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1/27/2025

Automobile Dashboard Analysis

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BATCH NO 108-EVENING

Objective of Automobile Dashboard Project

The primary objective of the analysis is to gain insights into the sales performance of different car brands across various countries, track sales trends over time, and identify patterns and relationships in the dataset. This can help in understanding customer preferences, optimizing inventory, and improving sales strategies.

Methodology

The project involves a structured approach to analyze sales data for car brands across various regions, focusing on key performance indicators and trends. First, a comprehensive exploration and cleaning of the dataset will be performed to address inconsistencies, missing values, and redundancies.

Relationships among tables, including product details, customer information, and regional data, will be established.

DAX measures will be developed to calculate total, average, and cumulative sales, as well as metrics like profit margin and sales contribution.

Advanced filtering and transformations will enhance the dataset for specific insights, such as grouping by regions or product categories.

Visualizations will be created using Power BI tools, including bar charts, line charts, heat maps, and KPIs, to communicate insights effectively.

The project also incorporates the use of slicers, bookmarks, and storytelling techniques to provide an interactive and user-friendly experience.

Finally, actionable insights will be derived, and recommendations will

be proposed for optimizing sales strategies.

Requirement Analysis

Data Understanding: The dataset includes key variables like InvoiceDate, SalePrice, Cost Price, Make, and CountryName, along with additional columns for costs and customer details.

Data Preparation: Cleaning and preparing the dataset to handle issues like duplicates, missing values, and inconsistent formats. Create derived columns such as total cost and split date into year and month.

Insights Development: Use DAX to calculate key metrics such as year-to-date sales, sales contribution, and moving averages. Identify trends and patterns using advanced visualizations.

Visualization Needs: Develop interactive dashboards with bar charts, line charts, pie charts, and maps to display sales by region, category, and product.

Interactivity: Implement slicers for product categories, regions, and dates to allow dynamic exploration. Add storytelling features with bookmarks and annotations.

Deliverables: A user-friendly Power BI dashboard showcasing actionable insights, including recommendations to optimize sales, focus on high-performing regions, and improve inventory management.

Task 1

1. How can you calculate the total sales for each year using DAX function?

Answer: - First, we calculate the Final Sales Price of the Automobile as follows;

$$\begin{aligned} \text{❖ Final Sales Price} = & [\text{SalePrice}] + \\ & [\text{DeliveryCharge}] + [\text{SpareParts}] + [\text{LaborCost}] - \\ & [\text{TotalDiscount}] \end{aligned}$$

A new column of Year is created. Then, a measure is created to determine total sales for each year

$$\begin{aligned} \text{❖ Total Sales}_{2012} \text{ M} = & \\ & \text{CALCULATE}(\text{SUM}(\text{Automobile}[\text{Final Sales} \\ & \text{Price}]), \text{Automobile}[\text{Year}] = 2012) \end{aligned}$$

$$\begin{aligned} \text{❖ Total Sales}_{2013} \text{ M} = & \\ & \text{CALCULATE}(\text{SUM}(\text{Automobile}[\text{Final Sales} \\ & \text{Price}]), \text{Automobile}[\text{Year}] = 2013) \end{aligned}$$

2. Create a measure to calculate the average sales per month?

Answer: - First a measure for a Sales is to be created as follows;

$$\text{❖ Sales M} = \text{SUM}(\text{Automobile}[\text{Final Sales Price}])$$

$$\text{❖ Avg Sales Per Month M} = \text{DIVIDE}([\text{Sales M}], \text{DISTINCTCOUNT}(\text{Automobile}[\text{InvoiceDate}]), 0)$$

3. How would you create a cumulative total of sales over months?

Answer:- For this, we have to can use already created

Sales M measure and Calendar Date T table (new Dax table). Then, we can write the below formula to calculate the cumulative sales over the month

❖ **Cumulative Monthly Sales M** = Cumulative Sales
Month = CALCULATE(SUM(Automobile[Final Sales Price]),FILTER(All('Calendar Date T'[Date]),'Calendar Date T'[Date] <=MAX('Calendar Date T'[Date]))))

If we want to see the cumulative sales over the month, quarters or, then we can take table visualization. Choose Calendar Date T table (Month and Quarter options) and also select Cumulative Sales Measure and put it on the table visualization. Thus, we get cumulative sales figures on a monthly or quarterly basis.

4. Write a DAX formula to Calculate the Year-to-Date (YTD) Sales?

Answer: - For this, we have to can use already created Sales M measure and calendar table (new Dax table). Then, we can write the below formula to calculate the cumulative sales YTD as follows; -

❖ **YTD Sales** = TOTALYTD(SUM(Automobile[Final Sales Price]),'Calendar Date T'[Date])

To visualize the cumulative sales yearly, then we can select table visualization. Choose calendar date (Year option) and Cumulative YTD Sales measure and plot them on a table. Here we have cumulative sales figures on yearly on top of this use a slicer/filter for displaying sales

for any given year as per requirement.

