Unit 14
Business Intelligence

BI TOOLS AND TECHNIQUES

Creating BI Application

The preliminary content for the BI application has been gathered through the requirements gathering processes.

Regarding business personas, we consider the tools that support them and then structure BI applications accordingly. These personas include:

- Casual consumers: Ranging from operations staff to executives.
- Analysts: Individuals with titles containing "analyst" (e.g., business analyst, financial analyst, sales analyst, operations analyst).
- Power users: Departmental experts in BI tools, often found in IT departments.
- Data scientists: Experts in data analysis and statistics.

As for BI analytical styles, they include various approaches such as reports, dashboards, scorecards, OLAP cubes, pivot tables, ad hoc queries, data discovery, data visualization and others.

Dashboards Vs. Scorecards: Deciding Between Operations & Strategy

DASHBOARD	SCORECARD
Tactical - focused on short-term decision making.	Strategic - focused on long-term decision making.
Provides a snapshot of business performance.	Represents trends/changes in business activity over time.
Operationally focused and supported by individual managers.	Supported by clearly defined management strategy.
Change in performance evaluated by primary decision-makers/ stakeholders.	Changes in performance measured against business goals.

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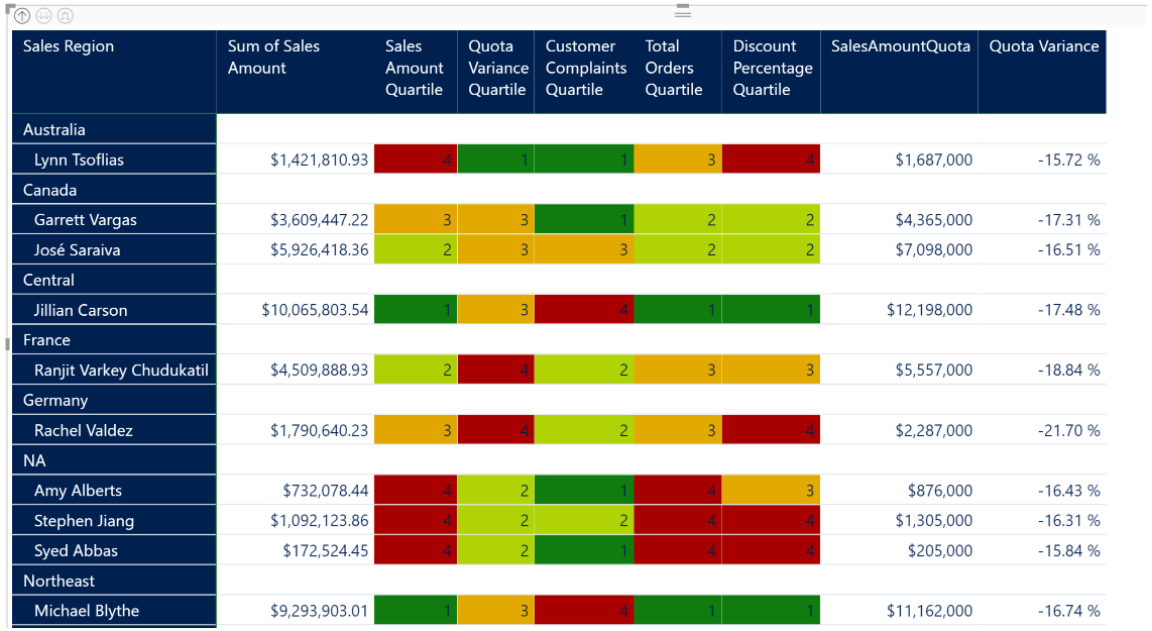
Dashboards Vs. Scorecards: Deciding Between Operations & Strategy

A **dashboard** is largely used as a business intelligence tool that helps you visualize large sets of data:

- You need to track the efficiency of production and error rates in your manufacturing facility.
- You need to track how many inbound calls your call centres get every hour.
- You need to monitor safety and instances of injury in a factory.
- You have to track the number of on-time arrivals and departures to and from your airport.



Sales Region	Sum of Sales Amount	Sales Amount Quartile	Quota Variance Quartile	Customer Complaints Quartile	Total Orders Quartile	Discount Percentage Quartile	SalesAmountQuota	Quota Variance
Australia								
Lynn Tsoflias	$1,421,810.93	4	1	1	3	4	$1,687,000	-15.72 %
Canada								
Garrett Vargas	$3,609,447.22	3	3	1	2	2	$4,365,000	-17.31 %
José Saraiva	$5,926,418.36	2	3	3	2	2	$7,098,000	-16.51 %
Central								
Jillian Carson	$10,065,803.54	1	3	4	1	1	$12,198,000	-17.48 %
France								
Ranjit Varkey Chudukatil	$4,509,888.93	2	4	2	3	3	$5,557,000	-18.84 %
Germany								
Rachel Valdez	$1,790,640.23	3	4	2	3	4	$2,287,000	-21.70 %
NA								
Amy Alberts	$732,078.44	4	2	1	4	3	$876,000	-16.43 %
Stephen Jiang	$1,092,123.86	4	2	2	4	4	$1,305,000	-16.31 %
Syed Abbas	$172,524.45	4	2	1	4	4	$205,000	-15.84 %
Northeast								
Michael Blythe	$9,293,903.01	1	3	4	1	1	$11,162,000	-16.74 %

Dashboards Vs. Scorecards: Deciding Between Operations & Strategy

A **scorecard** is a framework used to align your strategy with your objectives (display the KPI) :

- You need to determine if you creating the right products, if those products are keeping up with today's trends, if those products are profitable, and how all of those things tie into your strategy.
- You need to determine what your management team is doing to learn from and improve upon your training and employee satisfaction.

