7 benefits of adopting smart manufacturing

Discover AWS and AWS Partner solutions to maximize productivity, machine availability, and quality

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Advancing manufacturing, one cloud service at a time

Changing customer expectations, coupled with pandemic, natural disaster, and geo-political impacted supply chain delays, renewed the spotlight on business agility and digital maturity in manufacturing. Just as customers demanded more transparency into the production process, the world saw shortages of raw materials and parts, pushing droves of manufacturers to reevaluate the way they do business. For many, the answer was smart manufacturing—achieved through cloud-based technologies that simplify digital transformation.

The key to smart manufacturing? Data.

Through Amazon Web Services (AWS) and AWS Partners, manufacturers have found a wealth of industrial solutions that help them use their operational data to improve overall equipment effectiveness (OEE) and leverage artificial intelligence (AI) and machine learning (ML) for real-time and predictive analytics capabilities. AWS offers the most comprehensive and advanced set of cloud solutions available today with security designed for the most sensitive industries to make use of this valuable data.

This ebook discusses how manufacturers can apply AWS services and work with AWS Partners to build or buy solutions that help them accelerate design, maximize production, improve quality, enhance worker safety, build smarter products, reinvent supply chains, and operate sustainably.

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Get to market faster with cloud-based engineering and design

With AWS and AWS Partners, manufacturing design teams can increase their agility and innovate freely with cloud-based simulations, remote collaboration tools, and high performance computing (HPC).

Innovate faster with HPC on AWS

HPC on AWS processes large, complex simulations much faster, and at a lower cost than most on-premises environments. AWS services ensure compute power is available when you need it, without any advanced scheduling, major infrastructure acquisitions, or regular equipment refresh cycles. Finish your designs faster to speed time to market and focus on the best product design, not the infrastructure to make it happen.

Connect remote teams with cloud workspaces

Engineering and design teams are increasingly distributed across the globe and working remotely. Provide your teams what they need to work together, from anywhere on any supported device, with AWS services. Using Amazon WorkSpaces, engineers can work without workstations and securely access design applications on any computer.

SRAM

SRAM accelerates bicycle design with Autodesk on AWS

SRAM, which designs and manufactures precision bicycle components, needed to build a lighter crank arm that still retained the same strength and performance. Manipulating pixels in a 3D model in CAD was too slow, so SRAM tried Autodesk generative design on AWS. Using the AWS cloud, SRAM was able to execute rider-test simulations in minutes instead of hours.

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Valeo SIEMENS eAutomotive

VSeA innovates faster with cloud-based PLM

To help engineers collaborate and accelerate innovation, Valeo Siemens eAutomotive (VSeA) migrated its product lifecycle management (PLM) system to AWS. On the cloud, Valeo had a central place for engineers to develop, design, and analyze engine components, leading to greater agility for innovation.

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Maximize production and asset availability

Your factories collect massive amounts of machine and production data that can help you transform operations to improve production and significantly reduce unplanned equipment downtime.

Build a modern data strategy on AWS

The AWS Machine to Cloud Connectivity Framework securely connects your equipment to AWS to liberate trapped operations data. It automatically deploys and configures AWS IoT Greengrass, then publishes your equipment's telemetry data to AWS IoT SiteWise and Amazon Simple Storage Service (Amazon S3), populating an industrial data lake to support operational insights. With AWS IoT Core and Amazon QuickSight you can track OEE and view insights from a QuickSight dashboard. For orchestrating disparate robotic and automated industrial equipment, leverage AWS IoT RoboRunner, which makes it easier to build applications that help robots work seamlessly together.

GP Georgia-Pacific

Georgia-Pacific achieves tear-free paper production

Georgia-Pacific created a new analytics solution using Amazon Kinesis, Amazon S3, and Amazon SageMaker to optimize key manufacturing processes in many of its facilities. For one converting line, the company eliminated 40 percent of parent-roll tears during the converting process.

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Reduce downtime and enable predictive maintenance

By using AI and ML services from AWS, you can achieve higher machine uptime. Amazon Lookout for Equipment alerts you to failing machinery using existing data from equipment tags, sensors, and historical maintenance events. Additionally, Amazon Monitron uses wireless sensors to proactively detect abnormal machine behavior, enabling predictive maintenance. By identifying potential issues faster with machine learning, you can minimize downtime.

Koch Ag and Energy Solutions reduces downtime and costs

Instead of running lengthy maintenance workflows, Koch Ag and Energy Solutions turned to Amazon Monitron and Amazon Lookout for Equipment to detect abnormal equipment behavior and enable predictive maintenance. Amazon Lookout for Equipment caught a potential issue in a compressor hours before any other monitoring method, while Amazon Monitron proactively detected a possible fan failure based on increased vibrations, averting a catastrophic failure.

