Artificial intelligence in operational technology
Manufacturing snapshot

Manufacturers face a range of challenges including rising operational costs, supply chain disruption, and the growing impact of downtime. Many are looking at AI in operational technology to help mitigate these risks.

Rising operational costs from energy, raw materials and labor are affecting manufacturers, along with a growing shortage of skills. They also must deal with continuing supply chain disruption, while maintaining high product quality and battling with new nimble competitors worldwide.

Meeting challenges with AI in OT

To meet these challenges, manufacturers are looking to AI for optimization opportunities and technology innovation across the entire organization – including operational technology (OT) systems. Increasing the resilience of production is vital, and AI in OT is already playing a key role for many manufacturers in reducing unplanned downtime and mitigating the impact of any supply chain disruption.

The first step in bringing AI into the OT environment is to integrate IT and OT systems. This is already happening widely. In our manufacturing survey carried out by GlobalData, enterprises reported high levels of IT/OT integration, with 87% of respondents having made significant progress with full or partial integration.

Rapid progress in AI/GenAI

Our survey also found that AI/ML is deployed in manufacturing OT environments by 35% of our respondents, with a further 49% reporting pilot projects or plans to deploy the technology within the next 12 months. In addition, around 55% manufacturers have deployed or are piloting GenAI in OT, with 11% of respondents having no GenAI plans.

This push towards AI in OT is generally backed by the C-suite, with 60% executives saying it is either "essential" or "very important". Across all surveyed sectors, this initiative is being led by the IT department, as part of an IT/OT convergence strategy.

AI in OT benefits

In terms of identified AI benefits, the top three chosen manufacturing executives in our survey are improved productivity, improved product quality and greater efficiency.

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AI in OT use cases

Manufacturers are deploying a wide range of AI and GenAI use cases across the board in OT. We look at three of the most popular: predictive maintenance, supply chain monitoring and traceability.

Predictive maintenance

The age of infrastructure is a major challenge for the oil and gas industry, with many pipelines being over 50 years old. This increases the risks of corrosion, leakage and ruptures, which have both financial and environmental consequences. To mitigate this risk, one major oil and gas company deployed an AI-powered pipeline monitoring solution to predict failures based on a wide range of real-time and historical data, including sensor data, weather conditions and pressure trends.[1] This data informed a predictive model to identify potential pipeline failures: it was over 90% accurate in predicting corrosion failures and over 80% for equipment failures. By undertaking proactive maintenance, the company reduced downtime by 25% and maintenance costs by 30%, while also extending the lifetime of equipment.

Supply chain management

The semiconductor and electronics industry faces various supply chain issues, both for components and raw materials, such as gallium, germanium and graphite. AI can monitor supply chain data to identify potential disruptions caused by export bans, port congestion, worker shortages, or natural disasters and recommend actions to take. AI can also simulate different scenarios and evaluate strategies to mitigate supply chain disruptions, helping design optimal solutions. For example, Samsung uses AI in its supply chain management to extract logistics risk data from more than 60,000 global news articles daily. It uses this to predict supply chain disruptions and take steps to mitigate it, such as using different ports.[2]

Traceability

The pharmaceutical industry operates under strict regulations regarding product safety, traceability, and quality across production and distribution. Using IoT in serialization automates the capture and transmission of product data right across the supply chain. By analyzing this data with AI, companies can detect unusual patterns in their supply chain, which could indicate counterfeit activities or delays, allowing them to take immediate action.[3]

Overcoming AI challenges

Manufacturers identified several challenges holding back the broader adoption of AI within the OT environment. The top three were lack of AI skills, concerns over accuracy of findings, and insufficient data quality or availability.

To help them overcome issues around skills, many executives are turning to third-party assistance. The survey found that help was sought across the board, with the three most popular requests for assistance being improving data management, responsible AI practices and developing an AI roadmap.

Focus on digital infrastructure

Digital infrastructure plays a key role in enabling AI in OT projects, with foundational technologies such as networks, cloud and security helping drive the convergence of IT and OT. Our survey found that 86% of manufacturers had the requisite IT infrastructure fully or partially in place for deploying AI in OT. Concerns over cybersecurity and cloud connectivity dominated among those who didn't.

Manufacturers are increasingly the target of cyberattacks, which can shut down operations or steal business-critical information. Downtime is so damaging to business that ensuring resilience and production safety is essential. As such, upgrading OT security is an investment priority for 67% of manufacturers as part of their strategy to deploy AI in OT.

Connectivity is vital for the success of AI in OT because the processing of data is largely carried out in the cloud. However, manufacturers are increasingly looking to edge computing to bring processing closer to the factory, with 71% of respondents either using it or planning to use it within 12 months as part of their IT/OT strategy.

Why Orange Business

Orange Business can help you take advantage of these AI opportunities and support you in your data quality, integration, and infrastructure requirements.

We have a unique skill set as a global integrator, communications operator, and service provider and genuine industrial experience. Our individual approach is designed to make your business outcomes a reality. Our consultants have extensive manufacturing industry experience and are supported by best-in-class partner ecosystems.

We can answer your transformation challenges at every stage of the data journey using a secure, scalable, flexible approach. With our business approach, methodology, and skills, we will work closely with you to outline business goals, organize efficient and secure data sharing, and accelerate innovation.

Connect with Orange Business sales teams: Contact us

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1. https://superagi.com/optimizing-oil-and-gas-pipelines-with-ai-and-predictive maintenance-case-studies-and-best-practices/

2. https://www.samsungsds.com/en/news/cellosquare-mediaday-20240520.html

3. https://www.pharmatrax.pk/ai-and-iot-in-track-trace-transforming-pharma-supply-chains/

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