Microsoft

Data Analysis and Visualization with Power BI

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A BRIEF
INTRODUCTION

In this course, I provided about analyzing and visualizing data in Power BI, including how to:

- ➤ Recognize the different types of visualizations in Power BI
- ➤ Add visualizations to reports and dashboards
- ➤ Apply formatting choices to visuals
- ➤ Add useful navigation techniques to Power BI reports
- ➤ Design accessible reports and dashboards
- ➤ Use visualizations to perform data analysis

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Create a Sales Report

INTRODUCTION

Sales reports are critical tools for business owners, stakeholders, and decision-makers. They provide essential insights into how a company's products or services are performing in the market—guiding decisions and shaping future strategies. In this part, I provided Power BI's data visualization to create an interactive sales report.

CASE STUDY

By analyzing sales performance, I can help the company: Identify trends and areas for improvement, Assess business performance and progress toward goals, plan and Allocate resources, and Ultimately make data-driven decisions.

Say the sales department requests a sales report demonstrating Adventure Works' sales revenue over time. The sales dataset I used for the report consists of rows representing a transaction with various data points, such as Product Category, Product Name, Order Date, and Total Sales.

Sales Report Dataset

Consist 48 rows and 25 columns

Product ID	Product Category	Product Subcategory	Product Name	Product Description	Product Price
1001	Mountain Bikes	Cross Country	TrailBlazer 1000	Lightweight and versatile	R 1,200
1002	Mountain Bikes	Cross Country	TrailBlazer 2000	High-performance mountain bike	R 1,500
1003	Road Bikes	Racing	SpeedMaster 1000	Agile and aerodynamic road bike	R 1,800
1004	Road Bikes	Racing	SpeedMaster 2000	Premium racing road bike	R 2,100
1005	Touring Bikes	Long Distance	Explorer 1000	Comfortable and durable touring bike	R 1,300
1006	Touring Bikes	Long Distance	Explorer 2000	Advanced touring bike	R 1,600
1007	Mountain Bikes	Downhill	GravityMaster 1000	Rugged and durable downhill bike	R 2,200
1008	Mountain Bikes	Downhill	GravityMaster 2000	Rugged and durable downhill bike	R 2,500
1021	Mountain Bikes	Trail	Pathfinder 1000	Agile trail bike for all skill levels	R 1,100
1022	Mountain Bikes	Trail	Pathfinder 2000	High-performance trail bike	R 1,400
1023	Road Bikes	Touring	Voyager 1000	Comfortable touring road bike	R 1,700
1024	Road Bikes	Touring	Voyager 2000	Advanced touring road bike	R 2,000
1025	Touring Bikes	Touring	Adventurer 1000	Durable bike for long adventures	R 1,500
1026	Touring Bikes	Adventure	Adventurer 2000	Premium adventure touring bike	R 1,800
1027	Mountain Bikes	Enduro	EnduroMaster 1000	Endurance-focused mountain bike	R 2,300
1028	Mountain Bikes	Enduro	EnduroMaster 2000	High-performance enduro mountain bike	R 2,600
1041	Mountain Bikes	Fat Bikes	FatTrail 1000	All-terrain fat bike	R 1,300
1042	Mountain Bikes	Fat Bikes	FatTrail 2000	High-performance fat bike	R 1,600
1043	Road Bikes	Cyclocross	CrossRider 1000	Versatile cyclocross bike	R 1,900
1044	Road Bikes	Cyclocross	CrossRider 2000	Advanced cyclocross bike	R 2,200
1045	Touring Bikes	Tandem	DuoExplorer 1000	Comfortable tandem touring bike	R 2,000
1046	Touring Bikes	Tandem	DuoExplorer 2000	High-performance tandem touring bike	R 2,300
1047	Mountain Bikes	Electric	E-Mountain 1000	Electric mountain bike	R 3,000
1048	Mountain Bikes	Electric	E-Mountain 2000	High-performance electric mountain bike	R 3,500

Sales

- Customer Feedback
- Customer ID
- Customer Location
- Customer Name
- Estimated Delivery Date
- Order Date
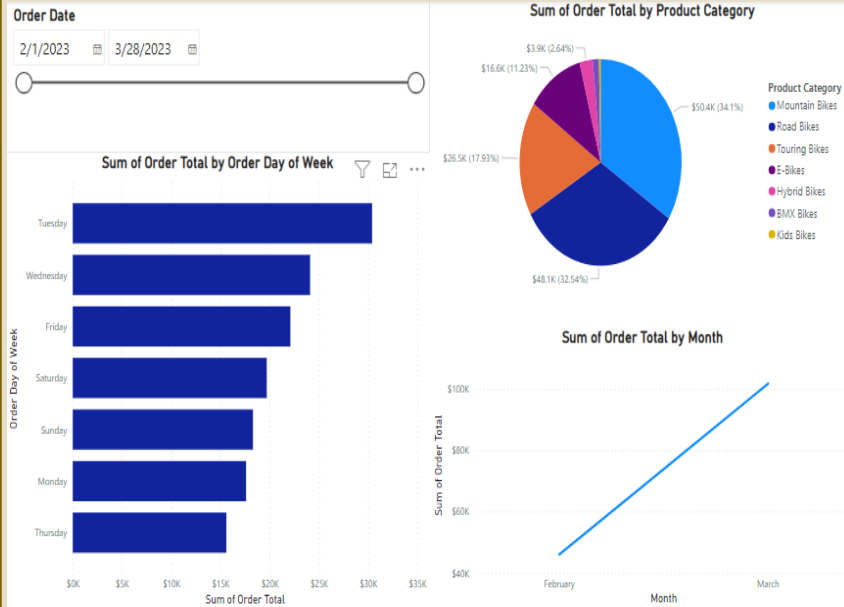- Order Day of Week
- Order ID
- ∑ Order Quantity