5. How you can calculate the percentage growth in sales compared to previous year sales?

Answer:- To calculate the sales growth over the years , we have to create a new Previous Sales measure by writing as follows;-

❖ Previous Year Sales = CALCULATE(SUM
(Automobile[Final Sales Price]),
SAMEPERIODLASTYEAR('Calender Date
T'[Date]))

Again, calculate the new measure with a name of % Sales growth as follows: -

❖ % Sales Growth = DIVIDE([YTD Sales]-[Previous
Year Sales], [Previous Year Sales],0)-1

To visualize the cumulative sales growth, then we can select table visualization. Choose Cumulative YTD Sales measure and Previous Sales measure in the table side by side. Thereafter, drag and drop % Sales Growth measure in the table , we get the Sales growth yearly basis. Then, go the Measure Tools in Ribbon and under the formatting group click on this % symbol to convert the sales growth in percent terms.

6. Create a measure to calculate the total sales for the last 12 months?

Answer: - For this, we have to can use already created

Sales M measure and calendar date T table (new Dax table). Then, we can write the below formula to calculate the cumulative sales YTD as follows; -

$$\text{❖ YTD Sales} = \text{TOTALYTD}(\text{SUM}(\text{Automobile}[\text{Final Sales Price}]), \text{'Calender Date T'[Date]})$$

To visualize the cumulative sales yearly, then we can select table visualization. Choose calendar date (Year option) and Cumulative YTD Sales measure and plot them on a table. Here we have cumulative sales figures on yearly on top of this use a slicer/filter for displaying sales for any given year as per requirement.

7. How would you calculate the highest sales month using DAX?

Answer:- For this, we have to create a Monthly Sales M measure as follows;-

$$\text{❖ Monthly Sales M} = \text{SUM}(\text{Automobile}[\text{Final Sales Price}])$$

Thereafter, we have to create another DAX measure as below one;

$$\text{❖ Highest Monthly Sales} = \text{MAXX}(\text{VALUES}(\text{'Calender Date T'[Date]}), \text{CALCULATE}([\text{Monthly Sales M}]))$$

To visualize the highest sales monthly, then we can select table. Further, choose calendar date (month option) and Highest Monthly Sales measure and plot both of them on

a table. So, we have Highest Monthly Sales for each month. This can be verified by creating simple table of monthly sales and perform cross comparison of respective highest sales of various months.

8. Write a DAX Formula to calculate the top 5 selling products?

Answer: - To calculate the top 5 selling products using DAX in Power BI or Analysis Services, you can create a measure that ranks the products based on their sales and then filters the top 5.

Since, we have already created the Total Sales Dax Measure. Then going forward, it is time to rank the Car models (Products) and then filter the top five best/top cars

❖ **Product Rank** =
RANKX(ALL(Sales[ProductName]), [Total Sales], ,
DESC)

❖ **Top 5 Sales** = IF([Product Rank] <= 5, [Total Sales],
BLANK())

To visualize the top five highest-selling car models, use a table visual in Power BI. Add the **Model** column from the **Automobile** table and the **Top 5 Sales** measure to the table. This will display the car models ranked by revenue, providing a clear view of the highest-selling models based on sales performance. This visualization enables focused analysis of top-performing products.

9. How can you calculate sales contribution of each category?

Answer: - **Saloon, Coupe, and Convertible** under the VehicleType Column are different car/Product Categories or Body Styles. We have considered VehicleType Column as Product Categories as per requirement in this given problem.

We have already Total Sales DAX Measure(Sales M) and have assumed product categories as mentioned above.

To visualize category-wise sales, use a table visual in Power BI. Add the **VehicleType** column from the **Automobile** table and the **Sales M** DAX measure to the table. This setup will display the sales contribution of each car/product category, making it easy to compare their performance. This approach provides actionable insights into the distribution of sales across different vehicle types.

10. Create a measure to find out total sales where sales amount is greater than specific value?

Answer: - In this question, specific value that has been considered is the average sales of 71,154. We will be focus on those car model, whose value is more than 71,154. We will use the below DAX formula, to get the average sales over the average sales of 71,154.

❖ Sales Above Average M =
IF(AVERAGE(Automobile[Final Sales Price])>71154,AVERAGE(Automobile[Final Sales Price]),Blank())

To visualize sales exceeding a specific value in Power BI, use a table visual. First, add the **Model** column from the **Automobile** table to the table visual. Next, include the **Average Sales M** measure to display the average sales values. Finally, drag and drop the **Sales Above Average M** measure into the visual. This setup will display only those car models whose sales exceed the threshold value of 71,154, providing a focused view of high-performing models.