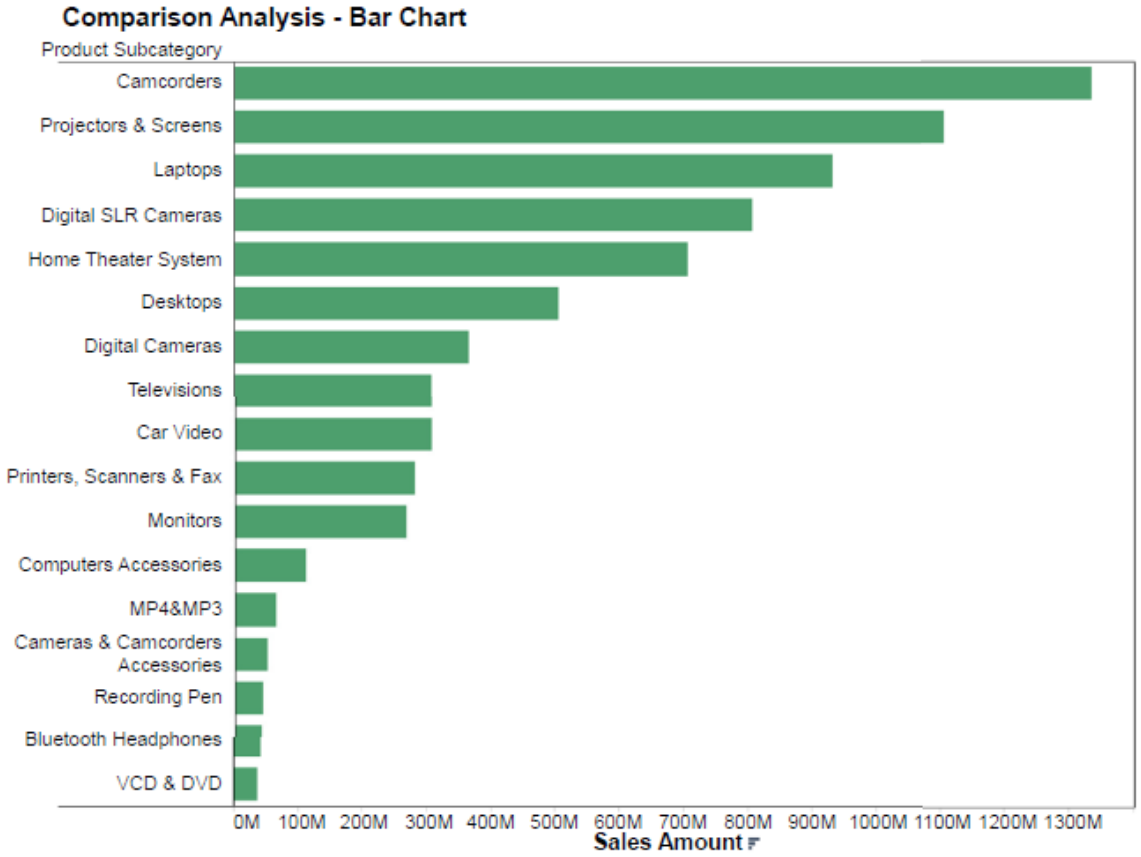
Best Practices for Dashboard Design

- Prioritize Consistency over Elegance
- Place Critical Data at the Dashboard's Forefront
- Restrict Visualizations to a Single Layout
- Use Colours Judiciously
- Keep Complexity to a Minimum
- Be Selective with Legends

Matching Types of Analysis to Visualizations

The most common types of analysis:

- Comparative
- Time-series or trending
- Contribution
- Correlation
- Geographic data
- Distribution



