DATA VISUALIZATION: INTRODUCTION TO TABLEAU

Contents

Unit 5

Building Visualizations using Tableau

Chart Design Principles, Basic Visualization Charts (Bar and Column Charts, Histograms, Pie, Line, and Area Charts, Scatter and Bubble Charts Etc) Advance Visualization Charts (Waterfall Chart, Ribban Charts, World cloud, etc)

Basic Visualization Charts (Histograms)

- Tableau Charts: Histogram
- Histograms show how your data is distributed across distinct groups. By grouping your data into specific categories (also known as “bins”), then plotting the number of records in a category as a vertical bar, you can quickly see which bins the majority of your data falls in. The histogram is your best option for visualizing how data fall into categories. For example, the number of customers by company size, student performance on an exam, and frequency of a product defect.

- The procedure to create histogram is shown below.
- Go to a new Worksheet.
- Select Discount from the measures.
- Click on Show Me button present in the top right corner of the worksheet. Histogram - Tableau Charts - Edureka

Basic Visualization Charts (Histograms)

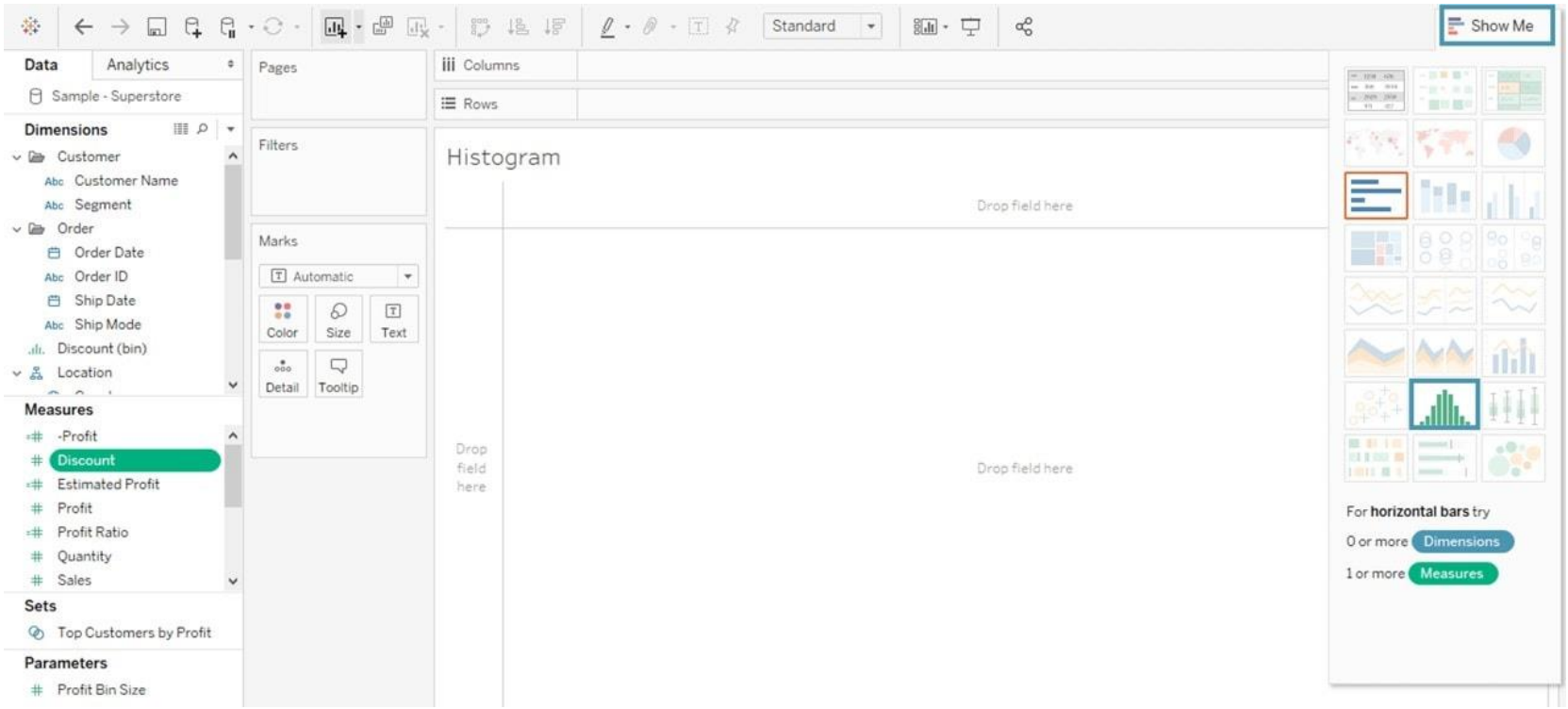
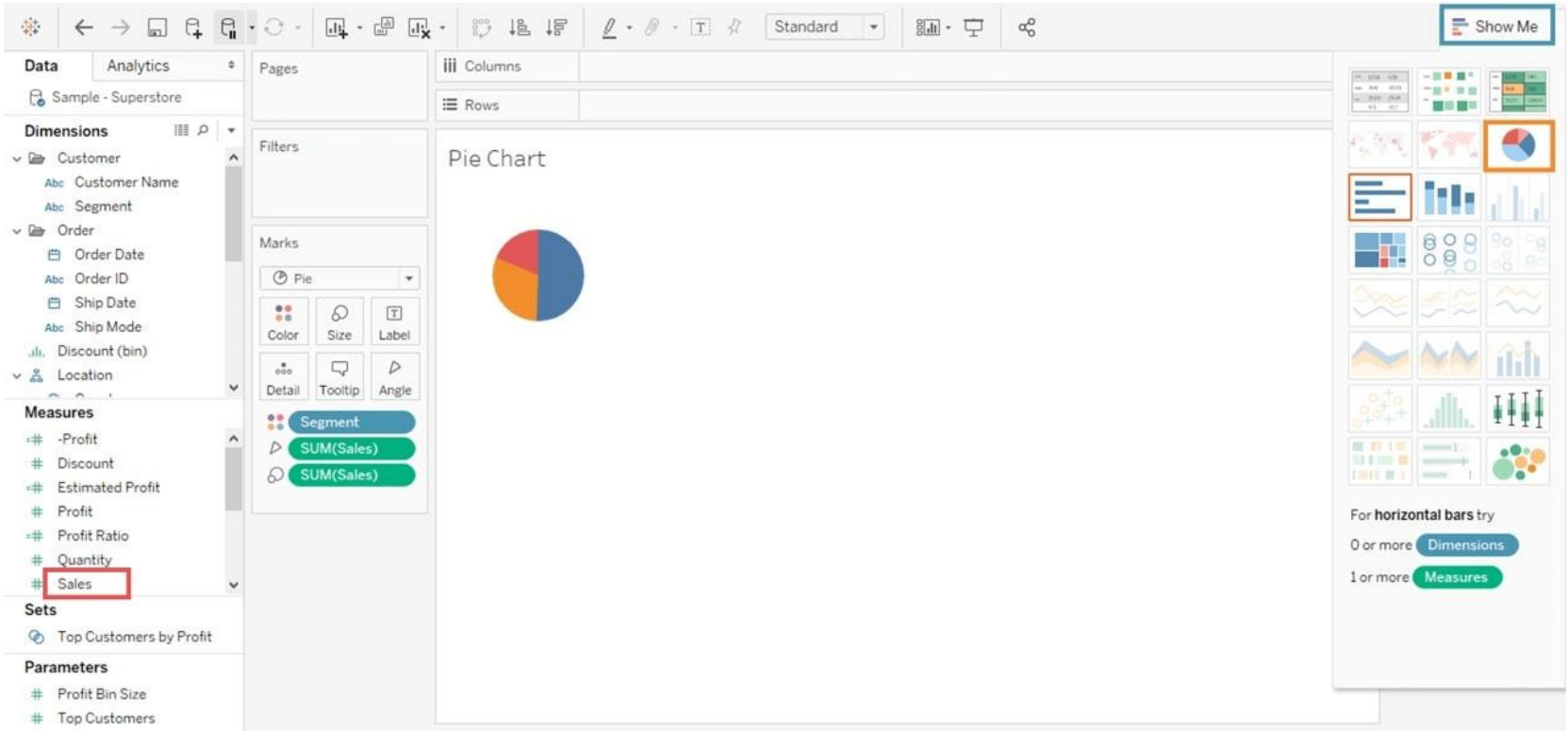


Tableau Charts: Pie Charts

- Pie Chart
- Pie charts are powerful for adding detail to other visualizations. Alone, a pie chart doesn't give the viewer a way to quickly and accurately compare information. Since the viewer has to create context on their own, key points from your data are missed. Instead of making a pie chart the focus of your dashboard, try using them to drill down on other visualizations.

- Pie charts are powerful for adding detail to other visualizations. The angle of the pie determines the measured value. Different colors can be assigned to pie to represent the members in a dimension.
- Go to a new Worksheet
- Select *Segment* and *Sales* from data pane.
- Click on *ShowMe* button present in the top right corner of the worksheet.
- Select *Pie Chart* from the list.

Tableau Charts: Pie Charts



Basic Visualization Charts (Bar)

- Bar Chart
- Bar charts are one of the most common data visualizations. You can use them to quickly compare data across categories, highlight differences, show trends and outliers, and reveal historical highs and lows at a glance. Bar charts are especially effective when you have data that can be split into multiple categories.

- Bar charts are definitely one of the most, if not the most common data visualizations across all BI platforms. You can quickly highlight differences between categories, show trends and outliers, and reveal historical highs and lows at a glance. Bar charts are simple, yet, effective, especially when you have data that can be split into many categories.
- To create a Bar Chart,
- Go to a new worksheet.
- Drag *Category* into *Column*.
- Drag *Profit* into *Rows*.

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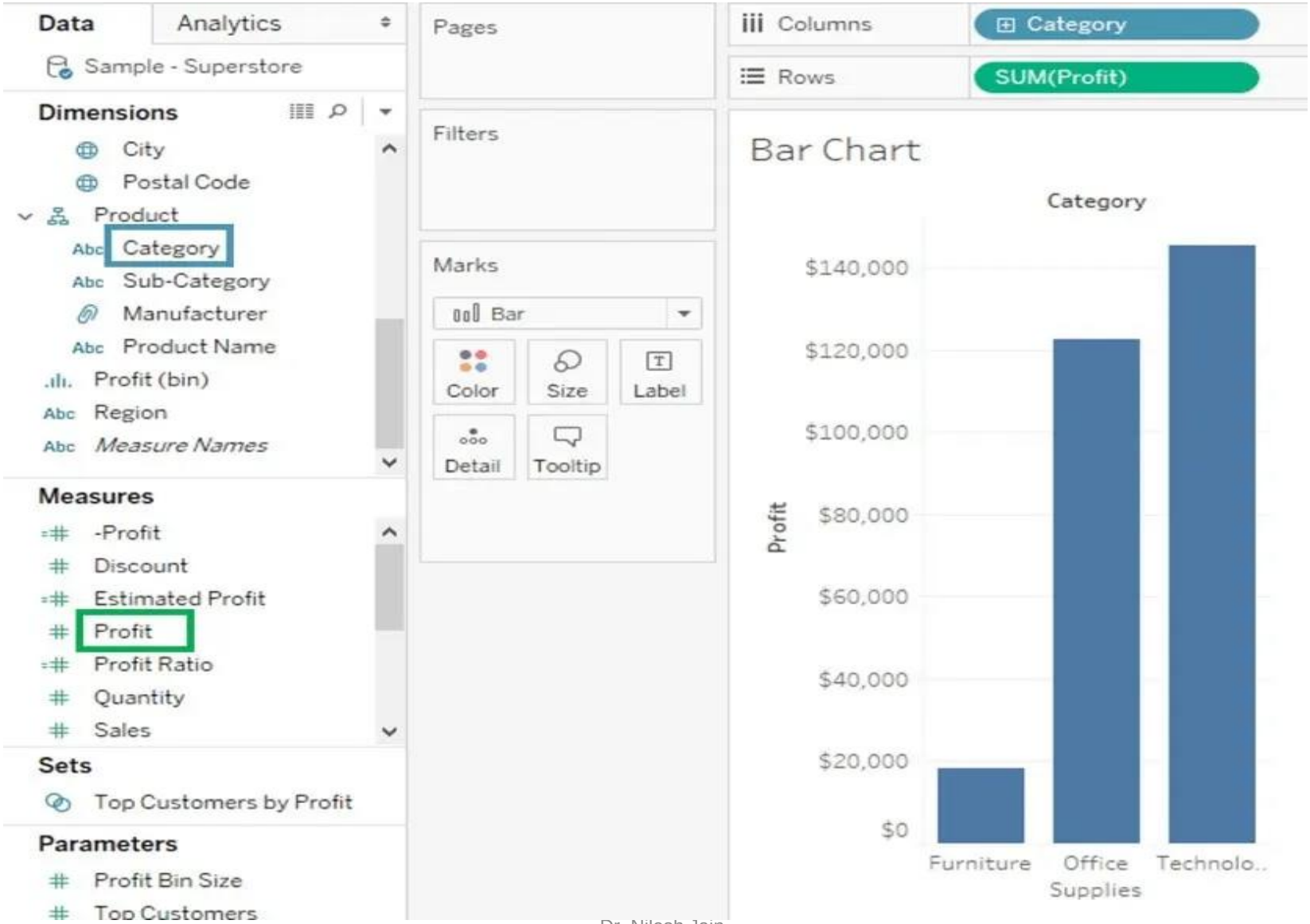
Basic Visualization Charts (Bar)



Basic Visualization Charts (Column Charts)

