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# Accelerating the Value of Data in Life Sciences

## A Guide to Becoming a Truly Data-driven Organization



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# Executive Summary

Accelerated digital transformation is driving up data volumes exponentially for every industry, and life sciences is no exception. In fact, the pandemic has demonstrated that data is a vital asset for the industry to respond to market changes. Data-led initiatives helped reduce trial timelines and scale up manufacturing for vaccines. Today, data-driven decision-making has become the new operating model in the life sciences industry, so much so that the industry is considering data-driven decision-making as the backbone of its growth strategy to accelerate drug discovery, improve patient engagement, and optimize cost structures.

However, as life sciences enterprises try to leverage data and analytics, challenges in the form of legacy systems, disparate data sources, and regulatory complications pose a hindrance to them. The first step in becoming a truly data-driven organization is to identify these challenges. Prioritizing use cases based on business objectives and corporate goals should be the next step. Enterprises should focus on their quick wins and follow them up by building resilience and operational efficiency, finally leveraging the benefits achieved for transformative and longer-term use cases.

Data and analytics investments are not a one-time affair; rather, they are continual, driven by the top leadership and targeted at business growth. Hence, they demand effective collaboration between life sciences leaders, functional heads, data scientists, and even sales representatives. Once an enterprise defines its vision and consolidates the entire ecosystem – processes, people, and technology – it can drive data and analytics initiatives in a scalable and accelerated manner.

The industry is rushing to realign with these new realities and transformation expectations. As life sciences organizations come to terms with this new reality, it is incumbent to truly think about the value that can be unlocked by data. This study explains how life sciences firms can get started and then build momentum to maximize the outcomes from their data and analytics initiatives.

# The current state of data and analytics in life sciences

The life sciences industry is inundated with data from diverse sources, and every value chain element uses multiple data types, as highlighted in Exhibit 1. Enterprises are looking at ways to generate insights and unlock value from this data deluge. During the pandemic, data and analytics played a pivotal role in ensuring the industry's global response to COVID-19 and has highlighted that it needs to continue to maintain as well as accelerate this momentum. In fact, data and analytics is now viewed as a critical competency to accelerate drug discovery, enhance time-to-value, and improve patient experience.

**EXHIBIT 1**

Data types used across the life sciences value chain

*NOT EXHAUSTIVE*

Source: Everest Group (2022)

| Drug/product discovery | Clinical trials | Manufacturing | Supply chain | Sales and marketing |
|---|---|---|---|---|
| Patient data | Trial protocols and setup data | Device and equipment data | Vendor data | Sales force data |
| Past trials' data | Sensor, mobile, and web data | Demand planning and forecasting data | Logistics data | Healthcare Professionals' (HCPs') data |
| Laboratory data | Demographic data | Workforce data | Order management data | Promotional and educational content |
| Genomic data | Past trials' data | Logistics data | Warehouse data | Pricing data |
| Proteomics data | Regulatory and safety data | Financial data | Financial data | Competitive intelligence |

To adapt to mobility restrictions in the last couple of years, the industry embraced decentralized clinical trials or increased its reliance on digital channels for engagement. These avenues generate significant data volumes from many disparate sources. Investments in data and analytics initiatives will help enterprises to maximize their leverage of these sources and assist in carrying out advanced research for drug development, reducing clinical trial timelines, developing preventive treatments, and building a robust workforce. All of these will, consequently, enhance internal capabilities and accelerate revenue growth and profitability.

## Challenges with data and analytics

Data and analytics initiatives are no longer regarded as siloed efforts to generate and measure a few KPIs; they have become the backbone of growth strategies for life sciences organizations. However, organizations are yet to realize the full benefits of data and analytics due to the lack of high-quality data and data interoperability, data and analytics adoption in pockets, and inefficient data management practices. The exhibit below groups data and analytics challenges in the life sciences industry under five categories.