11. How you can calculate the running total of sales for each product?

Answer: - As per this question, we have to calculate the running total of sales or cumulate sales for each product. Here in this case, we are considering different models of cars as products.

❖ **Running Total Model Wise M** =
 CALCULATE(SUM(Automobile[Final Sales Price]), FILTER(ALL('Calender Date T'),'Calender Date T'[Date]<=MAX('Calender Date T'[Date])),ALLEXCEPT(Automobile,Automobile[Model]))

To visualize model wise cumulative sales in Power BI, use a table visual. First, add the **Model** column from the **Automobile** table and then drag drop **Running Total Model Wise M** measure to display the model wise car sales value running total records.

12. Write a DAX formula to calculate the average sales

per customer?

Answer: Here, we have to calculate the average sales per customer and this can be done by creating Average Sales Per Customer measure as follows;

❖ **Average Sales Per Customer** = `DIVIDE (SUM(Automobile[Final Sales Price]), DISTINCTCOUNT(Automobile[ClientName]),0)`

To visualize Average Sales customer-wise in Power BI, use a table visual. First, add the ClientName column from the **Automobile** table and then drag drop Average Sales Per Customer measure to display the average sales client-wise.

13. How would you calculate the total number of distinct customers?

Answer: - To answer this question of calculating the distinct total number of customers by creating a below measure as follows;-

❖ **Distinct Customers M** = `DISTINCTCOUNT (Automobile[ClientName])`

14. How to create a measure to calculate the sales per region?

Answer: - Based on the information provided in the dataset, there is no specific column for regions. Therefore, for the purposes of this analysis, we have assumed and used the **CountryName** column as a substitute for the region. In this question, we can use the already created

Sales M as below; -

❖ Sales per Country M = SUM(Automobile[Final Sales Price])

Then, add the CountryName column to a table visual. Power BI will display the sales records by country-wise.

15. How can you calculate the moving average of sales over the 3 months ?

Answer: To calculate the moving average of sales over the past three months. We can use the Sales M measure that was already created and then created a new measure on the basis of above measure as follows;

❖ **Moving Average Sales 3 Months M** = Calculate (AVERAGEX (DATESINPERIOD('CalendarDate T'[Date], LASTDATE('Calendar Date T'[Date]),-3,MONTH),[Sales M]))

To visualize the Moving Average Sales in Power BI, use a table visual. Begin by adding the Calendar Date (using the Year and Month option) from the Calendar table. Next, include the **Sales M** measure to display monthly sales data. Finally, add the **Moving Average Sales for 3 Months** measure to showcase the smoothed sales trend over a rolling three-month period. This setup provides an insightful view of sales trends, highlighting any fluctuations or consistent patterns over time.

16. Write a DAX formula to filter sales data for a specific

product category ?

Answer: - Saloon, Coupe, and Convertible are different car/Product Categories or Body Styles. We have considered VehicleType Column as Product Categories as per requirement in this given problem. To calculate the sales for a specific product category. We can create a Sales Product Category DAX measure as follows: -

❖ **Sales Product Category M** =
Calculate(Sum(Automobile[Final Sales Price]),
FILTER (Automobile, Automobile[VehicleType]
="Saloon"))

❖ **Sales Product Category M** =
Calculate(Sum(Automobile[Final Sales Price]),
FILTER (Automobile, Automobile[VehicleType]
="Coupe"))

❖ **Sales Product Category M** =
Calculate(Sum(Automobile[Final Sales Price]),
FILTER (Automobile, Automobile[VehicleType]
="Convertible"))

17. How can you calculate the sales variance compared to budget?

Answer: In this question, we have to compute the sales variance and this can be easily done with below mentioned formula and performing the following steps as well;-

Sales Variance = Actual Sales - Budgeted Sales

Load Data: Make sure you have sales data (Automobile Dataset) loaded into Power BI. This should include at least a date column and a sales amount column.

Create a New Measure: Go to the “Modeling” tab and create a new measure and use DAX to create this measure. Here’s a sample formula to create a cumulative total:

❖ **Cumulative Sales** = CALCULATE(
SUM('Sales'[SalesAmount]),FILTER(ALLSELECTED('Sales'[Date]),'Sales'[Date] <=
MAX('Sales'[Date])))

❖ **Sales Variance %** = DIVIDE([Sales Variance],SUM('Sales'[BudgetedSales]),0)

Add the Measures to Report: Drag the new measures into report to visualize them. It can be added to a table or a chart to see the variance amounts and percentages.