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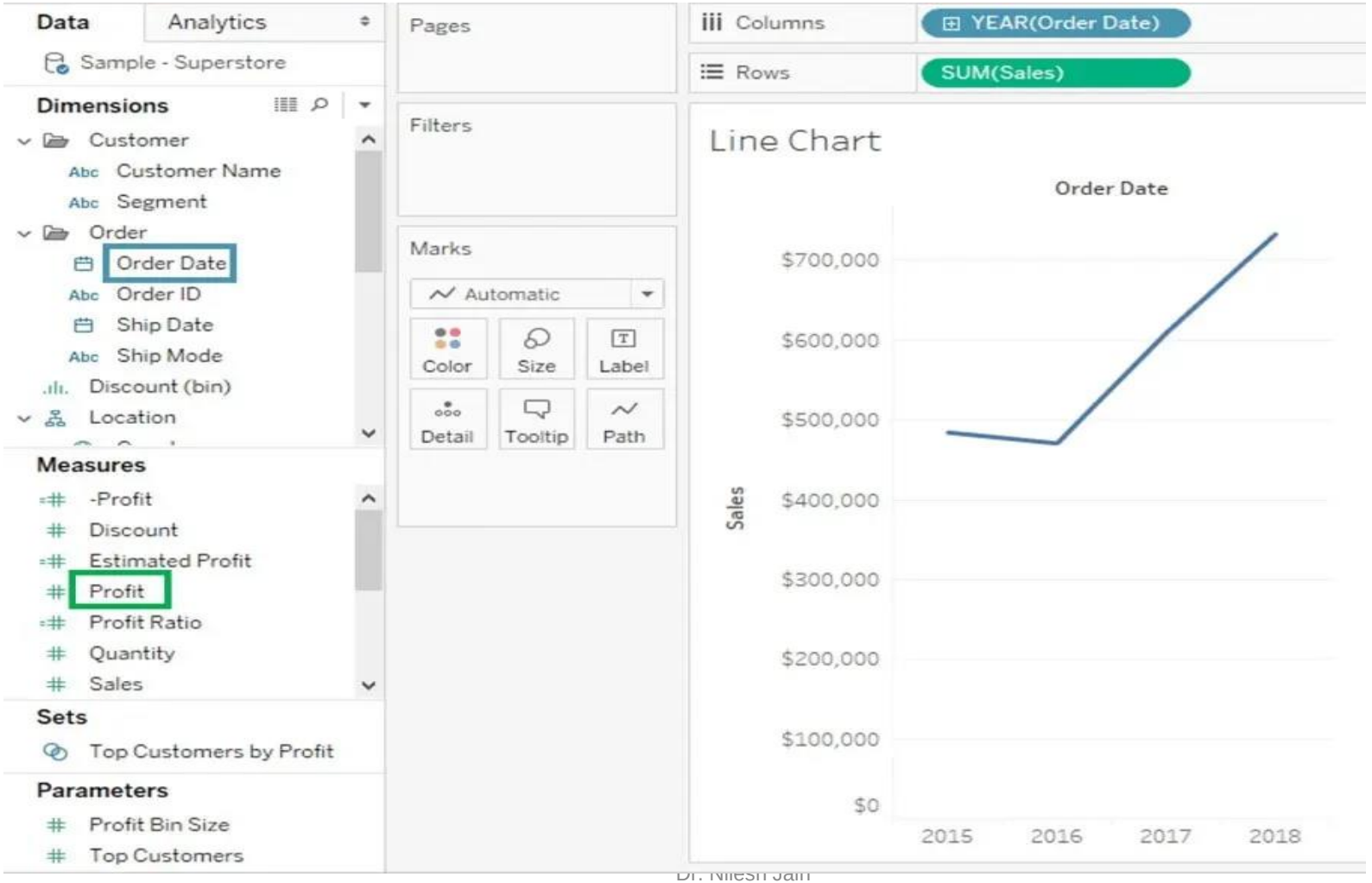
Basic Visualization Charts (Line)

- Line Chart
- The line chart, or line graph, connects several distinct data points, presenting them as one continuous evolution. Use line charts to view trends in data, usually over time (like stock price changes over five years or website page views for the month). The result is a simple, straightforward way to visualize changes in one value relative to another.
- The line chart, or line graph, is another familiar method for displaying data. It connects several distinct data points, presenting them as one continuous evolution. The result is a simple, straightforward way to visualize changes in one value relative to another.

- Go to a new Worksheet
- Drag *Order Date* into *Columns*.
- Drag *Sales* into *Rows*.

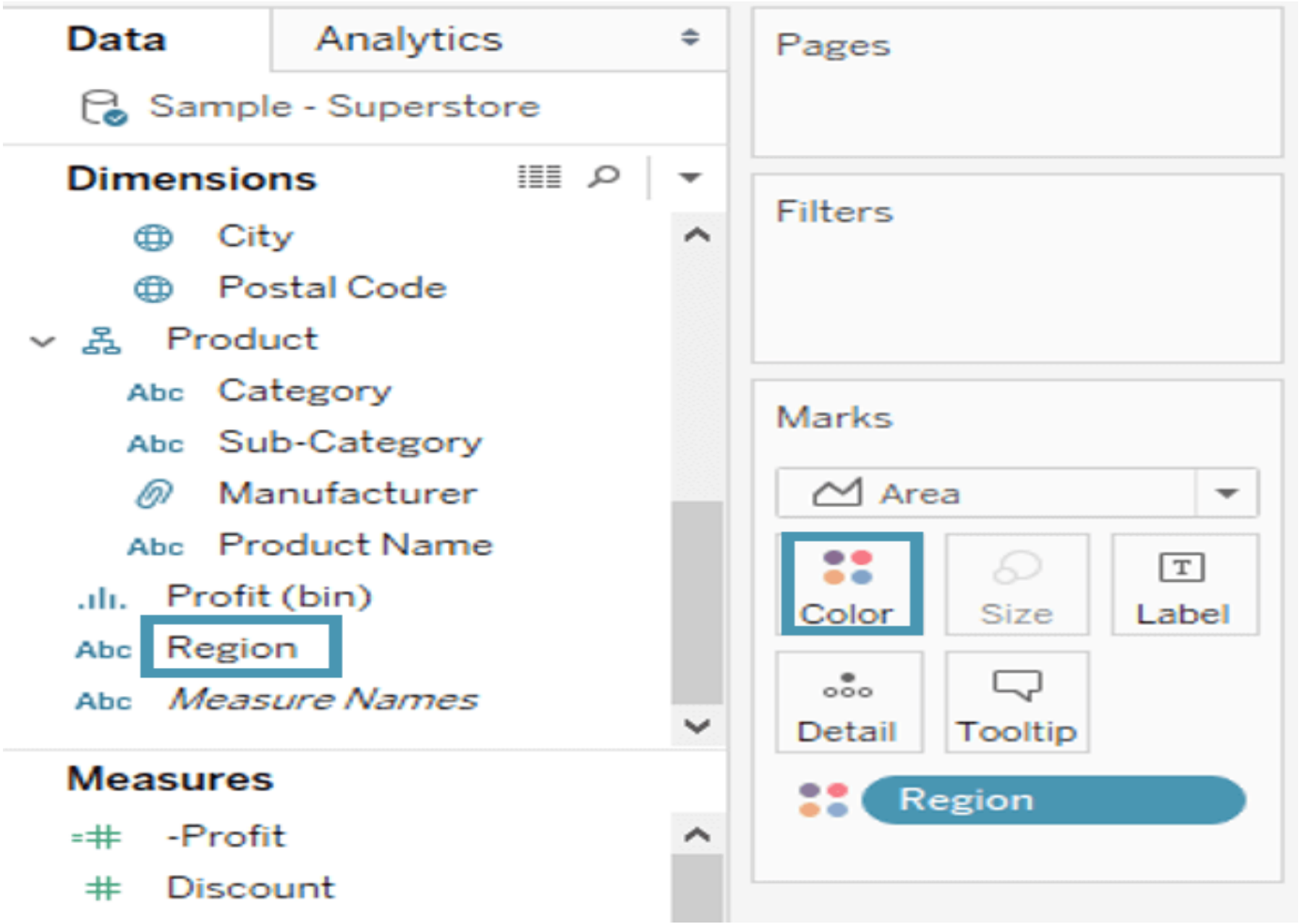
Basic Visualization Charts (Line)



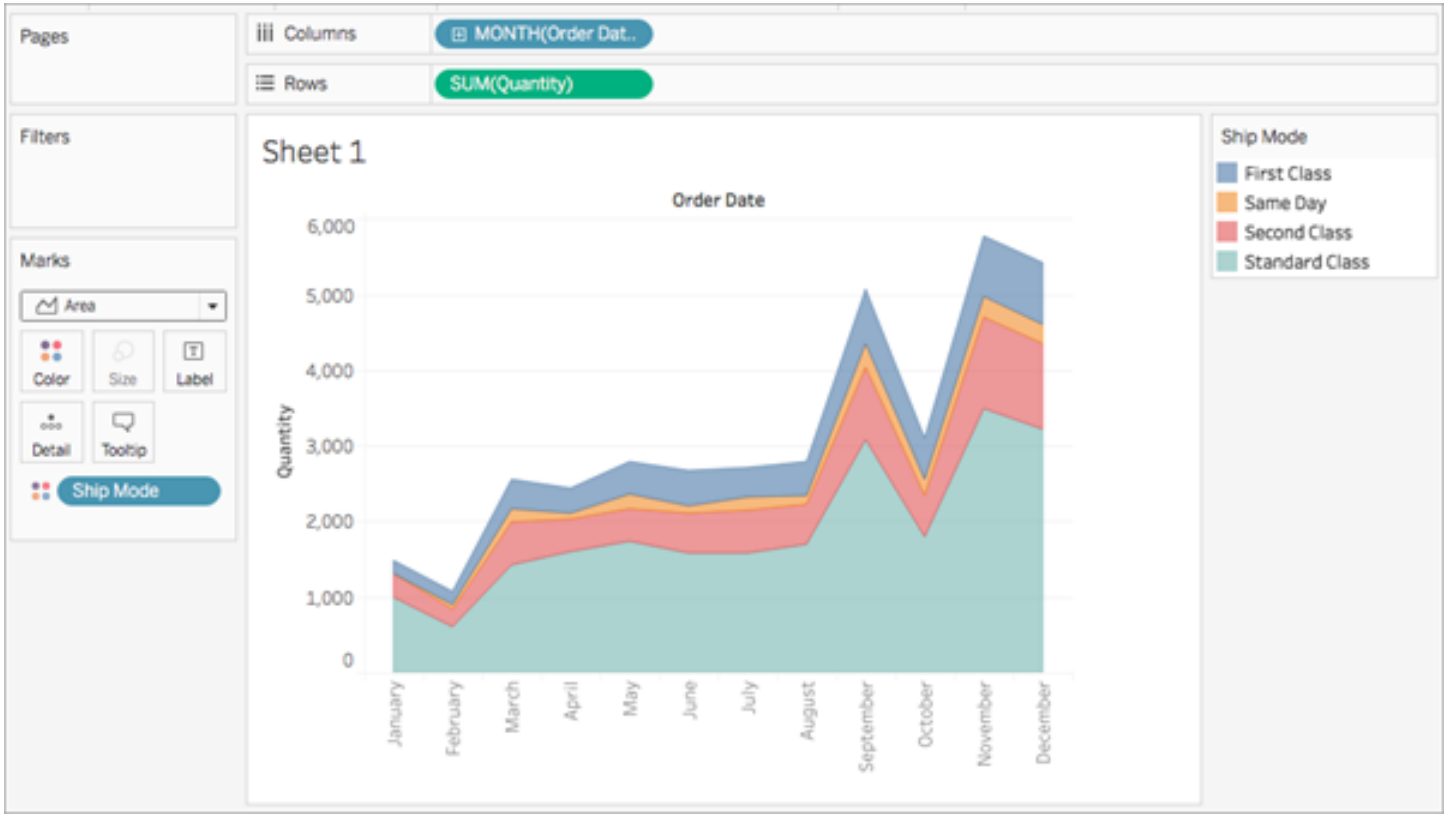
Basic Visualization Charts (Area Charts)

- Area charts represent any quantitative data over various periods of time. It is basically a line graph where the area between line and axis is generally filled with color. The steps to achieve this are as follow
- An area chart is a line chart where the area between the line and the axis are shaded with a color. These charts are typically used to represent accumulated totals over time and are the conventional way to display stacked lines.
- The basic building blocks for an area chart are as follows:
- **Mark type**: Area
- **Columns shelf**: Dimension
- **Rows shelf**: Measure
- **Color**: Dimension
- Select the *Area Chart* icon as shown in the figure.
- Drag *Region* from dimension pane and add it in *Color* icon of Marks card

Basic Visualization Charts (Area Charts)



Basic Visualization Charts (Area Charts)



Basic Visualization Charts (Scatter)

- Scatter Plot
- Scatter plots are an effective way to investigate the relationship between different variables, showing if one variable is a good predictor of another, or if they tend to change independently. A scatter plot presents lots of distinct data points on a single chart. The chart can then be enhanced with analytics like cluster analysis or trend lines.
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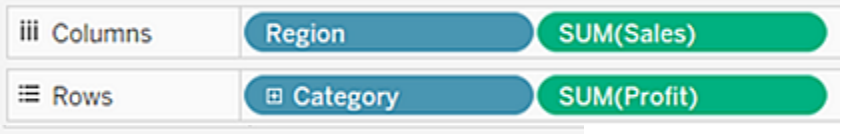
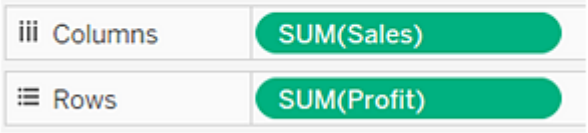


Basic Visualization Charts (Scatter)

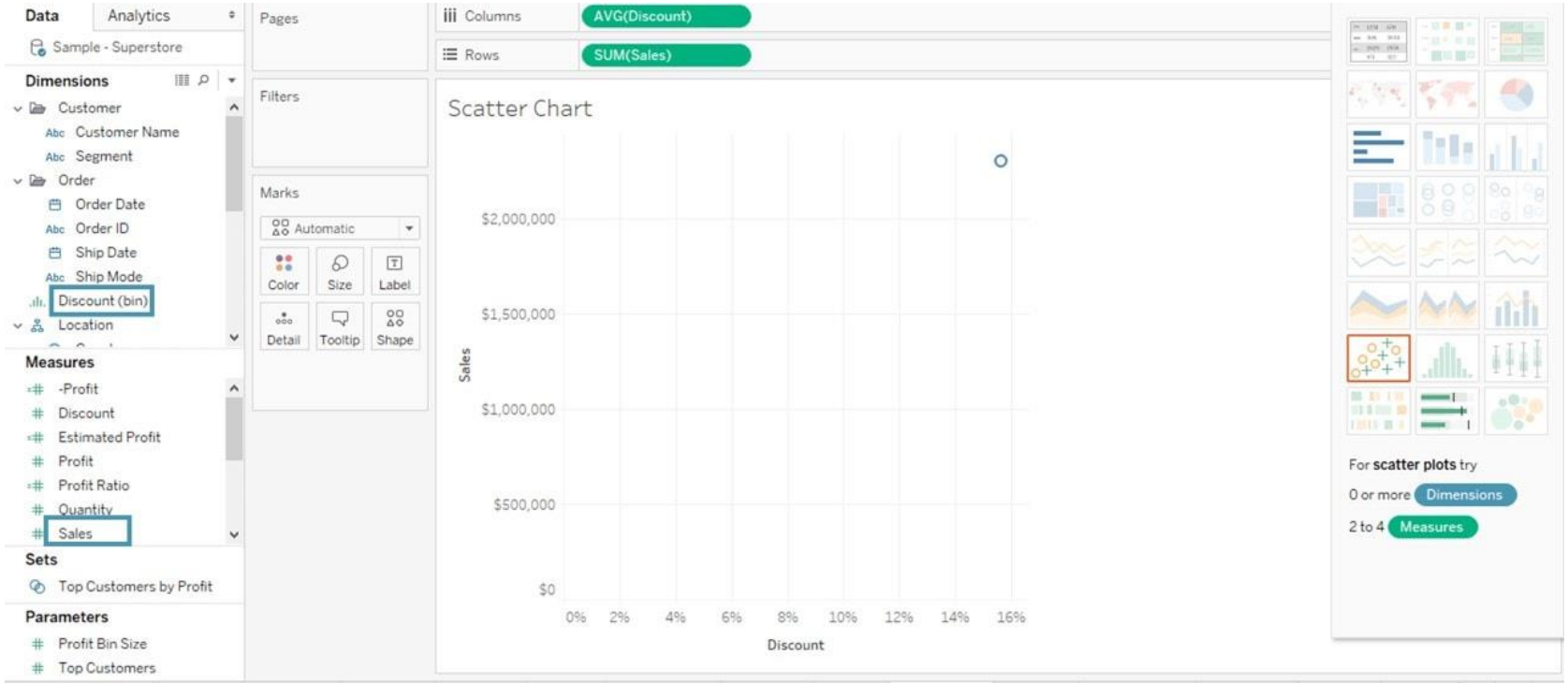
- Use scatter plots to visualize relationships between numerical variables. In Tableau, you create a scatter plot by placing at least one measure on the **Columns** shelf and at least one measure on the **Rows** shelf. If these shelves contain both dimensions and measures, Tableau places the measures as the innermost fields, which means that measures are always to the right of any dimensions that you have also placed on these shelves. The word "innermost" in this case refers to the table structure.

