Data Visualization Using Tableau

Charting Beyond Basics: Transforming Data into Visual Masterpieces

Quick Recap

- String calculations manage text tasks like concatenation and case conversion.
- Simple calculated fields handle basic data manipulations in Tableau.
- Scope and direction control calculation levels and interactions.
- Table calculations compute data within visualizations based on filters and sorting.

Engage and Think

You are a project manager at Amazon overseeing the launch of a new product line. You are tasked with creating a detailed timeline that includes tasks like product development, marketing, and logistics. You also need to consider resource allocation, dependencies between tasks, and potential delays that could impact the launch date.

How could you use a specific type of chart to visualize the timeline of your new product launch, including the allocation of resources, planning of tasks, and identification of dependencies, to ensure a successful and timely launch?

Learning Objectives

By the end of this lesson, you will be able to:

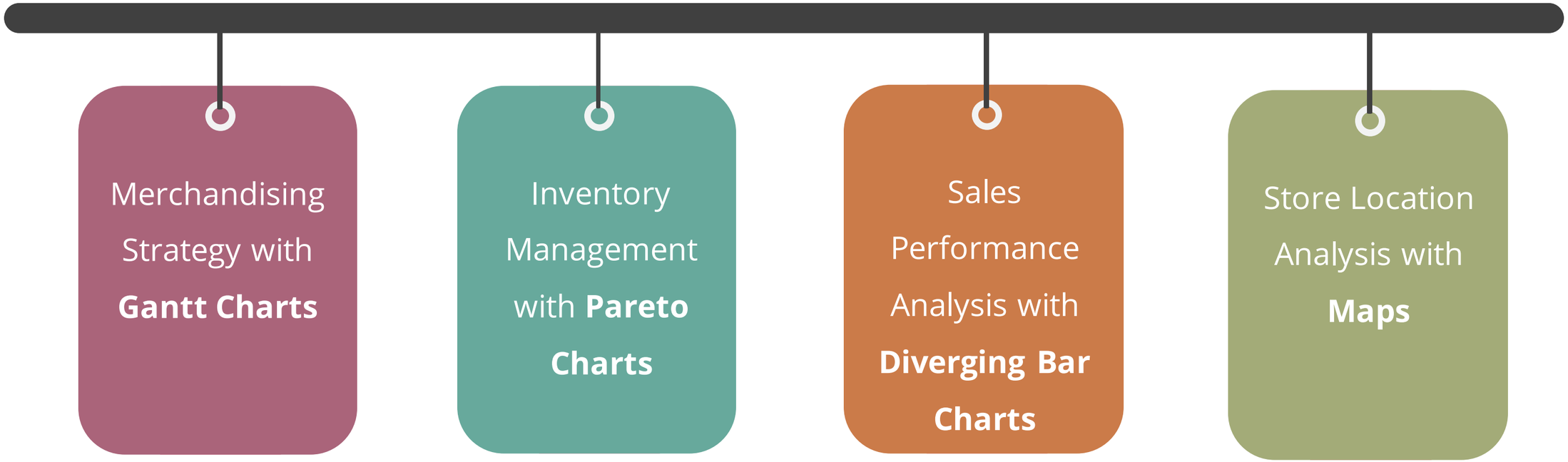
- Assess the suitability of using a donut chart for visualizing specific types of datasets
- Design a lollipop chart to compare categorical data points
- Construct a bullet chart to analyze performance against qualitative ranges
- Evaluate the usefulness of Gantt charts in managing complex projects
- Create an interactive motion chart for data analysis and visualization

Advanced Charts

What Are Advanced Charts?

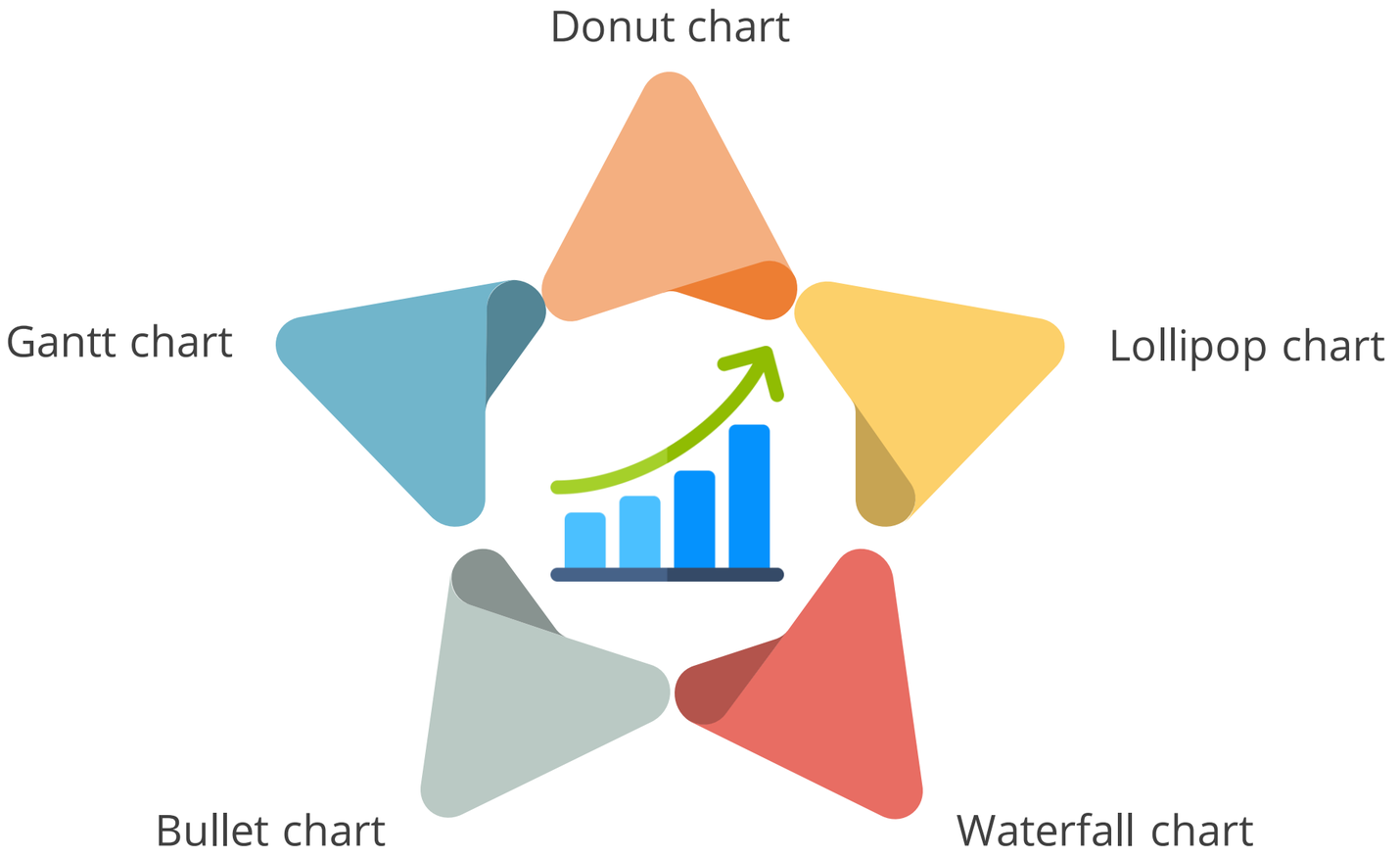
It refers to a type of data visualization that goes beyond basic charts and it involve more complex data sets or require specialized techniques to create and interpret.

In a business like Walmart, advanced charts can be used in many different contexts.



Types of Advanced Charts

These charts represent data in a more sophisticated and insightful manner, allowing for deeper analysis and understanding of the underlying information.



Types of Advanced Charts

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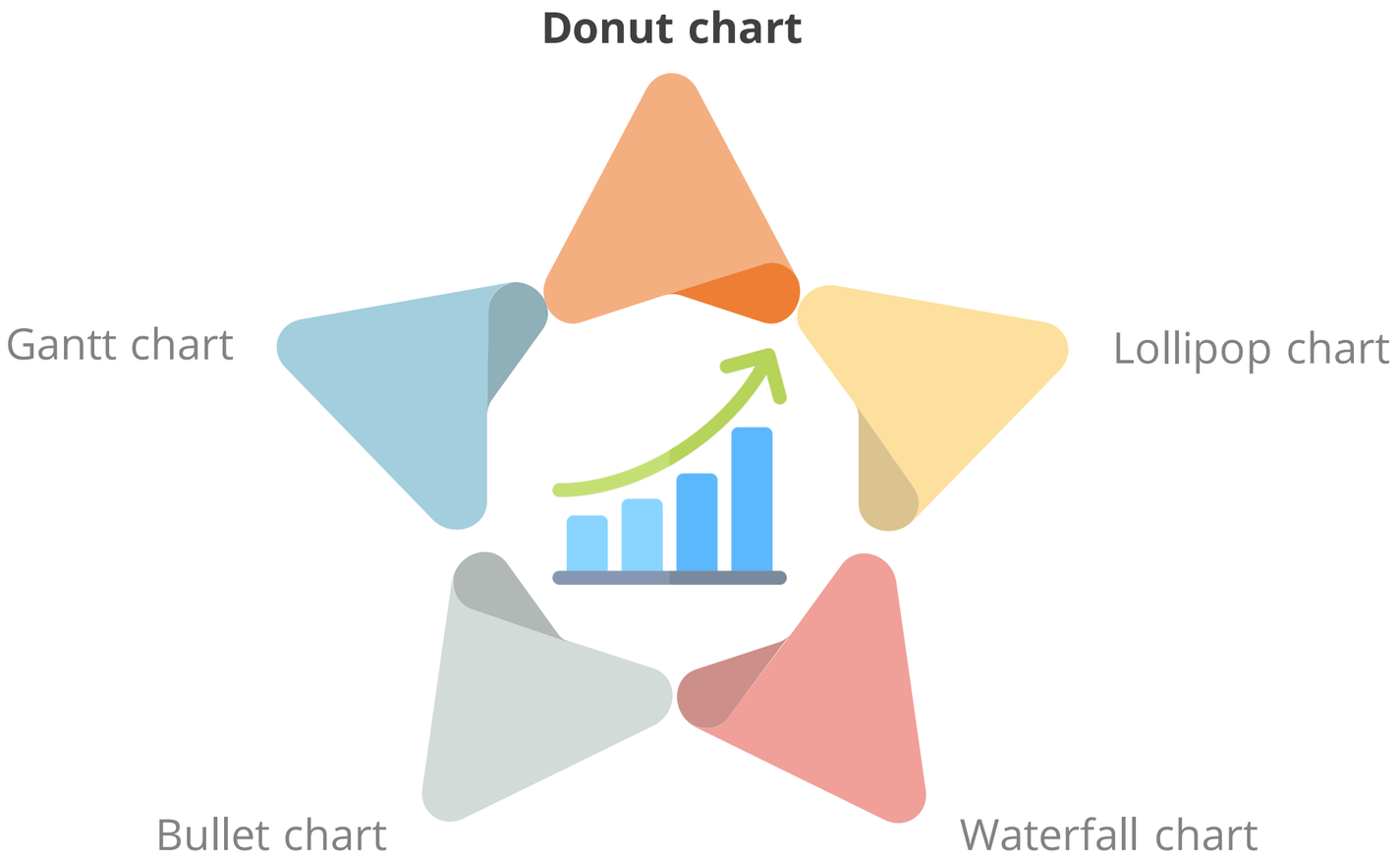
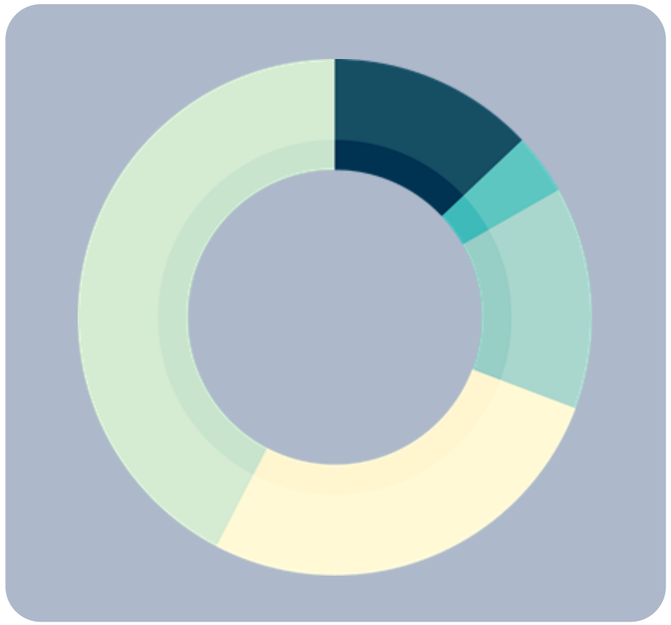


Donut Chart

It resembles a pie chart with part of the center cut out.



