Sales Dynamics: A Comprehensive Dashboard for the Sales-Management Association

This project is a comprehensive analysis developed as part of the Microsoft Power BI Desktop for Business Intelligence course on Udemy. It showcases the ability to transform complex datasets into insightful visualizations and dashboards, focusing on sales performance, customer metrics, and product analysis.

The dashboard features an executive overview, allowing users to navigate through various pages, including detailed insights on product performance, customer demographics, and geographic sales distribution. Utilizing advanced DAX calculations and interactive elements, the project highlights key metrics such as total orders, revenue, and profit, while enabling drill-through capabilities for in-depth analysis.

Through this project, I have demonstrated the skills acquired in the course, including data modeling, visualization techniques, and the creation of dynamic reports that facilitate data-driven decision-making.

Data Loading and cleaning

The project began by ingesting raw data from multiple sources:
CSV files.
Web links.

1. Data Transformation in Power Query Editor

Column and Table Naming:
Renamed several columns and tables for clarity and consistency.
Removed redundant and unnecessary columns that did not contribute to the analysis.

Data Types & Value Replacements:
Updated data types where necessary (e.g., converting text to dates or numbers).
Replaced certain values to improve readability and standardization.

New Column:
Created a new column by extracting all characters before the dash ("-") in the Product SKU column. The new column was named "SKU Type," offering additional categorization for analysis.

Data Profiling:

Conducted thorough data profiling to ensure quality.
Removed errors, null values, and irrelevant duplicates to maintain clean data.

Email Address Processing:

Duplicated the email address column and named it "Domain Name."
Transformed this column by removing all characters except for the domain name.
Cleaned up and capitalized domain names.

2. Date Dimension Creation

Developed a comprehensive Date Dimension from a one-column calendar lookup.
Added additional columns for more granular date analysis, such as:
{"Date", "Day Name", "Month Name", "Start of Week", "Week of Month", "Start of Month", "Start of Quarter" }

3. Rolling Calendar and Date Dimension:

Rolling Calendar Creation:

Implemented a dynamic rolling calendar starting from January 1, 2023, using the following formula:

```
Source = #date(2023,1,1),
List.Dates(Source,
Number.From(DateTime.LocalNow())-Number.From(Source),
#duration(1,0,0,0))
```

This formula dynamically generates dates up to the current date.

Table Conversion and Date Dimension:

Converted the rolling calendar list into a table.
Built a detailed date dimension with the following columns:
{"Date", "Day Name", "Month Name", "Month", "Year", "Days in Month", "Day of Week", "Day of Year", "Week of Year", "Start of Year"}

