



Building the business case for MES

You find the problem. MES helps ensure workflow and enforces the "new."

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MES overview

MES software can connect, manage, validate and optimize all aspects of production. When implementing an MES solution, you have options. A comprehensive MES – which can be purchased as a single-plant, multi-plant or industry-specific solution – can help you meet a range of productivity, quality, compliance and cost-saving goals.

Sometimes, however, a comprehensive MES solution delivers more than you initially need. In these instances, individual MES applications can address your specific challenges while building toward an eventual full-scale MES deployment. These applications can start with a single use case at the machine or work-area level, and then scale up to a larger MES solution over time as ROI is realized.

MES applications include the following:

- Production-management applications
- Quality-management applications
- Performance-management applications
- Warehouse-management applications



A man wearing safety glasses and a grey sweater is looking at a tablet held by a woman in a factory setting. The background shows industrial machinery and a blue overhead structure.

BEFORE YOU READ THIS CHAPTER

How are orders from ERP entered in your production management system?

How do you gain visibility as to where parts are in the manufacturing process?

How rapidly can you notify your manufacturing operations of a quality issue/concern?

How quickly can your quality operators create or build a quality plan?

DATA COLLECTION CONFIGURATION

Tag browsing requires no changes to automation

MACHINE STATE TRACKING

Equipment state is recorded at all times for analysis and troubleshooting

DOWNTIME DATA COLLECTION

A complete picture into what was happening when equipment goes down

OVERALL EQUIPMENT EFFECTIVENESS

Understand how effectively manufacturing assets are utilized by tracking availability, performance, and quality

MEAN TIME BETWEEN FAILURE

Compute a key measure of equipment reliability for maintenance personnel

MEAN TIME TO REPAIR

When failures occur, minimizing downtime is critical

OPERATOR CONSOLE

OEE analytics and event editing & reporting in one simple user interface

DRIVES OPERATIONS EXCELLENCE

Enable lean and continuous improvement efforts

MES applications

MES applications allow companies to connect, manage, validate and optimize production to achieve smart manufacturing in a scalable approach.

FactoryTalk Performance

Improving profitability hinges on improving OEE, so most manufacturers collect production data, but they may lack effective ways to analyze that data or miss critical data needed to identify real issues affecting cost and productivity.

FactoryTalk® Performance helps manufacturers to improve efficiency with an automated system that measures and analyzes data continuously to determine key corrective actions required to reduce the things that reduce OEE. These include downtime, unproductive time, cycle time and scrap. The application pinpoints which corrective actions will have the most impact, again and again over time.

BUSINESS VALUE:

- lowers cost
- improves asset utilization

FactoryTalk Production

To be successful, manufacturers must plan and control production to keep it running smoothly at required levels while meeting cost and quality objectives. They need to enforce standard manufacturing processes while continuously monitoring and evaluating production plans to adapt them to better meet cost, quality, flexibility, delivery and other objectives on the fly.

FactoryTalk® Production is a scalable solution that helps manufacturers to achieve balance with an automated method of managing orders for discrete applications in complex environments. Integrated with ERP and built on a common modular framework, the application tracks order data and recipe parameters necessary for production to support end-to-end production management and enable continuous improvement.

BUSINESS VALUE:

- right first time production
- retain and transfer knowledge
- make to demand
- faster time-to-market

PARTS MANAGEMENT

- Integrates with ERP and parts management systems to track order data and material consumptions

BILL OF MATERIAL

- Manages the entire bill of material and delivers to proper stakeholders

EQUIPMENT INTEGRATION

- Integrates with equipment to download and verify configuration data for each order

ROUTE ENFORCEMENT

- Verifies production follows the proper route based on configurable parameters

CONFIGURABLE WORK-FLOW

- A process step can only begin if the system confirms the proper preceding steps are complete

ORDER PLANNING & EXECUTION

- Supports accuracy of each order with detailed planning as well as work instructions, label printing & operator activity verification

ELECTRONIC PRODUCTION RECORD

- Every step in production is recorded and verified quality, compliance and continuous improvement.

