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Revolutionizing Market Access:
AI-driven Pricing Strategies in the Pharmaceutical Industry

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Background

- Pharmaceutical manufacturers are facing rising pressure due to dynamic market conditions, with more intricate and evolving pricing regulations across the globe. The large influx of complex and diverse healthcare datasets, including historical drug pricing information, clinical datasets and HTA requirements, varies significantly across regional and national markets. This complexity demands a comprehensive reassessment of global launch planning, as well as localized pricing and market access strategies.
- AI can potentially provide the most accurate and transparent pricing scenario for a product in a timely manner, which could lead to a metamorphosis of pricing frameworks within the healthcare industry, resulting in pricing strategies that optimize patient access. This research assesses how AI can enhance the ability of both payers and manufacturers to navigate the complex landscape of drug pricing and implement data-driven decision-making to transform pricing strategies.

Methods

- Secondary research was conducted to gain insights on AI and ML use in pharmaceutical pricing from 2019 to 2024. Topics searched were "AI and ML applications in pharmaceutical market access and pricing" and results were extrapolated from publicly available industry reports, whitepapers, specialty websites, and relevant articles.

Results

- AI-driven pricing strategies can support pharmaceutical companies in optimizing pricing and improving competitiveness, enabling customized pricing strategies. Five key archetypes were identified where AI solutions have been utilized in market access scenarios, with real-world example use-cases from Europe and the US, and the potential benefit of these outcomes from both the Payer and Manufacturer perspective.
- Findings from our research show potential benefits for both Payers and Manufacturers, that can be applied globally. AI can accelerate the gathering and analysis of data from historic drug submissions, pricing models, medical evidence, market access information and clinical trial results, supporting the specific case, leading to efficiencies in supporting pricing optimization strategies with more informed decision-making.

Table 1: Overview of the AI-based pricing archetypes

Archetype	Real-time Pricing Algorithms	Value-based Pricing Models	Segmented Pricing Strategies	Optimized Negotiation Tools	Competitive Intelligence Solutions
Objective	Adjust pricing in real-time based on market demand, competitor pricing, and product differentiation	Assess drug value through clinical efficacy, patient outcomes, and economic impact	Analyze the macro-economic environment and market data, data to identify needs and willingness to pay	Identify drivers in pricing scenarios, regulations, and market dynamics	Monitor competitor tender pricing strategies in real-time
Real case examples	• **Europe:** Okra Technologies have developed an AI-system-based software platform *ValueScope*, aiming to predict the price and likely outcome of HTA assessments with more than 90% accuracy. • The AI tool was built using historical data from more than 1,700 drugs launched in Europe.[4]	• **Global:** A leading pharmaceutical company has deployed an AI technology called "The Medical Brain". This was a custom-built NLP (natural language processing) for life sciences, with >1 million medical ontologies that analyze several thousand medical publications. • Alignment of pricing strategy with medical publications on the unmet needs of HCPs across markets led to the determination of a new strategy, combining clinical value with pricing model evaluations.[7]	• **US:** Glass Box Analytics has developed a new drug pricing method called Predictive Acquisition Cost (PAC) that aims to track drug acquisition prices more precisely. • PAC uses predictive analytics to analyze several factors when estimating the acquisition cost of a drug, including maximum acquisition cost (MAC), price benchmarks, published price, dispensation metrics, supply-demand measures, and survey-based acquisition costs, facilitating improved pricing strategies.[1]	• **Global:** A global pharmaceutical firm used Tellius Auto-Insights to identify drivers behind trend breaks; reaching underserved HCPs using new channels and improving response time to market changes. • Tellius AI-powered analytics platform provides domain experts with data-driven decision-making to better inform forecasting and predict impact of access changes. • AI driven formulary change trackers enable market access and brand teams to monitor access changes and brand performance in real time. [5]	• **Europe:** AI technology company, Konplik, uses its AI technology to deploy tailor-made ML algorithms, to predict tender prices for drugs. Automated processes run multiple model simulations to find the best fitted model based on historical data of tender prices and is used to predict future tender prices. • Such tools can be leveraged for efficient price prediction in markets where competitors have frequent and up-to-date information on bidding results providing real-time competitive intelligence solutions (e.g., the Scandinavian market).[6]
Data Inputs *(not exhaustive)*	• Clinical trial results, historic drug submissions, historical pricing data.	• Medical publications.	• Industry maximum allowable cost benchmarks, published price lists, existing price benchmarks, behavioral metrics, supply-demand measures, and survey-based acquisition costs.	• Sales, formulary, and third-party data, internal systems data (CRMs, ERPs, and EMRs)	• Historical data of tender prices
Payer outcomes	• Improves forecast accuracy and planning • Data-driven decision making • Transparent decision-making process	• Data-driven decision making • Improves insight into HCP and patient unmet needs to align reimbursement decisions	• PAC helps payers track the actual drug acquisition cost and has been selected by Oklahoma State Medicaid to better manage its State Maximum Allowable Cost (SMAC) drug price [2]	• Informed pricing and incentive optimization leading to improved contract negotiation • Wider insight into formulary monitoring	• Accurate tender management resulting in cost-efficiency • Informed decision making and utilization management • Accurate forecasting of market uptake and revenue
Manufacturer outcomes	• Competitive and scenario-based market-specific pricing strategies • Value propositions that provide product differentiation based on the current competitive landscape	• Improves alignment between the current treatment landscape incorporating stakeholder needs into pricing strategies • Personalizes value story to different audiences	• Identification of opportunities and risks that may inform reimbursement contract negotiations • Alleviates revenue risk mitigation	• HCP Targeting: helps to target growth opportunities and improve revenue • More insights into market dynamics, providing options for improved pricing negotiations	• Optimizes pricing and reimbursement strategies with price prediction based on competitor analysis • Insights into historical data and market trends help identify key value drivers for different stakeholders

