

DATA AND AI

I N S P I R A T I O N

*A CROSS-INDUSTRY META-MAP OF HIGH ROI AI USE CASES
WHAT WORKS, WHY IT MATTERS, AND THE IMPACT.*

RioTinto

Danfoss

Carlsberg

PJM[®]

KOMATSU

MARS



GE Aerospace

SIEMENS Gamesa
RENEWABLE ENERGY



BARRICK



Smurfit Kappa



CATERPILLAR[®]



Unilever



BOSCH

Purpose of this magazine

Welcome to the magazine – a meta-map of AI in practice.

This magazine gives you a clear and practical overview of how artificial intelligence is used in industry today. It's created with a simple purpose: to inspire and inform. Through selected cases, we show how companies, both large and small, turn advanced technology into real business value.

You'll get an honest look at real AI projects: What worked? What was learned? And how can others use those lessons as a starting point for their own initiatives? The focus isn't just on the technology but on how it's integrated into organizations, creates impact, and scales in the real world.

The magazine is aimed at leaders and specialists in production, operations, data, and digitalization who want to understand where and how AI makes sense—not as a buzzword but as a concrete tool.

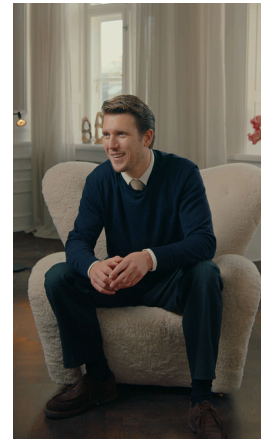
The content is based on cases from both Danish and international companies, as well as cases and projects delivered by Aplied.ai and .

This isn't a tech brochure. It's a map of **what actually works**.

Welcome.



Kristian Vingaard
Partner – Codellent



Silas Ystrøm
Partner – Aplied.ai



Casper Greve
Partner – Codellent



Mathias Korsgaard
Partner – Aplied.ai

Table of Contents

What is AI	04
Five key principles for making AI work in practice	05
Five barriers that hold back AI ambitions	06
An AI framework that creates real business value	07
Overview of the industries covered in this meta-map	09
AI in Heavy Industrial Machinery & Equipment Manufacturing	10
AI in Food, Beverage & Packaging Production	22
AI in Electronics & Component Manufacturing	36
AI in Machine & Equipment Manufacturing	50
AI in the Mining Industry	62
A selection of our cases and work	76

What is AI?

When you ask AI, the answer is: "AI (artificial intelligence) is a technology that enables computers and machines to perform tasks that normally require human thinking."

What is AI

AI, or Artificial Intelligence, is a field of computer science focused on building systems that can perform tasks that normally require human intelligence. This includes things like understanding language, recognizing images or sounds, solving problems, and making decisions.

At its core, AI is about using data to make machines learn, adapt, and respond in ways that seem intelligent. Most of the AI we interact with today is designed for very specific tasks—like recommending movies on Netflix, detecting fraud in banking, or helping customers through chatbots. This kind of AI is called "narrow AI" because it's good at one thing, but it can't think broadly like a human.

Some AI systems use a technique called machine learning, where the system improves its performance by finding patterns in large amounts of data. A more advanced version, deep learning, uses neural networks that mimic how the human brain works.

AI is already a big part of everyday life and business, and it's changing how we work, communicate, and make decisions. It's not human, but it's getting better at doing things that used to require human intelligence.

📄

👍

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🔊

✍️

🔄

📶

Spørg om hvad som helst

+

🔧 Værktøjer

🔊

🔇

ChatGPT kan tage fejl. Vi anbefaler at dobbelttjekke vigtig information.

If you're curious to learn more about AI and what the technology can do, you can read more in this magazine: [AI magazine](#)

04

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Five key principles for making AI work in practice

Our lessons from companies that succeed in using AI to create real business value.

01

Start small and scale

The best companies begin with small, clearly defined tests, like a PoC, and build on what works in practice. That way, they learn faster, reduce risk, and show early results without major investments.

02

The business owns AI

When AI projects are owned by the business, not just IT, the solutions hit closer to core value drivers. That creates faster results, more learning, and solutions that actually get used.

03

Data & processes are in place

Companies with control over their data and processes can take advantage of AI faster and more precisely. A solid foundation ensures models work in practice – not just as hypothetical ideas.

04

AI is used to target real value

Instead of experimenting blindly, the best companies define clear value goals before launching AI projects. That makes it easier to prioritize efforts and steer both leadership and execution.

05

Employees are involved

AI never works without people. When employees are involved early and given a chance to influence the process, adoption and results improve. Engagement and ownership reduce resistance. and that's often the biggest barrier.



Five barriers that hold back AI ambitions

In our experience, even ambitious companies often stumble over the same challenges when trying to turn AI potential into real change.

01

It feels too big or too early

Many associate AI with massive, complex projects that still feel too advanced. That can lead to delays or, worse, the project never getting off the ground at all.

02

Lack of ownership

If AI isn't anchored in the business, it becomes just another isolated IT project. That slows momentum and disconnects the solution from real needs and users.

03

Uncertainty about data

Companies struggle to locate, access, and structure the data needed to train and run AI models. That creates frustration, delays, and weakens the potential impact.

04

No clear business case

Without a clear idea of expected value, it's hard to defend an investment. Many initiatives stall at the experimental stage without buy-in from leadership

05

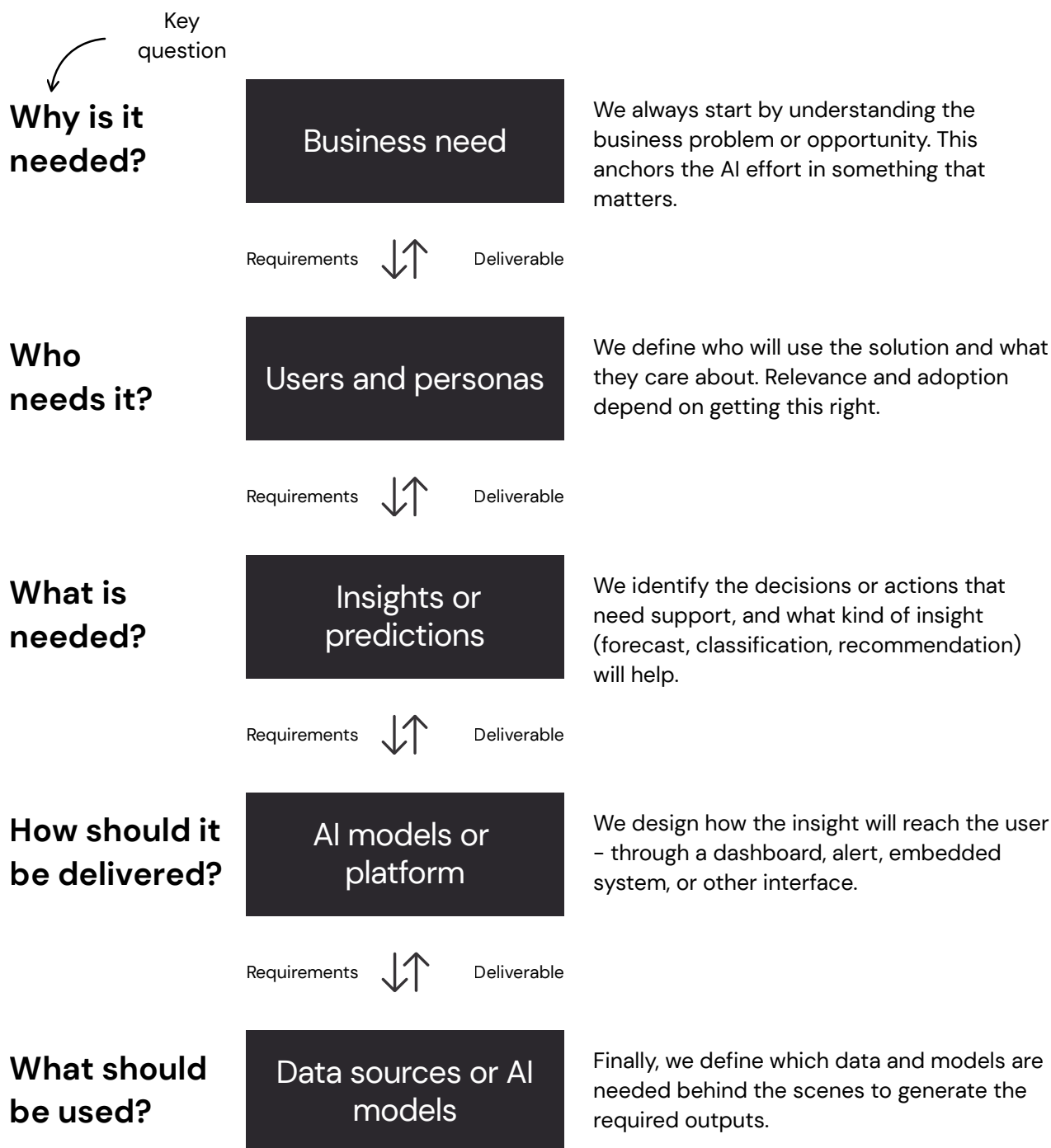
Too much focus on technology

When AI projects focus too much on the tech, they often lose touch with the business problem they were meant to solve. That slows things down and blocks real organizational change.



Our framework that aligns strategy with execution – from business needs to data, and back again

We use this structured approach to connect high-level goals with user realities, ensuring that every insight, model, and data source supports real decisions and delivers measurable value.





INDUSTRIES

*COVERED IN THIS META-MAP **



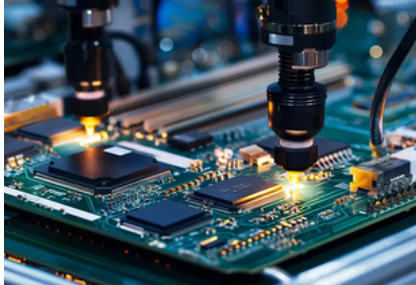
**Heavy Industrial Machinery
& Equipment Manufacturing**

Page 10-21*



**Food, Beverage & Packaging
Production**

Page 22-35*



**Electronics & Component
Manufacturing**

Page 36-49*



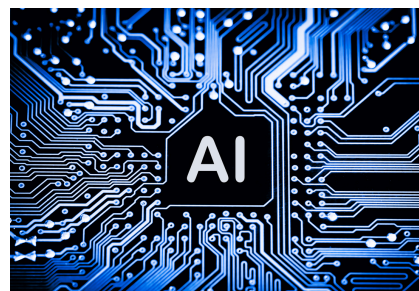
**Machine & Equipment
Manufacturing**

Page 50-61*



Mining

Page 62-74*



**Our cross industry
selected cases**

Page 76

**The displayed cases are for inspiration and ideation purposes. Most of the cases do not represent work done by Aplied.ai x .*



AI IN HEAVY INDUSTRIAL MACHINERY & EQUIPMENT MANUFACTURING

***Enabling smarter machines, safer operations,
and better aftermarket decisions***

AI is helping heavy machinery manufacturers address challenges like complex service needs, long equipment lifecycles, and the demand for safe, reliable uptime. In industries like mining, energy, and automation, even small improvements can have a major impact. Companies are using AI for autonomous haul trucks, turbine inspections, and smarter parts planning—boosting accuracy, reducing downtime, and improving operations.

In parallel, technologies like computer vision, machine learning, and Copilot-assisted workflows are changing how value is created. Instead of only optimizing existing processes, AI is enabling faster decisions, predictive service, and entirely new revenue streams – especially through smarter aftermarket platforms.

4 CASES

12 **AI-assisted blade inspection**

How Siemens reduced manual wind turbine blade inspection time by up to 80% with AI-assisted ultrasound.