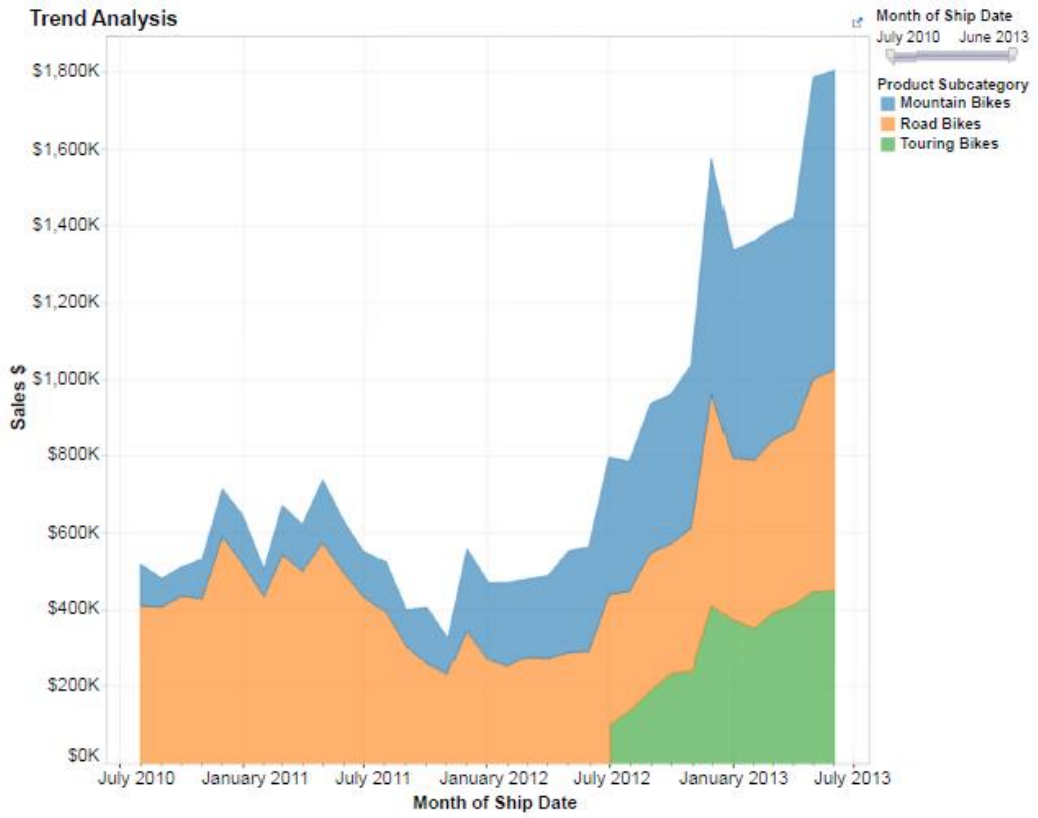
Comparative Analysis

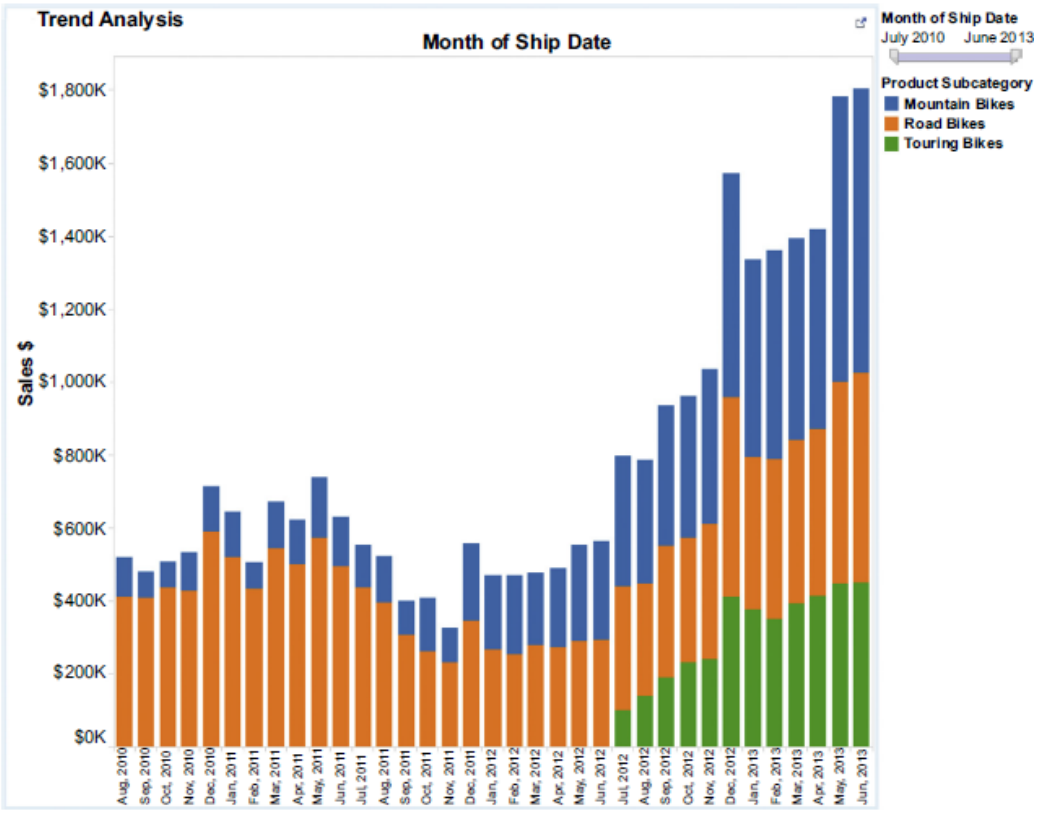
- An enterprise, for example, will compare sales by categories of product and then rank those sales by the top products.
- Bar charts are very effective for comparative analysis because the lengths of the bars represent quantitative measures that can be compared quite easily.
- When ranking is important, sorting bars by the measure's value enables a person to quickly discern the ranking order.
- It is best to use one colour for the bars rather than multiple colours, because it is easier to estimate the different bar sizes.
- Horizontal bars work well for any number of items. Vertical bars work well with fewer than a dozen items.