Collapse ∧

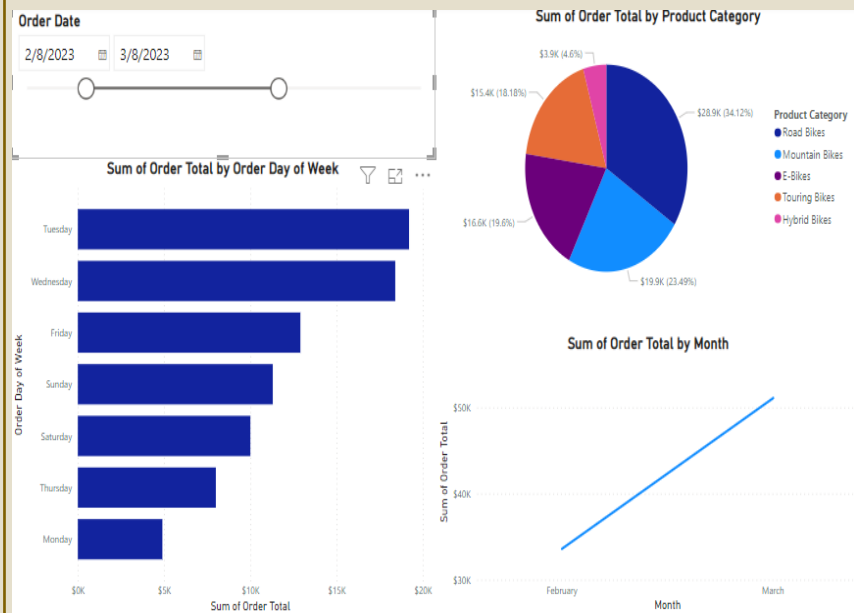# Sales Report **Dashboard**

Create-a-sales-report.pbix

Indicating Business Performance

Task: Prepare a report for the sales team at Adventure Works displaying key performance indicators (KPIs). A sales dataset for the last three months containing total sales volume and advertising spending for various sales regions. Each of these regions runs different advertising campaigns. Dataset consist 16 rows and 8 columns

SalesID	SalesOrderNumber	OrderDate	DueDate	SalesAmount	Region	MarketingSpend	SalesTeam
1	SO43659	Monday, May 1, 2023	Friday, May 12, 2023	23153.233	North	4000	Team A
2	SO43660	Tuesday, May 2, 2023	Saturday, May 13, 2023	145743.792	East	8000	Team B
3	SO43661	Wednesday, May 3, 2023	Sunday, May 14, 2023	36865.387	South	5000	Team B
4	SO43662	Thursday, May 4, 2023	Monday, May 15, 2023	32474.932	West	10000	Team A
5	SO43663	Thursday, June 1, 2023	Monday, June 12, 2023	29489.272	North	4500	Team A
6	SO43664	Friday, June 2, 2023	Tuesday, June 13, 2023	155098.272	East	8500	Team B
7	SO43665	Saturday, June 3, 2023	Wednesday, June 14, 2023	38587.532	South	5500	Team B
8	SO43666	Sunday, June 4, 2023	Thursday, June 15, 2023	31298.429	West	12000	Team A
9	SO43667	Saturday, July 1, 2023	Wednesday, July 12, 2023	31454.226	North	5000	Team A
10	SO43668	Sunday, July 2, 2023	Thursday, July 13, 2023	164253.849	East	9000	Team B
11	SO43669	Monday, July 3, 2023	Friday, July 14, 2023	40565.619	South	6000	Team B
12	SO43670	Tuesday, July 4, 2023	Saturday, July 15, 2023	30758.924	West	13000	Team A
13	SO43671	Wednesday, July 5, 2023	Sunday, July 16, 2023	34221.456	North	5200	Team A
14	SO43672	Thursday, July 6, 2023	Monday, July 17, 2023	170534.849	East	9500	Team B
15	SO43673	Friday, July 7, 2023	Tuesday, July 18, 2023	41875.219	South	6500	Team B
16	SO43674	Saturday, July 8, 2023	Wednesday, July 19, 2023	29598.924	West	14000	Team A

Indicating Business Performance

Indicating-business-performance.pbix
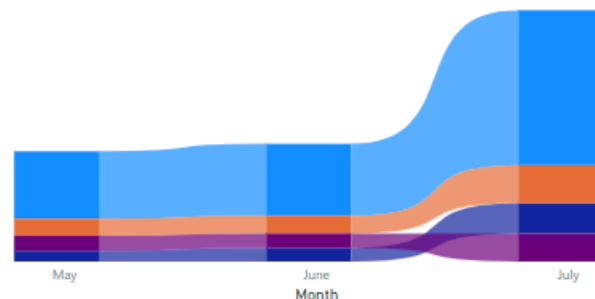
Indicating Business Performance

Based on the analysis performed in Power BI, the following key **insights** and **trends** can be concluded:

Total and average sales

The total sales for the business across all regions from January to March amount to approximately $1.04 million, with an average monthly sale of approximately $64.75K per order.

