# SAP Digital Manufacturing

## Strategy and Roadmap

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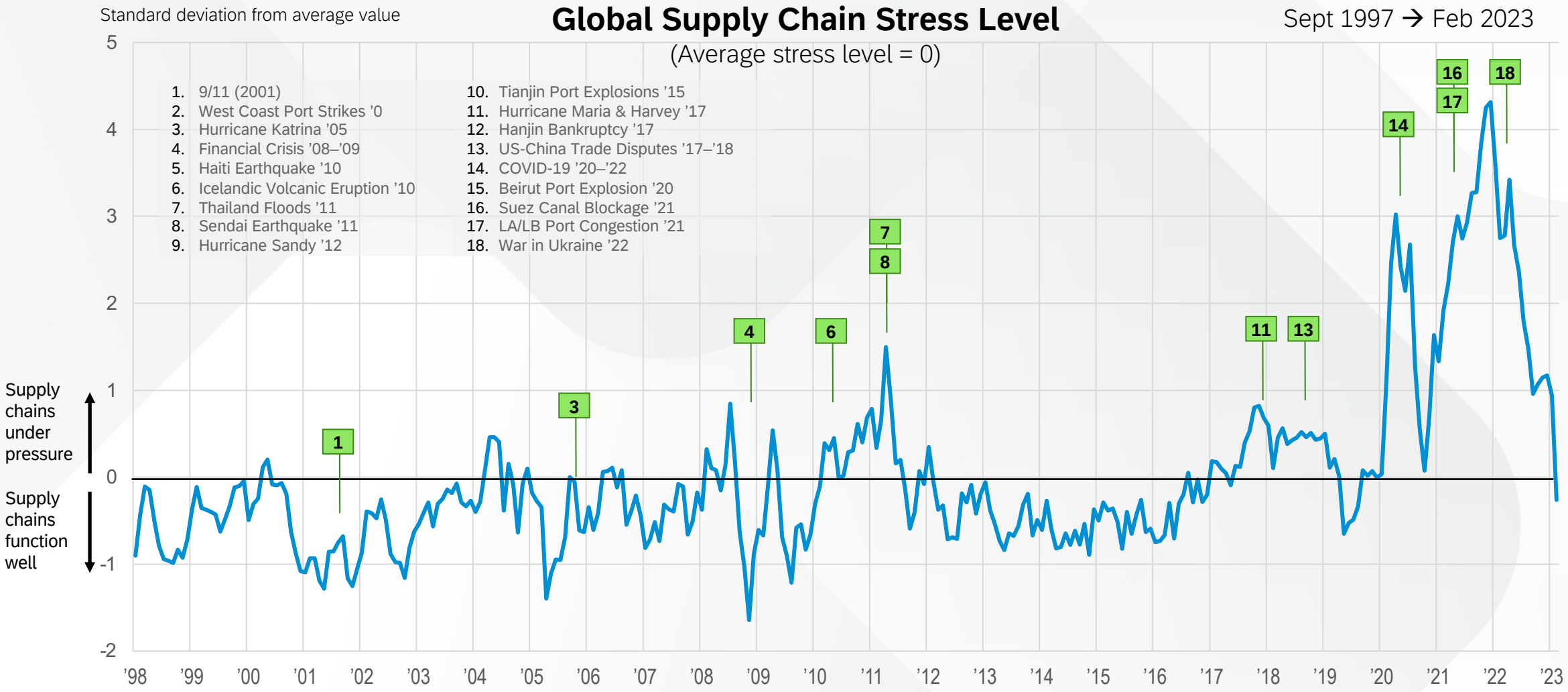
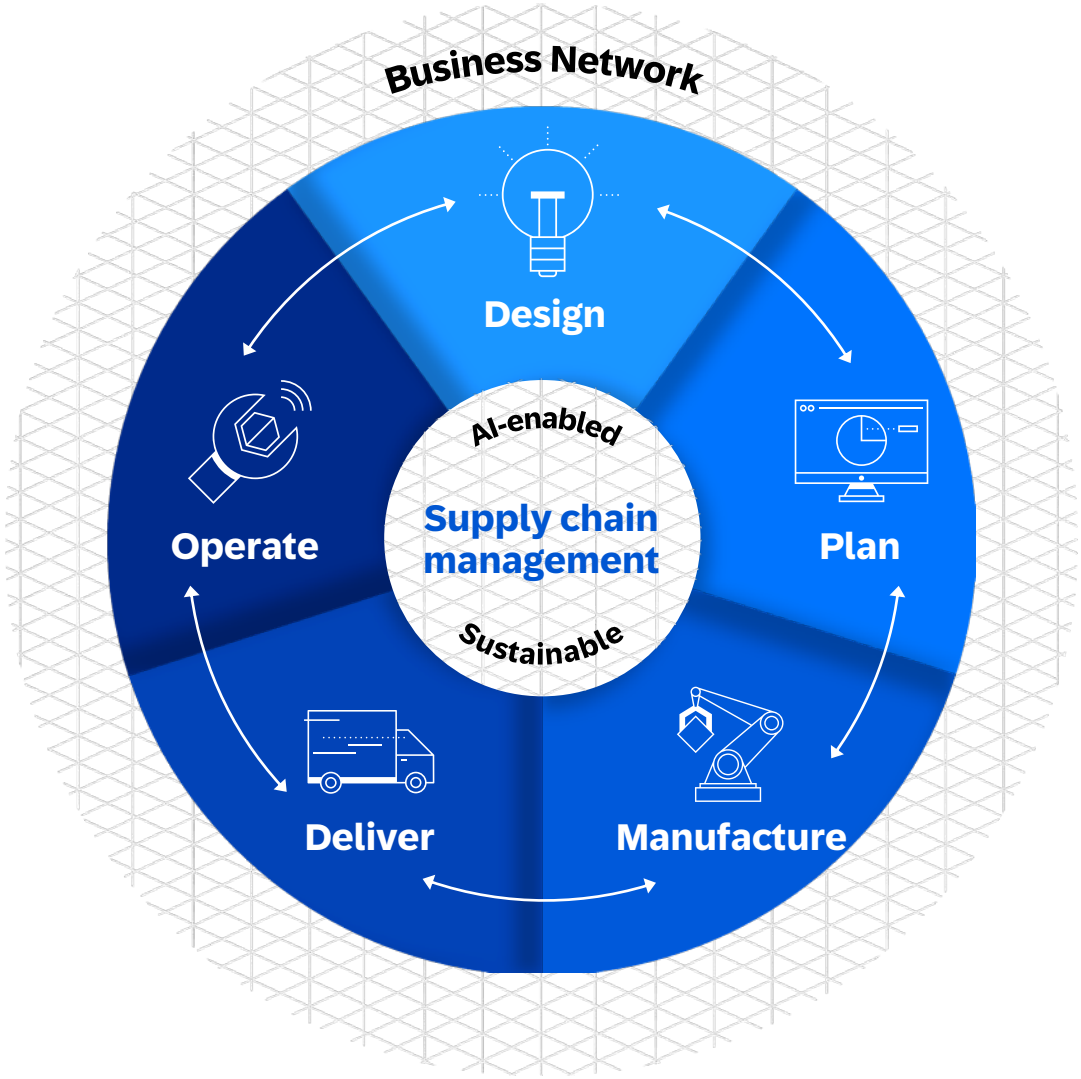
# The Only Thing Constant is Change