Creates Simple Scatter Plot	Creates Matrix of Scatter Plots
	

Basic Visualization Charts (Scatter)

- A scatter plot can use several mark types. By default, Tableau uses the shape mark type. Depending on your data, you might want to use another mark type, such as a circle or a square. For more information, see Change the Type of Mark in the View.
- To use scatter plots and trend lines to compare sales to profit, follow these steps:
- Open the **Sample - Superstore** data source (if necessary, you can download it from the Tableau Public sample data page(Link opens in a new window)).
- Drag the **Sales** measure to **Columns**.Tableau aggregates the measure as a sum and creates a horizontal axis.
- Drag the **Profit**measure to **Rows**.Tableau aggregates the measure as a sum and creates a vertical axis.
- Measures can consist of continuous numerical data. When you plot one number against another, you are comparing two numbers; the resulting chart is analogous to a Cartesian chart, with x and y coordinates.

Basic Visualization Charts (Scatter)



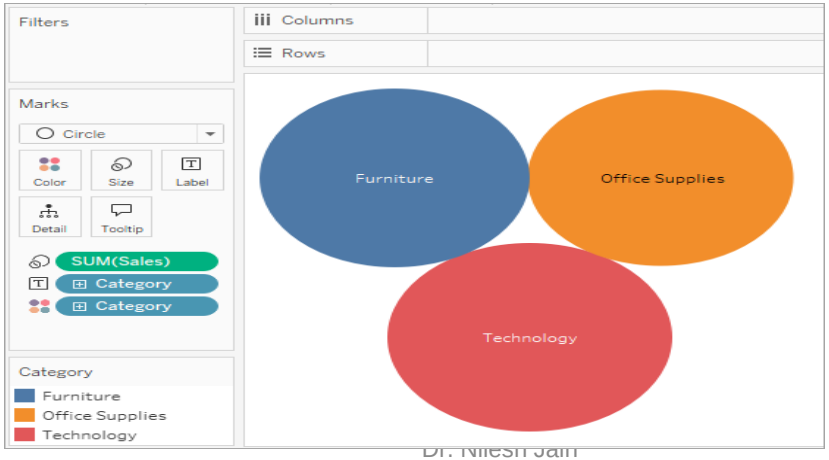
Basic Visualization Charts (Bubble Charts)

- Although bubbles aren't technically their own type of visualization, using them as a technique adds great detail to scatter plots or maps. Varying the size and color of circles creates visually compelling charts that present large volumes of data at once. Bubbles can add more detail to the traditional two-axis chart, highlighting the relationship between three or more variables, without overwhelming the viewer.
- The procedure to create a bubble chart is given below.
  - Go to a new Worksheet.
    - Hold on the *Control key* on the keyboard.
    - Click on *Sub-Category* and *Sales*.
  - Click on the *Show Me* option.

Basic Visualization Charts (Bubble Charts)

- packed bubble charts to display data in a cluster of circles. Dimensions define the individual bubbles, and measures define the size and color of the individual circles.

- The basic building blocks for a packed bubble chart are as follows:
- **Mark type**: Circle
- **Detail**: Dimension
- **Size**: Measure
- **Color**: Dimension or Measure
- **Label (optional)**: Dimension or Measure



Basic Visualization Charts (Bar and Column Charts, Histograms, Pie, Line, and Area Charts, Scatter and Bubble Charts Etc)

Line — View trends in data over time.

Examples: Stock price change over a five-year period or website page views during a month.

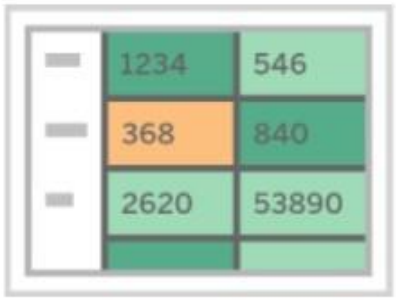
Bar — Compare data across categories.

Examples: Volume of shirts in different sizes, or percent of spending by department.

Heat Map — Show the relationship between two factors.

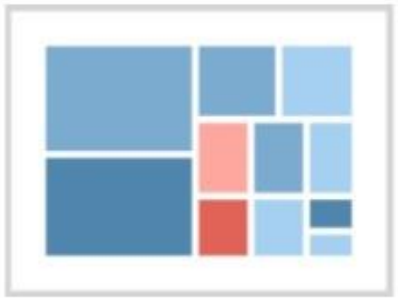
Examples: Segment analysis of target market, or sales leads by individual rep.

Chart Types



Highlight Table — Shows detailed information on heat maps.

Examples: The percent of a market for different segments, or sales numbers in a region.



Treemap — Show hierarchical data as a proportion of a whole.

Examples: Storage usage across computer machines, comparing fiscal budgets between years.

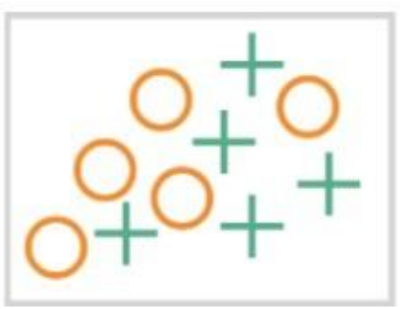
Gantt — Show duration over time.

Examples: Project timeline, duration of a machine's use, availability of players on a team.

Chart Types

Bullet — Evaluate performance of a metric against a goal.

Examples: Sales quota assessment, performan ce spectrum (great/good/poor).



Scatterplot — Investigate relationships between quantitative values.

Examples: Male versus female likelihood of having lung cancer at different ages

Histogram — Understand the distribution of your data.

Examples: Number of customers by company size, student performance on an exam, frequency of a product defect.

Chart Types

Symbol maps — Use for totals rather than rates. Be careful, as small differences will be hard to see.

Examples: Number of customers in different geographies.

Area maps — Use for rates rather than totals. Use sensible base geography.

Examples: Rates of internet-usage in certain geographies, house prices in different neighborhoods.

Box-and-Whisker — Show the distribution of a set of a data.

Examples: Understanding your data briefly, seeing how data is skewed towards one end, identifying outliers in your data.

Tableau Workspace

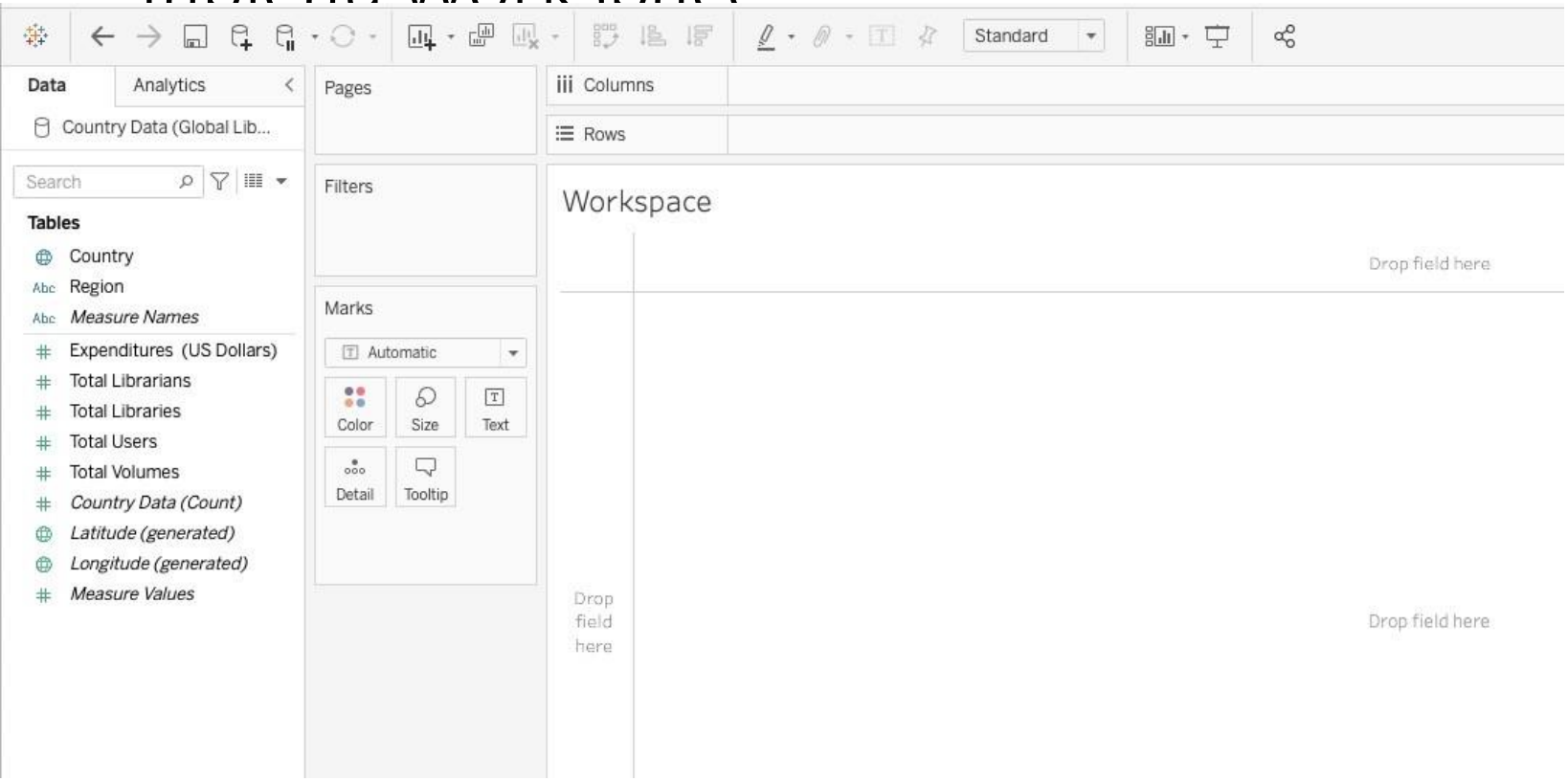
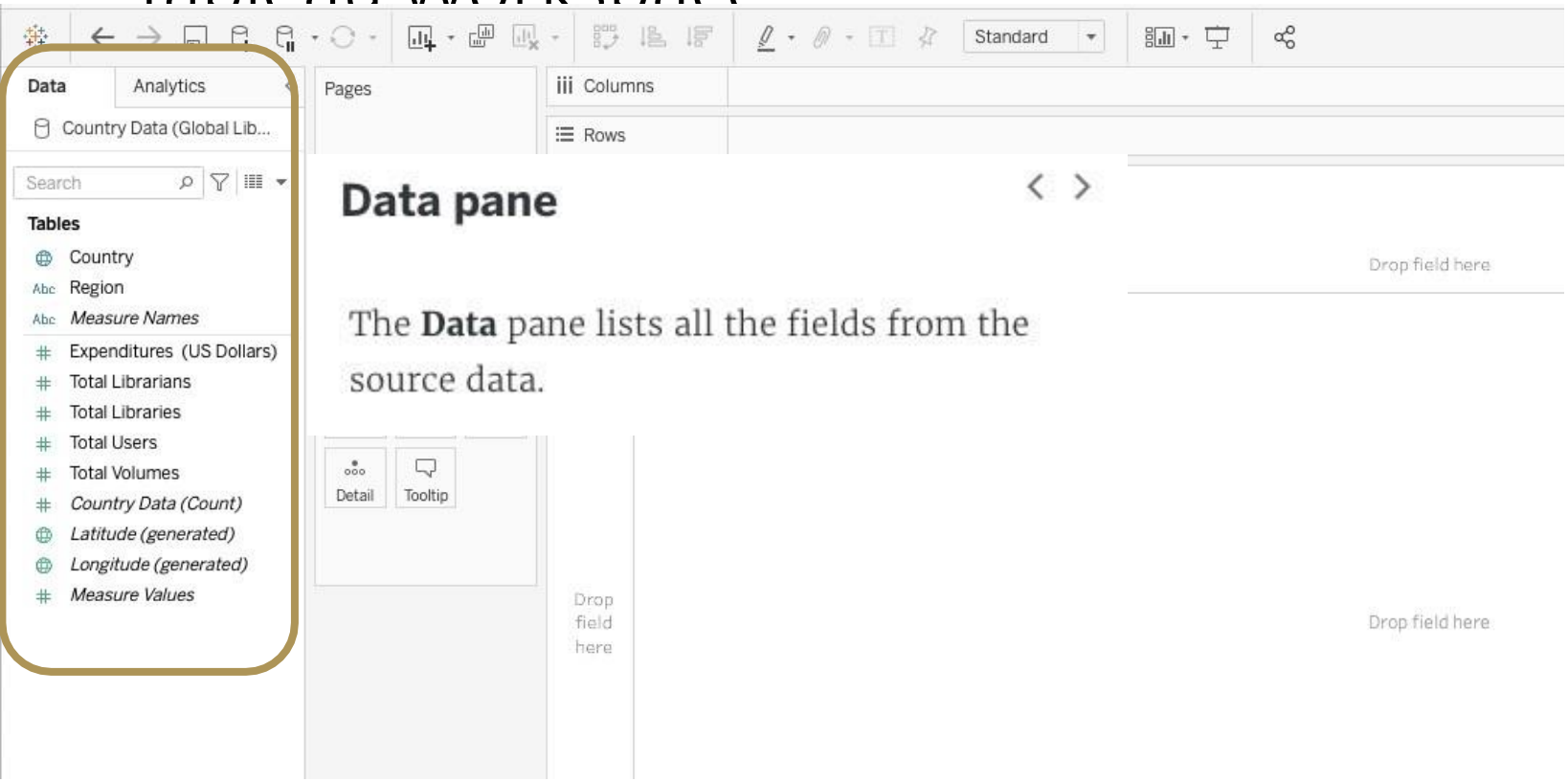


