

How to design a digital transformation architecture at Life Sciences organizations



There have been tremendous shifts in the Life Sciences industry over the past year. Manufacturers are facing more pressure than ever to reach the market first while outperforming quality standards. To maintain their competitive advantage, businesses need to drastically increase their organizational agility and increase resiliency to market shifts.

At Rockwell Automation, we've enabled some of the top Life Sciences organizations to accelerate their pace of business and responsiveness to the market by leveraging digital transformation technology. Automated processes and real-time access to production data help speed time to market while streamlining compliance and reducing risk. And greater integration across the enterprise is unlocking opportunities for business functions to collaborate in ways they never have before. A thoughtfully-designed digital transformation architecture with top-tier interoperability and security capabilities is key for any Life Sciences organization looking to take their business performance to the next level.

Building resiliency when disruption is the new normal

Navigating constant disruption is a prerequisite for success in today's Life Sciences industry. Products and processes are becoming increasingly complex with more rare diseases surfacing and a growing trend towards personalized medicine. This challenge is further compounded by the lack of skilled employees entering the industry as much of the existing workforce approaches retirement age.

Beyond managing complexity, Life Sciences organizations are also under tremendous pressure to speed time to market. We've seen that the first product in market wins doctor and patient specification, delivering the highest return on investment. However, disruption in the global supply chain and strict regulatory compliance requirements present unique challenges to increasing organizational agility.

With so much in flux, it's often difficult to see the bigger picture. Many companies are taking a piecemeal approach, attempting to address a single challenge or capitalize on a single opportunity at a time. The more forward-looking enterprises are rethinking their entire operations by connecting business processes across the organization – from research and development to production and distribution – to enable better decision-making and increased agility. They're addressing every challenge at once and becoming more resilient in the face of future disruption through a holistic digital transformation approach.

Challenges

Growing demand for personalized medicines and targeted biologics

Projected two million unfilled manufacturing jobs by 2025

Pressure to be first to market to win patient specification

Increasingly strict regulatory requirements and compliance audits



Elevate your performance with a holistic digital strategy

Digital transformation is an enterprise-wide strategy that leverages technology to increase connectivity between business functions, automate processes, and ultimately increase profit. These initiatives capture information from manufacturing operations and proactively integrate insights into production. This strategy is fueled by critical insights unlocked by the convergence of information technology (IT) and operational technology (OT) across the enterprise. Through the implementation of integrated technologies, Life Sciences organizations fundamentally enhance how their facilities operate.

Intelligent processes

Quality is too critical to rely on manual and paper-based processes. Reduce risk and improve quality by removing human errors from the equation with autonomous processes. Automated compliance reporting and on-line quality testing simplify regulatory audits and deliver superior results.

Intelligent systems also significantly impact uptime and throughput. Smart production control and predictive analytics across the facility automatically optimize production parameters based on operating conditions as well as predict and address machine failure before it occurs. These insights are instrumental for maximizing your production potential.

Empowered people

With the lack of skilled employees entering the workforce, it's more important than ever to capture expertise from top operators and accelerate new employee ramp time. Equip employees with the information they need in real time and on demand with digital transformation solutions.

Innovative Augmented Reality (AR) solutions deliver live production data and procedural guidance directly to your employees on the shop floor. Imagine your operators being able to see real-time asset health and maintenance procedures overlaid on the machine in front of them. Solutions like these reduce the risk of human error and get employees up to speed quickly in new roles.

Connected facilities

As facilities become fully integrated into the enterprise and value chain, they proactively adapt to the real-time needs of the business. End-to-end supply chain visibility across internal and external collaborators allows the facility to dynamically schedule production and work orders to optimize operations. This adaptive control will dramatically decrease the cost of work in progress across the enterprise.



