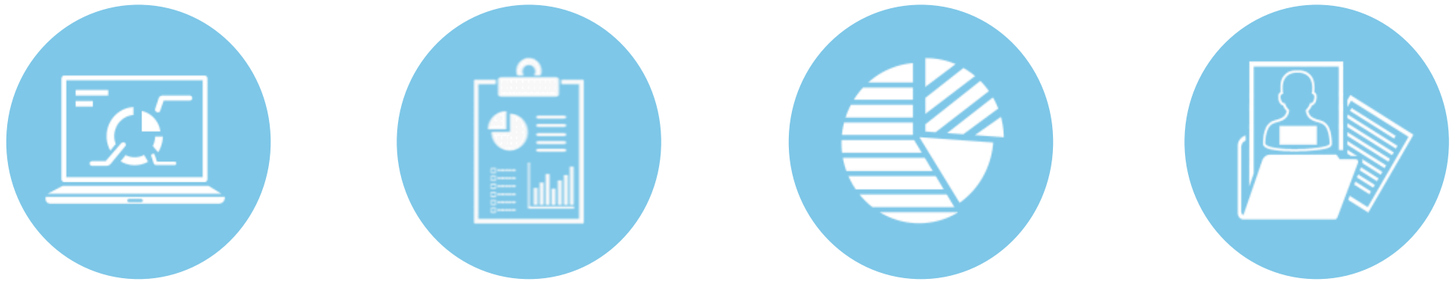
Data Science with R

Lesson 1— Introduction to Business Analytics



Learning Objectives

- Explain Business Decision and Analytics
- List the types of business analytics
- Discuss the application of business analytics
- Describe data science

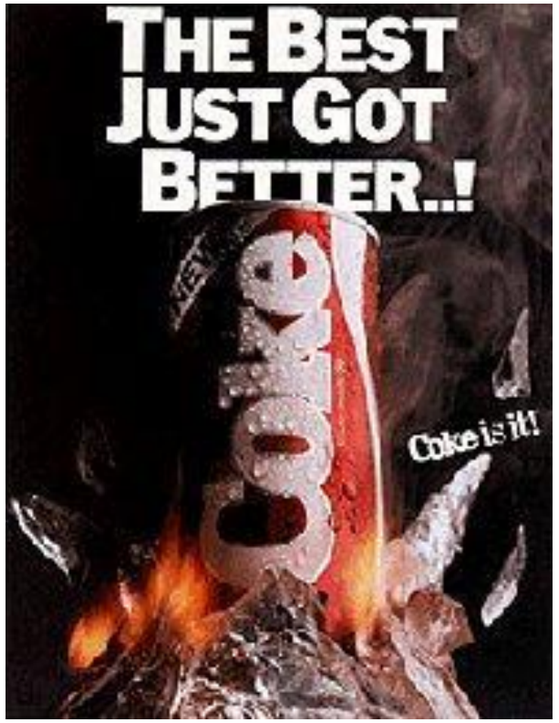
Introduction to Business Analytics

Topic 1—Business Decisions and Analytics

“New Coke” Disaster

Coca-Cola announced a change to its nearly century-old secret formula, 30 years ago.

It was stated that “The new coke would have a smoother, sweeter taste similar to Diet Coke, but sweetened with corn syrup”



Market researchers and pollsters were sure it'd be a hit.

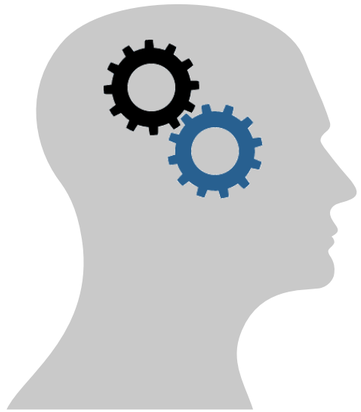
https://www.cbsnews.com/news/30-years-ago-today-coca-cola-new-coke-failure/

“New Coke” Disaster

However, a poll showed that only **13 percent** of soda drinkers liked the new Coke. The experiment was not accepted by the consumers.