QUALITY RECIPE CONFIGURATION
Define and disseminate each step in quality procedures

UI CONFIGURATION
Automated configuration of displays based on quality recipes

IN-PROCESS QUALITY SAMPLING
Verify quality of product before rework is required or product must be scrapped

SAMPLE PLAN TRIGGERING
Event based triggers for quality sampling supports consistent quality

WORKFLOW ENFORCEMENT
Confirms that every employee, every shift follows sequencing, resourcing and data collection requirements

FLEXIBLE NOTIFICATION ENGINEER
Never miss a scheduled quality check, escalate issues to proper stakeholders

OUT-OF-SPEC ESCALATION
Dynamic change quality testing regimen based on test results

QUALITY REPORTS
Keep all stakeholders informed on real-time quality metrics and trends

FactoryTalk Quality

Conformance is key. Companies that rely on disparate systems and antiquated paper processes cannot guarantee consistent production quality. Workflows and business processes built on industry best practices should provide the basis for manufacturing quality at every step of the manufacturing process. These best practices error-proof manufacturing processes to ensure that each step is executed correctly, with complete, fully traceable data.

FactoryTalk® Quality allows manufacturers to model and enforce their plants' in-process quality regimens easily, efficiently and at a scalable rate. Integrated with ERP and built on a common modular framework, the application supports a company's efforts to deliver quality products on time and to react quickly to quality issues.

BUSINESS VALUE:

- brand protection
- positive release
- eliminate plant-floor paperwork
- reduce cost of compliance

FactoryTalk Warehouse

FactoryTalk® Warehouse management provides capabilities for controlling processes and managing logistical operations throughout the entire warehouse. It provides full inventory transparency and helps to increase warehouse efficiency.

- Plan goods receipt and guide warehouse operators
- Track inventory
- Manage pallet operations
- Openly and easily interface with third-party clients

BUSINESS VALUE:

- supply chain efficiency
- make to demand
- inventory stock reduction
- lean manufacturing

BULK MATERIAL RECEIVING
Accurate and consistent detail on material/ingredient receipt

BULK MATERIAL INVENTORY
Removes inventory guesswork with immediate and accurate information on inventory levels and properties

WIP & RM INVENTORY MANAGEMENT
Track work-in-progress and raw material lots/units to keep lines moving and track particular units as necessary

MATERIAL PATH MODELING
Never start an order before validation-required materials are available

WET & DRY INVENTORY CONSUMPTION
Peace of mind that the correct material lot is consumed and recorded for auditing purposes

CARRIER MANAGEMENT
Manage and validate the appropriate is used and in production ready state

INVENTORY TRANSACTIONS
Keeps enterprise and plant systems aware of what's been consumed, what materials need to be ordered and more

MES workflows

Close the information gap while facilitating continuous improvement

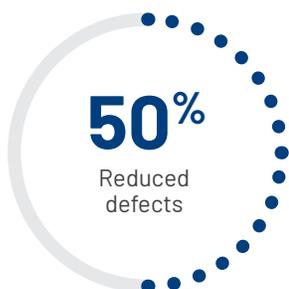
Think about it. Enforceable workflows break down organizational information silos to unite people with systems. They encourage and facilitate greater collaboration, standardization and enforcement of best practices, helping manufacturers to improve productivity and distinguish their company from the competition. And, because quality processes become integral to production activities, allowing process data to be viewed in context of orders, products, suppliers and materials, plants can learn more. The more plants know, the more they can do with that knowledge.

Achieve and demonstrate regulatory compliance

Standardized workflows and business processes built on industry best practices error-proof manufacturing processes. They help to prevent issues and mistakes from happening. They perform quality checks and initiate corrective action plans and quality reports automatically. So, when there is a deviation, they alert appropriate personnel and commence additional quality checks, corrective actions and quality reports. Corrective action plans may include no-fault forward systems to prevent release of below-quality products, and hold and quarantine capabilities that keep non-conformant products in a facility instead of in the hands of customers. Finally, enforceable workflows automatically create records that detail processes, material, equipment, tools, operators and test results, complete with timestamps and electronic signatures. This makes it easier to demonstrate regulatory compliance.