Increase revenue up to

10%



Decrease operating costs by up to

12%



Decrease cycle review times by up to

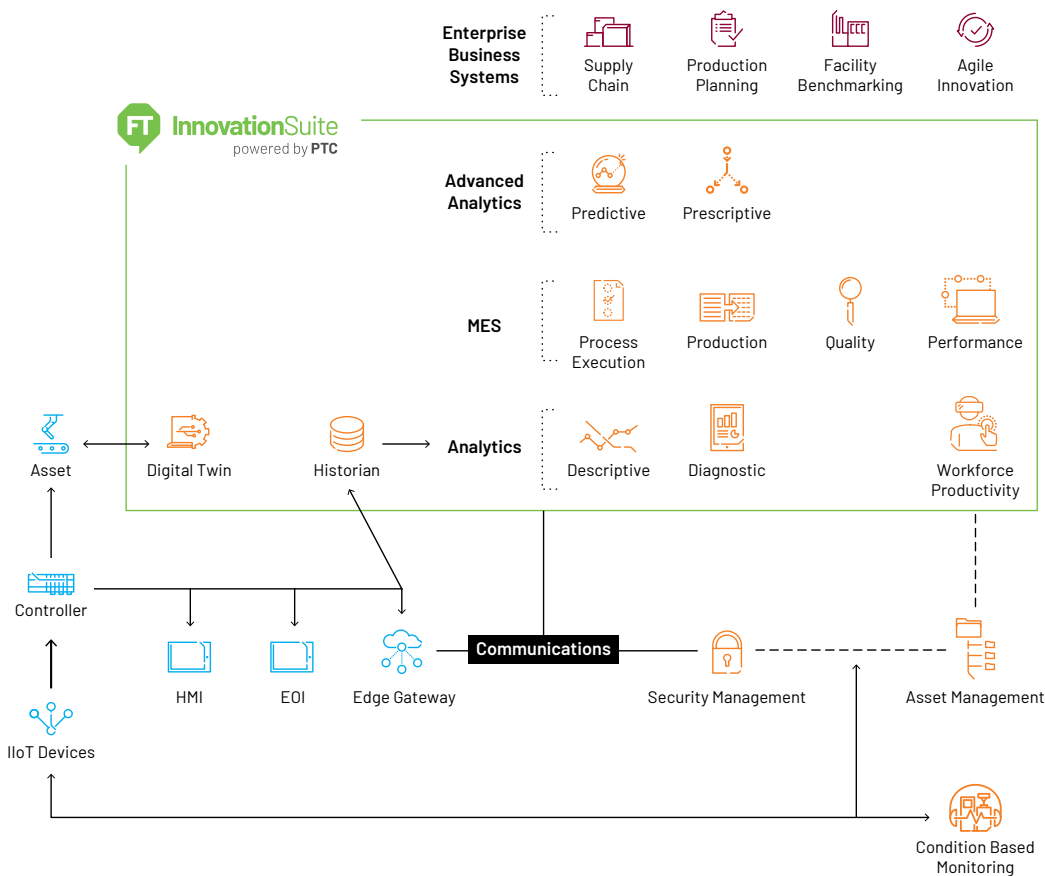
50%

Integrated systems are the foundation of digital transformation

To derive meaningful insight from the data generated by thousands of devices across global facilities, Life Sciences manufacturers need to adopt a new information strategy. It's nearly impossible to establish enterprise-wide visibility when facilities are operating in digital siloes and leveraging poorly integrated systems. Only an intelligent architecture built for the industrial enterprise provides the connectivity and control required to realize the value of digital transformation.

An intelligent architecture establishes control and reduces variability by building intelligence into processes that are enforced and acted upon by the system. Knowledge-driven operations rely on seamless interconnection between the assets and processes that control production. When the control system anticipates deviations in the process, it can proactively guide operations to take action to maintain optimal conditions.

When designing an intelligent architecture, the key is bi-directional, seamless data flow. The systems governing production must be able to both monitor and influence production control. But the production environment is complex; production planning is as integral to success as information and control. True digital transformation requires all systems from the shop floor to the top floor to be integrated through an interconnected architecture.



- 1 Establish real-time visibility with universal connectivity
- 2 Optimize operations management with MES and scalable analytics
- 3 Drive enterprise optimization with an integrated system of systems

Universal connectivity

Every digital transformation journey starts with connectivity. Universal connectivity enables the information generated by your operations – from machines, equipment, people, and more – to become available for consumption by higher-level systems. This single point for data aggregation and integration lays the foundation for all digital transformation initiatives to follow.