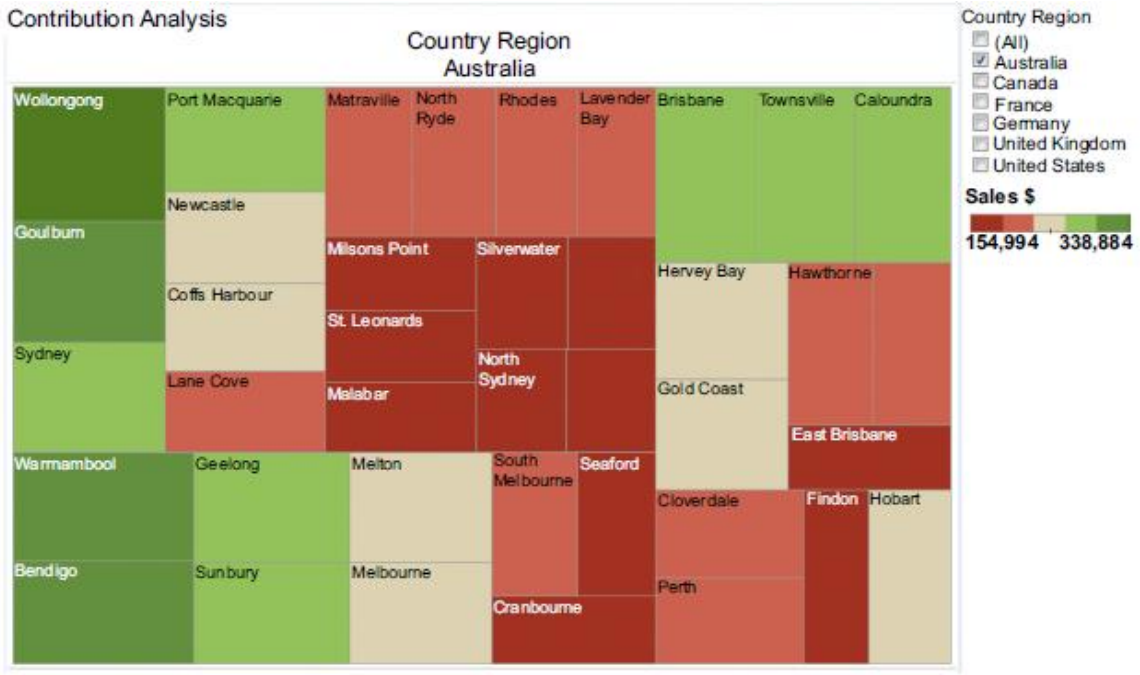
Time-Series or Trending Analysis

- Examining trends over time, such as tracking sales or the changing of people's opinion.
- Often the data tracked is broken down by some form of segmentation, such as product categories or by a person's income level.
- The best visualizations for time-series analysis are line, area, and bar charts. Different colours or line types often enhance usability.

