PLANT MANAGER EXCHANGE

AI in Manufacturing Operations

How are manufacturers using AI today to improve production, decision making, training, scheduling, or operational efficiency?

1

DOWNTIME & EQUIPMENT FAILURES

Unexpected breakdowns cause production delays, missed targets, and increased repair costs.

2

QUALITY ISSUES & REWORK

Defects, rework, and scrap lead to higher costs, customer dissatisfaction, and wasted resources.

3

PRODUCTION VARIABILITY

Inconsistent processes and variability result in unpredictable output and hard-to-meet customer demand.

4

SCHEDULING & PLANNING CHALLENGES

Changing demand, machine constraints, and labor shortages make it difficult to create and stick to realistic schedules.

5

LABOR SHORTAGE & SKILL GAPS

Finding, retaining, and upskilling the right talent is a constant challenge that impacts productivity and growth.

SOLVING THESE HEADACHES DRIVES PRODUCTIVITY, PROFITABILITY & GROWTH.

INTUITION + DATA = BETTER DECISIONS

TYPICAL AI USE CASES IN MANUFACTURING

AI turns data into insights and actions that improve quality, efficiency, and productivity.

1 PREDICTIVE MAINTENANCE

Predict equipment failures before they happen to reduce downtime.

Example:
Predict bearing failure in a CNC machine

Business Impact

Less downtime, lower maintenance costs

2 QUALITY INSPECTION & DEFECT DETECTION

Use computer vision to detect defects and ensure quality at scale.

Example:
Detect surface defects on parts in real time

Business Impact

Higher quality, less rework, happier customers

3 PRODUCTION OPTIMIZATION

Optimize process parameters and improve yield using machine learning.

Example:
Optimize temperature, speed, and pressure settings

Business Impact

Higher yield, better efficiency, lower costs

4 DEMAND FORECASTING & PLANNING

Improve demand forecasting and align production and inventory plans.

Example:
Forecast demand for finished goods

Business Impact

Better planning, lower inventory, fewer stockouts

5 WORKFORCE & SAFETY ANALYTICS

Analyze patterns to prevent incidents and improve workforce performance.

Example:
Predict safety incidents or near-misses

Business Impact

Safer workplace, lower incidents, higher productivity

6 DOCUMENT PROCESSING & KNOWLEDGE AI

Automate document processing and extract insights from unstructured data.

Example:
Extract data from quality reports or maintenance logs

Business Impact

Faster processes, fewer errors, better decisions

AI IS NOT ABOUT REPLACING PEOPLE.
IT'S ABOUT EMPOWERING PEOPLE WITH BETTER INSIGHTS TO MAKE BETTER DECISIONS.

EVERYDAY MANUFACTURING DECISIONS AI CAN ASSIST

1 Which machine will fail next?

Predict failures and prevent unplanned downtime

2 Which parts are likely to be defective?

Detect quality issues early and reduce scrap

3 What process setting should be adjusted?

Recommend settings to improve quality and yield

4 Which maintenance job should we do first?

Prioritize work based on risk and impact

5 Which production order should run next?

Optimize sequence for efficiency and on-time delivery

6 Where should we focus problem-solving first?

Identify the biggest drivers of scrap, downtime and variation

7 Is this abnormal or just normal variation?

Detect true issues early and reduce false alarms

8 Do we have enough labor in the right places today?

Forecast labor needs by shift and area

9 Which operator or team needs extra support?

Identify training and coaching opportunities

10 What material or component is becoming a supply risk?

Predict shortages and avoid line stoppages

11 Which finished goods should we build today?

Align production with demand and constraints

12 Should this alarm be escalated or ignored?

Focus on real issues and reduce noise

13 Which quality checks need extra attention today?

Focus inspection on high-risk areas

14 What is the likely cause of a problem happening now?

Find likely root causes faster

15 Should we stop production for containment?

Estimate risk and decide with confidence

16 Where can we save energy or cost without hurting output?

Find savings and reduce waste

BEST DAILY DECISIONS TO START WITH (GREAT AI PILOT OPPORTUNITIES)

PREDICT BREAKDOWNS

DETECT DEFECTS EARLIER

PRIORITIZE MAINTENANCE

IDENTIFY BIGGEST LOSS DRIVERS

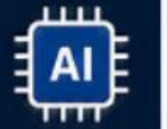
IMPROVE SCHEDULING

FLAG ABNORMAL BEHAVIOR

PREDICT SHORTAGES & DELIVERY RISKS

THE BOTTOM LINE

AI turns your existing data into insights that help you make better daily decisions, improve performance, and drive results.