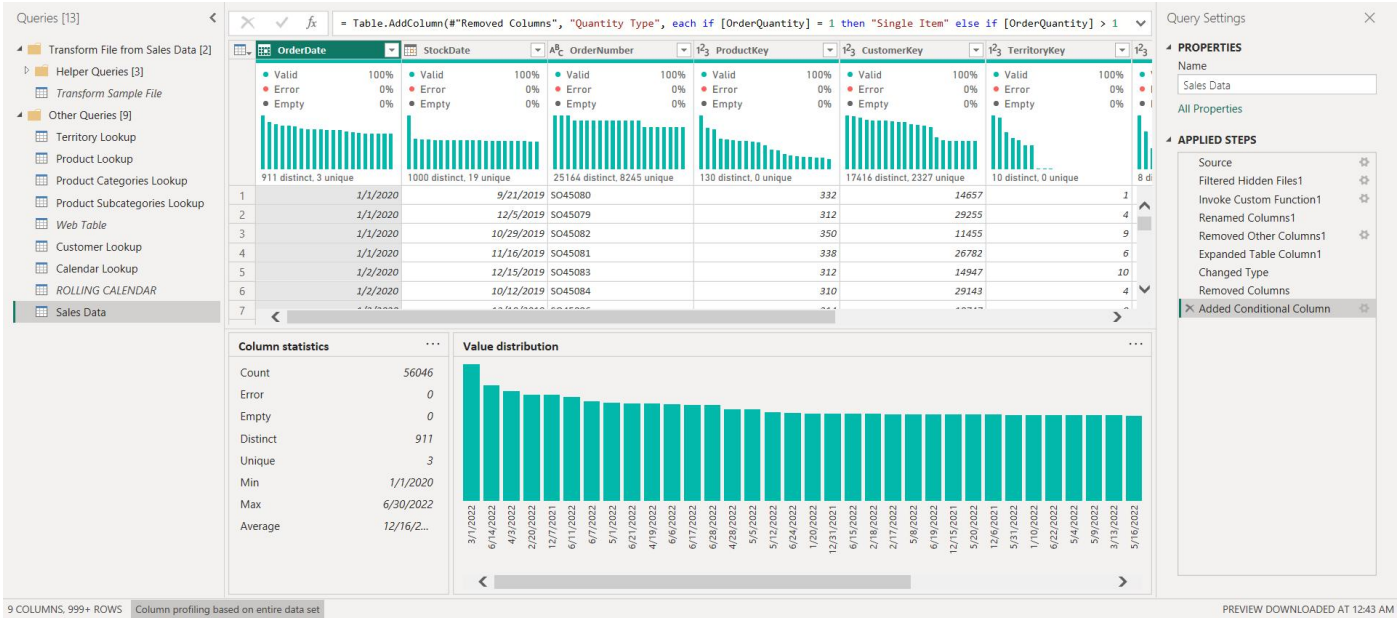
4. Sales Data Integration

Data Source Addition:

A new folder containing three CSV files related to sales was added as a data source.
These files were appended into one consolidated table called "Sales Data."

New Column:

A new column, "Quantity Type," was added to the Sales Data table, derived from the "Order Quantity" field.
The logic for "Quantity Type" is as follows:
If Order Quantity = 1, then Quantity Type = "Single Item".
If Order Quantity > 1, then Quantity Type = "Multiple Items".
Otherwise, Quantity Type = "Other".



Relational Model and Schema Design

Star Schema Creation:

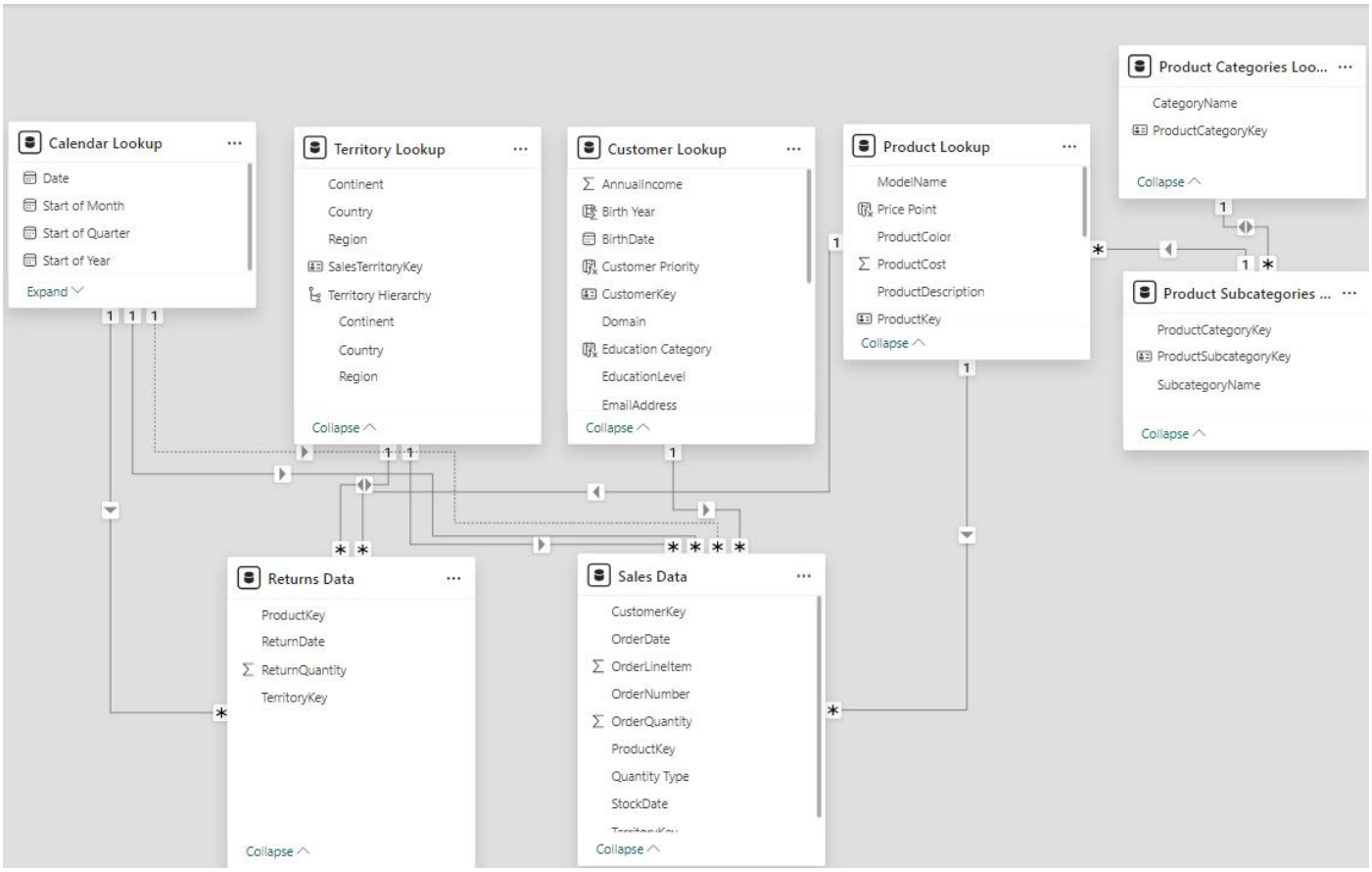
Built a star schema by establishing relationships between the following tables: Sales/Calendar/Customer/Product/Territories

