

How COVID-19 has accelerated digital transformation and how laboratory orchestration platforms are changing the landscape

Digital transformation during the age of pandemic

Prior to March 2020, digital transformation was increasingly becoming more of a priority to many organizations. Executives had been noticing the impact on digital technologies and realizing that it was crucial for their businesses to implement a strategy around it. However, when the global pandemic hit in March 2020, and SARS-CoV-2 drastically changed most aspects of how people live, work, and interact, the need for digital transformation became imminent.

According to a new McKinsey Global Survey of executives, companies have accelerated the digitization of their customer and supply-chain interactions and of their internal operations by three to four years. Additionally, the share of digital or digitally enabled products in their portfolios has accelerated by seven years.¹

In fact, Deloitte has reported that 77% of CEOs stated that the COVID-19 pandemic has accelerated their digital transformation plans.² The acceleration of the adoption of digital technologies due to COVID-19 is taking place throughout the end-to-end supply chain, with faster and broader adoption of data and predictive analytics, cognitive automation and artificial intelligence (AI), application and infrastructure platforms, digital reality, digital supply networks, smart factories, and e-commerce.

In the case of AI and its subsets, machine and deep learning, powerful and innovative applications of the technology are emerging as a result of the global pandemic. For example, The National Institutes of Health (NIH) launched a Medical Imaging and Data Resource Center that will use AI and medical imaging to diagnose, treat and monitor COVID-19 patients.³ Additionally, Amazon Web Services (AWS) launched COVID-19 Search, a machine learning powered website that can speed up investigators' research initiatives by helping researchers to quickly access research papers and documents related to COVID-19.⁴ Providing at least a temporary infrastructure for connected digital technologies, has allowed for scientists to make revolutionary breakthroughs, and businesses to work more efficiently than ever during the COVID-19 pandemic.

What does this mean for digital transformation in the life sciences industry post pandemic?

While the pandemic has caused an acute disruption in the world of digital transformation, the payoffs have proved to be a worthwhile investment and have therefore, accelerated many businesses' long-term digital strategies. The focus on creating a digitally connected laboratory environment to automate and accelerate science, remains strong in the pharmaceutical industry.

As we have learned, digital enablers such as AI, machine and deep learning, blockchain, digital analytics and delivery, and process automation are central to creating more agile research and development processes. These technologies all accelerate a specific component of the R&D process, but the real efficiency gains come from these technologies being connected.

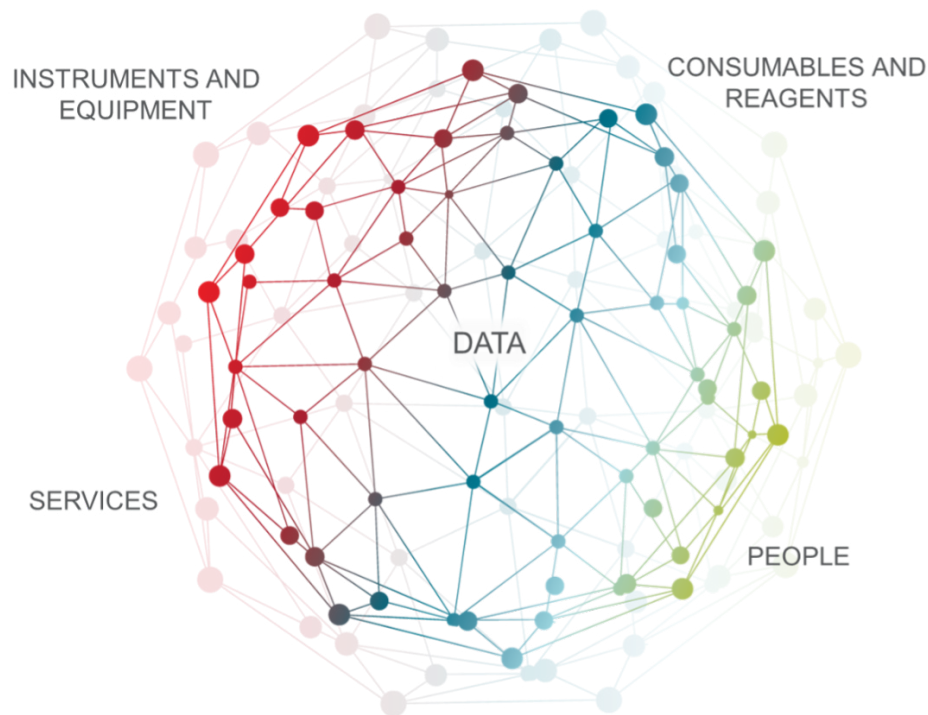
Creating a connected ecosystem - the connected opportunity

Initially, it was thought that a combined laboratory information management system (LIMS), scientific data management system (SDMS), electronic laboratory notebook (ELN), and laboratory execution system (LES) offering layered with advanced data visualization capabilities would provide the connected laboratory environment that pharmaceutical companies desired. However, this approach alone does not meet the needs of large organizations. To truly connect the laboratory environment and allow data from various systems to flow freely and communicate between one another, a more complex architecture is needed. True platform technologies can provide a laboratory orchestration engine to connect the various laboratory instrumentation and systems that exist within a large organization. This technology allows for data held within research, development, clinical, and manufacturing settings to become completely integrated and connected. This is where the future of digital transformation is headed, particularly in the pharmaceutical industry.

