

Artificial intelligence can elevate pharma manufacturing

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Jenni Spinner, 18-May-2021

According to a leader from industrial AI specialist AspenTech, AI can help avoid costly maintenance interruptions by predicting when upkeep is needed.

Any unnecessary downtime can be expensive for pharmaceutical manufacturing operations. What's more, unplanned stoppages can delay the delivery of much-needed product, potentially causing damage to a company's reputation.

David Leitham, senior vice president and general manager at industrial artificial intelligence (AI) technology firm AspenTech, recently spoke with Outsourcing-Pharma (OSP) about how AI can be put to use to help predict when maintenance is needed, and avoid unplanned or over-maintenance.

OSP: Could you please share an 'elevator presentation' description of AspenTech?

DL: AspenTech develops software to help customers in capital-intensive industries (such as energy, chemicals, and pharmaceuticals), address their biggest challenges: delivering increased value to stakeholders, responding to an evolving global population, and reducing environmental impact and waste. The company's suite of asset management and production optimization software helps organizations to drive efficiencies and higher quality in engineering, manufacturing, and supply chain processes, leading to reduced downtime, improved operational efficiency, and increased enterprise insights.

Across the pharmaceuticals sector, AspenTech's solutions enable companies to increase collaboration, simulate end-to-end batch processes, streamline compliance, and speed time to market for new products.

OSP: Please share your perspective on advancements in pharma supply chain management and manufacturing.

DL: Over recent years, one of the key areas of technological advancement we have seen is the evolution of predictive and prescriptive maintenance capabilities. The latest asset performance management solutions leverage such capabilities to enable pharmaceuticals companies to protect their supply chain, increase asset utilization and avoid unplanned downtime by predicting when equipment anomalies will occur, understanding why they do, and prescribing how to avoid potential failures.

Running in parallel, we are seeing solutions driving further efficiencies for pharmaceuticals manufacturers, enabling them to:

- Increase collaboration, from lab to pilot plant to API manufacturing
- Simulate end-to-end batch processes with first-principle models, accelerating regulatory approval and scale-up to full production
- Identify factors impacting product quality and process efficiency using multivariate analytics
- Anticipate and proactively react to changes or disruptions in their supply chains to optimize outcomes.

OSP: What challenges is the pharma industry struggling the most with in SC and manufacturing?

DL: Pharmaceuticals manufacturing is a complex process. Patented products are licensed for a finite amount of time before they become generic, equating to a constant sense of ‘the race is on’ to be able to meet demand. Manufacturers are focused on reducing supply chain disruption, increasing batch production capacity, and reducing batch losses.

Security of supply is an ongoing challenge. Many factors impact a pharmaceutical company’s ability to ensure supply of end products. One factor could certainly be equipment failures; but others include: changing operating conditions and the impact on process health, and overall insights in the operations across their enterprise. All can cause batch quality failures, resulting in costly production losses and disruptions to supply.

OSP: Could you please talk about some of the services and solutions AspenTech offers pharma professionals that help them deal with some of their unique challenges?

DL: AspenTech can offer pharmaceutical and life sciences companies a range of advanced analytics solutions that enable them to gain a significant competitive advantage by reducing maintenance costs and eliminating production losses to ensure the security of supply. Our predictive maintenance, multivariate analytics, and enterprise insights tools offer fast return on investment for pharmaceutical companies at all stages of the digitalization journey. These can improve overall equipment effectiveness significantly while also driving up yield, and when scaled over multiple products, assets, and sites, such benefits also ramp up over time.

OSP: How can AI help pharma professionals optimize their processes?

DL: Across the pharmaceuticals industry, professionals are turning to AI and machine learning to help them increase equipment reliability and throughput, prevent batch loss and find the “hidden factories” inside the plant, and reduce capital expenditures (CAPEX).

A recent PwC study reported “Advanced analytics in the pharmaceutical and life sciences industry – including tools such as artificial intelligence (AI), machine learning and data mining – has the potential to transform the commercial function. Process automation and data-driven, predictive insights, have the ability to dramatically change how executives make strategic decisions and manage financial performance across all commercial areas.”

OSP: Please tell us about asset performance management–what it is, the challenges it helps pharma industry professionals clear, and how your company helps.

DL: Asset performance management (APM) is the use of data and analytics to produce specific equipment and asset performance outcomes. Today, APM solutions are enabling pharmaceutical companies to protect their supply chain, increase asset utilization and avoid unplanned downtime by accurately predicting when equipment anomalies will occur and prescribing how to avoid future failures.

AspenTech’s own APM solution, Aspen Mtell, uses predictive maintenance technology to deliver the earliest, most accurate warning of equipment failures. It also uses machine learning to recognize precise patterns in operating data that indicate degradation and impending failure, even before it happens.

OSP: What aspects of digital transformation do pharma companies have the most problems with?

DL: Pharmaceuticals manufacturers, in particular, have historically found it difficult to embrace change. All pharmaceutical businesses by necessity have well-established, often complex, proven validation processes in place. If a technology has been through this cycle and is working, in the manufacturing environment, businesses are often reluctant to take on further ‘evaluation pain’ in a bid to achieve a more rapid time to value.

Today rising customer expectations in the digital age, especially around speed of delivery, are putting further



David Leitham
SVP and General Manager, AspenTech

pressure on pharmaceuticals to achieve fast time to market for new products. Further exacerbating the challenge are demand fluctuations for new product lines, which, since the outbreak of the pandemic, have become increasingly difficult to predict.

OSP: Silos can be an issue in any industry, but especially problematic in pharma environments. Could you please talk about some of the pitfalls of communications silos in pharma (both internally at companies, and lack of communication among collaborators), and how digital evolution can help?

DL: Many large pharmaceutical companies still work in silos. Maintenance and technical teams often operate in isolation. Data scientists experiment with new approaches but a lack of collaboration and communication with C-Level decision-makers can mean that innovative ideas are never taken to market. There is often a strict hierarchy of command in place, which makes direct interaction difficult.

The pressures of the COVID-19 pandemic could be a pivotal point for the industry, however. With existing manual processes less easy to execute thanks to social distancing, the industry is beginning to shift its focus away from a conservatively academic outlook and on to applied innovation. In these times especially, security of supply, remains one of the biggest drivers for pharmaceuticals manufacturers.

In this context, many of them have an intense focus on reducing supply chain disruption, increasing capacity of batch production, and reducing batch losses. Reducing lifecycle maintenance costs and CAPEX remain high on the agenda too. Notwithstanding compliance and safety, manufacturing equipment availability is, therefore, a top priority.