





## Pharma Digitization fueled by Artificial Intelligence

Technology is becoming a great enabler to many industries in India. The pharmaceutical industry is witnessing a significant rise in the adoption of digital technology enabled models and tools especially artificial intelligence (“AI”) and blockchain to streamline various processes.

**Dr. Milind Antani and Tanya Kukade** shares insights about the AI in Pharma Digitization and AI is likely to play a major role in automating and standardising the quality assurance processes, ensuring high standards in drug development and production, reducing domestic issues, development costs, and increasing drug adherence.



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**T**he move towards digitization in pharma is aimed at driving enhanced productivity, increasing supply chain efficiency and enabling increased focus on creating disruptive products with utmost focus on quality and safety.

In a bid to race ahead in the innovation game, pharma companies are willingly adopting AI to transform their businesses. Digital technology is seeping through every

stage of the business operation, enabling companies to collect large amounts of data for use across various activities to assist them in meeting the goals of research and development, drug manufacturing, clinical development, supply chain management, quality assurance and control and enabling greater accessibility for drugs to patients.

Digitization is enabling pharma companies to cut down on costs of research and development and collection

of primary data repeatedly. Automation of manual processes has not only enabled the companies to reduce room for human error but it has immense potential to ensure maintenance of product quality standards which is ultimately beneficial in ensuring patient safety.

The flexibility of the AI algorithms allows the companies to mould the functions of various tools basis the dynamically evolving goals for research and development. AI is playing a crucial role in accelerating the identification of potential drug candidates and optimizing molecular design. Traditionally, the drug discovery process in India can take up to six-seven years, with clinical trials adding at least a few more years in the development cycle of the drug to reach the market. Digitization at this stage enables companies to enhance this process by putting in place specific AI tools for analysing large datasets and molecular patterns to identify new molecules and compounds for disease treatment. AI can predict drug efficacy and safety profiles in parallel with the datasets, thereby reducing time and costs associated with bringing new drugs to the market.

Upon completion of the research and development stage in the drug development cycle, next in line is the requirement for establishing the safety and efficacy of the drug for use in human beings. AI has the potential to play a dynamic role wherein it can expedite the prolonged process of participant selection by processing data on existing participants, diseases, demographics, infection rates, etc. to handling large and complex data generated through the clinical trial, thereby reducing the risk of human error. The data generated by automated processes in a clinical trial set-up would enable streamlining of such collection activities, followed by processing, research and submissions to the regulators.

AI has the potential to improve the design and conduct of clinical trials through remote monitoring, telemedicine, and patient-generated data, making trials more efficient and patient-centric. This improves the rate of success of such trials and accelerates the research process, bringing drugs to market faster and aiding in enhancing availability.

Additionally, the focus on application of blockchain technology to the pharmaceutical industry is also gaining momentum and by virtue of the nature of the technology, it has the capability to improve data integrity in clinical trials by securely storing and timestamping data, ensuring that it remains tamper-proof. In the realm of drug development, blockchain can facilitate collaboration among researchers by providing a secure platform for sharing data and intellectual property. This can accelerate innovation and reduce duplication of efforts.

Also, the application of the blockchain technology to the supply and distribution channel is also likely to enhance transparency, security, and efficiency across the supply chain. One of the key applications is in tracking and tracing of drugs that enter the market, ensuring authenticity and providing a mechanism for preventing counterfeit medications. This is becoming seemingly important in light of the growing concerns surrounding counterfeit and spurious drugs being circulated in the Indian market. The drug regulators are proactively testing drugs to ensure implementation of the drug regulatory framework and the number of drugs determined to be not of standard quality by the drug regulator are on the rise.

In the past, pharmaceutical and life sciences companies have been cautious of adoption of technologies given the costs, operational burden and regulatory uncertainty. However, during the COVID-19 pandemic there has been greater acceptance of technology in clinical trials.

Digitization is also playing a crucial role in optimizing the pharmaceutical supply chain by enhancing predictive analytics and automation capabilities. This integration enables accurate demand forecasting, efficient inventory management, and optimized production schedules, leading to streamlined and cost-effective operations. AI ensures real-time monitoring as well as maintaining the integrity of sensitive medications.

Digitization at the supply chain stage also enables greater transparency in the process and provides the manufacturers with end-to-end process visibility, thereby enabling easier identification of errors in the supply chain. AI tools are also being employed by pharma companies in optimizing inventory

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management and improving decision making based on warehousing and demand and helps avoid stock-ups or shortages given that AI produces actionable predictions, coordinates maintenance efforts, and maximizes supply chain efficiency. For example, AI can predict stock of products, track daily orders by distributors, to optimize delivery times and sales.

AI in the pharmaceutical industry is not only benefiting the drug development and distribution cycle to ensure better availability of drugs in the market but is also faring well in its application to the disease diagnosis sector by enabling personalized treatment based on precise analysis. This is particularly valuable for diagnosing rare diseases, where AI helps doctors provide fast and accurate results, leading to precision medicine. Use of blockchain technology also has immense potential for patient data management, given the robust security features, which enable the secure sharing of sensitive health information while maintaining patient privacy. This can foster more personalized treatment plans and improve patient outcomes.

The focus of the companies to automate and digitize production by integrating digital technologies is likely to improve operations and enhance customer interactions with the company and its products. AI is likely to play a major role in automating and standardising the quality assurance processes, ensuring high standards in drug development and production, reducing domestic issues, development costs, and increasing drug adherence. ■

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