Retain and transfer knowledge

As retirees exit the workforce, intellectual property often walks out with them. Quite often, this occurs faster than new workers can be hired and trained. Enforceable workflows drive out variability through automated setup, work instructions and integrated quality processes. We understand the value that manufacturing production management software with enforceable workflows provides firsthand. Using it in our own plants at Rockwell Automation helped us to achieve tangible results:



THE CONNECTED ENTERPRISE



APPLICATION EXPERTISE

FT InnovationSuite
powered by PTC



INTEGRATED CONTROL & INFORMATION



MES

The ability to manage workflows and generate valuable production data can make your operations more efficient, productive and responsive.

What can MES do for you?

The ability to manage workflows and generate valuable production data can make your operations more efficient, productive and responsive. Here are some examples of questions that can help you understand the potential opportunities of MES in your operations:

How much can you increase production by automating data-collection and reporting tasks?

Could automated workflow execution help you reduce lead times, cycle times or reject rates?

Can products or batches be linked back to the equipment, employees and raw materials utilized in their production?

Increase your own production

APPLY YOUR METRICS BELOW

(Minutes per day spent manually
collecting data & producing reports)



60

X
(Production days
per year)

(Production hours
saved per year)

LEAD TIMES

(Average lead time in minutes)



0.45

(Potential lead time savings
per production run)

CYCLE TIMES

(Average cycle time in minutes)



0.45

(Potential cycle time savings
per production run)

REJECT RATES

(Average reject rate per
production cycle)



0.75

(Potential reject rate improvement
per production cycle)

*Based on demonstrated performance improvements using MES

Integrating enterprise-wide intelligence

You can use the data provided by MES to optimize operations. But by combining information from MES with the data available from other industrial and enterprise sources, you can begin to optimize operations across their entire enterprise.

This is where advanced manufacturing analytics software comes into play. The software collects data from multiple systems and organizes it in a way that makes the most sense for users. This creates a single decision-support platform that can help employees at every level of an organization make better business decisions.

SOME AREAS WHERE ADVANCED ANALYTICS CAN HELP A COMPANY IMPROVE INCLUDE:

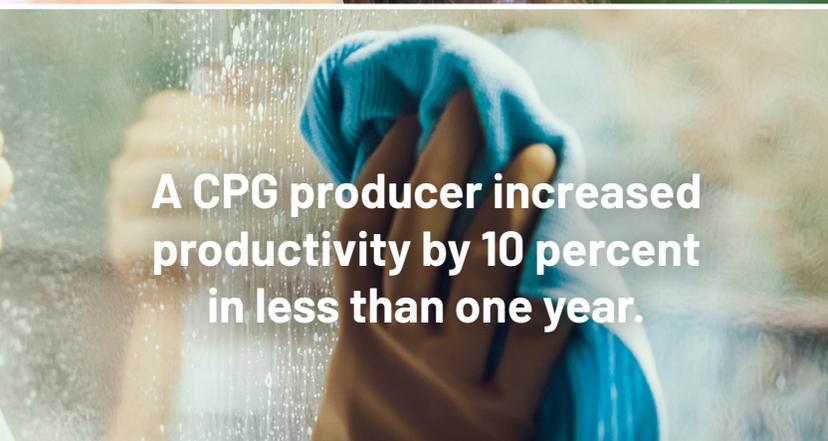
- Improving best practices and regulatory compliance
- Discovering downtime and improving labor utilization
- Increasing production volume
- Monitoring and troubleshooting remote assets
- Recognizing potential security risks
- Reducing demand forecast errors
- Enhancing quality and minimizing waste
- Maximizing resource utilization