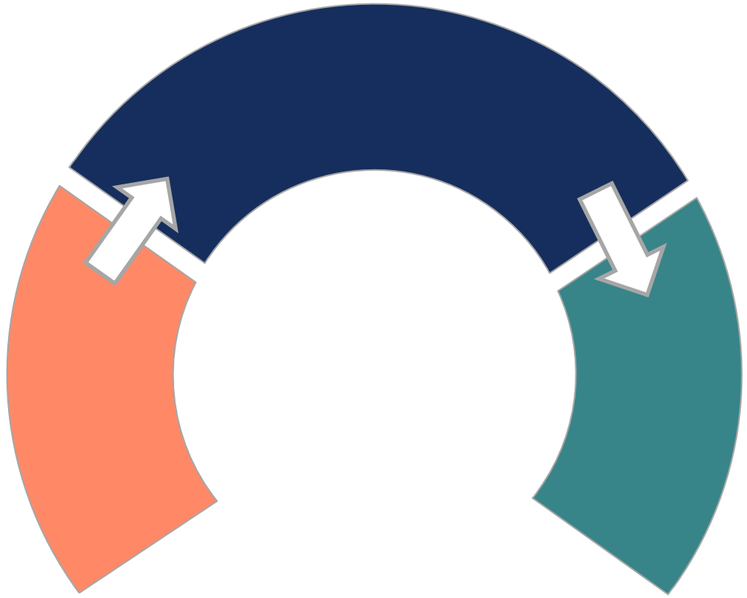
- It displays categories or attributes as arcs.
- It measures the arc lengths (as against areas in the pie chart).
- It allows more than one data series to be added as rings.

It is space-efficient as the blank space inside can display important information.

Donut Chart

Some of the use cases are:

Website page visits by category

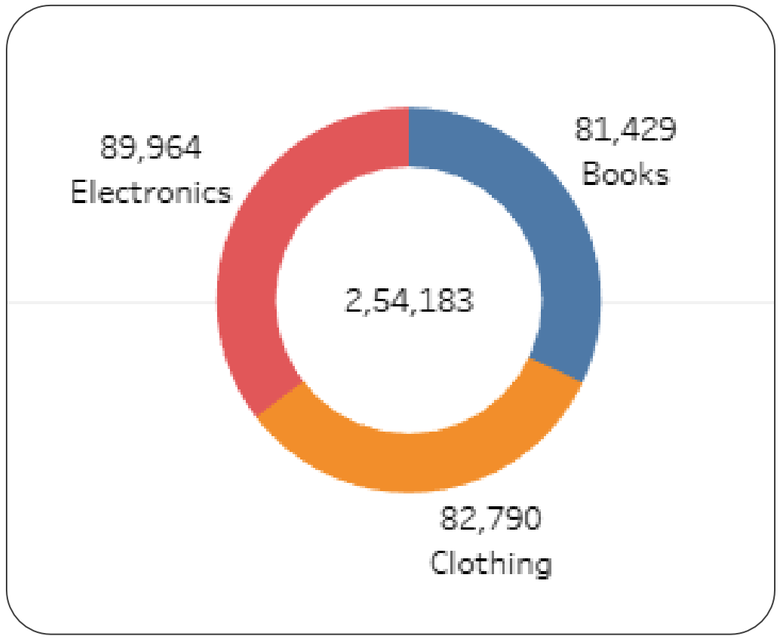


Sales across different retail channels

Sales or profit across various product categories or subcategories

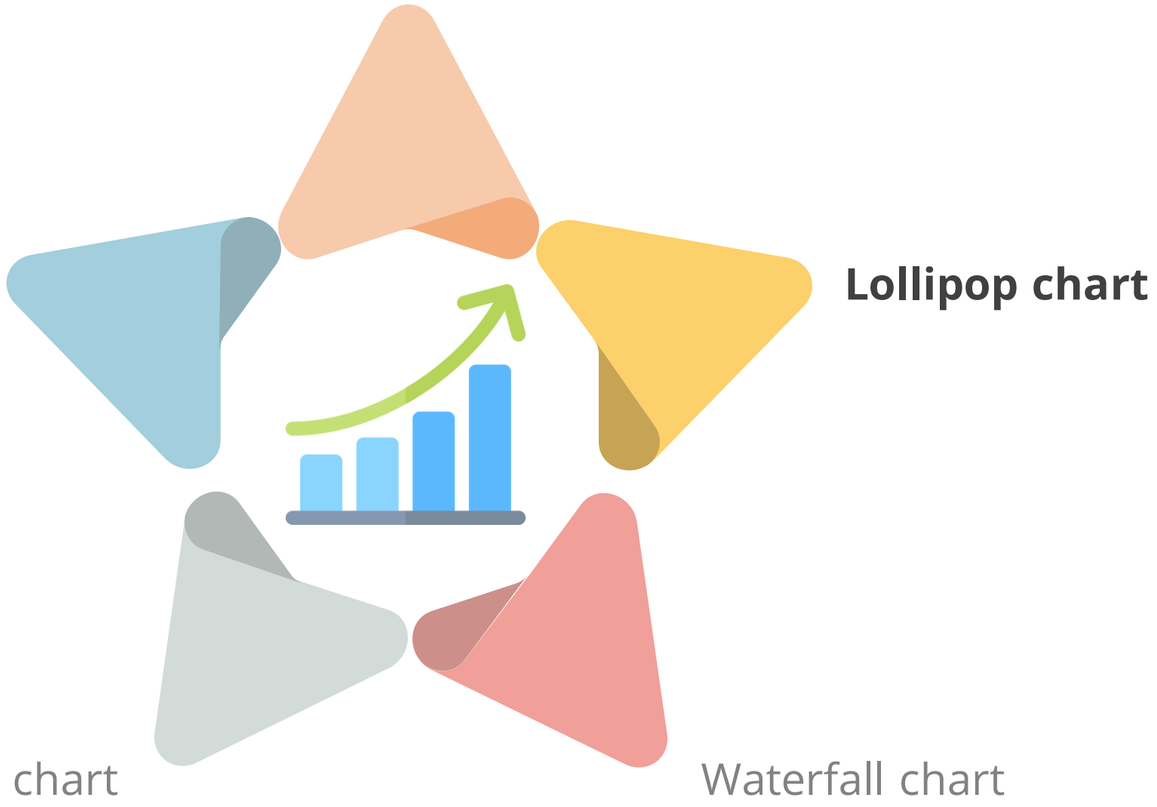
Donut Chart: Example

Scenario: Amazon aims to analyze sales performance across product categories to pinpoint the most revenue-generating categories. To achieve this, they need to visualize revenue distribution among categories to swiftly identify top performers and their contribution to total revenue.



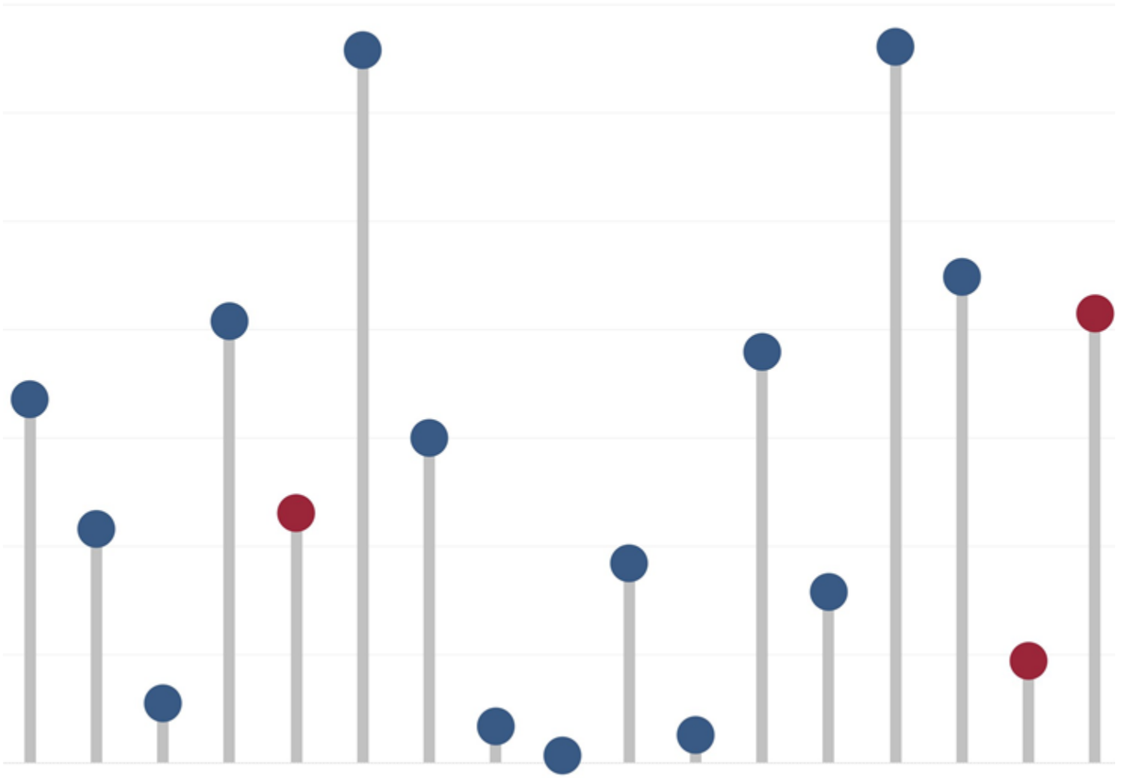
Outcome: The use of a donut chart allows Amazon to quickly pinpoint the best-performing product categories such as **Electronics**.

Types of Advanced Charts



Lollipop Chart

It is a composite chart consisting of bars and circles.



It is useful for visualizing sales across different product sub-categories or brands.

Lollipop Chart

It allows one to use more visual elements to convey information.