Sales across regions

When looking at the regional breakdown from the ribbon chart, the East and South regions (Team B) have higher sales when compared to the North and West regions (Team A), indicating better overall performance.

Number of orders

The total number of distinct orders placed during this period is around 16. This provides an insight into the volume of transactions that were processed.

Marketing expenditure

The total marketing expenditure during this period amounts to about $126K. In a monthly breakdown, marketing spend has seen a consistent increase which aligns with the objective of driving up sales.

Sales and marketing expenditure relationship

The waterfall chart indicates a positive correlation between sales and marketing spending. As the marketing expenditure increased, sales also grew. However, the ad campaigns run by Team B were more successful than Team A. An extra $17,000 spent on marketing brought approximately $223K of sales for Team B in July.

Region performance and ranking

The ribbon chart reveals that the East region consistently performed the best in terms of sales. However, even with substantial advertising spend, the West region did not perform proportionally well in sales, indicating potential issues with their advertising campaigns.

Explaining the Increase

In this part, I analyze feature in Microsoft Power BI to explain unexpected increases in sales totals and provide insights on the reasons for these increases.

More specifically, I were asked to:

- Use clustering in a **Scatter** chart to add product clusters that would assist the **Analyze** feature.
- Create a **Line** chart from the sales figures to identify the dates where a sales surge occurred, and then use the **Analyze** feature to detect the reason for these increases.
- Add to the report all the relevant visualizations based on the insights generated by the **Explain the increase** tool in Power BI.
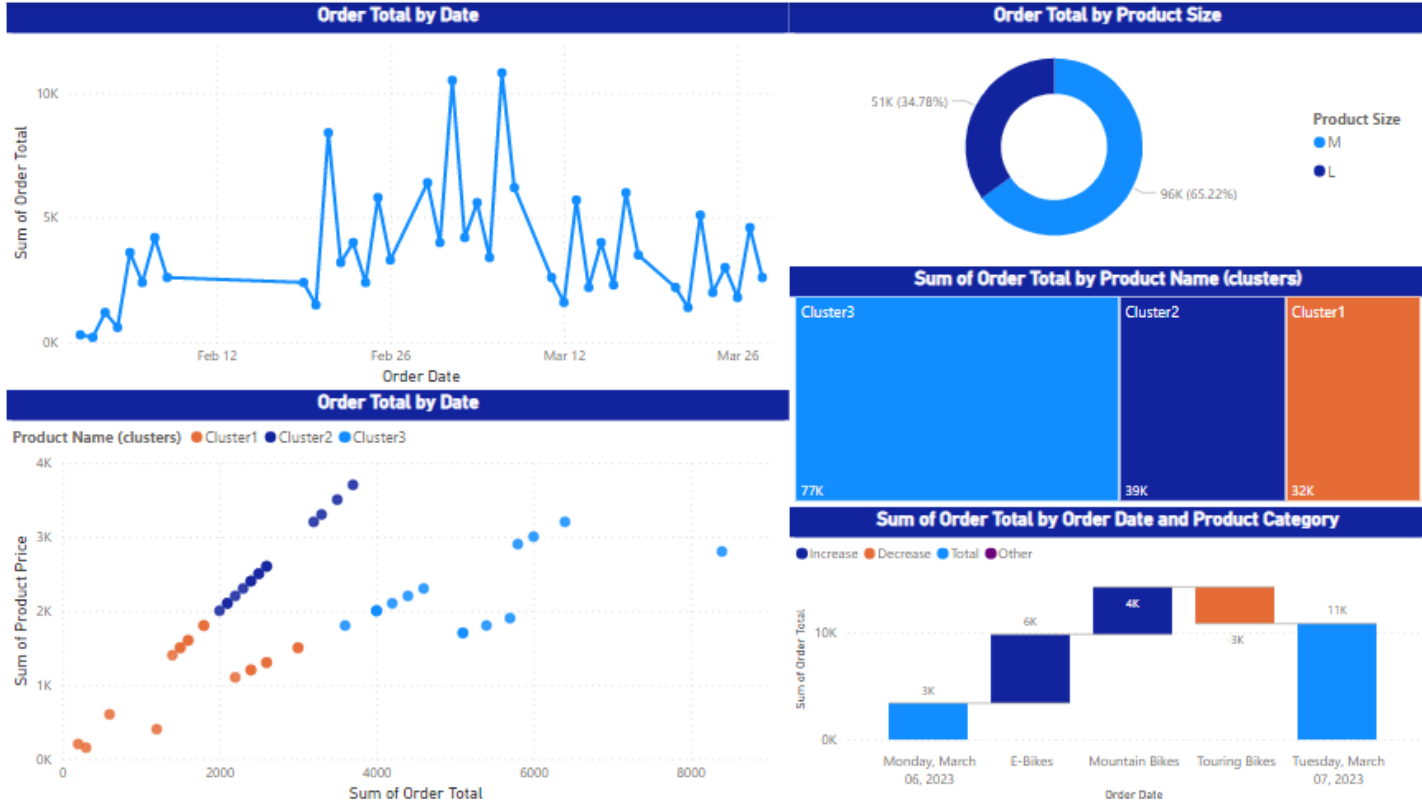
Explaining the Increase