14 **AI-powered engine Inspections**

How GE cut jet engine inspection time by 60% with AI and computer vision.



16 **Autonomous haulage system**

How Komatsu reduced idle time and tire wear by optimizing haulage operations with AI.



18 **MineStar Edge for smarter mining**

How Caterpillar increased mine productivity by 20–30% with AI-powered real-time data integration.



SIEMENS GAMESA

SIEMENS Gamesa
RENEWABLE ENERGY

AI-assisted ultrasound inspection of wind turbine blades



Situation

Siemens Gamesa manufactures large-scale wind turbine blades that must meet strict quality and safety standards. Inspecting these blades for internal defects using ultrasound is typically time-consuming, operator-dependent, and subject to interpretation, with each inspection taking up to 6 hours.

Solution

The company implemented an AI-based system to support ultrasound inspections. The solution uses historical scan data and machine learning models to interpret results and identify potential defects with high precision. The system visualizes problem areas and flags only sections that need manual review.

Results

Inspection time was reduced by 75% – from 6 hours to 1.5 hours per blade. The AI now evaluates 80% of the blade surface automatically, enabling more consistent, faster, and less labour-intensive quality control. Operators focus only on flagged areas, improving both speed and reliability.

75% reduction in inspection time per wing
(from 6 hours to 1½ hours)

80% reduction in the product area
requiring an expert technician's
attention

AI Solution developed by **FUJITSU**

Other high-impact use cases for AI-powered inspection



Rotating Equipment

Why beneficial: These components experience constant motion, high loads, and vibration, leading to wear and fatigue that's hard to detect early with manual methods.

AI impact: AI-assisted image analysis and pattern recognition can identify internal anomalies earlier, reducing downtime and enabling predictive maintenance of mission-critical equipment.



Structural and Lifting Equipment

Why beneficial: Stress fractures or deformation in structural parts are safety-critical but can go unnoticed during routine manual inspections.

AI impact: AI vision systems and sensors improve the detection of micro-fractures or irregularities, ensuring safer operations and compliance with safety standards.



Mobile & Transport Equipment

Why beneficial: These machines operate in rugged conditions and suffer from heavy wear. Undetected faults can lead to costly failures or unsafe conditions.

AI impact: Automated inspections reduce reliance on manual checks and extend equipment life by spotting problems earlier especially in remote or time-pressured environments.



Process & Utility Equipment

Why beneficial: Internal corrosion, pressure issues, or leakage in these systems are hard to monitor manually and can halt operations unexpectedly.

AI impact: AI-enabled anomaly detection and data fusion help teams act early, reducing maintenance costs and avoiding unexpected breakdowns.

GE AEROSPACE



AI-powered borescope inspection for jet engines



Situation

Jet engine inspections are critical for aviation safety, but the process is slow and relies heavily on manual image review. Technicians often face time pressure and must assess thousands of borescope images, increasing the risk of missed defects.

Solution

GE Aerospace developed an AI-powered system that analyzes borescope images using computer vision. It identifies patterns, detects defects like cracks or corrosion, and flags areas for technician review – improving accuracy while reducing manual workload.

Results

The AI tool improved defect detection by 34% and cut inspection time by 60%. The system supports faster, more reliable maintenance decisions while ensuring consistent safety standards across engine fleets.

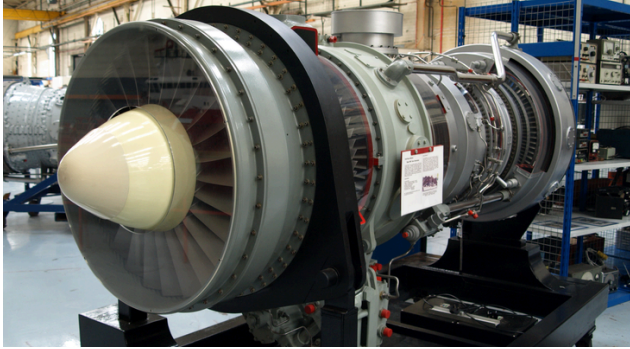
34% improvement in defect detection using AI-assisted image analysis

60% faster inspection time compared to traditional manual review

AI Solution developed by



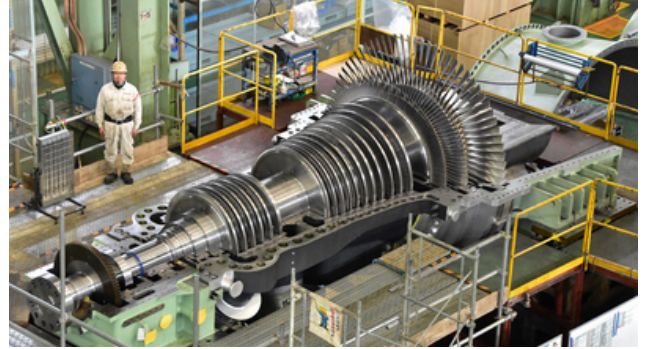
Other high-impact use cases for AI-driven engine inspection



Propulsion systems

Why beneficial: Propulsion systems in ships and industrial machinery endure intense stress and long runtimes, making manual inspections difficult and slow.

AI impact: AI-powered image analysis detects wear and damage faster, enabling early maintenance and reducing costly downtime or full system teardowns.



Industrial gas and steam turbines

Why beneficial: Turbines in power and manufacturing facilities require precise, reliable inspections to avoid catastrophic failures.

AI impact: Automated borescope inspection spots cracks, heat damage, or corrosion earlier, allowing for planned service instead of emergency shutdowns.



Diesel engines in rail and mining

Why beneficial: These engines operate in harsh conditions and are expensive to take offline for inspection.

AI impact: AI-supported inspections cut time and technician exposure while extending equipment lifespan through earlier interventions.



Industrial compressors and pumps

Why beneficial: Internal component failure in these systems can halt entire operations and often goes undetected with surface-level checks.

AI impact: AI improves detection of internal defects without disassembly, helping companies maintain uptime and meet strict safety standards.

KOMATSU



AI-driven autonomous haulage system for mining trucks



Situation

In large-scale mining, haul trucks are essential but costly to maintain. Manual driving leads to inconsistent braking and turning patterns, which increases wear on critical components like tires and brakes – and raises safety concerns in high-risk environments.

Solution

Komatsu deployed its FrontRunner Autonomous Haulage System (AHS), using AI to control truck movement, route selection, and traffic flow without human drivers. The system adapts to terrain and load conditions to minimize wear and maximize efficiency.

Results

The AI-managed fleet achieved a 13% reduction in maintenance costs and extended component lifespan by over 40%. By removing human error and enabling 24/7 operation, Komatsu improved both productivity and safety across mining sites worldwide.

13%

lower maintenance costs through smoother, AI-controlled vehicle operation

40%

increase in lifespan of tires and brakes due to optimized autonomous driving

AI Solution developed by **KOMATSU**

Other high-impact use cases for AI-powered autonomous haulage



Port container transport & logistics

Why beneficial: Container terminals face congestion, tight schedules, and safety risks during peak operations.

AI impact: AI-controlled autonomous vehicles can streamline container movement, reduce turnaround time, and improve yard efficiency.



Agricultural harvesting fleets

Why beneficial: Manual driving during harvest leads to inconsistent speeds and inefficient fuel use across long hours.

AI impact: AI-managed tractors and harvesters can optimize field coverage and reduce wear and fuel costs during long harvesting cycles.



Open-pit quarry transport ops.

Why beneficial: Quarry trucks often travel uneven terrain with varying payloads, increasing brake and tire wear.

AI impact: AI-enabled routing and driving minimizes sharp braking and improves load balancing extending vehicle life and reducing maintenance needs.



Steel plant slag transport vehicles

Why beneficial: These heavy-duty vehicles operate in harsh heat and must coordinate movement with upstream production.

AI impact: AI automation enables continuous coordination with furnace cycles and minimizes idle time, enhancing throughput and operational safety.

CATERPILLAR

AI-enabled mine management with Minestar Edge



Situation

Caterpillar faced the challenge of giving mining supervisors real-time visibility across the full operation. Many smaller mines still relied on paper-based reporting, resulting in delays, fragmented data, and poor coordination between early and later process steps.

Solution

The Cat® MineStar Edge™ platform uses AI specifically data fusion and machine learning to automatically collect and unify operational data across equipment, processes, and material flow. With up to 98% accuracy and intuitive dashboards, managers can adjust plans in real time based on performance forecasts.

Results

In mines transitioning from manual systems, MineStar Edge increased production by 20–30%. In digital sites, it improved data quality and reduced manual tasks, saving time and lowering support costs. The platform enables faster, more informed decisions across the mining value chain.

25% increase in production after replacing manual, paper-based reporting systems

98% data accuracy achieved across operations using AI-powered data integration

AI Solution developed by **CATERPILLAR®**

Other high-impact use cases for AI-powered site management



Aggregates & cement production

Why beneficial: Plants often suffer from siloed data, delayed reporting, and poor coordination between raw material input and output logistics.

AI impact: AI-driven platforms enable real-time visibility into production lines, helping operators adjust blending, inventory, and truck dispatching based on live demand signals.



Construction site operations

Why beneficial: Delays and inefficiencies stem from fragmented data on equipment use, material delivery, and subcontractor tasks.

AI impact: Integrated platforms consolidate project data to improve scheduling, minimize idle equipment time, and reduce cost overruns.



Steel & metals processing facilities

Why beneficial: These sites rely on timing and coordination between melting, casting, and rolling. Delayed or inaccurate data can lead to scrap and downtime.

AI impact: AI systems unify process data to provide early warnings and optimize flow control across production stages.



Energy infrastructure projects

Why beneficial: Complex projects involve multiple suppliers, tight sequencing, and tough environments—making visibility key.

AI impact: AI-enabled dashboards give managers real-time updates from suppliers, transport, and field installation, enabling better planning and fewer errors.

Our final reflection for the Heavy Industrial Machinery & Equipment Manufacturing Industry

The Untapped Potential Is Massive

The use cases shown so far are just the beginning. Across industrial operations, many processes still rely on manual inspections, outdated tools, and paper-based reporting. Much of the data being generated — from sensors, machines, and images — remains unused.

AI is now mature enough to handle these challenges. It can predict failures in rotating and mobile equipment, analyze sensor and image data from chemical or offshore installations, coordinate fleet logistics autonomously, and detect early signs of wear or corrosion in critical assets. These are high-value problems that occur daily — and the technology to solve them is ready.

The Cost of Waiting

Doing nothing is no longer neutral. Companies embracing AI are training models on their own data, embedding automation into workflows, and creating a compounding competitive advantage. Those who delay risk falling behind not just in cost, but in capability.

A Practical Way Forward

Start with a focused application — like borescope inspections or autonomous haulage. Deliver quick wins within a quarter. Then, scale gradually, integrating AI into broader operations to unlock predictive insights and long-term efficiencies.





AI IN FOOD, BEVERAGE & PACKAGING PRODUCTION

Smarter operations, leaner processes, and more responsive supply chains

Food, beverage, and packaging companies face intense pressure: reducing waste, meeting tough sustainability standards, and quickly adapting to changing consumer demands. However, traditional manufacturing systems often struggle to keep up, lacking the agility and responsiveness needed today.

AI is changing that. Manufacturers are now using AI-driven solutions to optimize everything from energy consumption and quality control to packaging design and product development.

With AI, companies achieve measurable outcomes quickly: reduced CO₂ emissions, lower production costs, faster market response, and significant cuts in waste.

In this section, we share real-world examples from top companies that have successfully moved from AI pilot projects to scaling practical solutions with clear, impactful results.

5 CASES

24 **AI-enhanced demand forecasting**

How Unilever boosted ice cream sales by up to 30% by using weather-based AI to align local stock with demand



26 **AI-powered energy optimization**

How Arla reduced pasteurization energy use by up to 15% through dynamic AI control systems.