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Pharmaceutical companies are faced with finding ways to shorten research and development timelines to address patent expirations and the overwhelming cost of R&D programs. To address this life science and pharmaceutical organizations are prioritizing making data a strategic asset, and thus have expanded their 2021 digital innovation budgets to support continued IT investments. A main component in making data a strategic asset, is data transformation, which is driven by the use of a laboratory orchestration engine that utilizes a transformational data layer.

A transformational data layer within a laboratory orchestration platform allows the four main components of the laboratory to become connected regardless of vendor: the people, the consumables and reagents, the data, and the services. This capability differentiates platform technologies from a traditional integrated LIMS offering.



As the focus in the industry has changed, to allow scientists to spend more time on the science and less time performing operational tasks, the IT strategy has shifted. Breaking up digital silos and converting them into a uniform digital platform represents a main task in laboratory digitalization. However, it is challenging for organizations to dedicate the

time and resourcing to connect large data silos. As part of the strategy development for this initiative, each detail of how the platform will be integrated into the existing digital infrastructure of the organization must be discussed.

For example, some initial key questions when selecting a digital laboratory platform are:

Connectivity	<ul style="list-style-type: none"> • How will the platform enable legacy systems such as LIMS, CDS, laboratory instrumentation, and data analysis and visualization tools to be integrated regardless of vendor? • How does the platform enable IoT readiness to control devices and monitor experiments remotely? • How are legacy business systems such as asset management and inventory management tools connected to the platform? Is this capability supported?
Compliance	<ul style="list-style-type: none"> • Will the platform support regulatory compliance across my organization for research, development, and manufacturing? • How is data stored and converted in the data transformation layer? According to FAIR data principles?
Vendor capability	<ul style="list-style-type: none"> • Will the vendor provide me strategic and industry leading advice on how to implement this technology? • Does the vendor have the capacity and resources to support a global organization? • Is the vendor a thought leader in laboratory digital transformation?
Business need	<ul style="list-style-type: none"> • Will this platform allow my scientists to spend more time at the bench? • Will this platform enable the use of advanced analytics tools such as AI, ML and DL to create efficiencies in the R&D process? • Is there a clear differentiator between this platform and a traditional LIMS offering?

A visionary leader in executing on digital transformation

The selection of a vendor to implement a laboratory orchestration platform differs from that of selecting a vendor to implement traditional laboratory software. To successfully execute on a digital transformation strategy, a partner is needed, not just a vendor. A partner who can guide your organization on how to create a connected ecosystem, serve as a strategic collaborator, and execute on the implementation of a laboratory orchestration platform.

Many organizations are looking to Thermo Fisher Scientific, the world leader in serving science, to provide expertise on how to implement complex digital solutions and ensure success in their digital strategies. Thermo Fisher has made it a priority to ensure that its customers are enabled to reach their highest potential. Richard Milne, VP and General Manager of Digital Science has stated to Scientific Computing World that **“The key to success is working holistically around four organizational pillars: the software, the instruments, the consumables and reagents, and the services, with a mechanism to connect these pillars.”**⁵

Currently, Thermo Fisher is developing technology to connect disparate software systems and laboratory instruments and provide a workflow engine for laboratory processes. Customers will have the ability to orchestrate and automate workflows, store data from multiple business systems in one location, monitor experiments in real time, and completely visualize and manage data. In addition to the digital science business at Thermo Fisher, other areas of the business are enabling intelligent inventory and resource management through the use of telemetry data, developing innovative instrumentation, and creating breakthrough scientific technologies. With these capabilities, Thermo Fisher is uniquely positioned to support its customers with a vendor agnostic platform approach to laboratory orchestration.

Conclusion

Now, more than ever, the execution on a digital transformation strategy is critical. A successful implementation of a laboratory orchestration platform enables innovation, productivity, collaboration amongst global teams, reduces the high operational costs of R&D, and sets an organization up for scientific success. Thermo Fisher is ready to partner with your global team to help you meet your business goals and get life transforming treatments onto the market as quickly and safely as possible. Thermo Fisher is dedicated to its mission of making the world a healthier, cleaner, and safer place; lets change the world together.

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