Time-Series or Trending Analysis







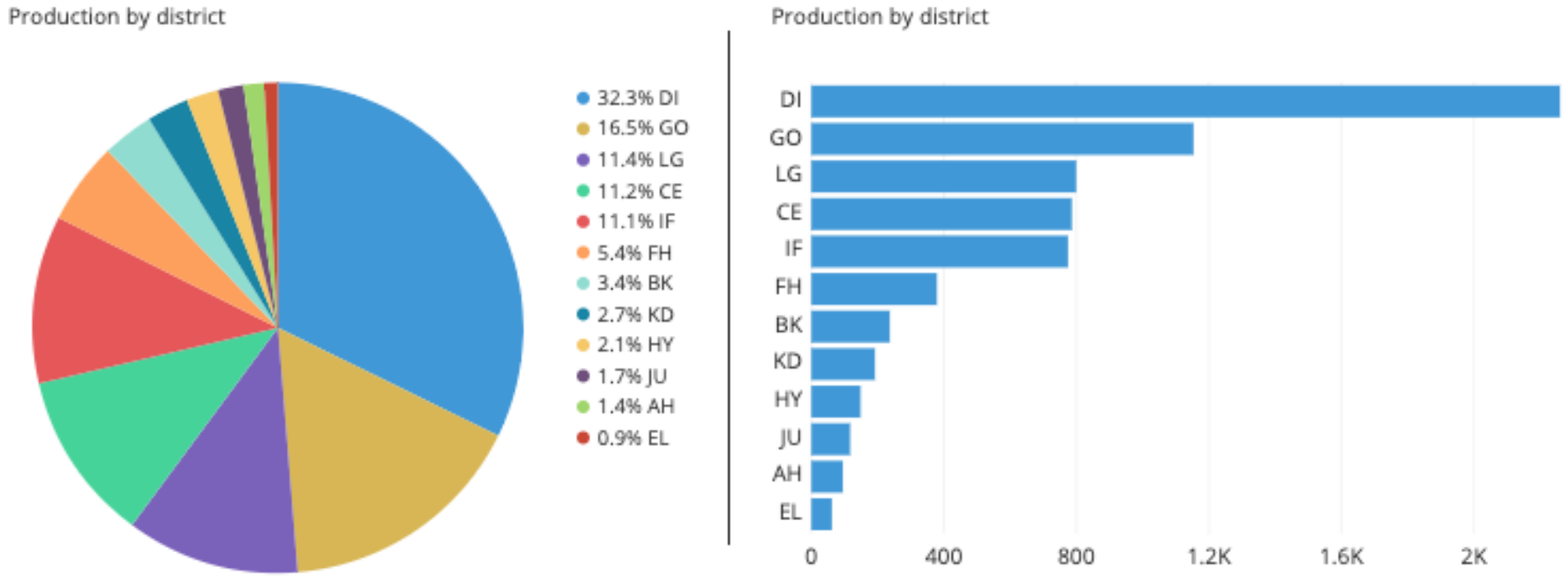
Contribution Analysis

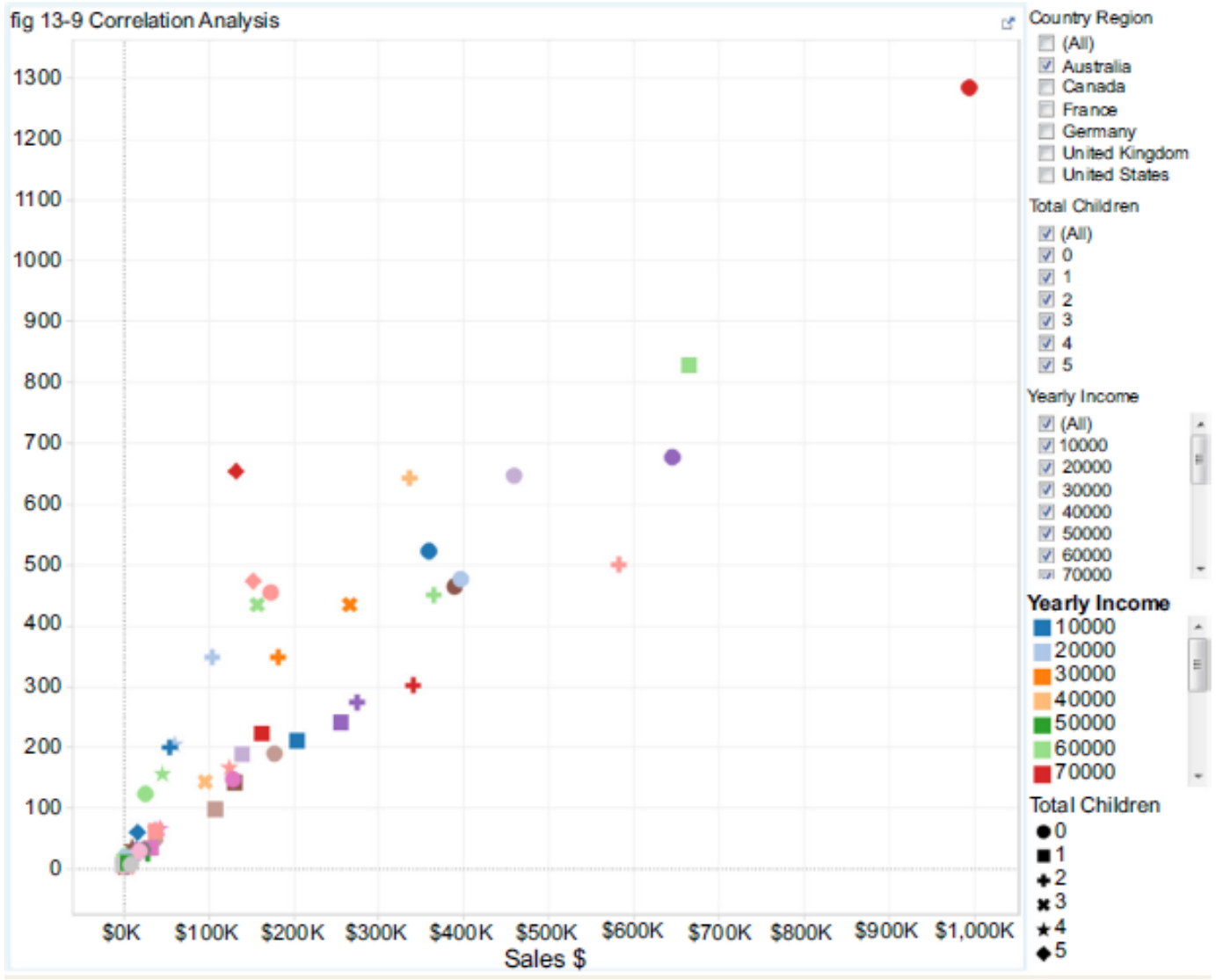
The contribution that each segment of something makes in relationship to the whole is typically represented by a percentage.

The most common visualization used for this purpose is a pie chart, but it really used when there are a few elements to display, such as three or four.

As the number of slices gets larger, use Bar charts where each bar is the same length and segments are sized by percentages. Or use the tree map.