28 **AI-based document processing**

How Carlsberg automated 80% of logistics paperwork with AI-driven OCR, cutting processing time by 58%



30 **AI-Driven sustainable packaging**

How Smurfit Kappa helped Henkel cut packaging by 66% using AI-powered digital twins.



32 **AI-powered product innovation**

How Mars cut R&D time by 30% and now generates up to 50 new product ideas daily using generative AI.



UNILEVER

AI-enhanced demand forecasting for ice cream logistics



Situation

Unilever struggled to align ice cream supply with fast-changing, weather-driven demand at the local level. Traditional forecasts were too broad, resulting in missed sales during heatwaves and waste during cooler weeks.

Solution

They implemented an AI model that combined historic sales data with hyperlocal weather forecasts. The system predicted product demand by store and day, enabling real-time adjustments to production and delivery planning.

Results

In pilot markets, Unilever saw up to 30% sales uplift on key products by improving store-level availability during peak demand. At the same time, the model helped reduce waste and overproduction by aligning stock with local consumption patterns.

30%

sales uplift through AI-driven, weather-based demand forecasting in Denmark

12%

sales uplift through AI-driven, weather-based demand forecasting in the U.S

AI Solution developed by



Other high-impact use cases for AI-powered demand forecasting



Fresh bakery goods distribution

Why beneficial: Shelf life is short and demand fluctuates daily, especially in convenience stores and supermarkets. Overstocking leads to waste, understocking leads to lost sales.

AI impact: Real-time demand forecasting helps align daily production and delivery with store-level sales patterns, reducing returns and improving freshness.



Cold chain logistics for dairy goods

Why beneficial: Products like milk and yogurt require tight delivery windows and temperature control. Delays or misallocation can cause spoilage or stockouts.

AI impact: Weather and demand-based models optimize routing and inventory, reducing spoilage and improving on-shelf availability.



Seasonal beverage sales planning

Why beneficial: Sales of soft drinks and juices spike during holidays and warm weather, often unpredictably across regions.

AI impact: AI models combine weather, calendar events, and historic sales to trigger automated stock placement and promotions in the right regions at the right time.



Ice cream freezer placement opt.

Why beneficial: Retail sales depend heavily on location and availability of branded freezers. Manual decisions often miss high-opportunity locations.

AI impact: AI analyzes sales by store type, foot traffic, and climate data to optimize placement, boosting ROI on freezer investments and increasing per-store sales.

ARLA FOODS

AI-powered energy optimization in dairy production



Situation

Arla Foods runs energy-intensive dairy plants where even small improvements can lead to major cost and emissions reductions. Pasteurization is one of the most energy-heavy steps, and was previously run using static settings that didn't adapt to daily variations in milk volume, temperature, or quality.

Solution

Arla implemented an AI-driven control system that dynamically adjusted pasteurization parameters in real time. The model used historical process data, sensor inputs, and external factors to fine-tune the heating process minimizing energy use while ensuring food safety and product quality.

Results

In pilot facilities, the system cut pasteurization energy use by 5–15% depending on the setup. Arla now expects that moderate scaling across its operations could lead to consistent savings of up to 15%, reducing utility costs and carbon footprint without compromising product standards.

5–15% reduction in energy usage for pasteurization across tested facilities

AI Solution developed by external technology partner and Arla Foods

Other high-impact use cases for AI-powered energy opt. in food production



Cheese & yogurt prod. facilities

Why beneficial: These dairy processes rely on precise temperature control to ensure quality, texture, and shelf life. Static heating parameters can waste energy or lead to inconsistent product outcomes.

AI impact: Real-time optimization of thermal treatment can reduce energy usage while maintaining strict microbial and quality standards across batch variations.



Beverage pasteurization

Why beneficial: Thermal processing of non-dairy beverages must adapt to seasonal changes in raw materials and product volumes.

AI impact: Adaptive energy control helps minimize overprocessing, reducing energy costs and preserving nutritional and flavor profiles.



Central milk processing plants

Why beneficial: These plants often run 24/7 and pasteurize large volumes, with temperature and flow variability depending on incoming milk supply.

AI impact: AI-controlled heating parameters optimize consumption in real time, enabling savings at scale without interrupting throughput.



Climate-focused food producers

Why beneficial: Food companies under sustainability pressure need cost-effective ways to meet energy reduction targets.

AI impact: AI-driven energy optimization enables measurable CO₂ savings across utilities, helping meet ESG goals without capex-heavy upgrades.

CARLSBERG

AI-based order processing for faster logistics



Situation

Carlsberg handles thousands of supply chain documents each month invoices, delivery notes, and customs forms often in different formats and languages. Manual processing created delays, errors, and unnecessary workload, slowing down logistics and data entry across markets.

Solution

Carlsberg implemented an AI-driven Intelligent Document Processing (IDP) solution from ABBYY. Using OCR and machine learning, the platform extracts key data automatically, learns from user corrections, and integrates with ERP systems.

Results

Within 6 months, Carlsberg cut document processing time by over half. The AI now processes most documents without human input, freeing up employees and improving data quality across the supply chain.

58% reduction in document processing time compared to manual workflows

80% of documents processed without human intervention after system training and integration

AI Solution developed by **ABBYY**

Other high-impact use cases for AI-based document processing



Cross-border shipping & customs

Why beneficial: International shipments involve customs declarations, invoices, and compliance forms in multiple languages and formats – often processed manually.

AI impact: Faster, automated extraction of data reduces customs delays, improves accuracy, and minimizes manual entry for logistics and trade compliance teams.



Accounts payable in enterprises

Why beneficial: Processing high volumes of incoming invoices across multiple suppliers and currencies is time-consuming and error-prone.

AI impact: AI-powered OCR extracts data fields automatically, enabling faster approval cycles, fewer late fees, and easier integration with finance systems.



Procurement & vendor onboarding

Why beneficial: Collecting, validating, and entering vendor documents (contracts, NDAs, certificates) is often slow and inconsistent.

AI impact: Automated document classification and data capture speeds up onboarding while improving data integrity and compliance tracking.



Warehouse order handling

Why beneficial: Many warehouses still rely on printed order forms and handwritten notes for picking, packing, or delivery documentation.

AI impact: Digitizing and automating document intake enables faster processing, better inventory visibility, and fewer dispatch errors.

SMURFIT KAPPA



AI-enhanced digital twin for sustainable packaging



Situation

Smurfit Kappa's customers across sectors like FMCG and retail needed to reduce packaging costs and emissions while protecting products during transport. But testing physical prototypes across the full supply chain was time-consuming, costly, and often lacked actionable insights.

Solution

Smurfit Kappa developed SupplySmart, an AI-powered digital twin platform that simulates packaging performance under real-world conditions. It enables virtual testing before production, helping reduce material use, emissions, and transport damage.

Results

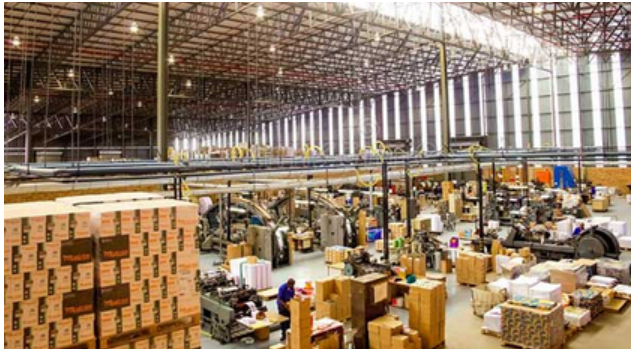
By replacing physical trials with AI simulations, Smurfit Kappa helped customers cut packaging volume and carbon footprint. Henkel achieved a 66% packaging reduction for one product, and overall, the platform has optimized over 100,000 supply chains.

66% less packaging used per product for Henkel

44% decrease in CO₂ emissions per shipment

AI Solution developed by Smurfit Kappa

Other high-impact use cases for AI-sustainable packaging



Faster packaging for new products

Why beneficial: Launching a new product often requires custom packaging, but the traditional process involves costly prototypes and long testing cycles.

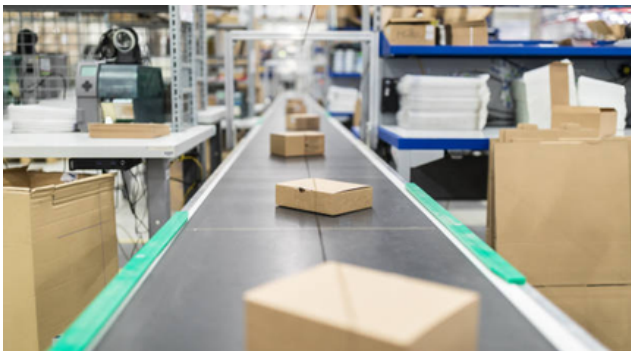
AI impact: Digital twin simulations allow packaging teams to virtually model strength, durability, and material usage early in the process – cutting weeks off development time.



Reducing transport damage

Why beneficial: Packaging that performs well in one country might fail in others due to climate, humidity, or rougher handling.

AI impact: AI simulates regional transport conditions and stress points, helping adapt packaging design for specific logistics environments and minimize product loss.



Lowering material costs in packaging

Why beneficial: In high-volume operations, using too much cardboard, plastic, or filler adds up to significant waste and cost.

AI impact: The platform evaluates alternative materials and structural layouts, recommending optimized solutions that reduce cost without compromising protection.



Sustainability and ESG reporting

Why beneficial: Companies face increasing pressure to document sustainability efforts, but data on packaging waste, carbon footprint, and design changes can be scattered.

AI impact: AI tracks packaging improvements across product lines and generates clear metrics for waste reduction and emissions – making ESG reporting more accurate and efficient.

MARS INC.

MARS

AI-powered product innovation and personalization



Situation

Mars wanted to speed up product development and better match evolving consumer preferences across its chocolate, snack, and pet care brands. Traditional R&D relied heavily on manual testing and long feedback loops, which limited how fast and how often they could launch new ideas.

Solution

Mars built a generative AI platform called Brahma to create new product ideas based on consumer data. Using 80,000 interviews and 800,000 consumption moments, it suggests tailored product designs, marketing, and packaging, and tests campaign ideas automatically.

Results

Mars used AI to cut product development time by 30%, allowing teams to test and iterate faster. With the new system, they now generate up to 50 product concepts per day – accelerating innovation and enabling more personalized offerings across brands.

30% reduction in product development time using AI-driven testing and feedback

50 new product concepts generated per day using the AI platform

AI Solution developed by **MARS**

Other high-impact use cases for AI-powered innovation and personalization



Localized flavor & packaging design

Why beneficial: Tastes, habits, and preferences vary widely across regions, but traditional R&D often struggles to personalize products at scale.

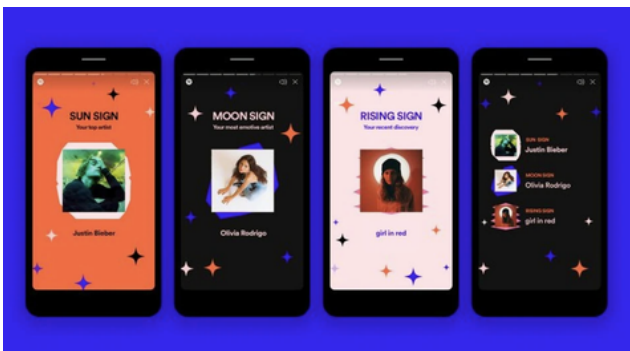
AI impact: Generative AI can analyze consumer trends and feedback from each region to propose locally relevant product formulations and packaging styles — increasing appeal and reducing launch risk.



Smarter product line extensions

Why beneficial: Companies often rely on intuition to expand a brand's product range, which can lead to overcrowded portfolios or irrelevant variants.

