

# DATA ANALYTICS AND DATA VISUALIZATION

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# DATA ANALYTICS AND DATA VISUALIZATION

A background illustration featuring a bar chart with blue, orange, and green bars, and a line graph with an orange line and circular markers. A magnifying glass is positioned over the line graph, highlighting a specific data point. A large grey arrow points upwards on the left side.

**DATA ANALYTICS AND DATA  
VISUALIZATION**



# CHAPTER-1

## INTRODUCTION TO DATA ANALYTICS

### **Introduction to Data Analytics:**

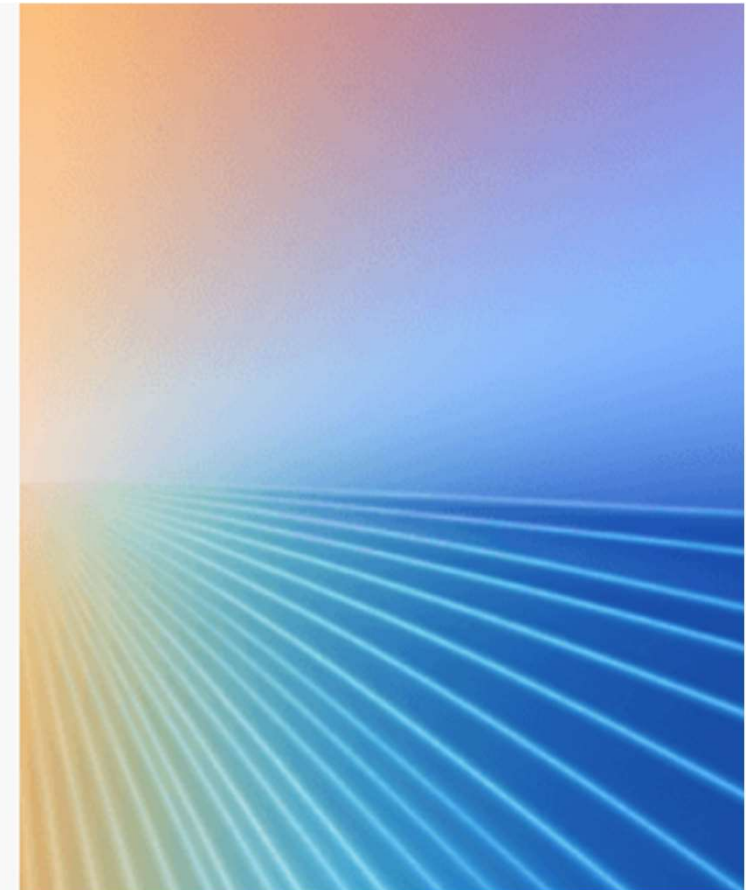
Introduction, Data and its importance, Data analytics and its types, Why data analytics is important, Data analysis Vs Data analytics, Classification of data analytics, Elements of Data analytics, Data analyst Vs. Data scientist



# CONTENT

## Content

1. Introduction to Data Analytics
2. The Importance of Data
3. Data Analytics Applications
4. Types of Data Analytics
5. Difference Between Data Analytics and Data Analysis
6. Difference Between Data Scientists and Analysts
7. Elements of Data Analytics
8. Conclusion