**EXHIBIT 2**

Data challenges in the life sciences industry

Source: Everest Group (2022)


- **High heterogeneity:** Operations and activities across the life sciences value chain generate enormous amounts of data in a wide variety of formats (text, audio, video, and images, among others). The incoming data is inconsistent, present in silos, and comes from unreliable sources. In fact, data scientists spend about 39% of their time cleansing and preparing the data before it can be used for analytical purposes[1]
- **Low interoperability:** Data diversity is crucial to successfully implement data and analytics initiatives. Disparate entities, legacy systems, and a poor IT landscape makes it difficult to develop and implement interoperability standards, such as Health Level Seven Fast Healthcare Interoperability Resources (HL7 FHIR) in the healthcare industry. The lack of data interoperability hinders effective collaboration with patients and Healthcare Professionals (HCPs), reduces transparency across the supply chain, and hampers regulatory compliance

> Pharma is struggling to manage data volumes for trials. Over the next few years, as the speed of data ingestion increases, the industry will expect data outputs to be cleaned at a faster pace.
>
> – Mayank Anand, VP and Global Head, Data Strategy, GlaxoSmithKline, January 2022

1 State of Data Sciences, Anaconda (2021)

- **Poor performance:** Enhancing drug discovery or reducing the time to market requires quick and actionable data insights. However, data silos and slow legacy systems deliver fragmented insights that require manual interventions. Additionally, enterprises often have sizable amounts of dark data as a result of daily business operations that are never exploited due to outdated and complex data architectures, limiting data quality and performance
- **Threats on privacy and security:** The exponential rate at which data is being generated in the life sciences industry increases the importance of maintaining data security and privacy. The industry faces threats of cyberattacks, malware attacks, and hostile intelligence gathering. In fact, cyberthreats to sensitive medical information are moving to the top of the list of business risks for life sciences enterprises
- **Complicated regulatory guidelines:** Life sciences enterprises need to comply with numerous industry-specific regulations with respect to data collection, storage, sharing, and usage, in addition to the standard compliances. At times, they also need to comply with region-specific versions of these regulations. From Health Insurance Portability and Accountability Act (HIPAA) and General Data Protection Regulation (GDPR) to variations such as California Consumer Privacy Act (CCPA), the compliances can drive up compliance costs as well as complexity

Enterprises need to fight through the noise of legacy architecture and inefficient systems and drive the next generation of transformation by unlocking value from the vast data pools.

## The pandemic's impact on data and analytics initiatives

The COVID-19 pandemic has accelerated the implementation of agile, data-driven strategies to meet businesses' unprecedented demands. What might have taken years was achieved in a few months. The life sciences industry's top priority was vaccine development but launching a new vaccine that met rigorous testing standards and stringent regulations was not an easy task.

With trials halted, processes disrupted, a wide supply-demand gap, and the transition to remote working models, the industry realized that traditional data and analytics techniques would no longer work. This realization drove up the demand for advanced solutions, which played a significant role in steering life sciences enterprises through the global crisis. Data and analytics accelerated clinical trials and helped create rapid and large-scale production processes.

> We managed disruptions to our development programs – our early investments in data science and technology helped to keep the majority of our clinical trials on track.
>
> – Vas Narasimhan, CEO, Novartis, 2020

While the pandemic had threatened lives and business operations, it also showcased that businesses could transform themselves virtually overnight with the help of a few valuable allies: data science, analytics, and advanced computing algorithms.

With the demand for data and analytics solutions surging, the life sciences industry is experiencing trends such as those highlighted in Exhibit 3. The industry is moving from simple descriptive models, which were used to analyze current trends, to highly sophisticated predictive and prescriptive models to define the future growth strategy. The pandemic might have forced the industry to speed up advanced data and analytics solutions, but now this has reset expectations on data-led transformation.

The industry is shifting from a reactive approach to increased focus on Real-World Data (RWD). The business landscape is looking at strategies to unify data silos, develop federated operating models, adopt a cloud-first approach, and accelerate the application of Artificial Intelligence (AI) and Machine Learning (ML) models.