AI impact: AI models evaluate gaps in existing offerings and simulate market potential, helping teams design extensions that meet unmet needs and avoid cannibalizing core products.



Personalized campaigns at scale

Why beneficial: Tailoring marketing messages across brands, channels, and demographics takes time and creative resources.

AI impact: AI can instantly generate ad copy, visuals, and taglines tailored to specific audiences – cutting production time while improving targeting precision.



Rapid testing of new concepts

Why beneficial: Testing product ideas with consumers is often slow and expensive, limiting how frequently new concepts are launched.

AI impact: AI tools simulate consumer reactions to product ideas using existing behavioral data, speeding up validation and helping teams prioritize the most promising concepts.

Our final reflection for the Food, Beverage & Packaging Production industry

The Value Is Proven

Across sectors — from dairy to packaging — companies are already seeing measurable results from AI. These are not theoretical promises, but real improvements in sales, energy savings, lead times, and product innovation. The impact is visible across logistics, manufacturing, and product development.

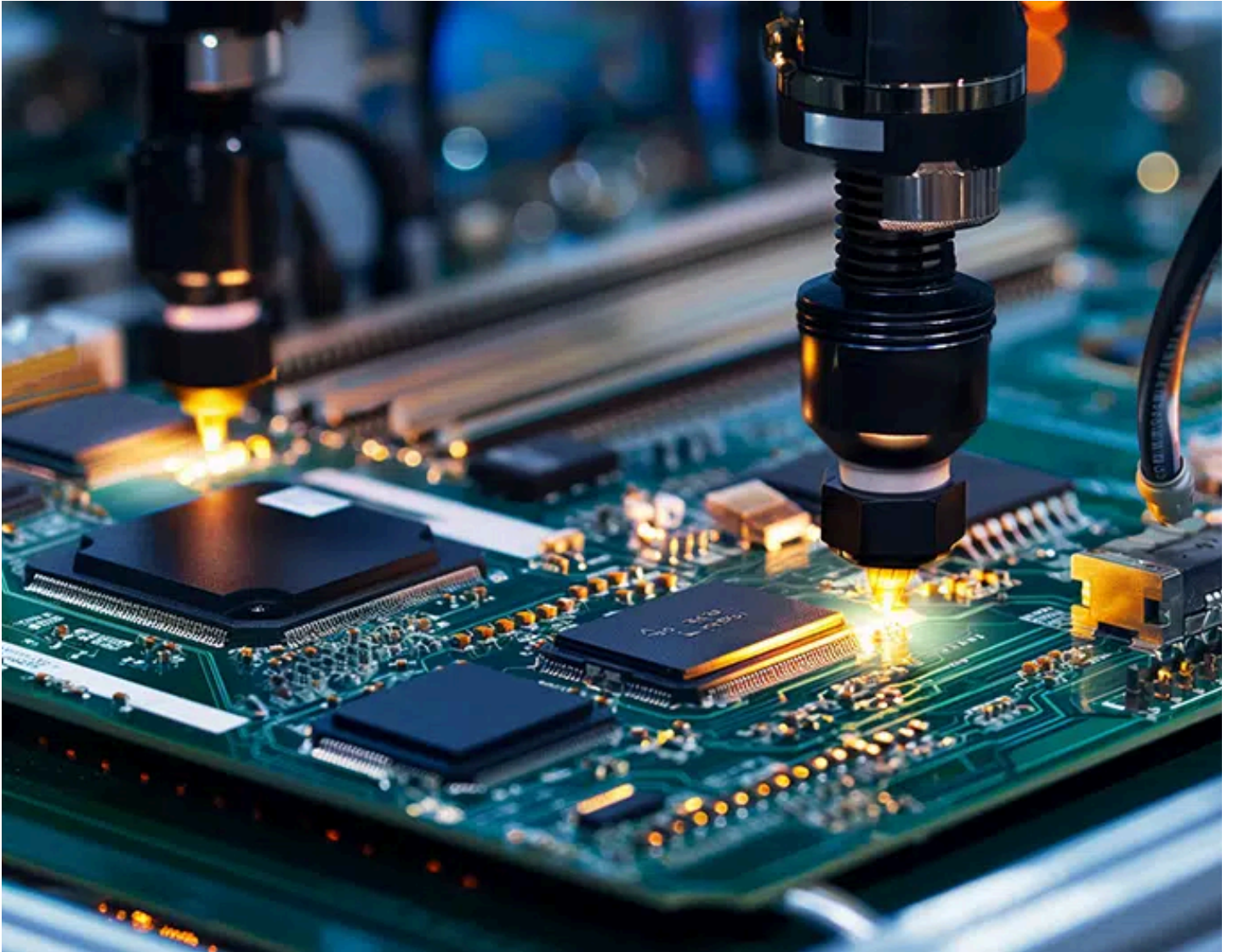
Practical Gains, Fast Delivery

Companies like Unilever, Arla, Carlsberg, and Mars aren't just running pilots — they're implementing AI that delivers ROI in months. Whether it's 30% more accurate demand forecasting or 66% packaging reduction, the focus is on quick wins that scale. Most projects began with one use case and expanded after success.

AI That Fits the Business

The best results come when AI is tightly integrated into existing operations. That means using company-specific data, aligning with business goals, and designing around real-world constraints. Success depends less on fancy models and more on matching the solution to the business problem.





AI IN ELECTRONICS & COMPONENT MANUFACTURING

***Smarter factories, faster output,
and fewer errors***

Electronics and component manufacturers operate under intense pressure—rapid product cycles, complex production demands, and strict quality standards, all while managing costs. Frequent downtime, inconsistent quality checks, and resource-intensive processes only add complexity. AI offers tangible solutions. Leading manufacturers from semiconductor facilities to electronics assembly plants are using AI-driven tools to enhance productivity, accelerate inspections, and proactively manage quality.

Whether it's optimizing complex scheduling, predicting maintenance issues before they occur, or automating precise quality inspections, AI helps manufacturers improve consistency, scale effectively, and respond faster to market demands. The cases in this section show how industry leaders like Siemens, Bosch, Infineon, Nokia, and Flex are putting AI to work — not just in pilots, but across multiple sites — and seeing real results: higher yields, faster delivery, fewer defects, and millions in annual savings.

5 CASES

38 Smart factory with 5G and AI

How Nokia used AI and 5G to boost productivity by 30% and cut delivery time by 50% in its manufacturing facility.

The Nokia logo, consisting of the word "NOKIA" in a bold, sans-serif font.

40 AI-powered energy optimization

How Siemens reduced downtime and energy use with AI for inspections and predictive maintenance.

The Siemens logo, consisting of the word "SIEMENS" in a bold, sans-serif font.

42 AI-driven testing & quality control

How Flex reduced test time by 30% and achieved 388% ROI with automated inspection.

The Flex logo, consisting of the word "flex" in a lowercase, sans-serif font.

44 AI scheduling for chip production

How Infineon improved throughput by up to 15% using AI to optimize planning and reduce idle time.

The Infineon logo, consisting of the word "infineon" in a lowercase, sans-serif font, with a stylized arc above the letters.

46 AI for process & visual inspection

How Bosch cut ramp-up time and test cycles by 14% with AI-guided operations and defect detection.

The Bosch logo, consisting of a circular emblem with a stylized 'H' inside, followed by the word "BOSCH" in a bold, sans-serif font.

NOKIA



AI-powered digital twin and automation for smart factory operations



Situation

Nokia's fully digitalized 5G manufacturing facility in Oulu, Finland (a World Economic Forum "Lighthouse" site) produces up to 1,000 telecom base stations per day. Nokia aimed to boost production efficiency and speed up delivery while maintaining quality.

Solution

Nokia equipped its Oulu factory with a private 4.9G/5G network and edge analytics to build a real-time digital twin from sensor data. AI-driven monitoring, robotics, and cloud-based control enabled smarter workflows and faster adaptation to new product designs.

Results

Nokia's smart factory increased productivity and reduced time-to-market. The integration of advanced connectivity and AI led to faster decision-making and more agile production cycles. The facility became a showcase for Industry 4.0, demonstrating how digitalization can improve output and efficiency.

30%

productivity increase after implementing 5G-connected AI systems

50%

reduction in time-to-market (delivery time) for new products, accelerating product rollout

AI Solution developed by **NOKIA**

Other high-impact use cases for AI-powered smart factories



Real-time quality monitoring

Why beneficial: Quality control in electronics manufacturing often relies on batch sampling and manual checks, which can miss defects and slow down production.

AI impact: AI-powered digital twins analyze sensor data in real time to detect anomalies and predict defects early, reducing rework and scrap.



Production line optimization

Why beneficial: Complex product variants and short cycle times make it hard to optimize production lines manually.

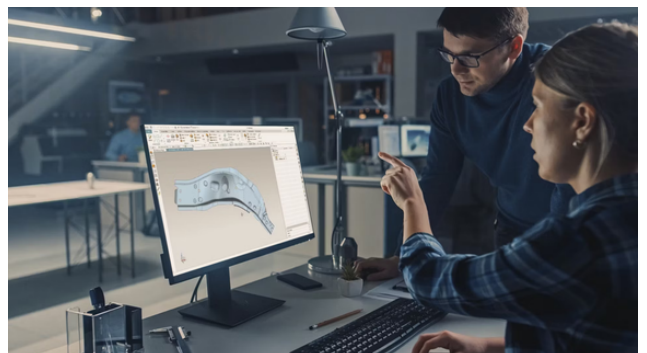
AI impact: Digital twins simulate different configurations and workflows, helping teams find bottlenecks and adjust schedules for higher throughput.



Predictive maintenance of machines

Why beneficial: Unplanned downtime in high-tech manufacturing can halt production and cause expensive delays.

AI impact: AI models trained on machine data predict failures before they happen, enabling condition-based maintenance that cuts downtime and repair costs.



Agile product design & prototyping

Why beneficial: Introducing new products requires testing how design changes affect production and performance – often through trial and error.

AI impact: Virtual testing environments built on digital twins let engineers simulate new designs before launch, accelerating development and reducing cost.

SIEMENS

AI-powered maintenance & energy optimization

SIEMENS



Situation

Siemens, a global leader in electronics and engineering, faced key manufacturing challenges: unplanned equipment downtime, high maintenance costs, inconsistent product quality across sites, and excessive energy use. Enhancing worker safety in complex factory environments was also a priority.

Solution

Siemens implemented predictive maintenance to avoid equipment failures, AI-based visual inspection for faster defect detection, and energy optimization tools to cut waste. AI also supported worker safety and upskilling across factories.

Results

AI improved Siemens' production efficiency, reliability, and cost control. Predictive maintenance reduced downtime, visual inspection raised product consistency, and energy optimization cut emissions and utility costs. The result: safer, more sustainable, and digitally advanced manufacturing operations.

20%

decrease in energy consumption across several production facilities after AI-driven optimizations



downtime slashed, avoiding costly production stops and saving millions of euros per year

AI Solution developed by **SIEMENS**

Other high-impact use cases for AI-driven manufacturing efficiency



Predictive maint. for equip. fleets

Why beneficial: Older machines often break down without warning, causing production stops and high repair costs. Maintenance is typically reactive, based on failure rather than foresight.

AI impact: Predictive models monitor sensor data in real time to detect early signs of wear and failure. This allows maintenance teams to intervene before breakdowns, extending equipment life and reducing unplanned downtime.



AI-optimized energy mgmt. in plants

Why beneficial: Manufacturing plants use significant energy for HVAC, lighting, and machine operations. Traditional control systems often run on fixed schedules, wasting electricity.

AI impact: Machine learning algorithms continuously optimize power usage based on real-time demand, weather, and production load. This cuts energy costs and helps companies meet sustainability targets.



