Digital transformation: building the lab of the future

WHITEPAPER:
DIGITAL TRANSFORMATION

scitara
meet the modern lab™

What's holding back the lab?

With a predicted spend of $1.97 trillion on digital transformation globally in 2022,[1] and the global commitment to accelerating drug discovery and development, reinforced by the pandemic, the life sciences and pharmaceutical industries are set to see rapid change in the coming years.

Despite a widespread acknowledgement that the scientific laboratory needs to join the digital revolution that is transforming every other business sector, digitalization has typically been held back by a marked resistance to embark on the implementation of new technology. The lab typically has systems in operation that are entrenched in the business, have been heavily customized over the years to meet specific needs and require formal validation for every process change in this regulated sector.

Change must happen, however, if the life sciences and pharmaceutical industries are to respond to the urgent call for accelerated medical advancement, where digital technology is no longer a competitive advantage but a primary entry point. It is unrealistic to expect the science lab to deliver 21st century medicine using outdated technology and the manual systems of the past.

With new drugs typically taking a decade or more to bring to market, at a cost of $1bn or more, there is an urgent need to improve the efficiency and cost-effectiveness of drug development.

We live in an era where the growing workforce of digital natives expects to live and work in a digitally enabled world. By 2026, according to the IDC, two-thirds of life sciences companies will adopt the intelligent lab of the future, leveraging digital transformation and integrating the Internet of Lab Things (IoLT),[2] with half of new business value created in global life sciences driven by cloud-based digital ecosystems.[3]

The question remains:

How can the life sciences and pharmaceutical industries create a connected ecosystem that supports data-driven decision making to build the lab of the future?

Connecting the lab of the future in a post digital world

Creating a data-driven business depends on connectivity that enables the free flow of data throughout the value chain. The focus of digital transformation strategies in the lab started predominantly downstream in manufacturing, where automation and smart production systems are transforming operations.

To really make a difference and ultimately speed up product time to market, an organization has to look further up the chain to research and development (R&D) and improve the flow at the start of the process, in the lab.

To deliver measurable value, the lab of the future must be connected, global, and scaleable, with the vision founded on four pillars:[4]

Operational efficiency

Building the research environment of the future depends on being able to adapt to new models and new ways of working. Key stakeholders are increasingly recognizing the need for consumer participation in healthcare decision-making, personalized therapies and incorporating the patient perspective in product development,[5] and the science around this patient-centric approach needs to keep pace. Achieving this level of digitalization in the laboratory could drive the next wave of scientific discovery and innovation—and bring new, personalized treatments to patients faster than ever before.[6]

Collaboration and connectivity

Creating collaborative global networks to drive forward scientific research depends on providing greater connectivity across people, systems, and digital technologies, delivering on the goal of research-without-borders. The urgent need for effective connectivity was highlighted by the SARS-CoV-2 pandemic and has been universally embraced as key to supporting an accelerated drug discovery process.

Seamless access to data

Providing a trusted data mobility environment allows for better knowledge sharing to develop improved processes such as target identification, drug discovery and lead optimization—that improve patient outcomes. Because scientific research and development data come from a huge variety of sources, the time spent curating data, hunting down the correct data—particularly from unconnected instruments—and solving data issues takes more time than actually using the data for science. Any solution must deliver data integrity—properly curated, tagged, stored and validated in a compliant solution.

Integrating human experience

Improved data accessibility is undeniably one of the most effective ways to free up scientists' time to focus on science. Critical here is to understand the scientists' needs and act as an enabler, rather than try to impose yet another new software.

Proactively creating a data-driven business

The Scitara Scientific Integration Platform, SIP is a new industry category that connects the world's scientists, data, applications, instruments, and devices to enable scientific data mobility.

