ABB Ability™ Smart Manufacturing Operations Management Suite

Proven. Flexible. Scalable.

—

Plan, optimize and continuously improve production processes in the discrete and hybrid manufacturing

Tailored digital and fully automated solutions for all types of factories: from small lot manufacturing to mass-customized and high-volume production.

Manufacturing today operates in a complex and highly competitive environment. In addition to fierce cost pressure, high demands are on quality, traceability, and time to market.

Evolving market conditions and competition require manufacturers to continuously keep up with increasing customer demands while simultaneously improving the agility, efficiency and resilience of their operations, future proofing it against constant change.

As digitalization progresses, it brings a free flow of data from both IT and OT applications across the value chain, making interoperability a basic expectation. Working with a partner who has the competency and clear focus on the entire operation, from the shop floor to enterprise level planning, is the best approach to convert traditional manufacturers into world-class, fully connected, flexible and self-optimizing smart factories.

Trust ABB and our Smart Manufacturing Operations Management suite specifically designed for the discrete and hybrid sectors. We help you deliver the best operational results by leveraging our leadership in automation, robotics, cobotics and AGV/AMR, our deep understanding of manufacturing processes, data security and the latest digital technologies.

ABB Manufacturing Execution System (MES) and Production Intelligence (PI) solutions are the foundation for all operational collaboration, helping you satisfy changing market demands dynamically and profitably and be ready for Industry 4.0.

Factories working with ABB typically achieve:
- **20-40% increase in throughput** and **10-20% improvement of OEE** thanks to Shop floor integration
- **50% reduction in waste and administrative paperwork** with Electronic Work Instructions and Track & Trace solutions
- **2-10% reduction of material consumption and inventory** via flexible warehouse and production management

"Not only were the functionality and technology of ABB's project solution convincing; they also showed experience and knowledge. It was a constructive and fruitful collaboration with ABB's team."

- Wander AG

Showcasing the art of possible with ABB's own smart factories and best practice harmonization

—
01
Over 80 ABB and Hitachi Energy factories use ABB MES and Production Intelligence solutions worldwide

—
01

ABB' modular and flexible smart manufacturing applications can be efficiently adapted to different production environments and business rules. This is because they are built on decades of collaborating with, and delivering informational and operational technologies to ABB's own factories and those of Hitachi Energy - serving as an innovation motor and a model for applying new tech.

Users benefit from the on-going investments in software development to future-proof their investment and their operations. After successful project deliveries, easy configurability, updates and other continuing services – often in a seamless cooperation with factories' own personnel – ensure that results and utilization are preserved, and total cost of ownership is reduced.

"Smart Industry means smart people deploying the right technologies against the right challenge."   - Nestlé

Smart Manufacturing journey
Comprehensive offering serving the needs of customers at different levels of digital maturity
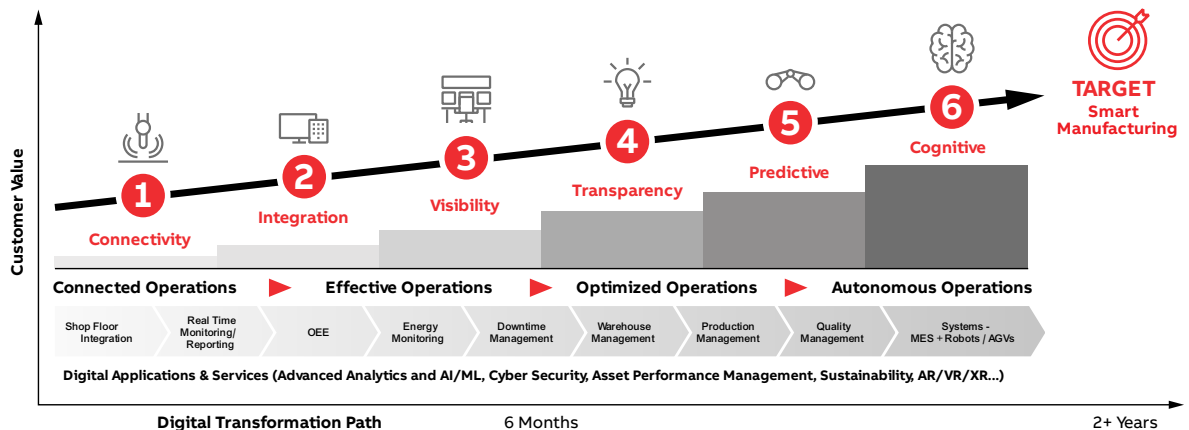
Converting from conventional to smart manufacturing – there is no single path

