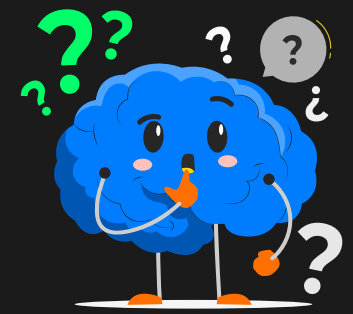


How Manufacturing leaders are leveraging AI

#Food for thought



01 Demand Planning & Forecasting

- Predict future demand with greater accuracy, leading to optimized production and reduced costs.
- SmartOpt, a Chemical manufacturing company saw that forecasting accuracies for the next 6 months reached **85-99%** with AI models.¹

02 Product Development

- Accelerate design processes, generate innovative concepts, and enhance product quality.
- Airbus leveraged AI-enabled generative design techniques to create a bulwark that was 40% lighter, yet 50% stronger, than prior versions of the Airbus A320 aircraft.²

03 Production scheduling and planning

- Optimize production schedules, minimize downtime, and ensure efficient resource allocation.
- Boeing uses AI algorithms to analyze machine availability, material lead times, and production capacity to create optimized production schedules.³

04 Predictive Maintenance

- Prevent equipment failure, reduce maintenance costs, and improve production uptime.
- Using sensors, data analysis, and machine learning, ABB predicts turbine failures with 95% accuracy & also offers remaining life insights based on operating conditions.⁴

05 Quality control & visual inspection

- Automate defect detection, enhance accuracy & consistency & streamline quality control process.
- Mitsubishi Electric has developed behavioral-analysis AI that analyzes manual tasks without requiring training data.⁵

06 Inventory Management

- Manage inventory levels, minimize stockouts and overstocking, & improve overall inventory management efficiency.
- Danone Group has seen a 30% reduction in lost sales & a 30% reduction in product obsolescence with the right inventory analytics.⁶

07 Warehouse & Logistics management

- Streamline warehouse operations, optimize logistics routes, and increase efficiency and accuracy.
- Amazon is leveraging AI to speed up deliveries with transportation & logistics, such as mapping and planning routes & where to place inventory.⁷

08 Sustainability & Environmental Impact

- Identify areas for resource optimization, waste reduction, and promote sustainable practices.
- Apollo Tyres is working on ways where AI can help reduce the amount of scrap materials produced in manufacturing.⁸



Most implemented use cases by sector

Let's take a look at the most prominent use cases in each of the manufacturing sectors and the types of AI techniques and programming used out of Symbolic AI, Rules Based, Robotics, Computer Sensing, Knowledge Engineering, Natural Language Processing, and of course, Machine Learning.

Automotive

Top 5 current analytics & AI use cases in the automotive sector include:

- 01 Predictive Maintenance
- 02 Product Development
- 03 Generative Design
- 04 Collaborative Robotics
- 05 Quality control & visual inspection