Customize the Visual: Adjust the visual settings to better display required variance by formatting the numbers, change colors, and add labels to make visuals more informative and visually appealing.

Use Filters and Slicers: Add filters and slicers to your report to allow users to interact with the data. For example, you can add a slicer for the date range or product category.

In this given question, due to lack or limited availability of data in Automobile dataset as it does not include a

specific "budget" column, calculating sales variance becomes challenging.

18. Create a measure to calculate the total profit margin?

Answer: To calculate the total profit margin. We can use the Total Profit Margin measure as follows;

❖ **% Profit Margin M** = `DIVIDE(SUM(Automobile[Profit]),
SUM(Automobile[Final Sales Price]),0)`

To visualize the Profit Margin in Power BI, use a table visual. Begin by adding the Calendar Date (using the Year and Quarter option) from the Calendar table. Next, include the **% Profit Margin measure** to display profit margin. This setup provides an insightful view of sales margin over the year as well as quarterly trends, highlighting any fluctuations or consistent patterns over time.

19. How you would calculate the sales rank of each product?

Answer: To calculate the ranking of products sales wise, we have assumed car models (Products) in this question. We can use the Sales M measure that was already created and then created a new measure as follows;

❖ **Product Sales Rank M** = `RANKX(All(Automobile[Model]),[Sales M],,DESC,Dense)`

To visualize the products sales wise ranking in Power BI, use a table visual. Begin by adding the Model column and Sales M from the Automobile table. Next, include the Product Sales Rank

measure to display ranking of various car models as per their sales amount as per requirement.

20. Write a DAX formula to calculate the total sales for a specific date?

Answer: To get the sales for a specific date of the year, we can create a measure below;

❖ **Sales for a date M =**
CALCULATE(SUM(Automobile[Final Sales
Price]),'Calender Date T'[Date]=DATE(2014,8,1))

To visualize the sales on a specific date in Power BI, use a table visual. Next, include the Sales for a date M measure to display sales on a particular date and also can change day as per our requirement as well.

Task 2

1. How do you filter the data to show only records where the make is “Jaguar”?

Answer: - This filter in the question can be done by the multiple ways, first method is DAX measure as follows:-

❖ Sales of Jaguar M =
CALCULATE(SUM(Automobile[Final Sales Price]),FILTER(Automobile,Automobile[Make]="Jaguar"))

Second method for filtering Jaguar based record is through as follows;-

To create an interactive table visualization in Power BI, add the **Make** column and the **Sales** measure from the Automobile dataset to the table visual.

Next, create a slicer by dragging and dropping the **Make** column into the slicer field and add another slicer for the **Model** column. This setup allows you to dynamically filter the sales records by selecting specific car makes and models, providing detailed insights into the respective sales records.

Creating a Visual-Level Filter: -

Select a visual (e.g., table, chart) and go to the Filters pane. Drag the Sales records and **Make** column to the visual-level filter field.

Set the filter condition to "Jaguar or you can exclude the

Other records by right click on the charts. Keep the Jaguar or Rolly Royce and exclude all others.

Using a Query in Power Query:

Open Power Query Editor. Select the **Make** column and apply a filter to keep only rows where **Make** is "Jaguar". Load the transformed data back into Power BI.

2. How can you remove Client Name and Laborcost from the Dataset?

Answer: - This can be done in multiple ways,

First method: -

Go the Table view of Power BI and navigate the data set. Then come the Automobile table and locate the ClientName and Laborcost Column and right click on the respective columns. You will be displayed list of various operations with respect to that column and click on the delete option. In this way, both the above columns can be deleted from the dataset.

Power Query Method: -

Another method is through the Power Query Editor method. In the table view in the Power BI desktop, in the home tab and under the queries group. Click on the transform button. You will land on the Power Query Editor. Then, select ClientName and Laborcost columns. Right click on and click on the remove columns option. Else, you can select ClientName and Laborcost columns and navigate to Manage columns group under the Home Tab. Click on remove columns

and select remove rows.

3. How can you replace the values “Coupe” with “Convertible” in the Vehicle Type Column?

Answer: To replace "Coupe" with "Convertible" in the VehicleType column, you can use the Power Query Editor in Power BI. Navigate to the VehicleType column within the Power Query Editor, then right-click on the column and select the Replace Values option. In the dialog box, enter "Coupe" in the Value to Find field and "Convertible" in the Replace With field. Once entered, click OK to apply the changes. This approach effectively updates all occurrences of "Coupe" to "Convertible" in the selected column.