Just like there is no single factory configuration or mindset of people working in it, there is no single path to smart, optimized and autonomous operations. No single company can realize this industry vision alone.

Process know-how produces the right partner
In a Smart Manufacturing project, the identification and harmonization of business processes, and the change management goals for the user community are as important as the IT implementation. Having an experienced partner during the implementation phase helps our customers navigate the complex project and ensure positive outcomes and user acceptance, with tangible results.

ABB accompanies you for every step of your project, from the digital maturity assessments, building a secure digital architecture and commissioning, to customized training and continuing support. With ABB Ability™ Smart Manufacturing Operations Management suite, factories gain the flexibility needed to manage evolving operations at reasonable ownership costs, with the possibility to configure different functions without requiring a program change.

Automation synergies and ERP integration fast-track the digital transformation
Manufacturers on the path to Digital Transformation and autonomy choose ABB for our overall understanding of the automation landscape. As MES optimization algorithms identify the best resource allocations and execution sequences, it helps to have a partner that deeply understands the automation and shop floor layers when establishing robust interfaces to these. For example, intelligent, real-time orchestration and optimization of all physical, business and digital process lets factories set priorities according to operational goals and production plans.

"The techniques and technologies [for Smart Manufacturing] are all there but they need the right culture to implement and unlock value."   - Mälarenergi

"Implementation of a truly agile "chip-to-module" manufacturing concept has led to a five-fold productivity gain, reduced delivery times and minimized downtime at the award-winning fully automated semiconductor factory in Lenzburg, Switzerland."

- Hitachi Energy

Flexible modules from order to delivery

ABB Ability™ Smart Manufacturing Operations Management suite with seamless manufacturing and business processes integration enable true interoperability among all entities involved in the production process.

Manufacturing execution		Production intelligence
Enterprise Integration	Material management	Dashboard
Production order management	Warehouse management	OEE
Quality management	Labor management	Energy monitor
Downtime management	Equipment maintenance management	
Electronic work instructions	Planning / scheduling	

The lifecycle of plant floor data no longer begins and ends on the plant floor. Instead, day-by-day operations require a complex network of many information flows between the business and manufacturing systems. With tight integration links between business and manufacturing systems, MES helps enhance the speed at which information is exchanged between the plant and the business. Production Intelligence apps help manufacturers become more responsive to the pull from the market and more predictive to their suppliers.

Flexible, ISA 95 based modeling capabilities and modular architecture allow to tailor projects to customer's current ambition level: starting from Shop Floor Integration, real-time monitoring/reporting and OEE, then gradually introducing additional modules, fully automated systems (orchestrating technologies like robotics, AGVs, IoT applications, test systems, RFID tags to trace products and parts) and advanced analytics use cases – thus increasing the delivered value and moving towards the vision of autonomous manufacturing.

Ease of use with modern interface
All user interfaces and navigation between displays have been co-created with factories' personnel, offering intuitive displays for superior top floor-to-shop floor visibility, most of which are web-based. With easily configurable dashboards, users can make changes on the fly directly from the management environment.

