

Beyond the Big Bet: **Strategic AI investments for a Smarter Pharma Future**

Industry Briefing

1.The Industry Outlook: Trends reshaping the Pharma Future

AI is rapidly reshaping pharmaceutical operations, positioning the industry to capitalize on unprecedented efficiencies and breakthroughs across every stage of the value chain-from early-stage drug discovery and clinical development to manufacturing and supply chain optimization. AI is enabling faster target identification, smarter compound selection, and significantly compressing timelines-cutting discovery phases from years to mere months in some cases.

1.1 Charting the AI Horizon



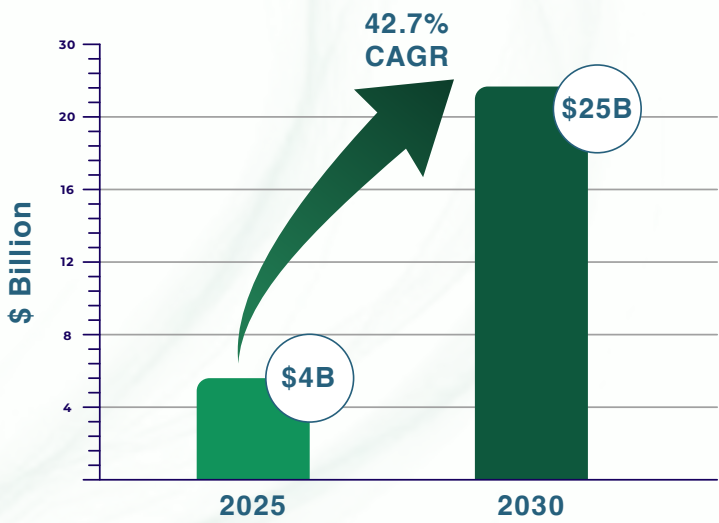
- 01. Generative AI is transforming pharma operations - from R&D and marketing to patient engagement - unlocking high-value opportunities.
- 02. AI could generate \$60-110 billion annually by boosting efficiency and driving faster innovation.
- 03. 75% of AI-first biotech firms are actively investing in AI capabilities to scale their impact.
- 04. AI-driven drug discovery collaborations are set to **explode from 10 in 2015 to 105 by 2025**, reflecting the accelerating demand for AI's transformative impact in the pharma industry.
- 05. AI is **expected to deliver \$350-410 billion** in yearly value for pharma by 2025, highlighting its strategic importance.
- 06. The AI cancer diagnostics market is growing at **40.1% CAGR (2021–2028)**, closely tied to pharma-led breakthroughs.
- 07. 65% of industry leaders see AI's biggest impact in **manufacturing and supply chain optimization**.
- 08. AI in genomics is projected to grow at **52.7% annually** through 2028, reshaping the future of targeted therapies.

1.2 Navigating the Complexities: Barriers to Scalable AI Value

This integration of artificial intelligence into the pharmaceutical sector is unlocking significant business value-but not without complexity.

On the upside, AI is driving operational efficiency, increasing precision in clinical trials, enhancing patient recruitment, and streamlining supply chains.

Pharma AI investment is set to jump from \$4B in 2025 to \$25B by 2030-a 6x rise at a 42.7% CAGR



However, realizing its full potential requires overcoming challenges such as:



Data Transparency



Algorithmic Bias



Limited Access to High-Quality Datasets



The Intricacies of Biological Systems



Ethical Considerations



Strong Data Governance

These challenges are no longer optional-they are essential to ensuring reliable, actionable AI outputs. They not only impact implementation but also have direct implications for capital strategy.

2. The Pharma Shift from Scale to Strategy

Traditional investment models-built around large-scale, capital-heavy projects-are increasingly misaligned with the fast-moving, iterative nature of AI. In response, the industry is shifting toward more agile, phased investment strategies that allow for incremental funding, rapid experimentation, and continuous adaptation based on real-world outcomes.

The pharmaceutical contract manufacturing market is set to grow from \$194.5B in 2025 to \$351.5B by 2034, reflecting a strong 6.8% CAGR and rising demand for outsourced production.

2.1 The shift drivers for a strategic payoff

- Greater operational flexibility Accelerates time-to-value.
- Enhanced cost efficiency and optimized budget-Helps investors and decision-makers manage risk more effectively.