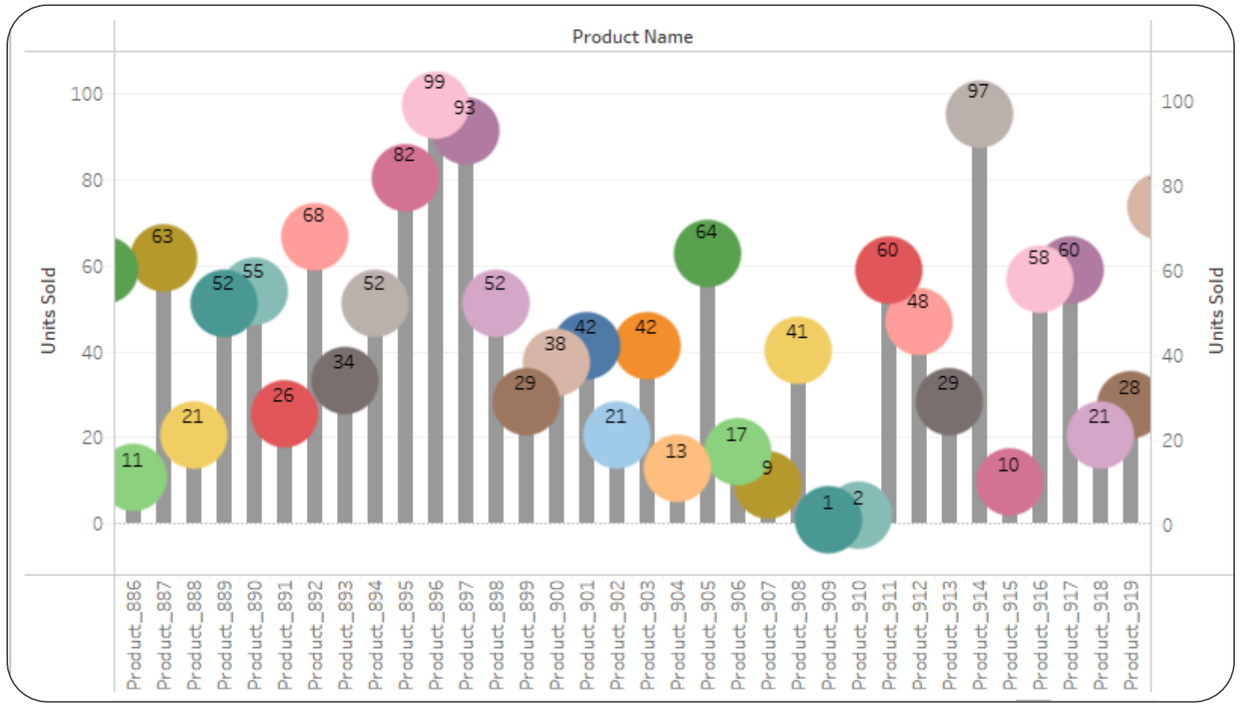
Color can represent a category or magnitude, and size can emphasize the degree.

The bar’s length measures the magnitude.

Circles can be replaced with icons for specific categories.

Lollipop Chart: Example

Scenario: Amazon needs to visualize sales data to identify the best-selling products within a specific category based on the number of units sold.



Outcome: By using the lollipop chart, Amazon can quickly identify the top-selling products within a category that is **Product_896**.

Quick Check

Which of the following statements accurately describes a donut chart?

A. It displays categories or attributes as bars.

B. It focuses on comparing categories by their areas.

C. It allows only one data series to be added as rings.

D. It resembles a pie chart with part of the center cut out.

Types of Advanced Charts

Donut chart

Gantt chart

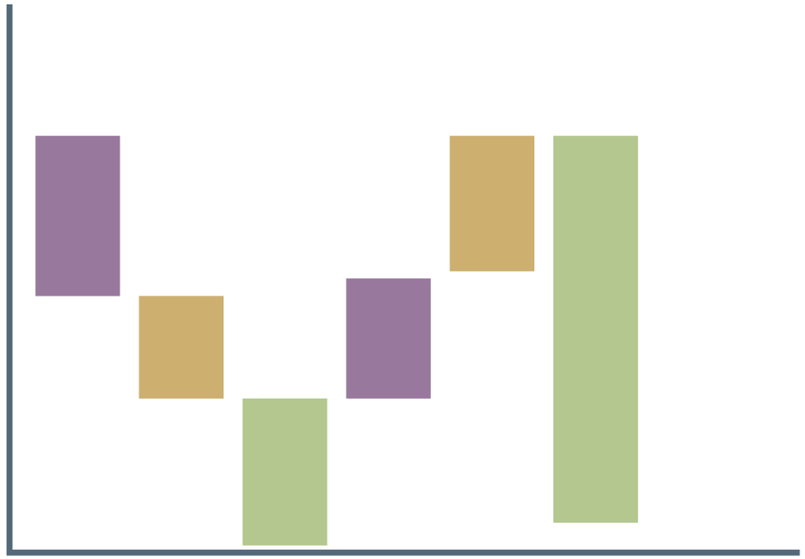
Lollipop chart

Bullet chart

Waterfall chart

Waterfall Chart

It shows how a series of positive and negative changes affect an initial value. The changes are represented as colored columns.

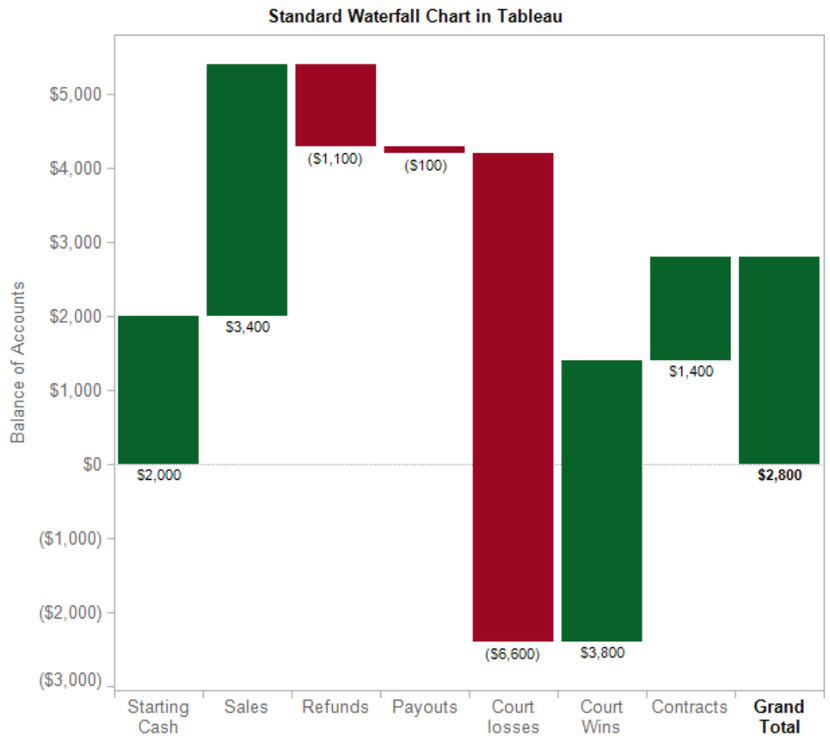


In financial services, it will show credits and debits and gains and losses between two time periods.

The height of the columns represents the magnitude of the change.

Waterfall Chart

The two points between which changes occur are called the beginning value and the ending value.

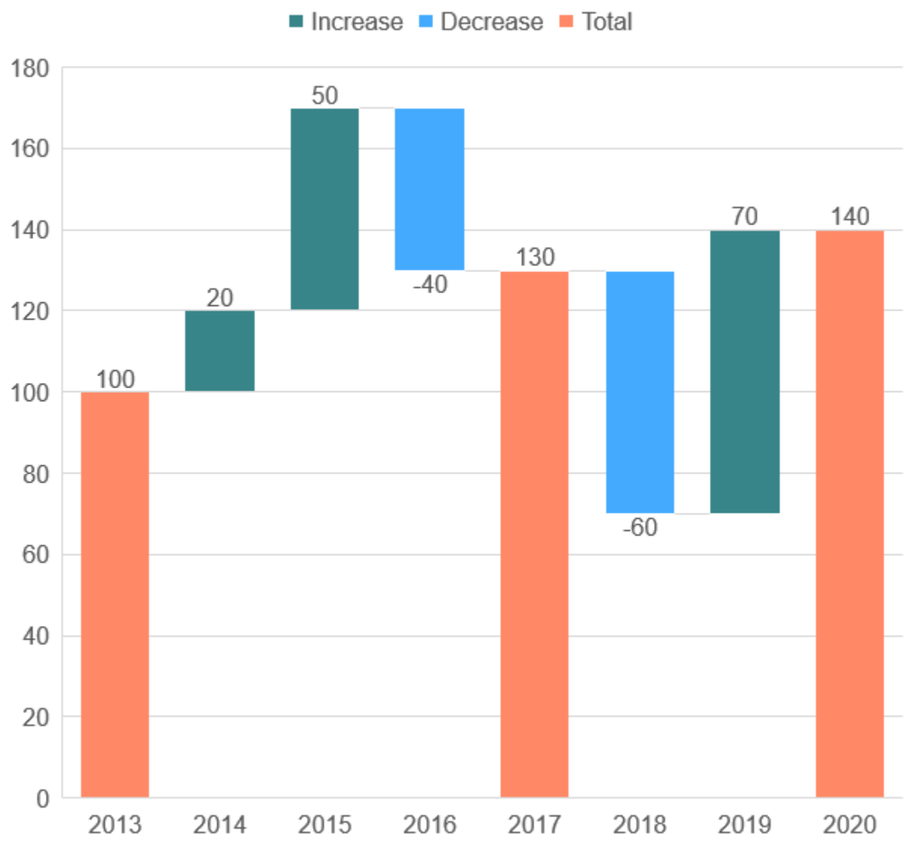


A waterfall chart simplifies the understanding of complex changes in data.

Source: https://freakalytics.com/wp-content/uploads/Standard_Waterfall_Chart_Tableau_Freakalytics1.png

Waterfall Chart: Example

Its impact varies for different target audiences and data values.



Colors can explain the changes in a waterfall chart better.

- Start and end points
- Positive changes
- Negative changes

Quick Check

How does a waterfall chart simplify the understanding of complex data changes?

A. By presenting data in a linear fashion

B. By providing detailed annotations for each data point

C. By visually illustrating cumulative changes over time

D. By excluding outliers from the analysis

Types of Advanced Charts

Donut chart

Gantt chart

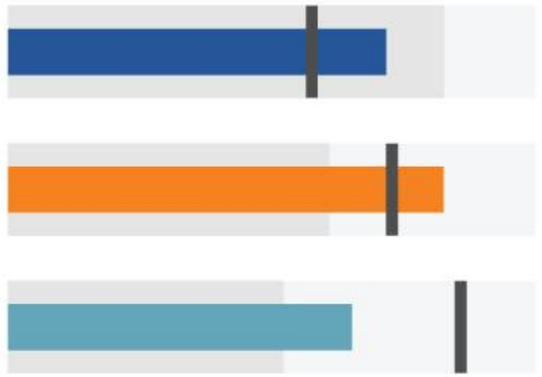
Lollipop chart

Bullet chart

Waterfall chart

Bullet Chart

It is a bar marked with extra encodings to show progress towards a goal or performance against a reference line.