Robotics Computer Sensing Expert Systems

Knowledge Engineering Machine Learning

Consumer Goods

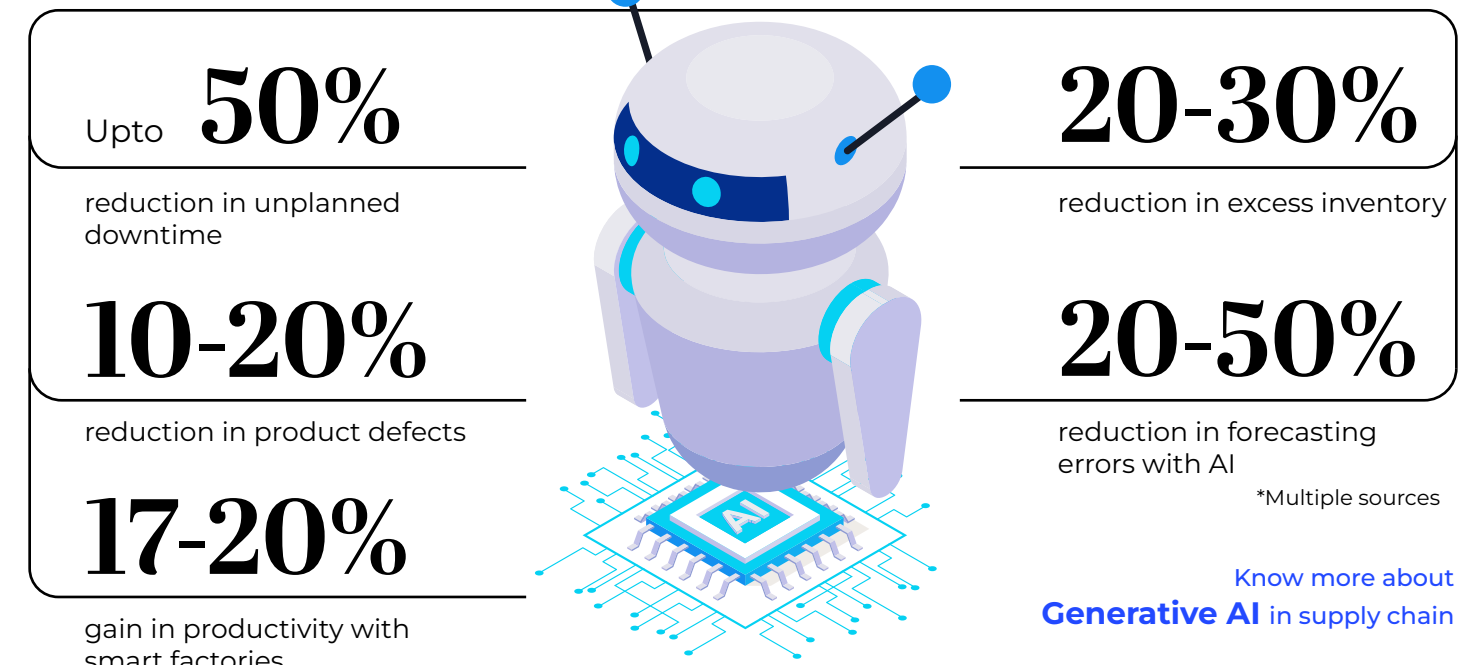
Top 5 current analytics & AI use cases in the manufacturing of consumer goods include:

- 01 Demand Forecasting
- 02 Inventory Management
- 03 Quality inspection
- 04 Supply chain visibility
- 05 New product design & enhancement

Reinforcement Learning Planning NLP

Expert Systems Machine Learning

The overall impact of AI and analytics on Manufacturing business operations*



The impact of Gen AI is still being studied with the most apparent impact on customer service operations

Using data and AI for end-to-end operations

AI & analytics can help improve the operations from a single asset to the value chain

Supply Chain (SC) Eco System (Industry value chain)	Supply Chain Control Tower				
Company SC (Intra-company flows, key suppliers and customers)	Manufacturing Control Tower				
Factory (End-to-end production unit)	OEE dashboard	Dynamic scheduling			Autonomous operations
Asset System (Line/Process Stream)	Line performance dashboard	Line digital cockpit	Statistical process control		
Single Asset (Machine)	Machine health monitoring	Condition-based maintenance	Predictive maintenance	Prescriptive maintenance	

