

# UNIT - 1

**Descriptive statistics, Introduction to Analytics, Business Understanding, Introduction to R- Basics, The R Environment, Inductive and Deductive Logic, Installation of R**

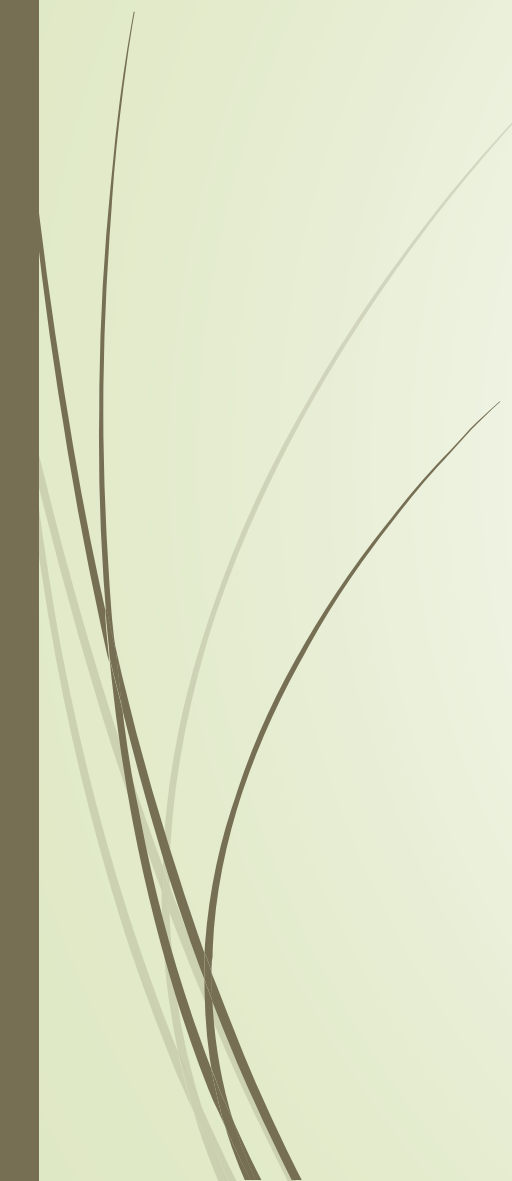


# Introduction to Analytics and Business Understanding



# Why Data Analytics

Data analytics helps in:

- Scientific decision making and effective business operations.
  - Analyzing data, gaining profits, making better use of resources, and improving managerial operations.
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# What is Data Analytics

- Data analytics is the science of extracting trends, patterns, and relevant information from raw data to draw conclusions.
- It has multiple approaches, multiple dimensions, and diverse techniques.

In addition to making business decisions, data analytics is also used by data scientists and researchers to verify scientific models and theories.



# What is Data Analytics?...

Analytics is the use of:

data,  
information technology,  
statistical analysis,  
quantitative methods, and  
mathematical or computer-based models

to help managers gain improved insight about their business operations and make better, fact-based decisions.

Business Analytics (BI) is a subset of Data Analytics



# Data Analytics: benefits

- Improved Efficiency
  - Good Resource Utilization
  - Good Market Insights
  - Effective Decision Making
  - Cost Reduction
- 