It compares the performance of a primary measure to one or more measures.

Understanding the Bullet Chart

A bullet, typically a bar in the middle, represents the primary measure. It is usually depicted with a bold line and strong color.

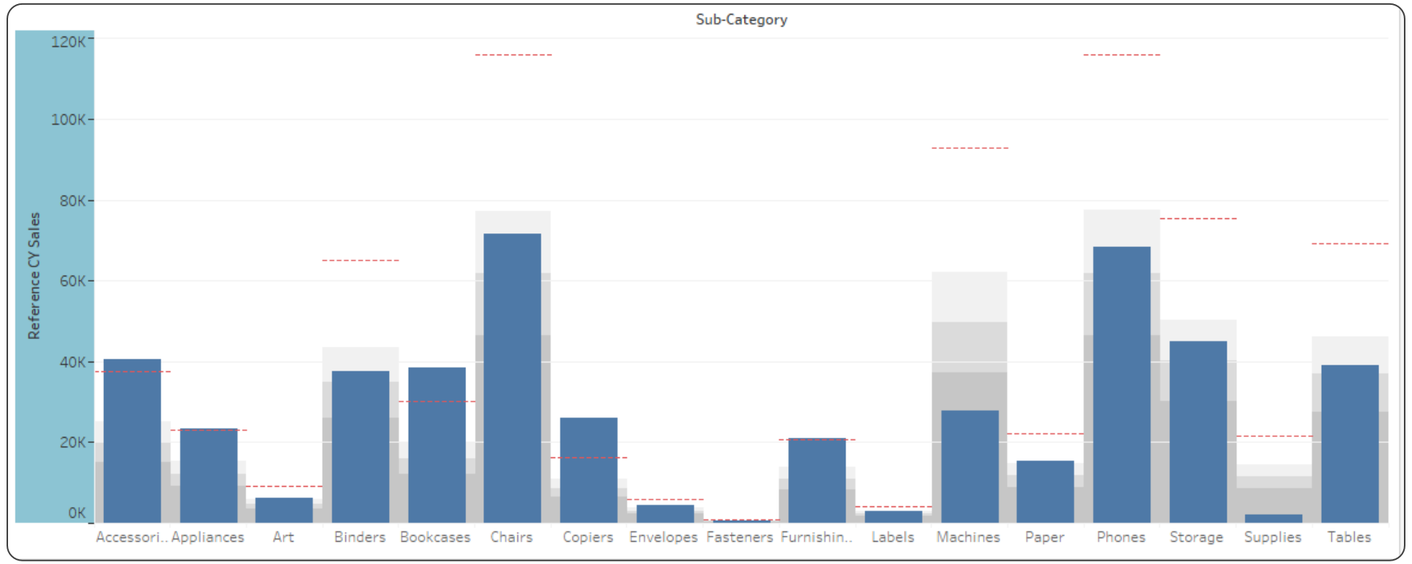
The primary variable or variable of interest is placed at the center and is dark-colored, typically representing the actual performance.

Another secondary variable, represented as a target line, is compared to the primary variable.

The secondary variable (in grey) is the variable with which the primary variable is compared; usually, it is the target.

Bullet Chart: Example

Scenario: Amazon aims to optimize its sales strategy by analyzing best-selling products within each category based on units sold.



Outcome: The bullet chart serves as a critical tool for Amazon's decision-makers, providing them with a clear and concise visualization of sales data.

Demo: Bullet Chart

Duration: 05 minutes

Demonstrate how to create a Bullet chart to view the relationship between sales of the current year and sales of the previous year.

DEMONSTRATION

Quick Check

What does the secondary variable in a bullet chart typically represent?

A. Actual performance

B. Progress towards a goal

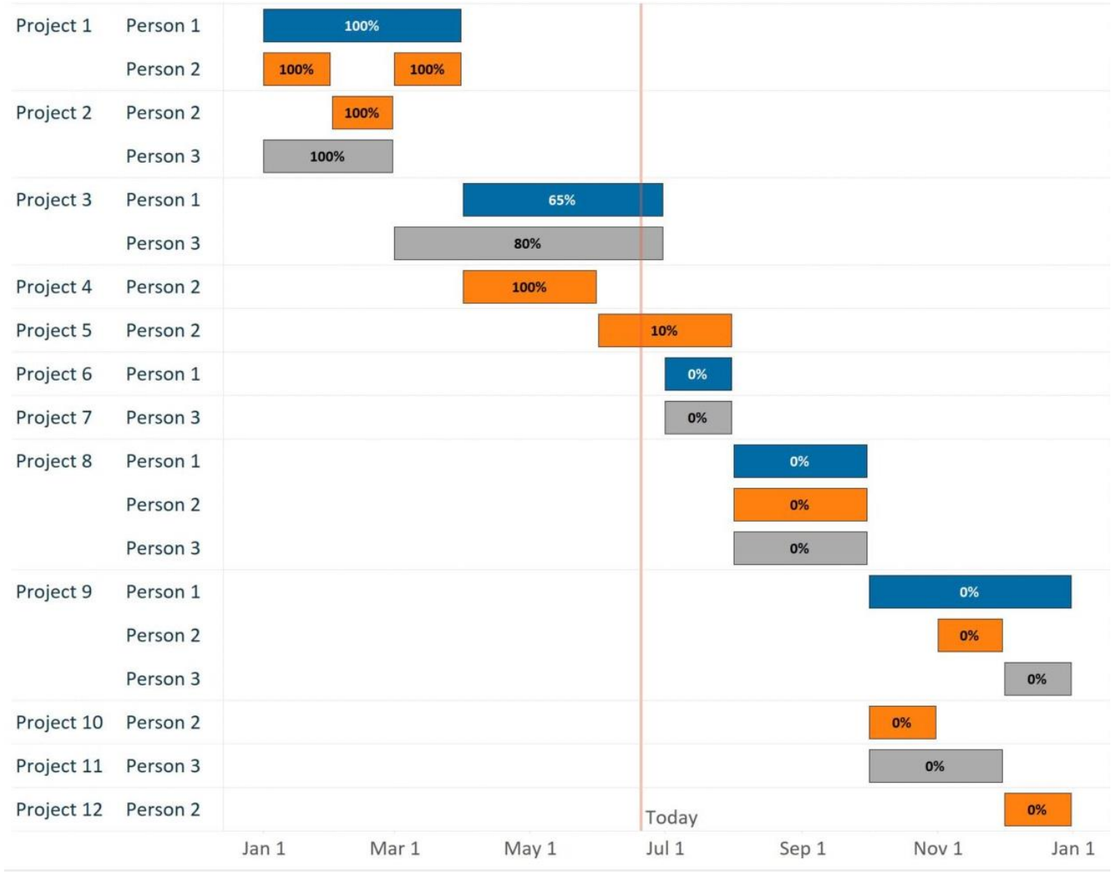
C. Reference line

D. Target compared to the primary variable

Types of Advanced Charts

Gantt Chart

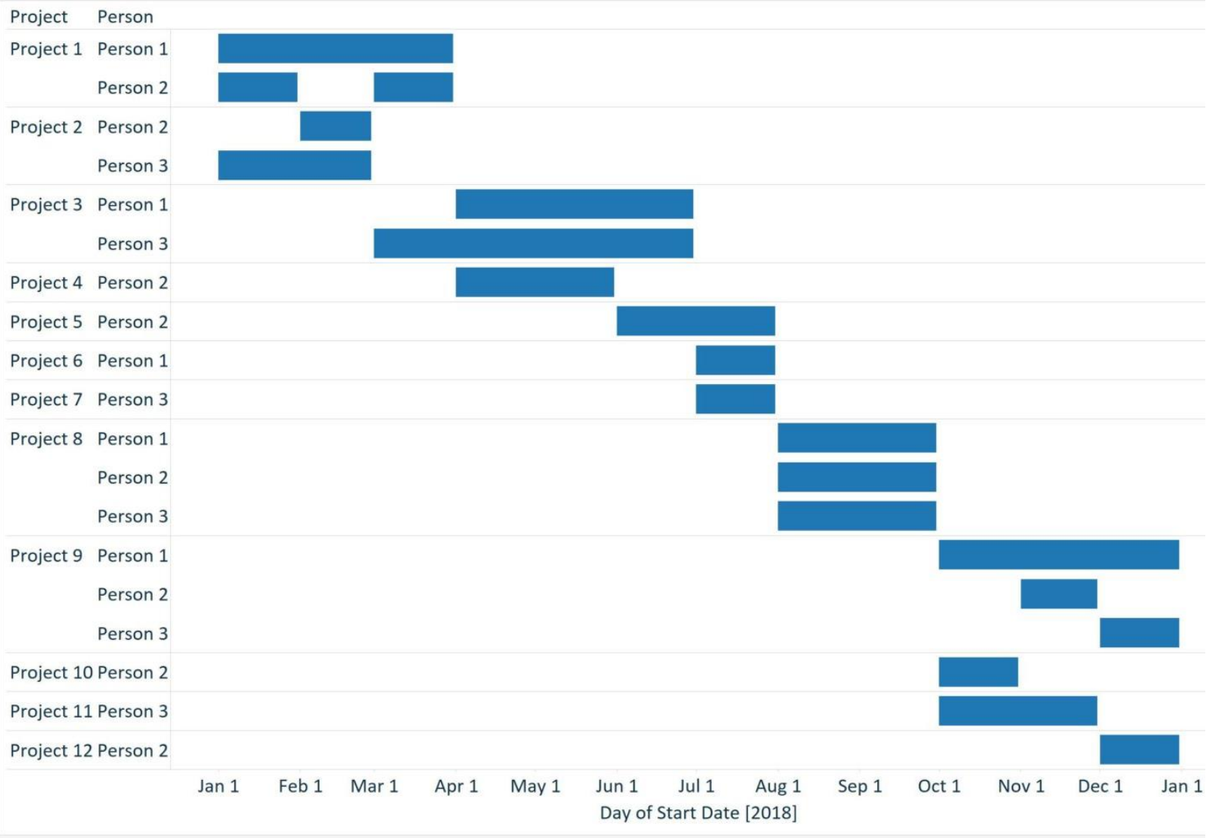
It is a graphical depiction of a project schedule.



It is a type of bar chart that shows the start and finish dates of a project's elements, such as resources, planning, and dependencies.

Reading a Gantt Chart

The length of the bar is proportional to the time necessary for completion of a task.