Adventure-Works-Sales-Report.pbix
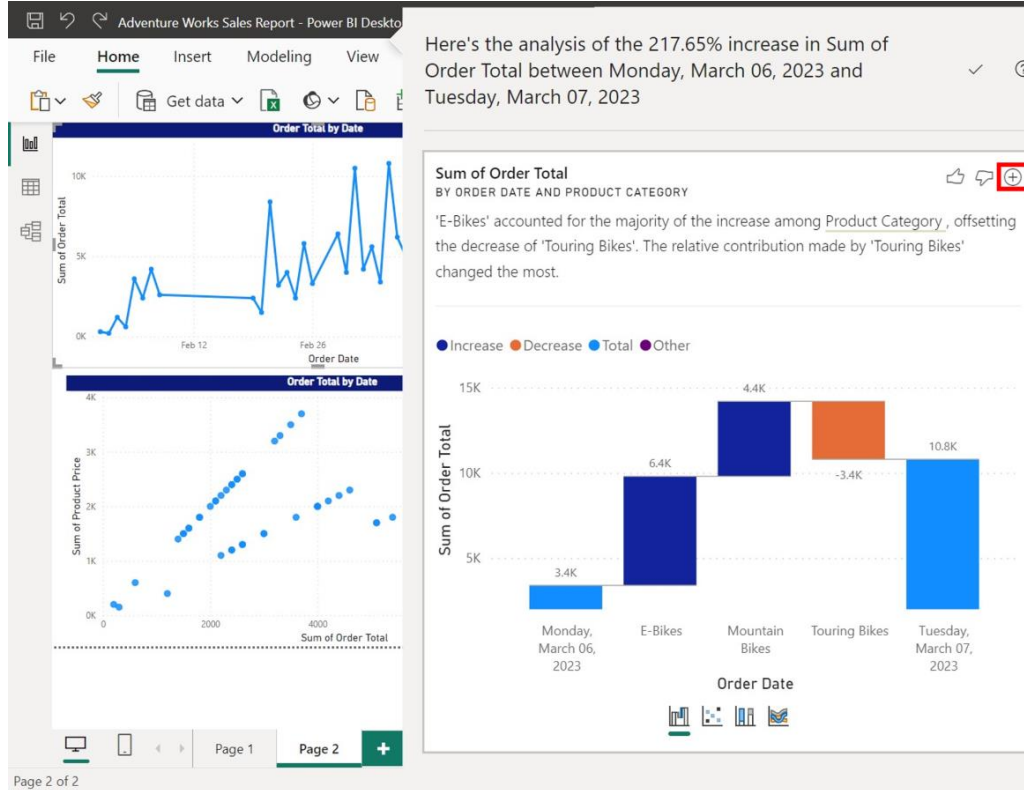
Act on the insights by using the Analyze feature

Explaining the Increase

Adventure-Works-Sales-Report.pbix – **FINAL Dashboard**

Root Cause Analysis

A real case scenario of actual environmental data to hone your analytical skills on Power BI reporting. The goal was to craft an insightful report, leveraging the significance of all available information in the dataset.

The specific tasks were to:

Create and explore the **Key influencers** visualization to identify the driving forces behind the CO2 emissions field.

Use the information provided by the **Key influencers** visual to add insightful visualizations to your report.

Create a decomposition tree to allow users to navigate themselves through the dataset.
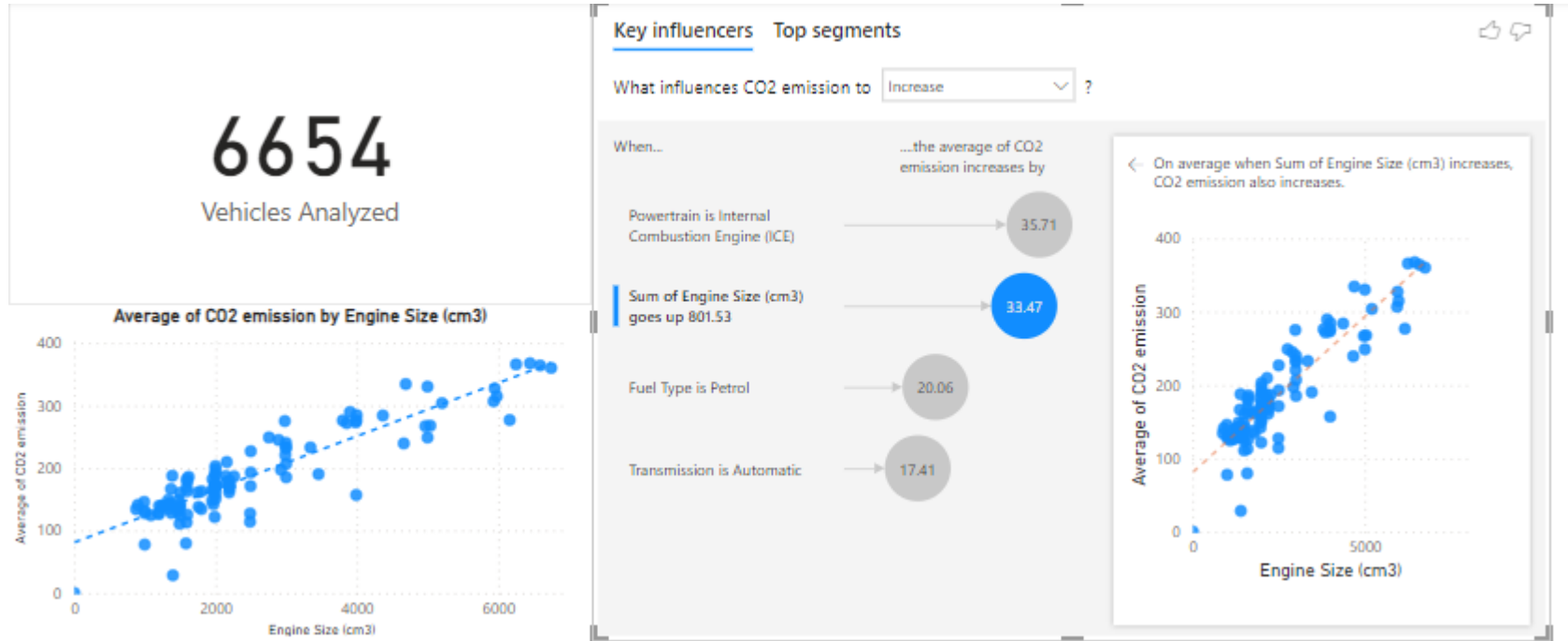
Root Cause Analysis