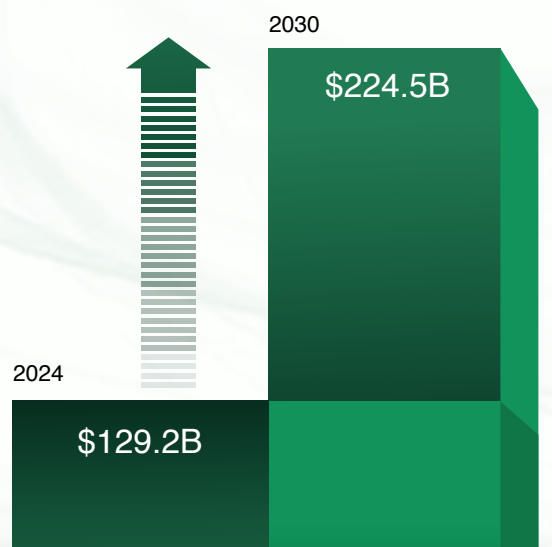
In tandem with this shift, pharmaceutical companies are rethinking their operational models - moving away from traditional large-scale contracts toward smaller, modular engagements.

2.2 Rise of Smaller, Modular Contracts

Pharma outsourcing is shifting rapidly toward smaller, outcome-based contracts. This reflects growing demand for agility, faster execution, and risk reduction.

Contract Manufacturing Organization
market to grow

CAGR 10%



2.3 Decline of Monolithic Agreements

Long-term contracts are being replaced by modular models enabling better resource alignment, scalability, and faster go-to-market strategies.



- ▶ **Smaller Contracts** reduced out-of-scope changes by 60%
- ▶ **Budget** overruns by 20%
- ▶ **Clinical Trial** timelines by 2 months.



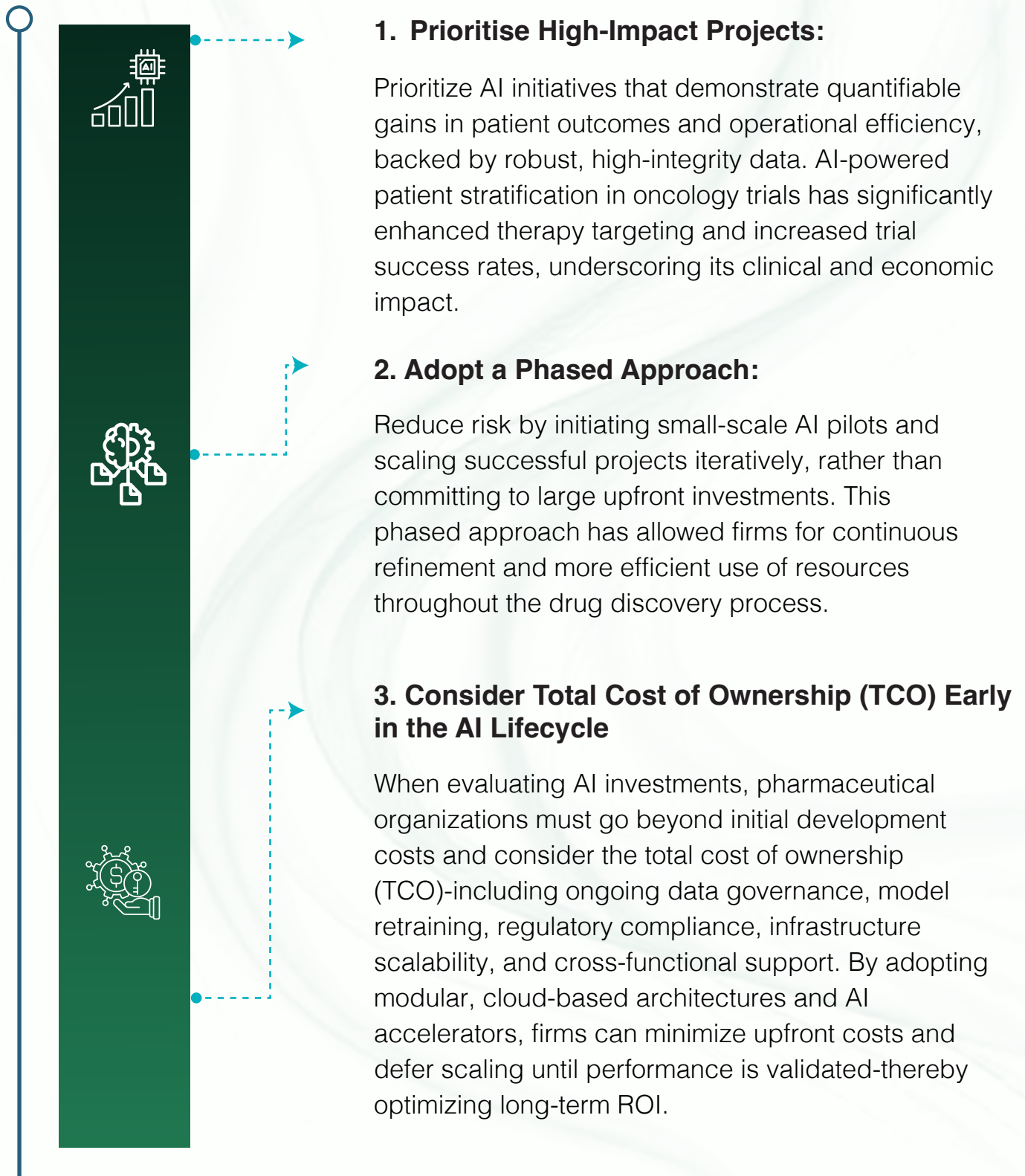
2.4 AI Disruption Reshaping Buyer Behavior