Snowflake Schema for Products:

Connected the Product, Subcategory, and Category tables in a snowflake schema for a more normalized representation of product data.

Validation Using Matrix Visual:

Utilized the matrix visual to ensure that Order Quantity values could be accurately filtered using fields from each of the connected dimension tables.



CALCULATED FIELDS WITH DAX

DAX Measures Table

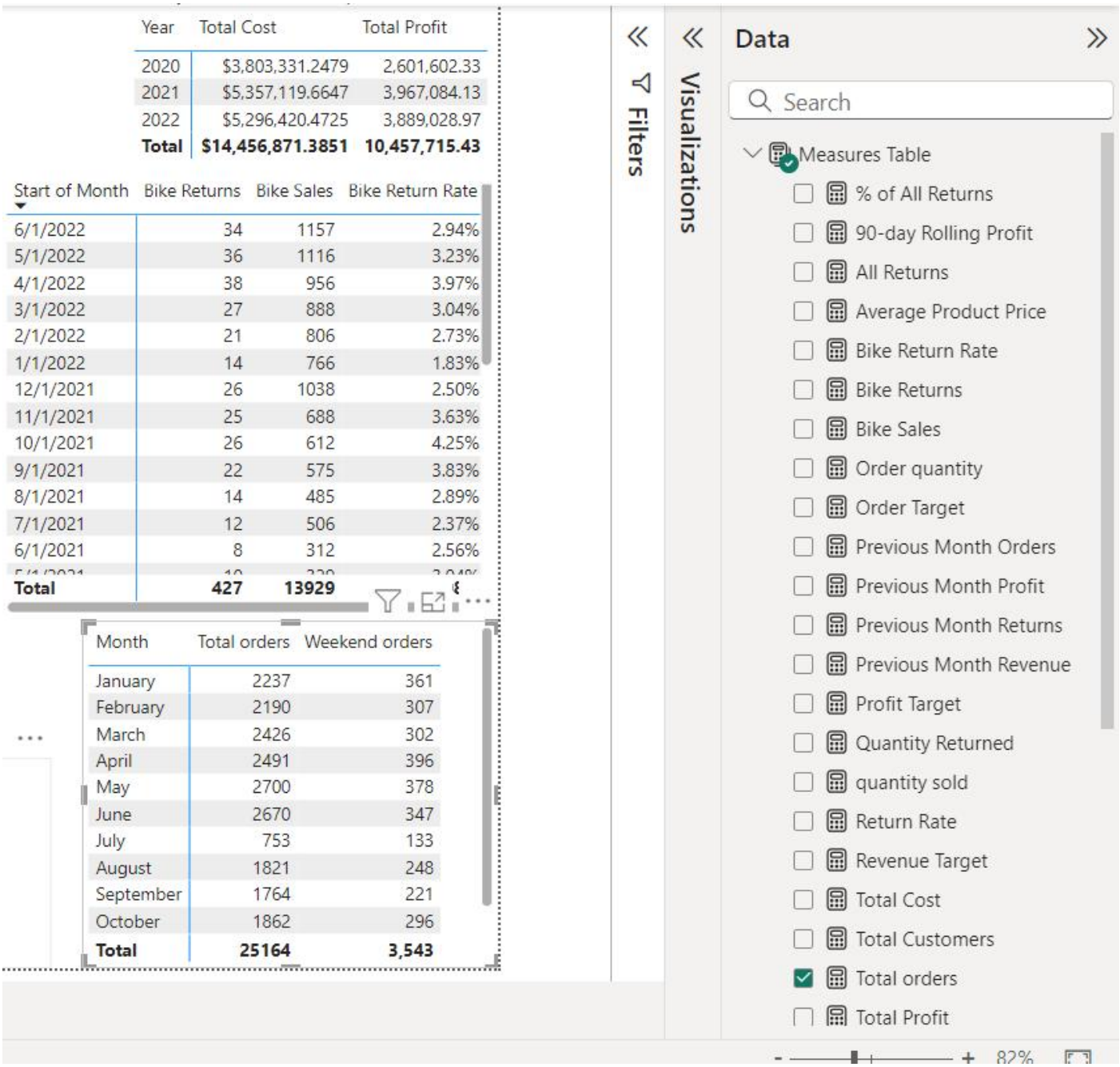
Created a dedicated measures table to manage calculated values using DAX.
Key measures include:

- ✓ Average Product Price: Calculates the average price of products.
- ✓ Order Quantity: Sums up the total quantity of items ordered.
- ✓ Quantity Returned: Sums the number of items returned.
- ✓ Quantity Sold: Sums the total items sold.
- ✓ Return Rate: Calculates the return rate as a ratio of returned items to sold items.
- ✓ Total Customers: Counts the unique number of customers.
- ✓ Total Orders: Counts the unique number of orders.
- ✓ Total Returns: Counts the total number of product returns.
- ✓ Weekend Orders: Calculates the total number of orders made during weekends.
- ✓ Bike Sales: Measures the total quantity of bikes sold.
- ✓ Bike Returns: Counts the total number of bikes returned.
- ✓ Bike Return Rate: Computes the return rate specifically for bikes.
- ✓ All Returns: Calculates the total number of orders by including all returns data.
- ✓ % of All Returns: Computes the percentage of total returns compared to all orders.
- ✓ Total Cost: Calculates the total cost by multiplying product cost with the order quantity.
- ✓ Total Revenue: Computes total revenue by multiplying order quantity with the related product price.
- ✓ Total Profit: Derives the total profit by subtracting the total cost from total revenue.
- ✓ Previous Month Revenue: Calculates the total revenue for the previous month.
- ✓ Revenue Target: Sets the target for the current month at 10% more than the previous month's revenue.
- ✓ Previous Month Orders: Calculates the total orders for the previous month.
- ✓ Previous Month Returns: Determines the number of returns for the previous month.
- ✓ Previous Month Profit: Calculates the total profit for the previous month.
- ✓ Order Target: Sets the target for orders at 10% more than the previous month's orders.
- ✓ Profit Target: Sets the profit target at 10% higher than the previous month's profit.
- ✓ 90-day Rolling Profit: Calculates the total profit over the last 90 days using a rolling window.