**EXHIBIT 3**

Historical and emerging data and analytics trends

Source: Everest Group (2022)

| Pre-pandemic trends | Parameters | New and emerging trends |
|---|---|---|
| Reactive approach | Approach to data & analytics initiatives | Proactive approach |
| Simple descriptive models | Data & analytics models | Sophisticated predictive and prescriptive models |
| Siloed data sources | Data sources | Enterprise data platforms |
| Centralized structures | Operating models | Federated learning models |
| On-premise and hybrid models | SaaS models | Cloud-first approach and optimized SaaS models |
| Widely present in literature but limited application | Application of AI/ML | Widespread adoption with focus on high-impact use cases |

## Harnessing data's power in life sciences

To address the pandemic's accompanying challenges, the industry realized that it could no longer treat data and analytics initiatives as a good-to-have but that they had to be incorporated as a core business function. In fact, these initiatives can transform the industry only if enterprises harness and translate data into actionable business insights.

The first step to becoming a truly data-driven organization is to identify use cases across the value chain, as depicted in Exhibit 4, to help life sciences leaders identify focus areas and prioritize use cases based on business goals and vision.

**EXHIBIT 4**

Data and analytics use cases across the life sciences value chain

Source: Everest Group (2022)


## Use cases in drug discovery

- **Predicting drug-target affinity:** Drug-target affinity is a crucial step in drug discovery, helping researchers screen compounds at an early stage. Majority of the present computational methods predict drug-target affinity using binary classification,[2] which determines if a drug-target pair interacts or not. If the binding affinity is not strong, the drug might not be useful. Advanced ML models can predict the interaction's strength, thereby reducing time and resource consumption and accelerating the drug development process
- **Drug repurposing and repositioning:** Drug repurposing and repositioning is an expedited method for drug development. Data mining approaches and ML platforms can enable accelerated and accurate drug repurposing forecast analysis. Incorporating the latest analytics models for drug reprofiling will accelerate the process and reduce chances of failure
- **Social media mining:** Patients tend to describe their drug/treatment experiences on different social media platforms. Organizations should carry out a careful analysis of this data for patient-centric drug development. Data and analytics models house powerful algorithms that can be used to study drug behavior on patients, define successful patient treatments, and identify symptoms in disease populations in an automated, time-efficient, and cost-effective manner

2 Prediction of drug-target binding affinity using similarity-based convolutional neural network, Jooyong Shim, Zhen-Yu Hong, Insuk Sohn & Changha Hwan, February 2021

## Use cases in clinical trials

- **Patient recruitment and retention:** Patient recruitment and retention has been a challenge for sponsors for decades. By leveraging advanced data and analytics models, sponsors can understand patient preferences and choices, resulting in social media campaigns for targeted recruitment, patient-centric trial protocol, and improved patient engagement strategies. RWD and analytics models can accelerate patient recruitment and increase retention, allowing sponsors to complete trials within desired timeframes
- **Remote patient care:** Wearables and sensors enable remote patient data collection, track patients' health status, and provide HCPs with a live RWD stream. Remote monitoring systems with an analytics engine can deploy ML algorithms to ascertain medication adherence, assess the risk factors for adverse events, and make room for timely and effective intervention
- **Protocol design:** RWD and advanced analytics can enable enterprises to optimize protocol design and identify unclear synopses, thereby reducing the risk of amendments and unnecessary delays. Moreover, analytics models help sponsors simplify trial protocols by removing non-core procedures and benchmark the design and strategy against industry best practices to maximize value
- **Signal management:** Signal management in pharmacovigilance is used to identify new risks and safety information associated with a particular drug. Data for signal management can come from multiple sources such as spontaneous reporting, interventional studies, systematic reviews, and non-clinical studies. With data and analytics integrated with unified data sources, analysts can automate signal detection and identify trends and patterns during signal evaluation
- **Case and complaint processing:** A surge in case volumes and the costs associated with them is forcing sponsors to look for solutions to drive costs out of case processing. Data and analytics models can be used to drive targeted human reviews and improve resource allocation and compliance management for case processing. Powerful predictive models can accelerate accurate processing of structured and unstructured cases and automatically determine case validity
- **Next-generation Sequencing (NGS):** NGS is the new buzzword in DNA sequencing applications. These applications have large datasets that are used to discover and develop new therapeutics. The industry is exploring deep learning algorithms to extract knowledge from the large amount of genomic and molecular datasets. Advanced analytics can help researchers identify novel drug targets and manage large data throughputs with short reads and reduced costs