## Global Supply Chain Pressure Index




Source: Federal Reserve Bank of New York, Global Supply Chain Pressure Index (GSCPI), link
Link to interactive graphic

# SAP DSC Portfolio | Connected Solutions for Resilient Business



SAP Digital Manufacturing

# PRODUCTIVITY AT SCALE

## Operational Efficiency and Resiliency
with seamless integration into the entire supply chain

## Shop Floor Automation
through machine integration & shop floor process modeling

## Connected Frontline Worker
with intuitive worker guidance and artificial intelligence

## Process Efficiency & Quality Control
supported by artificial intelligence, QM integration and issue resolution

## Analytics
for real-time insights and sustainability

## Traceability & Compliance
supported by paperless production

## Scalability & Agility
through standardized processes and integrated systems

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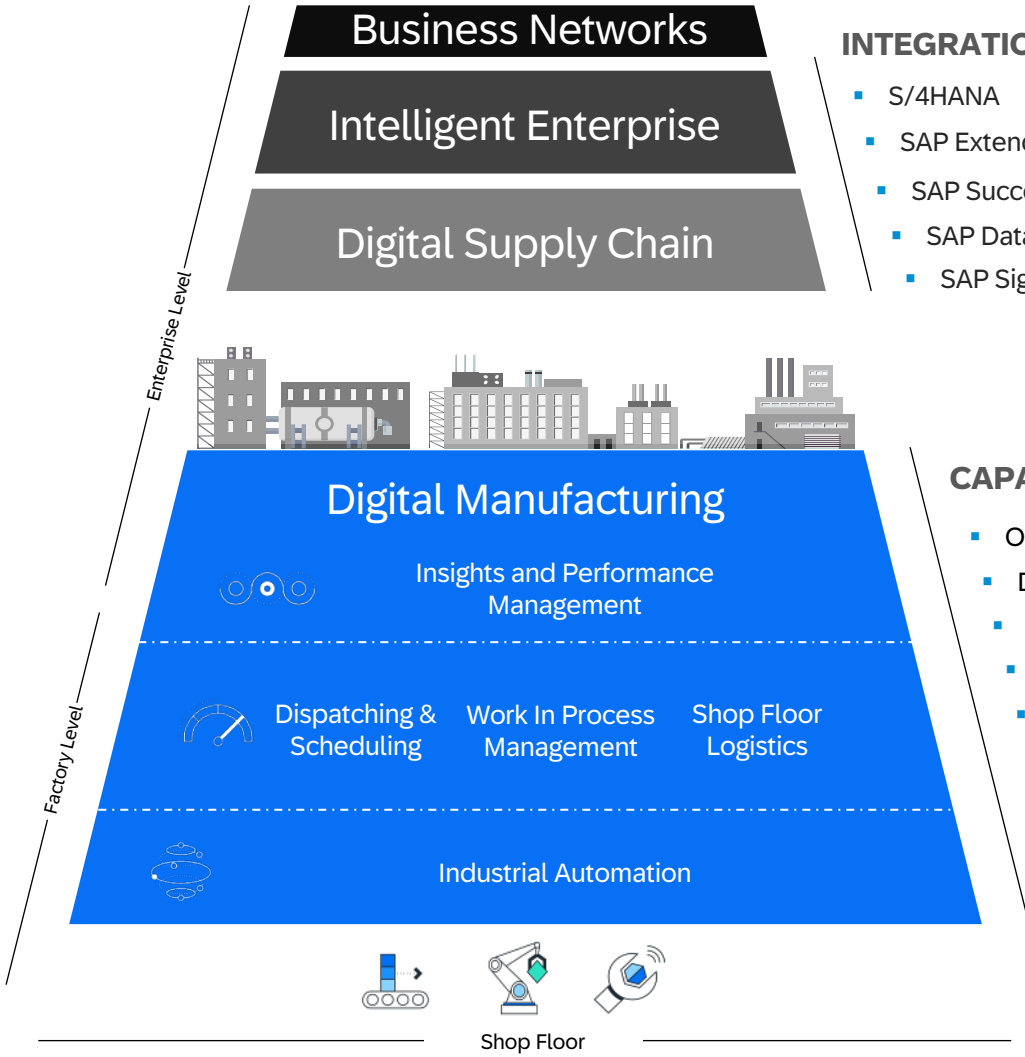
# SAP Digital Manufacturing




**INTEGRATIONS**

- S/4HANA
- SAP Extended Warehouse Management
- SAP SuccessFactors
- SAP Datasphere & Analytics Cloud
- SAP Signavio

**CAPABILITIES**

- Order Management
- Dispatch & Scheduling
- Labor Management
- Work In Process Management
- Quality Management
- Genealogy
- Insights and Performance Management
- Industrial Automation (IT/OT Convergence)

## BUSINESS BENEFITS

### Increased Productivity

Streamline and automate manufacturing processes, reducing paper and manual effort and increasing overall productivity

### Enhanced Visibility & GMP

Realtime data and insights into the manufacturing performance, track progress, full traceability to make informed decisions and support regulatory requirements

### Improved Quality Control

AI-based analysis of manufacturing processes, enabling enhanced product quality, reduced waste, and streamlined operations.

### Flexibility and Scalability

Enabling businesses to easily adapt and grow their manufacturing operations in line with changing business needs and market conditions

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# Selected Digital Manufacturing Successes

## Carl Zeiss
Enable the Connected Smart Factory

Customer Profile

Industry: Industrial machinery and components; optics and optoelectronics
Company: ZEISS is an internationally leading technology enterprise operating in the fields of optics and optoelectronics
Project: 1st DMC implementation in the Factory in Oberkochen (Germany) by the service partner Syntax

Business Driver

- Innovative strategic Manufacturing Execution System across all Zeiss Business Units supporting the Connected Smart Factory initiative at Zeiss
- Secure and fulfil challenges of the regulated environment
- Scalable application to respond to increasing market demand
- Ensure quick reaction to market and assure quality standards and admission conformity
- Empower the shop floor to run flexible, resilient and competitive manufacturing operations
- Comply to enhanced sustainability strategy and enable production insights with key performance indicators.
- Document full production data including machine data acquisition

Solutions:

- SAP Digital Manufacturing Cloud for Execution
- SAP Digital Manufacturing Cloud for Insights

**The vision is to live the 'digital mindset' – acting as a fully integrated digitized company.**

## Siemens Energy
Realizes the goal of the harmonized MES

Customer Profile

Industry: Discrete Manufacturing
Company: Siemens Energy operates globally along nearly the entire energy value chain. Its products include gas turbines, steam turbines, generators, transformers and compressors.
Project: MES@SE for Gas&Power, Generation, Transmission and Industrial Applications

Business Driver

- Unified MES for the international production landscape
- Visibility over the entire store floor; paperless production processes and improvements of all relevant manufacturing KPI's
- Efficient management and monitoring of production work
- Manufacturing information accessible in real time for comprehensive analysis and continuous improvement actions
- Brownfield connection of OPC UA machine types and in connection with the partner product FORCAM FORCE EDGE also connection of further machine types