Tableau Workspace



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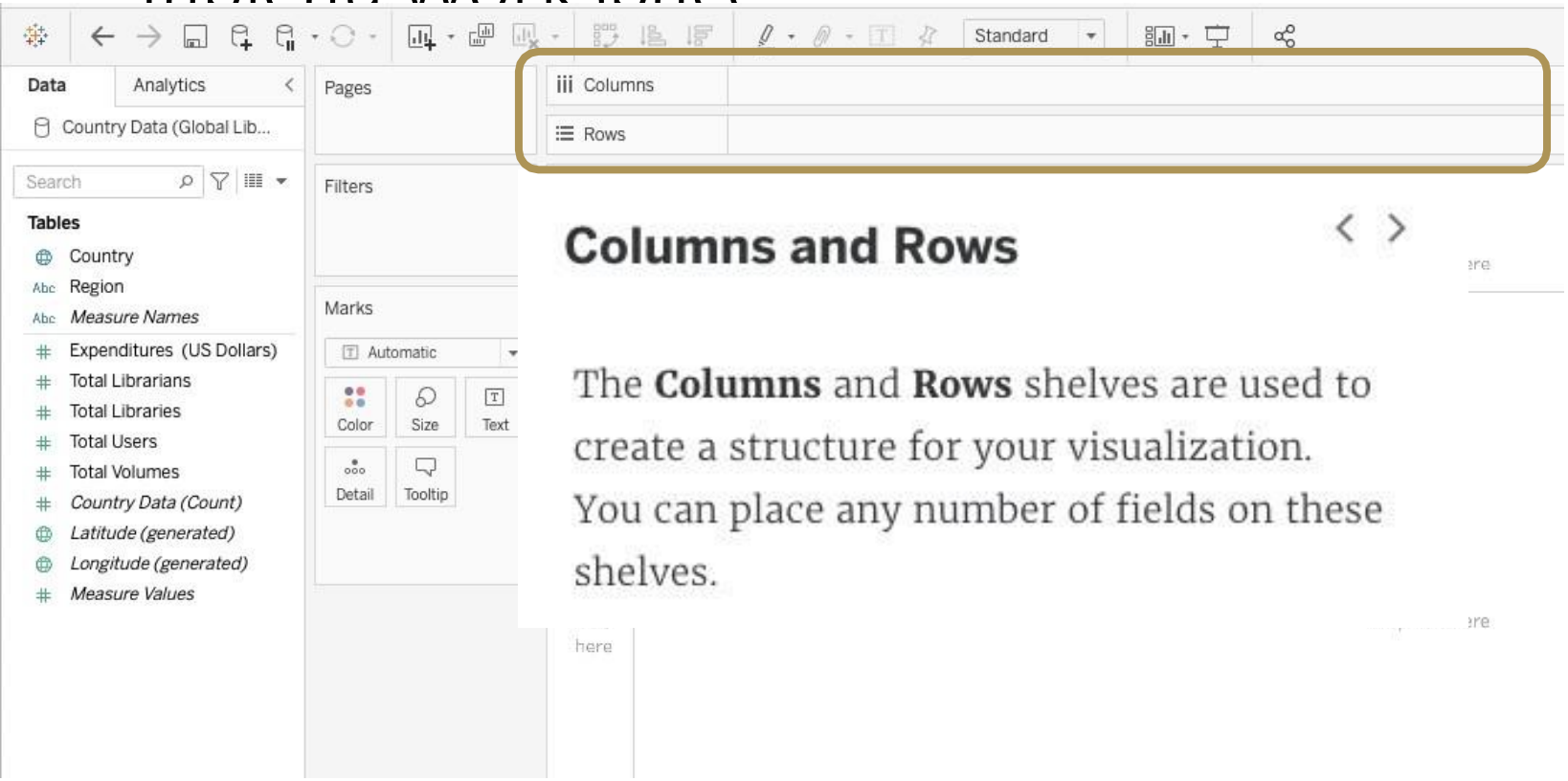

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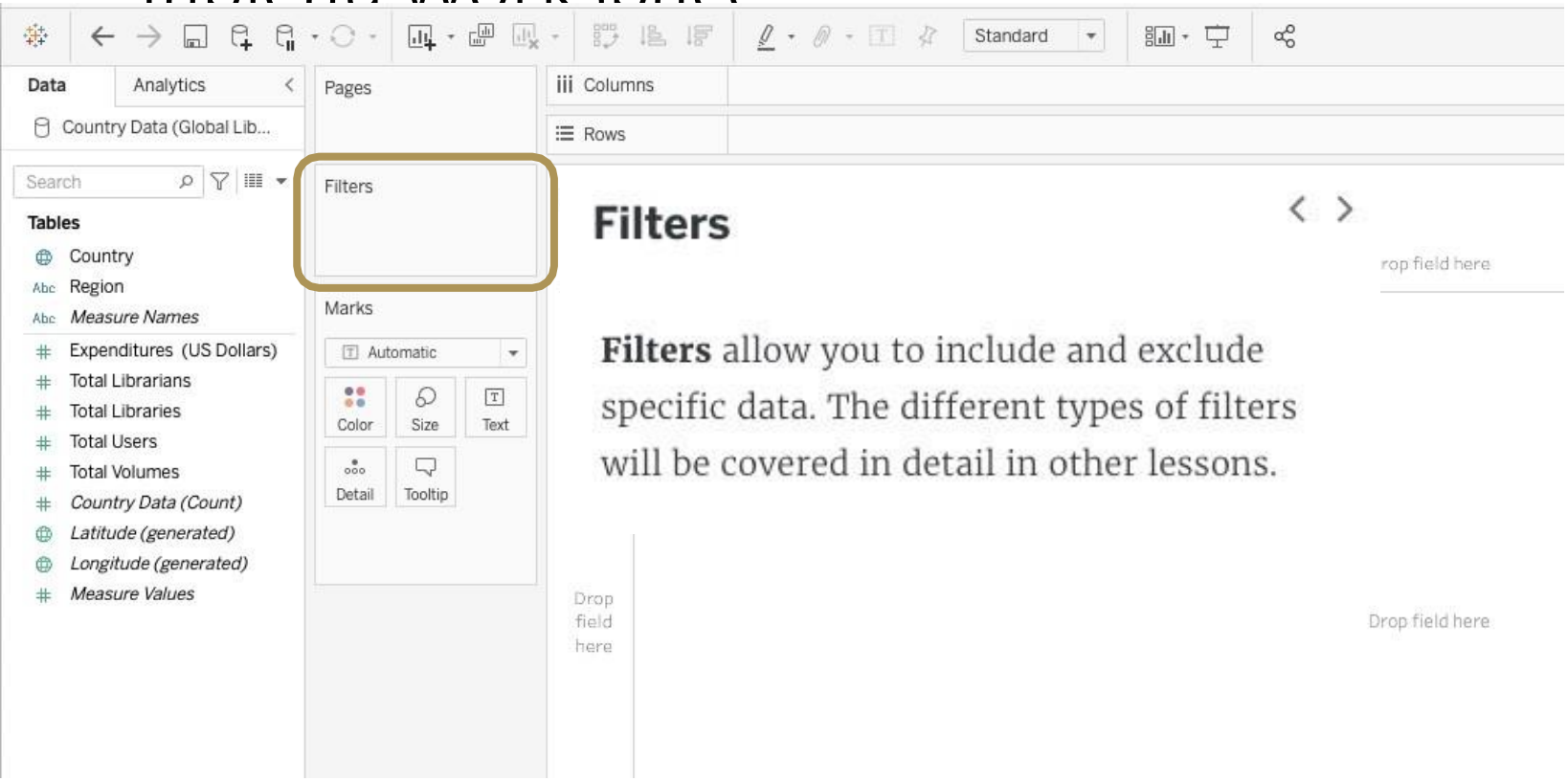