To replace the values "Coupe" with "Convertible" in the Vehicle Type column in Power BI or **using DAX**, you can create a calculated column with below formula; -

❖ Vehicle Type Updated = IF(Automobile[VehicleType] = "Coupe", "Convertible", Automobile[VehicleType])

4. How can you add a new column that calculates the total cost(Cost Price + Delivery Charge + Spare Part + Labor Cost)?

Answer: - To add a new column that calculates the total cost (Cost Price + Delivery Charge + Spare Part + Labor Cost), you can use a **calculated column** in DAX. Start by navigating to the table view in Power BI and locating the **Automobile** table containing the relevant columns. To create the calculated column, go to the **Column Tools**

tab. Under the **Calculations** group, click on **New Column**. This action will activate the formula bar, where you can define the new column by entering the appropriate DAX formula. This approach ensures the total cost is calculated and stored in a separate column as follows; -

❖ **Total Cost**= [CostPrice] +[DeliveryCharge] +
[SpareParts]+[LaborCost]

5. How can you split the InvoiceDate Column into two separate columns: Invoice Year and Invoice Month?

Answer: To split a column into two separate columns can be executed in multiple ways

First Method: Calculated Column

Start with navigating to the table view in Power BI and locating the **Automobile** table containing the Invoice Date Column. Navigate to formula and create both below mentioned calculated columns as follows;

❖ **Invoice Year** = YEAR([InvoiceDate])

❖ **Invoice Month** = MONTH([InvoiceDate])

Second Method: Calculated Table

To add a new Calculated table that you can use to separate Invoice Year and Invoice Month from Invoice Date. Start with navigating to the table view in Power BI and locating the **Automobile** table containing the Invoice Date Column. To create the calculated table, go to the

Column Tools tab. Under the **Calculations** group, click on **New Table**. This action will activate the formula bar, where you can define the new table DAX formula as below;

❖ **Calender Date T = CALENDAR(MIN(Automobile[InvoiceDate]),MAX(Automobile[InvoiceDate]))**

Now you can extract the Year and Date from the above DAX formula via Invoice Year and Invoice Month formula that I have discussed in first method.

Third Method: Power Query Editor

Open the Power Query Editor. Select the InvoiceDate Column. Locate and select the **InvoiceDate** column in your dataset. To extract the year by going to the **Add Column** tab and click on **Date → Year → Year**. This will create a new column with the year column. To extract the month: Go to the **Add Column** tab and click on **Date → Month → Month**. This will create a new month column.

6. How can you group the data by Make and CountryName to get sum of SalePrice for each group?

Answer: To group sales records by Car Make and CountryName in Power BI, you can use a table visualization. Start by selecting a table visual from the visualization pane.

Then, navigate to the Make column in the Automobile table and drag it into the table visual. Next, drag the

CountryName column into the same table to add country-level grouping.

Finally, insert the Sales M measure into the table to display the corresponding sales values. This setup will provide a clear view of sales records grouped by car make and country.

7. How can you sort the data by SalePrice in descending order?

Answer: Sorting of SalePrice in descending order can be done by multiple ways:

First Method: →

To sort the data by **Final Sales Price** in Power BI, navigate to the **Table View** from the Power BI desktop. Locate the **Automobile** table and scroll horizontally to find the **Final Sales Price** column.

Click on the dropdown button in the header of this column, and from the available options, select either **Sort Ascending** or **Sort Descending** based on your preference. This will rearrange the data in the desired order, making it easier to analyse the sales figures effectively

Second Method: →

To sort the sales data in Power BI, first, navigate to the **Report View** of the Power BI desktop. Select a table visualization, then drag and drop the **Calendar Table** (calculated table) and the **Sales M** measure into the table. Once the table is populated with the relevant data,

go to the upper-right corner of the table visual and click on the ellipsis (three dots). From the dropdown menu, select either **Sort Ascending** or **Sort Descending** based on your preference for organizing the sales data. This will arrange the data in the desired order according to the sales values.

Third Method: →

To sort the SalePrice records in Power Query Editor, first open the Power Query Editor. Select the **SalePrice** column from the respective table. Then, scroll to the top of the column and click on the small arrow button located above the column header. From the drop-down options, choose either Sort Ascending or Sort Descending based on your requirement.

8. How can you merge this dataset with another table that contains additional ClientName information using ClientName as the Key?

Answer: - To merge the dataset with another table containing additional ClientName information using ClientName as the key, follow these steps:

- First, we have to ensure that both the tables are connected by going to Model view and then see table contains additional ClientName information and another table are connected.
- Then, open **Power Query Editor** in Power BI. In the Power Query Editor, go to the **Home** tab and click on the **Merge Queries** button.

- A dialog box will appear. Select the first table (containing the original dataset) and the second table (with additional ClientName information).
- Choose **ClientName** as the common key column from both tables.
- Select the type of join (e.g., **Inner Join**, **Left Outer Join**, etc.) based on how you want to merge the data. This is an optional step.
- Click **OK**, and the tables will be merged.
- Finally, click **Close & Apply** to apply the changes and load the merged dataset into Power BI.

