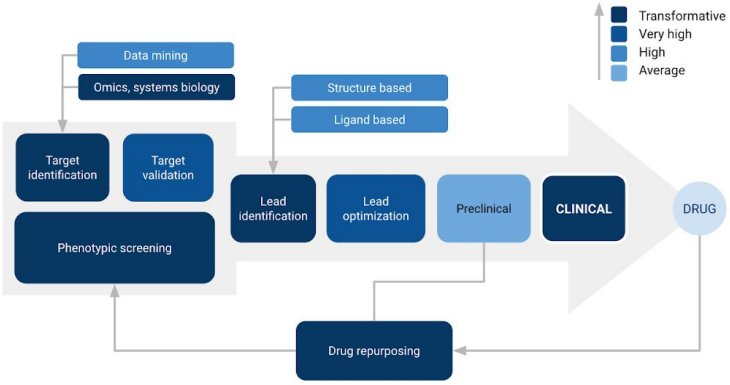
AI for Drug Discovery 2019: Intelligence, Analysis, Forecasts

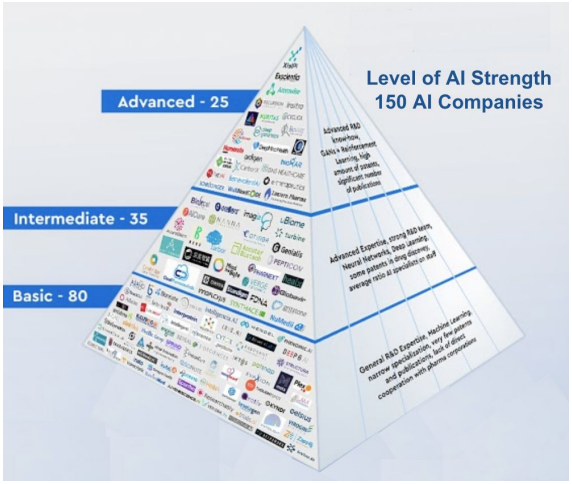
Investment in AI for Drug Discovery increased from $200M in 2015 to over $700M in 2018. Some analysts predict that the industry could reach a valuation of $20B by 2024.

The AI for Drug Discovery space is evolving rapidly. Taking into account the progress in the last three years, it's reasonable to expect that really significant results could be achieved in the next three years. In the first quarter of this year, the number of new research centers increased by 10, the number of companies in the space increased by 20, and the number of funds investing in the space increased by 30. There are now 350 investment funds investing in the sector including Google Ventures, Tencent, WuXi, Andreessen Horowitz, Khosla Ventures, and Sequoia Ventures. The demand for AI technology and talent in Pharma is even driving the formation of a new interdisciplinary field called data-driven drug discovery.

The "Heat Map" of AI Potential Value for Various R&D Areas



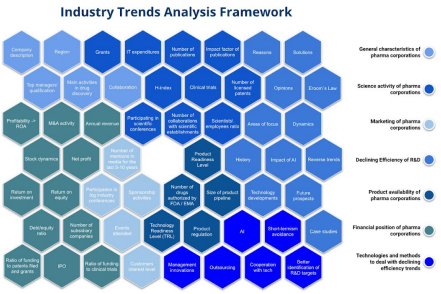
Discovering new drugs using AI is one of the most challenging areas in biological sciences. Due to the complexity, companies in this sector sometimes appear to be enigmatic black boxes to investors. Very few investment firms are capable of applying efficient due diligence to assess investment targets in this sector because they fail to use approaches that match the sophistication of the sector.



Although there are about 150 companies in the AI for Drug Discovery space, very few of them are capable of building end-to-end solutions. Companies such as WuXi NextCODE, BenevolentAI, DeepMind Health, and Insilico Medicine are leaders in this area. Since investing in Insilico Medicine in 2014, Deep Knowledge Ventures has acquired very specific knowledge about the sector and has developed very specialized due diligence methods to assess companies in this sector.

