SMART MANUFACTURING

Catering to a Dynamic Global Market

Integrated Suite for Manufacturing | Web Synergies

Last Updated: February 1, 2021

Web Synergies™
A Yokogawa Company

Why Smart Manufacturing?

- Optimize the entire manufacturing process
- Respond to dynamic global market demands
- Increase overall profits & efficiency
- Address customization & complexity

What is Smart Manufacturing?

"The complete integration of collaborative manufacturing systems that respond in real-time to meet the changing demands and conditions in the smart factory, in the supply network, and in customer needs."

What to Do

Data-driven decision-making aligned with live demand signals, production capacity, and supply chain reality. Smart systems tell you exactly where to focus effort.

When to Do It

Real-time responsiveness to factory floor conditions, supplier updates, and shifting customer expectations — so you're always one step ahead.

How to Optimize

Seamless integration of people, processes, machines, and data across the entire value chain — from raw material to final delivery.

Market Drivers & Industry Challenges

WHAT'S DRIVING ADOPTION

Fast-paced global marketplace
Products demanded at unprecedented speed and volume across all sectors.

Globalization pressures
Companies must serve diverse markets with varying standards and regulations.

Rising customer expectations
Customers demand customization, speed, and quality simultaneously.

Cost competitiveness
Manufacturers must do more with less — smarter, not harder.

Technology maturity
AI, IoT, and cloud have crossed the threshold from experimental to enterprise-ready.

KEY CHALLENGES ADDRESSED

Customization at scale
Mass-producing unique products without sacrificing efficiency.

Supply chain complexity
Managing multi-tier global supplier networks in real-time.

Data silos
Breaking down barriers between systems, departments, and partners.

Talent & skills gap
Bridging the gap between traditional manufacturing and digital tech.

Cybersecurity risks
Protecting interconnected systems from increasingly sophisticated threats.

10 Key Enabling Technologies

*The **smart manufacturing** revolution is powered by 10 interconnected technologies working in concert*

01 Cloud Computing & Storage
Outsource cost of managing data; stay current with emerging technology

02 Inventory & Network Opt.
Connect and optimize gathered data; real-time product management via drones

03 Sensors & Auto-Identification
RFID tags reduce manual QA steps; adds SKU-level supply chain visibility

04 Predictive Analytics
Use mass data to anticipate problems; enhance forecasting & prescribe next steps

05 Internet of Things
Sensor-enabled equipment in constant communication via a central system

06 Robotics & Automation
AI-powered, self-teaching robotic systems that adapt actions in real-time

07 Blockchain
Decentralized ledger for recording transactions and maintaining quality control

08 Driverless Vehicles & Drones
Expedite pick-pack, inventory control, and forklift operations autonomously

09 3D Printing
Build products in one step, reducing materials and production complexity

10 Artificial Intelligence
Low-cost sensors + affordable storage = rapid growth in manufacturing AI

Data & Connectivity Technologies

01 Cloud Computing & Storage

Migrating to the cloud allows manufacturers to outsource the significant cost and operational burden of managing data, memory, and IT infrastructure. Cloud platforms ensure companies always have access to the latest technologies without heavy capital expenditure.

- Eliminates on-premise hardware overhead
- Enables scalable data storage and compute
- Ensures access to the latest emerging technology
- CRITICAL: Cybersecurity must be maintained throughout migration

02 Inventory & Network Optimization

A unified platform connects all gathered data, enabling companies to extract maximum value and make well-informed business decisions. Inventory control drones send and receive real-time data, enabling dynamic product management across the entire supply network.

- Creates a single source of truth for all data
- Inventory drones provide real-time product visibility
- Supports faster, more informed business decisions
- Must integrate seamlessly with emerging technologies

03 Sensors & Auto-Identification

RFID tags and smart sensors dramatically cut the number of manual steps in quality assurance at every supply chain stage. SKU-level visibility enables granular tracking of every product. High processing speeds and large memory capacity are essential to handle the volume of data these systems generate.

- RFID drastically reduces manual QA touchpoints
- Provides in-depth SKU-level supply chain visibility
- Requires high processing speed and memory capacity
- Scales to handle massive new data volumes from sensors

Predictive & Prescriptive Analytics

Predictive Analytics

Uses mass amounts of collected data to anticipate problems before they occur and dramatically enhance forecasting accuracy across the **supply chain**.

- Predict supply shortages weeks or months in advance
- Minimize the customer impact of future disruptions
- Optimize procurement and production scheduling
- Reduce excess inventory and costly stockouts
- Improve demand forecasting across all product lines

Prescriptive Analytics

Goes beyond predicting problems — it actively suggests the best next steps for supply chain managers, turning data into clear, actionable recommendations.