Contribution Analysis

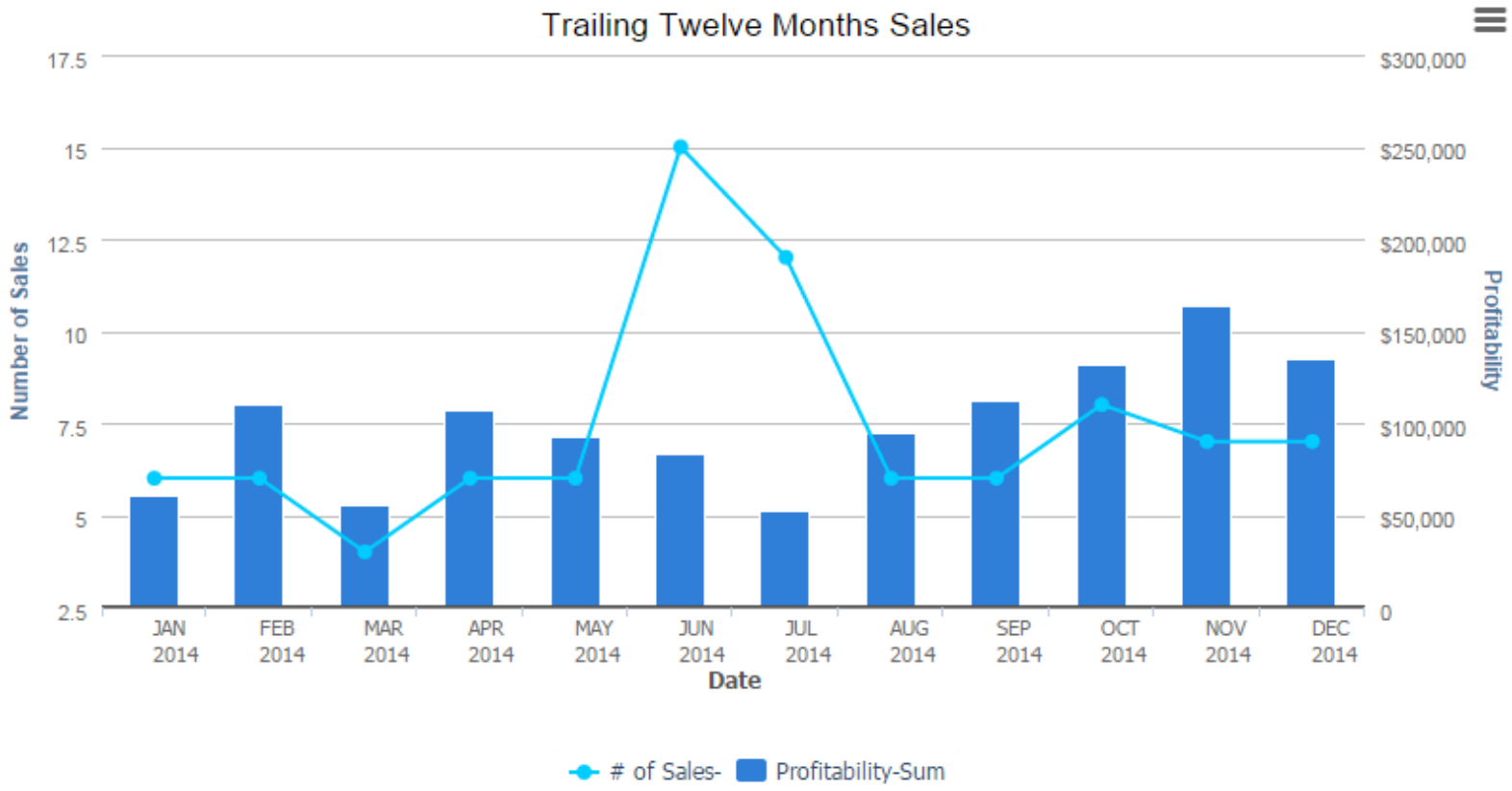


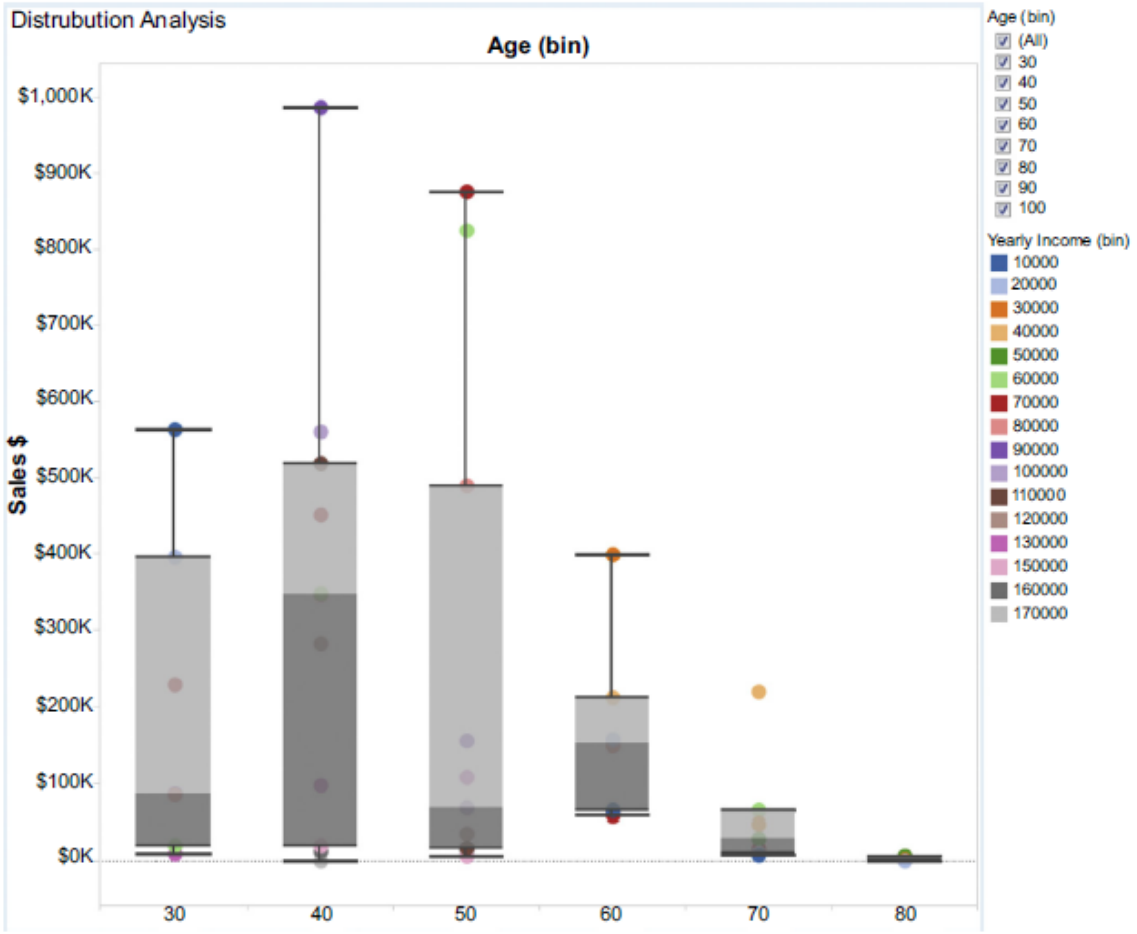


Correlation Analysis

- Scatter plots are very effective for correlation analysis, especially when size and colour are used to depict variation in the measure's quantitative values.
- Also, combinations of line and bar charts are sometimes effective to support correlation analysis, especially when trend analysis is being used to identify correlations.