AI in clinical trials can cut costs by up to 70% and reduce timelines by 80%, streamlining drug development pushing buyers toward performance-based, renewable contracts.⁵ Modular, pilot-to-scale models let pharma firms test, scale, and pivot quickly—minimizing risk while accelerating innovation and commercialization.

3. Key Strategies for Unlocking ROI (Return on Investment) in Pharma AI

To fully realize the value of AI in the pharmaceutical sector, organizations should focus on the following strategies:

3.1 The Strategy



4. Foster Collaboration:

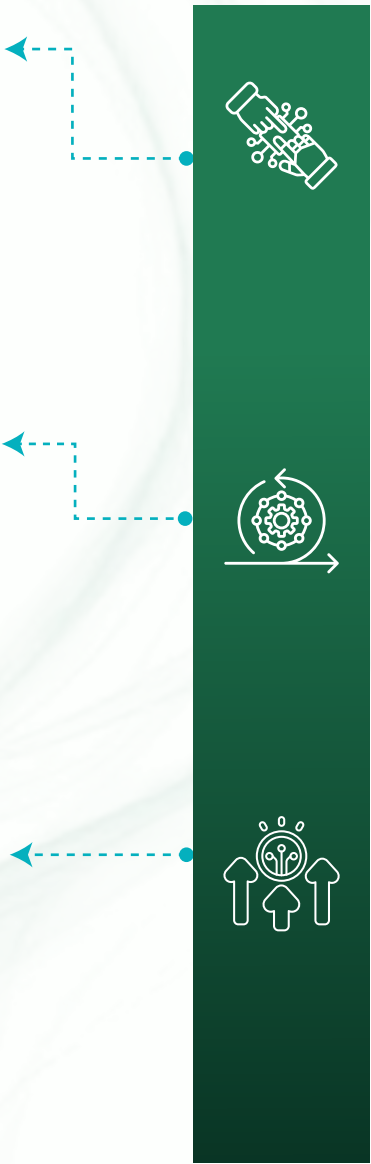
Align AI projects with organizational goals by encouraging collaboration across departments and expertise areas. A leading pharma company has successfully established cross-functional AI teams, accelerating the development and approval of AI-assisted diagnostic tools.