New Columns with Conditional Logic

Added new columns using conditional expressions to enrich the dataset:

- ✓ Parent: Indicates whether a customer has children based on the TotalChildren field.
- ✓ Customer Priority: Flags customers as "Priority" if they are parents with an annual income above 100,000; otherwise, they are classified as "Standard."
- ✓ Price Point: Categorizes products into "High," "Mid-Range," or "Low" based on their price thresholds.
- ✓ Education Category: Groups customers based on their education level into "High School," "Undergrad," "Graduate," or "Unknown."
- ✓ Income Level: Classifies customers' income into categories such as "Very High," "High," "Average," or "Low."
- ✓ SKU Category: Extracts all characters before the dash ("-") in the Product SKU field.
- ✓ Month Short: Extracts the first three letters of the Month Name field and converts them to uppercase for a shortened month format.
- ✓ Birth Year: Extracts the year component from the customer's birthdate.
- ✓ Weekend: Classifies days as "weekend" or "weekday" based on the day of the week.
- ✓ Retail Price: Retrieves the product price from the related 'Product Lookup' table.
- ✓ Revenue: Computes total revenue by multiplying the product price with the order quantity.



Year	Total Cost	Total Profit
2020	$3,803,331.2479	2,601,602.33
2021	$5,357,119.6647	3,967,084.13
2022	$5,296,420.4725	3,889,028.97
Total	**$14,456,871.3851**	**10,457,715.43**

Start of Month	Bike Returns	Bike Sales	Bike Return Rate
6/1/2022	34	1157	2.94%
5/1/2022	36	1116	3.23%
4/1/2022	38	956	3.97%
3/1/2022	27	888	3.04%
2/1/2022	21	806	2.73%
1/1/2022	14	766	1.83%
12/1/2021	26	1038	2.50%
11/1/2021	25	688	3.63%
10/1/2021	26	612	4.25%
9/1/2021	22	575	3.83%
8/1/2021	14	485	2.89%
7/1/2021	12	506	2.37%
6/1/2021	8	312	2.56%
Total	**427**	**13929**	

Month	Total orders	Weekend orders
January	2237	361
February	2190	307
March	2426	302
April	2491	396
May	2700	378
June	2670	347
July	753	133
August	1821	248
September	1764	221
October	1862	296
Total	**25164**	**3,543**

Visualization: sales-analysis Dashboard

The Executive Sales Dashboard serves as a high-level overview of key sales performance metrics, designed to provide actionable insights for senior leadership. The dashboard offers a clear snapshot of total orders, revenue, profit, and returns, making it easy to monitor the health of the business.

The dashboard is built with a user-friendly sidebar navigation that allows seamless movement between different report pages, accompanied by buttons for resetting filters and interacting with key slicers for enhanced interactivity.

Dashboard Features

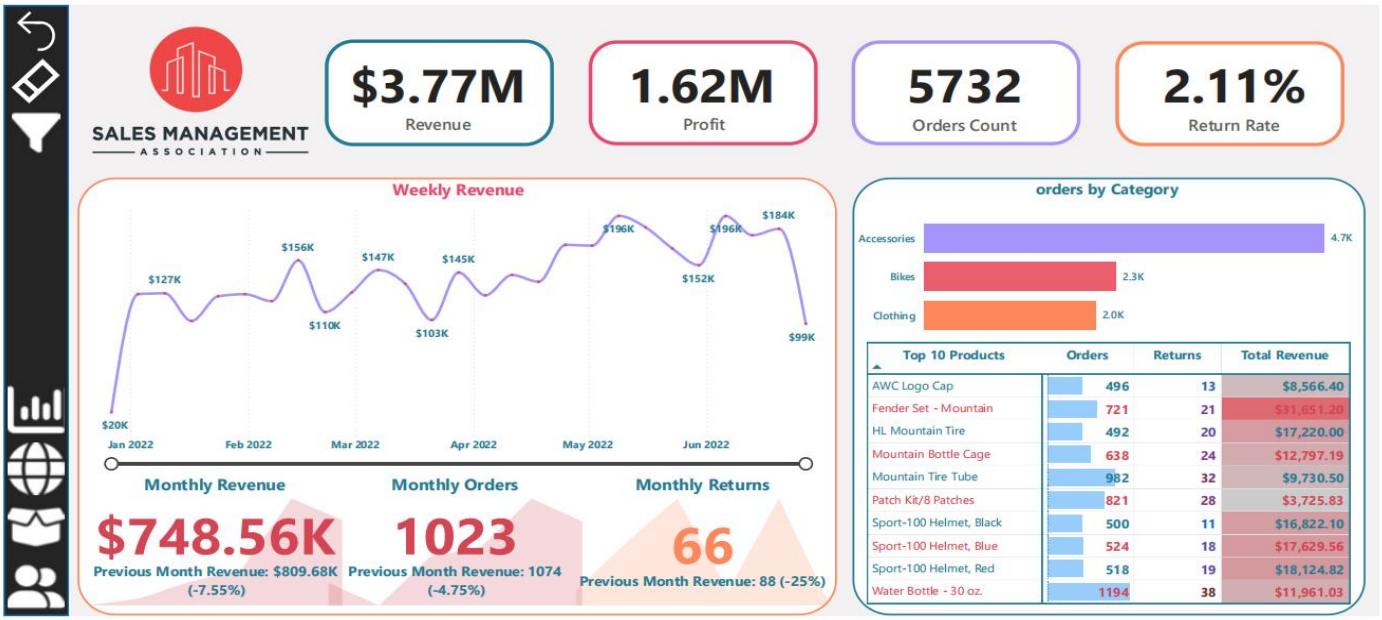
Navigation and Interactivity:

Sidebar Navigation: A collapsible side panel provides buttons to navigate between pages for specific sales analysis.

Reset Button: A dedicated reset button clears all filters, restoring the dashboard to its default view.

Slicer Lane: A slicer lane can be opened and closed with a button. This includes slicers for navigating the date hierarchy (e.g., Year, Quarter, Month) and territory hierarchy to filter the data by specific time frames or geographic regions. A clear slicer button is also available to reset all slicer selections quickly.

Visualizations on the Executive Page



Cards:

Total Orders: Displays the overall count of orders.

Total Revenue: Shows the total sales revenue.

Total Profit: Visualizes the net profit generated from sales.

Total Returns: Highlights the count of returned items, providing an indication of product performance.

Stacked Bar Chart - Orders by Category:

A stacked bar chart displays orders segmented by product categories, offering insights into which categories are performing best in terms of volume.

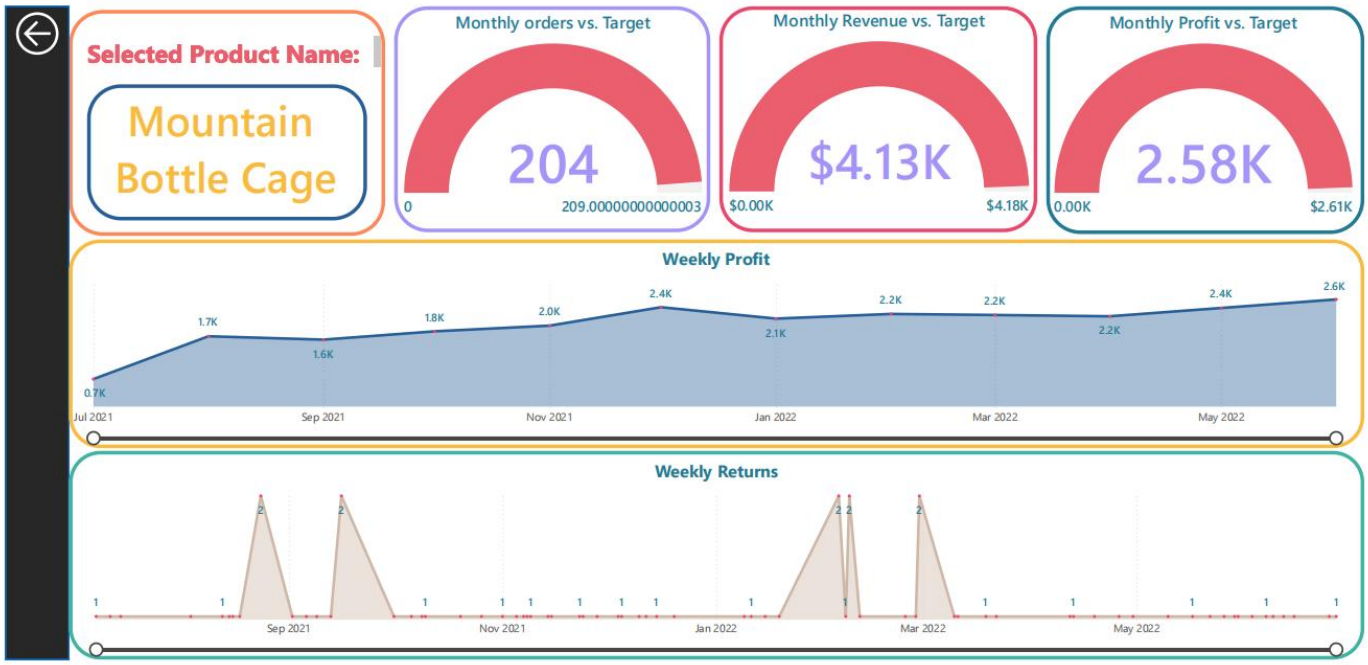
Matrix Table - Top 10 products:
A matrix table showing the top 10 products ranked by total orders, along with their total revenue and total returns. This provides an overview of the highest-performing products and their contribution to overall sales.
Users can drill through from the product name in the Top 10 Products matrix table to a Product Drill-Through Page. This page provides in-depth insights for the selected product.

