Artificial Intelligence and Advanced Analytics in Healthcare

Digital innovation, driven by Artificial Intelligence (AI) will undoubtedly bring the next wave of significant disruption to the healthcare industry, impacting organizations in myriad ways. AI technologies like machine learning, virtual reality, and robotics, have begun finding their way into several industries. Use cases from early adopters demonstrate the potential to improve profitability as well as competitiveness significantly. Companies need to prepare for change now or risk losing their relevance in the future.

Investment in AI is ballooning globally, driven by digital giants like Google, Microsoft, and Apple. Seed financing and PE/VC funding have also grown rapidly, resulting in an exciting start-up space and a robust M&A environment.

Despite significant investments in AI, the adoption by industry is still considerably limited. Business leaders are still unsure of how AI can help their organizations, since clear business cases have not yet been developed to warrant a buy-in from larger groups. A McKinsey Institute study published in 2017 showed that the adoption of AI generally followed the maturity of an industry's digitization.[1] The tech, telecom, and financial services industries are leading the adoption curve, while the healthcare industry has a low pace of adoption, due to a lack of digital maturity.

Successful adoption of AI needs a robust digital foundation. The key to success is ensuring that an appropriate data ecosystem is built and that digital transformation is successfully implemented with the required investments in people, processes, and systems.

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1. McKinsey Global Institute Discussion Paper June 2017 - Artificial Intelligence: The Next Digital Frontier

AI in Healthcare

AI and other related technologies have the potential to significantly impact business processes, efficiency, and profitability in various sectors of the healthcare industry. While the current adoption rate is low, a McKinsey Global Institute analysis indicates that AI can unlock a value of over USD 100 Billion in the Pharmaceutical and Medical products industry, and up to USD 300 billion in Healthcare systems and services.[2] CB Insights reported that healthcare AI start-ups have raised USD 4.3 billion across 576 deals since 2013, higher than any other industry in deal activity.[3]

AI has some potential uses and application in healthcare:

Application in Healthcare Delivery/Services

Clinical Imaging and Diagnostics
AI enabled systems/applications are being developed to provide more efficient and accurate diagnoses. Systems that read scans, ECGs, etc. with higher speed and accuracy to allow for earlier detection are already being trialed and deployed. The US FDA has already approved an AI-based software that can diagnose diabetic retinopathy. Similar positive results have been seen in the use of AI to spot tumors, identify early osteoporosis, and other dignoses.

Treatment Choices
AI will help look at data from treatment protocols and related outcomes more objectively. Analyses of large volumes of such data can help develop optimal protocols that would improve outcomes, reduce complications, minimize wastage and optimize cost. Such use of AI will also help physicians deliver more customized care regimens for individual patients.

Hospital Management
Advanced analytics can be used to streamline functions like admissions, equipment/asset utilization, billing and collection systems, patient readmissions costs, etc.

Applications for Pharma and Medical Products

Discovery and Development
There are several areas where AI has demonstrated the potential to impact innovation significantly. For example, AI is helping evaluate and analyze volumes of published scientific articles to help bring out obscure insights and ideas. AI and Advanced analytics can be used in the drug development process by helping evaluate potential active compounds in more significant numbers and facilitating selection of the most promising drug candidates for study. Speedy analysis of vast drug libraries can help weed out weak candidates and select the best, enabling significant time and cost savings.

2. McKinsey Global Institute Discussion Paper April 2018 - Notes from the AI Frontier: Insights fro Hundreds of Use Cases
3. CB Insights, AI Industry series: Top Healthcare AI Trends to Watch

Clinical Trial Management

Several exciting uses are being developed in the management of clinical trials. Such applications include - matching patients to clinical trials; analyses of vast data sets from clinical trials to find new and valuable insights.

Manufacturing Operations/Production

Manufacturing operations in pharma are becoming more complex, especially with increasing regulatory compliance requirements. Newer generation biologicals, gene therapies, etc. are likely to make these more challenging. Organizations wouldt assimilate vast amounts of data from connected IoT devices in manufacturing plants. They could then use advanced analytics and machine learning to establish performance and efficiency parameters, like targeted batch yields, or critical quality monitoring systems.

Supply Chain Efficiencies

Advanced analytics can bring in vast improvements in this area. Data-driven applications can help optimize inventory management by increasing accuracy in forecasting and planning. Analytics can help develop collaborative supplier networks, thereby improving supplier delivery performance and risk management. Visual pattern recognition technologies are helping revolutionize warehousing and physical asset management. Distributor network optimization, product traceability and dynamic responsiveness to consumer requirements are other advantages that can be tapped.

Sales and Marketing

With the changing technological environment and emerging competitive scenarios, pharmaceutical and medical device companies find it difficult to conduct meaningful engagement with customers. Competitive clutter and overlapping offerings make it difficult to offer a differentiated customer experience. Predictive analytics can help optimize the synergy between a company's sales and marketing efforts, leading to better customer engagement and increased revenue. Using data from multiple sources could help identify patterns and generate insights for improved customer experience, including methods to prioritize and personalize engagement efforts. Salesforce deployment can be optimized to ensure efficiency and impact.

While the healthcare industry is still at a nascent stage in the adoption curve for Artificial Intelligence and Advanced Analytics, it is crucial for companies to use such innovative solutions to gain a competitive advantage. Companies can get on-board early, work to organize data and pilot such initiatives that facilitate continual long-term success.

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