TYPICAL BARRIERS
FOR MANUFACTURERS TRYING AI

AI has great potential, but several challenges can slow or stop progress.

1 DATA QUALITY & AVAILABILITY

- Data is siloed across systems
- Inconsistent, incomplete, or inaccurate data
- Lack of real-time or historical data

IMPACT
Poor data leads to poor insights and unreliable AI outcomes.

2 SKILLS & TALENT GAP

- Limited AI/ML knowledge in the team
- Lack of data science or analytics expertise
- Difficulty attracting specialized talent

IMPACT
Hard to build, deploy, and scale AI solutions effectively.

3 LEGACY SYSTEMS & INTEGRATION

- Outdated equipment and software
- Difficult to connect systems
- High integration effort and cost

IMPACT
Slows data flow and increases complexity and cost.

4 CULTURE & CHANGE RESISTANCE

- Fear of job loss
- Low trust in AI outputs
- Resistance to change and new ways of working

IMPACT
Limits adoption and reduces the return on AI investments.

5 UNCLEAR ROI & HIGH EXPECTATIONS

- Unclear business case
- Unrealistic expectations for quick results
- Difficulty measuring value and impact

IMPACT
Projects stall or don't scale due to unclear value.

KEY TAKEAWAY: Addressing these barriers early increases the chances of successful AI adoption and lasting impact on your manufacturing operations.

HOW TO START A SMALL AI PILOT
USING EXISTING DATA

Prove value fast. Learn. Improve. Scale.

1 CHOOSE THE RIGHT PROBLEM

- Focus on a high-impact problem with clear pain (e.g., downtime, quality, yield, scheduling).
- Ensure it's narrow in scope and measurable.

Deliverable: Problem statement and success metrics

2 CONFIRM DATA YOU ALREADY HAVE

- Identify existing data sources (historian, MES, CMMS, quality systems, spreadsheets).
- Verify you have enough data: quantity, quality, and relevant time range.

Deliverable: Data inventory and availability check

3 DEFINE THE USE CASE & HYPOTHESIS

- Define what AI will predict or recommend.
- State your hypothesis (e.g., "We believe we can predict failures 2 hours in advance").

Deliverable: Use case definition and hypothesis

4 PREPARE & EXPLORE THE DATA

- Clean and combine data.
- Handle missing values and obvious errors.
- Explore patterns and understand key drivers.

Deliverable: Clean dataset and initial insights

5 BUILD A SIMPLE AI MODEL

- Start simple (e.g., classification, regression, anomaly detection).
- Use proven algorithms and baseline models.

Deliverable: Baseline model and performance results

6 TEST, VALIDATE & ITERATE

- Validate model on unseen data.
- Check performance vs. success metrics.
- Refine features or model as needed.

Deliverable: Validated model and learning summary

7 DEPLOY SMALL & MEASURE IMPACT

- Deploy in a limited environment (one line, shift, or asset group).
- Monitor, measure impact, and capture feedback.

Deliverable: Pilot results and business impact

SUCCESS TIPS

- **Start small:** Narrow scope, clear goal.
- **Use what you have:** Leverage existing data first.
- **Involve the right people:** Operations, data/IT, and subject experts.
- **Measure what matters:** Define clear success metrics.
- **Learn fast:** Iterate and improve.
- **Prove value, then scale.** with confidence.

START SMALL. PROVE VALUE. BUILD CONFIDENCE. SCALE IMPACT.