# Data Analytics: Domains

- ➡ E-Commerce Industry
  - ➡ Healthcare Industry
  - ➡ Media and Entertainment Industry
  - ➡ Education *Industry*
  - ➡ Government Organizations
  - ➡ Retail Industry
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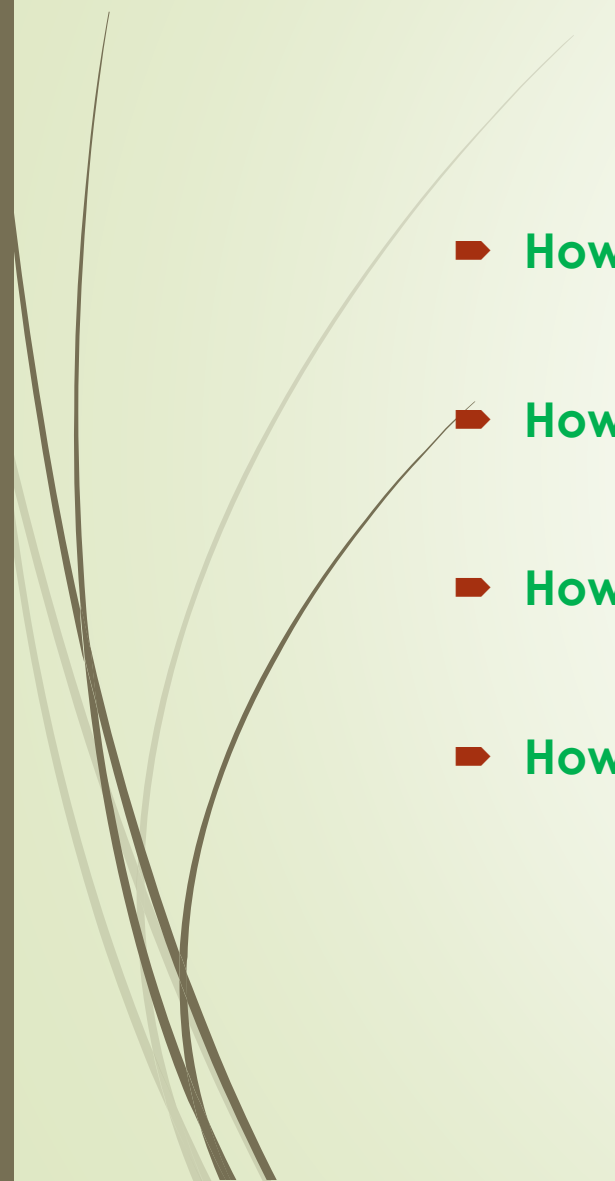
# Accounting Methods: Traditional approach and associated problems

- Accounting was done in the form of notebooks. This was cumbersome and tedious.
- Use of excel sheets simplified accounting but did not solve all problems.
- SMBs (Small and Medium Businesses) and start-ups face issues in managing and tracking cash flow.
- A highly accurate and dependable solution is required for financial management in business.
- Difficulty in tracking small expenses such as one-time government tax and regular taxes.
- Requirement of a dedicated financial expert by SMBs and start-ups.
- Small business owners managing the role of an HR and payroll expert due to lack of resources or money.
- Interpreting and analyzing financial reports with traditional accounting methods was difficult.
- The available excel-based macros and pivot tables did not provide sufficient insight into the data.





# Traditional Accounting Methods: Challenges

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- How much inventory must be held?
  - How many invoices are overdue?
  - How much cash is tied up at work?
  - How long does it take to get cash from the customers?