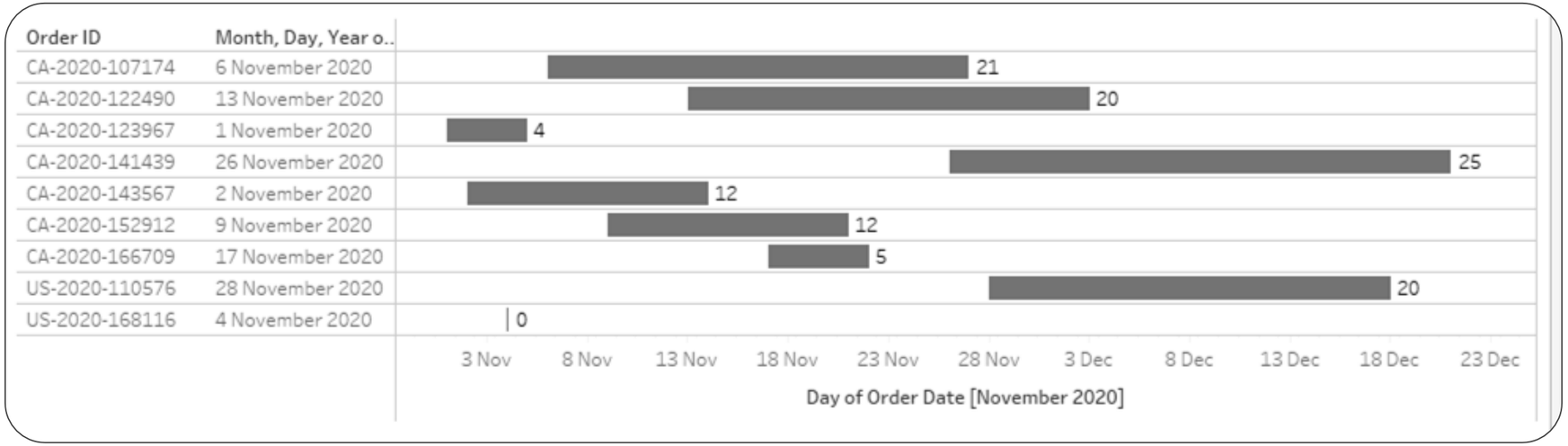
Horizontal bars of different lengths represent the project timeline, which displays:

- Task sequences
- Duration
- Start and end dates for each task

Time is placed on the X-axis, and time-based activities are on the Y-axis.

Gantt Chart: Example

Scenario: Amazon needs to analyze the efficiency of its order processing system during the November 2020 holiday season. They want to visualize order processing times to identify bottlenecks and delays.



Outcome: Amazon can use a Gantt chart to visualize order processing times. Each bar represents an order, with its length showing the processing time from order placement to delivery.

Demo: Gantt Chart

Duration: 10 minutes

Demonstrate how to build and use a Gantt chart by illustrating the shipping durations for the top N orders across diverse month or year combinations.

DEMONSTRATION

Quick Check

How is time typically represented in a Gantt chart?

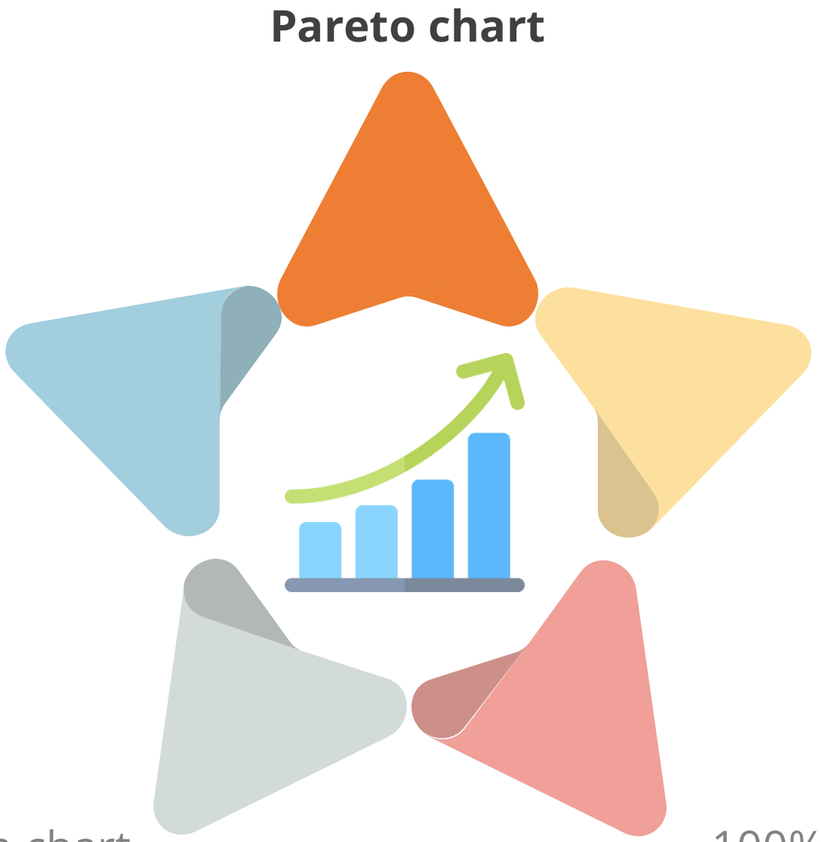
A. Y-axis

B. Z-axis

C. X-axis

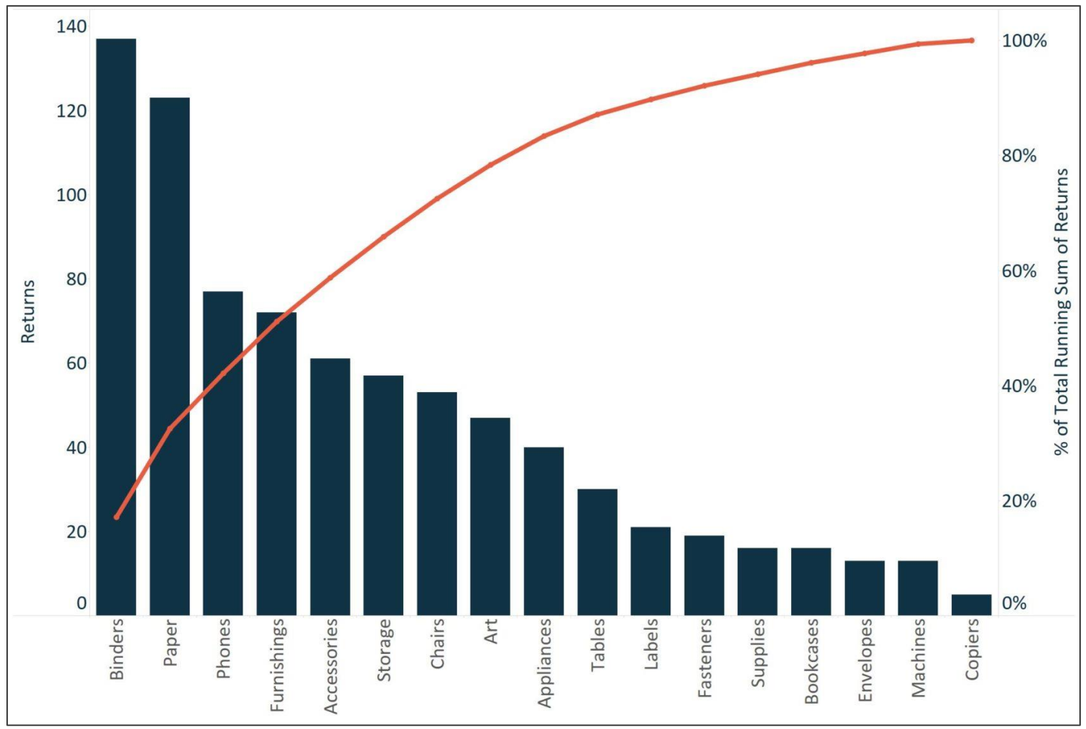
D. All of the above

Types of Advanced Charts



Pareto Chart

It is a combination of a bar and a line chart that displays both individual values and their cumulative total in descending order.

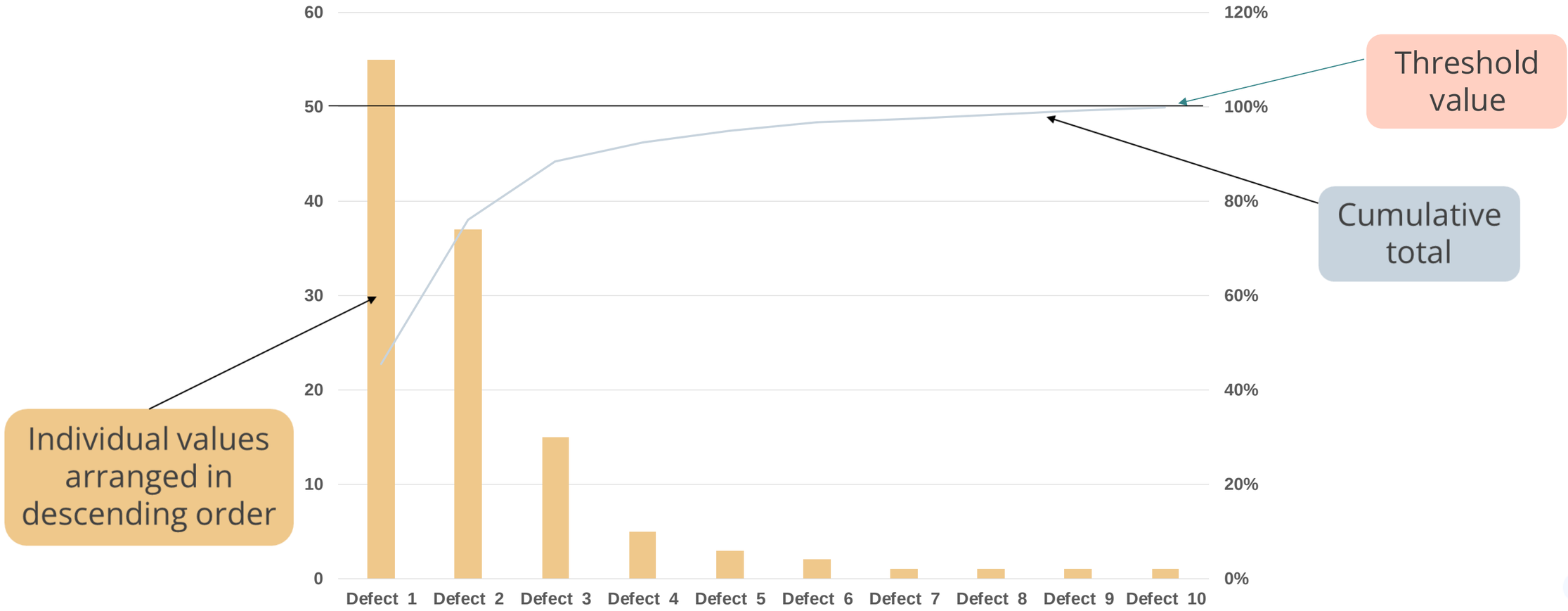


- It solves problems more efficiently, as businesses can target the problems that have a greater impact on the business.
- It determines which variable has the most impact.

It is a visual representation of the Pareto principle, also known as the 80/20 rule, which states that roughly 80% of business results come from 20% of the business initiatives.