9. How can you remove duplicate records based on the combination of InvoiceDate and Make?

Answer: -To remove duplicate records based on the combination of InvoiceDate and Make in Power BI, follow these steps:

- Open Power Query Editor in Power BI.
- In the Power Query Editor, select the table that contains the data you want to clean.
- Select both the InvoiceDate and Make columns by holding down the Ctrl key and clicking on the column headers.
- Once both columns are selected, go to the Remove duplicates option under the Home tab in the ribbon.

- Click on Remove duplicates. This will remove any rows where the combination of InvoiceDate and Make is duplicated, leaving only unique combinations.

10. How you can pivot the color column so that each unique color becomes a new column and the values are the saleprice?

Answer: -To pivot the Color column so that each unique color becomes a new column and the values are the SalePrice in Power BI as follow with steps:

- Open Power Query Editor in Power BI. Select the Automobile table from the list of queries in the Power Query Editor.
- Highlight the Color column by clicking on its header.
- Go to the Transform tab in the ribbon and click on Pivot Column.
- In the Pivot Column dialog box, under the Values Column, select SalePrice from the dropdown.
- If needed, choose the appropriate Aggregation method (such as Sum, Average, etc.) for how you want to handle duplicate values for the same color.
- Click OK to pivot the column.
- Once the pivot is applied, the unique Color values will become new columns, and the concerned **SalePrice** values will populate these columns.

Task 3

1. How can you create a bar chart to compare total sales by product category?

Answer:- Below is the process to create a bar chart to compare sales by product category(VehicleType Column)

Open Power BI Desktop: Navigate to the report view.

Add a Bar Chart: From the Visualizations pane, select the bar chart icon to add a bar chart to the canvas.

Drag Product Category/(VehicleType from Automobile Table) to x-axis.

Add Total Sales Measure (Sales M from Measure Table) to Values section: Drag the Total Sales measure (or calculated column) to the Values field of the bar chart.

Ensure the chart is sorted by either Total Sales (descending for better visualization) or Product Category (alphabetically, if needed. Here, we have Sales records with respect to product category chart.

2. What steps would you take to create a line chart showing monthly sales trends?

Answer: - To create a line chart showing Yearly/Quarterly/monthly that depicts sales trends in Power BI, follow these steps:

- i. Open Power BI Desktop: Navigate to the report view.

- ii. From the Visualizations pane, select the line chart icon to add it to the report canvas.
- iii. Locate the date column in the Fields pane (e.g., Calendar Date (Calculated Table)) and drag it to the Axis field in the Visualizations pane.
- iv. Next it to drag the Total Sales measure (Sales M) to the Values field of the chart. This will plot sales data.
- v. Power BI may automatically group Sales records into hierarchies like Year, Quarter, and Month. As per your requirement, select the Yearly, Monthly, Quarterly with sale records in a line format options for further analysis.