CO2-emissions-by-vehicle.pbix – **Consist 6654 rows and 7 columns**

| car_id	Transmission	Engine Size (cm3)	Fuel Type	Powertrain	CO2 emission	Engine Size (cm3) (bins)
269	Manual	999	Petrol	Internal Combustion Engine (ICE)	155	0
270	Manual	999	Petrol	Internal Combustion Engine (ICE)	166	0
279	Manual	999	Petrol	Internal Combustion Engine (ICE)	147	0
280	Manual	999	Petrol	Internal Combustion Engine (ICE)	160	0
283	Manual	999	Petrol	Internal Combustion Engine (ICE)	147	0
284	Manual	999	Petrol	Internal Combustion Engine (ICE)	160	0
287	Manual	999	Petrol	Internal Combustion Engine (ICE)	147	0
291	Manual	999	Petrol	Internal Combustion Engine (ICE)	147	0
292	Manual	999	Petrol	Internal Combustion Engine (ICE)	160	0
479	Manual	999	Petrol	Internal Combustion Engine (ICE)	120	0
480	Manual	999	Petrol	Internal Combustion Engine (ICE)	121	0
485	Manual	999	Petrol	Internal Combustion Engine (ICE)	121	0
486	Manual	999	Petrol	Internal Combustion Engine (ICE)	121	0
487	Manual	999	Petrol	Internal Combustion Engine (ICE)	120	0
488	Manual	999	Petrol	Internal Combustion Engine (ICE)	120	0
489	Manual	999	Petrol	Internal Combustion Engine (ICE)	127	0
490	Manual	999	Petrol	Internal Combustion Engine (ICE)	128	0
499	Manual	999	Petrol	Internal Combustion Engine (ICE)	120	0
500	Manual	999	Petrol	Internal Combustion Engine (ICE)	121	0

Root Cause Analysis

CO2-emissions-by-vehicle.pbix - **Identify the key influencers of CO2 emissions**
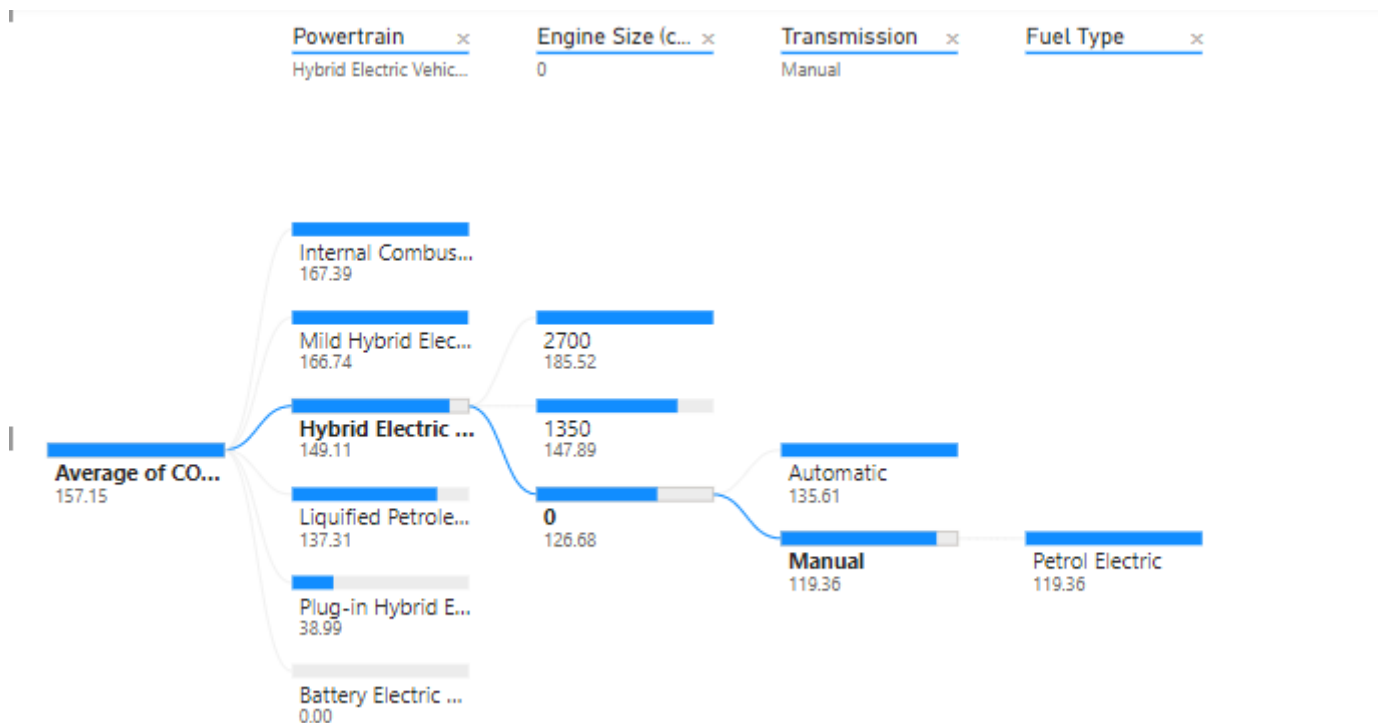
Root Cause Analysis