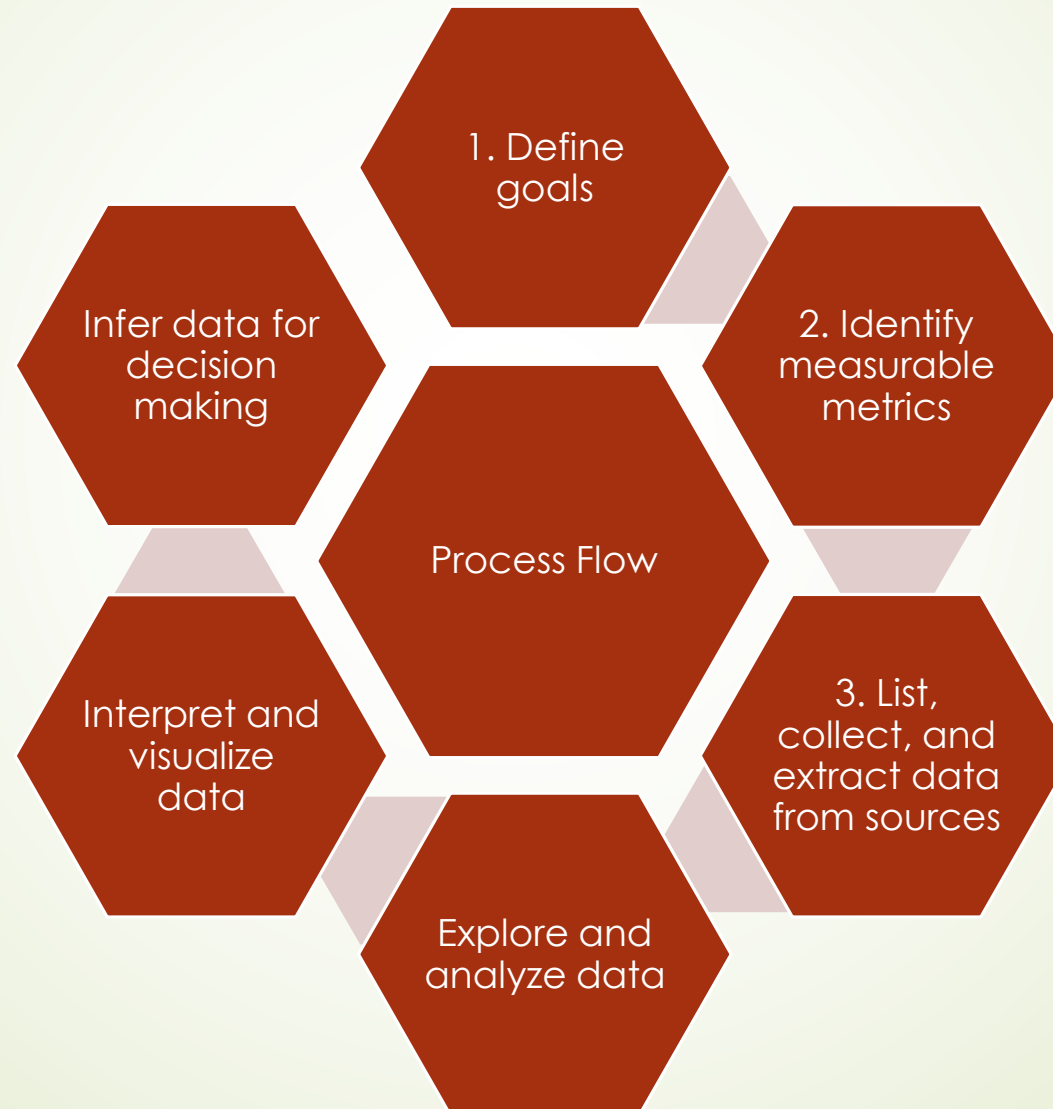
# Impact of Analytics on Accounting

- Uncovers valuable insights
  - Identifies process improvements
  - Help in managing risks