Product Drill-Through Page Features:

Product Name Display:
The page dynamically displays the selected product name at the top.

Gauges for Key Metrics:
Total Orders vs Target: A gauge showing the total number of orders against the predefined target.
Total Revenue vs Target: A gauge comparing the product's revenue to the target.
Total Profit vs Target: A gauge tracking the product's profit compared to the target.

Line Charts - Total Orders and Total Returns:
Line Chart 1: Displays total orders over time with a date hierarchy (Day, Month, Year, and Quarter).
Line Chart 2: Visualizes total returns over the same date hierarchy, allowing comparison of orders and returns over time.



Line Chart - Weekly Revenue:
A line chart shows weekly revenue trends, with the total revenue by the start of each week, helping executives to identify patterns or anomalies over time.

KPI Charts - Monthly Metrics:
Monthly Orders, Returns, and Revenue: Three key performance indicator (KPI) charts display the monthly order count, return count, and revenue, respectively, with targets set to the previous month's values. This allows a quick comparison of current performance versus past trends.

Interactivity and Custom Slicers:
Date Hierarchy Slicers: Multiple levels of date filters, including year, quarter, and month, are provided to allow drill-down analysis.
Territory Hierarchy Slicers: Filters allow users to slice the data by geographic territories, enabling location-specific insights.
Clear Filters Button: Users can reset the selected filters using a dedicated button to quickly return to an unfiltered view.