*Utilize the **Top segments** tool to detect groups of influencing factors*
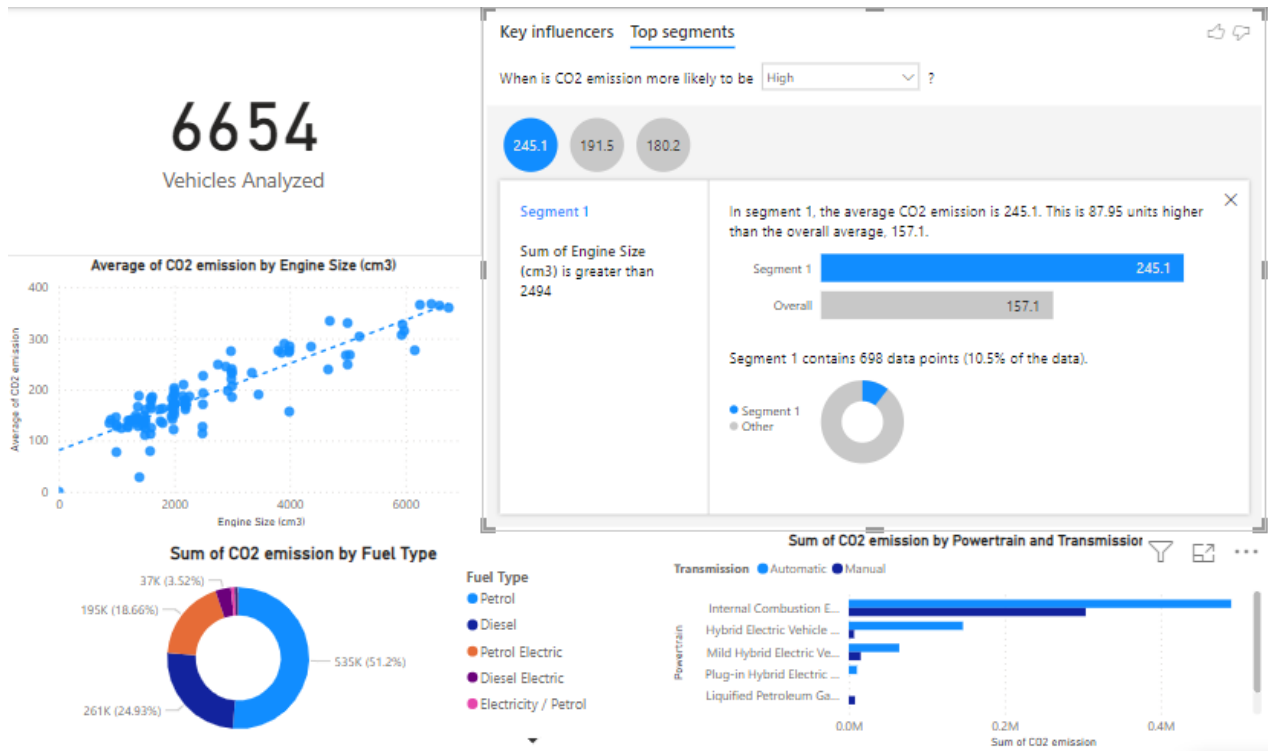
Root Cause **Analysis**