The journey of a smart factory
Wherever you are on your digital transformation journey, ABB can help you convert from conventional to more modern manufacturing operations that are safe, smart, and sustainable.
• **Pick an applicable, high ROI use case**
• **Tie it to your business strategy**
• **Engage front-line workers through the existing process Improvement Initiatives**

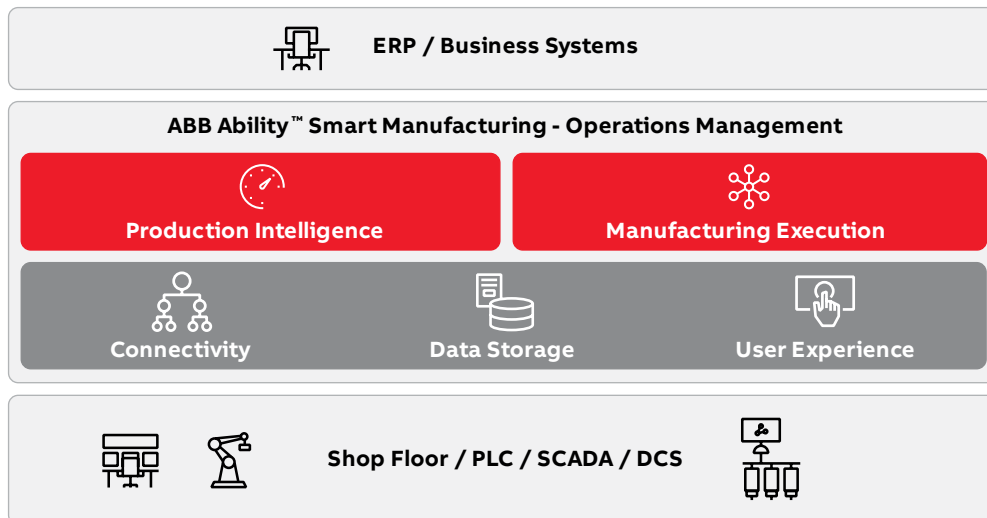"This approach facilitates our adaptation to the future tightening of requirements in process safety and traceability."

- DSM Nutritional Products

Start your smart factory journey by picking most applicable use cases tied to your business strategy

Feature	Benefit	Description
Integration	Seamless integration of Manufacturing (Shop floor) and Business (Top floor)	Connectivity solutions with SAP, Infor LN, IBM Maximo, and other ERP systems. Set of standard interfaces (ODBC, OLE DB), web service, XML, OPC, TCP/IP as well as specific protocols to communicate to external systems, equipment, and control system.
Production management	Plan, respond and change on demand	Production Management function includes: - Automatic or Manual download/update of ERP orders - Download of BOM, serial numbers, product configurations - Flexible and reliable dispatching, management, and execution of Production orders (Plan, Release, Start, Pause, Resume actions) - Configuration of production workflows with optional paths - Dynamic routing based on specific routing/ product characteristics from ERP and operations confirmation to ERP - Real-time status overview of a production order, product, station, operations.
Quality Management	Recognize and respond to quality challenges	Quality management function includes: - Quality measurements definition - Assignment to production steps, equipment, product types, etc. - Mandatory/optional quality parameter value collection - On-start/In-process/On-finish data collection - Checklist support - Tolerance definition and control via automatic validation. - Manual or automatic quality data collections - Manual or automatic submitting of non-conformity reports (NCR's) - Configuration and production of test certificates
Downtime Management	Improve plant performance and productivity	Collect and track real-time equipment downtime and interruption information and causes. Downtime reasons configurations. Tracking of non-productive activities (e.g., downtime due to cleaning), idle and rework time. Configurable effect on a product unit affected with downtime (pause, abort, resume).
Electronic Work Instructions	Bring consistency to manual operations	Guides the operator through each step with the required production and safety instructions and checklists. Integration with common document repositories (SAP DVS, SharePoint, etc.). Enables instant messaging between operators, supervisors, and logging of shift notes.
Material Management	Full material control and transparency	Material management function enables tracking & tracing of material(s) and include: - Tracking and traceability of individual parts, lots, batches, assemblies. - Real-time inventory levels update (allocate, reserve, receive, scrap). - Real-time reporting of material consumed, and material produced. - Management of material compatibility and relevant processes. - Material identification through barcode labeling. - Confirmation of material availability. - Equipment and material genealogy. - Weigh & dispense process support.
Warehouse Management	Improved inventory turns and inventory reduction	Management of material storage locations and levels. Support material movement within warehouses and its elements (cells, packages, silos, containers etc.). Material compatibility management. Integration with external warehouses and inventory management systems.
Labor or Workforce Management	Plan, measure, and view labor activities	Configuration of production calendars: shifts, working time, exceptional days and operation mode. Accurate management and tracking of staff presence (join/leave) and activities on a given product against defined production time. Reporting details to ERP.
Equipment Maintenance Management	Plan and execute maintenance activities	Plan, create and execute equipment maintenance tasks based on observations or preventive plans. Execution of task with support of instructions, checklists etc. Keeping track of when the request was created, started, and completed. Overview of active maintenance requests.
Overall Equipment Efficiency (OEE)	Uncover hidden potential	Overall Equipment Efficiency (OEE) function shows current and historical availability, performance, quality parameters and their contribution in the overall equipment effectiveness. Includes real-time visibility and analysis capabilities to enable operational decisions in a manufacturing execution context. Motivates production teams to maximize utilization, uptime and improve quality.
Dashboard	Operations and plant performance visibility	A presentation and design tool that enables users to design web dashboards based on their own real-time equipment and operational data and use them to present and analyze that data. In the design mode, the user can define dashboards layouts, organize them into groups and share with others. In the presentation mode, users can browse through the defined hierarchy of dashboards and view the presented data.