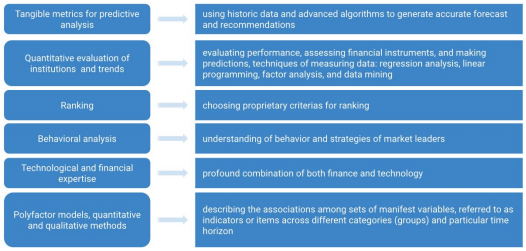
Key Questions

- What are the greatest opportunities for investors in AI for Drug Discovery?
- What are the opportunities for biopharma companies with regard to AI?
- What are the reasons and solutions for declining efficiency of biopharma R&D?



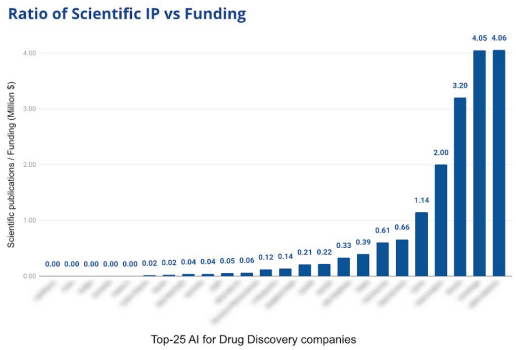
New Proprietary Report Series

Deep Knowledge Analytics Pharma Division has launched a new series of highly specialized proprietary reports to provide accurate, relevant, and up-to-date information about this sector. These proprietary reports are designed to provide deep analysis and tangible forecasts to facilitate strategic decision-making for M&A, and to help companies optimize strategic agendas, navigate challenges, and maximize opportunities. Our Pharma Division is completely focused on Pharma and AI for Drug Discovery.



Six Proprietary Case Studies

These proprietary case studies provide comprehensive information and practical insights to help biopharma companies and other entities optimize short and long-term strategies. Updated editions of each report will be released each quarter, incrementally increasing the precision, practicality and actionability of the analysis. Updated editions also provide identification and analysis of successful business strategies in the industry.



Our research is based on analysis of descriptive criteria and formal numerical metrics. The methodology used in our approach includes data sourcing, data, cleaning, data filtering, exploratory data analysis, data modeling, deriving results, and developing recommendations. The data is extracted from multiple sources including company websites, top pharmaceutical, healthcare, and AI conference programs, various databases, and reputable news sources. Reports include forecasts of the 3-5 year horizon, future scenarios in Pharma, practical guides for assembling the best tools and solutions, and quantifiable comparative analysis of key market players in the sector.

Report #1 Comparative Industry Analysis & Classification Framework

The AI for Drug Discovery and Biomarker Development sector has the potential to impact the whole biopharma industry. Knowledge of the landscape is crucial for the survival of every company in the market. Pharma companies are faced with the challenge of a significant cost increase for each FDA approved drug. Application of AI can accelerate the data analysis process and decrease the time for design and development. US based companies are the largest group both by total value of investments and quantity of deals.

- Enhanced analysis of the perspectives of AI for Drug Discovery and Biomarker Development industry in accordance with prevailing trends
- Tangible short-term and long-term forecasts, including an overview of novel biopharma tools and methods that will be relevant in the market by 2022-2025
- Analysis of key market players in the AI for Drug Discovery and Biomarker Development landscape

Report #2 Pharma AI Stock Index

The focus of this report is the financial dynamics of Pharma and Tech companies that are applying AI for Drug Discovery. The objective is to help investors, companies, and other industry participants to develop effective short and long-term strategies. The report estimates activities of the top 15 Pharma and Tech companies, comparing their market capitalization, and conducting in-depth analysis of Pharma and Tech stock indices in order to determine correlation between them and their relation to other well-known and relevant indices.

- Specific analysis of stock dynamics of Pharma and Tech AI companies in terms of their relation to the AI for Drug Discovery industry
- 3-5 year forecasts with extrapolation of possible scenarios of the indices development
- Deep analysis of the relation between Pharma and Tech composite indices to the most relevant stock indices

Report #3 [Declining Efficiency of R&D in Pharma Companies]

This report provides a deep analysis of the declining efficiency of the R&D process in Pharma companies as well as potential solutions for greater efficiencies. This report also includes an analysis of strategic areas within Pharma companies that are ready for immediate AI adoption.