Correlation Analysis

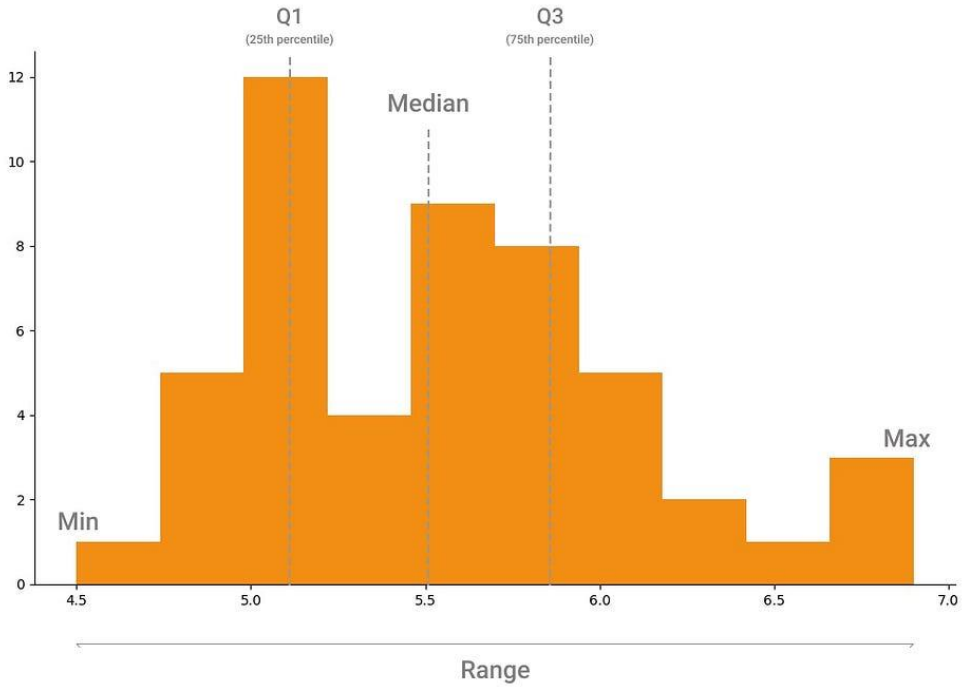


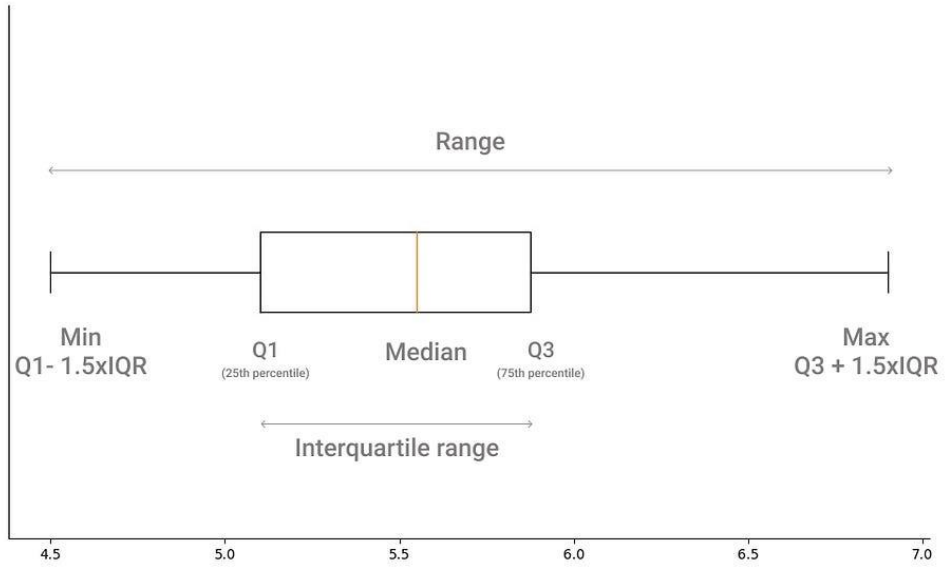


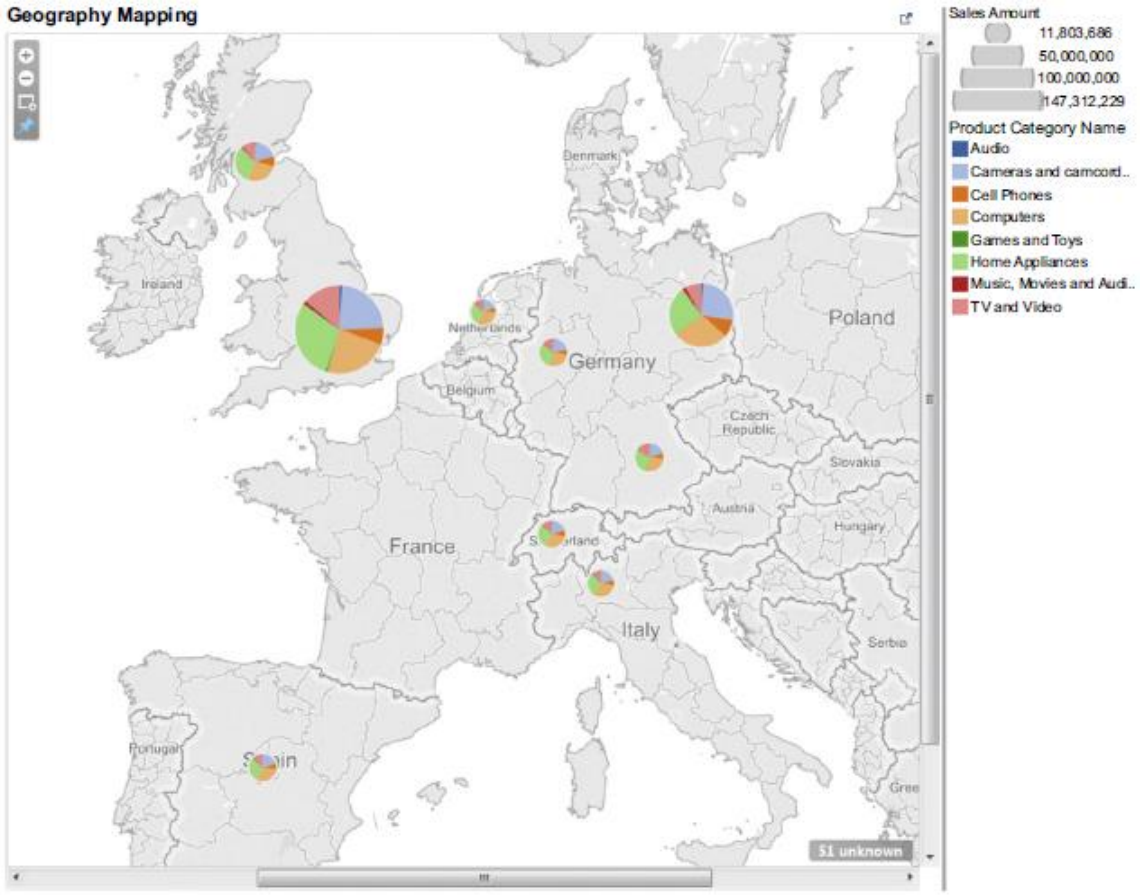
Distribution Analysis

- This type of analysis displays the distribution of values across your full quantitative range.
- For example, call centre talk time is examined by the length of call with its average, minimum, and maximum for different types of support calls.
- The two visualization techniques used to support distribution analysis are box plots and histogram.