Key drivers for a smart manufacturing program

Key drivers for implementing **ABB Ability ™ Smart Manufacturing Operations Management suite** include decarbonization, digitalization, automation, the evolution of the workforce, loss of expertise – contributing to corporate initiatives around operational excellence, continuous improvement, supply chain optimization and sustainability.

ERP / Business Systems

ABB Ability ™ Smart Manufacturing - Operations Management

Production Intelligence

Manufacturing Execution

Connectivity

Data Storage

User Experience

Shop Floor / PLC / SCADA / DCS

Benefits:

- **Manufacturing flexibility for leaner supply chains** increases responsiveness to the market demand, variations and predictability to the suppliers.
- **Operations transparency** coupled with the **seamless flow of manufacturing instructions** minimizes costs and maximizes order fulfillment and throughput.
- **Improved product quality, reliability, tracking, and traceability,** enhancing regulatory compliance capabilities.
- Implement **Dynamic responses to manage exceptions** (e.g., material shortage, machine or operator downtime, rework).

- **Direct and real-time information exchange with the enterprise** provides management with access to all types of operational data, enabling decision support towards corrective actions and performance.

"Time required to maintain data manually has been **reduced from 30 min to 2 min** per job. Now we have zero errors in entries, while eliminating documentation storage cost and risk of document loss"

– ABB

ABB Ability™ Smart Manufacturing - Operations Management

Release	8.0
Market presence	Since 2004 (as Enterprise Connectivity Systems, ABB Ability™ MOM/MES)
ISA 95 based	(ISA) - 95
B2MML support	B2MML
Technology	Microsoft (IIS, .NET Framework, .NET Core, C#, C++, SQL Server Reporting Services, SQL Server Analysis Services), Blazor, NHibernate, Spring.NET
Database	Microsoft SQL Server 2016 / 2019
Operating systems	Client: Windows 8.1 / 10 Server: Windows Server 2016 / 2019
Web browsers	Chrome, Edge
Virtual environment	Yes
NLS support	Yes

References

• Smart industry is built on trust and collaboration
• Cyber security considerations for manufacturing plants
• Manufacturing Execution System for Wander AG drink maker
• Manufacturing Execution System raises productivity for DSM Nutritional Products
• Semiconductors production in Lenzburg - award-winning "Excellent Location Safeguarded by Digitalization"
• The factory of the future is smart, connected and already here at ABB Heidelberg
• In the smart factory at ABB Beijing processes take place in real time, production is flexible, and the entire value chain is automated

—
For contact details or more information, please visit our website:
https://campaign.abb.com/smart-manufacturing

abb.com