Descriptive System reports what's happening	Diagnostic System provides insights on why it happened	Predictive System proposes options to respond to what's about to happen	Prescriptive System responds automatically to known and learnt scenarios	Adaptive System responds automatically to both known and new scenarios
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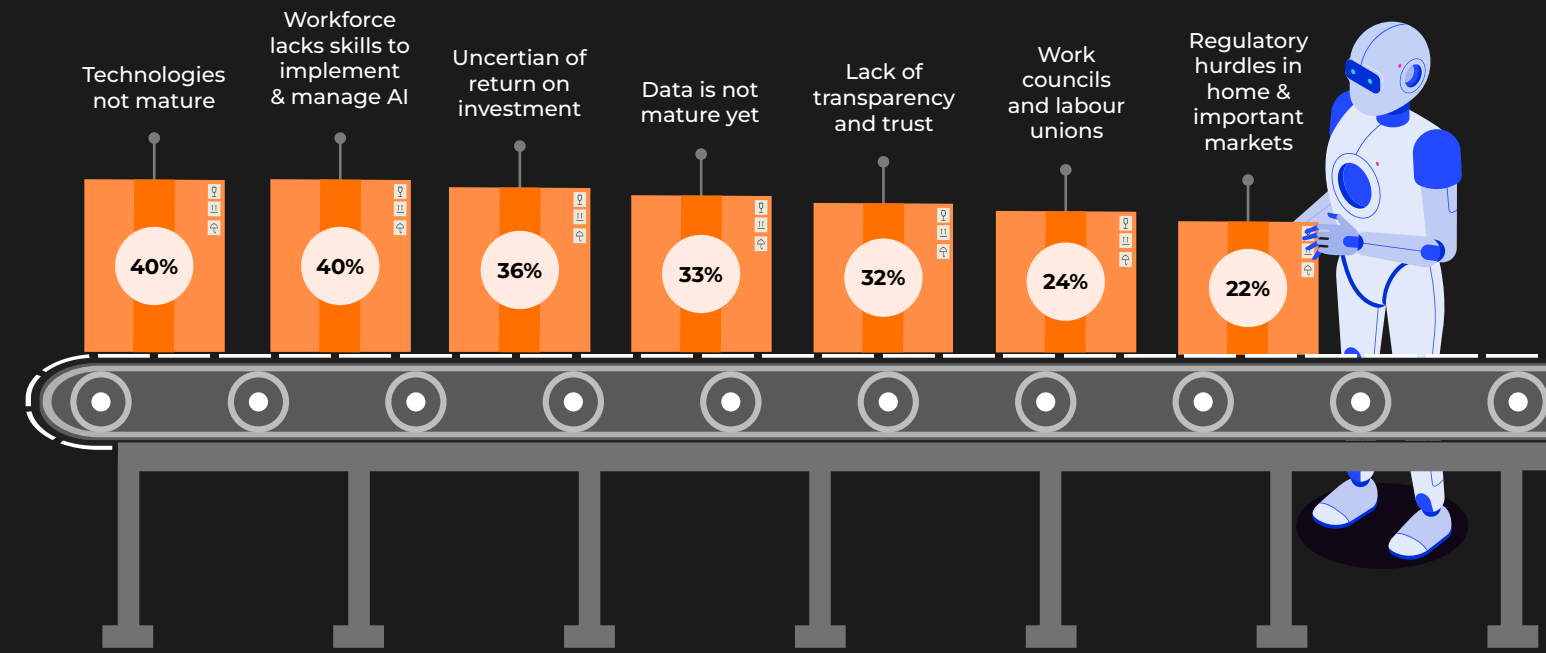
■ Current capabilities* ■ Aspirational capabilities*

* Illustrative, based on typical maturity level of a large number of consumer goods sites in North America

According to a report by Bain, regardless of their affinity for digital technology, manufacturing executives ranked AI (including GenAI) first among technologies that could positively disrupt their operations. This shows the potential data and AI have to boost productivity, reduce scrap, and improve quality. Let's take a look at the barriers that's preventing them from the adoption and a few KPIs you can start with.