How are companies using production intelligence? →





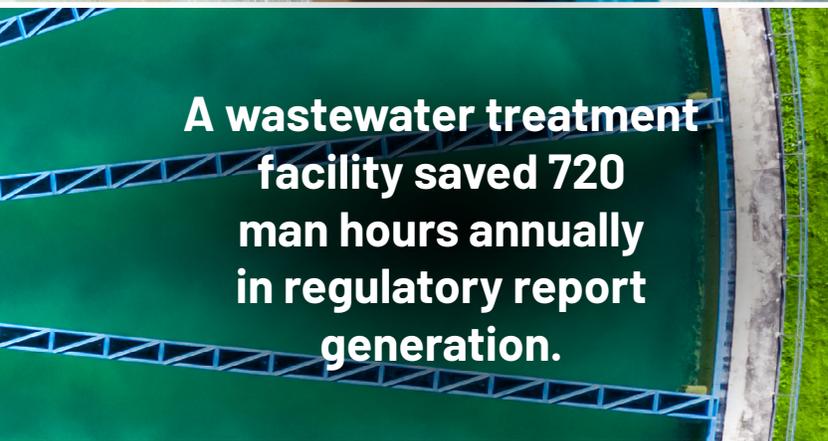
A dairy processor discovered more than 33 hours of additional production time per year.



A CPG producer increased productivity by 10 percent in less than one year.



A brewery increased throughput by 60 percent.



A wastewater treatment facility saved 720 man hours annually in regulatory report generation.



A food producer increased yield by more than 100,000 pounds of food per year.



A pet-food producer reduced energy consumption by 3 percent and saved \$845,000 in annual energy costs.



“

As soon as a defect is detected at a quality gate, an alarm is issued through the gate. Depending on the defect category, messages are sent to the supervisors and managers through the system. Prompt corrective and preventive actions are taken.”

- IT Manager, Leading Automotive Company



Leading formula producer

CHALLENGE

Minimize bottlenecks and lost production caused by manual processes. Comply with strict new China Food and Drug Administration (CFDA) regulatory standards meet new growth opportunities stifled by labor costs and productivity lags.

SOLUTION

Manage quality with standardized and centralized recipe management, and enforceable work flows. Seamlessly work with mixed-vendor infrastructure connects plant-floor data enterprise resource planning system.

RESULTS

- Increase productivity
- Cut labor costs
- Met regulatory standards
- Records all data