# INTRODUCTION TO DATA ANALYTICS

## Section 1

### Introduction to Data Analytics



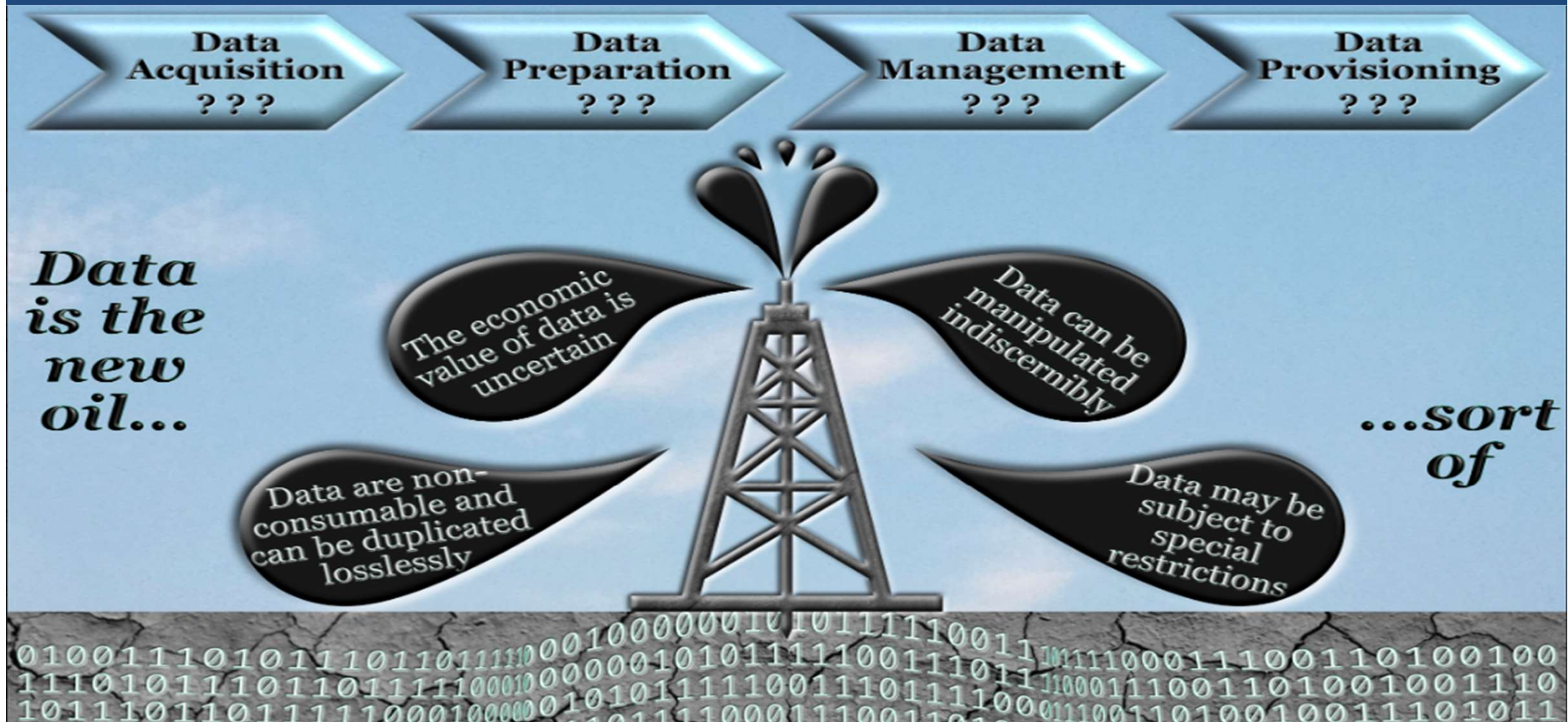
## Data - The New Oil

- Data is a crucial asset in today's digital age.
- It encompasses raw facts, statistics, and details collected for reference or analysis.
- Data generation sources: social media, IoT devices, online transactions.