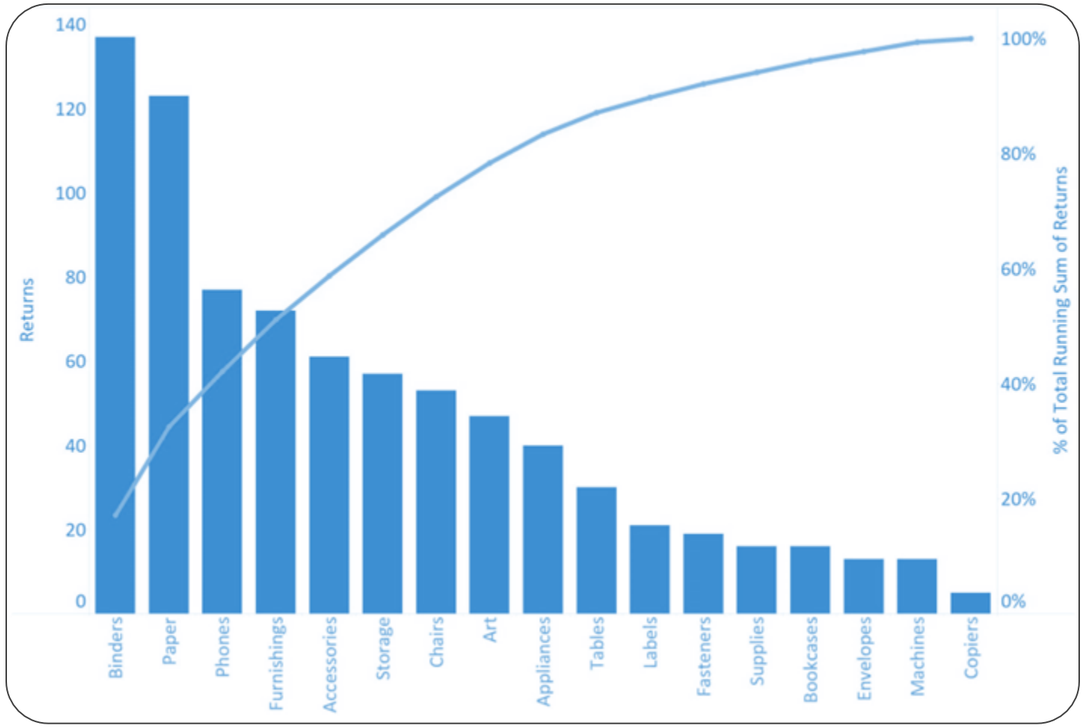
Understanding Pareto Chart

The line indicates cumulative percentage, the bars show component importance, and the threshold is displayed horizontally.



Pareto Chart: Example

Scenario: Amazon seeks to optimize inventory and reduce return rates by analyzing sales data to identify frequently returned products within each category and understand their impact on overall sales.



Outcome: The analysis shows that the categories like Binders, Paper, and Phones have high sales, they also experience high return rates, possibly impacting customer satisfaction and profitability.

Demo: Pareto Chart

Duration: 10 minutes

Demonstrate how to create a Pareto chart to show the top sub-categories that contribute to 80% of the sales.

DEMONSTRATION

Quick Check

What type of chart is commonly used in Pareto analysis?

A. Pie chart

B. Scatter plot

C. Line and bar chart

D. Radar chart

Types of Advanced Charts

Pareto chart

Maps

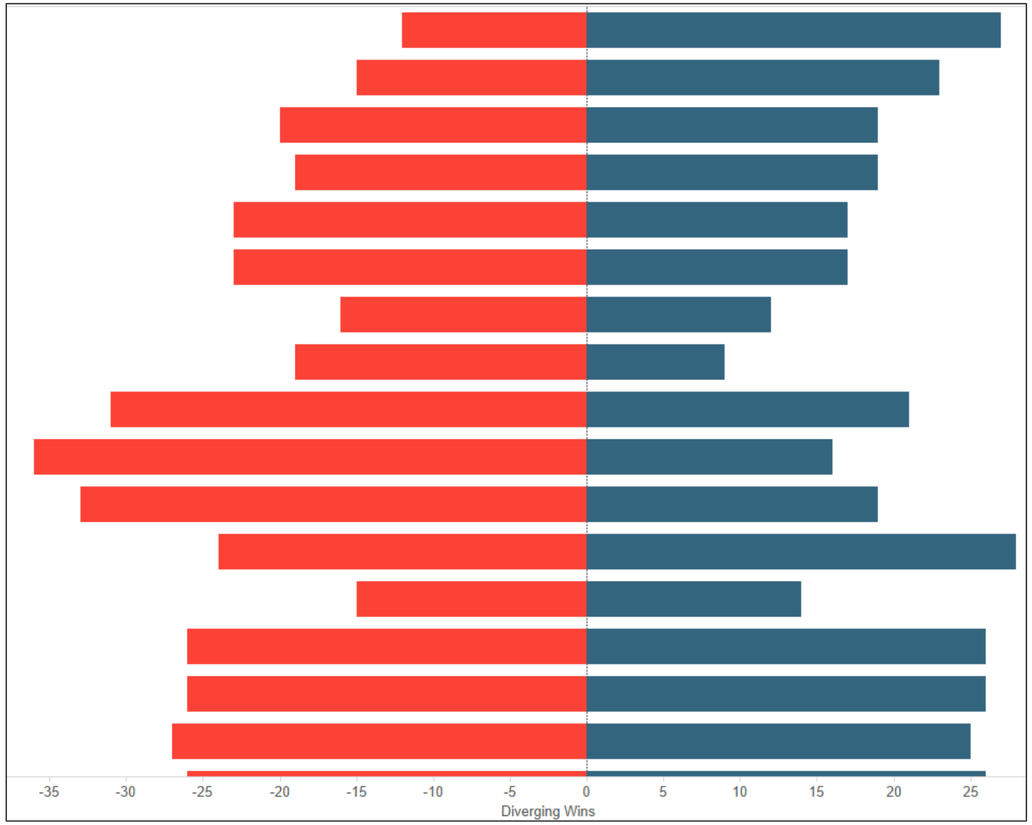
Diverging bar chart

Motion chart

100% Stack bar Chart

Diverging Bar Chart

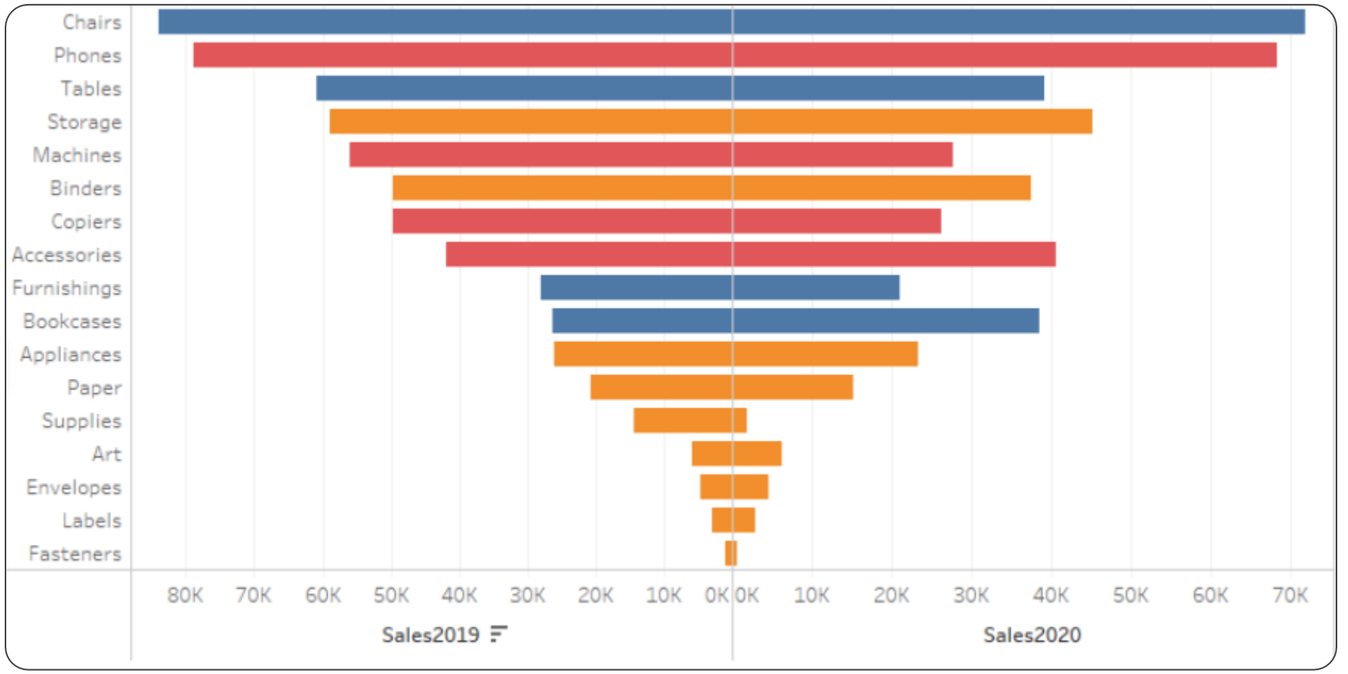
It facilitates the comparison of multiple categories.



Its design helps to compare two variables (with numerical values) in a variety of categories.

Diverging Bar: Example

Scenario: Amazon wants to analyze the sales performance of its product categories across different regions. The goal is to identify areas of strength and areas that need improvement.



Outcome: The diverging chart helps Amazon pinpoint strong performers like chairs and phones while highlighting areas needing improvement, such as Supplies and Fasteners products.

Demo: Diverging Bar Chart

Duration: 05 minutes

Demonstrate how to create a diverging bar chart to show the sales for 2019 and 2020 across different product subcategories.

DEMONSTRATION

Quick Check

What is the primary purpose of a diverging bar chart?