5. Stay Agile and Continuously Adapt:

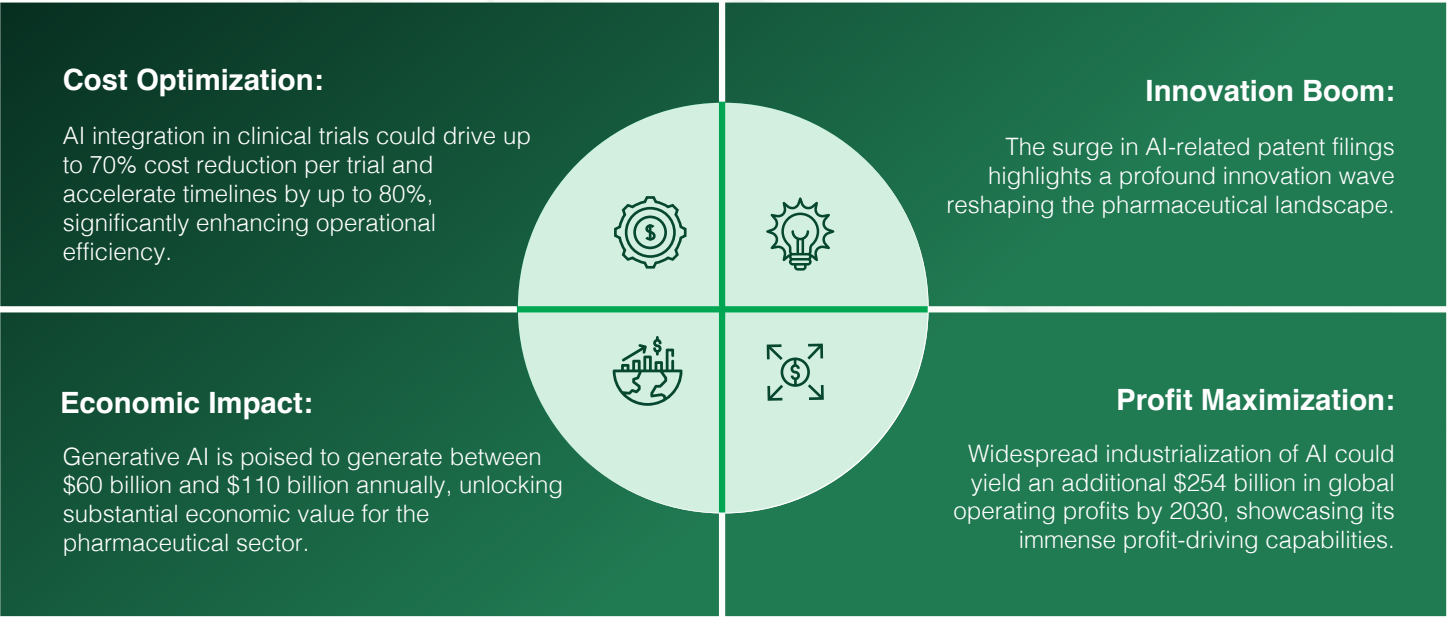
Monitor evolving technologies and regulatory changes, investing early and adapting quickly through continuous feedback and improvement. This approach has helped pioneer pharma companies to enable real-time adjustments in trial recruitment and compliance, enhancing agility and efficiency.

6. Leverage Emerging Opportunities:

Unlock new business models and value in pharma through AI-driven use cases such as R&D optimization, predictive analytics, and patient stratification. The use of AI in R&D portfolio management enables firms in dynamic resource allocation and earlier identification of promising drug candidates.



3.2 Strategic outcomes



4. The New Engagement Model for AI in Pharma

Pharma's AI adoption is shifting from large, rigid projects to agile, experimental partnerships focused on incremental value and domain expertise.

a. Rethinking Partnerships for Early-Stage AI

Due to AI's experimental nature, pharma favors small, phased pilots over multi-year contracts. This enables rapid testing, refinement, and scaling, reducing risk and maximizing ROI. Collaborations with specialized vendors, often milestone-funded and sometimes valued over \$1B, drive faster, domain-specific impact. Agile AI startups help achieve breakthroughs like biomarker discovery in months, not years.

b. Evolving the Center of Excellence (CoE) Model

To drive scalable AI success, pharma organizations must transition from ad-hoc initiatives to strategic, domain-specific Centers of Excellence (CoEs). These CoEs serve as enterprise hubs for AI governance, reusable assets, and knowledge sharing. Agilisium's life sciences-focused CoE model brings together bioinformatics, regulatory, medical, and commercial expertise to ensure scientific and compliance alignment. Our GenAI CoEs deliver tailored accelerators, enabling faster innovation and seamless scaling across therapeutic areas, R&D, and commercialization.