Tableau Workspace

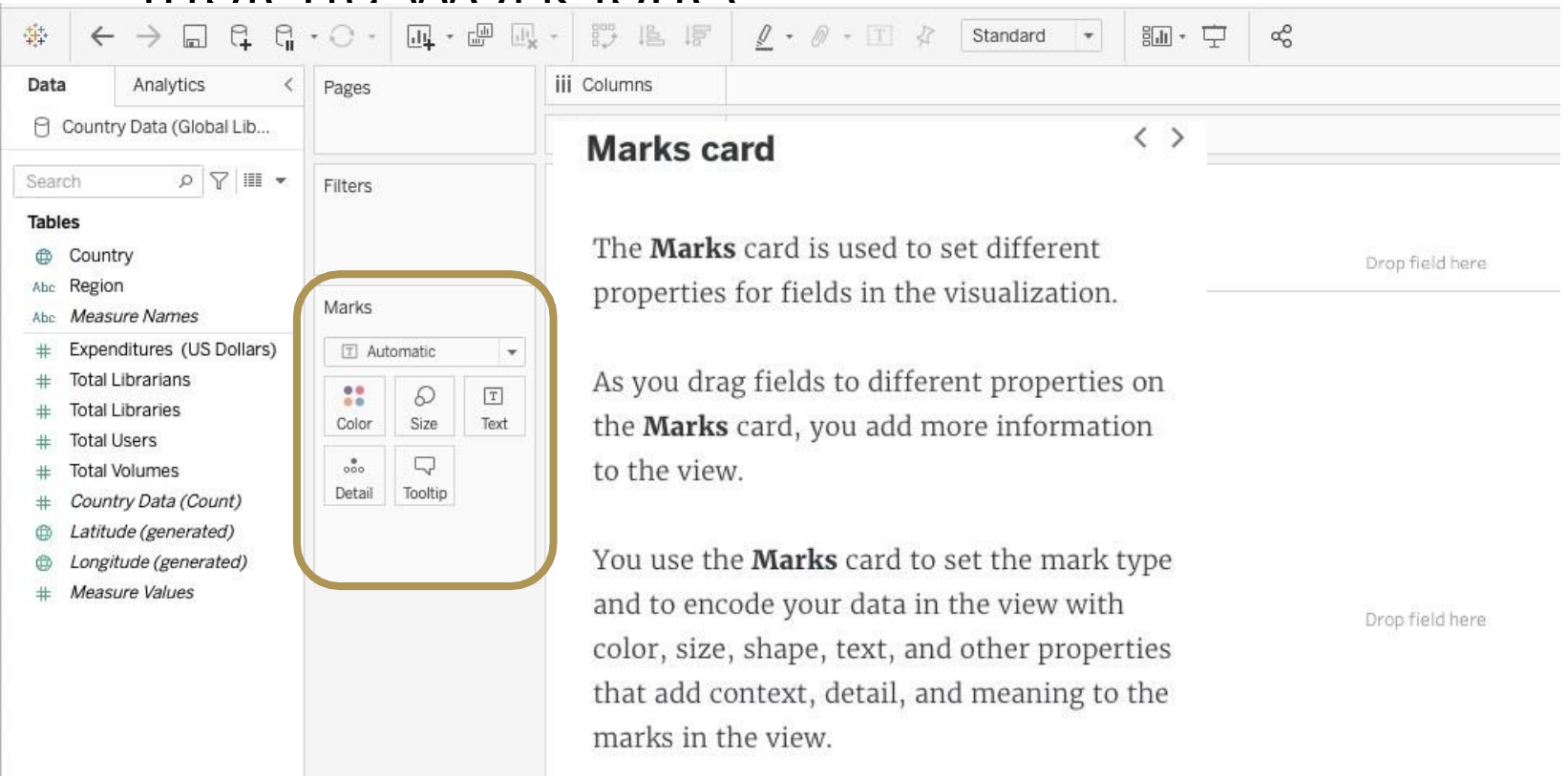
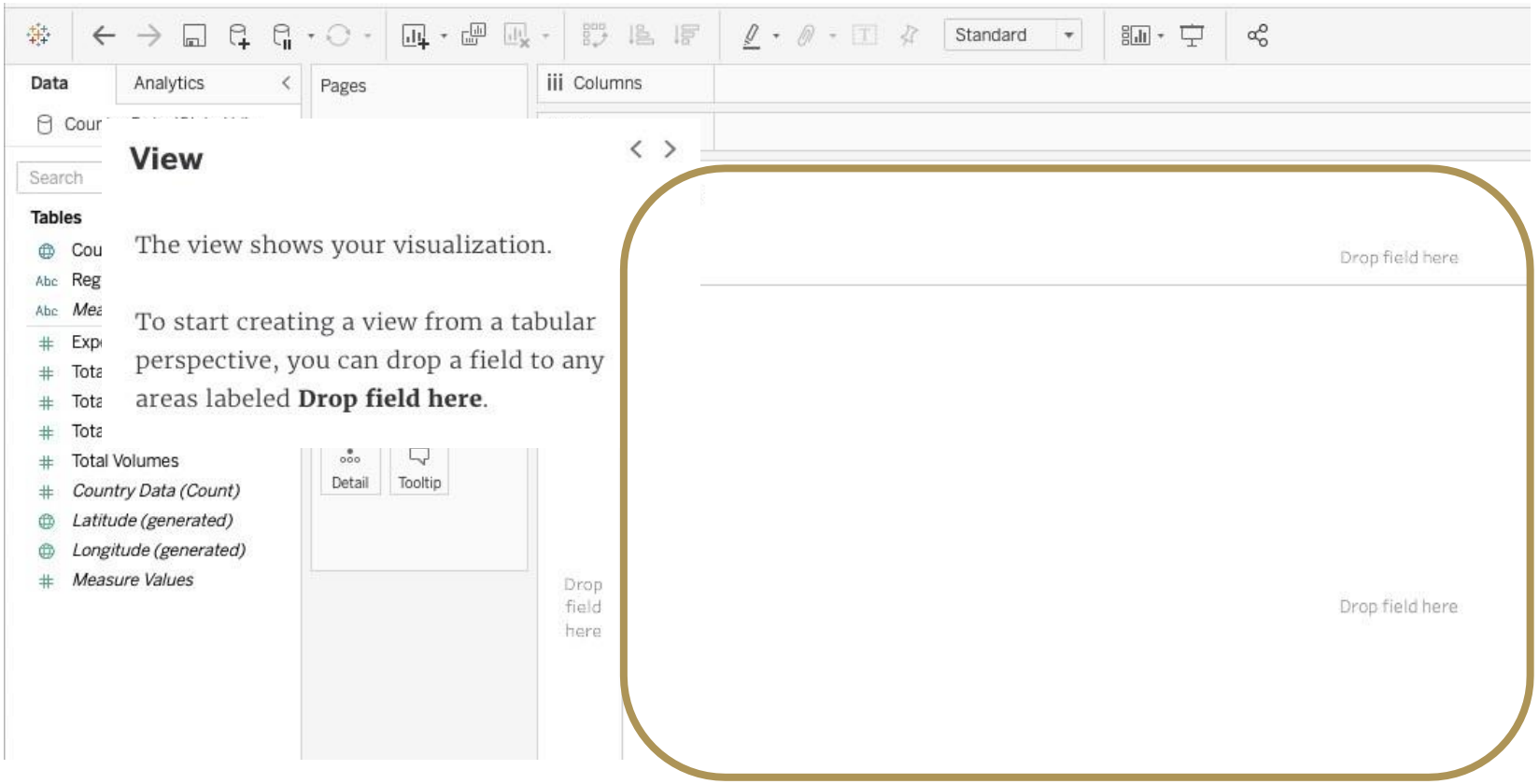
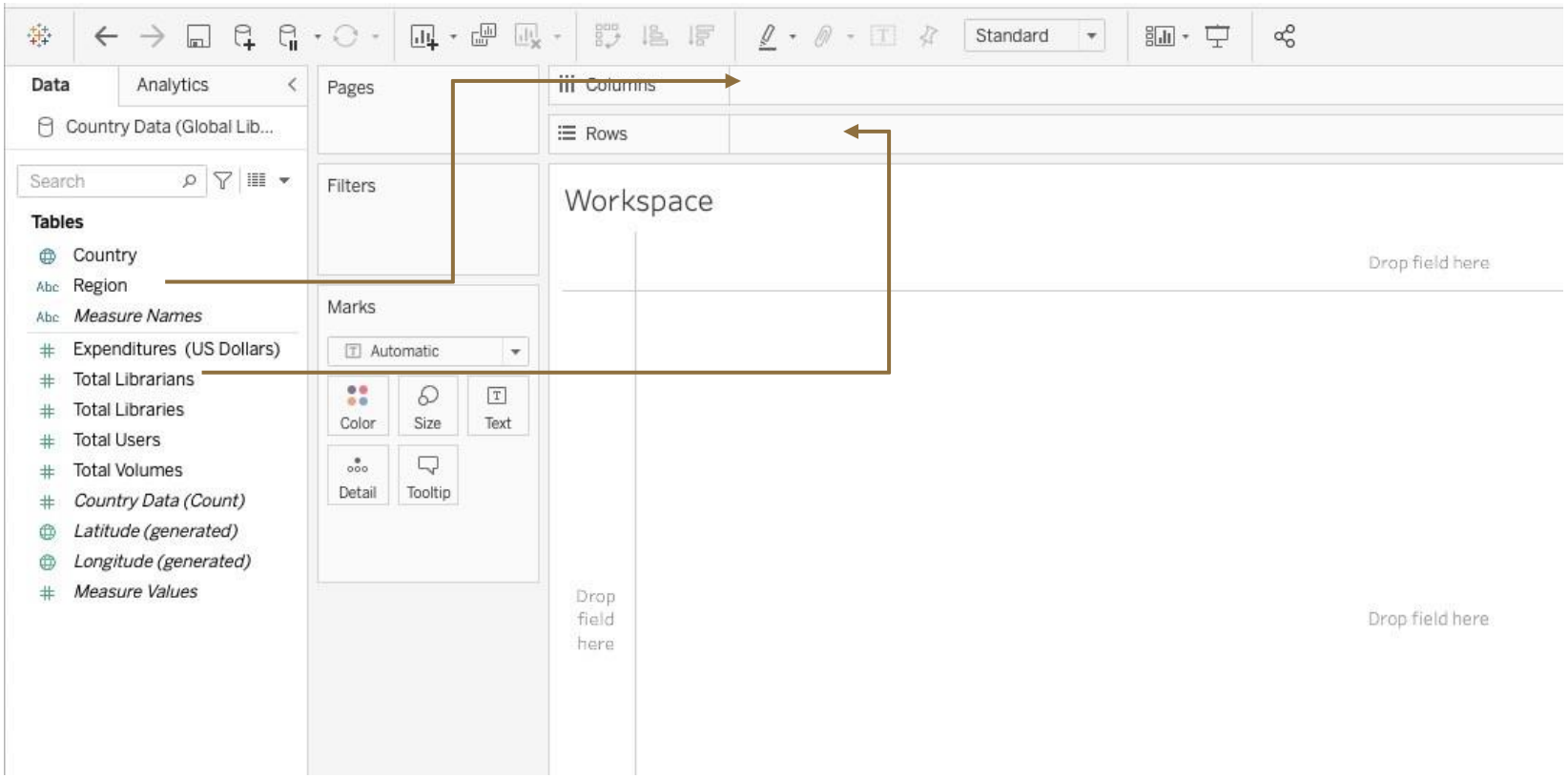


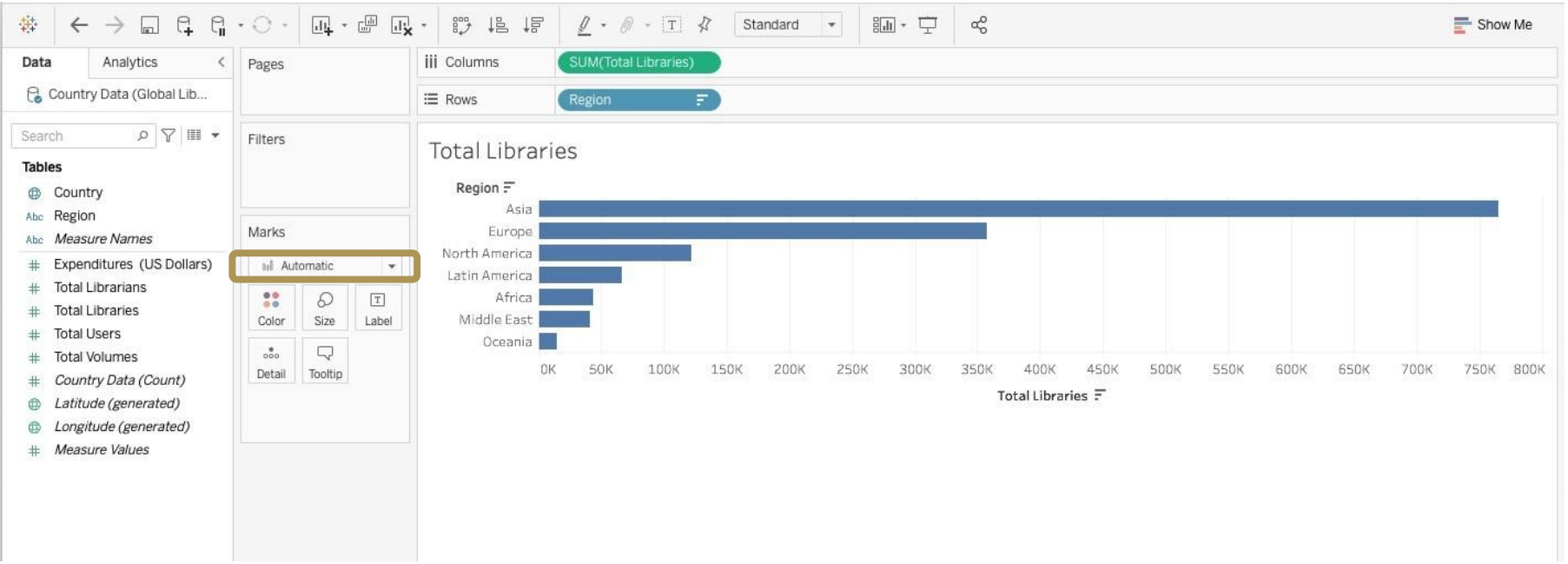
Tableau Workspace



Visualization



Visualization



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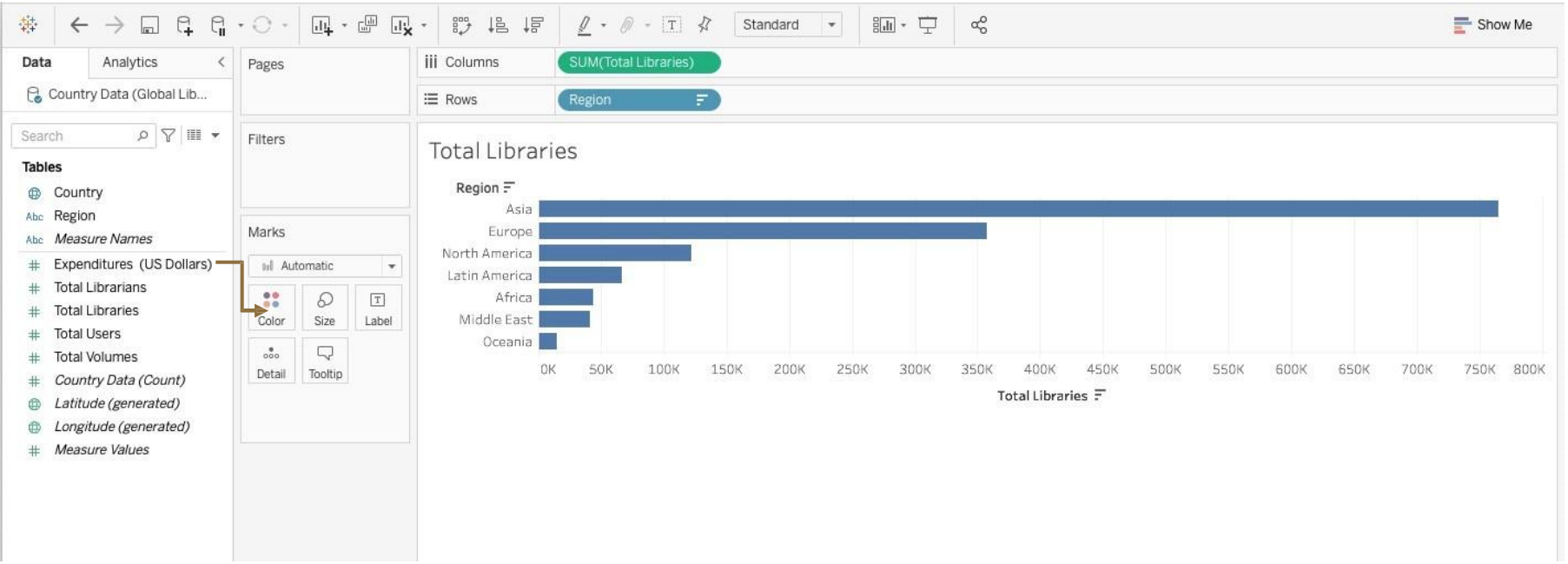

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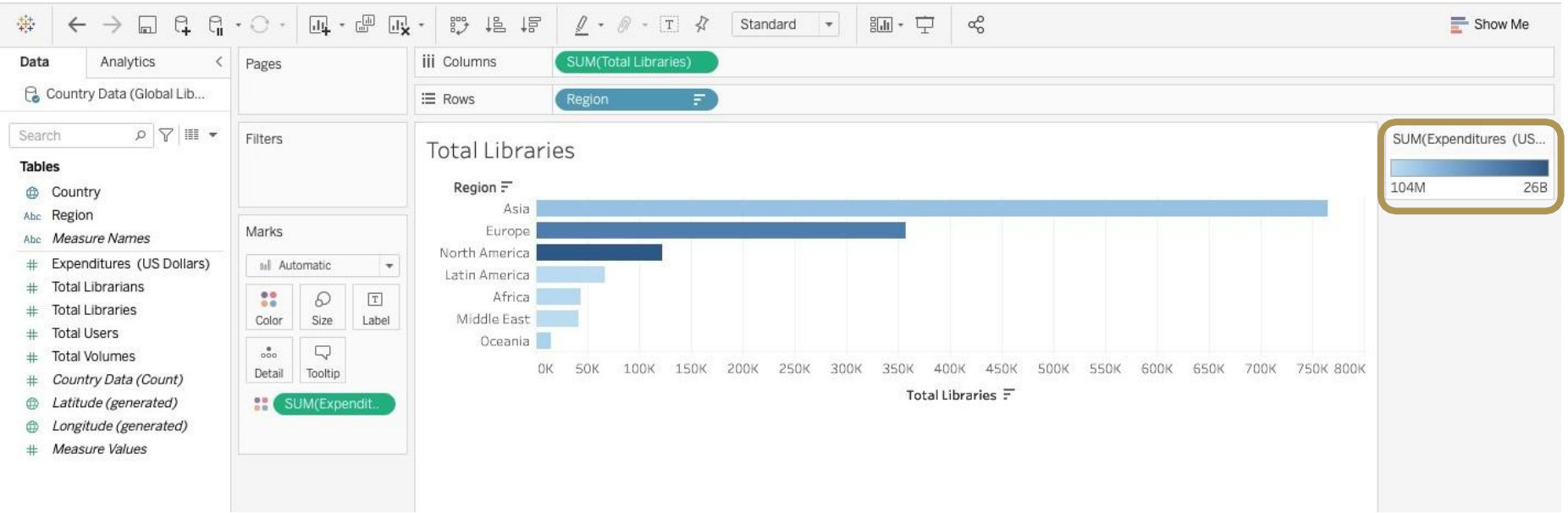