Solutions:

- SAP Digital Manufacturing Cloud for Execution
- SAP Digital Manufacturing Cloud for Insights

**The goal is to implement one MES across 100+ plants classified into 5 plant cluster. It is about innovation and end-to-end integration covering multiple production scenarios.**

## Vibracoustic – Industry 4.Now
Holistic Digital Manufacturing Operations with Global Scope

Customer Profile

Industry: Automotive
Company: Vibracoustic SE (subsidiary of Freudenberg Group) https://www.vibracoustic.com/
Project: Implement and roll out a global manufacturing operations solution to harmonize processes across all 40 production plants

Business Scope

- Global Testing
  - Digitalization of product testing processes (e.g. destructive sampling)
  - Decide production orders, scheduled and executed in DMC to guide and document test execution
  - Pilot is live, rollout to ten plants ongoing
- Global Prototypes
  - Digitalization of prototype manufacturing processes
  - MS Teams used as collaboration and workflow tool to trigger prototype production orders, integrated via MS Power Apps and ECC and DMC APIs
  - Pilot is live, rollout to ten plants ongoing
- Series Production
  - Build of combined production and logistics template based on repetitive manufacturing
  - Go-live and rollout planned from 2023 to 40 production sites

Solutions:

- SAP ECC (S/4HANA transition projected over the next 5 years)
- SAP Digital Manufacturing Cloud for Execution
- SAP Cloud Platform Enterprise Agreement

## Enhancing Productivity and Capacity with SAP Digital Manufacturing at a high-performance computing manufacturer
Eviden, Big Data & Security (BDS)

CHALLENGE:

- Current BDS Angers factory is not able to support the growth forecasted by BDS: production capacity x2 over the next 5 years.
- Business challenges includes doubling the current productivity capacity with only 30% more staff, -30% maintenance costs, +30% stock reliability, etc)

SOLUTION:

- A market study was conducted, after which the SAP Digital Manufacturing for execution was identified as the best response for BDS given its needs and its IT landscape (SAP S/4HANA)
- Global Supply Chain template enforcement for BDS with possible rollout for any other plant with production/assembly activities especially for SAP end-to-end Supply Chain deployed factories.
- Development of sprint plan (8 sprint) and dedicated work packages

OUTCOME:

The Project went live in 8 Months on SAP S/4HANA with minimum business downtime:

- SAP DMC (SAP Digital Manufacturing Cloud) or execution
- SAP Fiori based & Embedded SAP Analytics reporting
- SAP EPD (Enterprise Product Development) Integration

**47** Providing expertise for all industries in more 47+ countries

**30%** Overall SAP operational efficiency with direct access to Product & Assembly Routine Information

**2X** Improved data accessibility for faster decision making with SAP S/4HANA Embedded Analytics

## Bosch Rexroth
optimizes production execution and performance

Customer Profile

Industry: Discrete manufacturing
Company: Bosch Rexroth AG is part of Robert Bosch GmbH and is a global industry-leader, solving drive and control challenges around the world.
Project: SAP DMC implementation in Lohr, Germany, and later global roll-out

Business Driver

- Unified MES for the global production sites
- Efficient management and monitoring of production work
- Realtime shop floor connectivity to production systems
- Embedding of highly customized and complex business processes into DMC
- Interaction with legacy MES for end-to-end traceability
- Adaption of new MES for existing production line: eight workstations, incl. worker guidance for manual assembly, automated test stations, label printing, RFID reader, screwdrivers

Solutions:

- SAP Digital Manufacturing Cloud for Execution
- SAP Digital Manufacturing Cloud for Insights

**To set up their manufacturing sites for the future, Bosch Rexroth is replacing its legacy MES with SAP DMC as a state-of-the-art MES solution.**

## REWE Group – Glockenbrot Bäckerei
Connected and Integrated Bakery Processes

Customer Profile

Industry: Consumer Industries, food production
Company: Glockenbrot Bäckerei is the bread brand label from second largest food retailer REWE Group with about 3,300 stores in Germany
Project: Implementation of DMC in the bakeries in Frankfurt and Bergkirchen with a production of 450 tons per day

Business Driver

- Process automatization and E2E integration with SAP S/4HANA
- One MES platform across all REWE manufacturing plants
- Manufacturing Execution and Overall Equipment Effectiveness in one solution for the floor of the bakery
- Responsive and repetitive design (e.g., POD Designer)
- Scalable initiative solution, start simple and enhance the solution step by step according requirements
- The Go-Live for Glockenbrot Bäckerei is planned for October 2023
- First wave in the REWE Group are the bakeries, the second wave targets the meat processing unit of Brandenburg, which is largest private label supplier in the meat and sausage product range

Solutions:

- SAP Digital Manufacturing Cloud for Execution
- SAP Digital Manufacturing Cloud for Insights

**Vision:** Harmonized and optimized business processes, supported by an integrated system landscape, make our day-to-day work easier. This allows to work in an interconnected way and to make key decisions to set new production standards together.