Digital decoupling

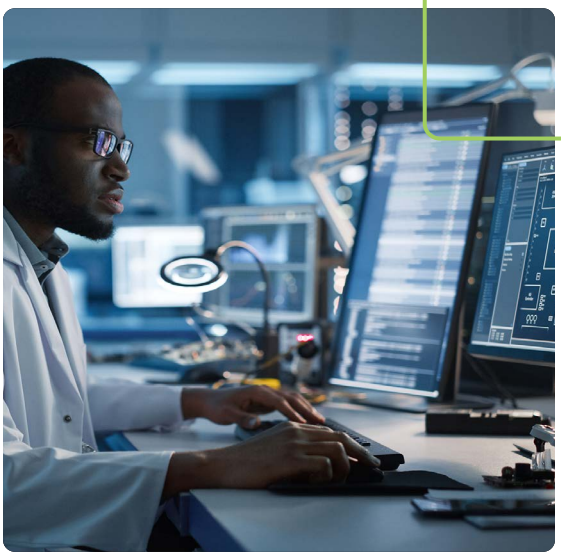
The principle of digital decoupling supports this goal. By decoupling the data layer from the enterprise management layer, the data layer becomes independent from the central legacy platform, and can be accessed, upgraded and reconfigured in situ as required. This removes the substantial—and resource-intense—validation process, eradicates the need for system upgrades to be carried out by vendors, and allows access to a wider pool of resources that is not limited by supplier.

Data curation

What's needed is a better way to capture and curate data—automatically and in context at the point of execution. Data that are not captured automatically or consistently, and not surfaced for use in a standardized format, make it difficult to employ analytics to optimize outcomes. This can also lead to data integrity concerns by regulatory agencies. Within the Scitara platform, data is curated while in flight, ensuring it is consistent, correctly entered and saved according to pre-defined protocols on arrival at its repository.

Managing risk

Managing risk in scientific data depends on compliance with regulatory and corporate guidelines. Critical in the quality control (QC) lab environment, manufacturers must be able to demonstrate to regulators that their products are produced in line with the required quality, safety, and efficacy standards. The Scitara data security model offers best in breed data integrity and has been built with QC compliance by design. It offers a secure, continuous validation model that is based on zero-trust principles, with data encryption in flight and at rest, multi-factor authentication for authorized users and user-configurable tokens as standard.



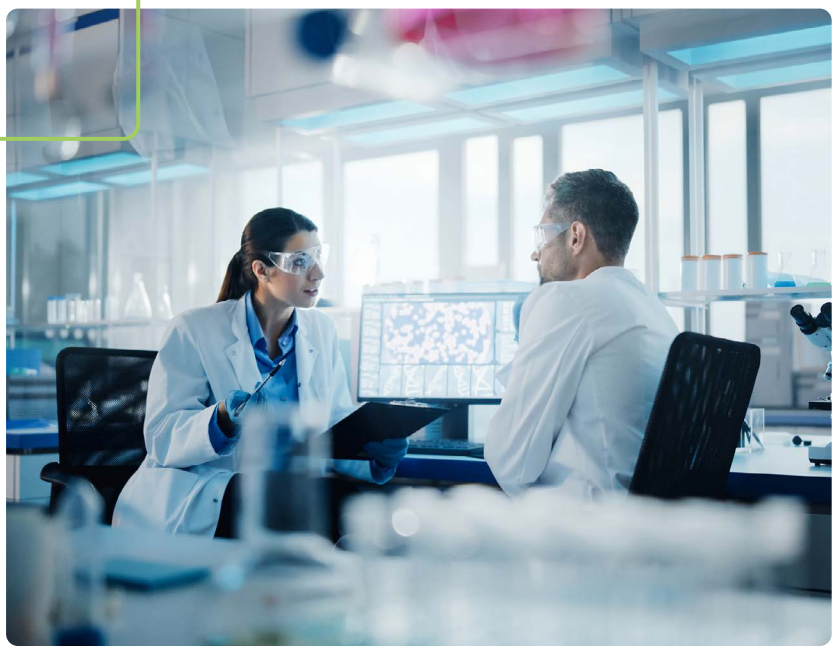
The laboratory of the future will see lab instruments directly connected to the data platform for real-time data capture, trends analysis and analytics. Largely trapped in silos in today's lab infrastructure, data is difficult to access and depends on manually configured, one-off point-to-point integrations that all require maintenance.

Lab innovation demands agility

Taking an agile approach to lab innovation depends on defining a plan of what success looks like—and getting started. Rather than become overwhelmed by trying to tackle every issue and getting stuck at planning or pilot stage, our recommended approach is to create and feed a pipeline of single ideas, each tied to one clear business objective: think big but start small—the goal here is incremental gains.

Breaking the cycle of pilot program inertia is critical to get things moving.

According to a report by Accenture,[7] 37 percent of leaders in the life sciences industry have embarked on piloting new technologies and, of this 37 percent, over two thirds report still being in pilot phase more than six months after they started—a drain on time and cost, with no results to show.