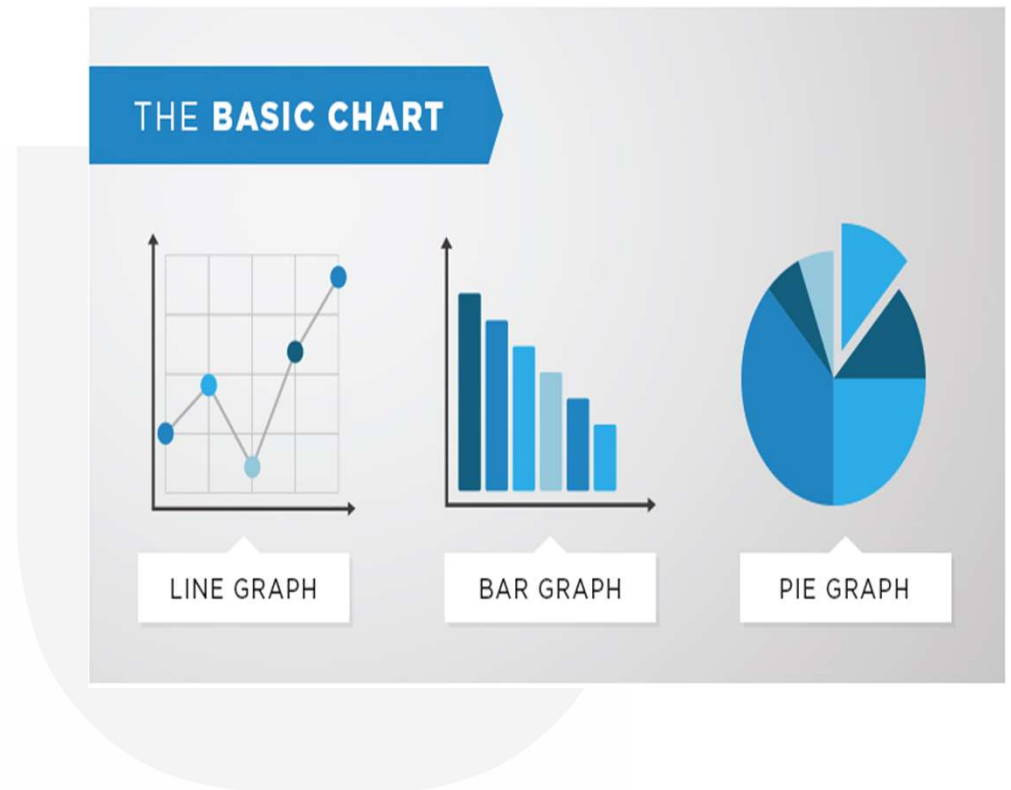
# Data - The New Oil





# The Importance of Data (Informed Decision-Making)

- Businesses use data analytics to understand market trends, customer behavior, and operational efficiency.
- Strategic decisions based on data enhance performance and competitiveness.







# The Importance of Data (Innovation and Development)

- Data fuels innovation by providing insights that lead to new products, services, and technologies.
- In healthcare, data from patient records, clinical trials, and genomic research drives advancements in personalized medicine.
- Big data analytics can improve healthcare outcomes by predicting disease outbreaks and personalizing treatment plans.



Illustration of data in healthcare  
(e.g., patient data, research data)



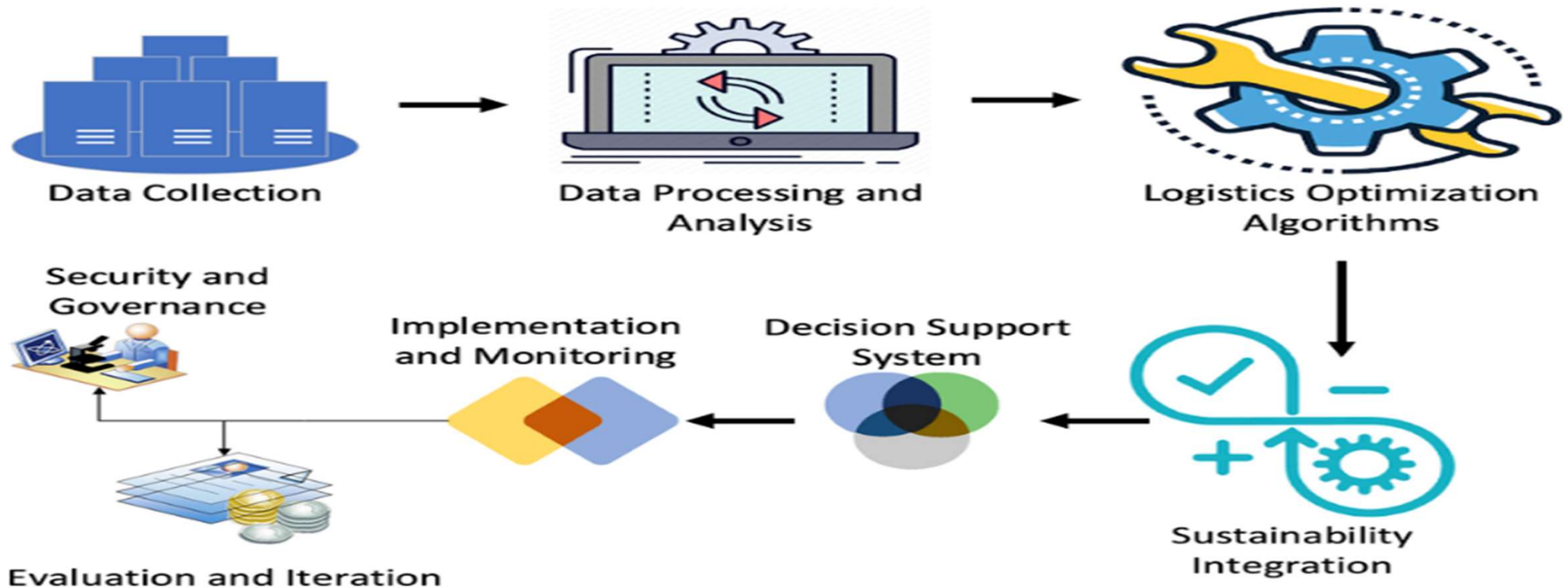
# The Importance of Data - Efficiency and Optimization