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Bloom Energy transforms manual production processes

To build its onsite power generators, Bloom Energy used a paper-based system to monitor and control production. Employees manually entered work orders, creating significant waste and difficulties with overage tracking. By implementing AWS Partner 42Q's manufacturing execution system on AWS, Bloom Energy reduced redundant work and improved productivity.

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Automate and improve quality management with cloud services

Robust quality management is crucial for all manufacturing companies to satisfy customers, stay profitable, and maintain reputation. Leveraging cloud technologies can streamline data collection and provide actionable insights that help reduce the potential for error. With cloud services from AWS, manufacturers can customize and automate the quality assurance (QA) process with fast, fully scalable computer vision (CV) solutions to improve accuracy.

Automate and improve quality inspection

With AWS services, you can easily implement CV-based inspection solutions in manufacturing processes at scale. Process onsite camera feeds in real time, generating highly accurate predictions within milliseconds, even in locations where network connectivity is limited or intermittent.

Tyson

Tyson Foods Inc. improves QA with CV models at the edge

Tyson Foods worked with the Amazon ML Solutions Lab to build CV models that counted products on its QA line and deployed the models at the edge using AWS Panorama. The low-latency object detection solution provided insights on how further improvements could be made to build, train, and re-deploy models on an ongoing basis.

Read the full story ›

Use ML-based CV models to detect anomalies

Amazon Lookout for Vision is a highly accurate, low-cost anomaly detection solution that uses ML to analyze images to spot defects and anomalies. Use Amazon Lookout for Vision to automate your visual inspections, even if you have no ML experience. AWS Panorama includes an ML appliance and Software Development Kit (SDK) that allows you to bring CV to many existing on-premises cameras, making predictions locally with high accuracy and low latency.

GUC
The Advanced ASIC Leader

GUC detects microchip failures and improves quality

working with AWS Partner proteanTecs, Global Unichip Corporation (GUC) combined data embedded in its microchips with predictive AI to track and repair silicon defects before they caused system failure. By taking these measures, GUC increased the quality and reliability of its microchips.

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Enhance worker safety and productivity across industrial operations

From foremen to fabricators, workers keep your organization running smoothly. But staff in industrial settings are also at a high risk for injury, which not only hurts your team, it can also slow down production, damage your reputation, and affect your bottom line. With cloud services from AWS and AWS Partners, you can empower your workers with technology that keeps them healthy, safe, and productive.

React faster to workstations that need help

Deploy Amazon Virtual Andon (AVA) to automatically notify personnel of problems, order spare parts, or issue work orders. As a digital notification system, AVA allows you to remotely monitor and quickly respond to issues on the factory floor to keep employees productive.

VOLKSWAGEN
GROUP

Porsche analyzes vehicle labels faster

To speed up inspection of its 25 different vehicle labels in multiple languages, that have over 2,000 variants Porsche, used Amazon Textract to compare the label text against stored data and flag anomalies. Instead of spending time muddling through a label written in a foreign language, workers are informed fast and can take quick action to fix any errors. The correct product labels, in the correct language are applied every time.

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Foster a safer workspace with IoT and CV

Improve compliance and reduce risk using IoT-enabled devices that trigger real-time alerts when unsafe behavior occurs. And by bringing CV and ML intelligence to your factory environments, you can alert your team when safety protocols are broken or hazardous scenarios occur. Keep employees out of restricted areas, ensure personal protective equipment (PPE) or hygiene requirements such as masks are worn, and maintain a safe space around equipment with AWS services. Using AWS Panorama you can also bring CV intelligence to your existing on-premises cameras.

USG BORAL
INNOVATION INSPIRED BY YOU.™

USG Boral sounds alarm with safety solution
After a forklift collided with a pedestrian in a USG Boral warehouse, the company sought a better solution for workplace safety. At the time, USG Boral would manually review its closed-circuit TV footage of any incidents and determine ways to mitigate accidents. With AWS Partner Bigmate, USG Boral developed an intelligent warehouse safety system called Warny™ that sounds an alarm when objects or people come within 3 meters of forklifts.

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Increase revenue with smart products

With data from smart products and machines, you can improve product quality and enable new forms of digital customer engagement. AWS IoT and AI/ML services help manufacturers collect, store, and analyze product and machine data.

Act on smart product data for a better customer experience

Services like AWS IoT Greengrass, Amazon Cognito, AWS Lambda, and Amazon DynamoDB deliver secure IoT applications that help you act on data from smart products and machines. Use the AWS IoT Device Simulator to build a large fleet of virtual connected devices. Simulate data publications at regular intervals to simulate your fleet before deployment, or monitor individual devices and observe how backend services process the data.

