

Drug Discovery Informatics Market - Global Industry Size, Share, Trends, Opportunity, and Forecast, Segmented By Mode (In-house, Outsourced), By Workflow (Discovery, Development),

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Abstracts

Global Drug Discovery Informatics Market was valued at USD 3.18 Billion in 2023 and is anticipated to project robust growth in the forecast period with a CAGR of 9.40% through 2029. Drug discovery informatics is a cutting-edge technological solution employed for the analysis and interpretation of vast volumes of biochemical data. It serves as a crucial application of computational and information technology, expediting and streamlining the drug discovery process. Informatics encompasses the utilization of computer algorithms and data analytics to cost-effectively and efficiently design, develop, and test new drugs. This multidisciplinary field integrates chemistry, biology, pharmacology, statistics, and computer science, facilitating the generation of valuable insights from data generated in clinical laboratories for research purposes. With its wide-ranging software and hardware-based tools for sequencing, target data analysis, data visualization, docking, molecular modeling, and database protection, drug discovery informatics is extensively utilized in healthcare institutions, pharmaceutical and biotechnology organizations, and contract research organizations (CROs).

Key Market Drivers

Technological Advancements in Data Mining and Analytics

Data mining and analytics enable the application of predictive modeling and machine learning algorithms. These technologies can identify potential drug candidates, predict their efficacy, and prioritize compounds for further testing, accelerating the drug discovery process. Data mining techniques can uncover hidden patterns and

relationships in biological data, helping researchers identify potential drug targets. By integrating genomics, proteomics, and other omics data, informatics tools can pinpoint key molecules involved in diseases. Virtual screening of chemical compounds is a critical aspect of drug discovery. Advanced analytics can rapidly assess the potential of thousands of compounds, narrowing down the selection for experimental testing. This saves time and resources. Data mining and analytics can optimize clinical trial design and patient recruitment. By analyzing patient data, researchers can identify suitable candidates and predict patient responses to specific treatments, reducing trial costs and timelines. Analytics can monitor clinical trial data for adverse events and safety concerns. Early detection of potential issues allows for timely intervention, ensuring patient safety and regulatory compliance.

Increasing RD on Drug Discovery

Drug discovery RD generates vast amounts of complex data, including genomic, proteomic, chemical, and clinical information. DDI systems are essential for managing, analyzing, and deriving insights from these massive datasets, making them invaluable for researchers. Advancements in high-throughput screening techniques have accelerated the generation of experimental data on potential drug candidates. DDI tools help researchers efficiently process and interpret this data, expediting the drug discovery process. Modern drug discovery often involves the integration of multi-omics data (genomics, proteomics, metabolomics, etc.) to identify drug targets and understand disease mechanisms. DDI platforms offer the capability to integrate and analyze diverse omics datasets. RD efforts increasingly rely on predictive modeling and machine learning algorithms to identify potential drug candidates, predict their efficacy, and optimize compound properties. DDI systems provide the computational infrastructure necessary for these advanced analyses. In silico virtual screening of chemical compounds is a cost-effective approach to identify potential drug candidates. DDI tools facilitate virtual screening by simulating compound interactions with target proteins and predicting binding affinities.

Increasing Research Spending

The pharmaceutical and biotechnology industries generate vast amounts of data in their research activities. This includes genomics, proteomics, chemical compound libraries, clinical trial data, and more. Increased research spending allows organizations to generate even more data, necessitating advanced informatics solutions to manage and analyze this information effectively. Higher research spending enables the adoption of advanced analytical techniques and technologies. Pharmaceutical and biotechnology

companies can invest in state-of-the-art informatics tools that provide more sophisticated data mining, machine learning, and predictive analytics capabilities.