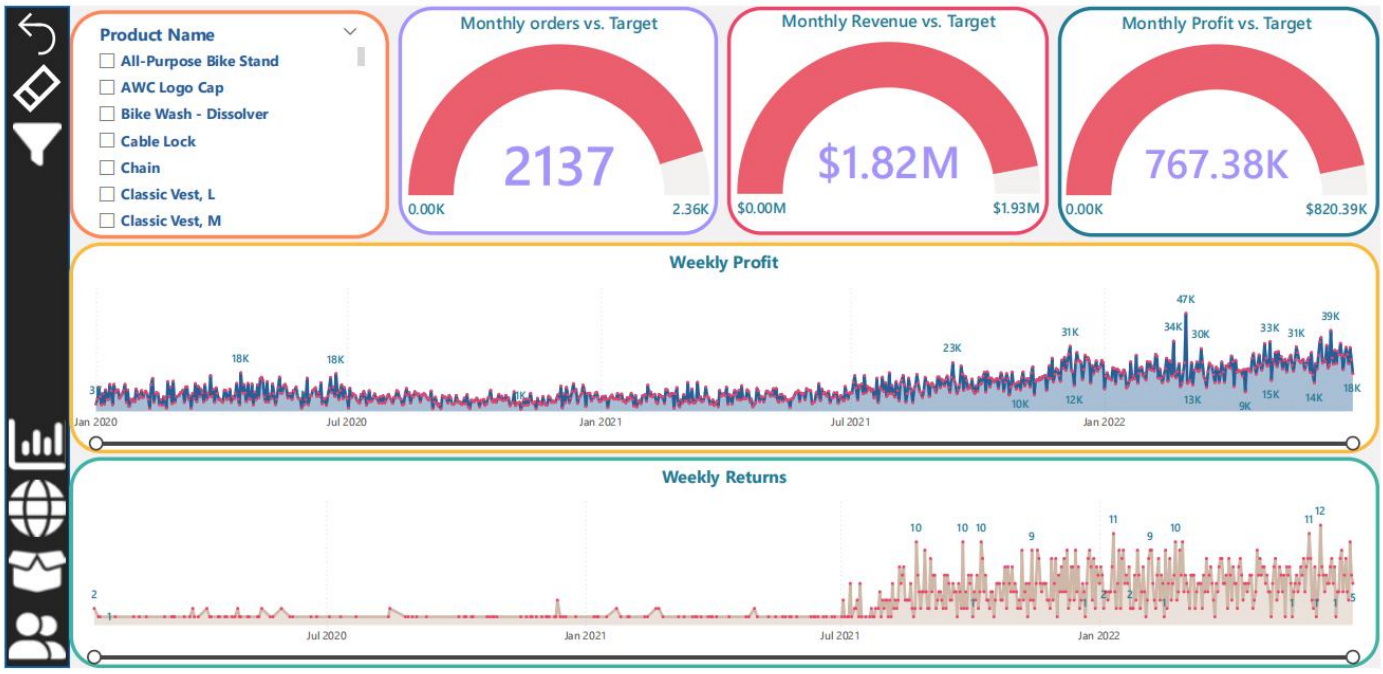
Product Details Page Features:

The Product Details Page offers a deeper look at the performance of individual products, providing insights on orders, revenue, and returns. Users can adjust filters to focus on specific products or product categories.

Slicers:
Product Name Slicer: Users can select the product they want to view in detail.
Additional Slicer Pane: The slicer pane contains slicers for Product Category and Subcategory, allowing users to filter the data by specific categories for more refined analysis.

Gauges for Key Metrics:
Total Orders vs Target: A gauge comparing the total number of orders for the selected product against its target.
Total Revenue vs Target: A gauge showing the product's total revenue against a predefined revenue target.
Total Profit vs Target: A gauge comparing the product's total profit with the target.

Line Charts - Total Orders and Returns:
Line Chart 1: Displays the total orders for the selected product over time, with a date hierarchy (Day, Month, Quarter, Year).
Line Chart 2: Visualizes total returns over the same date hierarchy, allowing for comparison between orders and returns over time.



Map Page Features:

Territory Hierarchy Slicers:

✓ Slicers are provided to filter the map based on Territory Hierarchy

These slicers allow users to zoom in on specific geographic areas and focus on sales performance at different territorial levels.

Map Visualization:

Bubble Size - Total Orders: The size of the bubble represents the total number of orders for each country.

Larger bubbles indicate higher order volumes.

Tooltip - Total Revenue: When hovering over a bubble, a tooltip will display the total revenue generated in that specific country.

Customer Detail Page Features:

Key Metrics Cards:

Total Number of Customers: Displays the total count of customers in the dataset.

Average Revenue per Customer: Shows the average revenue generated from each customer.

Slicers for Customer Segmentation:

Gender: Filter customers based on gender.

Marital Status: Filter customers based on their marital status.

Parent Boolean: Filter customers to distinguish between parents and non-parents.

Customer Metrics Field:
Field Metric: Displays:
Average Revenue per Customer
Total Customers
This field provides a quick overview of essential customer metrics.

Weekly Revenue Line Chart:
A line chart visualizes the weekly revenue, using the start of the week for time granularity. This helps track revenue trends over time.

Donut Charts:
Orders by Customer Occupation: Visualizes the distribution of orders across different occupations.
Orders by Income Level: Illustrates how orders are spread among various income levels.

Customer Table:
Displays a table listing the top 100 customers based on total orders, including:
Full Name
Total Orders
Total Profit
Total Revenue

Top Customer Cards:
Three cards highlight:
The name of the top customer by orders.
Number of orders placed by this customer.
Revenue generated by this customer.