Visual AI for quality control

Why beneficial: Manual quality checks can be slow and inconsistent, especially in high-speed production. Defects often slip through, leading to recalls or wasted material.

AI impact: AI-driven visual inspection systems detect product defects with higher accuracy and speed than human inspectors. This ensures consistent quality while reducing labor costs and scrap.



Safety monitoring

Why beneficial: Large production sites present physical risks – heavy machinery, heat, and hazardous materials. Monitoring for unsafe behavior or conditions is difficult manually.

AI impact: Computer vision and sensor data detect near-miss events, unsafe movements, or equipment anomalies. Alerts are generated in real time to prevent accidents and guide proactive safety improvements.

FLEX

AI-powered inspection & testing automation



Situation

Flex, a global electronics manufacturer, wanted to improve product quality and reduce manual testing effort. Traditional inspection processes were time-consuming, inconsistent, and costly to scale across global operations.

Solution

Flex deployed AI-powered visual inspection systems and automated testing across its facilities. These tools help identify defects faster and more accurately while reducing reliance on manual checks.

Results

The AI systems increased testing speed and improved defect detection accuracy. Flex also reduced inspection costs and was able to scale quality control across more sites consistently.

30%

reduction in overall test time for PCB assemblies (50% in failure cases) at the first deployment site

388%

ROI from scrap reduction and labor optimization at another deployment site

AI Solution developed by **flex**

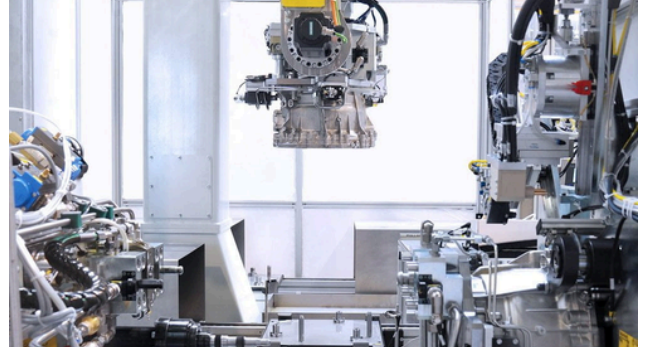
Other high-impact use cases for AI-powered inspection and testing



Automated optical inspection

Why beneficial: Manual inspection of printed circuit boards is slow, inconsistent, and prone to error—especially at high volumes.

AI impact: AI-powered vision systems identify defects like soldering faults or misaligned components faster and more accurately, improving first-pass yield and reducing rework.



Predictive testing workflows

Why beneficial: Static testing setups don't account for variability in components or prior performance trends, leading to inefficiencies and unnecessary test steps.

AI impact: AI systems dynamically adjust test sequences in real time based on historical failure patterns, reducing unnecessary testing and speeding up production without compromising quality.



Multi-site quality control

Why beneficial Manufacturers often struggle to maintain consistent inspection standards across global sites. Differences in processes and human judgment can lead to uneven product quality.

AI impact: AI models trained on shared defect libraries allow consistent inspection rules to be applied across sites, raising quality standards and simplifying compliance.



Labor optimization

Why beneficial: Manual testing depends heavily on skilled labor, which is costly, time-intensive, and hard to scale. It also creates bottlenecks in production, especially when demand spikes or staffing is limited.

AI impact: AI automates routine inspection tasks, freeing up skilled technicians for more complex work while scaling output without adding headcount.

INFINEON



AI scheduling boosts output in semiconductor production



Situation

Infineon, a global semiconductor leader, faced production planning challenges in its complex fabrication facilities. High product variety, long production cycles, and limited capacity made it difficult to optimize throughput using traditional scheduling tools.

Solution

Infineon introduced an AI-based scheduler to dynamically optimize production sequences based on real-time data, constraints, and predictive modeling. The system helps planners better prioritize tasks, reduce idle time, and respond faster to disruptions.

Results

The AI scheduler boosted throughput by streamlining lot flow and reducing wait times. Infineon scaled the system to three sites in 18 months, enabling higher output and better delivery accuracy without raising costs.

5–15%

capacity gain across key work centers like furnaces and lithography after AI scheduling rollout

Other high-impact use cases for AI-based scheduling in electronics manufacturing



Dynamic equipment dispatching

Why beneficial: Semiconductor fabs rely on hundreds of tools that must be scheduled in sync to avoid bottlenecks and idle time. Traditional scheduling systems struggle with real-time changes.

AI impact: AI algorithms constantly adjust task assignments based on current equipment availability and production status, improving tool utilization and throughput.



Capacity planning across global sites

Why beneficial: Demand spikes or equipment maintenance can disrupt planning across multiple fabs. Manual forecasting lacks precision.

AI impact: AI models simulate different scenarios using real-time and historical data, allowing planners to allocate production more effectively and avoid delays.



Predictive bottleneck resolution

Why beneficial: Fabs often face recurring chokepoints in steps like lithography or wet etching. Fixing these too late causes delays.

AI impact: Predictive analytics identify future bottlenecks before they occur, enabling proactive load balancing and better sequencing of tasks.



Energy-efficient scheduling

Why beneficial: Power-hungry equipment runs 24/7 in fabs, contributing to high energy costs and CO₂ emissions.

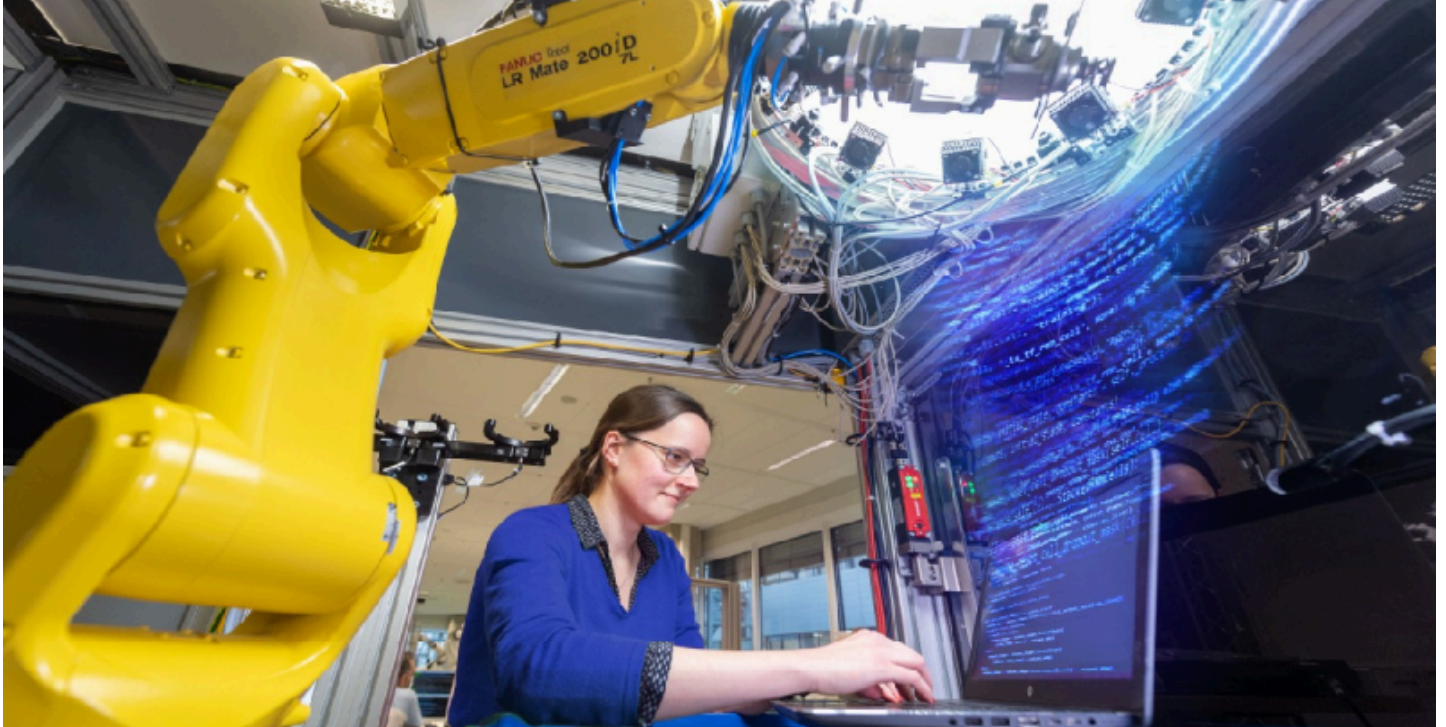
AI impact: AI schedules production in a way that flattens energy peaks, reduces HVAC loads, and integrates with renewable power usage, lowering environmental impact.

BOSCH

AI-powered visual inspection and process optimization



BOSCH



Situation

Bosch wanted to improve product quality and reduce errors on complex manufacturing lines. Manual inspections and process adjustments took time and often varied across plants.

Solution

The company deployed a generative AI platform that continuously analyzes visual and sensor data to detect anomalies, recommend process tweaks, and reduce operator workload. The system helps standardize quality control and guide workers with real-time suggestions.

Results

The AI improved visual inspection speed and consistency across factories, while also boosting operator efficiency. Bosch reports fewer defects and faster issue resolution due to automated process insights.

15%

reduction in production line ramp-up time at Bosch's Hildesheim plant using AI-driven data insights

14%

reduction in component test time at the Stuttgart-Feuerbach plant with AI-powered inspection tools

AI Solution developed by  **BOSCH**

Other high-impact use cases for AI-powered inspection



Automated visual defect detection

Why beneficial: Manual quality checks are slow, vary by operator, and often miss subtle errors that impact reliability. As production scales, maintaining accuracy without automation becomes increasingly difficult.

AI impact: AI vision systems detect anomalies in real time with high accuracy, ensuring consistent quality across global sites and reducing scrap.



Real-time process tuning

Why beneficial: Small deviations in process settings can lead to long-term quality issues, rework, or production delays. These issues often go unnoticed without continuous monitoring and timely intervention.

AI impact: AI analyzes sensor data to recommend immediate process adjustments, helping operators fix issues before they become costly.



Standardized quality control

Why beneficial: Plants often rely on locally developed procedures, creating inconsistencies in output. This variation makes it harder to scale best practices and maintain uniform product quality.

AI impact: AI platforms provide a centralized model for inspections, enabling consistent quality and faster onboarding of new workers.



AI-guided operator support

Why beneficial: Less experienced workers may struggle with complex tasks, inspections, or diagnosing issues quickly. Without structured support, this can lead to slower ramp-up times and more errors.

AI impact: Generative AI gives step-by-step guidance during inspections or line changes, boosting operator efficiency and reducing downtime.

Our final reflection for the Electronics & Component manufacturing industry

The Productivity Payoff Is Real

Across semiconductors, electronics, and industrial production, AI is already delivering results. Companies like Nokia, Siemens, and Bosch are using AI to cut downtime, speed up testing, and boost output. These are not pilots – they're scaled systems saving millions and raising efficiency.

Smart Factories Start with Focus

Top performers didn't "AI everything." They started with high-impact areas like defect detection, scheduling, or predictive maintenance. By targeting problems with clear data and clear payback, they proved value fast – then scaled from there.

AI Turns Data Into Better Decisions

From edge analytics in Nokia's smart factory to AI-based scheduling at Infineon, the common thread is smarter use of data. Real-time feedback, anomaly detection, and process recommendations help people, not just systems, work better and faster.





AI IN MACHINE & EQUIPMENT MANUFACTURING

***Smarter production, faster service,
and fewer breakdowns***

Machine and equipment manufacturers operate in a high-mix, high-precision world. Every order, part, and service call demands accuracy, speed, and flexibility. But many companies still struggle with siloed systems, manual processes, and limited visibility into what happens after the machines are delivered.

That's why manufacturers are turning to AI.

