Driving AI Success in Automotive Manufacturing

Strategies to help manufacturers effectively plan for, implement, and scale AI

BEGIN

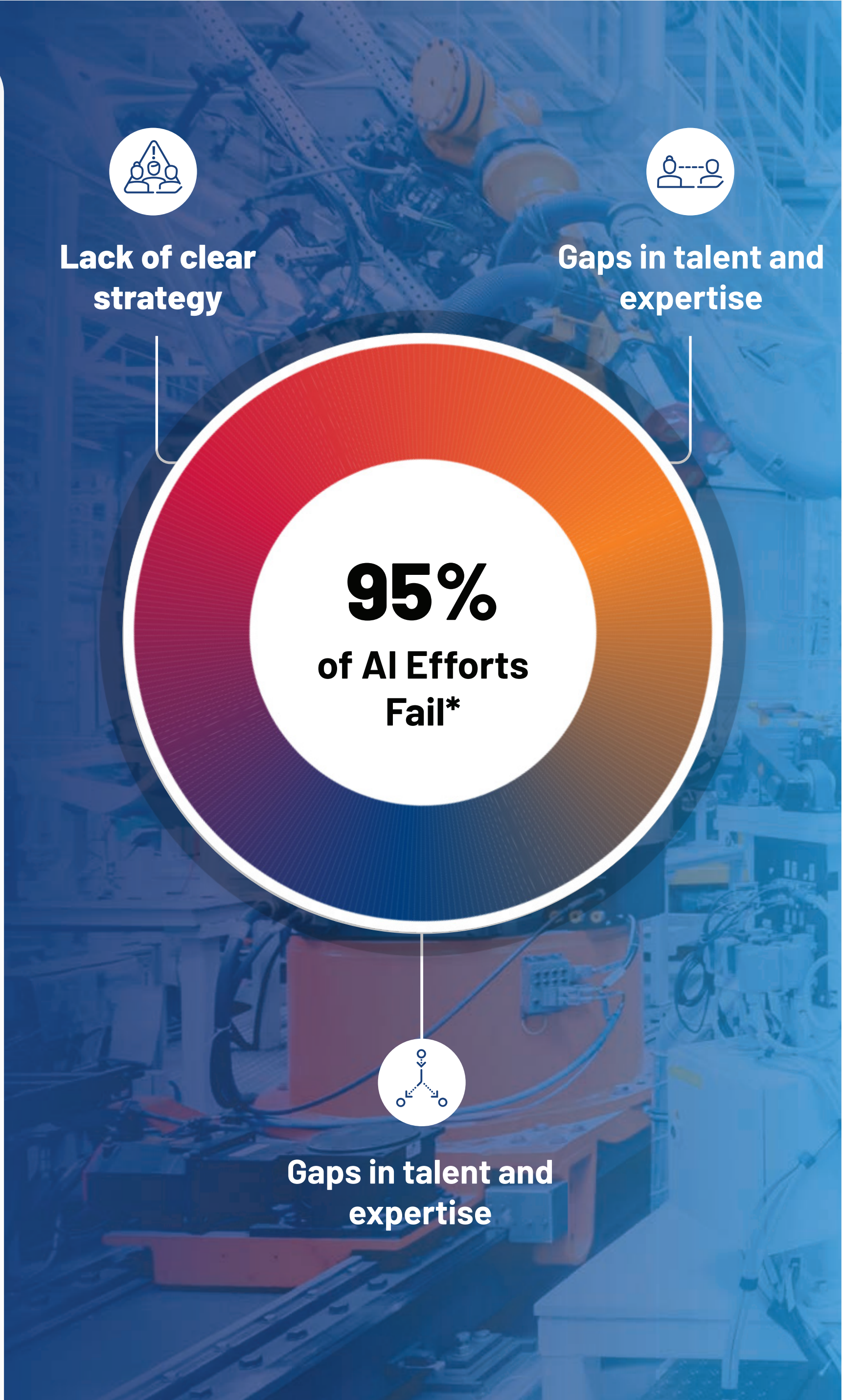
AI in Automotive:
Promise vs. Performance

Automotive manufacturers are under relentless pressure from razor-thin margins, global supply chain complexity, labor shortages, and ever-rising consumer expectations. To stay competitive, the industry is investing more aggressively in automation and digital transformation than nearly any other sector.

Yet ambition often outpaces execution. Despite billions invested, 95% of enterprise-level Gen AI initiatives fail to deliver measurable returns.* The technology isn't the problem—it's the lack of strategy. Without clear goals, scalable roadmaps, and the right expertise, even the most advanced tools risk stalling as underutilized experiments.