*Build a Decomposition Tree With **AI Capabilities***
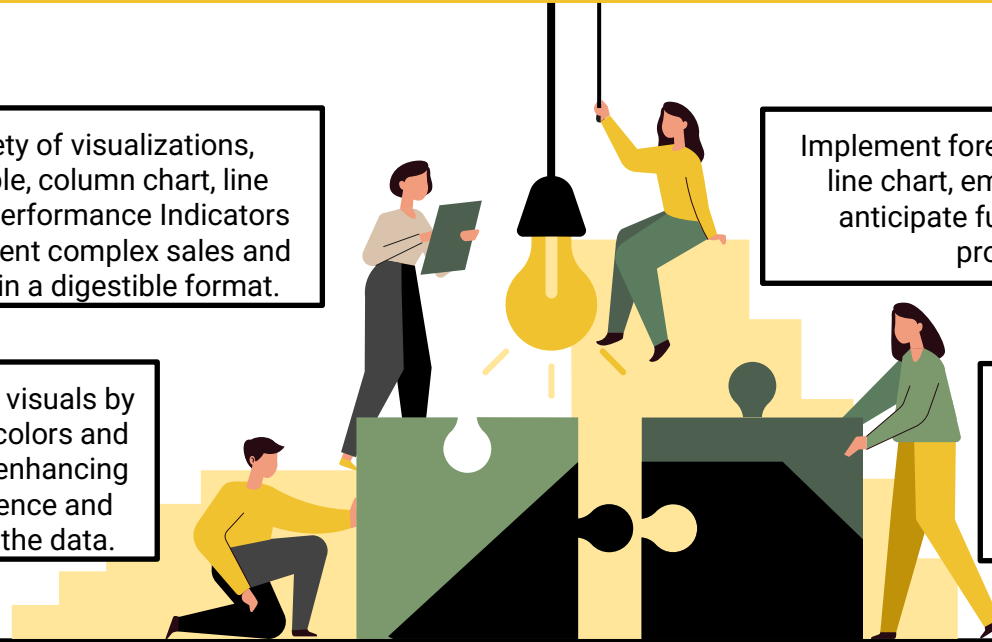
Adventure Works Executive Summary

The part aimed to provide the company's executive team with insightful and targeted information that could drive strategic decision-making at the highest level.

Create a variety of visualizations, including a table, column chart, line chart, and Key Performance Indicators (KPIs), to represent complex sales and customer data in a digestible format.

Implement forecasting functionalities on the line chart, empowering the executives to anticipate future sales trends and take proactive measures.

Customize these visuals by setting specific colors and adding tooltips, enhancing the user experience and accessibility of the data.

Integrate a Q&A visual into the report, enabling the executive team to query the data directly and receive timely insights.

Adventure Works Executive Summary

Adventure-Works-executive-summary.pbix – **Consist 2 tables**
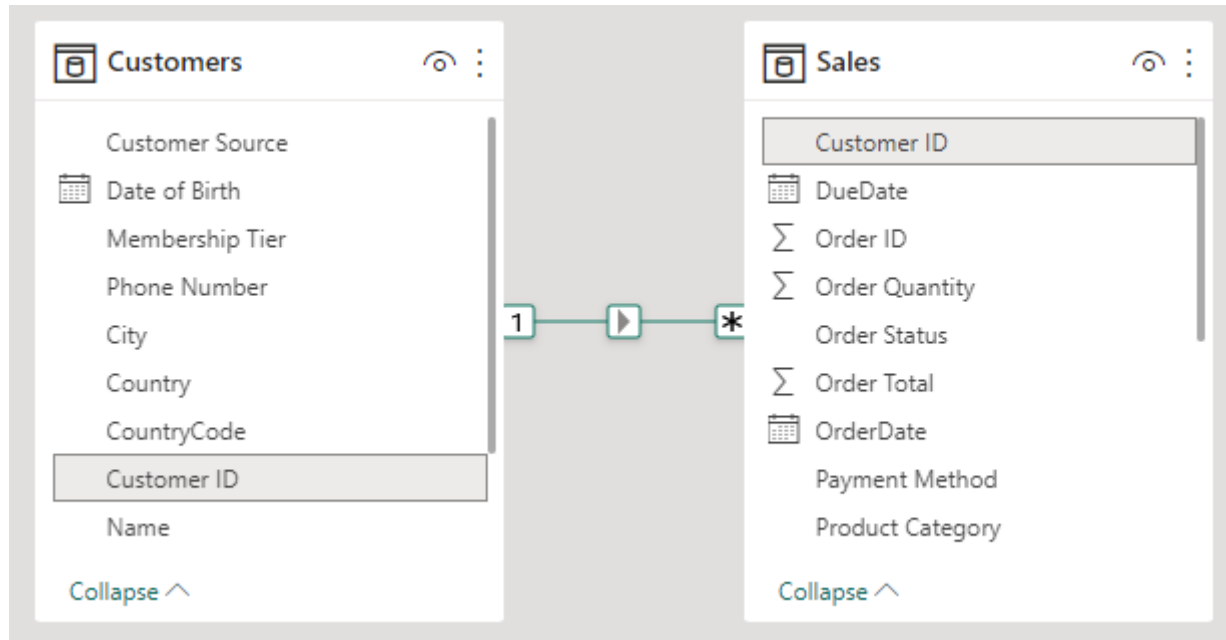
Customers table (48 rows & 12 columns)

