

The Smart Lab: Fostering Bi-directional Data Flow

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Mobile informatics has tremendous potential to improve productivity

Smartphones are an important part of our everyday life, a trend that holds true for laboratories as well. In countless industries, features and applications on mobile devices allow staff working outside of the lab to easily and more accurately capture new types of data from remote locations. But without proper technology, working remotely also poses unique challenges.

Picture an enterprise with technicians who must precisely and proficiently gather and test samples outside the lab. The sampling process includes many steps: technicians fill sample bottles, manually transcribe the barcodes and record the time and their location using a watch and a separate GPS. The information is handwritten in a notebook and, when field technicians return to the lab, the information is manually transcribed into a database and combined with the test results. The opportunity for error in this process is self-evident.

A mobile device is an obvious solution to sampling inefficiencies. With a smartphone, not only are field-related steps merged and streamlined, but the data no longer travels to the lab in a paper notebook, it arrives wirelessly before the technician even departs the remote location.

Today, smartphones are as transformative in the lab as they have been in our personal lives. And “going paperless” rightly extends beyond the physical boundaries of the laboratory. With modern laboratory information management systems (LIMS) and advanced mobile technologies, information can flow bi-directionally between the lab and the field, removing error-prone manual transcription and significantly expanding productivity. This next-generation sampling program refines regulatory compliance and traceability while increasing productivity in the modern lab and, possibly, across the entire enterprise.

Innovative possibilities for the modern laboratory

Mobile devices are designed to be spokes in a massive hub, capable of capturing and reading data in near-real time. And laboratories crave data, provided that it is accurate and properly managed. If, for example, the water sampling technicians described above possessed a company-issued smartphone, the GPS, wristwatch and notebook are effectively obsolete. Location and time are automatically recorded, the sample barcode is scanned and sample readings only keyed in once. And the workflow built into the LIMS can walk technicians through each of the required steps when collecting a sample to ensure consistency.

A mobile-enabled sampling program is also more dynamic. When smartphones or tablets are integrated with a LIMS, scientists have access to interactive data and not just static images, enabling them to drill down to the level of individual test results if necessary. The LIMS can even provide automated alerts on sample runs so that an outlying result can be flagged immediately and a retest ordered while personnel are still in the field. This prevents costly return trips and accelerates the overall sampling program.

Because smartphones and other mobile devices enable a more dynamic environment for data, laboratory staff can become more creative about designing sampling workflows. This new mobile ability can change a time-consuming, error-prone process into one that is streamlined and efficient — a true enabler of improved productivity.

Challenges of mobile devices

Mobile adoption in the laboratory is not without its trials. One major challenge is the popular “bring your own device” (BYOD) business trend.

Allowing personnel to use their own mobile devices at work — or do their work remotely — has some benefits, including cost-savings and better overall productivity. But consenting to or requiring BYOD also exposes businesses to IT security risks, complications with regulatory compliance and problems with software compatibility. These risks, complications and problems have stopped many regulated laboratories from adopting BYOD policies.

Despite widespread concerns, the industry continues to explore solutions that could soon make BYOD policies viable. Some laboratories are experimenting with technology that keeps personal data separated from business-related data on mobile devices. In this model, business-related activity occurs in a “sandbox” over which the IT organization has control. If the device is lost or the employee leaves, for example, all company data can be erased remotely. While this strategy may still be too untested for many CIOs, especially in pharma, it does move us a step closer toward addressing legitimate security and intellectual property concerns.

Beyond the obvious security and compliance risks, there are other challenges that must be overcome before mobile devices are useful for all applications. Mobile devices aren't an answer for everything, at least not yet or without further innovation. With manual data entry in a field or lab setting, for example, a smartphone isn't always the ideal device. To address this particular challenge, the user

interface in Thermo Scientific SampleManager LIMS, for example, is specially designed to accommodate the unique smartphone interface. When users access the LIMS on their mobile devices, the interface is designed specifically for that use and the phones' smaller form factor. Similar solutions can accommodate tablets and other mobile devices.

Smart lab pioneers

Which industries are early adopters? Process industries, such as water and environmental and oil and gas, which require remote sampling across a wide area, have been the earliest adopters. Large petroleum companies, for example, routinely use mobile devices to scan bar codes or radio frequency identification tags and submit samples to the LIMS, providing management with nearly instant access to data from the field. This enables greater agility in even the largest enterprises, driving just-in-time decision-making with valuable data that may find its way into the LIMS from someone's personal smartphone.

Even highly regulated industries are testing the waters with mobile devices and LIMS, including several life science companies that are supplying mobile devices for use within both R&D and production labs. In one case, mobile devices are being used to scan barcodes of samples thawed during preclinical testing. Because samples can lose integrity during multiple thaw and freeze cycles, it's critical to monitor the process with uncompromising accuracy. In a manual process, there is always a risk that data about thawing and freezing could be incomplete — and lead to questions concerning sample integrity. With mobile devices capturing data and delivering that data directly to the LIMS, sample condition data is always accurate up-to-the-minute.

The smart decision

The tipping point has passed for mobile device adoption into the workplace. Mobile technology should not just be transforming our personal lives, but businesses as well. Companies must begin to incorporate mobile devices into their workflow. A next-generation program, enabled by mobile technologies, doesn't just improve regulatory compliance, traceability and auditing, it can help improve productivity in the lab and across the enterprise and, in the process, transform a business from one reliant on paper and manual processes to one more agile and reliant on real-time data for business optimization. LIMS can foster a valuable bi-directional flow of data between the field and the lab, within the lab, across supply chains and every place where data integrity and speed of analysis are pivotal, which is nearly everywhere.

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