  - Adds value to the decision making process
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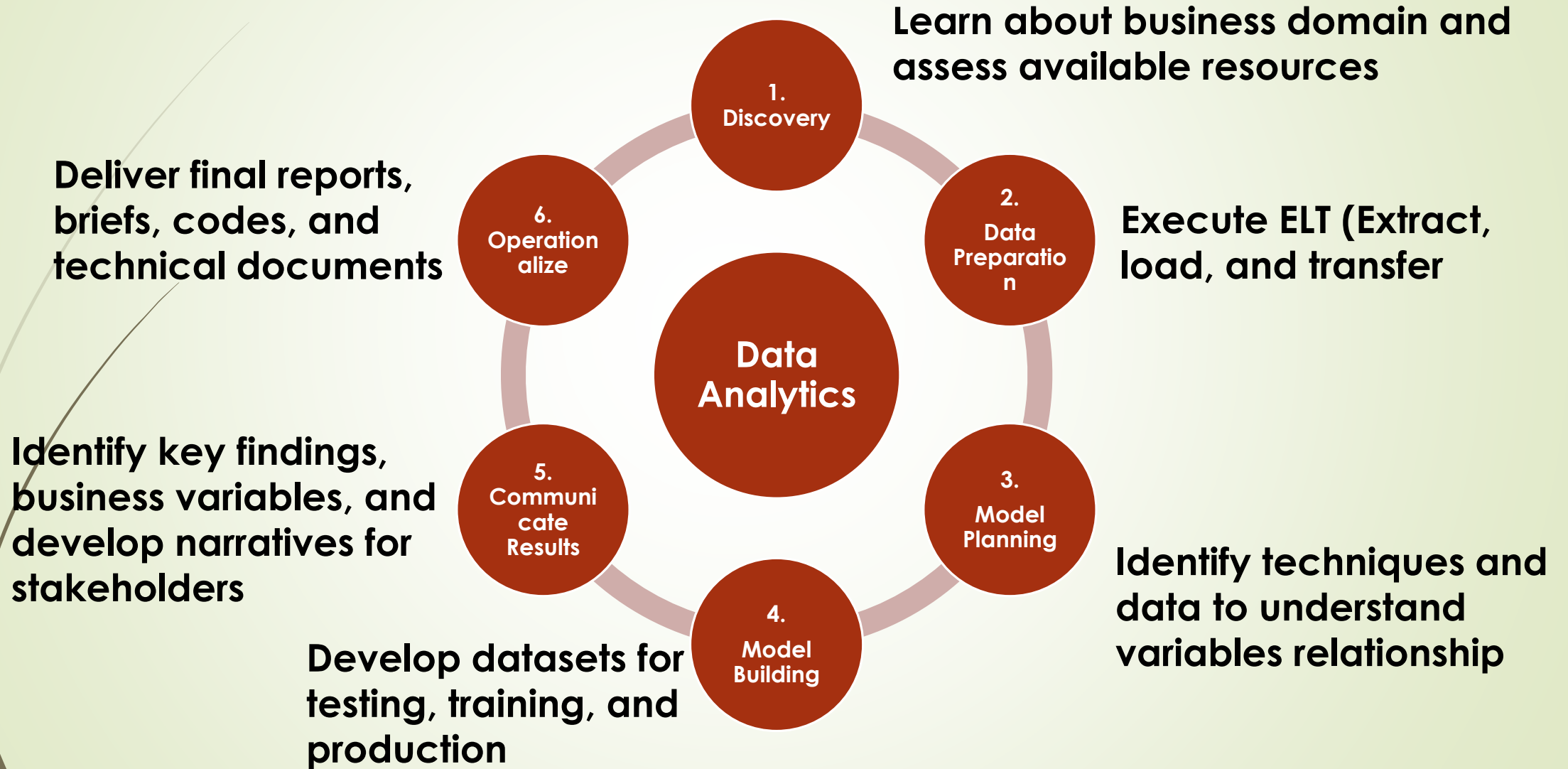
# Data Analytics in Accounting