Customer ID	Name	Surname	Phone Number	Date of Birth	Membership Tier
3001	Sophia	Anderson	555-123-4567	Tuesday, May 15, 1990	Silver
3002	Oliver	Johnson	555-987-6543	Saturday, September 21, 1985	Gold
3003	Emma	Brown	555-567-8901	Tuesday, November 3, 1998	Bronze
3004	Liam	Davis	555-234-5678	Sunday, July 11, 1982	Platinum
3005	Ava	Taylor	555-876-5432	Friday, March 28, 1975	Silver
3006	Noah	Wilson	555-345-6789	Wednesday, December 7, 1994	Gold
3007	Isabella	Taylor	555-678-9012	Friday, June 30, 1989	Bronze
3008	Sophia	Martinez	555-210-9876	Sunday, April 19, 1987	Platinum
3021	Ethan	Garcia	555-890-1234	Wednesday, February 14, 1996	Silver
3022	Mia	Robinson	555-543-2109	Monday, August 25, 1980	Gold
3023	Lucas	Lee	555-456-7890	Monday, October 12, 1992	Bronze
3024	Amelia	Lewis	555-901-2345	Monday, January 9, 1978	Platinum
3025	Harper	Hall	555-123-4567	Thursday, April 3, 1997	Silver
3026	Benjamin	Wright	555-987-6543	Sunday, September 18, 1983	Gold
3027	Evelyn	Lopez	555-567-8901	Tuesday, December 25, 1990	Bronze
3028	Samuel	Perez	555-234-5678	Wednesday, June 7, 1972	Platinum

Sales table (58 rows & 18 columns)

| Product ID	Product Category	Product Subcategory	Product Name	Product Description	
1001	Mountain Bikes	Cross Country	TrailBlazer 1000	Lightweight and versatile	
1002	Mountain Bikes	Cross Country	TrailBlazer 2000	High-performance mountain bike	
1002	Mountain Bikes	Cross Country	TrailBlazer 2000	High-performance mountain bike	
1004	Road Bikes	Racing	SpeedMaster 2000	Premium racing road bike	
1004	Road Bikes	Racing	SpeedMaster 2000	Premium racing road bike	
1005	Touring Bikes	Long Distance	Explorer 1000	Comfortable and durable touring bike	
1005	Touring Bikes	Long Distance	Explorer 1000	Comfortable and durable touring bike	
1006	Touring Bikes	Long Distance	Explorer 2000	Advanced touring bike	
1007	Mountain Bikes	Downhill	GravityMaster 1000	Rugged and durable downhill bike	
1003	Road Bikes	Racing	SpeedMaster 1000	Agile and aerodynamic road bike	
1004	Road Bikes	Racing	SpeedMaster 2000	Premium racing road bike	
1005	Touring Bikes	Long Distance	Explorer 1000	Comfortable and durable touring bike	
1006	Touring Bikes	Long Distance	Explorer 2000	Advanced touring bike	
1007	Mountain Bikes	Downhill	GravityMaster 1000	Rugged and durable downhill bike	
1008	Mountain Bikes	Downhill	GravityMaster 2000	Extreme downhill performance	

Adventure Works Executive Summary

*Relation (Model View) **Customers** table and **Sales** table*
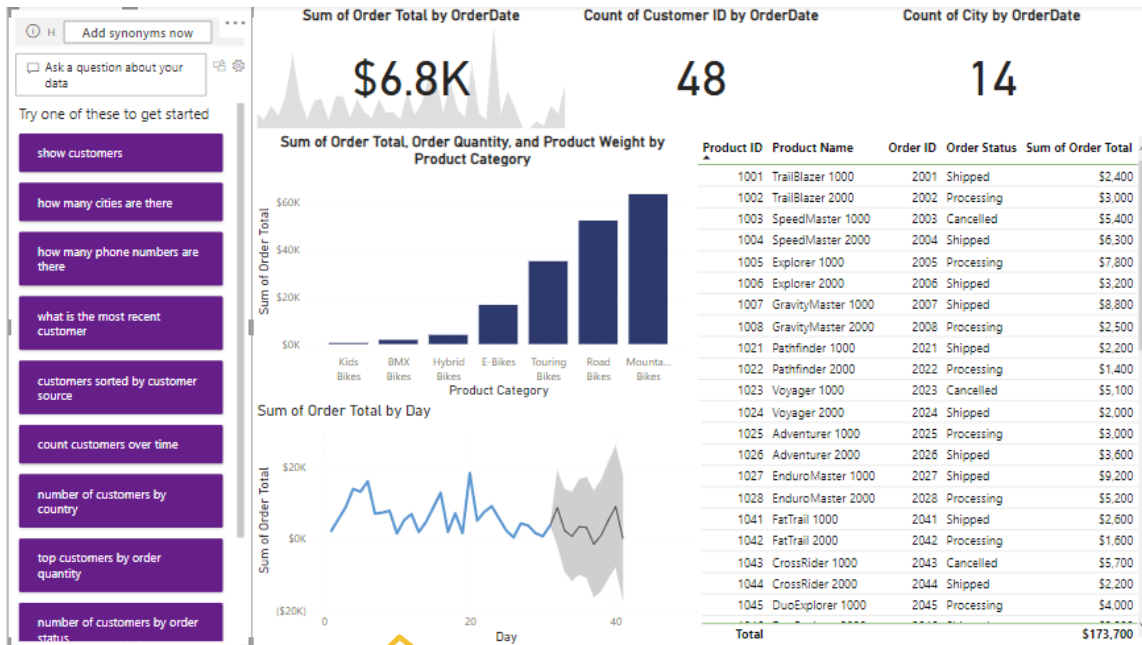
THANK YOU

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