Establishing connectivity to your OT equipment and system doesn't have to require revalidation. Through read-only connections, Life Sciences manufacturers gain visibility into rich OT data without altering their control system. This provides meaningful insight into performance and drives actionable insights for future process improvements.

Manufacturing operations management

Production control and information management systems are the heartbeat of your digital transformation. These systems monitor current operating conditions and manage enforceable workflows to maintain optimal throughput and outperform quality standards. Integrating the information from your operations management systems into this layer affords manufacturers a greater level of consistency than would be possible through control or information alone.

These systems also fuel continuous improvement and error-proofing initiatives. An integrated information enablement strategy adds critical production context to data, enriching future analytics projects with insight into machine- and product-level context.

Enterprise integration

Integration into the broader enterprise enables facilities to adapt to the needs of the market. Enterprise systems like Enterprise Resource Planning (ERPs) provide valuable production planning context to production control systems like Manufacturing Operations Management (MOMs). This allows for autonomous production planning and execution based on customer orders.

Life Sciences organizations need to expand beyond intelligent, siloed facilities and begin building their intelligent facility network. This provides visibility into enterprise-level production and enables dynamic scheduling across the network, reducing your time to market and cost of inventory.

Operational intelligence

Operational intelligence is the backbone of your digital transformation. Industrial analytics transform operations data into actionable insights, enabling transformative capabilities. With an interconnected architecture, analytical models can be deployed anywhere from edge to cloud to uncover meaningful insights and prescribe the appropriate action. These prescriptive insights drive process optimization by constantly modelling the impact of changes on the current state and identifying the optimal action.

Knowledge-driven operations

Analytics are only valuable when insights are connected to the right people and systems at the right time. The bi-directional data flow that is inherent in a well-designed intelligent architecture enables information-driven production control at the asset or facility level. Autonomous systems remove human error from the production process and deliver more consistent results. But systems aren't the only aspect that benefit from knowledge-driven operations. Operators armed with integrated AR solutions receive real-time alerts and prescriptive insights leading to more informed decisions and efficient production.

Improving the employee experience across the facility

Engineering design

Validating changes to an existing line may not be worth the investment if you're not confident in the resulting value for production. With access to rich data from operations and digital twin simulations, engineers have the capability to investigate and verify the impact of process improvements before the organization makes any changes in the physical world. This functionality empowers engineers to confirm improvements in quality and throughput, reducing risk in the revalidation processes.

Operations

Access to real-time production data and prescriptive analytical insights in a single pane of glass takes the guesswork out of operations for your employees. Armed with role-based dashboard views and prescriptive guidance, connected workers identify production issues and prevent losses before they occur. And digital work instructions visualized through AR delivers on-demand, hands-free guidance on the shop floor to reduce process errors and accelerate issue resolution.

Maintenance

Keeping up with increasingly complex equipment and maintenance procedures is challenging for any engineer, especially those new in the role. However, when engineers have access to predictive insights and digital work instruction visualizations, they achieve higher first-time fix rates and accelerate time to resolution. Additionally, enforceable workflows and automated record keeping confirm machine calibration and cleaning procedures are completed on schedule.

Quality assurance

Digital recordkeeping streamlines compliance and accelerates batch release by simplifying the review process. Electronic batch records automatically capture the key quality and compliance information throughout production without requiring human intervention. This provides immediate access to accurate data and enables review in real time by exception only. There's no longer a need for the quality assurance team to wait until a batch is complete to review quality.

Production planning

Managing a global supply chain and adapting to disruption is the new normal for production planning. End-to-end supply chain integration provides full visibility into raw material inventory, expiration dates, work in progress, and customer demand across the enterprise. These insights empower production planning managers to dynamically schedule production to meet the needs of the market while minimizing operating costs.