- The main reasons for this declining trend in efficiency of R&D, and the business consequences of such declining for the corporations and other participants of the industry
- Deep analysis of Pharma companies to find solutions to deal with this declining efficiency
- Forecasts of industry prospects regarding the evidence of R&D efficiency

Report #4 [The Top 20 AI in Drug Discovery Investors]

The objective of this report is to identify the most sophisticated investors in the AI for Drug Discovery sector. We have selected the top 20 investors and analyzed their investment strategies. Only 25% of investors are engaged in debt financing. In total, these 20 firms have raised over $40 billion, with Sequoia Capital alone accounting for roughly a third of that amount. In the future, we expect a surge in specialized investment in the biotech sector, which will accelerate AI for Drug Discovery investments even more.

- Overview and comparison of key investors in AI for Drug Discovery industry, including the investment strategies of different types of investors
- Forecast of future trends of investment in the Pharma industry
- Recommendations which can be applied for assembling the most optimal possible tools and solutions both for investors and investment-seeking companies

Report #5 The Top 30 Analysts working in AI in Pharma

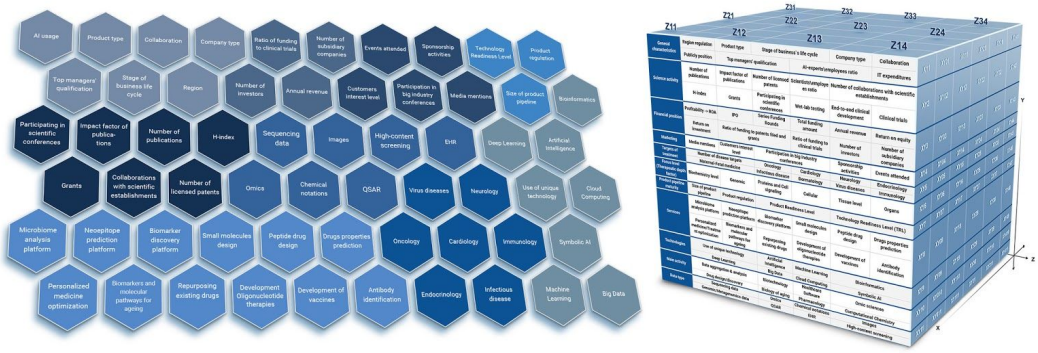
More of the top 30 AI analysts work in biopharma companies than in tech companies. These top analysts usually have deep technical backgrounds in areas such as AI, computer science, data science, engineering, statistics, math, with some acquired level of expertise in life sciences. Most analysts work in the field of healthcare, business management, and data science.

- The current distribution of experts in the field
- Assessment of key areas of necessary focus for specialists in the industry
- Making investment decisions on the basis of competencies of companies in the field

Report #6 Best Investment Targets for the AI-Pharma Hybrid Index Hedge Fund

There are 25 AI companies that are considered to be the most promising investments targets for the AI Pharma Index Hedge Fund. 15 of these companies are located in the US. By specialization, the companies are divided into two groups: 14 are classified as AI for Bioinformatics companies, and 11 are classified as AI for Drug Discovery companies. Almost all of these companies use unique technologies to achieve high results.

- Developing the optimal portfolio for investing in the AI for Drug Discovery, Bioinformatics, and Biotechnology industries
- Gaining understanding of current Pharma and Tech markets, opportunities, and threats
- Determining what to do to benefit from these tendencies and tackle particular issues



Specialized Metrics To Properly Assess AI-Pharma Startups

Deep Knowledge Analytics Pharma Division uses tangible metrics and parameters to assess AI for Drug Discovery companies. Early stage startups are assessed using 100 parameters. Advanced stage companies are assessed using more than 300 parameters. These are 10 fundamental parameters that we use.

1.Team Structure

The number of specialists and balance in the company's team structure. Generally the best structure is 1/3 biochemistry specialists, 1/3 AI specialists, and 1/3 business development and investment relations experts, including former Pharma executives to assist in establishing contact and cooperation with Pharma companies. In practice what constitutes a *sufficient number* depends on the scope of the company's target applications. As a general rule, the number of specialists should be more than 10. Top tier companies typically have a significant number of employees with expertise in AI/ML/DL, which allows generating unique know-how and intellectual property. These companies have strong interdisciplinary teams enabling collaboration between AI and life science experts.