Distribution Analysis

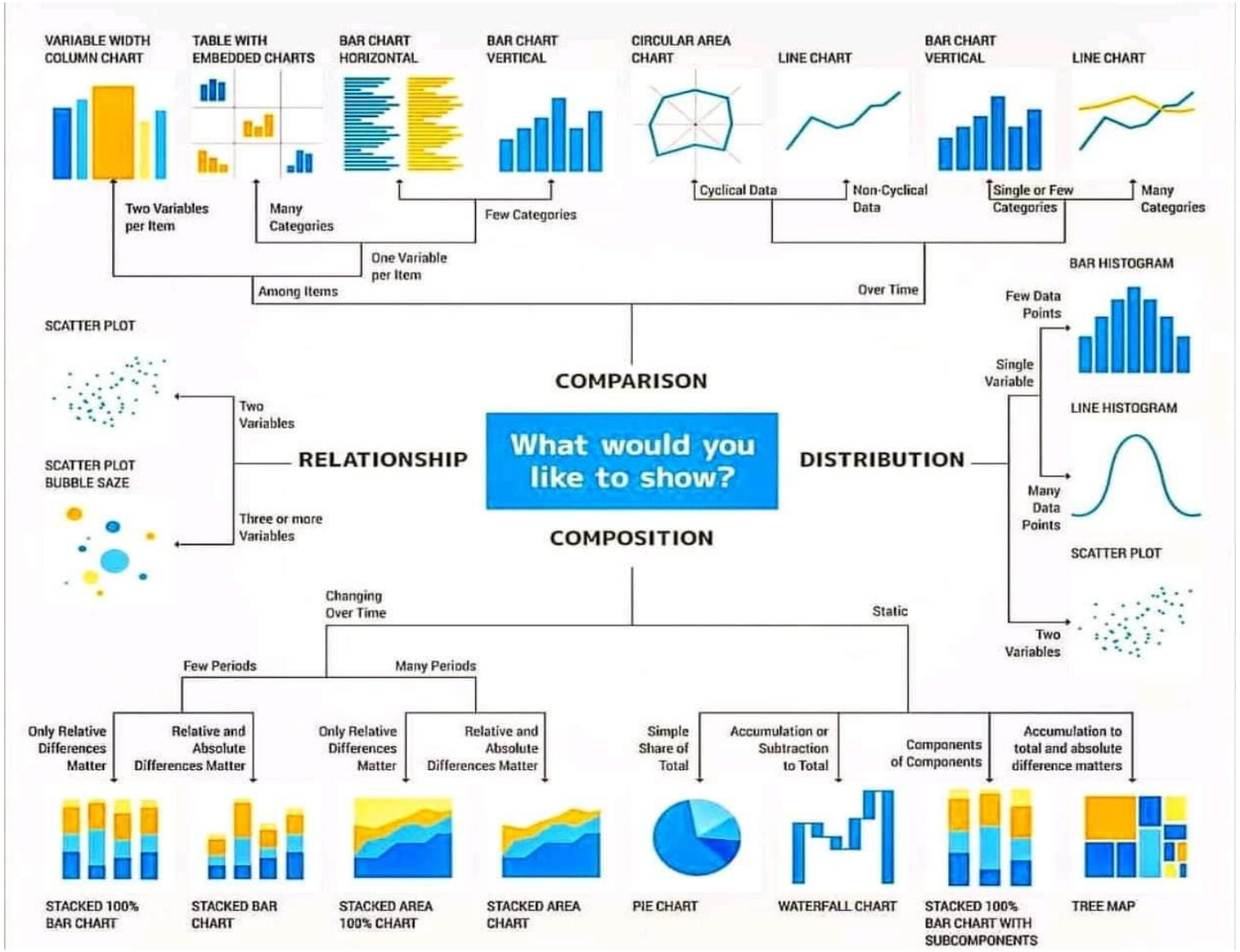






Geographic Data

- The most effective method to visualize data by location is to use a map.
- Sales by the location of the retail store where the product was bought or by where the customer lives are excellent examples of how a map can show the distribution of sales.


What would you like to show?
COMPARISON
DISTRIBUTION
COMPOSITION
RELATIONSHIP
VARIABLE WIDTH COLUMN CHART
TABLE WITH EMBEDDED CHARTS
BAR CHART HORIZONTAL
BAR CHART VERTICAL
CIRCULAR AREA CHART
LINE CHART
BAR CHART VERTICAL
LINE CHART
Two Variables per Item
Many Categories
Few Categories
One Variable per Item
Among Items
Cyclical Data
Non-Cyclical Data
Single or Few Categories
Many Categories
Over Time
BAR HISTOGRAM
Few Data Points
Single Variable
LINE HISTOGRAM
Many Data Points
SCATTER PLOT
Two Variables
SCATTER PLOT
Two Variables
SCATTER PLOT BUBBLE SAZE
Three or more Variables
Changing Over Time
Static
Few Periods
Many Periods
Only Relative Differences Matter
Relative and Absolute Differences Matter
Only Relative Differences Matter
Relative and Absolute Differences Matter
Simple Share of Total
Accumulation or Subtraction to Total
Components of Components
Accumulation to total and absolute difference matters
STACKED 100% BAR CHART
STACKED BAR CHART
STACKED AREA 100% CHART
STACKED AREA CHART
PIE CHART
WATERFALL CHART
STACKED 100% BAR CHART WITH SUBCOMPONENTS
TREE MAP