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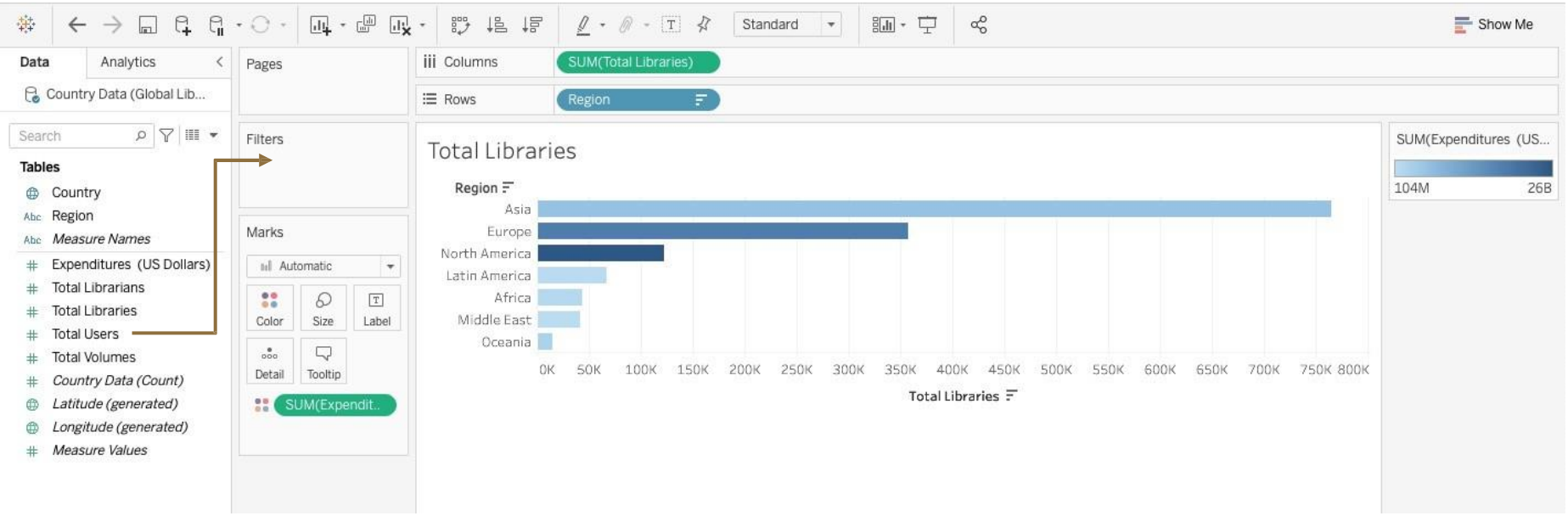
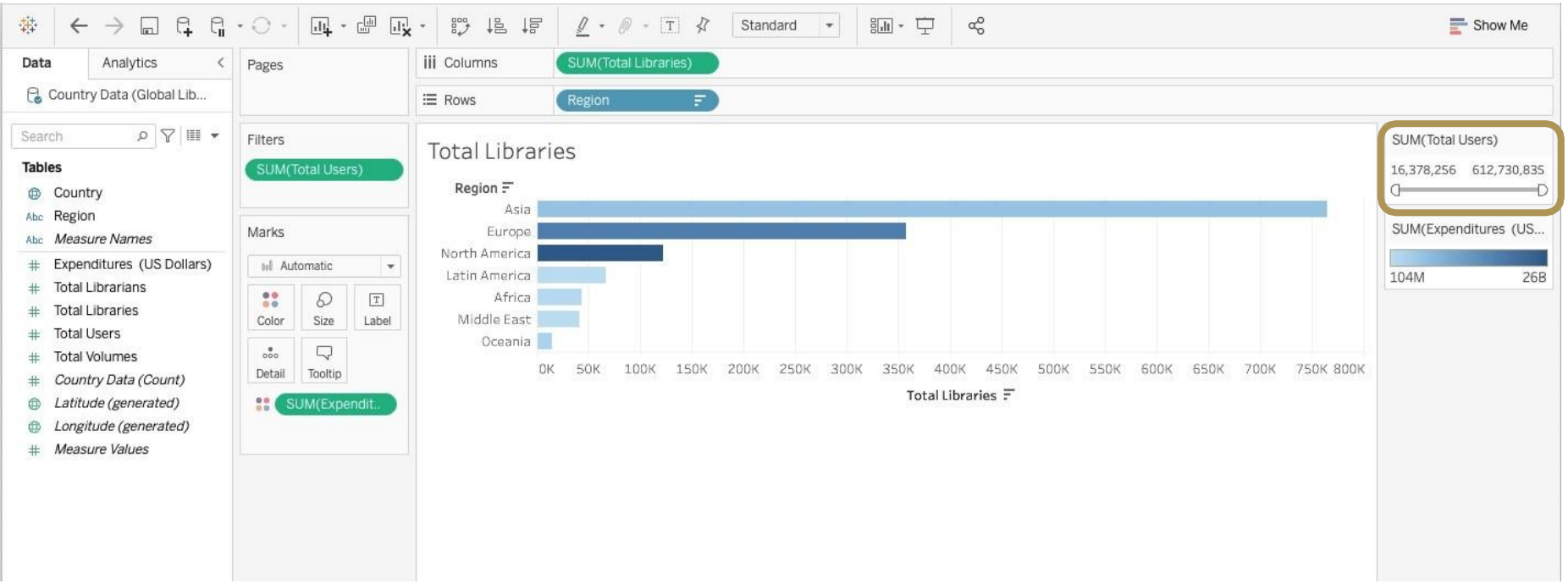


Visualization



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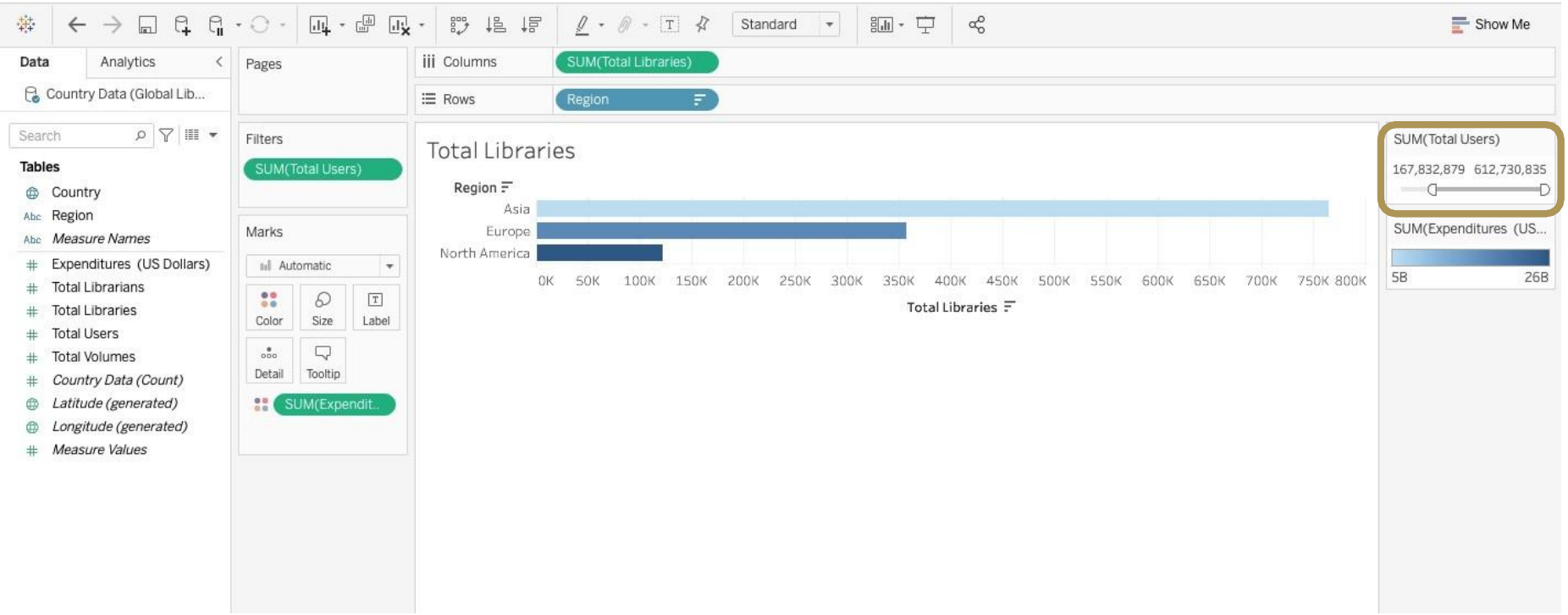

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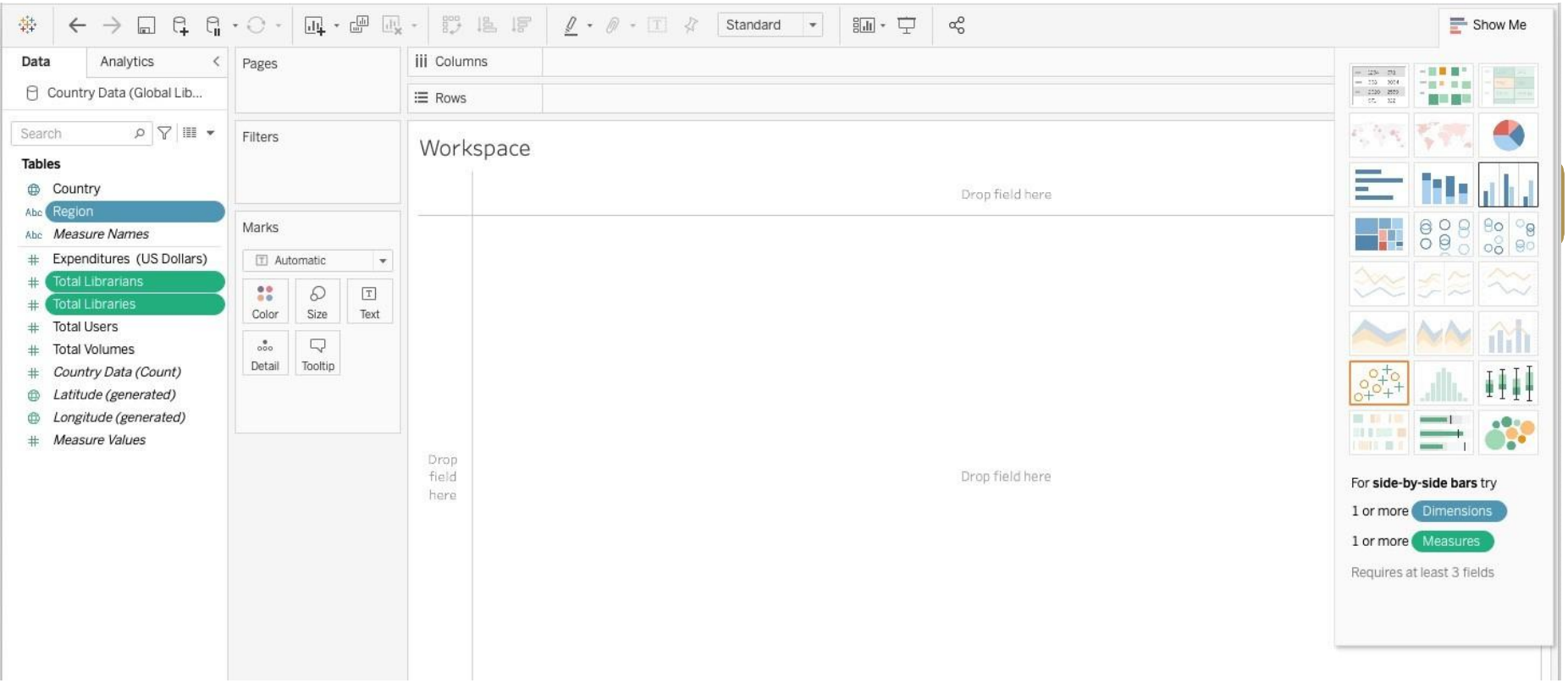
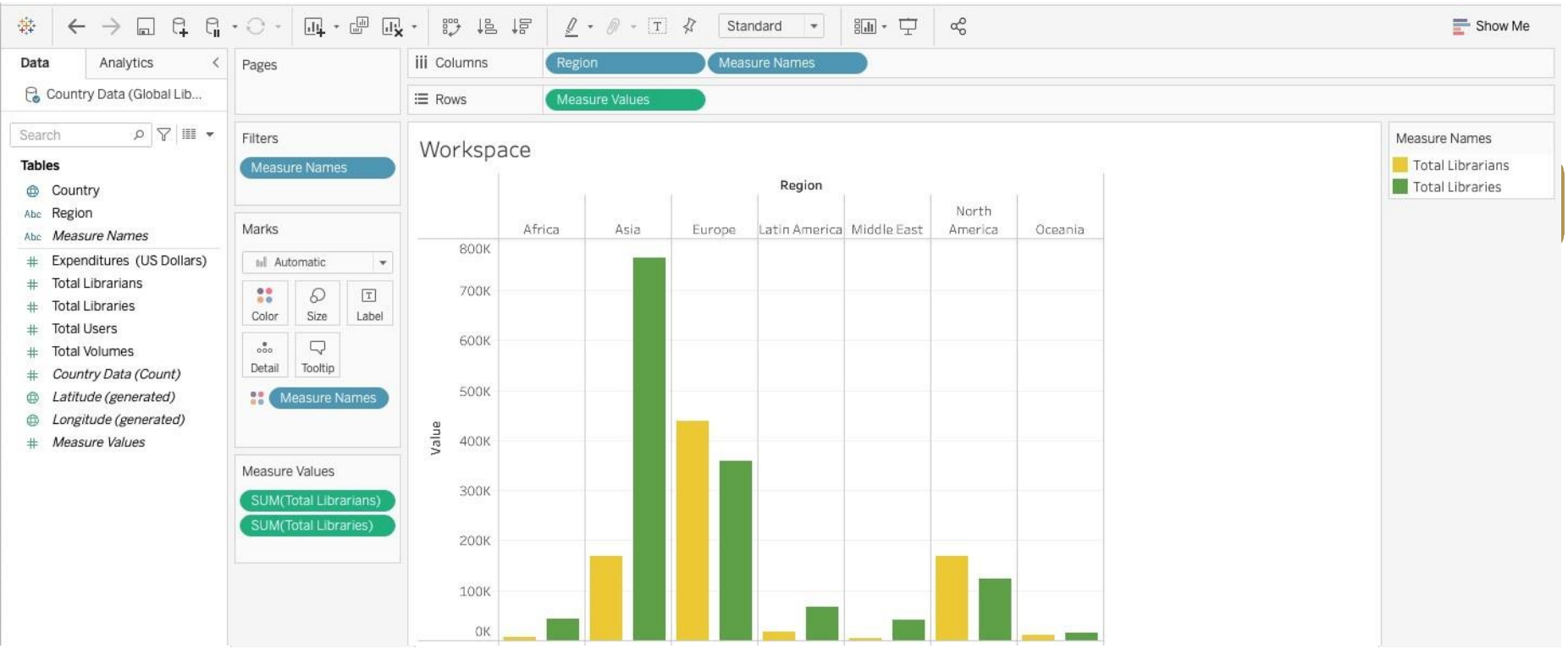
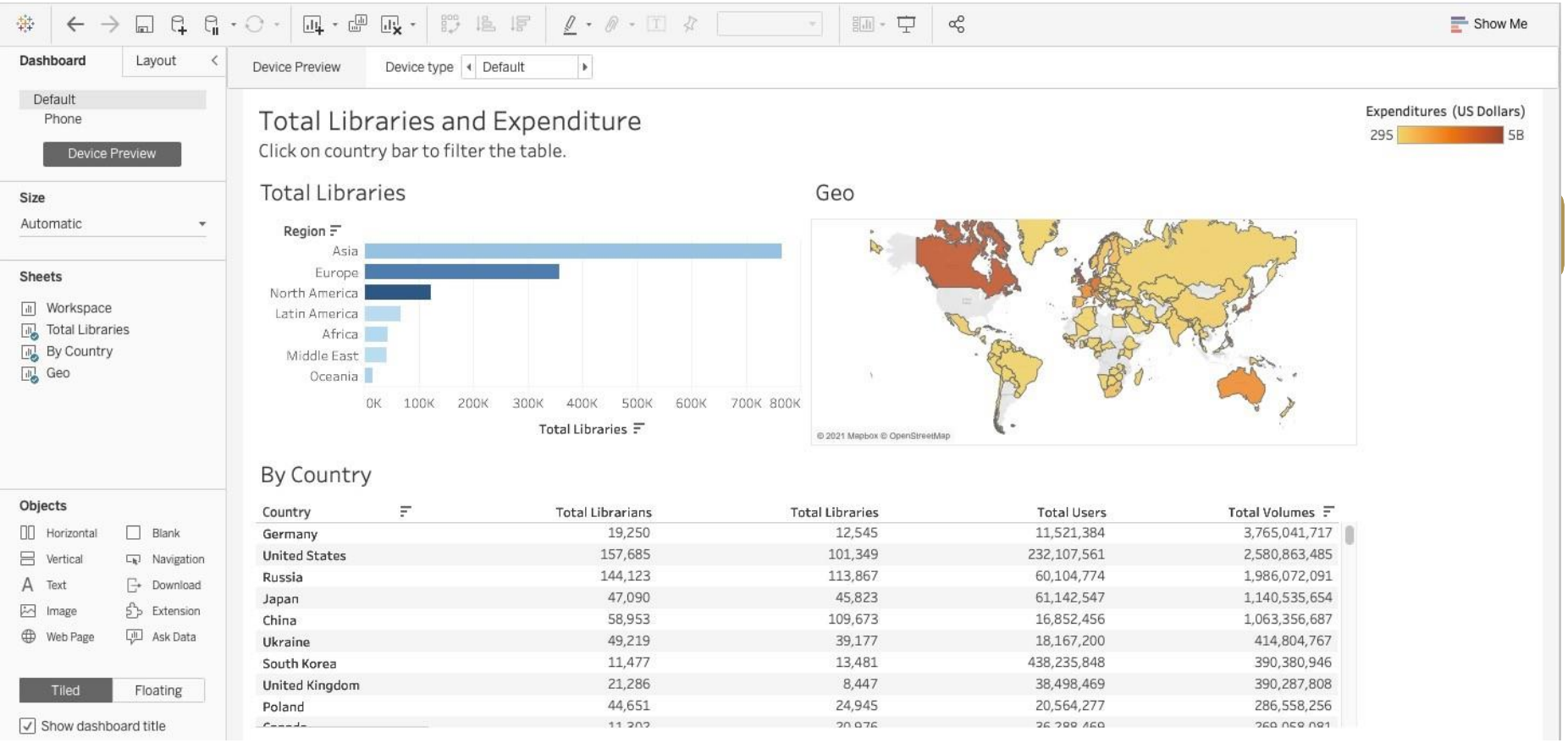