Getting started

- ☐ **Evaluate**
  Create a pipeline of ideas, each with a defined goal and with clear metrics.
- ☐ **Incubate**
  Implement the solutions that work into the business operation and measure the results.
- ☐ **Industrialize**
  Build those priority solutions out to a pilot project.
- ☐ **Integrate**
  Scale up and scale fast—if an idea works, quickly implement it at scale across the enterprise.

The lab of the future—five key enablers

1. Artificial intelligence (AI) and machine learning (ML)

Advanced automation will help manage the wealth of scientific data and build predictive models that support and accelerate decision making by providing valuable insights. The Scitara model supports the concept of the self-enabled scientist by providing a configurable platform that does not rely on vendor intervention or lengthy recoding. The SIP creates a flexible ecosystem where integrations, APIs, workflow set-up and automations are delivered on demand as business needs change.

2. Extended reality

A fully connected laboratory allows the free flow of data between multiple end points—rather than bespoke, one-off point-to-point connections that still largely rely on manual data entry or transfer— enables the free flow of information between laboratories across the world. The Scitara SIP infrastructure supports collaboration, enabling best practices and information to be shared in real time and paving the way to a connected global scientific community of the future.

3. Data integrity

Implementing a transformative digital strategy in the life sciences and pharmaceutical industries must be based on consistent protocols. The Scitara SIP offers data integrity by design, and follows the established ALCOA (attributable, legible, contemporaneously recorded, original, and accurate) scientific data management principles, defined by US FDA guidelines[8] as a framework to ensure data integrity.

4. Platform architectures

The platform architecture is the lifeblood of the lab, as it provides a fully connected network to allow the free flow of data through the enterprise. By separating the system connectivity layer from the applications, instruments and other management platforms, an organization can adopt its technologies of choice unrestricted by vendor, safe in the knowledge that any new technology can be integrated to support business strategies.

5. IoLT (seamless connection)

The fully connected approach underpinned by next generation infrastructure enables science to embrace the Internet of Lab Things by connecting instruments, robots, and humans—bringing the connectivity we see in our homes, such as voice recognition and virtual reality, to the lab.

Breaking the technology time warp

In a climate where, currently, 40 percent of life science and pharma industry leaders say they have not embarked on any efforts towards digital transformation in R&D or QC labs,[9] there is huge potential for change.

As a global community, we are putting significant demands on the life science industry to accelerate discovery and commercialization, to bring safe and effective new medicines to patients faster than ever before, yet scientists are still caught in a technology time warp. Combining the best in scientific innovation and health technology depends on data-led development and gives the lab the tools that allow this innovation to become reality.

The Scitara SIP brings the technology and connectivity to the scientific lab in an easy to implement, reconfigurable solution that enhances rather than disrupts the existing network, to solve the decades-old problem of data management, delivering a modern lab and, ultimately, supporting the goal of dramatically accelerated medical advancement.

The Scitara SIP is powered by the Digital Lab Exchange DLX™ platform to deliver best-in-class integration capabilities, redefine the lab integration framework, and enable breakthrough automation and data exchange, to support the modern laboratory.

Powering digital transformation

The Scitara Scientific Integration Platform, SIP

Scitara offers an industry-leading SIP that connects the world's scientists, data, applications, instruments, and devices. The Scitara technology drives scientific data mobility by:

- ☐ Automating the exchange of scientific data across multiple endpoints in the scientific network.
- ☐ Creating a flexible ecosystem where integrations and automations for laboratory instruments, applications, and other resources may be switched in and out, and the platform reconfigured on-demand as business needs change.
- ☐ Accelerating the delivery, accessibility, and sharing of scientific data across the enterprise.

Scitara Digital Lab Exchange DLX™

Designed for operation in a regulated environment, the Scitara DLX is the foundation technology of the SIP. The Scitara DLX delivers a seamless digital data exchange experience by incorporating unparalleled connectivity and unrivaled automation, resulting in unprecedented scientific insights and real time decision making.

Meet the Modern Lab™

For the first time, organizations in life science can achieve a data mobility strategy. By implementing a fully connected and compliant laboratory infrastructure with data mobility as standard, the vision of the lab of the future comes a significant step closer.

For more information on how to build a connected laboratory:

BOOK A DEMO HERE

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