BioSpect
the business of Bi
24 years of leveraging the business of Bio
www.biospectrumindia.co

Integrating Research Data for Drug Efficiency in the Indian Pharma Landscape

30 June 2024 | Views | By Dr Mary Donlan, Global lead- Product Marketing Team, Revvity Signals

The average cost to develop a new drug is approximately $2.6 billion, according to a study by the Tufts Center for the Study of Drug Development. This cost may be reduced by up to 30 per cent through the integration of AI/ML and data analytics, which would result in substantial savings for India's pharmaceutical industry and poised to strengthen its global competitiveness and contribute to a healthier world.



The Indian pharmaceutical industry has emerged as a global powerhouse, catering to over 60 per cent of the world's vaccine demand and ranking 3rd worldwide in drug production volume. However, to sustain this competitive edge, the sector must prioritise efficiency, innovation, and process optimisation across the drug development lifecycle. Driving this necessity is the transformative phase the Indian pharmaceutical industry is experiencing, fueled by technological advancements that enhance research capabilities and drug efficiency.

Among these pivotal technologies are generative AI, AI/ML, and data analytics, which offer unprecedented opportunities to revolutionise drug development and boost efficiency. The integration of research data in the Indian pharma landscape, a critical step in leveraging these technological advancements will impact drug efficiency, cost reduction, regulatory harmonisation, and global competitiveness, while also addressing the associated challenges and strategic implications.

Enhancing Formulation Research through Data Integration

Formulation research, which determines the bioavailability, stability and efficacy of a medicinal product, plays a key role in the development of these products. Historically, data on product formulation have been fragmented across different systems, making it difficult to collaborate and slowing down the pace of market entry. Pharma companies can streamline the exchange of information, enabling researchers to make data driven decisions and accelerate the development of drugs, by integrating formulation data into a central electronic laboratory notebook (ELN).

The ELN solution acts as a unified repository, capturing structured and unstructured data from diverse sources, including lab instruments, electronic records, and manual entries. This comprehensive data integration fosters transparency, reduces errors, and empowers scientists to uncover insights that can optimise formulations for improved drug efficiency.

Transforming Generic Pharma R&D through Digitisation

India's generic pharmaceutical industry is booming and contributes significantly to affordable healthcare in the world. However, a shift to digital and data-centric approaches in research and development processes is necessary due to strong competition and strict regulatory requirements. Generic pharmaceutical companies can use solutions such as an ELN to streamline their research processes and ensure data integrity, traceability and compliance with regulatory requirements. In addition to improving efficiency, automated data capture, version control and audit trails are also facilitating the seamless transfer of information with a view to shortening time to market for generic drugs.

Moreover, the integration of data analysis capabilities into an ELN enables researchers to discover patterns, trends and correlations that can facilitate process innovation and optimise strategy for developing drugs in order to improve R&D effectiveness.

Generative AI and AI/ML in Drug Discovery

Generative AI and machine learning (AI/ML) are reshaping the drug discovery process by enabling the rapid identification of potential drug candidates. These techniques are used to predict molecular behaviour, optimise chemical structures and speed up the initial stages of drug development by analysing vast datasets. The integration of AI/ML can significantly improve the effectiveness of research, given that the pharma sector is an important part of the Indian economy.

The AI/ML algorithms are capable of processing millions of chemical compounds to determine which ones have the greatest potential for therapeutic success. The time and cost of traditional trial and error methods are greatly reduced by leveraging this capability. However, for AI/ML models to be truly effective, they require high-quality, structured data in an AI-ready format.

Data Analytics for Informed Decision Making

Data analytics provides pharmaceutical companies with a deeper understanding of various factors influencing drug development and commercialisation, enabling them to make informed decisions. By analysing market dynamics, and research findings, companies can identify trends, anticipate demand, and adjust their R&D strategies accordingly. The strategic use of data analytics is not only effective in maximising resource allocation but also in increasing market relevance and profitability. Data-driven insights empower pharmaceutical companies to decide which drug candidates to prioritise for development, optimising their pipelines and bringing the most promising and impactful therapies to market efficiently.

Leveraging Research Data for Drug Efficiency

By understanding how drugs relate to biological systems, the effective utilisation of research data can positively impact drug efficiency. Scientific data engineering solutions help structure and integrate diverse research data sources, enabling pharmaceutical companies to derive valuable insights. This data-driven approach minimises trial and error in drug development by facilitating the analysis of data from biological studies, clinical trials, and real-world evidence. Companies can optimise formulations, dosing schedules, and drug combinations based on these insights, leading to more effective treatments and better patient outcomes.

Moreover, by integrating and analysing genetic data, pharmaceutical companies can uncover opportunities for developing personalised medicines tailored to individual patients' genetic profiles. Solutions that empower researchers to leverage this genetic information increase the effectiveness of treatments through a deep understanding of each patient's unique characteristics.

Cost Reduction

The cost of discovering and developing drugs has been significantly reduced by the use of AI/ML and data analytics. These technologies reduce the financial costs associated with long and costly studies through the automation of routine tasks and improvements in prediction accuracy. Moreover, companies can avoid investing in less viable options and further reduce costs by identifying the most promising drug candidates early.

According to a study by the Tufts Center for the Study of Drug Development, the average cost to develop a new drug is approximately $2.6 billion. This cost may be reduced by up to 30 per cent through the integration of AI/ML and data analytics, which would result in substantial savings for India's pharmaceutical industry.

Improving Efficiency through Collaborative Research

Multidisciplinary teams working in different geographic areas are frequently involved in the study of pharmaceuticals, which requires coordination and data exchange. This gap could be bridged by connecting research data with solutions such as ELNs and data analytics solutions, and providing a platform on the web that allows collaboration and communication between researchers.

The sharing of experimental protocols, data and insights, the promotion of knowledge exchange and cooperation among synergistic working teams can be made possible by researchers. By exploiting a variety of perspectives and expertise, this collaborative approach is not only accelerating the time to develop new drugs but also promoting innovation.

Conclusion

Integrating research data is pivotal for enhancing drug efficiency in the Indian pharmaceutical landscape. By harnessing the power of generative AI, AI/ML, and data analytics, companies can drive innovation, reduce costs, and ensure regulatory compliance. As Indian pharma companies continue to evolve and adapt to these technological advancements, they are poised to strengthen their global competitiveness and contribute to a healthier world.

Dr Mary Donlan, Global lead- Product Marketing Team, Revvity Signals