## Jowat: Creating seamless operations with SAP Digital Manufacturing

Before: Challenges and Opportunities

- Aimed to get a tight grip on surging raw materials costs.
- Relied on manual, paper-based processes to track inventory and raw material consumption.
- Used multiple systems to track inventory and production workflows, leading to conflicting sources of information.

Why SAP

- Enables Jowat to manage inventory and production processes from one intuitive platform.
- Integrates seamlessly with Jowat's existing SAP S/4HANA, SAP Extended Warehouse Management, and SAP Business Technology Platform.
- Ensures Jowat can take advantage of the latest features thanks to the quarterly refresh cycle.
- Guidance and expertise provided by consultants from SAP Services and Support.

After: Value-Driven Results

- Eliminates manual, paper-based processes, helping to reduce errors and improving productivity.
- Provides leaders with up-to-the-second insight on inventory, helping to drive smarter purchasing decisions.
- Saves workers time on the factory floor so they can focus on creating high-quality products.
- Provides granular visibility of production workflows, supporting robust quality control.
- Prevents delays in production, empowering Jowat to deliver goods on time to customers.
- Opens the door to future innovation with artificial intelligence and Internet of Things technologies.

"With the implementation of SAP Digital Manufacturing through SAP Services and Support, we see ourselves on the way to becoming a transparent factory with a reduction in risks, errors, and process costs through optimized processes."
Dirk-Alexander Segger, Detmold Plant Manager, Jowat SE

**100%** Inventory accuracy

**3** Person-days a week saved by automating raw material consumption updates

| Jowat SE | Industry | Products and Services | Employees | Revenue | Featured Solutions |
|---|---|---|---|---|---|
| Detmold, Germany www.jowat.com | Chemicals | Adhesives, primers, cleaning, and flushing agents | 1,200 | €425 million | SAP Digital Manufacturing, SAP S/4HANA, SAP Extended Warehouse Management, SAP Business Technology Platform, SAP Services and Support |

## Accelerating the Global Transition to Renewable Energies
SMA Solar Technology AG

CHALLENGE:

The in-house-developed manufacturing execution system (MES) landscape has evolved over the last 40 years. In return, future development of solar innovations have become limited due to complex interfaces, low performance, and expiring maintenance intervals of solutions installed on-site.

The aging system posed a major challenge to the competitive delivery of the latest solar technology innovations in a new SMA Gigawatt Factory. Risks included production downtime resulting in frustrated employees, high logistics costs, unsatisfactory inventory management, and a lack of process transparency.

SOLUTION:

SMA initiated the modernization of its operations by establishing a cloud foundation that includes SAP S/4HANA Cloud Private Edition integrated with the SAP Digital Manufacturing solution and various other SAP and third-party solutions. Guided by the expertise of the Cloud Success Services team from SAP, this transition was supported by a selective data migration, strategic prioritization of process improvements, and a focus on standardization.

SMA continues to enhance its digital capabilities on the integrated platform. Plans include tools for collaboration, transportation management, yard logistics, and integrated business planning.

OUTCOME:

The project is already delivering impressive results, boosting supply chain productivity, reducing inventory carrying costs, and decreasing days in inventory. This trend is expected to continue as supply-chain-planning costs and total logistics costs decrease. The initiative will also help streamline transportation planning, curb freight spending, and establish a collaborative partner portal. Additionally, the real-time visibility that the platform provides can help improve transparency into order statuses while supporting connected devices in the yard. Overall, these outcomes signify an enhancement in operational efficiency across various facets of the organization.

**15%** Increase in supply-chain workforce productivity

**10%** Improvement in overall supply-chain planning costs

**10%** Reduction in inventory carrying costs and stock turnover rate

## Schwarz Produktion – Digital Factory
Build Bridges, Not Silos

Customer Profile

Industry: Consumer Products – Coffee Roasting
Company: Schwarz Produktion (Part of Schwarz Group) https://schwarz-produktion.com
Project: Greenfield coffee factory "Bon Presso" in Rheine (Germany)

Business Drivers

- Smart production and process order **execution**
- Shopfloor **performance** management: machine and line monitoring
- **Realtime** shop floor **connectivity** to production systems
- Digitalization of **quality** management
- **Automated** Production Processes
- **Paperless** shopfloor and operator guidance
- Shop floor **stock** management in synch with SAP EWM
- Realtime **integration** to SAP ECC, SAP EWM
- Integrated Dynamic Asset Performance Management with **Maintenance** and Service processes and data

