

The Paperless Lab in Action

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Many organisations are striving to create a paperless laboratory environment by integrating lab instruments and software solutions with the enterprise. A paperless laboratory can be integrated easily into the overall business process, improving productivity, enabling better management of data and optimising the investment in the lab. How does a paperless lab work? What are its pros and cons? How are life sciences organisations achieving this goal?

Why Paperless?

For starters, what are the benefits of using paper? They're not hard to establish. Paper is generally easy to use, it's often convenient, frequently portable and much of the time legally defensible, and paper requires no 'user training.' For the most part, new users can be trained on a process and quickly accomplish the task. Those are the positive aspects of paper, but, as you'd expect, the downside to paper is greater than the upside. Using paper-based methods for sensitive and complicated laboratory workflows creates a number of security, expense and productivity challenges. First of all, paper reports or workflow documents introduce significant security risks into what should be a completely secure process.

Paper processes also always introduce a human factor, and any human activity is inherently prone to errors to some degree. At the very best, for every 1,000 results transcribed from an instrument, a human being will make, on average, 3-6 mistakes. Typical error rates increase to 3 per 100 transcribed results (or 30 errors for every 1,000 results) if any math or stress is involved. Organisations have to keep strict controls around their paper processes because they must control document access, version control and information cataloguing to ensure that it can be located when required. Paper-based processes are costly, both in terms of the physical purchase of paper and in terms of the human capital that is expended to manually handle the process – human capital that is probably highly skilled and trained for scientific research and laboratory processes, not managing paper reporting.

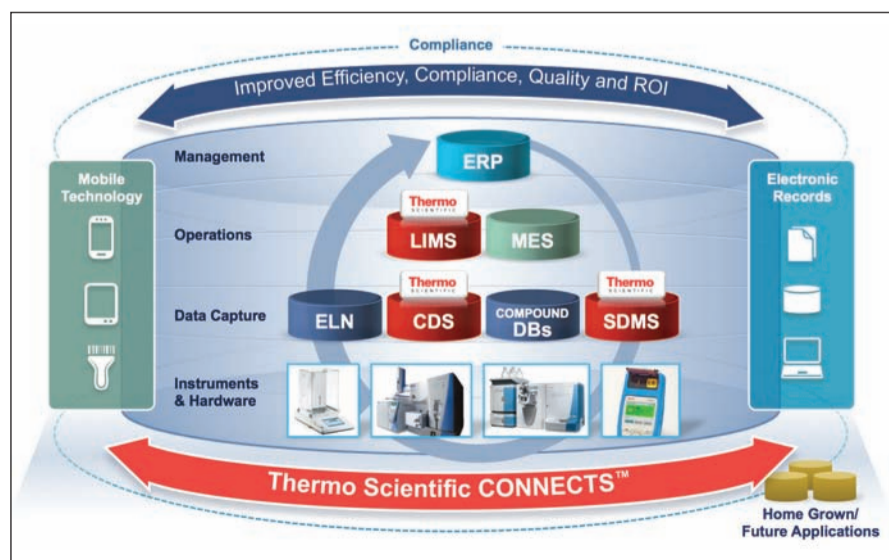
Finally, in the current economic climate where every minute of research and scientific progress must be measured by a success factor, paper processes represent the antithesis of collaborative efforts. Today's pharmaceutical company works in collaboration with academia, Contract Research Organisations (CROs), and partner biotechnology companies. Their data is spread across these organisations. Paper isn't 'searchable' and in this era of distributed research and development and outsourced testing, paper-based processes represent barriers to collaboration and a time drain on sharing valuable scientific information.

How LIMS Factors In

More and more laboratories are realising that all the investment they've made in setting up a state-of-the-art laboratory is not being fully optimised. The typical lab has expensive instrumentation and other laboratory equipment, all of which are generating data of some kind. Each of these instruments, if siloed, requires that a human has some interaction with that data to collate it with data from other instruments and compile reports. A paperless laboratory helps to optimise that investment and the management of the information the lab creates.

While many technologies come together in a successful paperless lab, the critical component is a Laboratory Information Management System (LIMS). LIMS solutions are now able to fully integrate even the most heterogeneous labs. With today's LIMS solutions, the cost to integrate different software systems and equipment from independent instrument vendors is no longer prohibitively high.

In fact, some LIMS solutions go beyond basic instrument integration and data storage, utilising sophisticated vendor neutral data transformation tools to enable scientists to see raw data in its original form regardless of supplier. This type of automated data acquisition and point-to-point data distribution across the enterprise is the true key to enabling today's paperless lab.



How Does it Work?

Efficiencies in the lab come from streamlining workflow and automating processes. When the lab is fully integrated, meaning the instruments and other information systems are integrated with the LIMS, then all data collection and analysis is automated, freeing up the lab's scientists to focus on science and more value added revenue-generating activities. The reduction in time spent performing manual paper-driven tasks can produce an enormous improvement in productivity and also cost savings. For example, a modest reduction of 20% in man-hours spent on paper-based efforts can produce hundreds of thousands of dollars in annual savings. It's worth thinking about how much more revenue could be generated by those man-hours if they were spent on novel research instead of paper-based data collation and reporting processes or if a problem with production was discovered and the organisation was able to react even one hour earlier in the process. This is the value many companies are seeing when they fully integrate their labs and connect them with the rest of the organisation.

The first thing an organisation needs to look at when considering a paperless solution is the landscape of the lab. How is the lab set up? What instruments are in place or are planned for the future? What is the workflow required? It's important to ask these seemingly basic questions because often the existing workflow isn't the one that the lab actually wants – but it's the one that's in place. So part of implementing a paperless lab is to find a consulting ally that can honestly assess the situation in the lab and lay out a plan that will be flexible enough to grow with the lab and the business in the near future. Once this assessment is complete and an optimum workflow has been identified, the work can begin to make recommendations for integrating all those disparate instruments and connecting the lab's output with key business metrics for management to use.



Finding the right LIMS is also a critical ingredient to successful integration. The offering you select should leverage your organisation's existing investments, even if they've been purchased from a variety of commercial vendors. The ideal solution fully integrates instruments and equipment, connecting data sources with data destinations via a single interface. State of the art integration middleware can translate disparate instrument languages and convert raw data to a vendor-neutral storage format for data archiving. Finally, in keeping pace with technology advancements in and out of the laboratory environment, your investment in a paperless lab solution should be able to offer access to raw data and instruments from any web browser or mobile device.

Conclusion

The response to paperless lab offerings among pharmaceutical companies has been overwhelmingly positive. More and more, life sciences industries want to get to a paperless lab. Pharmaceutical companies understand the value proposition inherent in measuring the success of every minute of research and scientific progress. Production efficiencies and enhanced regulatory confidence offer a competitive advantage to those companies willing to go paperless – and it is not hard to foresee the day when the same is true in life sciences. The paperless lab is the lab of the future, and LIMS is the technology that will make that future possible.