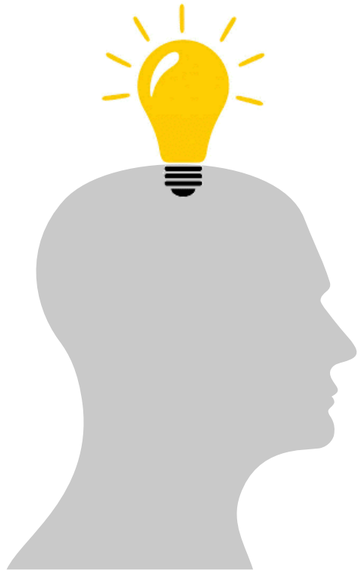
Coke drinkers launched grassroots campaigns across the country to force Coca-Cola to bring back the original Coke, which compelled the company to work on it.

“New Coke” Disaster



Where did the company go wrong?

“New Coke” Disaster



Donald Keough, President, Coca-Cola Company, stated "The simple fact is that all of the time and money and skill poured into consumer research on a new Coca-Cola could not measure or reveal the depth and abiding emotional attachment to original Coca-Cola felt by so many people.“

The company failed to take the right **business decision.**

https://www.cbsnews.com/news/30-years-ago-today-coca-cola-new-coke-failure/

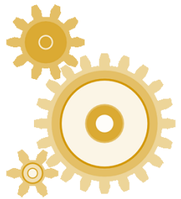
Right Business Decisions

The right business decisions help to achieve high revenue, reduce expenses, and meet customer expectations.

It involves a series of methods and techniques to measure performance and improve them. This is called **Business Analytics**.

Business Analytics

Business Analytics is a scientific process that transforms data into insight that is used for fact-based or data-driven decision making.



It uses tools such as reports and graphs (simple), optimization, data mining, and simulation (complex)

Features of Business Analytics

Business analytics offer:

Decision Support Systems	Business Continuity Support	Various Methodologies
Solutions are primarily used as decision support systems or as their components. Solutions help executives, salespeople, and other organizational leaders to make business decisions.	Business Analytics supports essential business functions. It also aids in functions such as hiring, reducing attrition, improving retention, performing staff deployment, and deciding strategy.	Methodologies include concepts from applied probability, applied mathematics, applied statistics, and computer science. Data produced helps you gain meaningful insights into better business planning and business performance.

Introduction to Business Analytics

Topic 2—Types of Business Analytics

Types of Business Analytics

Descriptive Analytics

Predictive Analytics

Prescriptive Analytics

Types of Business Analytics

Descriptive Analytics

Predictive Analytics

Prescriptive Analytics

It is regarded as the first stage in analysis of data. It involves **consolidation and summarization of data for further analysis.**

Descriptive Analytics includes techniques that explain what has happened in the past. It includes:

- Reports
- Data-mining techniques
- Descriptive statistics
- Data queries
- Data dashboards

Types of Business Analytics

Descriptive Analytics

Predictive Analytics

Prescriptive Analytics

The data that is received from descriptive analytics is further used for predictive analytics, where the objective is to **predict future unforeseen events**.

Predictive Analytics techniques use models created from past data to predict the future or determine the impact of one variable on another.

Example: A company can predict the market share of a new product by using survey data and past purchase behavior.

Types of Business Analytics

Descriptive Analytics

Predictive Analytics

Prescriptive Analytics

Prescriptive Analytics specifies the **best course of action for a business activity** in the form of output of a prescriptive model.

The models used in prescriptive analytics are called **optimization models**.

Example: Airline industries can get inputs from revenue management models and past purchasing data to get the best pricing strategy across all flights.

Introduction to Business Analytics

Topic 3—Applications of Business Analytics

Business Analytics in Supply Chain

Analytics tools used in logistics and supply chain management of companies help in:

- Efficient delivery and optimal sorting of goods
- Vehicle and staff scheduling
- Vehicle routing
- Better inventory and processing control
- Efficient supply chains

Example

- **Bernard Chaus, Inc.**: A women's apparel manufacturing company uses Descriptive Analytics to present its supply chain status to its managers.
- **ConAgra Foods**: A packaged foods company uses Prescriptive and Predictive analytics to plan its capacity utilization better by including the inherent uncertainty in commodities pricing.

