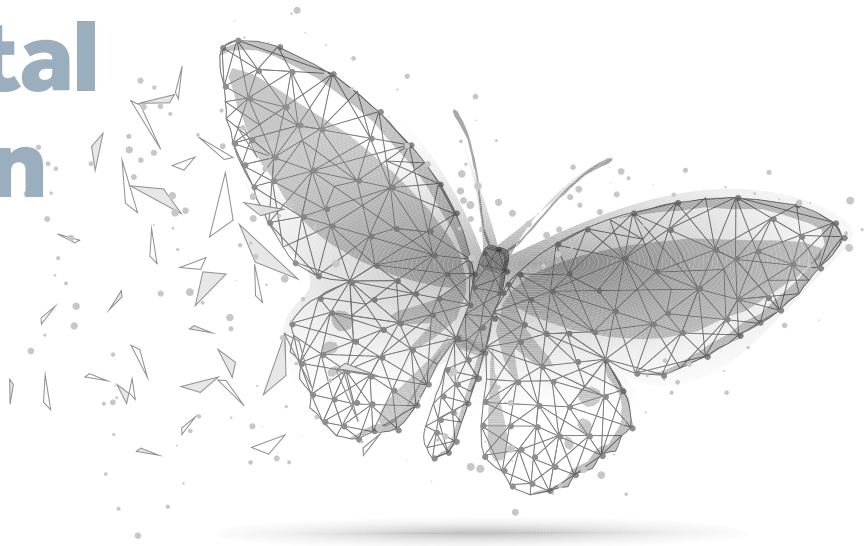
Managing digital transformation



DIGITAL TRANSFORMATION EXPOSES A NEED FOR STREAMLINED PROCESSES AND DATA INTEGRITY, FINDS ROBERT ROE

From the switch to paperless digital lab technologies such as electronic laboratory notebooks (ELN) and the integration of instruments to connect disparate systems, the path towards. Digital transformation is complex and the endpoints can change based on an organisations requirements. The road to fully automated experiments, cloud-based data storage and seamless connectivity between collaborators and data systems is long and requires a methodical approach to managing change in the laboratory.

The steps toward achieving a Lab of the Future (LoF) are numerous and involve changes at both the organisational and individual levels that can take many months or even years to complete. But the investment of both time and resources can deliver substantial gains leading to impactful innovation.

Laboratory informatics services provider Astrix's annual market research report has delivered a wide array of statistics that help to shed some light on current digital transformation activities. The report also highlights what it is laboratory managers are looking for when adopting digital technologies.

The data is based on a survey conducted by Astrix in March 2022. The survey was completed by laboratory professionals from a wide cross-section of science-based industries including professionals from at least 20 sectors, representing business, government, and academic laboratories.

Through the process of evaluating survey responses, Astrix has established that the movement towards the LoF is evolving in a non-linear path. The company has determined several steps that are key to the digital transformation journey; Awareness, Interest, Consideration, Investigation, Information Gathering (Shopping and Selection), Acquisition (Purchase), Installation, Training, Adoption/ Conversion, Implementation, and Prevalence. These stages describe the process of modernising an operation and, irrespective of size, appear to be common to laboratories across the spectrum of type, function, and setting represented in this snapshot.

The report notes that early adopters of LoF technologies, sometimes driven by economic necessity, are predominantly enjoying real and positive impacts on their operations thanks to continuous technological innovation.

However, even professionals in the most sophisticated and well-funded laboratories are aware that progress is needed to fully capitalise on the breadth of capabilities afforded by tools designed to deliver on the promise of a LoF.

In an aim to streamline the process of digital transformation, laboratory informatics providers are developing integration software and making it easier for scientists to connect their instruments and data systems. However, there are still differences in these platforms and so the right choice for one organisation may not be the same for others.

Integration of digital systems

In a blog post written by Matt Hazlewood, Senior Director, Global Chromatography Data Systems at Thermo Fisher Scientific, he noted the idea of eliminating data silos through seamless integration data standardisation.

'Data standardisation has long been a challenge for pharmaceutical companies, resulting from a historic lack of standardised data formats used across the informatics industry,' states Hazlewood.

Astrix survey results have helped to quantify some of the drivers that are most cited by the respondents. They found that organisational priorities have changed, or requirements increased, for achieving or maintaining compliance.

For example, data integrity was highlighted by 63% of respondents. This reflects the need to initially obtain and record error-free, reliable data for use in automation and digitisation of key functional and reporting processes.

Good Laboratory Practice (GLP) guidelines (44%), Regulatory Requirements (38%), and Good Manufacturing Practice (GMP) guidelines (35%) represent the second tranche of organisational priorities – by prevalence – that survey participants report having changed. Astrix also found that of its repondents actively engaged in LoF initiatives – which accounts for 76% of total survey respondents – IoT and Artificial Intelligence (AI) or Machine Learning (ML) were the most prevalent investment activities. Smart technology is the most popular area of investment among 62% of respondents. Although fewer survey participants report investment in AI/ML (48%), it represents a rapidly growing field among lab professionals.

Cooperative integration

Scitara has developed its own integration layer called the Scientific Integration Platform (SIP), which aims to solve some of the challenges of instrument and system integration. Scitara has now announced several different collaborations to combine the SIP with other lab software products, including Agilent and PerkinElmer applications.

The most recent announcement focuses on the integration of Scitara's SIP with Agilent's Software and Informatics

"More agile data management will help our customers optimise their lab operations and increase business efficiencies"

Division portfolio of products, including chromatography software and lab workflow management solutions.

Thomas Schmidt, marketing director of Agilent's Software and Informatics Division, comments: "Agilent's OpenLab CDS offers the only open platform for chromatography data. Incorporating Scitara's SIP adds a new data integration feature for our chromatography customers, providing enhanced digital transformation through multi-directional data and workflow management.

"More agile data management will help our customers optimise their lab operations and increase business efficiencies."

The partnership will enable bi-directional communication with SLIMS, initiating lab integration workflows that will facilitate data exchange from and back into SLIMS using Scitara's Digital Lab Exchange DLX, providing universal connectivity within a GxP-compliant environment.

A similar bi-directional communication with OpenLab CDS will include the ability for OpenLab to accept sample lists from external sources connected to Scitara DLX, and to exchange results with external applications also connected to the Scitara DLX.

Process and standards support integration

However, Hazelwood feels that collaboration between software companies is not enough. He would like to see open standards used in the laboratory. "An industry-wide commitment to open data standards is key to fulfilling the promise of digital transformation."

"To meet this need, vendor-independent standards are now emerging based on these open data standards, the latest informatics solutions support broad instrument control, allowing, for example, laboratories to manage their whole fleet of instruments regardless of vendor, using a single integrated system," Hazlewood continued.

"Improved interoperability also eliminates the need for time-consuming transcription and validation steps, safeguarding the accuracy and completeness of data across workflows. These solutions are helping organisations work more efficiently, improving data integrity and providing a strong foundation for future digitalisation efforts."

In today's laboratories, there are often multiple solutions used by teams to collect, manage and share pharmaceutical data. These heterogeneous, with different architectures, user interfaces and performance capabilities can lead to added complexity.

This can lead to inconsistent data management approaches which are becoming "increasingly challenging from a user experience standpoint as datasets grow larger and become more complex," notes Hazlewood.

"Data integrity principles expand upstream from formerly unregulated aspects of the drug development journey, poor process standardisation also puts compliance at risk," Hazlewood continued. "Integrated laboratory informatics solutions that provide a consistent user experience, from early research through to manufacturing, are key to improving standardisation within the pharmaceutical industry."