## Use cases in manufacturing

- **Predictive asset maintenance:** Data and analytics initiatives can take asset maintenance from preventive maintenance to predictive maintenance. Analytics models leverage historical data, understand failure patterns, and predict asset anomalies well in advance, which helps plan an effective maintenance schedule with minimum downtime and increased product throughput
- **Workflow leveling:** Life sciences enterprises can adopt optimal production changeover sequencing for the efficient management of raw materials, human capital, and machine output. The predictive algorithms run on past production data, present inventory levels, available resources, and changeover timings. This optimization reduces changeover durations, helps prioritize orders, and cuts down wasteful practices

- **Manufacturing process control:** Data from the manufacturing process generates insights on yield rates. These insights notify manufacturing personnel of anomalies, facilitating prompt interventions to bring processes back to the steady state, in turn optimizing the production process and the order cycle time
- **Quality control and compliance:** Data and analytics can optimize and simplify compliance and quality control processes. The integration of business data with production and compliance data will allow predictive models to identify quality issues and predict new and emerging risks. It will highlight process changes that require due diligence, ultimately modernizing the production process to seamlessly integrate regulatory reporting and documentation

## Use cases in supply chain

- **Vendor management:** Data and analytics can reduce the costs and risks associated with new vendor selection and streamline the material sourcing process. Life sciences companies can evaluate vendors based on financial data, capabilities, and relevant organizational objectives. These initiatives bring in a fact-based approach to vendor management, enhancing the overall value proposition for an organization
- **Demand and supply planning:** Supply chain models have emerged in global networks demanding greater visibility, compliance, and serialization practices. Analytics tools and software facilitate the use of historical data and scenario simulation for accurate demand forecast and supply planning. Beyond forecasting and planning, data and analytics initiatives ensure end-to-end visibility for all supply chain stakeholders, alert organizations in case of a supply disruption, and help prepare contingency and risk-mitigation plans
- **Logistics optimization:** Demand volatility and increasing vendors and suppliers pave the way for optimizing logistics. Organizations can leverage data and analytics for route optimization, fleet sizing, and load planning, deriving significant savings. Additionally, analytics models can enhance product traceability across the supply chain, protecting patients against counterfeit products and uplifting the corporate image of life sciences brands

## Use cases in sales and marketing

- **Market analysis and Competitive Intelligence (CI):** Having information about the competition and a sound knowledge about its strategies and numbers helps life sciences companies stay ahead in the market. Analytics models and tools help organizations understand market trends, upcoming opportunities, competitors' focus areas, and SWOT, thereby enabling them to make the most of CI programs
- **HCP segmentation and targeting:** HCPs have become more digitally savvy than before, with many using digital channels for personal learning and development. Developing precise targeting strategies and curating personalized content require life sciences enterprises to extract insights from sizable data volumes from diverse sources. ML algorithms facilitate segmentation and precise targeting based on parameters such as market and patient potential, brand loyalty, and referral patterns
- **Channel and campaign RoI measurement:** Statistical modeling allows enterprises to compute and analyze the RoI for digital and non-digital channels based on predetermined KPIs or metrices. This helps generate insights at individual and aggregate levels, across regions and geographies. RoI measurement helps enhance channel management, better content creation, and improve engagement strategies

- **Sales force segmentation:** Alongside digital technologies, the on-field sales force plays a crucial role in life sciences sales. Enterprises can look to apply data and analytics models to identify patterns in past sales data and use that information to segment the sales force based on classic behavioral segments. Segmentation will enable sales managers to devise appropriate interventions based on individual behavior to boost effectiveness

The initiatives listed above are not exhaustive and each element in the value chain offers numerous avenues for organizations to extract value from data and analytics. Instead of focusing on all of these initiatives at the same time, life sciences enterprises should develop a framework that guides and helps prioritize use cases to accelerate value realization.