Organizations leverage data to streamline processes and optimize operations.

- By analyzing data, companies can identify bottlenecks, reduce waste, and improve resource allocation.
- Particularly evident in supply chain management, where data helps predict demand, manage inventory, and reduce costs.
- **\*\*Deloitte Research:\*\*** Companies using data analytics to drive their supply chains can achieve 10% higher efficiency.



## Diagram showing data-driven supply chain optimization



Architecture of big data-driven sustainable logistics optimization methodology





## The Importance of Data (Personalization and Customer Experience)

Data enables businesses to offer personalized experiences to their customers.

- By analyzing customer data, companies can tailor products, services, and marketing efforts to individual preferences and behaviors.
- Enhances customer satisfaction and loyalty.
- **\*\*Accenture Survey:\*\*** 91% of consumers are more likely to shop with brands that provide relevant offers and recommendations.

- Infographic showing personalized customer experience.



Implementing Personalization In Customer Experience - FasterCapital



- Data analytics is the process of converting raw data into actionable insights.
- It involves a range of tools, technologies, and processes.
- The goal is to find trends and solve problems by leveraging data.
- Data analytics has the potential to shape business processes.
- It can also improve decision-making within organizations.
- Ultimately, data analytics contributes to business growth.



# Data Analytics of Stock Market





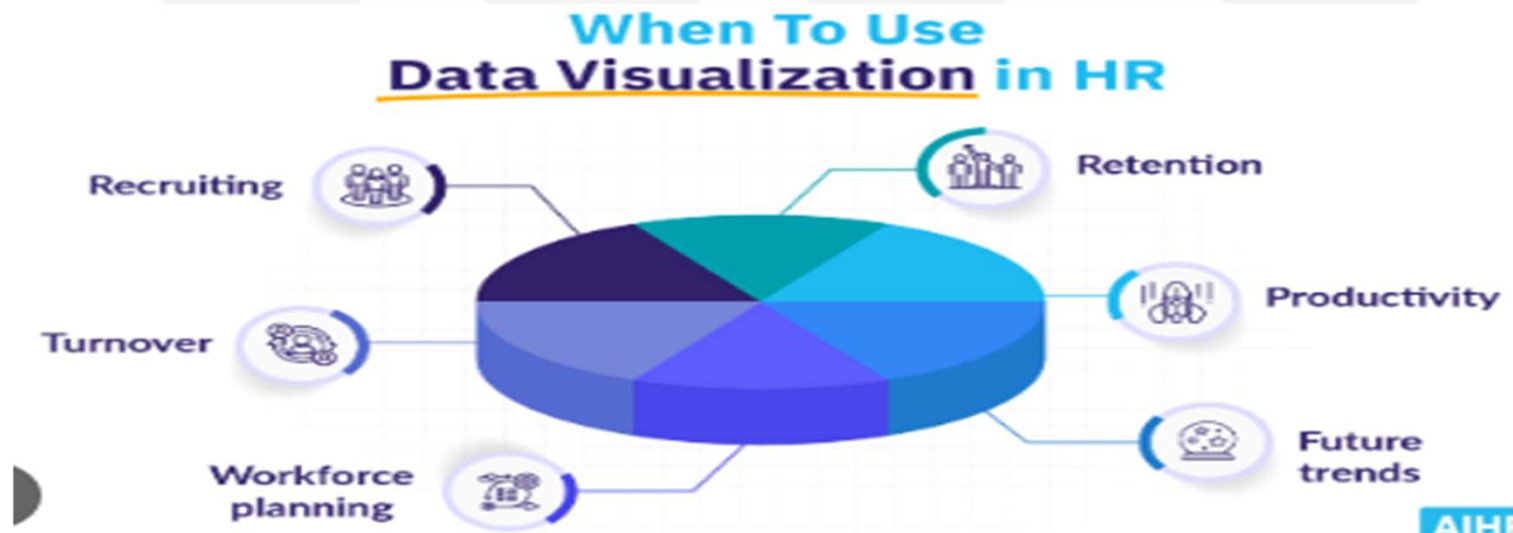
## Why is data analytics important?

