Evolving consumer needs, health and economic crises, and other changes over the past two decades have brought uncertainty to the manufacturing sector. According to a Deloitte industry report, the agility that emerging technologies like artificial intelligence (AI) bring could be key to industry resilience. Markets and Markets forecasts that the smart manufacturing market—artificial intelligence, IoT, digital twins—will reach $384.8B by 2025, and manufacturers stand to gain a wide range of benefits by leveraging AI-powered solutions to address inefficient operational processes. Facing rapidly changing market realities, strategic adaptability is key to consistent growth, business success, and resiliency in the face of disruption.

ADVANTAGES OF DIGITIZATION

In the face of health and economic shocks and stresses, whether expected or not, resilience is more important now than ever. According to the 2020 McKinsey Retail and Consumer Goods Bold Moves Survey, digital capabilities such as advanced analytics and machine learning are among the top capabilities considered the most important over the next 12-18 months. Though it requires an investment and total commitment across the organization, manufacturers are in a good position to adopt AI-powered solutions, generate meaningful results, and future-proof their operations.

A comprehensive, robust AI strategy will enable manufacturing companies to optimize operational performance through visibility, actionable insights, and continual learning. More specifically, by unlocking the value of data, AI and machine learning will empower manufacturing companies to:

- Assess operational performance
- Address process inefficiencies
- Improve reliability and safety
- Reduce waste and operational costs

"Adaptability is about the powerful difference between adapting to cope and adapting to win."

MAX MCKEOWN,
Adaptability: The Art of Winning in an Age of Uncertainty

SPARKCOGNITION SOLUTIONS FOR PROCESS AND DISCRETE MANUFACTURING

SparkCognition, a leading industrial AI company based in Austin, TX, develops scalable machine learning solutions to assess operational performance and proactively address inefficiencies in production processes.

QUALITY CONTROL

Producing consistent, high-quality products is essential to customer satisfaction and building a positive brand identity. Low quality products are a waste of production resources, money, and operating time, as well as a threat to the company's reputation, and manufacturing companies need to be certain they can meet and exceed expectations every time. Data is the lifeblood of digital transformations and successful daily operations, capable of ensuring resilience in volatile markets. Even though most manufacturing facilities are heavily outfitted with sensors to collect and monitor data, plant managers lack the tools to extract real value from this data. Plant managers need to know whether operations are running at peak

Visibility	Actionable Insights	Continual Learning
Provides layers of insight with operational metrics	Detects operational inefficiencies with a machine learning backbone	Learns and adapts to new situations and operation behavior with AI and humans in the loop
Assesses and addresses problems with process inefficiencies	Takes proactive actions to prevent production-impacting issues	Futureproofs the system with continually evolving models

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performance, or if processes need to be fine-tuned to prevent process drift and the creation of low-quality goods. When deviations in the data go undetected, problems arise: critical pieces of equipment break down, output quality falters, and operational costs increase. Manufacturing companies must invest in AI-powered technologies to gain insight and total visibility into their data to ensure consistent, high-quality output.

SparkCognition Industrial AI Suite includes a predictive analytics module that leverages AI for normal behavior modeling and anomaly detection to ensure quality control in operations. Machine learning algorithms ingest historical data from a facility's operations and use that data to build a model that simulates "normal" operations. This normal behavior model can then analyze sensor data in real time and flag any values that deviate from the established norm. For example, if a certain production line is using an abnormal amount of water (a waste of resources and a sign of potential process drift), the normal behavior model will alert subject matter experts (SMEs) to the anomaly, allowing them to quickly discover the root cause of the problem and fix it in a timely manner. By leveraging Industrial AI Suite, manufacturing companies can gain greater insight into operations, identify anomalies, and implement better quality control to realize this value. A Fortune 50 beverage manufacturer challenged by operational inefficiencies has used Industrial AI Suite to detect anomalies in its production process and ensure quality control. As a result, the beverage producer expects to be able to achieve and ultimately exceed its production goals while ensuring consistent quality.

PREDICTIVE AND PRESCRIPTIVE MAINTENANCE

Equipment failures and unexpected downtime are significant problems faced by manufacturing companies today. When a critical asset breaks down, production must come to a halt, requiring expensive repairs that consume valuable resources. Historically, the industry has relied on preventive maintenance to address equipment health and potential failures, but running maintenance on a periodic schedule is a waste of time, money, and resources. What if an asset doesn't need attention? Instead, your data should ideally inform you when an asset is in need of repair.

Manufacturing companies stand to gain a host of benefits by taking a predictive maintenance approach that's powered by AI and driven by data. By making better use of the sensor data they already have, manufacturing plant managers can start predicting and preventing asset failures before they occur, while allowing assets that do not need maintenance to continue running. The best way to truly derive value from predictive maintenance is by leveraging an AI-powered solution such as Industrial AI Suite. AI-powered predictive maintenance uses machine learning algorithms to analyze historical sensor data from a facility's operations, including critical pieces of equipment. Like the anomaly detection used for quality control above, this data is then used to build a model that simulates "normal" behavior. This normal behavior model can then analyze facility sensor data in real time, and identify any data points that deviate from the established norm. Rather than simply warning that a piece of equipment is at risk, the model will indicate when and how an asset failure will take place, allowing SMEs to take the necessary actions to perform maintenance before the equipment has a chance to break down.

While predictive maintenance can be done without AI and machine learning, these advanced technologies alleviate—or even eliminate—many of the difficulties associated with traditional predictive maintenance:

- Unlocking data insights at speed and scale

- Maintaining models over time

- Deciphering and analyzing unstructured data, including using sources of data beyond sensors, e.g., maintenance records

In addition, solutions that leverage AI can move beyond predictive maintenance and into prescriptive maintenance by incorporating natural language processing technology (NLP), such as SparkCognition NLP Studio technology. Maintenance solutions that make use of these technologies are able to ingest historical records and service manuals, as well as past courses of action taken by subject matter experts. Using this bank of information, the solution can speed up maintenance processes by listing possible next steps and suggesting corrective measures. Research from McKinsey suggests that predictive maintenance generally reduces machine downtime by 30-50% and increases asset life by 20-40%. Various industries, including utilities, oil and gas, and aviation, among others, have already adopted predictive maintenance, with dramatic results. One hydropower utility was able to use this technology to avert failure that would have cost an estimated $1.5M, while an oil and gas supermajor increased their production by about $30M per year on each of their offshore platforms. The manufacturing industry can and should be enjoying these same benefits.

Adaptability is the answer to uncertainty when addressing operational inefficiencies. It's time to stop reacting and start anticipating. For more information on how SparkCognition can help you optimize operational performance, please visit: www.sparkcognition.com/industries/manufacturing.

ABOUT SPARKCOGNITION

SparkCognition's award-winning AI solutions allow organizations to predict future outcomes, prescribe next actions, empower people, and protect assets. We partner with the world's industry leaders to analyze, optimize, and learn from all types of data, augment human intelligence, drive profitable growth, and achieve operational excellence. Our patented AI technologies include machine learning, deep neural networks, natural language processing, generative AI, and computer vision—enabling productivity, innovation, and accelerating digital transformation. Our solutions solve critical problems, prevent unexpected downtime, maximize asset performance, deliver net-zero initiatives, proactively address safety, and prevent cyberattacks. To learn more about how SparkCognition's AI solutions can unlock the power in your data, visit www.sparkcognition.com.

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