If most AI initiatives fail to scale, what will it take for manufacturers to achieve measurable impact? How can the industry move beyond experiments to create real transformation?

That's the journey we'll explore in the chapters ahead.



The Gen AI divide: State of AI in business 2025 (Version 0.1) [PDF]. Massachusetts Institute of Technology. https://example.com/v0.1_State_of_AI_in_Business_2025_Report.pdf

The Three Tenants of AI Success

Transformation only succeeds when manufacturers align AI investments to **measurable goals** and a **clear strategy**. Across the automotive ecosystem—from EVs to tires to batteries—successful manufactures unlock real value by focusing on three interconnected tenants of success.

Three automotive manufacturing pillars for AI success:

- **Driving peak production efficiency –** Anticipating disruptions, optimizing throughput, and maximizing OEE.
- **Delivering next-level quality –** Detecting anomalies before they happen and embedding intelligence across every step of production.
- **Enhancing workforce capabilities –** Empowering teams with AI-enabled insights, tools, and agility.

Like interlocking gears, these three tenets reinforce one another and turn AI from isolated experiments into engines of meaningful impact. In the chapters that follow, we'll take a closer look at each tenet, explore the challenges they present, outline what success looks like, and examine the strategic use cases and outcomes they can enable.

Drive Peak Production Efficiency through Intelligent Automation

Anticipate, Prevent, Optimize

Manufacturers face constant pressure from tight margins, unpredictable supply chains, and growing production complexity. Without smarter systems in place, small disruptions quickly compound into costly downtime, lost throughput, and declining competitiveness. Efficiency drives profitability in manufacturing, and every percentage point of improvement can translate into millions in saved costs and increased output.

Intelligent automation takes that pursuit further by using AI to shift from a reactive stance to a proactive one—anticipating and helping prevent disruptions before they impact production. From optimizing schedules to balancing material availability and machine capacity, AI helps manufacturers run smoother, faster, and smarter. The result is a very different picture of day-to-day operations—one where production stays ahead of problems instead of falling behind them.

Challenges and Pain Points

- Downtime from unexpected equipment failures.
- Bottlenecks across complex supply chains.
- Inefficient scheduling that underutilizes assets.
- Rising costs that squeeze already thin margins.

What Success Looks Like

Success means production running at maximum efficiency with minimal disruption. Equipment is maintained before it fails, schedules adapt in real time, and bottlenecks are eliminated before they impact output.

How to Measure Success

- Overall Equipment Effectiveness (OEE)
- Downtime
- Mean Time To Repair (MTTR)/Mean Time Between Failures (MTBF)
- Cycle Time

Drive Peak Production Efficiency through Intelligent Automation

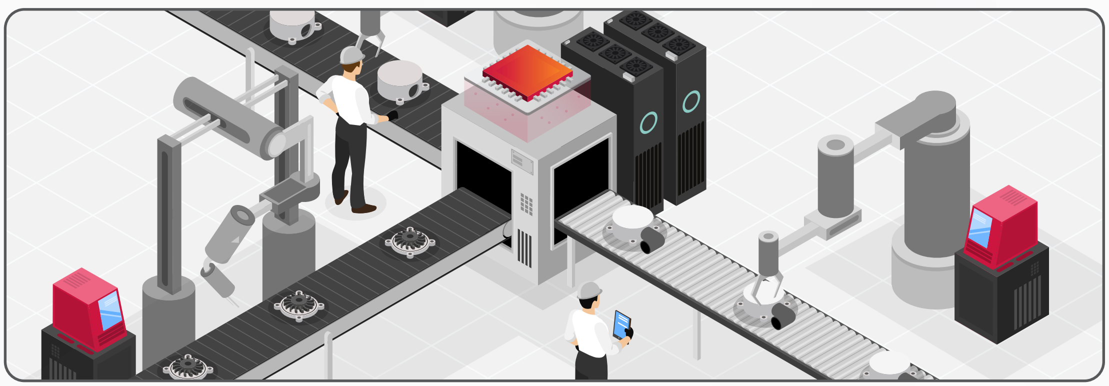
AI-Driven Strategies to Maximize Efficiency

Strategic Use Cases

- **AI-optimized production scheduling –** Recommendations based on machine capacity, material availability, and delivery deadlines.
- **AI systems for equipment maintenance –** Analyze sensor data, vibration patterns, and historical maintenance records to anticipate issues and automate fixes.
- **AI algorithms for supply chain –** Analyze demand patterns, inventory levels, and supplier performance to avoid delays.