Whether it's automating order intake, predicting equipment failures, guiding technicians in the field, or mapping the installed base across customers, AI is helping streamline operations and unlock new revenue opportunities. From Danfoss and KONE to ABB and PJM, this section highlights how companies are using AI not just to reduce costs but to improve service, speed up workflows, and build smarter digital foundations for growth.

4 CASES

52 **AI-powered document processing**

How Danfoss cut order handling time by 95% using AI to read and route customer orders.



54 **Predictive elevator maintenance**

How KONE used AI to reduce breakdowns by 20–30% and fix issues before they happen.



56 **AI assistant for faster field repairs**

How ABB improved first-time fix rates by 50% with step-by-step guidance from generative AI.



58 **Installed base intelligence platform**

How PJM built a unified machine view to boost aftermarket insights and service planning.



DANFOSS

AI-powered document processing for faster order handling



Situation

Danfoss receives thousands of customer orders via email, often in unstructured formats like PDFs or Excel files. Manually entering this data into ERP systems was time-consuming, error-prone, and a growing bottleneck for operations.

Solution

Danfoss implemented an AI-based document processing system that uses OCR and natural language processing to extract relevant order data automatically. The AI agents route structured data into internal systems, flag exceptions for review, and improve continuously through human feedback.

Results

Danfoss cut order processing time by over 95%, going from days to minutes. Customers now get faster confirmations and deliveries, while staff can focus on higher-value tasks. After successful pilots in Spain, France, and Italy the AI solution is being rolled out globally.

95% reduction in order processing time – from days to minutes

AI Solution developed by **go autonomous**

Other high-impact use cases for AI-powered inspection



AI-powered sales order validation

Why beneficial: Sales orders often contain missing fields, invalid SKUs, or inconsistent formats, which delay processing and require manual clarification.

AI impact: AI can automatically validate key fields (e.g. part numbers, delivery addresses, quantities) and flag exceptions instantly, reducing back-and-forth with customers and speeding up fulfillment.



Multilingual document understanding

Why beneficial: Global customers submit orders in multiple languages and templates, making it hard for shared service centers to process them uniformly.

AI impact: NLP models can extract structured data from orders written in different languages and layouts, enabling consistent handling without the need for language-specific teams.



Integration with legacy ERP systems

Why beneficial: Manual ERP entry is slow, error-prone, and hard to scale as order volumes increase, often leading to processing delays, backlogs, and dissatisfied customers.

AI impact: AI agents can convert unstructured documents into ERP-ready formats and push them directly into legacy systems, eliminating manual steps and improving data quality.



AI for demand planning

Why beneficial: Without structured order data, forecasting departments lack early insights into customer demand patterns.

AI impact: Structured data from processed orders feeds into analytics dashboards, enabling earlier detection of volume shifts, seasonal trends, or new customer behaviors.

KONE



AI-powered predictive maintenance for elevators



Situation

KONE wanted to reduce elevator downtime and improve service quality. Traditional maintenance was reactive or time-based, often missing early signs of failure and leading to unplanned outages.

Solution

KONE developed the 24/7 Connected Services platform using AI from IBM Watson. It collects sensor data from elevators and escalators, analyzes it in real time, and predicts faults before they happen. Technicians are notified proactively, enabling condition-based maintenance.

Results

AI-based alerts helped reduce equipment downtime, improved service response, and extended the lifespan of elevator components. In pilot deployments, KONE reported a 20–30% drop in breakdowns and faster issue resolution – boosting passenger satisfaction.

70% of potential faults are detected and addressed before they cause an elevator breakdown

40% fewer customer-reported elevator issues have been recorded after deploying the AI maintenance system

AI Solution developed by 

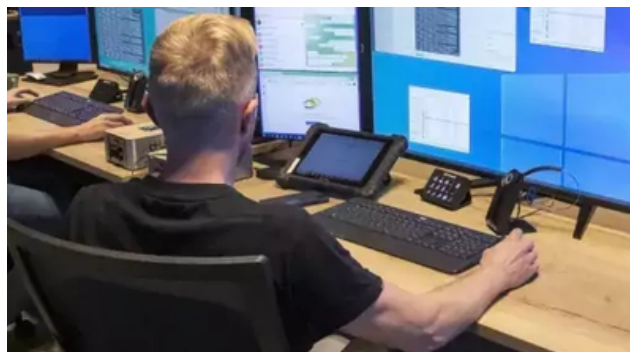
Other high-impact use cases for AI-driven fault detection and service optimization



Predictive fault detection

Why beneficial: Traditional maintenance is often reactive and misses early signs of failure, leading to costly breakdowns and unplanned downtime.

AI impact: AI systems analyze real-time sensor data to detect faults before they occur, enabling proactive service and fewer disruptions.



Remote diagnostics and alerts

Why beneficial: Technicians often rely on on-site checks or customer reports, which can delay repairs and increase travel time.

AI impact: AI tools automatically detect and classify issues remotely, sending alerts directly to technicians with suggested actions, speeding up resolution time.



Condition-based servicing

Why beneficial: Standard service intervals don't reflect actual elevator usage or component wear, leading to over- or under-maintenance.

AI impact: AI enables tailored maintenance schedules based on real usage and component condition, improving asset life and reducing unnecessary work.



Passenger experience improvement

Why beneficial: Frequent breakdowns or delays frustrate users, disrupt daily operations, and can damage a company's reputation for reliability and service quality.

AI impact: With fewer breakdowns and faster repairs, elevators run more reliably, resulting in smoother rides and fewer complaints from passengers.

ABB



AI-powered maintenance assistant for faster troubleshooting



Situation

Technicians servicing ABB's industrial measurement devices often spent hours diagnosing faults, relying on scattered manuals, codes, and technical documents. This slowed down repairs and increased equipment downtime, especially in critical infrastructure sectors like energy and water.

Solution

ABB developed My Measurement Assistant+, a generative AI tool that combines equipment data, service history, and technical documentation to provide real-time, step-by-step troubleshooting. Delivered via mobile devices, it helps technicians solve issues faster and with greater accuracy.

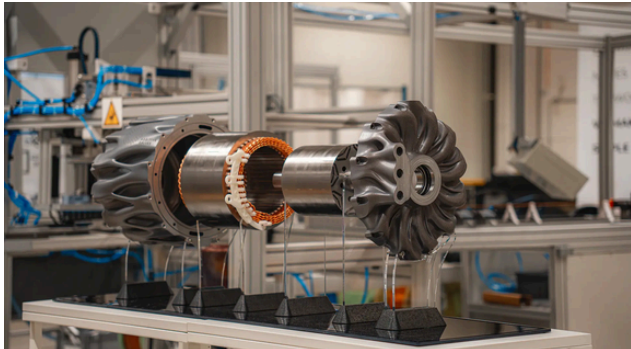
Results

Field tests show the AI assistant significantly boosts efficiency and accuracy in maintenance tasks. It centralizes complex technical knowledge and helps technicians solve issues faster, even in remote or high-pressure environments.

50% increase in first-time fix rate – more issues resolved on the first visit

AI Solution developed by **ABB**

Other high-impact use cases for AI in industrial operations



Predictive maint. for motors & drives

Why beneficial: Unexpected equipment failures cause costly downtime in factories, energy plants, and processing facilities.

AI impact: AI models analyze sensor data like vibration and temperature to detect early signs of wear, helping maintenance teams intervene before breakdowns occur.



Energy optimization in facilities

Why beneficial: Industrial facilities often have complex energy systems with hidden inefficiencies. Managing energy use manually makes it hard to cut costs or meet sustainability goals.

AI impact: AI can detect inefficiencies in energy use, forecast consumption patterns, and suggest actions to lower waste and improve overall energy performance.



Fault detection in power systems

Why beneficial: Power distribution failures can interrupt operations, damage sensitive equipment, and compromise safety. Manual monitoring often misses subtle early warning signs.

AI impact: Anomaly detection models flag abnormal patterns in electrical loads and switchgear behavior, helping prevent faults before they escalate.



Autonomous Intralogistics

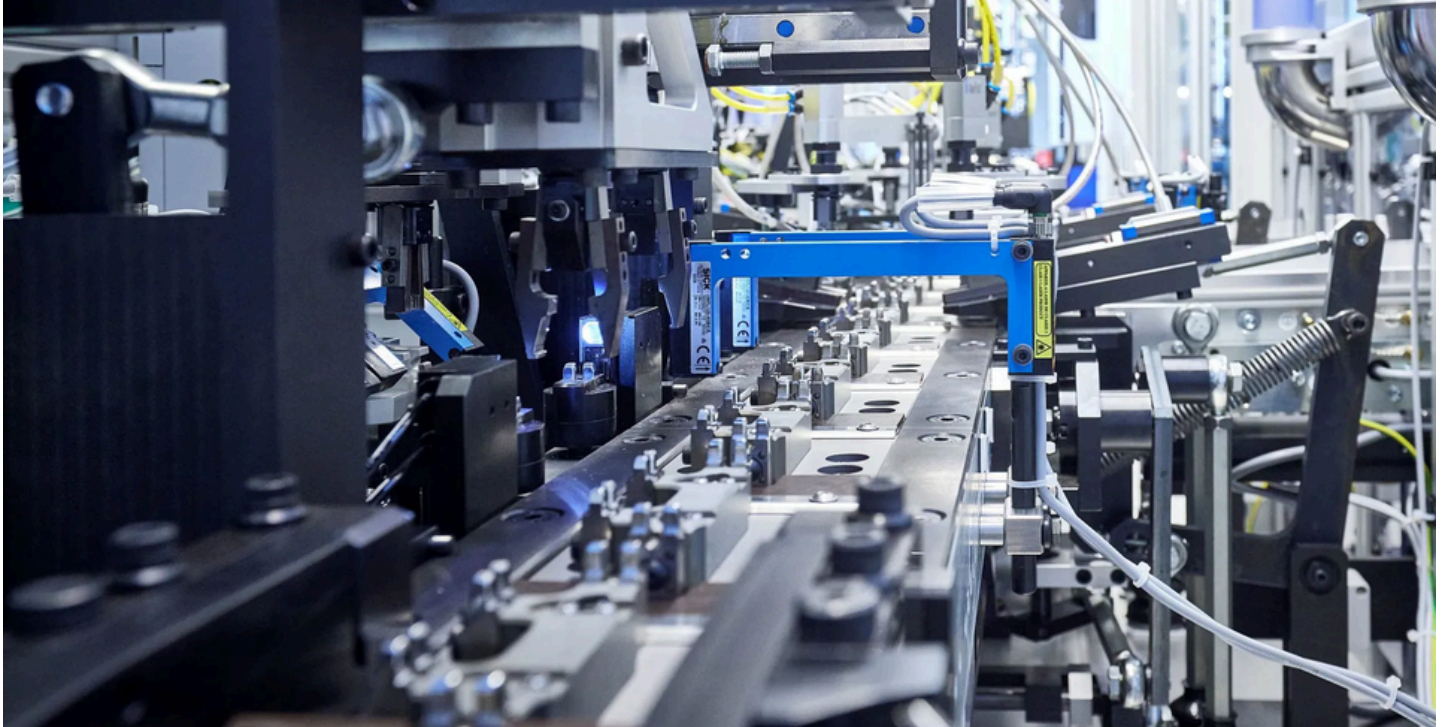
Why beneficial: Traditional intralogistics setups rely on fixed routes or manual labor, which reduces flexibility and increases operating costs especially in high-mix, low-volume production.

AI impact: AI-powered robots use visual navigation and real-time mapping to move parts independently, adapting to layout changes and reducing setup time.

PJM



AI-enabled platform for installed base insights



Situation

PJM delivers custom industrial automation machines, but lacked a unified view of their installed base—where machines were located, which parts were in use, and what service had been performed. This made it hard to identify upsell opportunities, optimize spare parts inventory, or support service teams effectively.