- Data analytics is essential in today's digital age.
- It transforms how businesses operate, make decisions, and interact with customers.
- Applications span across multiple domains, driving efficiency, innovation, and competitive advantage.



## Visibility and Understanding

- Data analytics enables companies to gain deeper visibility into their processes and services.
- Provides a comprehensive understanding of operations and performance.
- Helps identify areas of improvement and potential issues before they escalate.





## Insights into Customer Experience

- Companies obtain detailed insights into the customer experience through data analytics.
- Identifies potential customer problems and areas for improvement. - Enhances customer satisfaction by addressing issues proactively.

PU



# Infographic showing customer insights



- Infographic showing customer insights and experience improvement.

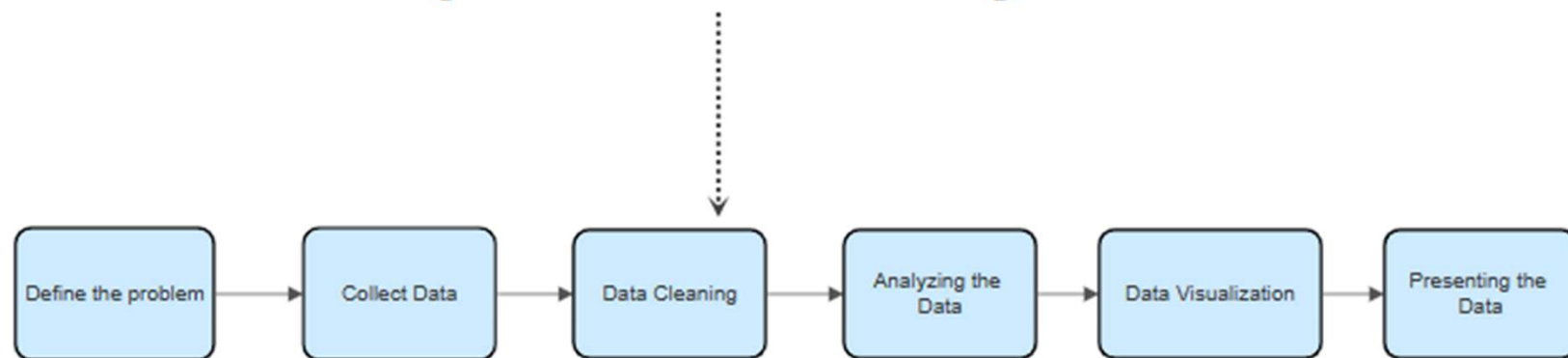


## Connecting Insights with Action

Beyond just analyzing data, companies can connect insights to actionable steps.

- Enables the creation of personalized experiences for customers.
- Drives the development of relevant digital products and services.
- Leads to operational efficiency and boosts employee productivity.

### Six Steps of Data Analysis Process





# Applications of Data Analytics

Healthcare  
Finance  
E-commerce  
Cybersecurity  
Supply Chain Management  
Banking  
Logistics  
Retail  
Internet Searching  
Risk Management

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# Data Analytics Applications



Data Analytics Applications



## TYPES OF DATA ANALYTICS

- **Descriptive Analytics:** Summarizes past data (e.g., monthly sales reports).
- **Diagnostic Analytics:** Explains reasons behind past outcomes (e.g., sales decline analysis).
- **Predictive Analytics:** Forecasts future events (e.g., sales forecasting).
- **Prescriptive Analytics:** Recommends actions to achieve specific outcomes (e.g., supply chain optimization).