2. Independent Scientific Validation

Evidence of independent scientific validation including a significant number of peer-reviewed papers in the domain of pharmaceutical research published in high-impact journals. Companies in this category demonstrate significant advances in the application of AI to drug discovery, which is reflected in a high number of research publications, public presentations, press-releases, and patents.

3. Active Participation in Conferences and Events

Companies in this category are typically participate actively in high profile public events, discussions and forums; they appear in news and media regularly. They contribute significantly to promoting AI-driven approaches to drug discovery and basic biology, educating the public by specific use cases, and establishing best AI adoption practices. They usually have strong expertise both in drug discovery and development and in theoretical and practical aspects of AI technology, and have visibility within the scientific community through frequent presentations at scientific and technology conferences.

4. Direct Collaboration with Pharma and Tech Companies

The company should have direct collaboration with Pharma and Tech companies. This serves as additional validation that the company has something practical and tangible in its pipeline. The company should have official research collaborations with top 30 Pharma and Tech companies, where the company provides advanced know-how in AI-driven drug discovery.

5. AI Strength

There must be evidence that the company uses state-of-the-art AI techniques and consistently absorbs ongoing innovation in novel AI technologies and methodologies. If the company claims that it is an AI company, then it should be particularly strong in AI.

6. Investors

The company should have world-class investment funds as investors in their Series A or B rounds. There are fewer than 20 world-class investment funds recognized as being top funds globally by the entire investment community.

7. Target Molecules and Target Applications

The company should have a large number of target molecules discovered, and a sufficient number of molecules currently in clinical trials. Also taken into consideration is the number of target applications the company of pursuing (e.g. drug discovery, biomarker development, toxicity and ADME prediction, compound generation, compound binding, etc.).

8. Technology Development Scope

Whether the company is developing an end-to-end clinical pipeline, or focusing on just one particular segment in the overall drug discovery and development process.

9. R&D Depth

The proportion of the company’s funds dedicated to its R&D activities, as opposed to completing the development of products near the end of their development cycle. A high proportion of funds devoted to R&D indicates proactive innovation and new technology adoption.

10. Ratio of Investment to IP Produced

The ratio of the amount of money invested in the company to the amount of IP produced by the company. This is indicative of the performance of the company’s R&D activities and the company's future prospects, and reflects how intelligently and efficiently the company has utilized its funding to date.

Comparative Industry Analysis & Classification Framework

Pharma AI Stock Index

Top Analysts AI in Pharma

Declining Efficiency of R&D in Pharma Corporations

Top-20 AI in Drug Discovery Investors

Enhanced analysis of most promising AI-companies as the best investments targets for AI-Pharma Index Hedge Fund

Access to Proprietary Analytical Reports

Proprietary reports are accessible via annual subscription and are available for purchase individually. All reports are updated quarterly with deep and precise analysis. Please click this link to preview the proprietary reports:

Deep Knowledge Analytics Pharma Division

About Deep Knowledge Ventures

Deep Knowledge Ventures is a leading investment fund focused on the synergistic convergence of DeepTech verticals, frontier technologies and technological mega-trends. Deep Knowledge Ventures is known for its use of sophisticated analytical systems for investment target identification and due-diligence. Major investment sectors include AI, Precision Medicine, Longevity, Blockchain and InvestTech. @DeepTech_VC

About Deep Knowledge Analytics

Deep Knowledge Analytics is the DeepTech analytical arm of Deep Knowledge Ventures, specializing in forecasting the convergence of technological mega-trends, conducting special case studies, and producing advanced industry analytical reports on the topics of AI, DeepTech, GovTech, Blockchain, FinTech and Invest Tech. DKA's Pharma Division is the leading analytical entity specifically focused on providing deep intelligence on the Pharma industry and the AI for Drug Discovery sector, and serves as the main source of market intelligence and analytics for AI-Pharma, a specialized hybrid hedge fund. @DK_Analytics

This article was written by Margaretta Colangelo and Dmitry Kaminskiy.

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