Solution

PJM launched a pilot platform that combined data from ERP, Excel, and documentation into a Power BI dashboard. It provided real-time visibility into machine locations, service history, and sales opportunities, while also laying the groundwork for future AI applications.

Results

With one central view of their installed base, PJM can now support service teams more proactively, plan smarter inventory, and identify commercial opportunities. The platform strengthens data-driven decision-making and sets a foundation for long-term growth in service and aftermarket sales.

1

central view of machines, parts, location, and service history across customers

100%

of installed base mapped giving full visibility into machines across customers

AI Solution developed by **APLIED.ai** x Codellent

Other high-impact use cases for AI-enabled installed base platforms



Industrial pump & valve producers

Why beneficial: These companies often serve hundreds of sites globally, but lack consolidated visibility into where equipment is installed and when service is due.

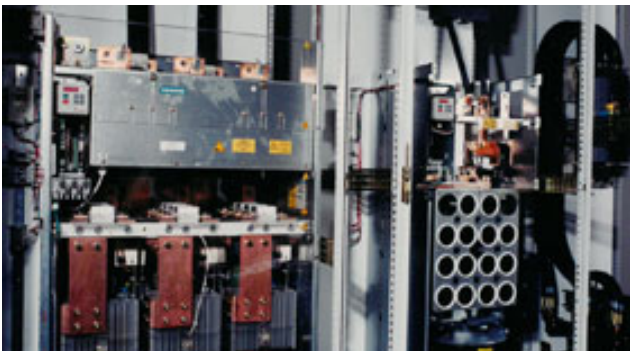
AI impact: A centralized platform improves aftermarket sales, enables predictive service planning, and helps sales teams identify upsell and retrofit opportunities.



Robotics & automation suppliers

Why beneficial: With complex machines installed across diverse industries, it's difficult to track lifecycle status, wear patterns, or usage history.

AI impact: Installed base insights can reveal which components need upgrades, when service contracts should renew, and where to direct support efforts.



Transmission & systems providers

Why beneficial: Customers rely on these critical components but rarely share usage data back to the manufacturer, leaving service reactive.

AI impact: Mapping installed assets allows for data-driven service models, lifecycle management, and new offerings like performance-based maintenance.



HVAC & climate equipment makers

Why beneficial: Units are often installed across many sites or partners, but without centralized tracking, making it hard to monitor performance, service history, or commercial potential.

AI impact: A unified installed base view helps companies reduce warranty costs, plan spare part inventory, and identify service gaps across geographies.

Our final reflection for the Machine & Equipment Manufacturing industry

From Back Office to Field – AI Delivers Speed and Scale

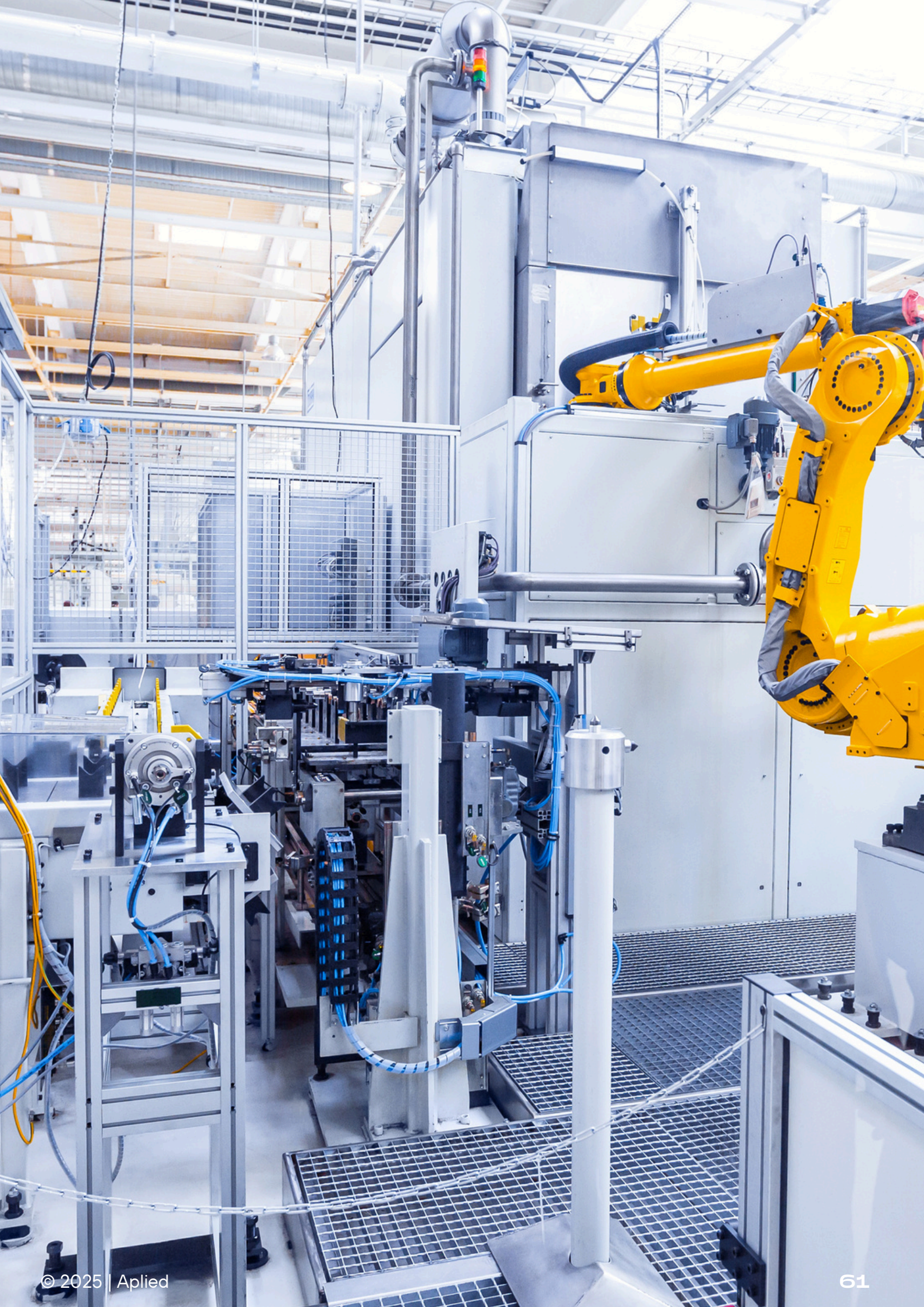
Whether it's automating order intake at Danfoss or guiding elevator repairs at KONE, AI is cutting delays and unlocking productivity in both digital and physical operations. Faster response times, fewer errors, and better service are the norm — not the goal.

AI Solves the Hidden Bottlenecks

These companies didn't need to reinvent their business models — they solved real-world friction: manual document handling, unclear asset visibility, or inefficient fault detection. By digitizing and connecting data flows, they unlocked value without large-scale disruption.

The Tech Is Ready – Now It's About the Use Case

The success stories weren't driven by flashy tech. They started with clear use cases: "process orders faster," "reduce breakdowns," "help service teams fix things right the first time." That clarity led to faster rollouts, measurable ROI, and strong user adoption.





AI IN THE MINING INDUSTRY

***Smarter logistics, better uptime,
and more efficient exploration***

Mining operations are complex, capital-intensive, and increasingly scrutinized for safety, sustainability, and efficiency. Yet many teams still rely on reactive maintenance, rigid planning, and slow, manual processes – a mismatch for an industry that needs real-time decisions and system-wide coordination.

AI is starting to fill that gap. It's helping mining firms anticipate failures, optimize resource use, and speed up exploration – not through blue-sky projects, but through grounded use cases like fleet scheduling, predictive maintenance, and satellite-based prospecting.

This section highlights how companies are using AI to solve high-stakes operational bottlenecks – and what it takes to turn pilot success into everyday performance improvements

5 CASES

64 **AI-powered scheduling for logistics**

How Rio Tinto doubled scheduler productivity and increased throughput by using AI to optimize operations

RioTinto

66 **AI-driven maintenance planning**

How BHP improved truck uptime and saved \$5.5M by predicting failures and scheduling maintenance early.

BHP

68 **AI assistant for field support**

How U.S. Steel cut maintenance time by 20% using a generative AI tool for real-time repair guidance.



70 **Satellite sensing for mineral discovery**

How Barrick Gold used AI-powered satellite tech to scan 100× faster and find mineral zones without drilling.



72 **AI for process & visual inspection**

How BHP saved 118GWh of energy and 3 billion liters of water annually with AI-powered process optimization.

BHP

RIO TINTO

AI-powered supply chain scheduling for iron ore logistics

RioTinto



Situation

Rio Tinto's Pilbara operations move over 1 million tonnes of iron ore daily through a complex mine–rail–port network. Legacy scheduling tools couldn't keep up with real-time changes, limiting throughput, delaying shipments, and straining dispatch teams managing dozens of variables.

Solution

Rio Tinto partnered with BCG X to develop a modern AI-powered scheduling platform that integrates machine learning, real-time data, and simulation models. The system supports 50+ planners across mines, trains, and ports, helping them make faster and more accurate dispatching and allocation decisions.

Results

The new platform doubled scheduler productivity and delivered a significant uplift in throughput. According to Rio Tinto, the entire system paid for itself in less than three months after deployment through improved operational efficiency and better asset utilization.

100%

increase in scheduler productivity after switching to AI-based planning

<3

months to recoup full implementation cost through operational uplift

AI Solution developed by **BCG X**

Other high-impact use cases for AI-powered logistics & scheduling



Dynamic resource allocation

Why beneficial: Coordinating people, machines, and materials across mining, ports, and rail can lead to bottlenecks and idle time if not managed in real time.

AI impact: AI tools adapt to shifting conditions—like delays or equipment availability—to reassign resources instantly, keeping throughput high and minimizing costly downtime.



Multi-site supply chain visibility

Why beneficial: With assets spread across wide geographies, manual coordination often causes blind spots and reactionary decision-making.

AI impact: AI platforms integrate data from across sites (mines, trains, ports) into a single view, helping dispatchers plan proactively and optimize the entire flow—not just individual steps.



Simulation-based scenario planning

Why beneficial: Planning for demand shifts, equipment outages, or weather disruptions is difficult without accurate forecasts.

AI impact: AI models simulate alternative scenarios—like delays or port congestion—and recommend the best plan, allowing planners to respond before problems arise.



AI-enabled planner productivity

Why beneficial: Human planners face dozens of variables and constant updates, making it hard to act quickly and with precision.

AI impact: Assisted planning tools suggest optimal moves, freeing planners to focus on exceptions and strategic decisions. At Rio Tinto, this led to a 100% increase in productivity.

BHP

BHP

AI-powered maintenance planning for haul trucks



Situation

BHP's Yandi iron-ore operation grappled with unpredictable downtime and uneven wear on its fleet of CAT 793F haul trucks. Only ~10% of maintenance jobs scheduled >2 weeks in advance were accurate, and parts shortages were common (13% of jobs lacked needed parts)

Solution

BHP's global Maintenance Centre of Excellence applied machine learning to historical maintenance records and real-time engine sensor data. The AI algorithms predict component wear and failures, enabling advance scheduling of maintenance at optimal times

Results

After deployment, planning accuracy for long-lead jobs jumped from ~10% to 85%, and parts availability improved dramatically (parts missing fell from 13% of jobs to ~1%). Truck availability exceeded 90%, and the program generated an estimated US\$5.5 million in cost savings at Yandi in one year

85%

increase in long-term maintenance planning accuracy using AI-based prediction models

5.5M

USD annual cost savings from improved truck availability and optimized maintenance scheduling

AI Solution developed by **BHP**

Other high-impact use cases for AI-enabled maintenance and asset planning



Advance job scheduling

Why beneficial: Unplanned maintenance often causes costly downtime, delayed production, and part shortages – especially for large, high-value equipment.