3. How can you use a pie chart to show the sales distribution by region?

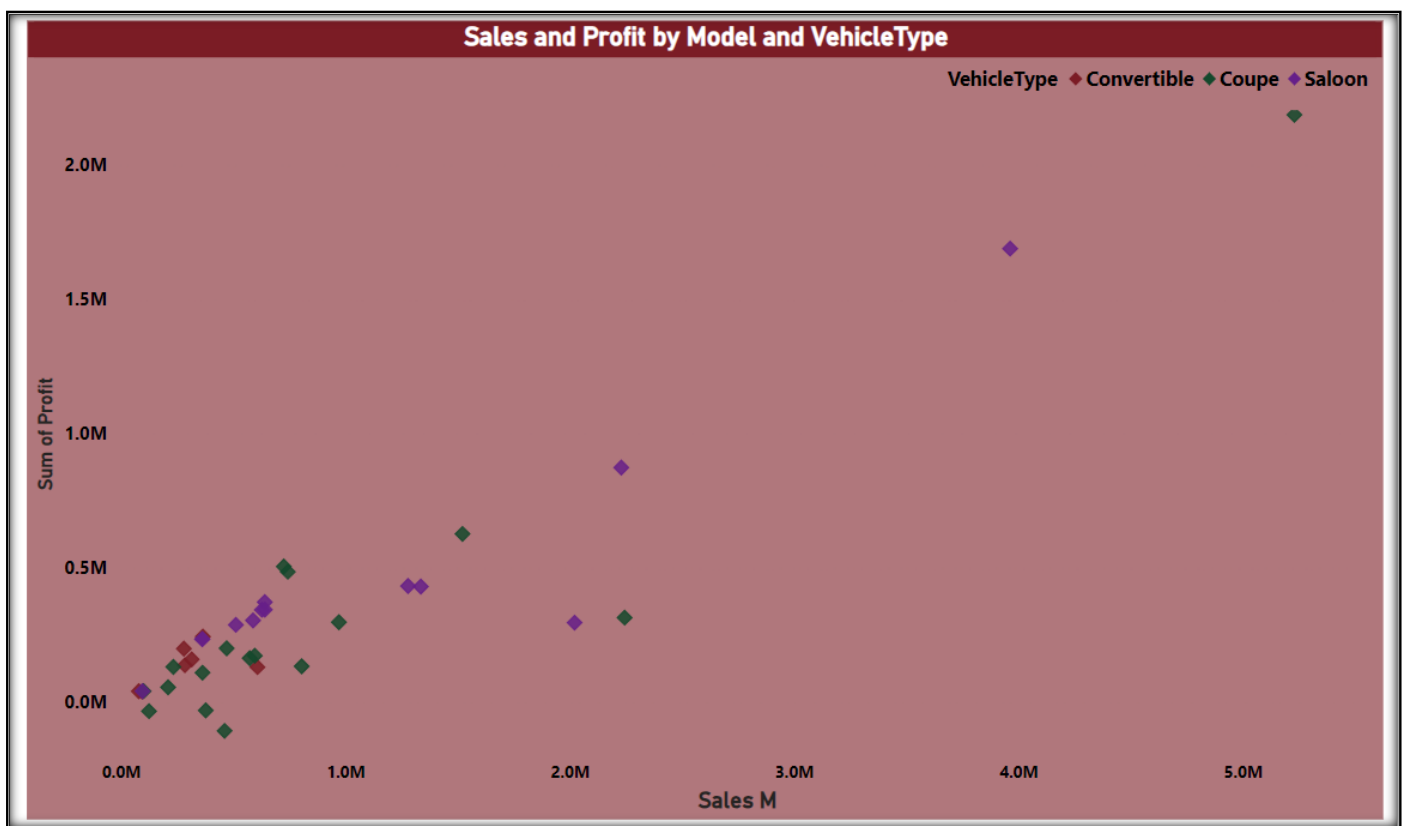
Answer: To create a pie chart in Power BI to show sales distribution by region, follow these steps:

- i. First, open Power BI Desktop and navigate to the report view.
- ii. Add a Pie Chart from the Visualizations pane, select the Pie Chart icon to add it to the report canvas.
- iii. Drag Regions Column to Legend and locate the region column (or its equivalent, such as CountryName in the available question) in the Fields pane. Drag it to the Legend field in the Visualizations pane.
- iv. Drag the Total Sales measure (calculated column) to

the Values field. This will display the sales records as per region-wise (CountryName).

4. Create a scatter plot to visualize the relationship between sales and profit?

Answer: - To create a scatter plot in Power BI to visualize the relationship between sales and profit, by this graph as follows:



5. How can you add a trendline to a line chart to show sales growth over time?

Answer: -Following are the steps to create a line chart and trendline as follows;

- Select the **Line Chart** visual from the **Visualizations** pane.

- Drag the **Date** field (e.g., **Calendar Date T**) to the **X-axis**.
 - Ensure the date field is set to the correct granularity (e.g., Month, Quarter, or Year) by using the **Hierarchy or Drill Down** options.
- Drag the **Sales Amount** and Profit Amount fields to the **Y-axis**.
- Click on the add or remove visual elements button the upper right-hand side of the visualization.
- Dialog box opens and tick the trendline, markers, or data labels options as per our requirement.

6. What is the process to create a stacked bar chart to show sales by product category and region?

Answer: -Steps to Create a Stacked Bar Chart to Show Sales by Product Category and Region:

- i. **Select the Stacked Bar Chart Visual:** In the Visualizations Pane, select the Stacked Bar Chart option.
- ii. **Selection of Axis:** Drag the Product Category (VehicleType) field from Automobile table to the Axis section.
- iii. **Legend:** Drag the Region (CountryName Column) field to the Legend section. This will split the bars by region and apply different colors for each.

- iv. **Values:** Drag the Sales Amount(Sales M measure) field to the Values section. This ensures the height of the bars represents the total sales.
- v. **Adjust the Chart Settings:**
 - Stacking: Ensure the chart is in stacked mode (not clustered) to see the contribution of each region within the product category.
 - Color Scheme: Customize the colors for each region in the Format Pane under the Data Colors section.
- vi. **Add Labels and Titles:** Go to the Format Pane to make the chart easier to interpret: Add Data Labels to display the exact sales values on the bars. Set a clear and descriptive Title, such as "Sales by Product Category and Region."