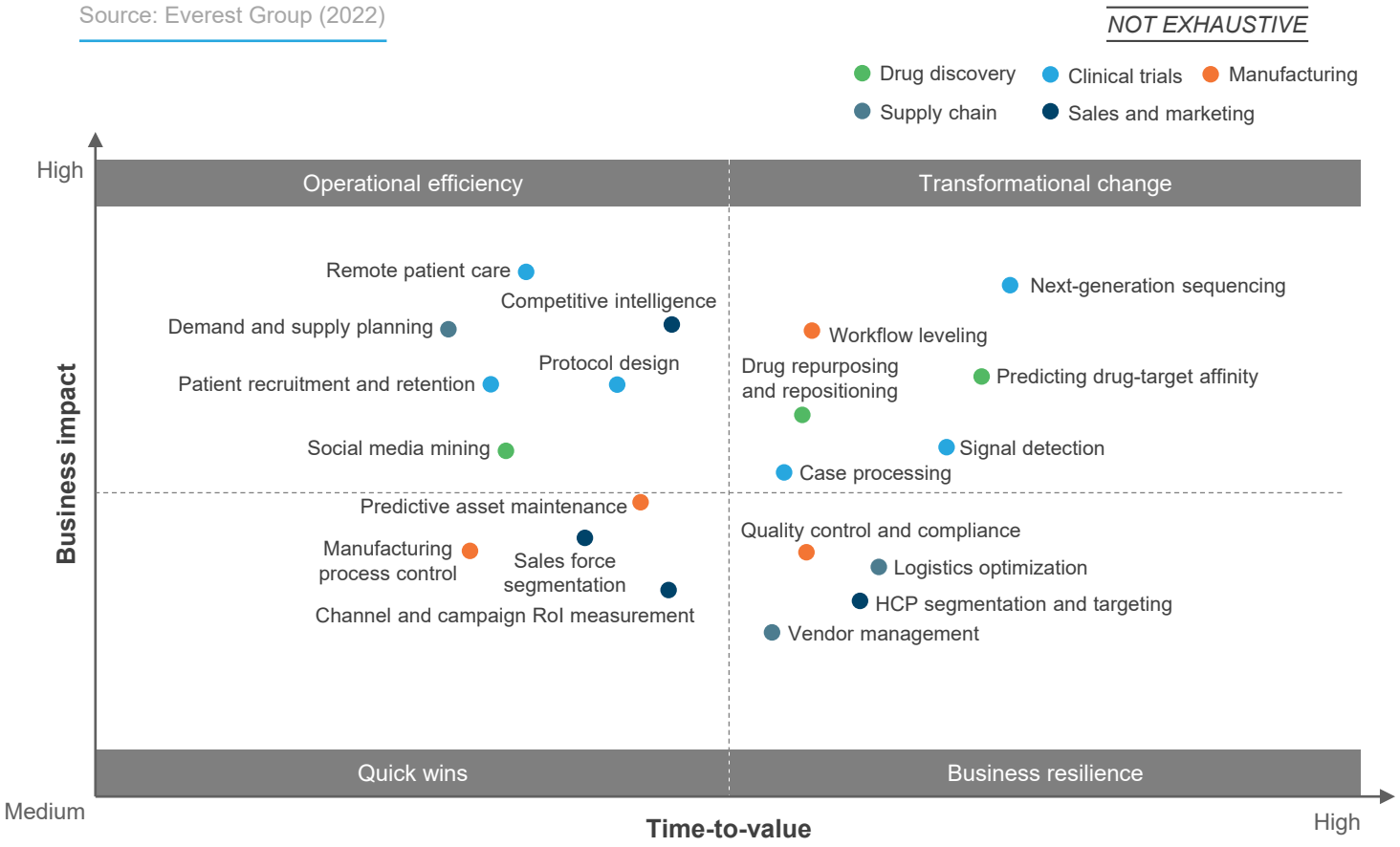
## Prioritizing use cases to drive successful transformation

The next step in the journey is to prioritize use cases to drive successful transformation. The framework depicted in Exhibit 5 maps 20 data and analytics use cases against time-to-value and business impact. Time-to-value is measured as the time taken to realize tangible benefits such as reduced trial timelines, improved demand forecasting and planning, understanding of patient and HCP preferences, increased transparency across supply chain, and next-best-action recommendation for commercial teams. Business impact is measured by the value unlocked through data and analytics interventions including patient/physician benefits and process standardization.

**EXHIBIT 5**

Mapping data and analytics use cases for successful prioritization

Source: Everest Group (2022)



Below we take a closer look at the use case groupings.