AI impact: AI models forecast future failures based on historical and sensor data, enabling teams to schedule key maintenance tasks weeks in advance and reduce surprise breakdowns.



Improved parts availability

Why beneficial: Parts delays are a common bottleneck in maintenance operations, especially for long-lead or critical components.

AI impact: AI-powered planning ensures the right parts are ordered and delivered on time by forecasting future needs, cutting urgent orders and downtime.



Smarter team deployment

Why beneficial: It's hard to assign the right number of technicians when job duration and complexity are unclear, often leading to idle time or last-minute firefighting.

AI impact: AI improves labor planning by predicting job requirements, helping maintenance managers deploy teams more efficiently and minimize wasted capacity.



More reliable fleet performance

Why beneficial: Maintenance uncertainty reduces truck availability and puts strain on logistics and production schedules.

AI impact: AI scheduling tools improve job accuracy and coordination, helping companies increase overall fleet availability and asset utilization.

US STEEL

AI-guided troubleshooting for mining technicians



Situation

US Steel's Minnesota Iron Range operations run a fleet of Bucyrus RH-400 (A60) haul trucks. Maintenance crews needed faster access to technical guidance (manuals, procedures) when troubleshooting equipment issues to reduce downtime and labor costs.

Solution

U.S. Steel and Google Cloud launched MineMind, a generative AI assistant that helps technicians troubleshoot equipment by answering questions in natural language. It pulls repair steps, diagrams, and references directly from manuals, with confidence scores to support decision-making.

Results

Trials on A60 haul trucks showed MineMind reduced maintenance work-order times by ~20%. Technicians spend less time searching documentation, helping speed up routine tasks and cut overtime. U.S. Steel is now expanding the tool across more sites, aiming for similar productivity gains.

20%

reduction in maintenance work order time using generative AI assistant

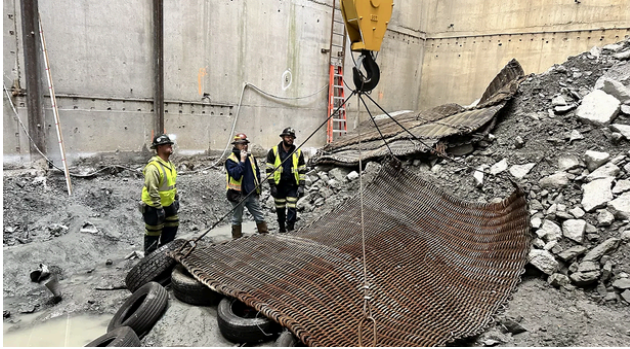
100%

of responses include source citations and confidence scoring for technician trust and traceability

AI Solution developed by



Other high-impact use cases for AI-guided technician support



Faster troubleshooting in the field

Why beneficial: Long repair times delay equipment availability and increase labor hours, especially when technicians need to look up documentation manually.

AI impact: Generative AI tools help technicians resolve issues faster by instantly providing step-by-step repair instructions pulled from manuals and diagrams.



Reduced search time for tech. info

Why beneficial: Crews spend valuable time searching for relevant procedures, which slows down maintenance and drives overtime costs.

AI impact: AI assistants surface the right documents, repair steps, and safety procedures on demand — reducing delays and helping teams stay focused on the job.



Smarter onboarding of technicians

Why beneficial: Less experienced team members often struggle to find and follow the correct repair procedures, leading to errors or rework.

AI impact: On-demand guidance with source citations and confidence scores improves decision-making and helps newer staff work more independently.



Scalable knowledge across sites

Why beneficial: Best practices are often locked in site-specific documents or individual expertise, limiting company-wide gains.

AI impact: AI-powered guidance tools can be deployed across locations to deliver consistent instructions and enable data-driven standardization at scale.

BARRICK GOLD

AI-powered satellite sensing for mineral exploration



Situation

At the Reko Diq copper-gold project in Pakistan, Barrick Gold needed to accelerate mineral exploration while minimizing environmental disruption and drilling costs. Traditional exploration methods were time-consuming and invasive, often requiring months of surveys and heavy equipment.

Solution

Barrick partnered with Fleet Space Technologies to deploy ExoSphere, an AI-powered satellite geophysics platform. The system uses portable sensors, ambient seismic readings, and machine learning to generate 3D subsurface maps of mineral zones . without drilling.

Results

ExoSphere enabled Barrick to scan target areas up to 100× faster than traditional methods, producing early copper deposit models with zero drilling. The AI system cut exploration time and cost while reducing environmental impact, accelerating decision-making for future resource extraction.

100X

faster subsurface exploration compared to traditional geophysics and drilling methods

0

exploration drilling required during initial copper deposit modeling

AI Solution developed by **FLEET**

Other high-impact use cases for AI-driven mineral exploration



Faster subsurface scanning

Why beneficial: Traditional methods like drilling or seismic surveys are time-consuming and labor-intensive, delaying exploration timelines.

AI impact: AI-based satellite sensing enables rapid, non-invasive scans of large areas, producing subsurface models much faster and reducing delays in resource discovery.



Lower exploration costs

Why beneficial: Physical surveys and drilling campaigns require major capital and operational expenditure.

AI impact: By reducing the need for initial drilling and heavy fieldwork, AI sensing lowers upfront costs while increasing site screening efficiency.



Reduced environmental disruption

Why beneficial: Exploration can damage local ecosystems and trigger regulatory delays or pushback from communities.

AI impact: Satellite and sensor-based methods minimize surface disruption, helping companies meet environmental goals and stakeholder expectations.



Improved decision-making

Why beneficial: Inaccurate or incomplete data early in the process can lead to costly mistakes later in development.

AI impact: High-resolution geological models generated with AI improve decision accuracy in site prioritization and resource estimation – before drilling begins.

BHP

AI-powered energy and water optimization in copper mining



Situation

Energy and water use in BHP's Escondida concentrator and desalination plant were major cost and sustainability drivers. The mine sought to reduce its large power draw and water consumption without disrupting production.

Solution

BHP deployed AI-powered process controls and analytics in real time. Machine-learning models continuously monitor energy/water usage patterns and suggest adjustments (e.g. process setpoints and schedules) to optimize plant performance while meeting throughput targets

Results

Since FY2022, Escondida's AI system has enabled savings of 3 billion+ liters of water and 118 GWh of energy across its operations – equivalent to millions of dollars in utility costs and a significant cut in carbon footprint. These quantifiable resource savings were directly attributed to the AI-driven optimization.

118GWh

energy saved annually through AI-powered process optimization

3B L

of water saved across operations since deploying AI at Escondida

AI Solution developed by **BHP**

Other high-impact use cases for AI-driven resource efficiency



Energy optimization with analytics

Why beneficial: Mines consume huge amounts of electricity, and even small inefficiencies drive up costs and carbon emissions.

AI impact: AI systems continuously analyze energy usage patterns and recommend real-time process tweaks to reduce consumption without affecting output.



Smarter water resource mgmt.

Why beneficial: Water is a scarce and expensive resource in many mining locations, and overuse can limit sustainability.

AI impact: Machine-learning models help operators optimize water input for tasks like cooling or cleaning, reducing waste while meeting operational needs.



Predictive load control

Why beneficial: Running equipment at non-optimal loads increases wear, energy use, and risk of downtime.

AI impact: AI can forecast equipment demand and dynamically adjust operations to keep systems running at ideal load levels.



Data-driven environmental reporting

Why beneficial: Environmental audits require detailed usage data, which is time-consuming to collect and report manually.

AI impact: AI-enabled tracking provides accurate, real-time data for energy and water metrics, making compliance and reporting easier and more transparent.

Our final reflection for the Mining industry

AI Tackles Mining's Most Costly Constraints

From scheduling to exploration, AI is solving long-standing pain points in mining: delays, downtime, and inefficiencies. Rio Tinto, BHP, and Barrick Gold are proving that AI doesn't just optimize—it transforms operations at scale, with returns visible in months, not years.

Efficiency Without Trade-Offs

The standout wins came where AI improved speed, safety, and sustainability at the same time. Faster exploration without drilling. Higher truck availability with fewer surprises. Smarter use of energy and water, with no drop in throughput. It's no longer an either-or situation.

The Frontier Is Operational AI

Most impact came from applying AI where humans hit their limits: multi-variable scheduling, predictive maintenance, and real-time process control. These are not "tech showcases"—they're solving gritty, daily operational problems and making mining more resilient and scalable.



A selection of our cases and work

Case	Description	Business Value
Container utilization and prioritization across ports/routes	Predict future container volumes and cargo mix by vessel, route, and time.	Improves scheduling and vessel capacity planning; reduces risk of under/overbooking.
Predictive maintenance using pictures of the fleet worldwide	Use historical data and pictures of the fleet to understand, predict and plan future maintenance.	Improved planning of maintenance saving cost and distributed knowledge worldwide
Case handling with AI-models	Activate historical data and knowledge using AI-models to compare cases, provide tags and sub-tags related to the content, and showcase similar cases to look at.	Faster case processing with improved quality and productivity
AI-agent to automate the order/purchase process in near real-time	Providing a chat/voice based interface that automates the purchase process from need to placed order across prices, volume, time, date, type etc.	Time to execution way faster with improved quality
Customer segmentation and sales targets	Segment customers using volume, revenue, share of wallet, churn, CLV etc. to drive targeted sales and pricing strategies.	Enables data-driven sales focus and customer targeting; supports pricing and commercial excellence.
AI-engine calculating dynamic pricing based on demand, location, type/segment, margin etc.	AI pricing model based on demand patterns, market signals, and capacity utilization.	Maximizes yield via dynamic pricing; balances demand across routes.
AI-assistant in medical research	AI-assistant for Medical Research making it possible to search, analyze and rate relevance scientific articles in text with user criteria inputs	Time savings and improved productivity
Fuel optimization and emission reduction	AI-based optimization of speed, routing, and trim to cut fuel use and emissions.	Reduces fuel cost and supports environmental compliance; potential for emissions-based pricing.
AI assistant for ticket/process handling	Use AI to support internal/customer processes like orders, claims, or container management.	Automates manual tasks; improves efficiency and accuracy.
AI classification model in patient diagnostics	Machine Learning models with automated process flow to provide doctors with 7-day patient recommendation forecasts	Faster and more data-driven recommendations
CustomGPT to access, activate and share domain knowledge	Private domain AI-chatbot with an Open Source LLM using existing data and meta-data from word-documents, pdf's etc. to answer questions and do simpler analysis.	Knowledge activation, improved on-boarding, faster time-to-answer
Scenario analysis	Run "what-if" simulations (e.g. price increases by region or customer segment).	Helps in strategic decision-making and risk assessment.
AI use case exploration	Explored AI opportunities through workshops, analysis and interviews to identify high-ROI and technical feasible use cases.	Highlights the most impactful opportunities and directs efforts toward scalable AI initiatives.
AI change management	AI upskilling programs that give employees the skills and tools to use AI effectively, supported by change management to drive adoption in daily work.	+60% in AI maturity and usage among the companies we work with - which enables employees to create measurable impact.

Due to the confidential nature of working with client-sensitive data and AI models, we are happy to provide a more detailed case description upon request.





Ready to Grow and Optimize Your Business with AI?

Phone: +45 40 40 04 90

Mail: Mak@applied.ai

Reach out and hear more about how we help companies unlock the potential of AI to solve real business challenges, improve efficiency, and drive measurable results. Whether you're just starting your AI journey or looking to scale existing efforts, we're here to provide the expertise and guidance needed to make it happen. Let's explore how we can tailor our approach to fit your unique needs and goals.