A. To display categorical data

B. To visualize trends over time

C. To facilitate the comparison of multiple categories

D. To represent geographical information

Types of Advanced Charts

Pareto chart

Maps

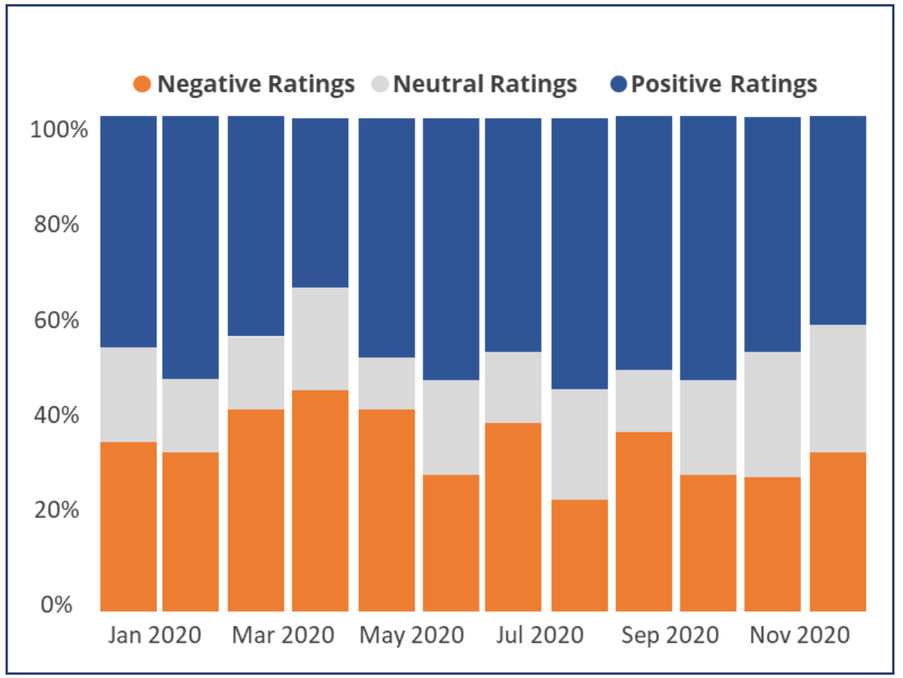
Diverging bar chart

Motion chart

100% Stack bar chart

100% Stack Bar Chart

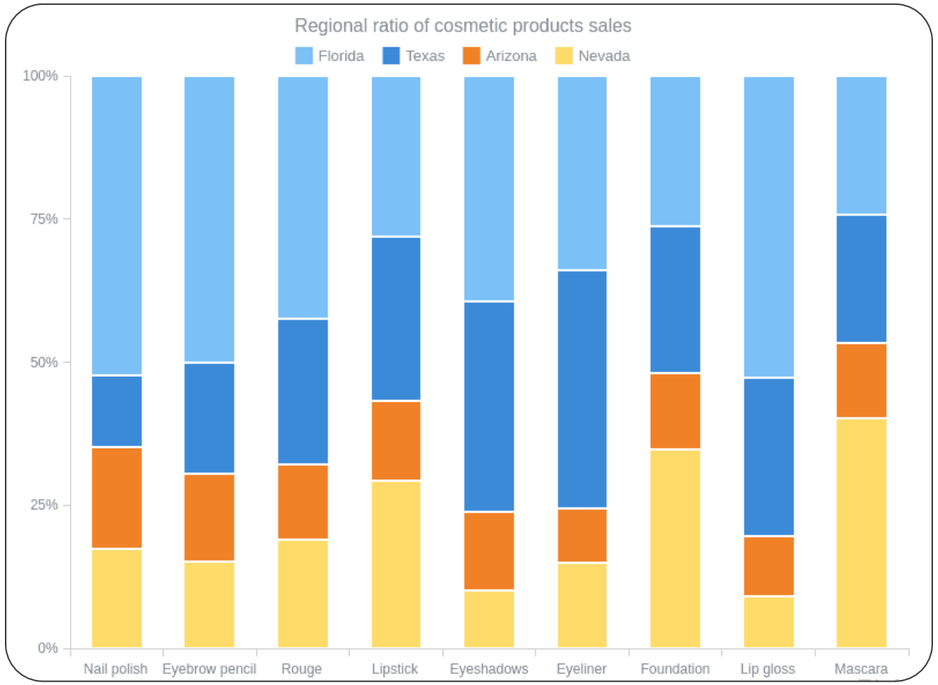
It resembles a traditional stacked bar chart, illustrating each section of the bar as a proportion of the total rather than displaying specific numerical values.



The Y-axis is standardized to a 100% scale, ensuring uniform bar lengths across all categories.

100% Stack Bar: Example

Scenario: Amazon aims to improve marketing and inventory strategies for cosmetics by analyzing sales data to identify regional best-sellers, enabling tailored stock levels and marketing campaigns.



Outcome: Florida favors Nail Polish and Lip gloss, and Nevada prefers Foundation and Mascara; Arizona shows balanced demand across products.

Types of Advanced Charts

Pareto chart

Maps

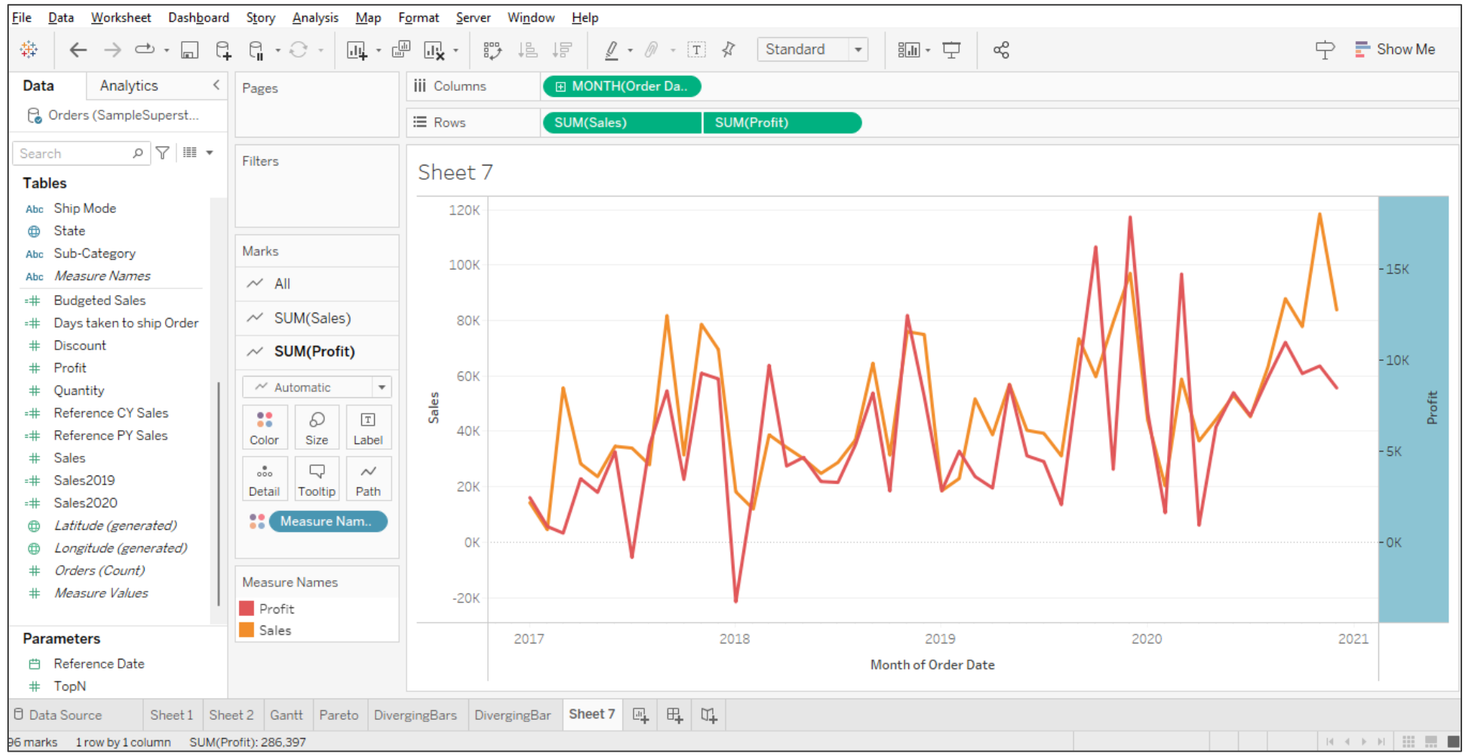
Diverging bar chart

Motion chart

100% Stack bar Chart

Motion Chart

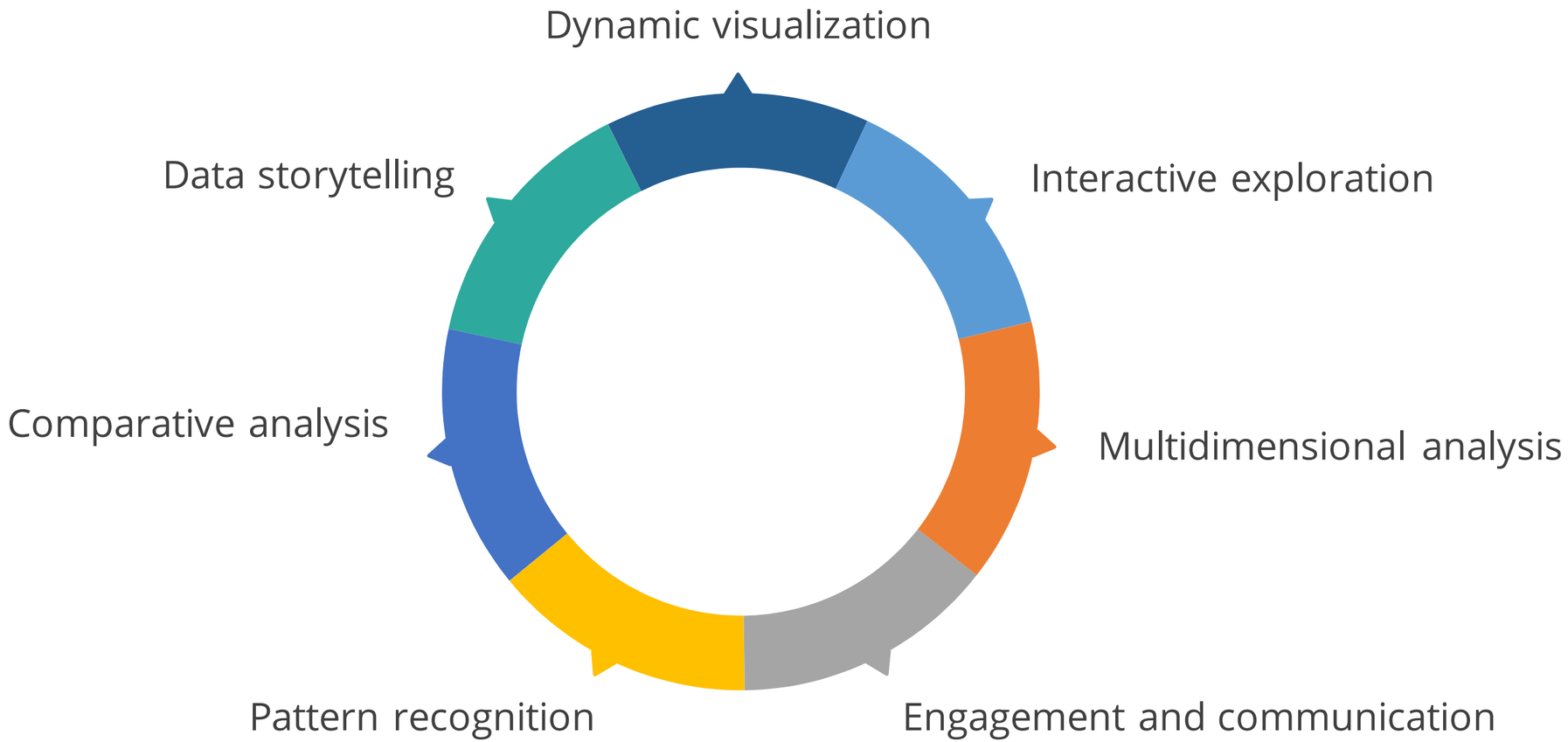
It is a dynamic data visualization that displays changes in data over time.



It is used for visualizing complex datasets with multiple variables.