The growing research investment in informatics by the pharmaceutical and biotechnology sectors is among the key factors driving the expansion and demand for the drug discovery informatics market. Additionally, the increasing support for rare disease and orphan drug research, coupled with the focus on informatics software for drug discovery, further contribute to the market's growth during the forecast period from 2024 to 2029. Moreover, the introduction of innovative Insilco tools by certain organizations, along with the rise in chronic illnesses such as cardiovascular diseases, oncology, diabetes mellitus, and other infectious diseases, bolster the market's development. Furthermore, the advancements in software versions for data processing, aggregation, analysis, and visualization play a significant role in fueling the growth of the drug discovery informatics market. The increased utilization of cloud-based services ensures a promising industry growth trajectory in the forecast period. The expanding biotechnology industry, biologics market, and the presence of leading pharmaceutical and biotechnology companies, coupled with patent expiry, offer substantial growth opportunities for the market during the forecast period from 2024 to 2029.

Increasing Number of Clinical Trials

The rising number of clinical trials generates a substantial volume of data, including patient records, medical images, laboratory results, and electronic health records. Informatics platforms are essential for efficiently managing, integrating, and analyzing these complex datasets. Clinical trials increasingly focus on patient stratification to identify subpopulations that respond differently to treatments. DDI systems help researchers analyze diverse patient data to identify relevant biomarkers and tailor therapies to specific patient groups. Incorporating real-world data from clinical trials into drug discovery processes is becoming more common. Informatics tools facilitate the integration of this diverse data, allowing researchers to validate findings in real-world patient populations. Informatics solutions aid in patient recruitment by identifying eligible participants based on trial criteria and real-world patient data. This streamlines the recruitment process and reduces trial delays. Drug safety is a critical aspect of clinical trials. DDI systems assist in monitoring adverse events and safety signals in real-time, ensuring patient safety and regulatory compliance. Beyond trial completion, informatics tools are crucial for analyzing post-trial data, including long-term follow-up data and real-world evidence generated by patients who have participated in trials.

Key Market Challenges

High Pricing and Setup Cost of Informatics Software

Pharmaceutical and biotechnology companies, especially smaller ones and startups may have limited budgets for software procurement and implementation. High pricing can be prohibitive, making it difficult for these organizations to invest in DDI solutions. Significant upfront setup costs and software licensing fees divert resources from other critical aspects of drug discovery research and development. Organizations may be hesitant to allocate a substantial portion of their budgets to informatics software. The cost of DDI software may outweigh its perceived benefits for some organizations, especially if they are unsure about the software's ability to accelerate drug discovery or improve research outcomes. In addition to initial setup costs, organizations must consider ongoing maintenance, support, and licensing fees. The total cost of ownership over time can be a significant burden. Smaller pharmaceutical and biotechnology companies, which may have limited financial resources, can be particularly sensitive to high pricing and setup costs. This may result in delayed or limited adoption of DDI among SMEs.

Lack of Skilled Professionals

Implementing drug discovery informatics software often requires a specialized skill set to set up, configure, and integrate with existing systems. The scarcity of skilled professionals can lead to delays and difficulties in the software's deployment. Tailoring DDI software to an organization's specific research needs and workflows often requires expertise in informatics and bioinformatics. Without skilled professionals, organizations may struggle to customize the software for maximum efficiency. Effective data management is crucial in drug discovery, and DDI professionals are essential for ensuring data quality, integration, and security. The lack of such experts can result in data-related challenges and errors. DDI software often has powerful capabilities for data analysis, predictive modeling, and virtual screening. Skilled professionals are needed to leverage these features to their fullest potential, optimizing research outcomes.

Key Market Trends

Growing Need for Orphan Drug Research

Orphan drug research often involves studying rare diseases with complex genetic and molecular underpinnings. DDI solutions are essential for managing and analyzing the diverse and intricate datasets associated with these diseases, which can include

genetic data, patient records, and clinical trial results. Integrating data from various sources, including patient registries, omics data, and clinical trials, is critical in orphan drug research. DDI platforms provide the capability to integrate and harmonize these disparate data sources, facilitating comprehensive analysis. Orphan drug research often requires a patient-centric approach due to the limited number of affected individuals. DDI enables the analysis of patient-specific data, supporting the development of personalized therapies for rare diseases. DDI solutions can aid in the identification of existing drugs that may be repurposed for orphan diseases. By analyzing large datasets, researchers can uncover potential candidates among approved medications, expediting treatment development.