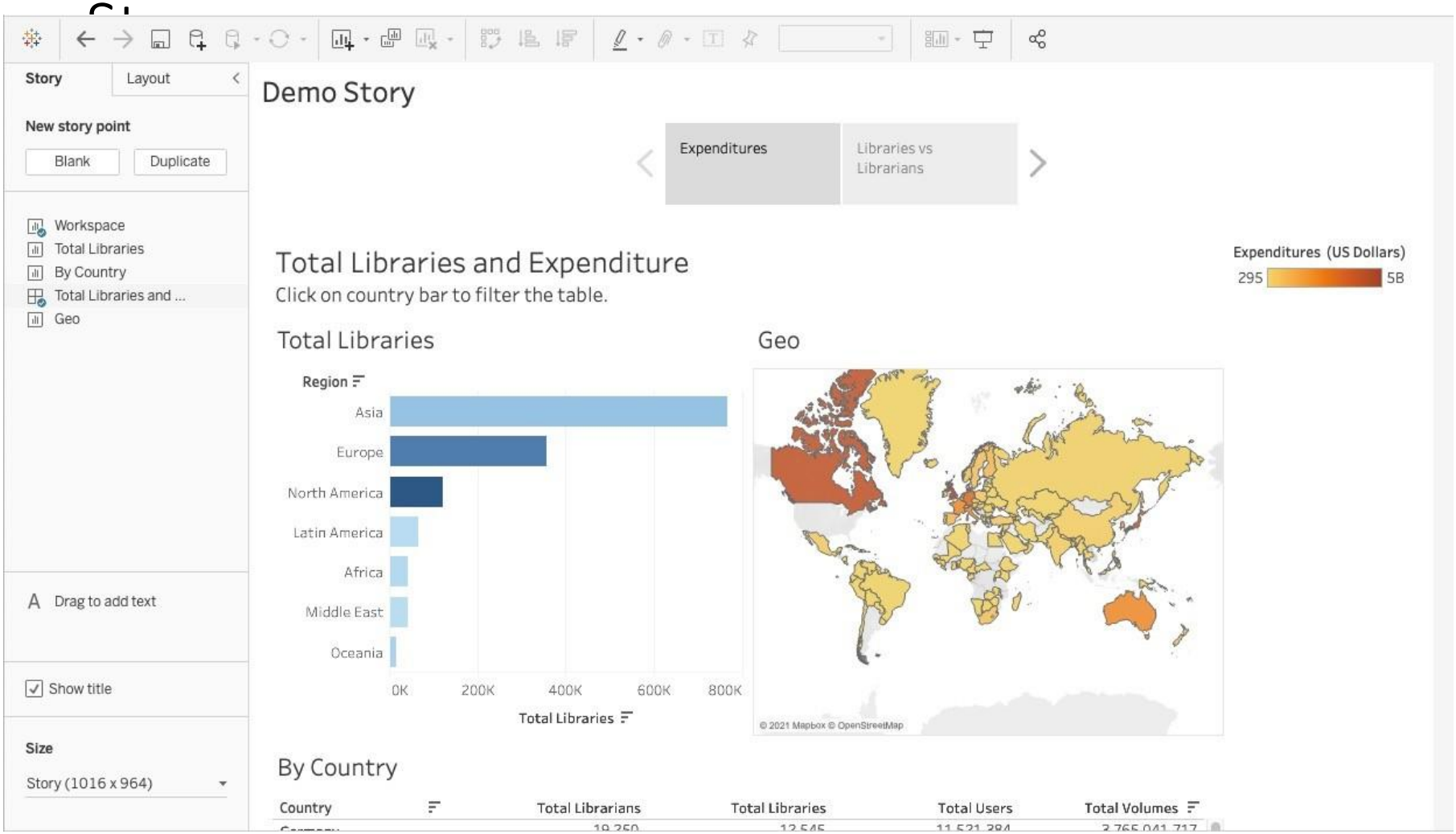
Visualization



Dashboard



Country	Total Librarians	Total Libraries	Total Users	Total Volumes
Germany	19,250	12,545	11,521,384	3,765,041,717
United States	157,685	101,349	232,107,561	2,580,863,485
Russia	144,123	113,867	60,104,774	1,986,072,091
Japan	47,090	45,823	61,142,547	1,140,535,654
China	58,953	109,673	16,852,456	1,063,356,687
Ukraine	49,219	39,177	18,167,200	414,804,767
South Korea	11,477	13,481	438,235,848	390,380,946
United Kingdom	21,286	8,447	38,498,469	390,287,808
Poland	44,651	24,945	20,564,277	286,558,256


Story
Layout
New story point
Blank
Duplicate
Workspace
Total Libraries
By Country
Total Libraries and ...
Geo
Drag to add text
Show title
Size
Story (1016 x 964)
Demo Story
Expenditures
Libraries vs Librarians
Total Libraries and Expenditure
Click on country bar to filter the table.
Expenditures (US Dollars)
295
5B
Total Libraries
Region
Asia
Europe
North America
Latin America
Africa
Middle East
Oceania
0K
200K
400K
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Geo
© 2021 Mapbox © OpenStreetMap
By Country
Country
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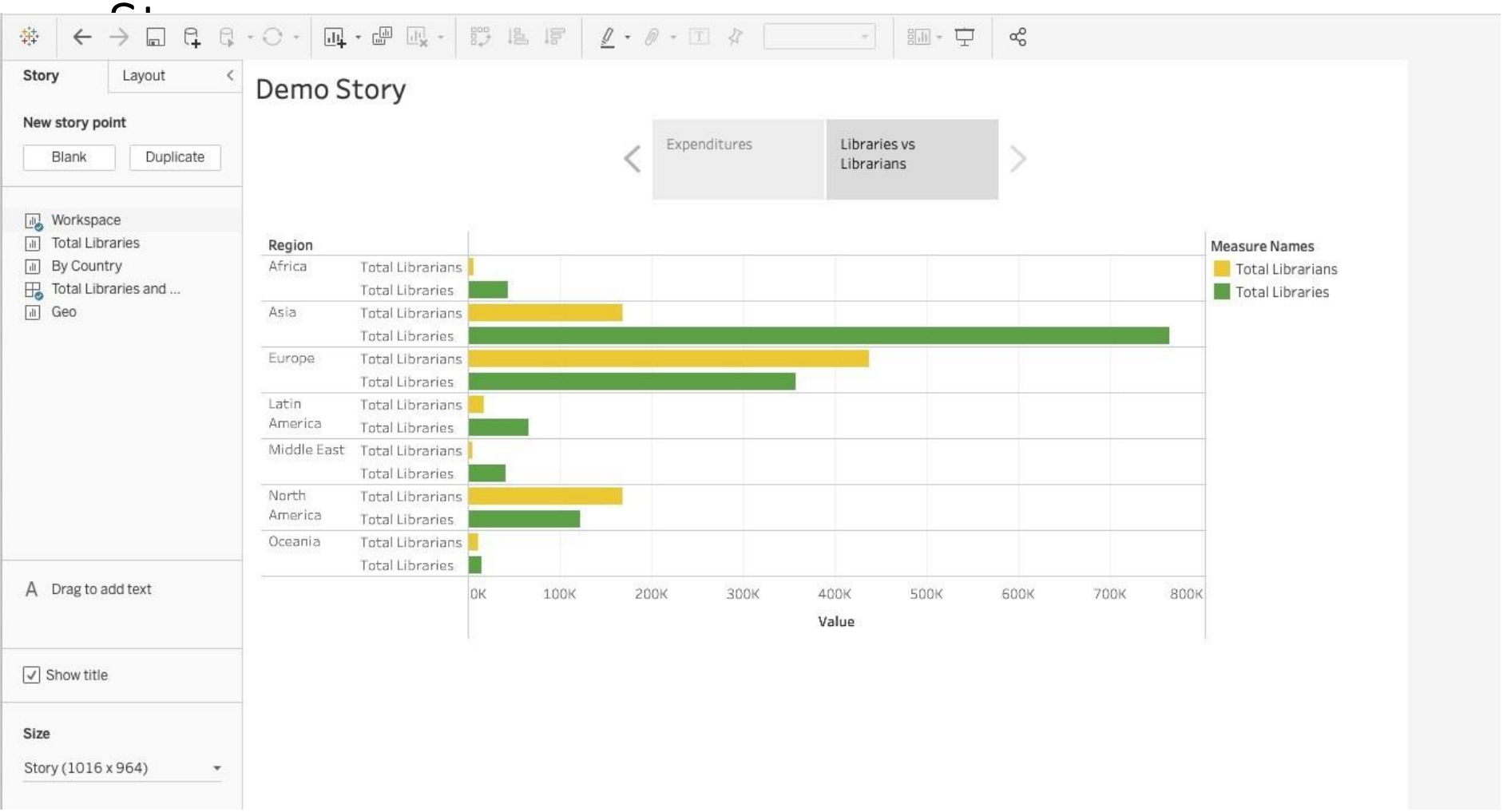
Total Users
Total Volumes


Story
Layout
Demo Story
New story point
Blank
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Total Libraries
By Country
Total Libraries and ...
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Libraries vs Librarians
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Value
Drag to add text
Show title
Size
Story (1016 x 964)