IT/OT administration

As production and IT systems become more integrated and responsibilities are shared, streamlining IT/OT convergence is critical. Interoperable IT and OT systems simplify and drastically shorten the process to integrate new applications into the architecture. And with point solutions and major platforms offering varying stability and support, IT admins can rest easy knowing their digital transformation architecture is built on a platform that provides longevity and recognized stability.

95% of the Fortune 500
Life Sciences companies
rely on Rockwell Automation

What to consider when selecting a digital transformation platform

Choosing a digital transformation platform is a big decision and it's more than likely that your organization will build their strategy around this solution for the next decade. When evaluating which platform is right for your organization, there are four key capabilities you need to consider that will drastically impact the platform's viability.



Security

A comprehensive transformation architecture must prevent all kinds of threats to your business. As we move into a more digital world, maintaining cybersecurity is a top priority. But that's not all – you need to also manage internal facility access and application permissions all in one platform.

Services and offerings from Rockwell Automation are built with security by design. We have the unique IT/OT expertise to support the NIST Cybersecurity Framework at your facility from the identify and protect stages through detect, respond, and recover. Leverage our end-to-end security program to assess your level of risk and address operational vulnerability while maintaining business continuity.

Interoperability

To achieve digital transformation, every system and function in the enterprise must be seamlessly connected. If there are challenges in sharing data across systems, you're still operating in digital siloes. Interoperability between your digital transformation platform, legacy assets, and existing IT systems is a critical component of a successful platform.

Rockwell Automation has invested heavily in achieving interoperability between our software solutions. We've designed an open platform that will connect to nearly any hardware or IT system you're currently using today, even if they're not provided by Rockwell Automation. Built around common IT and OT standards, our platform delivers harmonious data flow throughout your digital transformation architecture.

Innovation

The digital transformation platform you select must support your evolution from where you are today to a digitally-mature, predictive facility. Your platform should be future-ready, developed by a supplier with a vision for the future, and offer long-term stability. At Rockwell Automation, we know no single supplier can deliver every capability necessary to build the facility of the future. That's why we've built a framework for co-innovation with our best-in-class partner ecosystem to solve our customers' needs across the IT and OT spectrum.

Partnership

Implementing a digital transformation architecture is a significant investment in your organization's future. When you choose Rockwell Automation, you gain a strategic, long-term partner that brings a wealth of industrial transformation expertise to your digital strategy and execution plan. Our domain experts provide the front-end engineering and design support you need to reduce risk and maximize return on investment. We'll guide you through every step of the process – from prioritizing high-value use cases to selecting and implementing proper technology – to make your aspirations a reality.

Are you ready to elevate your industrial performance?

Where digital transformation may once have been an aspiration, in today's complex environment it's now an imperative. Only a holistic digital approach that connects systems across the value chain will empower organizations to thrive today and be ready for tomorrow.

Companies that invest in an enterprise-wide transformation strategy built upon an intelligent architecture will be best equipped to adapt to shifts in the market and capitalize on tomorrow's opportunities. Integrated technology provides access to the information needed to make decisions in real time and optimize operations in any situation. But not all technology platforms are created equal – only a platform built with the future in mind will provide the foundation for the evolution of your facility.

There may be many steps on the path to becoming a digitally-enabled enterprise but you don't need to navigate this process alone. Rockwell Automation is your end-to-end digital transformation partner, enabling you to drive continuous improvement through a virtuous cycle across the value chain – from product development to production to patient outcomes. Your

facility floor is a complex environment, rich with data, but getting value from that data is no simple task. It requires a partner who knows not just how to connect your data, but how to put it into context and make it useful. Our innovative solutions turn your data into actionable insights and get it to the right places at the right times. But our approach isn't limited to your facility floor. We digitize entire processes, so your visibility extends across the supply chain and across the entire product lifecycle.

Having enterprise-wide insights at your fingertips is your key to innovation and ultimately competitive advantage. And we're here to support you every step of the way – not just with our own capabilities, but with our extensive partner ecosystem. Only Rockwell Automation offers a future-ready digital transformation architecture and a best-in-class partner ecosystem leading the industry in co-innovation.



Visit our website to learn more about how digital transformation is changing Life Sciences manufacturing.

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