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ASIA EDITION

# Unleashing data's potential in the pharmaceutical landscape

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**The life sciences industry is at a critical juncture in its digital transformation. Technological advancements including breakthroughs in digitised research and manufacturing, have propelled organisations towards embracing digital agendas.**

Realising that traditional paper-based operations and fragmented data collection methods hinder their ability to adapt and evolve to thrive in an ever-changing and increasingly competitive business environment, many organisations are now actively revolutionising their digital transformation strategies.

The capability to gather, combine and analyse data has become crucial for achieving success, affecting both regulatory compliance and profitability in the process.

Key to realising product and process visibility across the life sciences include the following:

**Breaking data silos**

Existing data silos are complex. Research and development (R&D) and engineering design data is challenging for process line manufacturing stakeholders to access.

On manufacturing lines, the numerous types of equipment are often maintained by entirely different teams of engineers. It becomes difficult, costly and time-consuming in such environments to blend the data created across these various 'digital islands'.

The data silos also make it difficult to communicate evidence back to the regulators that a highly controlled production environment is being maintained.

With enormous data being generated from many isolated systems – such as research, production, and quality control ? visibility of how that data impacts production efficiency and product quality is limited.

**Boosting business capabilities**

True digitalisation involves the ability to develop capabilities to capture, blend, and contextualise data efficiently. It then enables that data to be accessed and used by multiple organisational stakeholders effectively.

Building data ontology (the ability to discern the properties of the various pieces of data and the relationships between them), building a data hierarchy, and designing a data architecture based on a consistent set of rules and governance all help to maximise or augment the business value of the data that daily operations generate.

**Making data accessible**

The ability to capture and analyse data should also extend to life sciences operations' contracted manufacturing.

For example, from a regulatory standpoint, questions about drug ingredients, where they have been sourced, and when the drug was produced need to be addressed quickly – even if the drug in question has been manufactured via third-party contractors.

The data must also be managed beyond just one plant within one geography. Enterprise-wide data must account for variations across multiple plants and global regions where regulatory statutes may differ.

**Areas where digital transformation can yield benefits**

To achieve the goals of high visibility and flexible operations, life sciences organisations have deployed digital transformation initiatives designed to help drive faster and more accurate business decisions.

These are some areas where significant digital transformation are taking place:

***Data visibility***

In the life sciences industry, traceability is crucial for safety reasons – both to regulators and customers alike. To ensure that drugs are manufactured to a standard, pharmaceutical companies must guarantee replicable production standards regardless of location.

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Achieving this level of consistency requires clear visibility into laboratory and manufacturing operations, which can be facilitated by digitisation using digital services, artificial intelligence, and data analytics.

These tools provide real-time feedback and increase connectivity, making cybersecurity a critical factor in safeguarding digitised operations.

***Workforce training***

During the COVID-19 vaccine rollout, major drug manufacturers adopted an emergency 'all-hands-on-deck' work approach. While successful in the short term, this approach became unsustainable due to ongoing labour shortages.

To tackle this problem and equip new employees with the necessary information, cost-effective solutions like 'digital twins' emerged. These tools helped guide employees, making it possible to manage tasks effectively.

***Digital twins***

A digital twin is a virtual software model that analyses data and performs simulations to assess performance and identify areas where efficiency can be improved.

By pairing both virtual and physical worlds, manufacturers can analyse data in real time as well as monitor systems. This helps prevent problems before they occur, reducing downtime, and creating opportunities for improved efficiency.

In the life sciences industry, new employees can be trained in augmented reality and virtual reality environments, allowing them to address potential issues without disrupting existing operations. These AR-VR tools can also be used in engineering and manufacturing environments to enhance design and production processes.

***Credible sustainability***

Mastering both product and process data results in improved output quality. In some instances, batch processes can be converted to continuous processes, which increases output delivery and boosts output volumes, leading to a reduction in waste and improving sustainability in business processes.

Consistent production of high-quality products leads to energy savings, which is critical in the production of more sustainable drugs. The increased operational flexibility also allows for the reuse of single-use materials such as bioreactor processes that traditionally deployed disposable bags.

A convergence of events has disrupted how manufacturers operate, but it has also provided businesses with the opportunity to become more efficient and profitable. Through digital transformation, we can tackle multiple areas of businesses, simultaneously giving life sciences organisations a chance to evolve.

By adopting new technologies, businesses can be more efficient, productive, and keep customers happy, allowing them to gain a competitive edge in today’s increasingly complex and competitive business environment.