Solutions:

- SAP Digital Manufacturing Cloud for Execution
- SAP Intelligent Asset Management
- SAP Extended Warehouse Management

**All production and asset management processes can be executed, running on SAP Industry Cloud Solutions. Schwarz is now able to significantly reduce their TCO and increase the efficiency of operations in the coffee plant contributing to the goals of their digital strategy.**

## Smart Press Shop – Industry 4.0
The smart Press Plant

Customer Profile

Industry: Automotive
Company: Smart Press Shop GmbH & Co. KG (Joint Venture of Porsche AG and Schuler AG) www.smartpress.plus
Project: Greenfield factory between Halle and Leipzig (Germany) with newest hardware and software (100% Cloud)

Business Drivers

- Smart Features
  - Paperless production
  - Fully autonomous setup process with press tool provisioning, allowing the competitive production of small batches
  - Press tools are digitally connected to press
  - Processes are supported digitally to the maximum
  - Continuous traceability from the raw material to the body part
- Sustainability
  - Lightweight tools: CO2 savings
  - Operations with 100% green electricity and gas
- All fully supported by SAP Cloud Products

Solutions:

- SAP S/4HANA Cloud Essentials
- SAP Digital Manufacturing Cloud for Execution
- SAP Cloud Platform Enterprise Agreement

"We were looking for a modern cloud solution for our IT. SAP Digital Manufacturing Cloud convinced us in the end with its modern cloud architecture and modern user interface. We also appreciate that SAP Digital Manufacturing Cloud will develop quickly and expand further functions. We will benefit from this through the frequent updates and therefore always have the most up-to-date system" Hannes Rothe, Managing Director Smart Press Shop

## Manufacturing digitalization with SAP DM
ABB Drive Products

CHALLENGE:

In the context of operations digitalization, challenge is to find a solution that meets evolving Smart Factory requirements which will help accommodate these requirements in simpler and faster fashion.

Current complexity of the user interface for end users without integration to quality and takt time control processes, directly impacts production output. A reliable method to connect and master shop floor automation systems and tools such as robots, torque tools, vision systems, and pick-to-light systems were missing, resulting in a disjointed manufacturing process. One of the key challenge has been to visualize end to end process and measure real time KPIs

SOLUTION:

Utilizing SAP Digital manufacturing, SAP Business Technology Platform (BTP_ and Cloud connectivity technologies, ABB was able to build modern intuitive user interfaces to simplify interactions for operator, implement quality control process with real-time equipment integration from cloud to shop floor for multiple global locations. SAP Integration Suite has enabled efficient communication within Manufacturing Execution System (MES) and ERP and other 3rd party systems.

Leveraging Manufacturing Insights combined with Power BI solution, has largely improved visibility.

OUTCOME:

The project successfully replaced the old platforms with modern systems and the latest technologies, leading to improvement in production productivity and quality. This modernization not only enhanced user satisfaction by providing a more intuitive and efficient user experience but also improved factory connectivity. The advanced connectivity enables real-time visibility, allowing for more dynamic and responsive production processes. These outcomes collectively marked a substantial step forward in the organization's operational efficiency, customer perceived quality and technological advancement, setting a new standard for its manufacturing capabilities.

**~40%** Increase of production output in one production line (6 month after implementation)

**4x** Shorter onboarding and learning curve for new production workers

**>70%** Increase in Operator satisfaction

## Global Growth Plan driven by Digital Transformation
Zero Motorcycles

CHALLENGE:

Established processes were not able to support the growth of business. Orders were not fulfilled on-time and as a result the forecast was inaccurate and growth targets were missed.

Zero Motorcycles struggled to track production and inventory on-hand did not reflect actuals. Customer satisfaction was on the decline and a fragmented technology landscape further slowed down operations and the business's ability to address customer needs.

SOLUTION:

Using SAP's Best Practices and Fit-to-Standard approach for manufacturing, a new state-of-the-art, cloud-based solution was quickly available to meet their needs.

Efficient and highly integrated processes can be implemented using SAP S/4HANA integrated with SAP Digital Manufacturing, SAP Integrated Business Planning, SAP Ariba, and SAP PLM. This improved visibility to operation actuals, plan adherence, inventory, quality, and cost/labor.

OUTCOME:

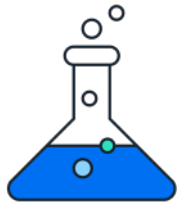
The simplified system landscape reduced cost of ownership of the end-to-end system and provided a single system of record. Master data is centrally maintained for all processes, avoiding redundant maintenance and ensuring consistency and integrity in processes. The landscape fully supports future growth initiatives for global expansion of Zero Motorcycles into international markets. Harmonized processes are streamlined, and easier and quicker to consolidate. These benefits cemented position Zero Motorcycles as a leader in their industry.