- **Quick wins:** Life sciences enterprises should select these areas on priority to reap benefits quickly. These use cases primarily focus on manufacturing and marketing value chain areas, generating measurable business profits within a short time span. Data and analytics will help improve asset management, optimize sourcing decisions, and enhance sales force management
- **Business resilience:** Every enterprise is trying to build business resilience in the wake of the pandemic. Although use cases in this quadrant will not generate disproportionate impact or organization-wide ripples, they are worthwhile investment opportunities to create robust business units and departments. Initiatives around HCP targeting, signal management, case processing, and quality control will enable enterprises to become more resilient and be prepared to deal with future uncertainties
- **Operational efficiency:** Creating patient-centric trials and treatments is the ultimate goal of every life sciences enterprise, and investing in initiatives on remote patient care, patient screening and recruitment, protocol design, and social media mining will give them an edge over the competition. These are low-hanging fruits, generating high business impact and improving operational performance within a short time span
- **Transformational change:** If organizations are looking to achieve a sustainable competitive advantage for the future, they should invest in bold initiatives and follow them through to success. These initiatives include use cases focused on accelerating drug development, ramping up research on genomics, and optimizing manufacturing resources

Innovations focused on clinical trials and drug discovery will be the key differentiators driving disruptions in the future, and data and analytics will play a pivotal role in shaping the industry's future. Hence, life sciences organizations should carefully prioritize use cases to understand how these initiatives can improve trials and operations, and then plan an incremental approach to adopt initiatives across the organization and ecosystem in a time-bound manner.

## Case study 1

### A pharmaceutical company drove customer insights leveraging analytics and ML for clinical trials and therapies

#### Challenge

A large pharmaceutical company wanted to improve the productivity of certain lines of business, including R&D, to accelerate new drug discovery and allow its scientists to explore complete datasets much faster and with increased efficiency. However, all of its data existed in non-scalable, inflexible, siloed systems, with non-existent real-time screening capabilities, resulting in poor analytics and ML models.

#### Solution and impact

The company adopted a unified data model for an R&D data convergence hub and a clinical trial research platform. All R&D data on this platform could deliver advanced analytics for new drug discovery and development (pre-clinical data, third-party medical records, and generic evidence data). It also offered real-time streaming from wearables and data engineering, data warehousing, and ML capabilities. The solution enabled a central data store for fast and comprehensive analytics and ML for the clinical trial research platform and data hub. This helped the company in driving customer insights to improve the drug pipeline, increase efficiencies, and reduce costs to manage clinical trials.

## Case study 2

### A global pharmaceutical company increased the speed and quality of its drug discovery pipeline

#### Challenge

A global pharmaceutical company wanted to accelerate safe medicine delivery to the market. To achieve its objective and maintain industry leadership, the company needed to rethink its data architecture and strategy. The key goal of its envisioned data platform was to enable strategic business value by unifying its distributed and siloed data sets, such as clinical, lab, and production data, across different legacy systems. The platform was also expected to provide self-service data access options to R&D departments and scientists, reduce costs involved with existing processes, and meet quality and compliance requirements.

#### Solution and impact

The company turned to a hybrid approach to deliver a holistic view of all data within R&D and provide researchers with a significant analytics advantage. The platform combined all data from across the organization. As a result, researchers could combine and analyze data, regardless of when, how, and where it was generated. With the new platform, researchers could use pharma analytics to gain insights that helped streamline every aspect of the R&D process. The company has been able to address horizontal scaling, improve memory utilization, and implement a common security interface. It previously took several months to identify the optimal mix of participants and assemble and analyze data across multiple clinical trials. Today, with the clinical trial data standardized and analytics-ready, the analysis can be done in minutes.