Increasing Development of Diverse Set of Tools

The development of tools for genomics, transcriptomics, proteomics, and metabolomics requires integration for a systems biology approach. DDI systems enable the integration and analysis of multi-omics data, supporting comprehensive research. High-content screening tools generate large volumes of image-based data. DDI solutions are crucial for managing and analyzing these data sets efficiently, allowing researchers to extract meaningful insights.

Various modeling and simulation tools are used to predict compound properties, drug interactions, and toxicity. DDI facilitates the integration of modeling results into the drug discovery pipeline. AI and ML tools are increasingly used for drug discovery, from target identification to drug design. DDI platforms provide the computational infrastructure for implementing and managing these algorithms. The increasing diversity of tools in drug discovery reflects the evolving nature of the field and the adoption of advanced technologies. DDI plays a central role in harnessing the potential of these tools by providing data management, integration, analysis, and visualization capabilities. As the drug discovery process becomes more complex and data-driven, the demand for informatics solutions is expected to rise to ensure efficient research, data-driven decision-making, and successful drug development.

Segmental Insights

Workflow Insights

Based to the workflow, the market is divided into two segments: drug discovery and drug development. In 2023, the dominance of discovery informatics was observed due to the significant focus on the development of precision medicines. Precision medicine

involves delivering personalized medical care based on the genetic and molecular profiles of patients. Companies such as PerkinElmer, Inc. provide discovery informatics solutions, utilizing analytics to expedite the drug discovery process in a swift manner.

Services Insights

Based on the services, the market is segmented into sequence analysis platforms, molecular modelling, docking, clinical trial data management, and others. In 2023, the sequence analysis platforms emerged as the industry leader. Throughout the forecast period, this segment is expected to maintain its leading position while demonstrating the highest compound annual growth rate (CAGR). Bioinformatics solutions are extensively utilized for the creation of primary and secondary databases of nucleic acid, protein, and other biomolecular sequences. Informatics software is employed in the mining and warehousing of genome sequencing data to identify genes and target proteins that will facilitate the development of potential medications. Additionally, the growth of this segment is fueled by the utilization of various databases and sequence analysis tools, such as CLUSTALW, BLAST, and FASTA, in basic drug discovery research.

Regional Insights

North America accounted for the largest share of the global drug discovery informatics market in 2023. The local growth of the market can be attributed to several factors, including the presence of prominent companies, rapid adoption of innovative and advanced RD tools, and a higher prevalence of infectious diseases. Moreover, local companies are focusing on research collaborations and joint ventures, which is expected to further drive market expansion in the near future. For instance, Atomwise Inc. recently announced a growing portfolio of collaborative projects with companies such as A2i Therapeutics and OrganAi, encompassing areas like neuroscience, oncology, clotting disorders, infectious diseases, and immunology.

Key Market Players

Dassault Systemes SE

IBM Corporation

Infosys Ltd.

Schrödinger Inc.

Jubilant Life Sciences NV

Aragen Lifescience Ltd.

Charles River Laboratories Inc.

Thermo Fisher Scientific Inc.

Clarivate Analytics LLC

PerkinElmer Inc.

Report Scope:

In this report, the Global Drug Discovery Informatics Market has been segmented into the following categories, in addition to the industry trends which have also been detailed below:

Drug Discovery Informatics Market,By Mode:

- oIn-house

- oOutsourced

Drug Discovery Informatics Market,By Workflow:

- oDiscovery

- oDevelopment

Drug Discovery Informatics Market,By Services:

- oSequence Analysis Platforms

- oMolecular Modelling

- oDocking

oClinical Trial Data Management

oOthers

Drug Discovery Informatics Market,By End User:

oPharmaceutical and Biotechnology Companies

oContract Research Organizations (CROS)

oOthers

Drug Discovery Informatics Market, By Region:

oNorth America

United States

Canada

Mexico

oEurope

France

United Kingdom

Italy

Germany

Spain

oAsia-Pacific

China

India

Japan

Australia

South Korea

oSouth America

Brazil

Argentina

Colombia

oMiddle East Africa

South Africa

Saudi Arabia

UAE

Competitive Landscape

Company Profiles: Detailed analysis of the major companies present in the Global Drug Discovery Informatics Market.

