

Mega-trends Driving Chemical Industry - Underlying Technologies (Pt.3)

Introduction

The current pace of technological advancements has the most profound impact on enabling how chemical manufacturers transform themselves to respond to market trends and deliver an entirely new customer experience. Intelligent technologies promise to bring great benefits such as productivity and efficiency gains, enabling innovative new business models and generating new revenue streams.

The following intelligent technologies are instrumental in helping chemical companies respond to market trends.

1. Artificial Intelligence and Machine Learning

More than 80% of executives in the chemical industry acknowledge that artificial intelligence shall have a huge impact on the business in the next three years. This latest technology will play a vital role in reducing their operational costs, increasing profits and improving the quality of products. Automation of data extraction, supply chain planning and quality testing are the most important areas which will be assisted to increase production efficiency. Through AI implementation and task automation, chemical industry specialists can accelerate the process of discovering new vaccines, treatments, and ingredients to make the new vaccines. AI solutions can help companies speed up and increase the accuracy of the R&D process to improve efficiencies for activities that an organization does to create the best version of the product for the market. Machine learning tools have been found useful in discovering and recognizing molecules, creating formulas, defining exact proportions and quantities of chemicals. AI helps analyze possible chemical combinations and predict whether they will be effective in their predefined purpose.

Smart Predictive Forecasting ML and AI-enabled models and [advanced analytics](#) help predict how much raw material for chemical production is left and how much more is needed. AI forecasting leaves a place for alterations at every step of molecular development. It can further predict future prices for materials, thus helping in acquiring the raw material at lowest price and selling the product at best prices, resulting in significant increase in the the company's profit. AI used in the chemical industry is capable of reducing forecasting errors by 50% as compared to human forecasting errors. Companies can also streamline the supply chain and avoid overstocking by forecasting demands with Artificial Intelligence.

Smart Data Analytics in Production Manufacturing companies have to fit certain regulatory standards as the overall world is moving towards sustainability. If a company exceeds the norms of carbon emissions, water consumption, or level of pollution in production premises, it's going to pay hefty fees. Controlling these indicators manually can take ages. But with AI-enabled data analysis, companies can easily track and adjust their production to the norms implemented by authorities. Furthermore, together with sensor technology, smart data analytics identifies, defects and alerts staff about inconsistencies. Knowing the root cause of the problem, experts can intervene in the manufacturing process and promptly resolve the issue.

Quality Assurance in Production In the chemical industry, the importance of timely quality assurance is paramount. If a wrong substance gets on a product line, it may take seconds for it to ruin the whole batch of products. Here, AI is capable of detecting such instances and preventing accidents on the product line. Moreover, ML tools can learn from such occurrences and use this knowledge in similar cases in the future — to be even more efficient in solving the issue. Quality assurance in chemical production is mainly ensured by computer vision. With the help of deep learning algorithms, computers scan substances on production lines, evaluate them, and classify them based on their properties.