Leading pharmaceutical company

CHALLENGE

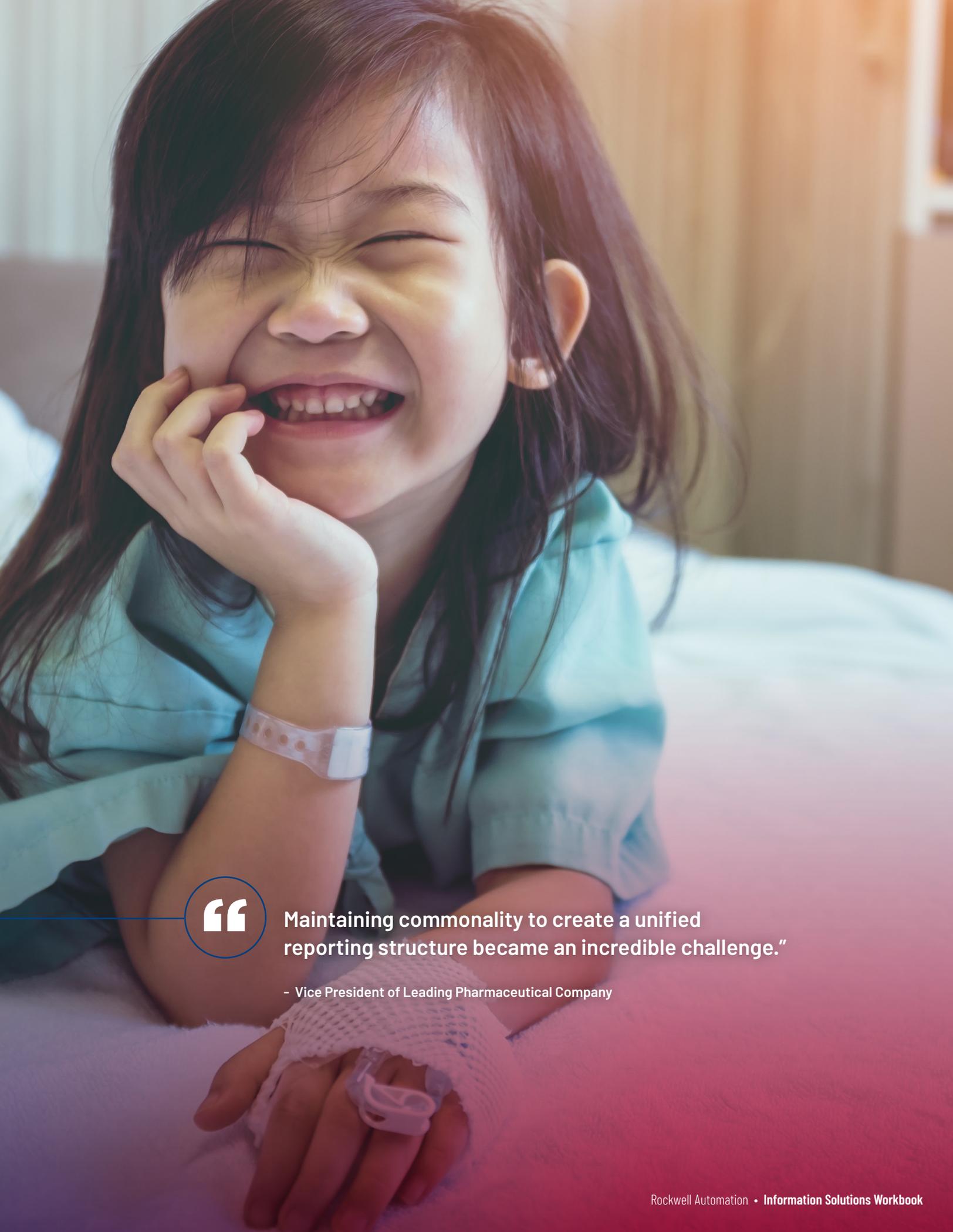
Greenfield project with a goal of going completely paperless for MES process. Management was spending too much time reviewing the documentation that came with a paper-laden process; documentation was prone to human error. Company needed to integrate 2-D labeling with their MES system.

SOLUTION

Operation data is now transparent to anyone who has a mobile device. Virtualization broke the chains between hardware and software. Help reduce labor costs. Provides a more efficient, verifiable quality management solution. Implements Electronic Batch Record (EBR) & paperless solutions.

RESULTS

- Reduced operating costs
- 100% paperless production
- Reduced review time



“

Maintaining commonality to create a unified reporting structure became an incredible challenge.”

- Vice President of Leading Pharmaceutical Company

Summary & resources

A strong understanding of the information flowing from your technology and your people can help you deploy a high-performing production environment of the future and ultimately give you a competitive edge. It also will help you make more informed decisions in the buying process. The following resources can help you stay current on the latest advances in production analytics and provide support in your journey.

Industry Research and Insights

To stay informed of the latest advances in analytics technologies and how companies are using them, follow the latest research and insights from these organizations:

[MESA](#) | [ARC Advisory Group](#) | [Gartner](#) | [International Society of Automation](#) | [LNS Research](#) | [Smart Manufacturing Leadership Coalition](#)

Digital Transformation

To learn more about comprehensive solutions for Digital Transformation, [click here](#).

Network Design Guidance

The [CPwE reference architectures](#) provide guidance and best practices for designing and deploying industrial network architectures.

Training and Certification

IT and OT professionals can learn more about the skills needed for managing and administering networked, industrial control systems with [training and certification](#) from Cisco and Rockwell Automation.



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