# Descriptive Analytics

## Steps Involved in Descriptive Analytics



Track business  
metrics



Collect the data



Prepare the data



Analyze the data



Present the data





# Diagnostic Analytics



# Predictive Analytics

An illustration depicting predictive analytics. It shows three stylized figures interacting with a large, glowing blue sphere. One figure is climbing a ladder to reach the top of the sphere, another is pointing at a document on the left, and a third is kneeling on the right, looking at a magnifying glass. The sphere is filled with various data visualizations, including a line graph with a star, a bar chart, and a document with a checkmark. The background is a solid blue color.

## Predictive Analytics

*[pri-'dik-tiv ,a-nə-'li-tiks]*

Determining future performance based on current and historical data.

# Prescriptive Analytics



**Prescriptive  
Analytics**







## Difference between Data Analytics and Data Analysis

Data Analytics	Data Analysis
It is described as a traditional form or generic form of analytics.	It is described as a particularized form of analytics.
It includes several stages like the collection of data and then the inspection of business data is done.	To process data, firstly raw data is defined in a meaningful manner, then data cleaning and conversion are done to get meaningful information from raw data.
It supports decision making by analyzing enterprise data.	It analyzes the data by focusing on insights into business data.
It uses various tools to process data such as Tableau, Python, Excel, etc.	It uses different tools to analyze data such as Rapid Miner, Open Refine, Node XL, KNIME, etc.
Descriptive analysis cannot be performed on this.	A Descriptive analysis can be performed on this.
One can find anonymous relations with the help of this.	One cannot find anonymous relations with the help of this.
It does not deal with inferential analysis.	It supports inferential analysis.



# DATA ANONYMIZATION

- Data anonymization is the process of preserving private or confidential information by deleting or encoding identifiers that link individuals and the stored data.
- Data anonymization policies ensure that a company understands and enforces its duty to secure sensitive, personal, and confidential data.
- Gathering anonymous data and removing identities from the database would restrict the ability to extract private information from the results.

## Inferential Statistics

Inferential statistics is the practice of using sampled data to draw conclusions or make predictions about a larger sample data sample or population.



## DIFFERENCE BETWEEN DATA SCIENTISTS AND ANALYSTS

- **Data Scientists** are generally focused on building advanced models and algorithms to predict future trends and derive actionable insights from complex data. They require strong programming skills and a deep understanding of machine Learning and statistics.
- **Data Analysts** primarily work on interpreting and reporting existing data to aid business decisions. Their role is more focused on data cleaning, visualization, and descriptive analytics, requiring proficiency in tools like SQL and Excel.