Pharma is capitalizing on AI by launching strategic Centers of Excellence, partnering with leading academic and tech institutes to fast-track innovation and scale AI-driven solutions, positioning itself at the forefront of industry advancements.

c. Bridging Gaps Left by Traditional SIs

Agile AI partners combine technical excellence with pharma domain expertise, filling gaps left by traditional system integrators (SIs). Unlike SIs' bureaucratic, rigid models, niche AI vendors offer lean, fast, and focused approaches, enabling rapid prototyping, adaptive engagements, and easier pivots. This agility delivers measurable outcomes like optimized trials and enhanced compliance, driving innovations such as real-time patient matching and predictive analytics. Speed-to-proof equals speed-to-value, with agile partners often delivering ROI faster than traditional integrators.

d. Embracing the “Small Bites, Continuous Improvement” Philosophy

Pharma is adopting iterative, value-driven AI models over large upfront bets, piloting AI tools in specific therapeutic areas before scaling. Modular AI use cases (e.g., trial optimization, adverse event detection) build credibility and confidence. McKinsey reports iterative AI strategies yield ROI 30–50% faster, easing regulatory integration and aligning stakeholders by demonstrating real-time value.

e. AI in Action: Real-World Success Stories

- A pharma firm’s \$1.5B oncology AI alliance uses massive bio/chem datasets to fuel drug discovery.
- Another doubled its AI metabolic disease program to 20 candidates, targeting obesity treatments valued at \$4.6B.
- A global biopharma automated medical writing, reducing report time from 12 weeks to 10 minutes, supporting 150+ trials.
- AI partnerships totaling over \$1B in neuroinflammation and oncology focus on target discovery with milestone-based ROI.

Niche AI Specialists	Traditional SIs
Agile, algorithm-first startups solving targeted biotech problems	Broad-scope known for enterprise-scale data infrastructure and transformation
<ul style="list-style-type: none">• Rapid iteration with domain-expert algorithms• Drive innovation in key pharma AI areas like Genomics, Clinical operations & Medical Imaging• Achieve clinical milestones at record speed	<ul style="list-style-type: none">• Strength in large-scale rollouts• End-to-end consulting• IT modernization

Key Takeaway

- Pharma AI leaders are shifting to niche, AI-native specialists
- Modular, value-first models enable incremental AI adoption
- Specialized partners navigate R&D, compliance & commercialization complexities
- Industry moving from traditional vendors to outcome-driven partnerships

f. Agilisium's Domain-Centric, Life Sciences-Focused Proposition

Agilisium differentiates itself as a niche player that goes beyond generic, cross-value-chain AI solutions by embedding deep domain expertise into life sciences-specific business processes. Our AI agents are meticulously aligned with the unique workflows, regulatory complexities, and operational nuances of the pharmaceutical ecosystem. This laser-focused integration enables us to deliver precision-driven, high-impact insights that drive measurable business outcomes. By tailoring AI capabilities to the core of life sciences processes, we empower pharma organizations to accelerate innovation, optimize decision-making, and sustain competitive advantage in a highly specialized and rapidly evolving market.



30–50% Faster ROI

For companies adopting
self-servicing AI frameworks
compared to traditional models

Conclusion

AI success in pharma depends on cultural transformation as much as technological innovation. Leaders must promote a mindset that values experimentation, cross-functional collaboration, and decentralization of power to the business units. As pharma becomes more data-driven, those who embrace agile, self-servicing AI models will unlock new levels of innovation, efficiency, and market impact.

The successful integration of AI in pharma requires a fundamental shift in mindset from viewing AI as a standalone project to embracing it as a long-term, enterprise-wide capability. This transformation starts with phased investment models that reduce risk while allowing for experimentation and measurable ROI. Rather than making large, upfront bets, leading organizations are adopting pilot-to-scale approaches, where only high-performing initiatives are expanded ensuring continuous learning and efficient resource allocation.

Equally critical is the selection of the right partners not just for their technical expertise, but for their ability to align with your strategic goals, culture, and pace of innovation. AI success is increasingly defined by how well technology partners can integrate with business workflows, drive domain-specific value, and adapt to evolving regulatory and scientific landscapes.

To support this shift, pharmaceutical leaders must establish adaptive Centers of Excellence (CoEs) cross-functional hubs that not only centralize AI governance and knowledge but also promote scalability, talent development, and rapid deployment of proven solutions across the enterprise.