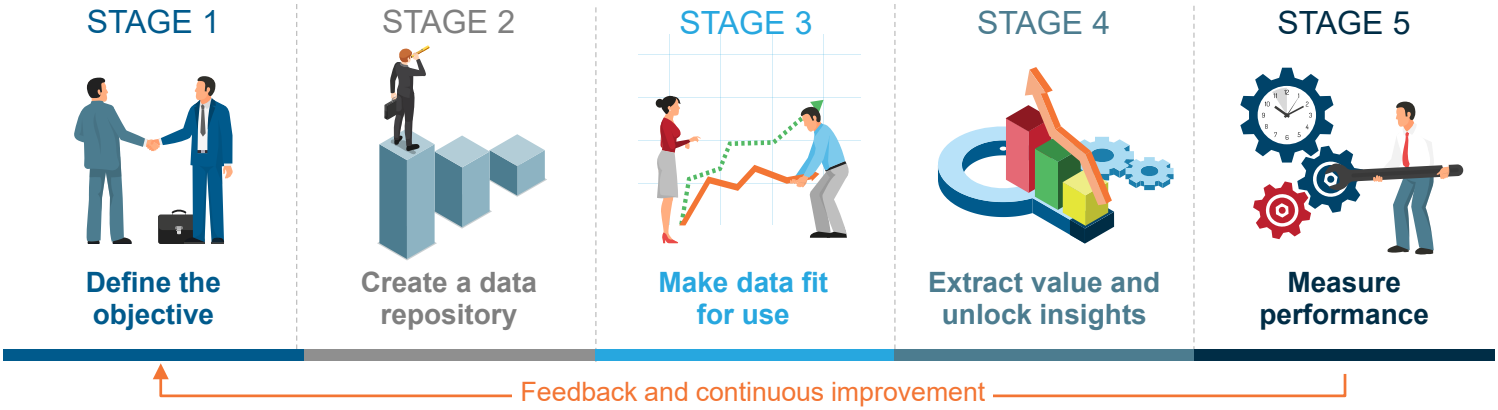
## Adopting a journey-based mindset to become truly data-driven

To capitalize on the incredible insights locked within data, life sciences companies need to adopt a journey-based mindset to become truly data-driven enterprises. The implementation of any data and analytics initiative follows a rigorous step-based process. Enterprises need to adopt a data-driven mindset and start with select use cases to build momentum. This quick wins will fuel further innovation and the learning curve will enable them to implement transformative use cases using powerful tools and models. The exhibit below lists the step-by-step approach to implement any data and analytics initiative.

**EXHIBIT 6**

A quick start guide to implementing data and analytics initiatives

Source: Everest Group (2022)



We take a closer look at each of these steps below.

- **Define the objective:** The first step is to define the problem statement or the business objective that an enterprise wants to achieve using data and analytics. This objective should be tied back to the use cases to help enterprises prioritize initiatives based on current capabilities, financial strength, and corporate goals. At this stage, there must be clarity on the present state of systems and the desired state, along with a clear definition of performance requirements
- **Create a data repository:** Once an enterprise has prioritized the use cases, it should gather data from all the diverse sources relevant to the use case under consideration in a unified data repository. This step will stitch together the disparate and distributed data sources, bringing all the data (structured, unstructured, real-time, and batch-mode) into a unified enterprise data platform. It will help create an enterprise data repository that is built incrementally to realize initial value and build a scalable foundation
- **Make data fit for use:** When using data, the insights and analysis are as good as the data collected. Thus, data cleansing and scrubbing, or removing corrupted, incorrect, duplicated, and incomplete data within datasets, is an essential part of the data-driven decision-making process. There is no one-size-fits-all solution for data cleaning, but organizations can establish a template for data cleansing so that they do not compromise on data quality
- **Extract value and unlock insights:** Once the data is cleansed, the next step is to apply analytical models to spot trends, correlations, patterns, and anomalies within and between datasets. The type of data analysis (descriptive, diagnostic, predictive, or prescriptive) and algorithms that need to be applied depend on the organization's desired objectives. Business intelligence and visualization tools are used to understand these patterns and unlock insights from incoming data
- **Measure performance:** Finally, the insights generated are presented in the form of dashboards, interactive reports, or narrative stories for business consumption. The results should be benchmarked against the business goals, industry standards, and performance expectations decided in the first step

This step-based approach is an iterative process rather than a simple linear journey. The models and methods applied in any initiative will be different from others and every initiative will be a learning opportunity for life sciences enterprises to get better at unlocking value from data. A continuous feedback loop will enable organizations to improve at prioritizing initiatives and implementing transformative use cases. Through an iterative approach, they will be able to embed data and analytics into the DNA of their companies, making them truly data-driven organizations.