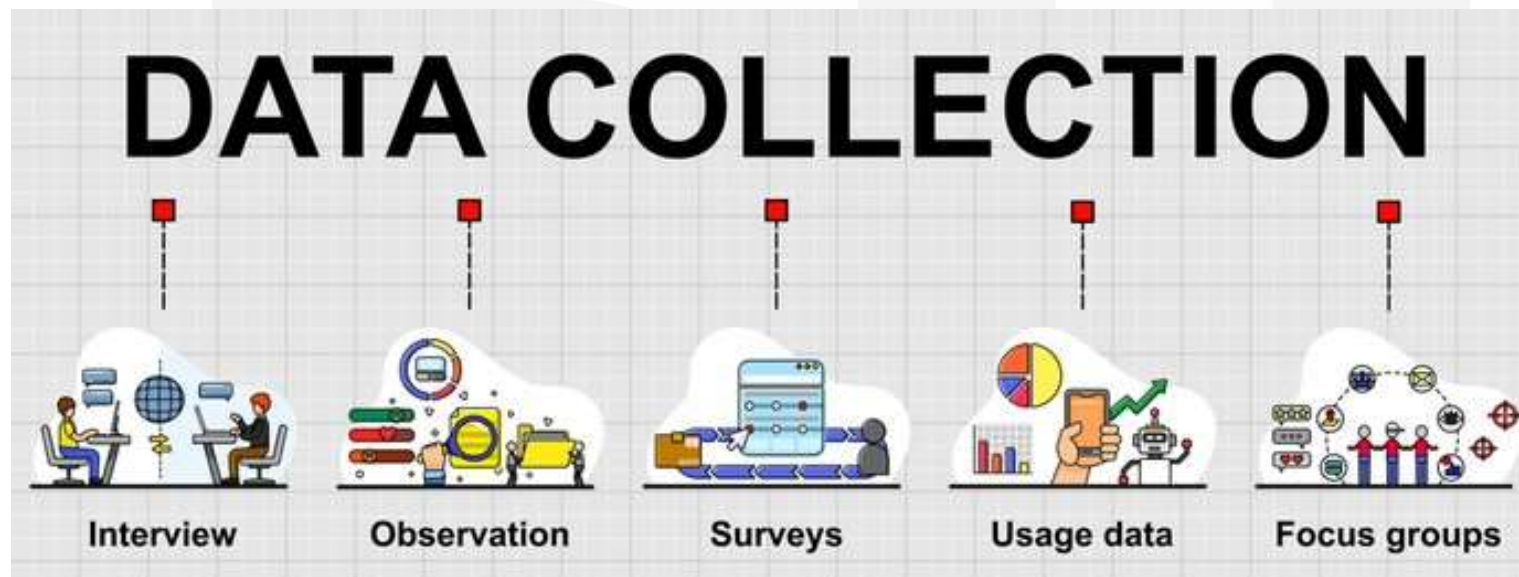
## DIFFERENCE BETWEEN DATA SCIENTISTS AND ANALYSTS

5 Key Differences Between Data Science & Data Analytics		
	DATA SCIENTISTS	DATA ANALYSTS
1	"Explore" data	"Cleanse" data
2	Focus on the future	Focus on what's happening now
3	Utilize machine learning & algorithms	Utilize coding languages (SQL, R, or Python)
4	Look for connections in information	Look for hypothesis validation in information
5	Lean on predictive modeling and analytics	Use broad statistical patterns and analysis



# Elements of data analytics

## 1. Data Collection



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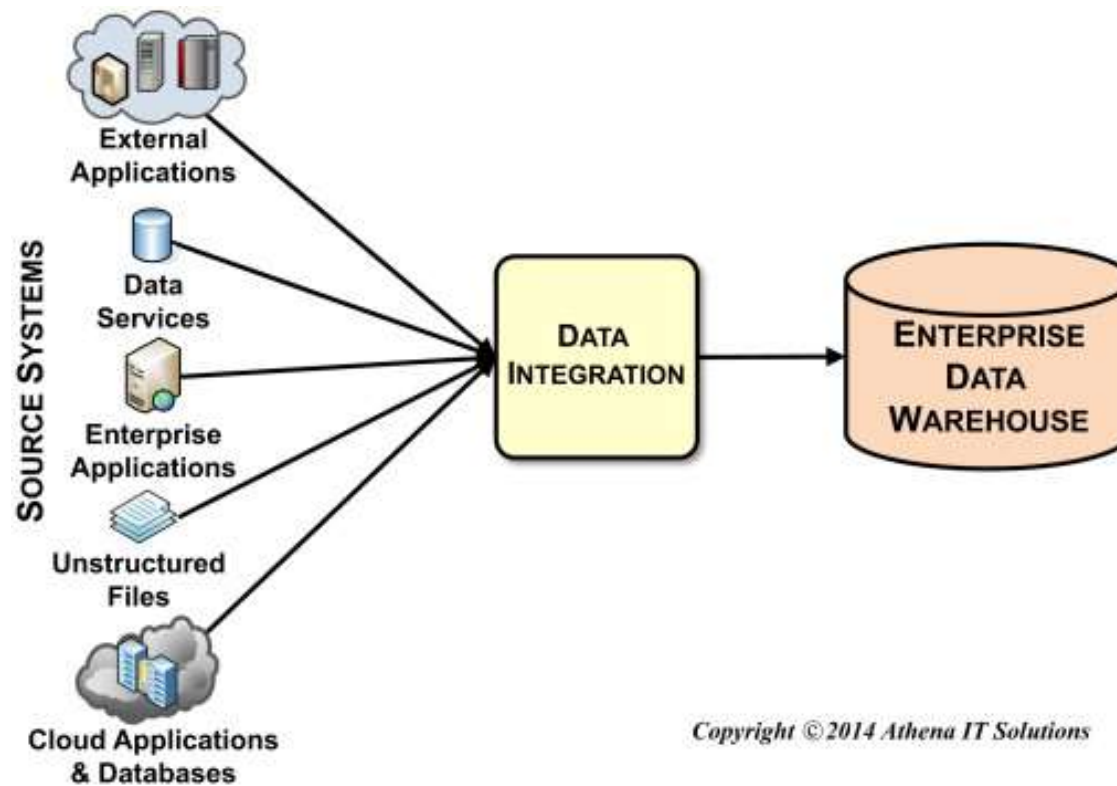
## 2. Data Cleaning