Auditors	Tax Accountants	Investment Advisors
<ul style="list-style-type: none"><li>• Deploy continuous monitoring</li><li>• Analyze and verify large datasets</li><li>• Few errors and precise recommendations</li></ul>	<ul style="list-style-type: none"><li>• Use data science to analyze complex taxations</li><li>• Helps in faster investment decisions</li></ul>	<ul style="list-style-type: none"><li>• Use big data to find behavioral patterns</li><li>• Identify investment opportunities</li><li>• Generate higher profit margins</li></ul>

# Data Analytics: Process Flow



# Data Analytics: Life Cycle





# Types of Data Analytics

We have 4 types of Data Analytics based on work flow and requirements

- Descriptive Analytics
  - To explore what happened
- Diagnostic Analytics
  - Why did this happen
- Predictive Analytics
  - What will happen
- Prescriptive Analytics
  - How can we make this happen



# Descriptive Analytics

- It is the conventional form of Analytics
- Its purpose is to summarize the findings
- It focuses on the summarized view of facts
- Descriptive Analytics is designed to access information about the past



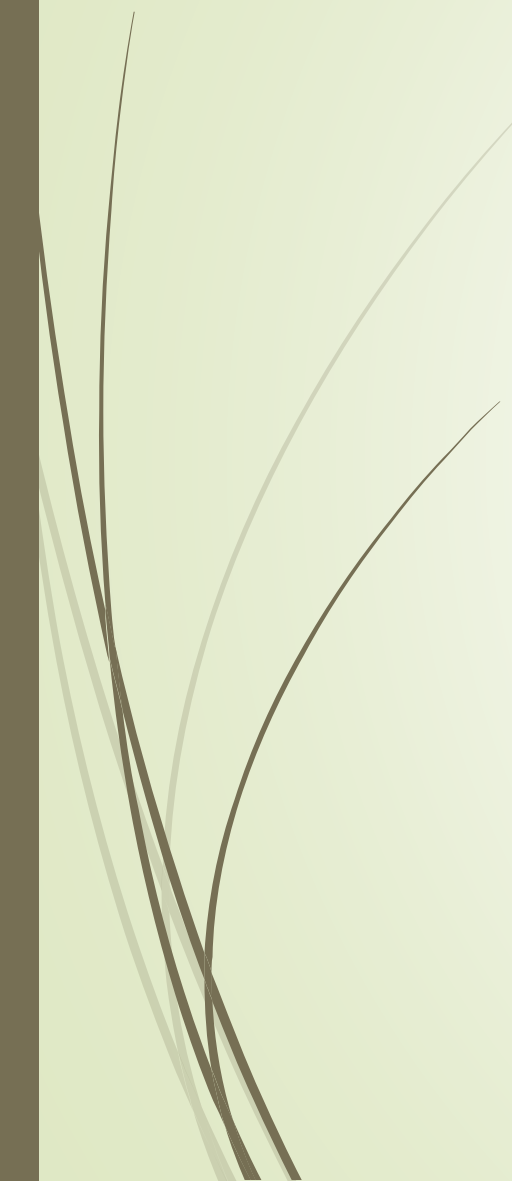
# Descriptive Analytics



- Data aggregation is the process of gathering and expressing information in a summarized form
- Tools for data aggregation: R, Python, MS Excel, MATLAB, SPSS, ...
- Various company reports is an example of descriptive analytics



# Diagnostic Analytics

- This helps us why something happened in the past
  - It helps us in understanding the root cause of events
  - It has a limited ability to provide actionable insights
  - It provides an understanding of casual relationships and sequences
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# Diagnostic Analytics: Techniques

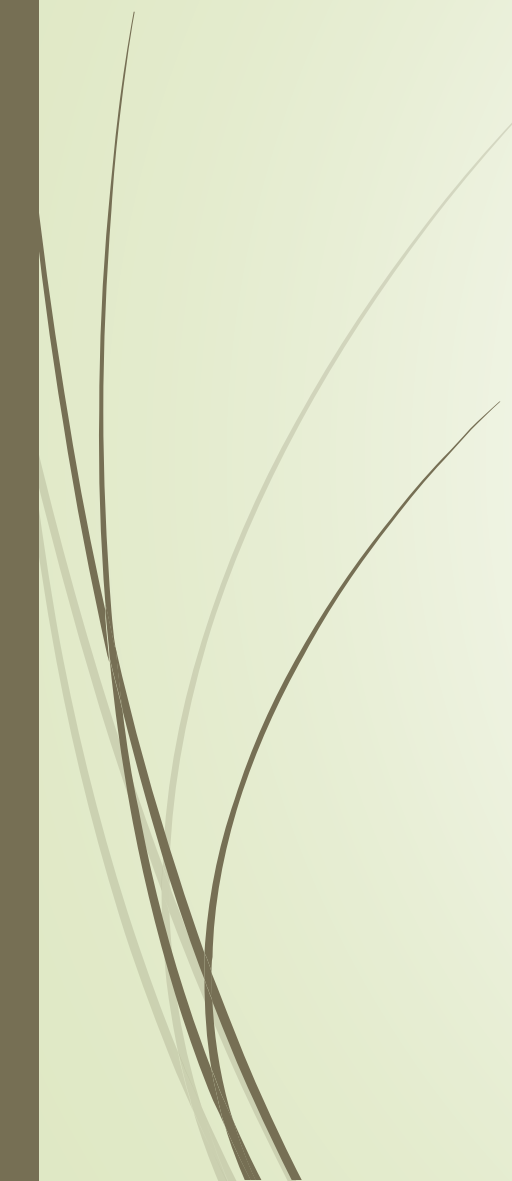
- ❑ Drill-down
- ❑ Data Discovery
- ❑ Correlation
- ❑ Data Mining

- This can be used to discover casual relationships between 2 or more datasets.
- This is helpful for those concerned with day-to-day operations.
- It can helps us in identifying why a sales representative sold fewer items than usual in a specific time unit.



# Predictive Analytics

This analytics is used:

- For predicting future outcomes in terms of probability of an event to occur
  - For analyzing sentiments where all opinions posted on social media are collected to predict a person's sentiment, for example
  - For identifying target audience for a promotional campaign
  - For forecasting weather, plan-failure prediction, and travel products recommender system
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# Predictive Analytics: Tools

ML algorithms: RF, SVM, Statistical Algorithms

Tools

These tools are used by Data Scientists and ML experts to build models

Other tools: R, Python, ...