Expected Outcomes

- Higher overall equipment effectiveness (OEE)
- Reduced downtime
- Extended equipment life



Use Case in Action

An EV startup transforms production by digitizing operations

Approach with Rockwell:

Rockwell Automation MES enabled:

- Higher productivity, reduced labor, improved OEE, quality and visibility
- Integration of production processes with near real-time decision support
- Dynamic end-to-end scheduling to improve manufacturing agility and efficiency
- Centralized data collection for advanced analytics to enhance cost improvement efforts
- High availability of the system

Impact:

- Optimized inventory and plant bottlenecks
- Improved material timing to cut costs
- Enabled predictive quality with machine learning
- Increased plant uptime and availability

CHAPTER 2

Deliver Next-Level Quality with AI-Powered Solutions

Quality Defines Reputation

In today's automotive industry, even a single anomaly can trigger recalls that cost hundreds of millions and erode years of brand trust. Customers demand flawless performance, and regulators enforce increasingly strict standards. Traditional inspection and quality processes struggle to keep up—manual checks miss subtle flaws, global operations lack uniform standards, and siloed data makes it hard to spot risks in time. The result is costly anomalies, recalls, and damaged reputation.

AI changes the game by moving quality from a reactive checkpoint to a proactive advantage. It enables earlier flaw detection, predictive insights, and consistent performance across every facility. By embedding intelligence into inspections and testing, manufacturers can reimagine quality—not just as a safeguard, but as a competitive edge.

Challenges and Pain Points

- Manual inspections miss anomalies.
- Fragmented oversight across global operations.
- Siloed data slows detection and response.
- Costly recalls and reputational damage from late-stage anomalies.

What Success Looks Like

Success means that quality is built in at every stage. Automation and AI continuously learn from production data, improving inspection accuracy and predictive insights over time. Defects are prevented before they occur, inspections become continuous and intelligent, and standards remain consistent across every line and location. As AI systems evolve, manufacturers gain a self-improving quality process that strengthens efficiency, reduces scrap, and helps maintain customer trust.

How to Measure Success

- First Pass Yield (FPY)
- Scrap & Rework Rate
- Customer Complaints / Warranty Claims
- Inspection Accuracy
- First-Time Quality

Deliver Next-Level Quality with AI-Powered Solutions

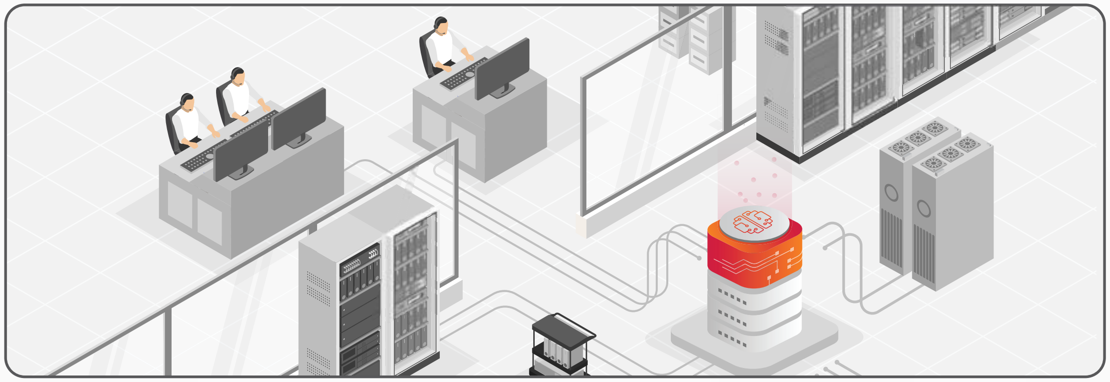
AI-Powered Quality Strategies

Strategic Use Cases

- **Comprehensive quality analysis –** Corelating structured and unstructured data from multiple sources (sensors, cameras, logs).
- **AI systems for anomaly detection –** Predict anomalies and automatically adjust machine parameters to prevent anomalies and maintain quality.
- **AI-powered cameras and vision systems –** Detect subtle variations in production data to predict and prevent anomalies before they occur, improving process stability and product quality.

