

Quality Control with Analytics



Forget dusty inspectors and endless checklists – manufacturing's quality tipping point is here- and it is DATA. From finding hidden insights from sensors, machines, and processes to predicting defects, optimizing settings, and pinpointing root causes analytics is helping organizations build flawless products and a thriving bottom line.

Take a deep dive into the applications, methods, KPIs, and more.



of manufacturers who use AI in their day-to-day operations use it for quality inspection and 35% for product and/or production line quality checks

[Google](#)

Applications of analytics for quality control

CATEGORY	USE CASES				
Proactive and Predictive quality control	Machine Vision Inspection	Predictive maintenance for equipment failure and downtime	Digital twin based quality control	Generative Adversarial Networks(GANs)	Explainable AI(XAI) for detect detection for greater trust and control
Process Improvement	Statistical Process Control for identifying process shifts	Anomaly detection for deviation from normal quality norms	AI-powered root cause analysis	Closed-loop quality control for automatic production parameter adjustment to prevent issues	Bio-inspired quality control to learn and adapt to changing production environment and raw material quality
Cost saving and efficiency optimization	Yield and scrap reduction	Reduced Warranty Claims and Recalls	AI-driven Supply Chain Optimization	Demand forecasting	
Compliance and Risk management	Digital twin based quality control	Explainable AI(XAI)	AI powered root cause analysis	Closed loop quality control	

Impact on business operations

90%

Reduction in defects rates

10%-20%

decrease in quality-related expenses

45%-60%

increase in OEE

15%-30%

increase in labor productivity

10%-30%

improvement in throughput

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Quality Control Methods using Advanced Analytics

In manufacturing industry, **59%** emphasize quality control with analytics at the deployment stage, recognizing its pivotal role. Gartner reports that **54%** of AI projects progress from pilot to production, showcasing successful implementations. At the conceptual phase, **40%** are exploring proof-of-concepts, illustrating a growing interest in integrating AI for quality control and analytics into manufacturing processes.

Stage of Adoption	Methods					KPIs to track	Overall
Already Deployed	Natural language processing for quality documentation	Predictive maintenance predictive	Statistical process control	Machine vision inspection	Anomaly detection	<ul style="list-style-type: none"> Defect Detection Rate First Pass Yield Scrap Rate Mean time between failure (MTBF) Customer Satisfaction score 	Overall equipment effectiveness (OEE)
Pilot Phase	Generative adversarial networks for anomaly detection	Digital twin-based quality control	Edge computing for real-time analytics	AI powered root cause analysis	Close-loop quality control	<ul style="list-style-type: none"> False positive Rate(FRR) Root cause solution time Corrective Action Effectiveness 	Cycle time for quality control
Conceptual	Quantum machine learning for complex quality control	Bio-inspired quality control	Explainable AI(XAI)			<ul style="list-style-type: none"> Reduction in warranty claims Process capability index Sampling Accuracy Variability in production 	Customer complaint rate

About Polestar Solutions

As an AI & Data Analytics powerhouse, Polestar Solutions helps its customers bring out the most sophisticated insights from their data in a value-oriented manner. From analytics foundation to analytics innovation initiatives, we offer a comprehensive range of services that helps businesses succeed with data.

[Curious to know more?](#)

[Get a detailed overview and approach to start your Quality Control Journey](#)