Business Analytics in Healthcare

Analytics in healthcare is used to:

- Simultaneously control cost and provide more effective treatment to patients
- Improve staff, patient, and facility scheduling
- Control inventory, purchasing, and patient flow

Example

McKinsey Global Institute (MGI) and McKinsey & Company14 Study

By better utilizing analytics, the United States health care system could save more than $300 billion each year, which is equivalent to the complete gross domestic product of countries such as Singapore, Finland, and Ireland.

Business Analytics in Marketing

Analyzing the customer behavior using data generated from social media and scanner data leads to:

- Better use of advertising budgets
- Effective pricing strategies
- Improved demand forecasting
- Better product line management
- Increased customer satisfaction and loyalty

Example

Automobile Manufacturer Chrysler Team with J. D. Power and Associates

Chrysler developed predictive models to support its pricing decisions for automobiles. This helped the company to analyze the ramifications of proposed pricing structures. The models generated an estimated annual savings of $500 million.

Business Analytics in Predicting Hurricanes

CASE STUDY

Problem statement

According to 2004 New York Times, the Atlantic coast of Florida was in danger as Hurricane Frances was barreling across the Caribbean and threatening a direct hit.

Study by Walmart

Outcome

Business Analytics in Predicting Hurricanes

CASE STUDY

Problem statement

Study by Walmart

Outcome

In Bentonville, Arkansas, the executives at Walmart Stores considered the situation an opportunity to apply predictive technology. The technology provided forecasts based on:

- Shopping patterns of customers when Hurricane Charley had struck several weeks earlier
- Huge amounts of shopper history stored in Walmart's data warehouse

Business Analytics in Predicting Hurricanes

CASE STUDY

 Problem statement	With a thorough analysis, Walmart could: • Predict what was about to happen • Identify the local demand for products • Anticipate rush to the stores much before the hurricane's landfall • Determine that the stores would also require more than the usual products • Observe an unusual increase in the sales of strawberry Pop Tarts • Observe that beer was the top-selling pre-hurricane item
 Study by Walmart	
 Outcome	**The analysis helped Walmart to be prepared for the situation.**

Business Analytics in Predicting Sales

 Problem statement	Amazon sells iPhone 6 on its website through multiple listings. However, sales have decreased, and the stakeholder for the electronic department is facing a business challenge. Competitors are able to acquire higher market share of iPhone 6 sales.
 Study by Amazon	
 Outcome	

Business Analytics in Predicting Sales

 Problem statement	Amazon conducted data analysis on the website and realized that the prospective customers do visit the website and look for iPhone 6 on the Amazon website, but all of them do not purchase it. Studies were also conducted to understand the sales corresponding to different discount percentages.
 Study by Amazon	
 Outcome	

Business Analytics in Predicting Sales

Problem statement

Study by Amazon

Outcome

Amazon realized that if it offers more than 13% discount, it does not bring incremental value in terms of increase in success rate. Through the promotion response curve, it was able to fetch the optimal discount it should offer to increase the sales.

Introduction to Business Analytics

Topic 4—Data Science Overview

Business Analytics and Data Science

Companies are turning to analytics solutions to uncover hidden patterns, meaning, and other insights from the huge volumes of data (big data) to improve decision making.

Many businesses use data analytics to get value from the existing data and to generally consider if the business has the right analytical talent.

This is done using various **methods and techniques in data science**.

Data Science

Data science, also known as data-driven science, is an interdisciplinary field of scientific methods, processes, algorithms, and systems to extract knowledge or insights from data in various forms, either structured or unstructured, similar to data mining.

Key Takeaways

- Business Analytics is a scientific process that transforms data into insight.
- Descriptive Analytics includes techniques that explain what has happened in the past.
- Predictive Analytics includes techniques that predict the future by using models created from past data or determine the impact of one variable on another.
- Prescriptive Analytics, the final phase of Business Analytics, specifies the best course of action for a business activity in the form of the output of a prescriptive model.
- Data science, also known as data-driven science, is an interdisciplinary field of scientific methods, processes, algorithms, and systems to extract knowledge or insights from data in various forms, either structured or unstructured, similar to data mining.