Share

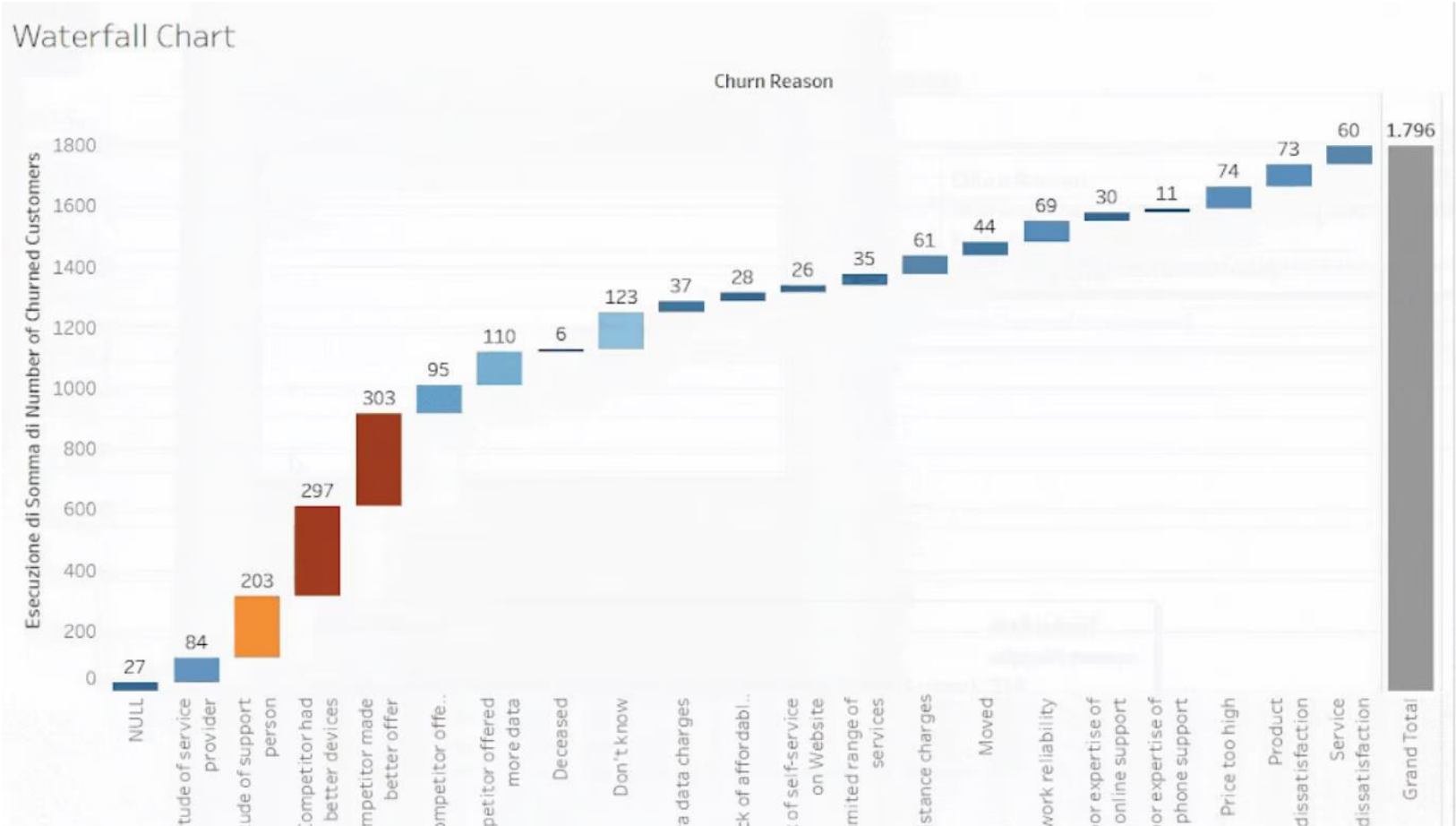
- Saved File
  - .twb or .twbx
- Publish to Tableau Server (Secure)
- Publish to Tableau Public (Unsecure)

Advance Visualization Charts (Waterfall Chart)

- Tableau supports advanced visualizations like waterfall charts, ribbon charts, and word clouds, offering tools to create these visualizations. These charts are used to display complex data relationships and trends.
- 1. Waterfall Chart:
- **Purpose:**
- Shows how an initial value changes through a series of positive and negative values, culminating in a final value.
- **In Tableau:**
- You can create a waterfall chart by combining a bar chart with a calculated field to display the cumulative effect of each step.

Waterfall Chart

- A waterfall chart, shown below, is a special type of bar chart designed to show the cumulative effect of positive and negative values on an outcome. It's especially useful for visualizing the progression of data through a sequence of changes, providing a clear picture of how different factors contribute to a result over time.

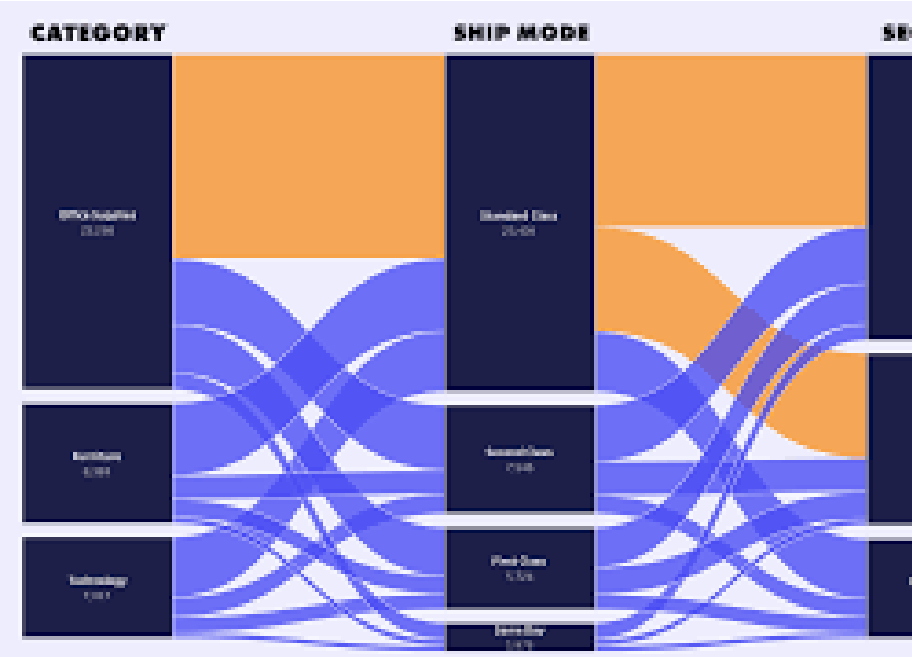


Waterfall Chart

- There are many instances where we may want to use a waterfall chart to illustrate trends and relationships. Here are a few examples:
- **Financial statements:** Waterfall charts can show the impact of things like revenue and expenses on the bottom line.
- **Project management:** They can demonstrate how tasks contribute to a project's timeline.
- **Sales performance:** They show the effect of sales in different regions on total sales growth or decline.

Advance Visualization Charts (Ribban Charts)

- . Ribbon Chart:
- **Purpose:**
- Similar to a waterfall chart, but typically used to visually represent the flow of data between different categories or stages.
- **In Tableau:**
- Ribbon charts can be created using calculated fields and shapes to connect different bars representing the data flow.



Ribbon charts

- Ribbon charts, or stacked area charts, are an advanced visualization in Tableau used to display the flow of information or data across different stages or categories. They are particularly effective for showing the contribution of various factors to a total outcome or the movement of data between different groups.
- How to create a ribbon chart in Tableau:
- **1. Prepare your data:** Ensure your data includes a dimension for the "stages" or "groups" you want to represent, and a measure for the "value" or "flow" that needs to be visualized.
- **2. Create a calculated field:** This field will be used to determine the height of each ribbon, which should be calculated as the cumulative value of the measure across each stage or group.
- **3. Choose a "Stacked Area Chart":** Select the "Stacked Area" visualization type in Tableau.
- **4. Add dimensions and measures:** Drag your "stages" dimension to the "Rows" shelf and your calculated field to the "Size" mark on the "Marks" card.
- **5. Adjust colors and labels:** You can customize the colors, labels, and other visual properties of the chart to enhance its clarity and readability.

Advantages of using ribbon charts:

- **Clear representation of flow:**
- They effectively show the movement of data between different categories or stages.
- **Comparison of contributions:**
- They allow for easy comparison of the contributions of different factors to a total outcome.
- **Enhanced visual impact:**
- The stacked and colored areas create a visually engaging and impactful representation of the data.
- **Examples of applications:**
- **Sales pipeline:** Show the flow of leads through different stages of the sales process.
- **Marketing campaign performance:** Track the conversion of customers from different channels.
- **Supply chain analysis:** Visualize the movement of goods through different stages of the supply chain.
-

Advance Visualization Charts (Word Cloud:)

- **Tableau:** Tableau is a very powerful data visualization tool that can be used by data analysts, scientists, statisticians, etc. to visualize the data and get a clear opinion based on the data analysis. Tableau is very famous as it can take in data and produce the required data visualization output in a very short time.
- **World Cloud:** A Word cloud, also referred to as a Tag cloud, may be a visual representation of text data, typically want to depict keyword metadata (tags) on websites or to see free morpheme text[Wikipedia]. Word clouds are a popular type of info-graphic with the assistance of which we will show the frequency of words in our data. This can be depicted either by the size or the color of the chosen fields in the data. They are a reasonably powerful feature to draw attention to your presentation or story.
- **Word Cloud:**
- **Purpose:**
- Visualizes text data, with the size of each word reflecting its frequency or importance.
- **In Tableau:**
- You can create a word cloud by importing text data, using a shape to represent each word, and adjusting the size of the shape based on the word's frequency.

Advance Visualization Charts (Word Cloud:)

- **Steps to illustrate a Word Cloud in Tableau:**
- Open Tableau tool and connect a dataset into it.
- Drag and drop the one sheet of connected dataset.
- Click on *Sheet1* to open the tableau worksheet.
- On clicking *Sheet1* you will get whole dataset attributes on left side and a worksheet for work.

Word Cloud:

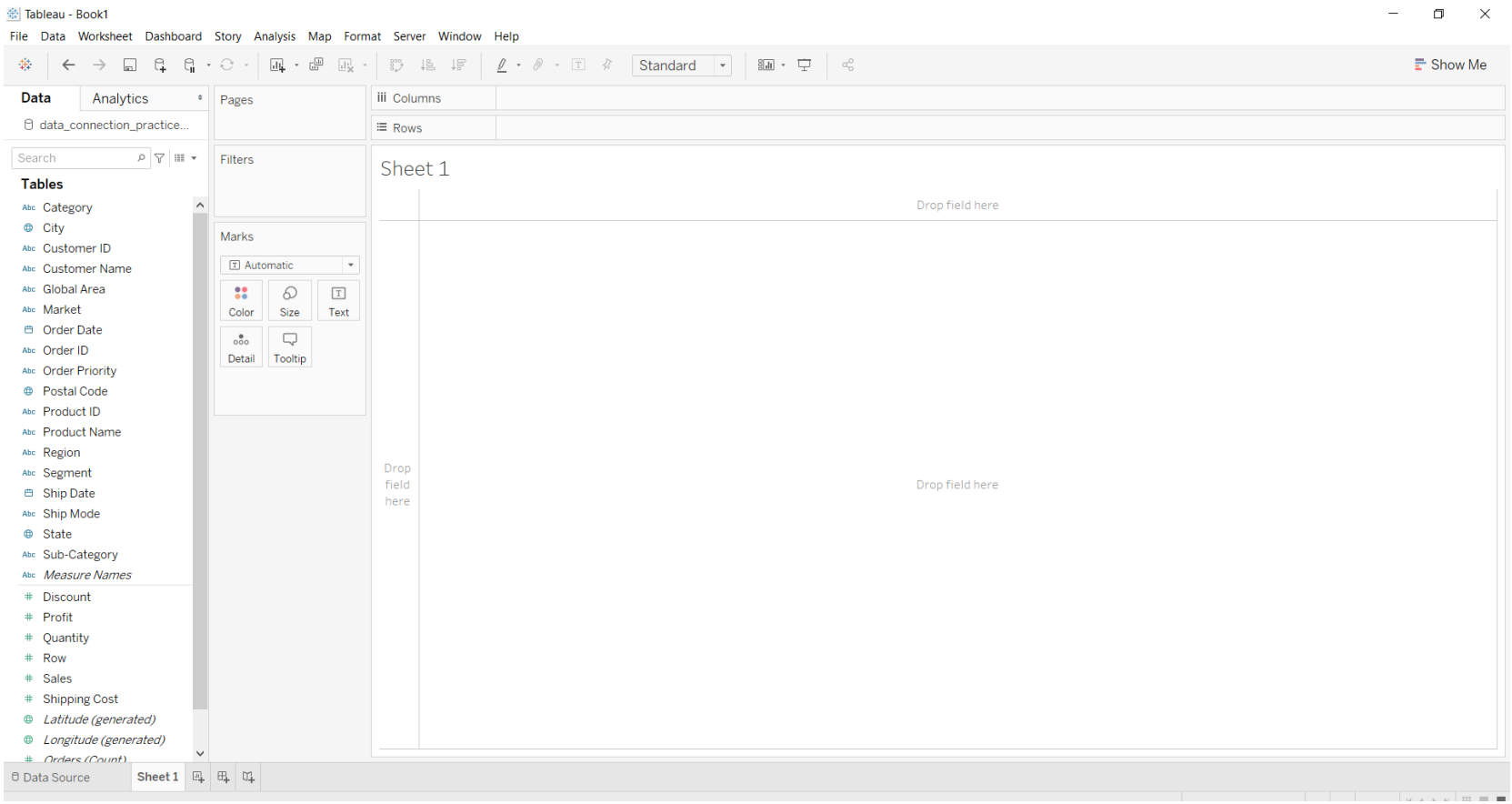


Tableau - Book1
File Data Worksheet Dashboard Story Analysis Map Format Server Window Help
Standard
Show Me
Data
Analytics
data_connection_practice...
Search
Tables
Category
City
Customer ID
Customer Name
Global Area
Market
Order Date
Order ID
Order Priority
Postal Code
Product ID
Product Name
Region
Segment
Ship Date
Ship Mode
State
Sub-Category
Measure Names
Discount
Profit
Quantity
Row
Sales
Shipping Cost
Latitude (generated)
Longitude (generated)
Pages
Filters
Marks
Automatic
Color
Size
Text
Detail
Tooltip
Columns
Rows
Sheet 1
Drop field here
Drop field here
Drop field here
Data Source
Sheet 1

Word Cloud


Solutions
Jennifer
Illumine
experiences
Creative
cultural
clients
institutions
museums
new
programs
evaluation
Ohio
consultant
leadership
project
patrons
museum
experience
vision
visitor
goals
staff
development
media
next
work

Advantages of Word Clouds in Tableau:

- **Visual Representation:** Word clouds provide a clear and intuitive way to visualize the frequency of words, making it easier to identify prominent themes or topics within text data.
- **Data Exploration:** They serve as a valuable tool for exploring textual data, helping users uncover patterns, trends, and relationships.
- **Communication:** Word clouds can effectively communicate important information in a concise and visually appealing manner, making them suitable for presentations, reports, or dashboards.
- **Engagement:** Word clouds can be more engaging than traditional charts, making them a great option for presentations or infographics.
- **SEO Analysis:** They can help determine the most used keywords, aiding in SEO efforts.
- **Scalability:** Word clouds can accommodate a large number of tags, allowing for a comprehensive visualization of text data.
- **Intuitive Insights:** The most frequent words are instantly visible, providing a quick overview of the data.
- **Multidimensional Representation:** Word clouds can represent multiple dimensions, such as words, their frequency (size), and color-coding.