Expected Outcomes

- Fewer anomalies and reduced scrap
- Faster market readiness
- Consistency across global operations
- Strengthened brand reputation



Use Case in Action

A tire manufacturer reduces out-of-tolerance splices while maintaining peak performance values

Approach with Rockwell:

FactoryTalk® Analytics™ VisionAI™ and **FactoryTalk® Analytics™ LogixAI®** enabled:

- AI-powered vision systems that monitor production continuously for quality and consistency
- Self-learning quality analysis that improved detection of potential anomalies over time
- Predictive modeling using historical data to determine optimal machine settings
- Real-time adaptive machine control that senses deviations and adjust automatically to stay within specifications

Impact:

- Improved splice quality
- Reduced downtime and waste
- Increased revenue

Enhance Workforce Capabilities with Scalable Automation

Enhancing Human Capabilities through AI

Automotive manufacturers face persistent labor shortages and widening skills gaps. Experienced workers are retiring faster than new hires can be trained, while consumer expectations demand both speed and quality. Beyond these pressures, the workforce is the backbone of innovation, problem-solving, and operational excellence—its knowledge, creativity, and adaptability directly impact product quality, customer satisfaction, and competitiveness. Without new approaches, workforce strain threatens productivity, innovation, and long-term growth.

AI strengthens—not replaces—the workforce, directly addressing these pressures. By taking on repetitive tasks, it reduces strain on employees, accelerates training, and builds agility, allowing teams to focus on problem-solving, innovation, and higher-value work. For manufacturers, scalable automation isn't just about efficiency—it's about empowering people to perform at their best, creating a more capable, confident, and resilient workforce that can adapt quickly and sustain long-term growth.

Challenges and Pain Points

- Labor shortages and high turnover make staffing production lines difficult.
- Skills gaps slow training and reduce operational agility.
- Repetitive tasks lead to fatigue, errors, and disengagement.
- Without the right support, workforce strain reduces productivity and morale.

What Success Looks Like

Success means a workforce that is augmented, not replaced. Repetitive tasks are automated, freeing employees for problem solving and innovation. Training is faster and personalized with AI guidance, and teams operate with greater agility, productivity, and confidence—ready to adapt quickly to changing market demands.

How to Measure Success

- Training Time to Proficiency
- Employee Productivity per Labor Hour
- Employee Retention / Turnover
- Safety Incidents / Near Misses

Enhance Workforce Capabilities with Scalable Automation

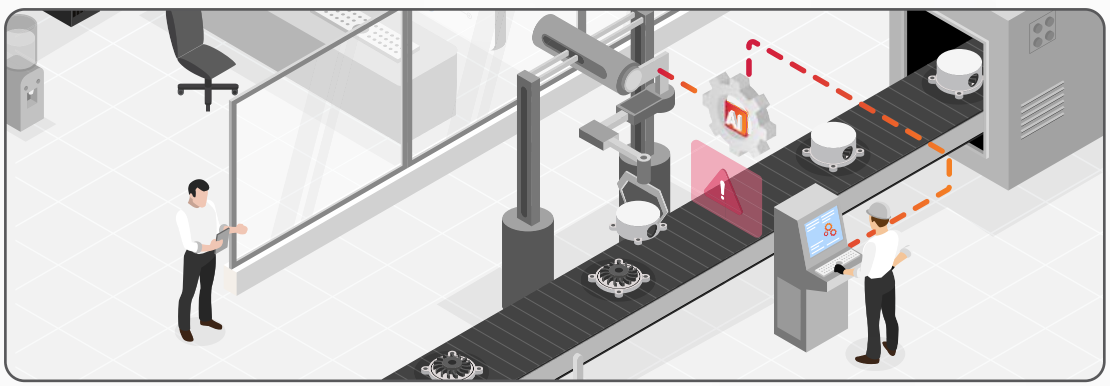
AI Strategies for Workforce Enhancement

Strategic Use Cases

- **AI-powered robots –** Automate simple and complex tasks, adapting to variations and relieving workers of repetitive labor.
- **Intelligent virtual assistants –** Provide on-demand, personalized support for plant technicians, speeding training and troubleshooting.
- **AI for workflow optimization –** Analyze production data to spot slowdowns, streamline handoffs, and accelerate shift changeovers.