Limitations

- There is an abundance of historical data required for each factor needed to develop AI algorithms and ML models that can efficiently predict pricing. Available data can be fragmented and require manual human intervention and manipulations to fill data gaps. Potentially, there is also a chance of unintentional omission of some parameters in ML models that may influence pricing outcomes.
- In certain markets some price components remain confidential, such as price discounting in the UK and the IIRC framework, limiting the ability of AI to identify actual price points.
- With the adoption of AI into healthcare, some ethical, regulatory, and technical challenges have emerged, such as patient confidentiality issues, clinical inaccuracy, and a fear of the 'loss of human touch' in patient care. There is also uncertainty as to how AI can integrate clinical outcomes data in relation to the determination of price.
- In this context, the complexity of pricing and global healthcare systems suggests that there will always be a need for human intelligence alongside AI, to address the concerns related to the potential bias in AI algorithms and related limitations.

Conclusion

- AI-driven pricing strategies have the potential to support pharmaceutical companies in optimizing price setting and forecasts for new and existing therapies, considering evolving market dynamics.
- As HTA agencies meticulously scrutinize clinical data uncertainty prior to pricing decision-making, robust clinical evidence, as well as comparisons with the standard of care are essential, to ensure that clinical data and outcomes are effectively integrated into AI-pricing models, leading to improved pricing negotiations.
- Market Access organizations can effectively support price optimization strategies, linking clinical data with economic value, by determining early in the development cycle the key parameters influencing economic value, while maintaining regulatory compliance and transparency, to enhance patient access and meet payer needs.
- Further research is required to identify how AI can integrate both the clinical and economic value to revolutionize pharmaceutical pricing and healthcare outcomes in the future, balancing patient affordability with sustainable business models, paving the way for more equitable healthcare delivery.

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Abbreviations

AI: Artificial Intelligence; ML: Machine Learning; HTA: Health Technology Assessment; HCP: Health Care Professional; PAC: Predictive Acquisition Cost; MAC: Maximum Acquisition Cost; SMAC: State Maximum Acquisition Cost; CRM: Customer Relationship Management; ERP: Enterprise Resource Planning; EMR: Electronic Medical Records; US: United States.