Kemppi brings IoT solution to market faster and saves 50 percent on development

Kemppi needed to bring its IoT solution for welding equipment to market fast and cut the cost of software development. Using AWS technologies such as AWS IoT Core, AWS Lambda, and Amazon Elasticsearch Service, Kemppi brought its product to market in six months instead of one year. Its developers can now confidently release new code up to ten times a week instead of once each quarter.

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Add new revenue streams with digital customer engagement

Smart products and machines can be a revenue goldmine, helping manufacturers move beyond a one-time sales and improve customer satisfaction and retention. Services like Amazon Kinesis and Amazon Lookout for Equipment help enable preventive maintenance, so you can complete repairs or recommend spare parts before downtime occurs. This allows for automatic scheduling of service technicians along with advance information about what may be broken, what parts are needed, and how to fix the problem.

UNOX meets 95% of service-level customer requests

UNOX, which designs and manufacturers smart ovens, struggled with its on-premises contact center, because it lacked the ability to report on key metrics about customer service. By going all-in on AWS, migrating its SAP system, and adopting AWS serverless services, UNOX has experienced an overall increase in cost savings, time optimization, and customer satisfaction.

Read the full story ›

Reinvent your supply chain for faster delivery

With end-to-end visibility into your supply chain, you can verify transactions and keep tabs on production and transport. Solutions built using AWS services such as Amazon Managed Blockchain and Amazon Forecast provide the unified data you need to track and trace the entire production process with unprecedented efficiency.

Optimize processes with AI/ML and automation

With AI/ML services from AWS you can improve your forecasts for more accurate inventory levels, better demand planning, and intelligent buying decisions. Tools like Amazon SageMaker help you sense consumer demand and supply chain risks to maintain lean inventory and boost profits. Because the AWS Cloud also provides the infrastructure for connected data, data lakes, and advanced analytics, you can leverage automation to ensure on-time-in-full compliance, streamlined warehouse operations, and improved supply chain resiliency.

Carrier teams with AWS to reduce 475 million tons of food waste

Carrier, which monitors more than 15 million cold chain products annually, collaborated with AWS to develop Lynx, a digital platform that optimizes cold chain operations for perishable foods and critical medications. Built on AWS ML services and AWS IoT Core, Lynx unifies the highly fragmented cold chain to reduce food spoilage, support end-to-end visibility, and increase efficiency throughout the various stages of refrigerated storage and transportation.

Check out the infographic ›

Develop more sustainable operations and cut costs

AWS can help manufacturers reduce their carbon footprint, use fewer resources, improve sustainability, and ultimately save costs.

Reduce energy costs and improve energy efficiency

Equipment that's not running at peak performance wastes energy. Using AWS services and AWS Partner solutions can help you discover ways to better understand and reduce WAGES (Water, Air, Gas, Electricity, and Steam) consumption and improve sustainability. Store, access, and analyze IoT data in an AWS data lake, and use ML capabilities to visualize plant floor data to pinpoint areas for improving energy efficiency. Remote asset monitoring on AWS can help you prevent, detect, and resolve equipment issues and act on opportunities for improved energy efficiency.

AMATROL®

Amatrol cuts energy costs with ML forecasting

Working with AWS partner DT40, Amatrol, a technical training company, implemented an AI-powered application built on AWS to optimize its manufacturing process and reduce electrical energy consumption. Already, Amatrol has cut energy consumption by 5 percent by identifying a CNC machine that was running idle.

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Model cost and energy savings

With AWS IoT TwinMaker you can build digital twins of your equipment, assets, and systems that simulate how they operate under different conditions. Use real-time data for updates, model different production scenarios, and learn how to operate your machines more efficiently, cost-effectively, and sustainably.

ICCI

Coca Cola İçecek reduced energy consumption by 20%

Coca-Cola bottler, Coca-Cola İçecek (CCI), developed a digital twin and used AWS IoT SiteWise to optimize production processes through data-driven monitoring. As a result, CCI has saved 20 percent on energy and 9 percent on water for two process systems annually.

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Make smart manufacturing a reality

Advances in IoT, analytics, and cloud technology have unlocked major opportunities for today's manufacturers. Those that can tap into their equipment and operational data will transform the way they do business and innovate faster.

With AWS you can make smart manufacturing a reality. Choose AWS as your innovation partner to optimize asset availability, improve quality management, enhance worker safety, accelerate engineering and design, develop smart products, and make your operations more sustainable.

Learn more about how AWS enables manufacturers with solutions for:

- Engineering & Design

- Production & Asset Optimization

- Supply Chain Management

- Smart Products & Services

- Sustainability