# Prescriptive Analytics

- Prescriptive analytics provides the solution for a prediction in the future.
- It creates and updates the relationship between action and outcome using a feedback system.
- It helps in making optimal recommendations during the decision-making process.
- It helps in mitigating the possible risks based on the available predictive analytics.
- It has the power to suggest favorable solutions and ease the decision-making process.
- It is the final frontier of advanced analytics.
- It is used by recommendation engines in companies.

Advancements in predictive analytics is paving the way for its development.

# Case Study on Analytics



**Amazon uses data analytics to improve efficiency and reduce cost.**

- **Descriptive Analytics**

- ✓ Spent \$20M in different sales training the previous year

- **Diagnostic Analytics**

- ✓ Amazon's revenue increased in the West Coast during the past one year
- ✓ Increased spending on sales training

- **Predictive Analytics**

- ✓ Purchase factors: price, time, weather, and festive seasons
- ✓ Predicted 10–12 percent increase in revenue

- **Prescriptive Analytics**


- ✓ Sales trainings fetched good ROI
- ✓ Implemented a suitable optimization plan to maximize revenue





# Data Analytics Benefits: decision-making

Data Analytics helps us in defining our target audience base don :

- Customer age group
  - Customer preference
  - Location-based purchase
  - Popular brands or products people seek
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# Data Analytics Benefits: decision-making

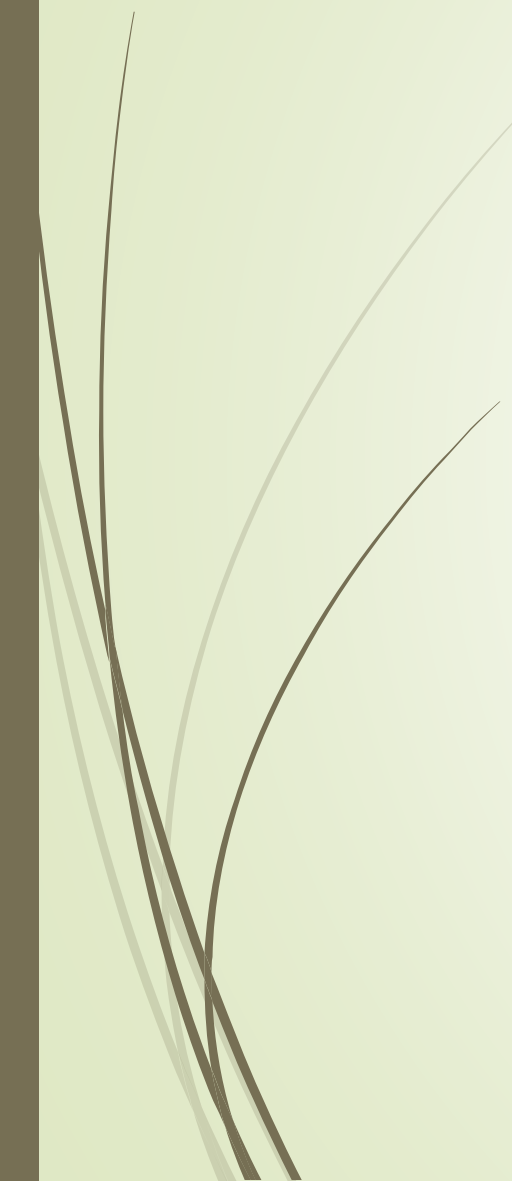
Data Analytics helps us:

- Manage inventory
  - Forecast demands
  - Identifying shopping seasons
  - Analyze customer sentiments
  - Decide optimum prices
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# Data Analytics Benefits: cost reduction

Data Analytics helps us:

- Understand shopper behavior by monitoring their browsing interest
  - Seller identifies shopping pattern and customer demand
  - Customer data helps companies minimize failed campaigns and reduce cost associated with them.
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# Case Studies on Analytics



Amazon uses data analytics to improve efficiency and reduce cost.

LinkedIn

LinkedIn employs data analytics to revamp its job listings, track user profiles, and posts.



Netflix gathers data from its subscribers to decide on customer preferences.

# Case Studies on Analytics



**According to McKinsey, companies that use customer analytics outsmart their competitors in terms of profit.**



**According to a survey conducted by the Business Application Research Center (BARC) on the Analytics trends, Master Data and Data Quality Management were the most important trend in 2020.**



Thank You !