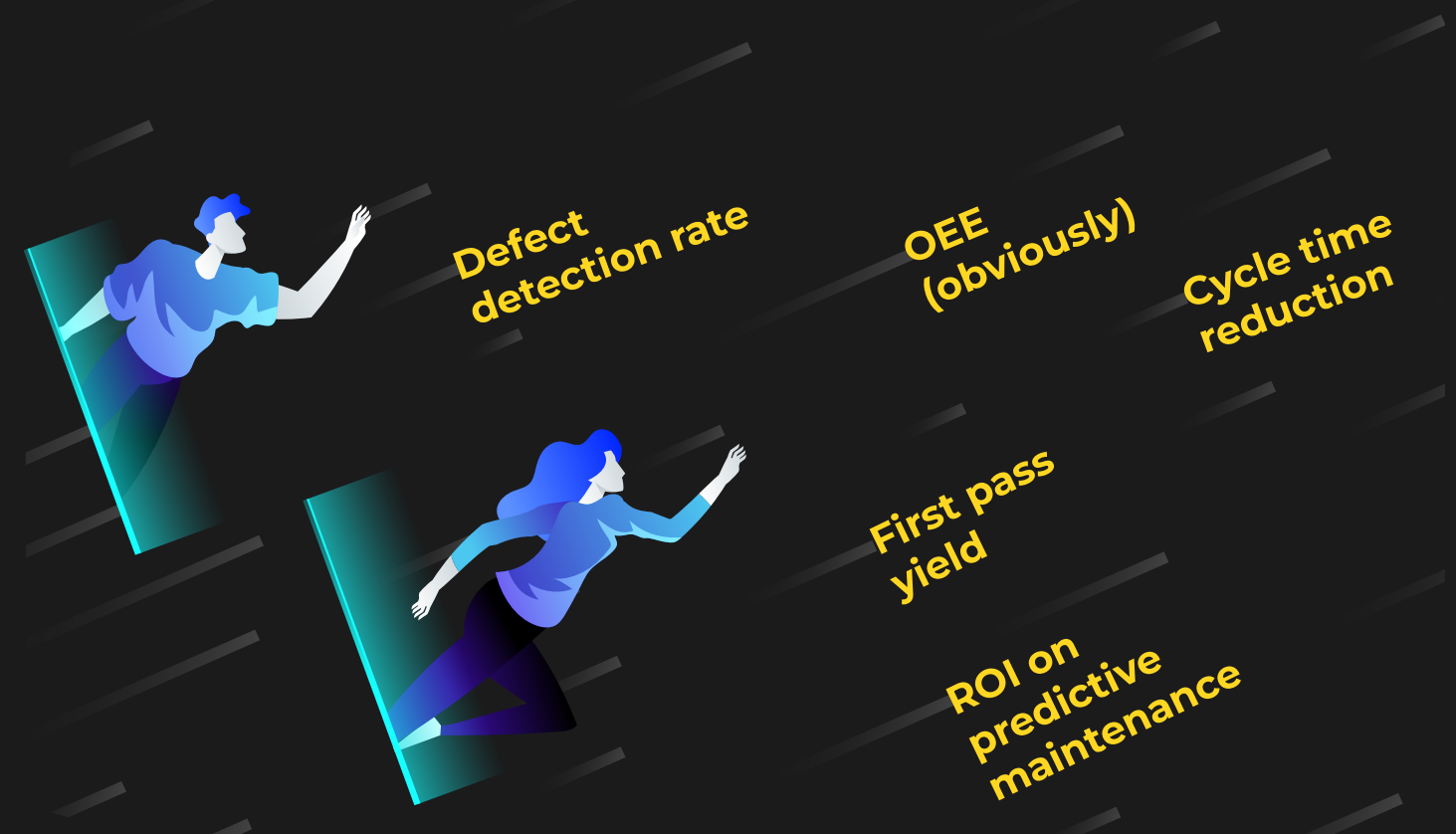
What's stopping the leaders: Key barriers to AI

From a mismatch between AI capabilities and operational needs to lack of explainable models there are quite a few challenges leaders are facing



KPIs you should track in your manufacturing AI journey

Additionally, for evaluating generative AI models, the three main areas to focus on are: model quality, system quality, and business impact



Industrial manufacturing

Top 5 current analytics & AI use cases in industrial manufacturing include:

- 01 Intelligent Maintenance
- 02 Real-time optimization
- 03 Collaborative robotics
- 04 Energy management
- 05 Quality control & visual inspection

- Expert Systems
- Machine Learning
- Robotics
- Knowledge Engineering
- Reinforcement learning