- Suggests specific remediation actions for each issue
- Recommends optimal inventory reorder points and timing
- Guides routing and logistics decisions in real-time
- Surfaces prioritized action lists for supply chain managers
- Bridges the gap between insight and real-world action

Internet of Things & Artificial Intelligence

Internet of Things (IoT)

IoT is the foundational technology of smart manufacturing — a vast network of sensor-enabled equipment and systems in constant communication with each other and a central intelligence hub.

Smart Factory Foundation
An **entire factory floor** can be monitored and controlled through interconnected IoT sensors on every machine and asset.

Real-Time Data Streams
Sensors continuously deliver operational data — temperature, vibration, output, energy — to a central management system.

Predictive Maintenance
Equipment anomalies are detected early, preventing costly unplanned downtime through automated alerts.

Remote Monitoring
Factory conditions and KPIs can be monitored and managed from anywhere in the world, at any time.

Artificial Intelligence

AI in manufacturing is now viable at scale thanks to three converging forces: low-cost sensors generating huge data volumes, affordable cloud storage, and accessible processing power.

Self-Teaching Robotics
AI-integrated robots learn from their environment and continuously improve their own performance autonomously.

Real-Time Adaptation
AI systems change their actions on a real-time basis, responding instantly to changes on the factory floor.

Quality Assurance AI
Computer vision and AI algorithms detect defects faster and more accurately than manual inspection processes.

Demand Intelligence
AI models analyze vast market data to generate highly accurate demand forecasts and production plans.

Automation & Next-Gen Technologies

Robotics & Automation

Modern robotics systems are deeply connected to the sensor network on the factory floor, dynamically adjusting actions based on real-time data inputs. AI implementation makes these systems autonomous and self-teaching.

Connected to factory-wide sensor networks • AI-powered systems are autonomous and self-improving • Adapt actions in real-time to incoming sensor data • Reduces human error while dramatically boosting throughput

Blockchain

Blockchain provides a tamper-proof, decentralized ledger that manufacturers can use to record transactions across their entire network and maintain quality standards. Currently in a nascent but rapidly advancing stage for supply chain applications.

Immutable ledger for all supply chain transactions • Verifies authenticity and provenance of materials • Enhances quality control visibility across the network • Currently focused on supply chain ecosystem integration

Driverless Vehicles & Drones

Autonomous vehicles and drones significantly increase productivity by replacing human resources in routine, repetitive tasks. Smart factory layouts must be redesigned to integrate these vehicles safely alongside human workers.

Expedite pick-and-pack and forklift operations • Inventory drones provide real-time stock visibility • Factory design must safely integrate driverless vehicles • Minimizes disruption to human labor operations

3D Printing

Additive manufacturing allows companies to produce small and complex parts in a single production step, drastically reducing material waste and lead times. It requires upfront investment and specialized expertise to integrate effectively.

Produces complex parts in a single step • Significantly reduces material waste and scrap • Requires investment to integrate with existing processes • Demands specialized talent for effective implementation

Smart Manufacturing Implementation Roadmap

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01

Assess & Strategize

Conduct a thorough audit of current manufacturing systems, processes, and data flows. Identify the highest-impact smart technology opportunities and define a prioritized roadmap aligned to business goals.

02

Cloud Migration

Migrate legacy systems and data storage to a secure cloud platform. Establish robust cybersecurity protocols and identity management before migrating sensitive production data.

03

Sensor & IoT Deployment

Install RFID tags, IoT sensors, and auto-identification systems across the factory floor and supply chain. Build the data infrastructure needed to handle high-velocity sensor data streams.

04

Analytics & Intelligence

Deploy predictive and prescriptive analytics dashboards. Integrate AI models to begin turning raw data into actionable manufacturing intelligence and supply chain foresight.

05

Automation & Scale

Introduce robotics, autonomous vehicles, and drones. Redesign factory layouts to accommodate autonomous systems. Continuously train AI models and expand smart capabilities across all operations.

Ready to Transform Your Manufacturing?

Web Synergies helps organizations across industries optimize operations through innovative technology solutions — tailor-made, high-value, and designed with cybersecurity at the core.

GET IN TOUCH

Our Smart Manufacturing Capabilities

- Cloud Computing & Storage Solutions
- IoT Sensor Network Deployment
- Predictive & Prescriptive Analytics
- AI-Powered Robotics Integration
- Blockchain Supply Chain Solutions
- 3D Printing Process Integration
- Autonomous Vehicle & Drone Systems
- End-to-End Cybersecurity