Expected Outcomes

- A more agile workforce
- Higher productivity without additional strain
- Greater employee confidence and retention



Use Case in Action

A major auto manufacturer greatly improves workforce collaboration & assistance

Approach with Rockwell:

- **FactoryTalk® InnovationSuite** helped accelerate digital transformation across manufacturing operations
- **ThingWorx IIoT** platform connected, manages, monitors, and controls diverse automation devices and software through one intuitive interface
- **Vuforia** augmented reality enhances operations and enables remote maintenance

Impact:

- Enabled remote support for global teams
- Boosted workforce productivity and efficiency
- Enhanced workforce decision-making

CHAPTER 4

Implement and Scale AI Successfully with Trusted Expertise

Before investing in AI, manufacturers need to ensure they are ready and not just following a trend. Successful adoption comes from understanding where AI can have real impact, aligning initiatives with business goals, and preparing people, processes, and technology for meaningful change. With the right expertise guiding implementation and scaling, AI becomes more than a set of tools—it becomes a pathway to measurable business value rather than a series of experiments.

Challenges and Pain Points

- Many pilots stall before reaching production, draining time and capital.
- Skills gaps leave manufacturers struggling to integrate AI with existing operations.
- Technology fragmentation creates complexity rather than clarity.
- Lack of proven roadmaps leads to delays, rework, and costly missteps.
- Without trusted guidance, scaling AI across plants and regions feels unattainable.

The Case for Partnership

The future of automotive manufacturing is being built today, but success with AI doesn't happen by chance. Despite billions invested, 95% of enterprise-level Gen AI initiatives fail to deliver measurable returns. The difference is expertise—knowing how to connect strategy, talent, and technology to create tangible impact.

AI can transform efficiency, quality, and workforce agility, but without experienced guidance, pilots stall, resources are wasted, and technology remains underutilized.

A trusted partner brings tested solutions, deep manufacturing expertise, and proven integration strategies—helping manufacturers move beyond pilots, scale AI confidently, and turn investment into measurable operational and competitive advantage.

Scale AI Successfully with Trusted Expertise

Partnering with Rockwell Automation

Rockwell Automation brings decades of automotive and industrial manufacturing expertise, helping manufacturers turn AI potential into lasting performance. From EVs to tires and batteries, Rockwell's suite of integrated hardware, software, and AI-powered solutions is uniquely designed to address industry-specific challenges while delivering measurable results.

Differentiators:

- Deep industry expertise across automotive, EV, tire, and battery manufacturing.
- Extensive portfolio of integrated hardware and software with built-in AI.
- Tailored AI services and roadmaps proven to accelerate time-to-value.
- Global network of End Users, OEMs, technology partners, and system integrators.
- In-region support backed by global reach and local market insights.
- Extensive cybersecurity investments to help protect AI projects.
- Commitment to sustainability: Reducing energy, water, and waste while improving outcomes.

Scaling AI successfully requires more than technology—it takes trusted expertise. With Rockwell Automation, manufacturers gain a partner committed to helping them achieve sustainable, measurable outcomes. **Together, we can turn AI investment into a lasting competitive advantage.**

Segment Spotlights

- **EV:** AI-powered automation for closed-loop production, boosting speed, quality, and compliance.
- **Tire:** AI-driven solutions enabling autonomous stages of production—from mixing to final inspection—helping produce more tires at lower cost.
- **Battery:** Smart automation and predictive AI insights that streamline quality, minimize scrap, and accelerate time-to-market.

Set Your AI Operations Up for Success

The future of automotive manufacturing is already here. The question is not if AI will transform the industry, but how quickly and successfully you will capture the advantages.

GET STARTED

To get started today, visit our Automotive Solutions site or contact us directly to speak with an automotive AI expert.

Connect with us.

rockwellautomation.com — expanding **human possibility**®

AMERICAS: Rockwell Automation, 1201 South Second Street, Milwaukee, WI 53204-2496 USA, Tel: (1) 414.382.2000
EUROPE/MIDDLE EAST/AFRICA: Rockwell Automation NV, Pegasus Park, De Kleetlaan 12a, 1831 Diegem, Belgium, Tel: (32) 2663 0600
ASIA PACIFIC: Rockwell Automation SEA Pte Ltd, 2 Corporation Road, #04-05, Main Lobby, Corporation Place, Singapore 618494, Tel: (65) 6510 6608
UNITED KINGDOM: Rockwell Automation Ltd., Pitfield, Kiln Farm, Milton Keynes, MK11 3DR, United Kingdom, Tel: (44)(1908) 838-800

Allen-Bradley, Emulate3D, expanding human possibility and Studio 5000 are trademarks of Rockwell Automation, Inc.
Trademarks not belonging to Rockwell Automation are property of their respective companies.

Publication AUTO-SP057A-EN- P - October 2025
Copyright © 2025 Rockwell Automation, Inc. All Rights Reserved. Printed in USA.