Available Customizations:

Global Drug Discovery Informatics market report with the given market data, Tech Sci Research offers customizations according to a company's specific needs. The following customization options are available for the report:

Company Information

Detailed analysis and profiling of additional market players (up to five).

Contents

1.PRODUCT OVERVIEW

- 1.1.Market Definition
- 1.2.Scope of the Market
 - 1.2.1.Markets Covered
 - 1.2.2.Years Considered for Study
 - 1.2.3.Key Market Segmentations

2.RESEARCH METHODOLOGY

- 2.1.Objective of the Study
- 2.2.Baseline Methodology
- 2.3.Key Industry Partners
- 2.4.Major Association and Secondary Sources
- 2.5.Forecasting Methodology
- 2.6.Data Triangulation Validations
- 2.7.Assumptions and Limitations

3.EXECUTIVE SUMMARY

- 3.1.Overview of the Market
- 3.2.Overview of Key Market Segmentations
- 3.3.Overview of Key Market Players
- 3.4.Overview of Key Regions/Countries
- 3.5.Overview of Market Drivers, Challenges, Trends

4.VOICE OF CUSTOMER

5.GLOBAL DRUG DISCOVERY INFORMATICS MARKET OUTLOOK

- 5.1.Market Size Forecast
 - 5.1.1.By Value
- 5.2.Market Share Forecast
 - 5.2.1.By Mode (In-house, Outsourced)
 - 5.2.2.By Workflow (Discovery, Development)
 - 5.2.3.By Services (Sequence Analysis Platforms, Molecular Modelling, Docking, Clinical Trial Data Management, Others)

5.2.4.By End User (Pharmaceutical and Biotechnology Companies, Contract Research Organizations (CROS), Others)

5.2.5.By Region

5.2.6.By Company (2023)

