The companies around that have tried this to

find it extremely difficult to use QM as a LIMS. SAP says that they do not intend to ever create a LIMS. We would recommend against trying to use QM as a LIMS, unless your lab requirements are simple, and are met by QM's capabilities. In fact, we would argue that once you have a LIMS, you don't need the QM module, unless you just want to use it as the interface between your LIMS and SAP. In most cases we are familiar with there is a one-to-one relationship within SAP between the analysis (SAP term: Method – "How to analyze") and the component (SAP term: characteristic – "What to analyze for") as the data structure in SAP is different from most LIMS, in a way that makes it relatively difficult to use the method for anything useful. This means that SAP holds the specification (i.e. LOD < 5%) but not how to determine this in detail. LIMS enhances the analysis with additional components (i.e. weight of dish, weight of dish +sample) and calculations.



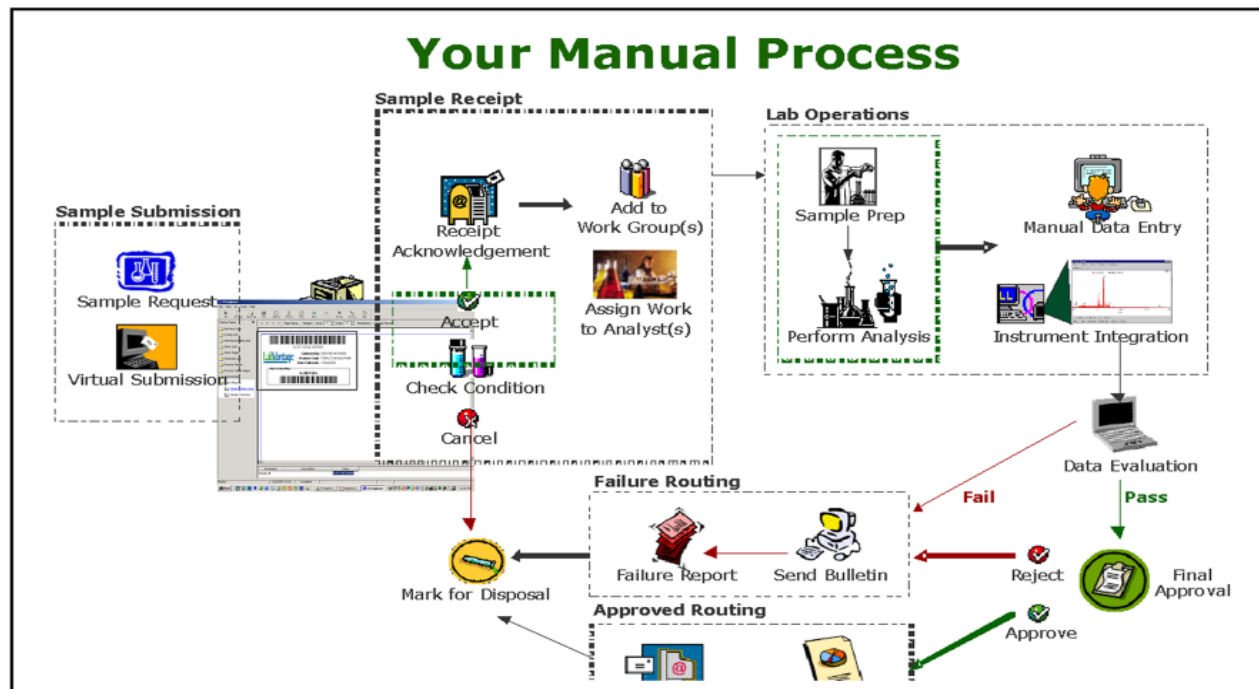
QM is what it states to be; a Quality Management and Quality Information system. QM lacks most of the laboratory orientated functionality offered by most LIMS systems today, such as control samples, standards & reagents, stability just to mention a few. Further to this, reporting and setting up calculations in SAP is not an easy task, and does normally require assistance by qualified IT-personnel, which is often not the case with most LIMS systems.

SAP is not very flexible in that you have to pass all the results back that it is looking for, and it cannot accept ad hoc results from LIMS. QM is only interested in final results, and does not know about "raw data" for calculations, replicates, standards, etc. ERP is concerned with using information about quality to move materials through the supply chain, and LIMS is concerned with generating quality information and moving samples through the lab.

Why most organisations should go for LIMS ?

LIMS provides solution to labs that fit within the overall corporate strategy, enabling flexibility and cost reduction and better service.

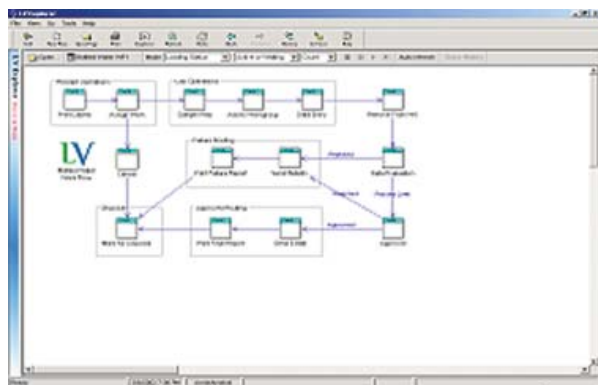
LIMS enables the labs to Reach beyond the four walls of the lab by allowing to Share information with internal and



external customers facilitating the Virtual Lab and provide business benefit in real-time.

LIMS helps to improve management capabilities by rapid reporting at various levels of detail. LIMS helps labs map to corporate business and IT objectives as a Solution that adds business value and enables better customer service and minimize risk by facilitating user acceptance.

should be configured by lab technicians to meet their own needs and those of their customers. The power user is enabled to manage the LIMS system and database via in built tools – freeing up IT professionals for other projects, all within the IT budget. Breakeven can be realized in 1-3 years, reducing total costs over five years by as much as 300% and an extended useful life of 10 years!



Automates your manual process

LIMS Market in India

Infact LIMS Market is still now in a nascent stage in India, than what it was expected. The Present LIMS Market is estimated around Rs.20 Crores with an expected growth rate of 15% to 20%. The world market is estimated to be around USD 500 Million by next year.

The Major players in this segment are M/S Labvantage Solutions, Star LIMS, Labware, Thermo, Perkin Elmer, Novatech etc. . There are also some indigenous LIMS solution providers such as M/S Caliber Systems, Ocimum Biosystems & Oasis LIMS etc. and holding 15-20% of the market share.

Conclusion

A Full function LIMS has a low cost of ownership than a Quality Management module of an ERP. LIMS enables Lab throughput to be increased, and improve data accuracy. LIMS helps the lab gain productivity because technicians can concentrate on processing samples. Customer satisfaction is improved because customers are sent real-time results. The Ideal LIMS should be managed by the lab for the lab, and

In addition India being house to some of the Major Software Solutions providers, there are some players, who are showing interests in development and Implementation of LIMS solutions on their own, but the success of such players is not yet proven as LIMS is a very domain specific functional solution.

The Illustration and some technical information in the above article have been provided by the courtesy of M/S Labvantage Solutions Inc, USA. ■