**2x** Faster Physical Inventory

**95%** On-prem to Cloud transformation

**4→1** Full Consolidation from 4 to 1 System of Record

# Core process industries scenario

| | 1. Weighing / Premixing | 2. Batch-Production / Mixing | 3. Continuous Output (i.e. Extruding) | 4. Filling/Packaging |
|---|---|---|---|---|
| **Process** | Ingredients are weighed out for a specific order (i.e. Premix) |  Materials are mixed resulting in one or multiple batch(es).<br>Batch-Reaction | Materials and Intermediates are further processed i.e. by extruding resulting in a continuous production output | Finished products are filled or packed in serialized or non-serialized packages |
| **SAP DM capability** | SAP DM **Weigh & Dispense** | SAP **DM Batch Production** with Order-Split into multiple shop floor units, Batch Genealogy, Batch Valuation /w characteristics, NC Entry.<br>Parallel phases, flexible quantities | SAP **DM order-based production**, automated Yield/Scrap and Goods Receipt postings<br>SAP DM with **Planned Orders** (Repetitive Manufacturing) | SAP **DM order-based production** and/or **Packaging** solution for serialized products and traceable **packing units**, **Label printing**<br>**EWM integration** with Handling Units |
| **Partner/ Customer** | Pre-Weighing with Labeling, Campaign Weighing, Active Ingredient Weighing | Customer specific processes | Advanced Mill, Mining, Refinery processes | Customer specific processes |

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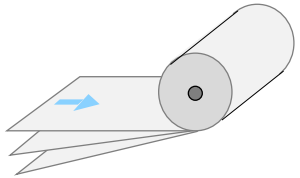
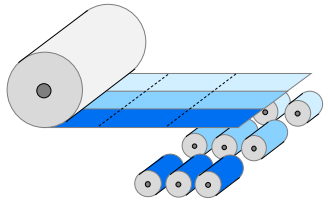
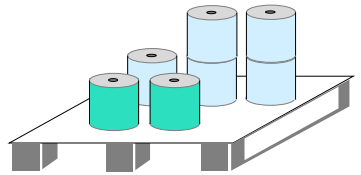
# Core mill industries scenario

| | 1. Pre-Processing | 2. Laminating | 3. Roll Slitting / Cutting | 4. Labelling/Packaging |
|---|---|---|---|---|
| **Process** | Pre-treatment of metals, pickling, or coating of materials to be prepared for the next production step |  Different layers of metal, plastic, or other materials are laminated to produce a composite. This composite material is then formed into a coil. |  Unwound the master coil and cut it into narrower strips which are rewound into smaller rolls. Within one process step multiple products (different sizes) are produced (Co-Production)<br>Scrap (ends) may occur |  Finished products are labelled, packed and stored on pallets and delivered to a warehouse.<br>This process may be customer specific to meet for example specific cut-lengths |
| **SAP DM capability** | SAP DM **Batch Production** and/or **Serialized Production** | SAP **DM Order/SFC based Production**<br>Genealogy and optional Batch Valuation /w characteristics,<br>**Non Conformance Entry** | SAP Resource Orchestration (REO) and **Tool Management**<br>SAP **DM SFC Production** with **SFC split** into multiple shop floor units (Coils)<br>Genealogy (Master Coil / Child Coil)<br>**Co-Product SFCs** (Future scope) | SAP **DM order and SFC based production** and/or **Packaging** solution for serialized and non-serialized products and traceable **packing units**, **Label printing**<br>**EWM integration** with Handling Units |
| **Partner/ Customer** | Customer specific processes | Specific NC management. (NC on a specific part of a coil) | Specific NC management<br>Combined Orders & Configurable products<br>Alternative UoMs (individual lengths)<br>Specific Scrap processes | Re-Classification / Re-Assignment of products (Changing Production) to different customer<br>Customer specific processes |

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# SAP Digital Manufacturing 2024

## Next level **PRODUCTIVITY AT SCALE**

Subject to Change
Updated May 2024

### MANUFACTURING OPERATIONS

- Electronics
- Service & Repair
- Compliance / GxP
- Dispatching & Monitoring for Process Industry
- Issue Resolution

### INSIGHTS

- Overall Equipment Effectiveness Analysis
- Enterprise Analytics Enablement via Live Connection and Data Products

### APPLICATION SCALABILITY

- Transport Management
- Object-based Authorizations
- Simplified Automation Onboarding

### PARTNER SOLUTIONS *

- Meat & Fish
- Mill & Mining
- Statistical Process Control (SPC)
- Digital Shift book
- Shop Floor Automation

### ARTIFICIAL INTELLIGENCE

- Conversational assistance with Joule
- 'Just Ask' on shop floor data
- Visual Inspection
- Manufacturing Issue Analysis and Solution Assistant