5.3.Market Map

6.NORTH AMERICA DRUG DISCOVERY INFORMATICS MARKET OUTLOOK

6.1.Market Size Forecast

6.1.1.By Value

6.2.Market Share Forecast

6.2.1.By Mode

6.2.2.By Workflow

6.2.3.By Services

6.2.4.By End User

6.2.5.By Country

6.3.North America: Country Analysis

6.3.1.United States Drug Discovery Informatics Market Outlook

6.3.1.1.Market Size Forecast

6.3.1.1.1.By Value

6.3.1.2.Market Share Forecast

6.3.1.2.1.By Mode

6.3.1.2.2.By Workflow

6.3.1.2.3.By Services

6.3.1.2.4.By End User

6.3.2.Canada Drug Discovery Informatics Market Outlook

6.3.2.1.Market Size Forecast

6.3.2.1.1.By Value

6.3.2.2.Market Share Forecast

6.3.2.2.1.By Mode

6.3.2.2.2.By Workflow

6.3.2.2.3.By Services

6.3.2.2.4.By End User

6.3.3.Mexico Drug Discovery Informatics Market Outlook

6.3.3.1.Market Size Forecast

6.3.3.1.1.By Value

6.3.3.2.Market Share Forecast

6.3.3.2.1.By Mode

6.3.3.2.2.By Workflow

6.3.3.2.3.By Services

6.3.3.2.4.By End User

7.EUROPE DRUG DISCOVERY INFORMATICS MARKET OUTLOOK

7.1.Market Size Forecast

7.1.1.By Value

7.2.Market Share Forecast

7.2.1.By Mode

7.2.2.By Workflow

7.2.3.By Services

7.2.4.By End User

7.2.5.By Country

7.3.Europe: Country Analysis

7.3.1.Germany Drug Discovery Informatics Market Outlook

7.3.1.1.Market Size Forecast

7.3.1.1.1.By Value

7.3.1.2.Market Share Forecast

7.3.1.2.1.By Mode

7.3.1.2.2.By Workflow

7.3.1.2.3.By Services

7.3.1.2.4.By End User

7.3.2.United Kingdom Drug Discovery Informatics Market Outlook

7.3.2.1.Market Size Forecast

7.3.2.1.1.By Value

7.3.2.2.Market Share Forecast

7.3.2.2.1.By Mode

7.3.2.2.2.By Workflow

7.3.2.2.3.By Services

7.3.2.2.4.By End User

7.3.3.Italy Drug Discovery Informatics Market Outlook

7.3.3.1.Market Size Forecast

7.3.3.1.1.By Value

7.3.3.2.Market Share Forecasty

7.3.3.2.1.By Mode

7.3.3.2.2.By Workflow

7.3.3.2.3.By Services

7.3.3.2.4.By End User

7.3.4.France Drug Discovery Informatics Market Outlook

7.3.4.1.Market Size Forecast

7.3.4.1.1.By Value

7.3.4.2.Market Share Forecast

7.3.4.2.1.By Mode

7.3.4.2.2.By Workflow

7.3.4.2.3.By Services

7.3.4.2.4.By End User

7.3.5.Spain Drug Discovery Informatics Market Outlook

7.3.5.1.Market Size Forecast

7.3.5.1.1.By Value

7.3.5.2.Market Share Forecast

7.3.5.2.1.By Mode

7.3.5.2.2.By Workflow

7.3.5.2.3.By Services

7.3.5.2.4.By End User

8.ASIA-PACIFIC DRUG DISCOVERY INFORMATICS MARKET OUTLOOK

8.1.Market Size Forecast

8.1.1.By Value

8.2.Market Share Forecast

8.2.1.By Mode

8.2.2.By Workflow

8.2.3.By Services

8.2.4.By End User

8.2.5.By Country

8.3.Asia-Pacific: Country Analysis

8.3.1.China Drug Discovery Informatics Market Outlook

8.3.1.1.Market Size Forecast

8.3.1.1.1.By Value

8.3.1.2.Market Share Forecast

8.3.1.2.1.By Mode

8.3.1.2.2.By Workflow

8.3.1.2.3.By Services

8.3.1.2.4.By End User

8.3.2.India Drug Discovery Informatics Market Outlook

8.3.2.1.Market Size Forecast

8.3.2.1.1.By Value

8.3.2.2.Market Share Forecast

- 8.3.2.2.1.By Mode
- 8.3.2.2.2.By Workflow
- 8.3.2.2.3.By Services
- 8.3.2.2.4.By End User
- 8.3.3.Japan Drug Discovery Informatics Market Outlook
 - 8.3.3.1.Market Size Forecast
 - 8.3.3.1.1.By Value
 - 8.3.3.2.Market Share Forecast
 - 8.3.3.2.1.By Mode
 - 8.3.3.2.2.By Workflow
 - 8.3.3.2.3.By Services
 - 8.3.3.2.4.By End User
- 8.3.4.South Korea Drug Discovery Informatics Market Outlook
 - 8.3.4.1.Market Size Forecast
 - 8.3.4.1.1.By Value
 - 8.3.4.2.Market Share Forecast
 - 8.3.4.2.1.By Mode
 - 8.3.4.2.2.By Workflow
 - 8.3.4.2.3.By Services
 - 8.3.4.2.4.By End User
- 8.3.5.Australia Drug Discovery Informatics Market Outlook
 - 8.3.5.1.Market Size Forecast
 - 8.3.5.1.1.By Value
 - 8.3.5.2.Market Share Forecast
 - 8.3.5.2.1.By Mode
 - 8.3.5.2.2.By Workflow
 - 8.3.5.2.3.By Services
 - 8.3.5.2.4.By End User

9.SOUTH AMERICA DRUG DISCOVERY INFORMATICS MARKET OUTLOOK

- 9.1.Market Size Forecast
 - 9.1.1.By Value
- 9.2.Market Share Forecast
 - 9.2.1.By Mode
 - 9.2.2.By Workflow
 - 9.2.3.By Services
 - 9.2.4.By End User
 - 9.2.5.By Country