Pharmaceutical

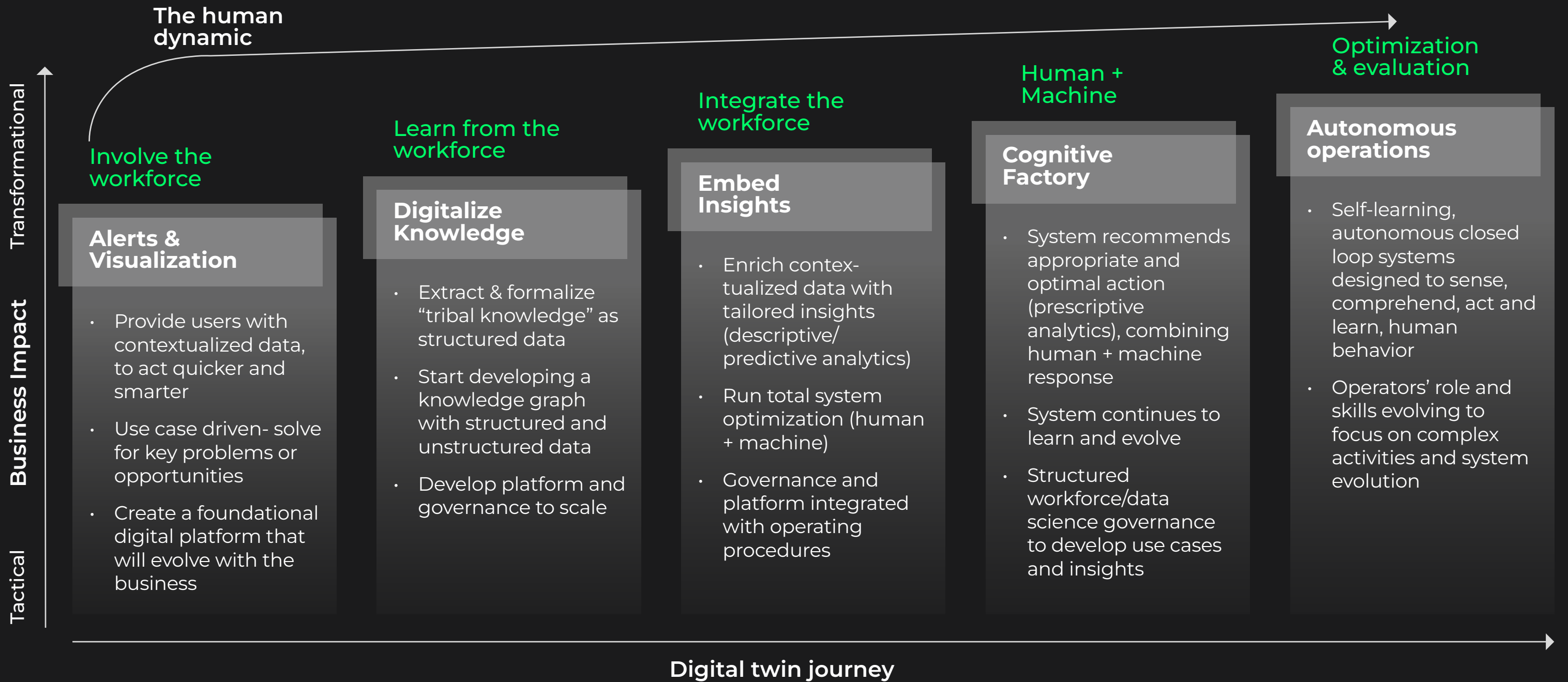
Top 5 current analytics & AI use cases in the manufacturing of pharmaceutical products-

- 01 Process optimization
- 02 Regulatory compliance
- 03 Predictive maintenance
- 04 Inventory management
- 05 Quality Control & Process Optimization

- Computer sensing
- Knowledge Engineering
- Machine Learning
- Rule-based systems
- NLP

How to approach AI for Manufacturing

Though generative AI has sped up the process of AI adoption, artificial intelligence is still a big step for any organization. You need to take the next step based on a feasibility assessment comparing it to the business impact. Here is a sample journey towards autonomous operations from a descriptive start.



How Polestar can help you achieve this

The human dynamic

Start with specific use cases and scale to other markets to build capabilities to generate value



Extend use case driven capabilities to help develop fully mature capabilities



Roll out capabilities to all markets & products to help achieve future state vision

Future- State Vision

Talk to our experts if you are interested to know more