## Preparing a blueprint for success

The pandemic had pushed the industry to adopt measures that can extract value from data and accelerate vaccine development. At that time, leaders did not have the luxury to define a roadmap and strategize processes. Now is the opportunity to absorb the lessons learned and apply them in defining a forward-looking vision and an impact-driven strategy. Organizations' leadership teams must define the vision along with a roadmap. They should follow it up by setting up a steering committee and making it accountable for planning and implementing the initiatives. The committee should agree on the success factors to track to measure performance and ensure that the building blocks are in place, including getting the right talent combination on board and collaborating with cloud providers, data and analytics partners, and system integrators.

Successful implementation will require a well-planned change management strategy, along with close monitoring of the performance metrics. Leadership support is extremely crucial in preparing individuals, teams, and the entire organization for a transformational change. The exhibit below depicts the different steps in this journey.

**EXHIBIT 7**

A blueprint for success

Source: Everest Group (2022)

| Define the vision | Prepare the roadmap | Identify success factors | Get the building blocks in place | Focus on change management |
|---|---|---|---|---|

## Bringing the ecosystem together

Implementing a data and analytics initiative is a complex task that requires an ecosystem-based approach – bringing together people, processes, and technology – to maximize efficiencies and outcomes.

- **People:** Accessing and hiring the right set of data and analytics talent can be a challenge for enterprises. Hence, they should consider reskilling inhouse talent and/or partnering with an external analytics service provider
- **Process:** Senior leaders must prepare a robust roadmap, with well-defined milestones and performance-measuring metrics. Additionally, they should take regular feedback and continuous process improvement efforts to maximize efficiency
- **Technology:** Organizations should aim to develop a reusable, efficient, and fit-for-purpose technology stack. In other words, they should focus on the latest and fastest tools and software to create maximum impact

While making huge investments in the technology stack seems like an attractive proposition, it will not yield the best outcomes, as technology cannot work without the right set of talent and procedures in place. Technology should be an enabling consideration once the vision is set, talent model is in place, and processes have been clearly defined.

### Measuring success and value creation

The management adage *if you cannot measure it, you cannot improve it* holds good for data and analytics implementations too. However, measuring success is not an easy task. When it comes to data and analytics initiatives, one cannot rely on any universal set of KPIs and metrics. Each implementation is different, based on varying business objectives, technology stacks, and talent sets, and is focused on a particular value chain element.

Instead, we should look at the broader value chain landscape and define success within the context of the organization, value chain element, and stakeholders involved. Success parameters could include reduced timelines for drug discovery and clinical trials, lower trial and R&D costs, improvements in demand planning, accurate forecasting, and increased RoI from marketing activities.

## Conclusion: focus on the journey

Data is an invaluable asset for the life sciences industry, and enterprises that can harness value from data will succeed in the future. The life sciences industry engages with prodigiously increasing data volumes, and enterprises must exploit the power of this data to become leaner, faster, and more efficient.

Before the pandemic, data and analytics investments were regarded as reactive. However, following the pandemic, enterprises realize the benefits of adopting rich data science and powerful analytics models to unearth insights across every value chain element. They should now adopt a journey-based mindset and take incremental steps to transition into data-driven organizations. The right approach is to start small, prioritize investments, build expertise, and then push the accelerator to implement transformational use cases.

The life sciences industry has been historically committed to making a difference in the lives of patients and communities across the world. Data and analytics can prove to be that ally that is always ready to help and accelerate efforts to stay committed to the goal and make a difference.

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CLOUDERA

## About Cloudera

Cloudera enables life science companies, providers, and health plans to leverage the power of data, analytics, and machine learning. Engage patients and members to improve care, achieve better treatment and manage and prevent disease, all while maintaining data privacy requirements. Cloudera Data Platform is a hybrid data cloud, based on open source technology, that manages the end-to-end data lifecycle—collecting data at the source and driving actionable insights and intelligence. Over 100 healthcare and life sciences companies globally rely on Cloudera for their data management needs.

Learn more at cloudera.com/solutions/healthcare

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