9.3.South America: Country Analysis

9.3.1.Brazil Drug Discovery Informatics Market Outlook

9.3.1.1.Market Size Forecast

9.3.1.1.1.By Value

9.3.1.2.Market Share Forecast

9.3.1.2.1.By Mode

9.3.1.2.2.By Workflow

9.3.1.2.3.By Services

9.3.1.2.4.By End User

9.3.2.Argentina Drug Discovery Informatics Market Outlook

9.3.2.1.Market Size Forecast

9.3.2.1.1.By Value

9.3.2.2.Market Share Forecast

9.3.2.2.1.By Mode

9.3.2.2.2.By Workflow

9.3.2.2.3.By Services

9.3.2.2.4.By End User

9.3.3.Colombia Drug Discovery Informatics Market Outlook

9.3.3.1.Market Size Forecast

9.3.3.1.1.By Value

9.3.3.2.Market Share Forecast

9.3.3.2.1.By Mode

9.3.3.2.2.By Workflow

9.3.3.2.3.By Services

9.3.3.2.4.By End User

10.MIDDLE EAST AND AFRICA DRUG DISCOVERY INFORMATICS MARKET OUTLOOK

10.1.Market Size Forecast

10.1.1.By Value

10.2.Market Share Forecast

10.2.1.By Mode

10.2.2.By Workflow

10.2.3.By Services

10.2.4.By End User

10.2.5.By Country

10.3.MEA: Country Analysis

10.3.1.South Africa Drug Discovery Informatics Market Outlook

- 10.3.1.1.Market Size Forecast
 - 10.3.1.1.1.By Value
- 10.3.1.2.Market Share Forecast
 - 10.3.1.2.1.By Mode
 - 10.3.1.2.2.By Workflow
 - 10.3.1.2.3.By Services
 - 10.3.1.2.4.By End User
- 10.3.2.Saudi Arabia Drug Discovery Informatics Market Outlook
 - 10.3.2.1.Market Size Forecast
 - 10.3.2.1.1.By Value
 - 10.3.2.2.Market Share Forecast
 - 10.3.2.2.1.By Mode
 - 10.3.2.2.2.By Workflow
 - 10.3.2.2.3.By Services
 - 10.3.2.2.4.By End User
- 10.3.3.UAE Drug Discovery Informatics Market Outlook
 - 10.3.3.1.Market Size Forecast
 - 10.3.3.1.1.By Value
 - 10.3.3.2.Market Share Forecast
 - 10.3.3.2.1.By Mode
 - 10.3.3.2.2.By Workflow
 - 10.3.3.2.3.By Services
 - 10.3.3.2.4.By End User

11.MARKET DYNAMICS

- 11.1.Drivers
- 11.2.Challenges

12.MARKET TRENDS DEVELOPMENTS

- 12.1.Recent Development
- 12.2.Mergers Acquisitions
- 12.3.Product Launches

13.GLOBAL DRUG DISCOVERY INFORMATICS MARKET: SWOT ANALYSIS

14.PORTER'S FIVE FORCES ANALYSIS

- 14.1.Competition in the Industry
- 14.2.Potential of New Entrants
- 14.3.Power of Suppliers
- 14.4.Power of Customers
- 14.5.Threat of Substitute Products

15.COMPETITIVE LANDSCAPE

- 15.1.Dassault Systemes SE
 - 15.1.1.Business Overview
 - 15.1.2.Company Snapshot
 - 15.1.3.Products Services
 - 15.1.4.Financials (As Reported)
 - 15.1.5.Recent Developments
 - 15.1.6.Key Personnel Details
 - 15.1.7.SWOT Analysis
- 15.2.IBM Corporation
- 15.3.Infosys Ltd.
- 15.4.Schrödinger Inc.
- 15.5.Jubilant Life Sciences NV
- 15.6.Aragen Lifescience Ltd.
- 15.7.Charles River Laboratories Inc.
- 15.8.Thermo Fisher Scientific, Inc.
- 15.9.Clarivate Analytics LLC
- 15.10.PerkinElmer Inc.

16.STRATEGIC RECOMMENDATIONS

17.ABOUT US DISCLAIMER

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