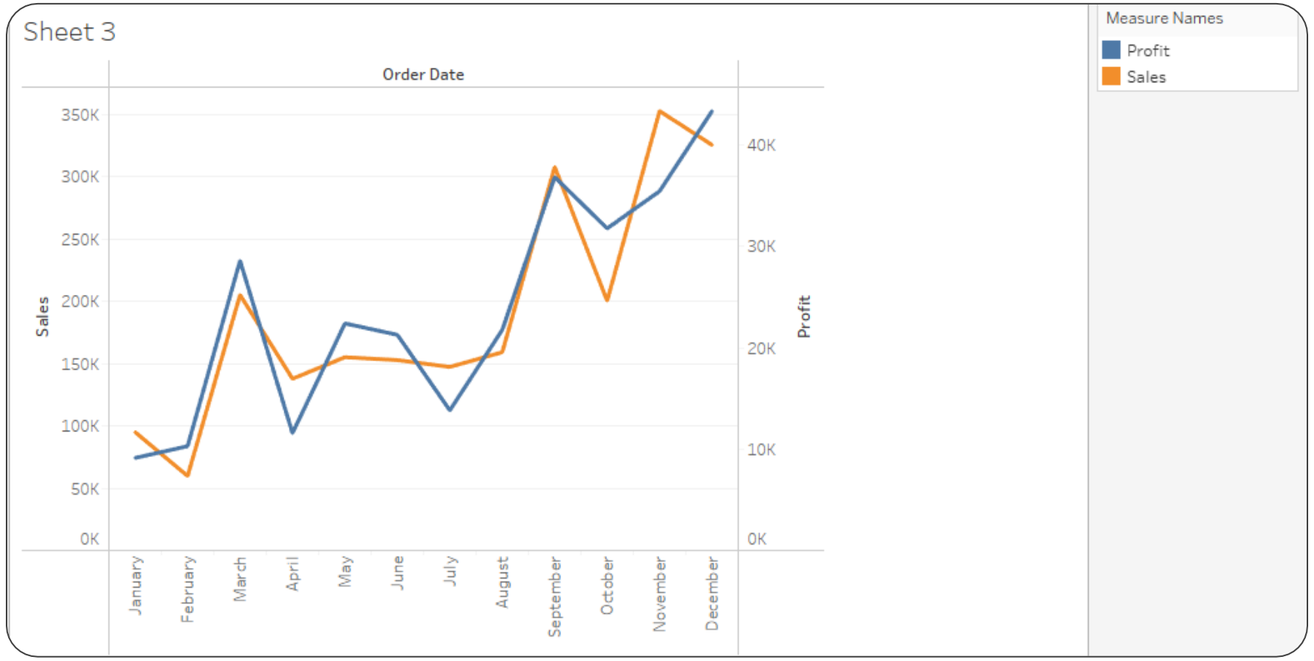
Motion Chart: Features

Here are some salient features of the motion chart:



Motion Chart: Example

Scenario: Amazon, a leading online retailer, is tracking the monthly sales and profit performance over the course of a year. The goal is to analyze trends, identify peak sales months, and make informed decisions to optimize revenue.



Outcome: The motion chart is a key tool for Amazon's decision-makers, providing a clear visualization. November is highlighted as the peak sales month, while December is likely the peak profit month.

Demo: Motion Chart

Duration: 10 minutes

Demonstrate how to create a motion chart to show the movement of monthly sales and profit using a line chart.

DEMONSTRATION

Quick Check

How are individual data points typically represented in a motion chart?

A. As text labels

B. As lines connecting points

C. As symbols, such as circles or bubbles

D. As bars of different lengths

Maps

Types of Advanced Charts

Pareto chart

Maps

Diverging bar chart

Motion chart

100% Stack bar chart

Maps

They represent data that has geographic or location-wise attributes or values.

Types of Maps

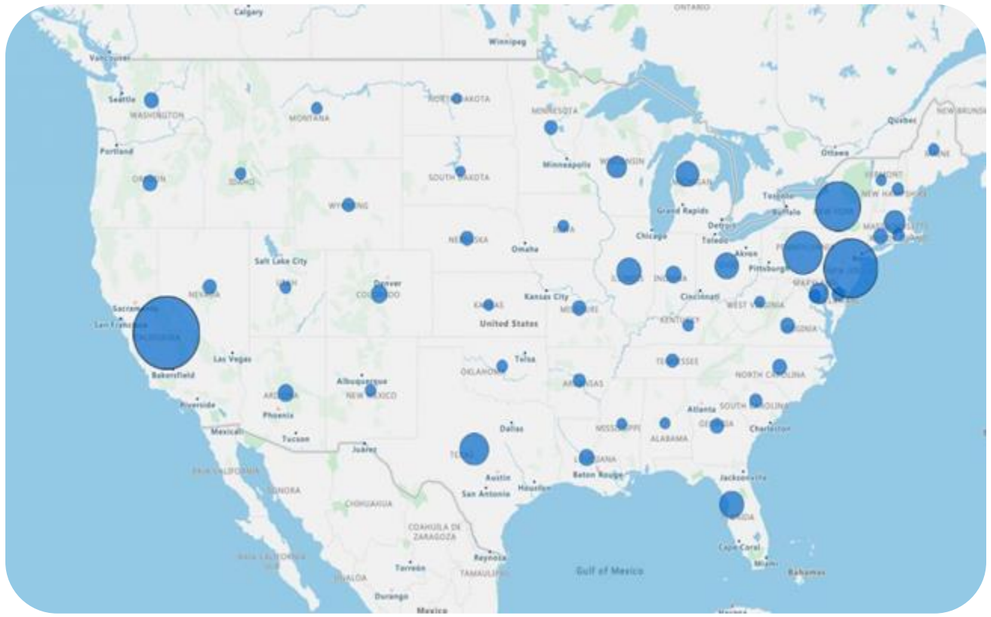
The most common types of maps are:

Bubble maps

Choropleth maps

Bubble Maps

Bubbles or circles represent attributes of a geographical region.

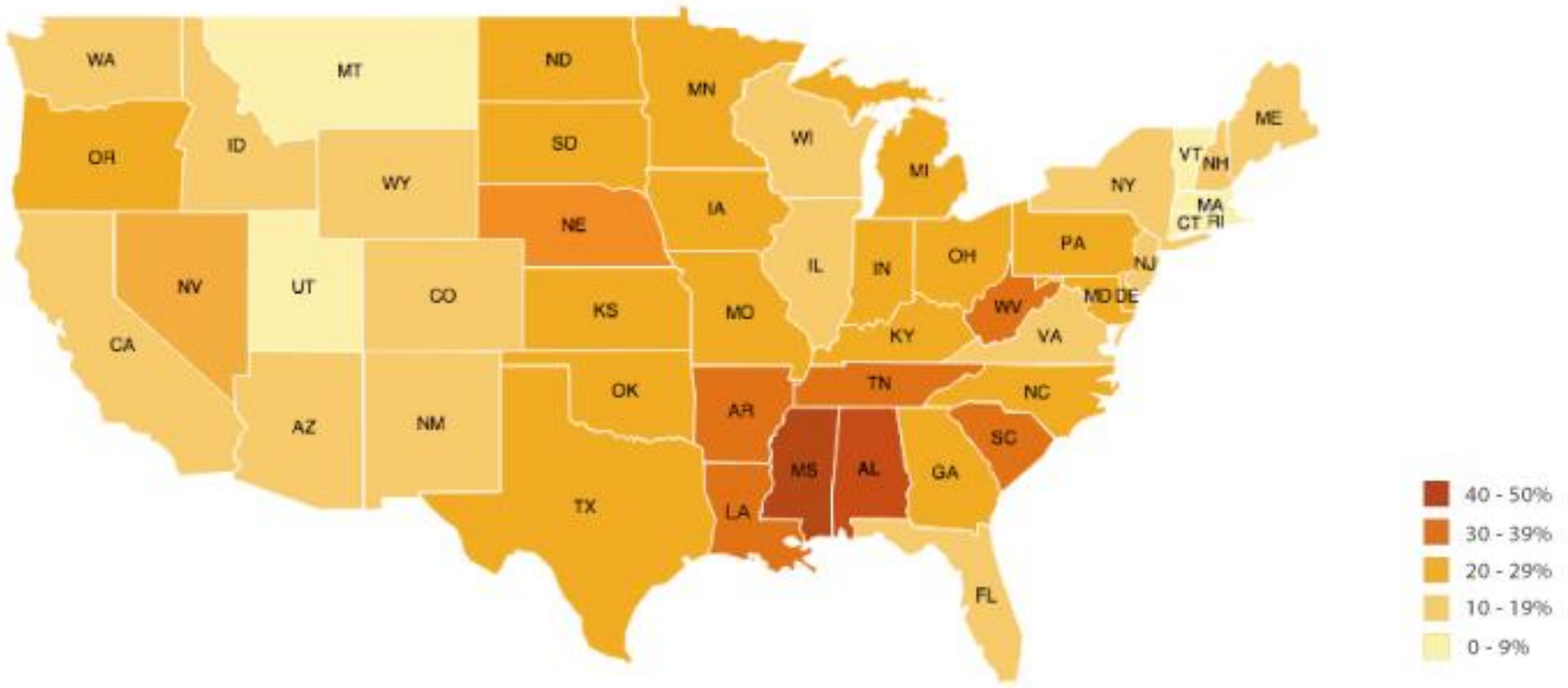


- The size of the bubble is proportional to the numeric value of the data.
- They are ineffective when larger bubbles overlap the smaller bubbles in the map.

Bubble maps are good for comparing proportions across different geographic locations.

Choropleth Maps

These maps are thematic; regions are colored, shaded, or patterned based on the data.



The data variable uses color progression to represent values on the map.

Maps: Example

Scenario: Amazon needs to visualize the sales data on a map to identify which products are selling well in specific cities or regions.

Outcome: By using the maps chart, Amazon can identify trends in sales across different cities.

Use Case: Uber Uses Maps

Scenario

Uber needs to visualize vehicle availability and traffic congestion to optimize driver allocation and improve service efficiency in a dynamic environment where traffic conditions and ride demand vary.

Solution

Uber uses Tableau to create a geographical map chart that shows the real-time location of available vehicles, traffic congestion levels, and areas with high demand for rides. The map is color-coded to indicate the level of congestion, and markers represent the location of available vehicles.

Quick Check

What visual representation is commonly used to depict geographic or location-wise data attributes?

A. Squares

B. Circles or bubbles

C. Triangles

D. Stars

Guided Practice

Overview **Duration: 20 minutes**

In this exercise, you will explore the creation of a Pareto chart using Tableau. The Pareto chart is a valuable tool for identifying the most significant factors in a dataset, aiding in prioritization and decision-making. By analyzing sales data, we aim to extract insights that can inform strategic business decisions.

Key Takeaways

- Donut charts display the proportions of a whole in a circular format with a center hole, aiding in visualizing data distribution.
- Lollipop charts blend bar and dot plots, using vertical lines (lollipops) to represent categorical data points, enhancing comparison.
- Bullet charts show performance against qualitative ranges, with added measures for comprehensive analysis.
- Gantt charts visualize project schedules, tasks, durations, and dependencies for efficient project management.
- Motion charts depict data changes over time through animated transitions, providing dynamic insights into trends and patterns.

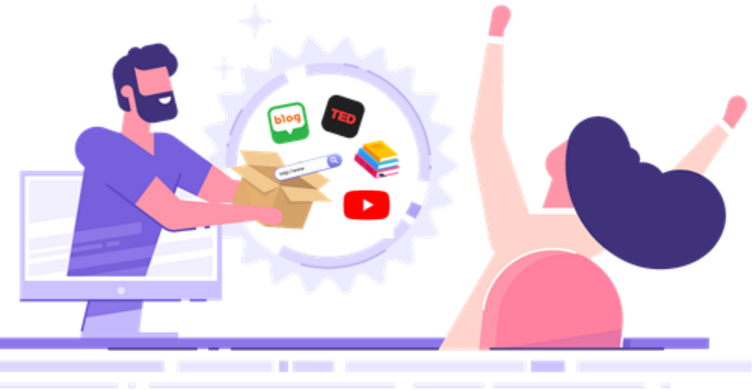
Practice Project

Growmart Sales Analysis

In this project, you will utilize Tableau's capabilities to visualize and analyze Superstore order data. The primary objectives include exploring trends and patterns, creating complex visualizations, and drawing actionable insights from the data. The project focuses on a fictional scenario involving a dataset of orders received by a prominent superstore, Growmart.

PRACTICE PROJECT

Additional Resources



- Use radar charts to compare dimensions over several metrics.

Q&A