### 3. Data Transformation



## 4.DATA INTEGRATION



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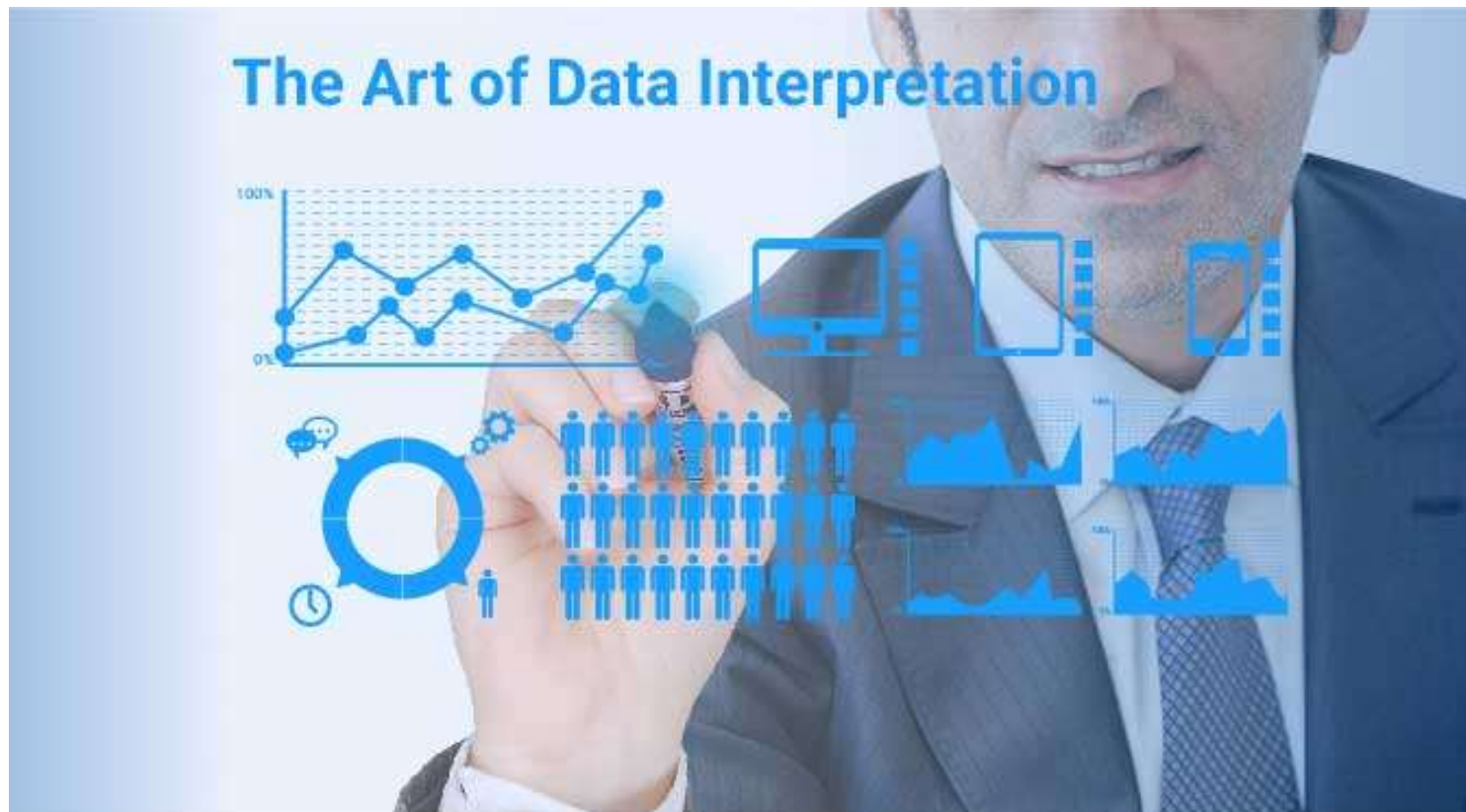


## 5. Data Analysis



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## 7.DATA INTERPRETATION





## 8. Data Governance and Security





**THANK YOU**