

Artificial intelligence in operational technology

Sector focus: Pharmaceutical



The pharmaceutical industry is embracing AI and machine learning in operational technology (OT) to improve manufacturing operations, reduce the price of drugs and meet complex regulatory needs.

As a global business, the pharmaceutical industry must navigate complex and evolving regulations across many different jurisdictions. Ensuring the safety of pharmaceutical products throughout complex and highly-regulated supply chains is key, particularly in the face of ongoing trade disruptions.

The industry is also under growing pressure internationally to reduce the cost of drugs, while developing innovative new treatments, and struggling to deal with a global shortage of talent in life sciences.

Meeting challenges with AI in OT

Technology can help meet these challenges, and the pharmaceutical industry is adopting AI and machine learning to help reduce costs in manufacturing operations and increase flexibility to meet business needs.

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 Global Data, pharmaceutical companies reported some of the highest levels of IT/OT integration, with half of respondents reporting full integration, and a further 40% saying they had achieved partial integration.

Rapid progress in AI/GenAI

Our survey also found that AI/ML is widely deployed in pharmaceutical OT environments by nearly half of our respondents, with a further 40% reporting pilot projects or plans to deploy the technology within the next 12 months. A similar proportion of pharmaceutical companies are adopting GenAI, with only 10% of respondents not having any GenAI plans at all.

This push towards AI in OT is being strongly driven by the pharmaceutical C-suite, with over three-quarters of executives saying it is either “essential” or “very important”. Like most other 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 by pharmaceutical executives in our survey are improved productivity, improved supply chain logistics and reduced costs. Clearly costs are at the top of mind of the pharmaceutical industry as they navigate the uncertain global business environment.

Resilient supply chains are essential to ensure that they can manufacture drugs efficiently and safely, even as they move manufacturing operations to meet changing geopolitical realities.



AI in OT use cases

The pharmaceutical industry is deploying a wide range of AI and Gen AI use cases. The top three use cases identified in our survey were demand forecasting, condition-based monitoring and traceability. Examples of their use are described below.

Demand forecasting

AI can be used to measure demand for medicines using historical and market trends along with predicting supply chain bottlenecks and disruption. This can help pharmaceutical companies optimize their supply chains in real time, which is essential when raw materials are in short supply.¹ AI can even help forecast the demand for drugs based on analysis of diseases to predict patient numbers, which can help manage inventories effectively.²

Condition-based monitoring

The pharmaceutical industry is reliant on key manufacturing equipment such as pill presses. AI can help minimize downtime in these machines by integrating predictive maintenance and real-time data analytics. Failures in pill presses are particularly costly as the entire batch of pills would have to be discarded, further increasing losses.³

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.⁴

Overcoming AI challenges

However, there are several challenges pharmaceutical survey respondents have identified holding back the broader adoption of AI into the OT environment. The top three were data quality, concern over accuracy, and lack of AI skills.

As such a regulated industry, with their products often meaning the difference between life and death, it's little surprise that data quality and inaccurate results from AI are at the top of people's minds. There continue to be concerns around hallucinations in GenAI, for example, and using it safely requires expertise in areas such as retrieval augmented generation (RAG).

However, the general lack of AI skills affects all industries, and many companies are turning to third-party assistance. Improving data management was one of the top areas the pharmaceutical industries identified for seeking external help when scaling their AI projects.



Why Orange Business

Orange Business can help you make the most 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, along with genuine experience of the industrial world. Our individual approach is designed to make your business outcomes a reality. Our consultants have extensive pharmaceutical 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.

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1. <https://www.mckinsey.com/industries/life-sciences/our-insights/generative-ai-in-the-pharmaceutical-industry-moving-from-hype-to-reality>
2. <https://www.impactive-ai.com/en-clients/pharmaceutical-ai-case-study>
3. <https://www.bkvibro.com/how-ai-enhances-condition-monitoring-in-the-pharma-industry/>
4. <https://www.pharmatrax.pk/ai-and-iot-in-track-trace-transforming-pharma-supply-chains/>



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