### INTEGRATION

- CALM
- SuccessFactors
- Datasphere
- Signavio

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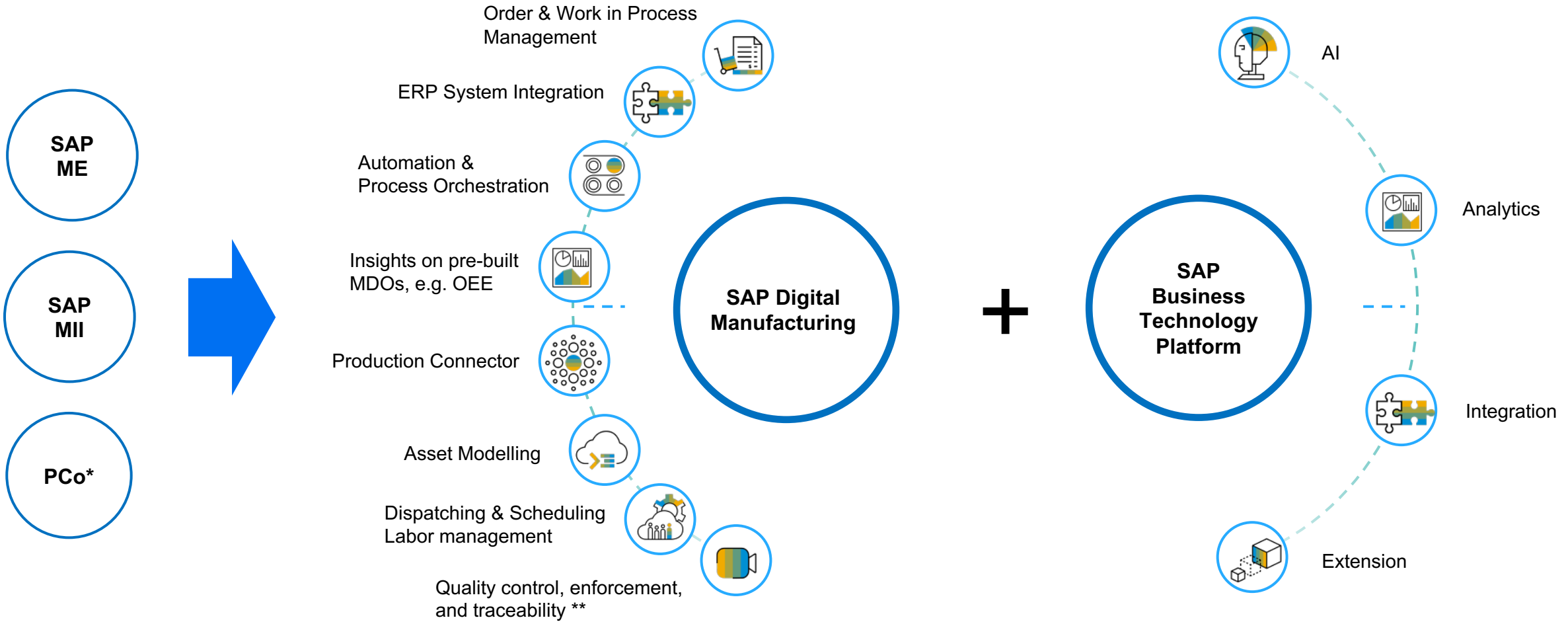
[Official SAP Digital Manufacturing Roadmap]

* Capability provided by partners

# Elevate SAP MES (OP) to SAP Digital Manufacturing

## Transformation Strategies: High-Level Overview




* *Plant Connectivity*

** *e.g. Visual inspection via bring your own model support*

- ✓ Partner Ecosystem
- ✓ State of the art architecture & technology
- ✓ Low-code no code capabilities for citizen developers
- ✓ Innovative hybrid Cloud / Edge architecture

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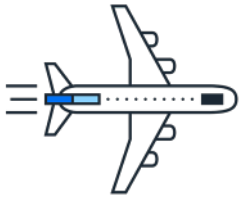
# Driving Business Value with Digital Manufacturing

## Industry Depth

Best-in-class for your Industry

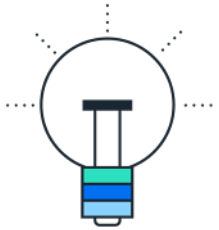


## Speed to Market

Accelerate time to market and global roll-outs

## Strategic Importance

Implement and scale the factory of the future

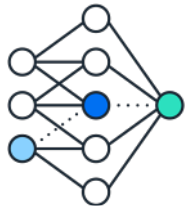


## Compliance & Sustainability

Reduce waste, comply with standards and meet sustainability targets

## Real Time Insights

Real-time visibility for improved decision making and workforce optimization.



## Global Partner Ecosystem

Strong pool of experts for fast and high-quality implementations

# Thank you.

Contact information:

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