Ultimately, AI should be positioned as a core capability embedded across the drug development value chain from discovery and trial design to manufacturing and commercialization. Companies that treat AI as a strategic enabler rather than a series of isolated projects will be better equipped to accelerate innovation, drive operational excellence, and remain competitive in an increasingly data-driven, agile industry.

About the Author

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Dr. Sudipta Misra is a seasoned professional at the intersection of scientific research and digital innovation in Life Sciences and Healthcare. With deep expertise in toxicology and a proven track record leading large-scale digital transformation programs, he helps organizations enable secure, compliant, and data-driven decision-making. Sudipta blends scientific rigor with technology strategy, leveraging his domain knowledge, customer-focused mindset, and innovation-led solutioning to help businesses stay ahead in a rapidly evolving landscape. He is currently exploring how emerging technologies like autonomous Agentic AI can augment decision support across regulated environments. Holding a PhD in Toxicology, Sudipta is also a published researcher with eight scientific publications. He continues to bring a unique balance of research depth and applied innovation to every engagement.

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References:

1. <https://www.coherentsolutions.com/insights/artificial-intelligence-in-pharmaceuticals-and-biotechnology-current-trends-and-innovations>
2. <https://www.scilife.io/blog/ai-pharma-innovation-challenges>
3. <https://www.mckinsey.com/industries/life-sciences/our-insights/generative-ai-in-the-pharmaceutical-industry-moving-from-hype-to-reality>
4. <https://tecknoworks.com/wp-content/uploads/2025/02/Report-AI-Adoption-in-Drug-Development-Pharmacology-Industry.pdf>
5. <https://www.scilife.io/blog/ai-pharma-innovation-challenges>
6. <https://www.mordorintelligence.com/industry-reports/artificial-intelligence-in-pharmaceutical-market>
7. <https://www.precedenceresearch.com/pharmaceutical-contract-manufacturing-market>
8. <https://www.globenewswire.com/news-release/2025/03/19/3045180/28124/en/Pharmaceutical-Contract-Manufacturing-Market-Report-2025-2030-API-Manufacturing-and-Oncology-Segments-Drive-Growth-as-Market-Reaches-224-5-Billion-by-2030.html>
9. <https://strategikon.com/solutions/clinical-financial-management/manage-out-of-scope/>
10. <https://www.nature.com/articles/s41392-024-01760-0>
11. https://www.novartis.com/sites/novartis_com/files/novartis-integrated-report-2024.pdf
12. <https://www.techtarget.com/healthtechnanalytics/feature/The-cost-of-AI-in-healthcare-explained-Is-it-worth-it>
13. <https://www.roche.com/stories/ai-revolutionising-drug-discovery-and-transforming-patient-care>
14. <https://www.fivetran.com/case-studies/pfizer-speeds-up-clinical-trials-by-unlocking-real-time-data>

References:

15. <https://www.gsk.com/en-gb/behind-the-science-magazine/ai-medical-innovation-ethics-responsibility/>
16. https://www.mckinsey.com/~/_media/mckinsey/business%20functions/mckinsey%20digital/our%20insights/the%20top%20trends%20in%20tech%202023/mckinsey-technology-trends-outlook-2023-v5.pdf
17. <https://analytics.deep-pharma.tech/AI-for-DD-Q4-2021/Full-Report.pdf>
18. <https://www2.deloitte.com/content/dam/Deloitte/cn/Documents/life-sciences-health-care/deloitte-cn-lshc-global-life-sciences-sector-outlook-2024-en-240709.pdf>
19. <https://mila.quebec/en/news/roche-canada-launches-the-national-artificial-intelligence-centre-of-excellence-in-partnership>
20. <https://ir.recursion.com/news-releases/news-release-details/bayer-and-recursion-focus-research-collaboration-oncology>
21. <https://www.fiercebiotech.com/biotech/novo-nordisk-doubles-down-valo-betting-190-million-near-term-apply-ai-obesity-and-diabetes>
22. <https://www.fiercebiotech.com/cro/novartis-makes-investment-ai-firm-yseop-clinical-trial-writing>
23. <https://www.fiercebiotech.com/biotech/merck-kgaa-doubles-ai-partners-tapping-benevolentai-and-exscientia-drug-discovery-push>