7. How can you use a map visualization to display sales data by geographic location?

Answer: Steps to use a map visualization to display Sales Data by geographic location:

1. Select the Map Visual:

In the Visualizations Pane, choose the Map visual (or Filled Map for shaded regions).

2. Configure the Fields:

- **Location:**

Drag a geographic field (e.g., CountryName) to the

Location section.

- **Bubblesize:**

Drag the Sales Amount (Sales M measure) field to the bubblesize section. This adjusts the size or intensity of the points/regions based on sales data.

- **Legend (Optional):**

Drag a categorical field (VehicleType) to the Legend section to differentiate sales by categories

- **Data Colors:**

Customize colors to make the sales data visually distinct. For a filled map, darker shades can represent higher sales.

- **Size Scaling:**

Adjust the bubble sizes in the Format Pane under the Bubble Size setting.

- **Add Labels and Filters:**

Enable data labels in the Format Pane to display sales figures directly on the map.

3. Add Titles and Enhance Visuals:

- Add a clear and descriptive title, such as "Sales Data by Geographic Location."
- Include a Legend and customize the map view (zoom level and position) for better focus on key regions.

8. Create a heat map to show the intensity of sales across

different regions?

Answer: - Creating a heat map in Power BI to show the intensity of sales across different regions is straightforward and provides a clear visualization of data distribution. In this question we don't have categories, so we have assumed VehicleType as categories and CountryName as region and accordingly provided the visualization with Sales M measure.

Heat Map of Sales Across Countries with Years						
Year	France	Germany	Spain	Switzerland	United Kingdom	USA
2012						
Qtr 1				41436	440782	93772
Qtr 2	46436				745694	
Qtr 3	124950			113475	555474	161769
Qtr 4	211200			48557	713578	
2013						
Qtr 1	353310	41875	70661	115990	1472719	
Qtr 2	296605	30375	22975	249782	1260253	72311
Qtr 3	162001			76490	1263023	42150
Qtr 4	80120			147595	1534895	41875
2014						
Qtr 1				49711	452595	831057
Qtr 2	44611				705331	750417
Qtr 3	127625			116507	426992	1136261
Qtr 4	123787			117232	718071	1000950
2015						
Qtr 1	445835	33211	94181	69290	1571411	2118097
Qtr 2	211530	42800	25800	174482	1373037	2110579
Qtr 3	214256			90095	1289043	1681868
Qtr 4	152445			84625	1590984	1911329

9. How can you use a tree map to visualize the sales contribution of each product category?

Answer: To use a Tree Map to visualize the sales contribution of each product category in Power BI:

- I. **Insert Tree Map Visual:** Go to the Visualizations pane and select the Tree Map visual.
- II. **Add Product Category:** Drag the Product Category(VehicleType column) from the Automobile dataset to the Group field of the Tree Map.
- III. **Add Sales Measure:** Drag the **Sales M** measure to the **Values** field of the Tree Map.
- IV. **Customize the Visual:** Adjust colors, labels, and tooltips in the formatting pane to enhance the visualization and ensure clarity.

10. What steps would you take to create a waterfall chart to show sales variances?

Answer: In this question, first the formula for Sales Variance can be defined as follows:

$$\text{❖ Sales Variance} = \text{Actual Sales} - \text{Budget Sales}$$

To create a waterfall chart in Power BI to show sale variances using only actual sales data, you can represent month-on-month changes or cumulative sales variations. It begins by taking the waterfall chart from visualization. Then, drag **Invoice Date** column (formatted as months/years or quarters) to the **Category** field.

Next, add the **Actual Sales** or **Sales Variance** measure to the **Values** field. Power BI will automatically compute the sales trends and represent the cumulative impact across time period.

In the available dataset, we required to have information of budgeted sales or historical data. In the absence of that, it would be difficult to compute the sales variances for the given question and visualize the waterfall chart.

11. How can you create a KPI visual to display key sales metrics?

Answer: - Add KPI Visual: In Power BI, go to the Visualizations pane and select the KPI (Scorecard or Mult scorecard) visual icon.

Set the Indicator: Drag and drop the measure or column for monitoring or tracking purpose (e.g., Total Sales, Profit, or Sales Growth) into the field.

Customize the KPIs to display the sum, average, count/distinct count, maximum or minimum metrics in the scorecard.

Customize the KPI: Adjust formatting options like the indicator color, goal display, or data labels to ensure clarity and alignment with your requirements.

12. What is the process to create a funnel chart to visualize the sales pipeline?

Answer: - To create a funnel chart with sales

visualization can be created by following steps

1) Prepare Data: -

Ensure the dataset includes the necessary fields:

- **Stage:** Represents the sales pipeline (e.g., "Year", "Quarter" etc.).
- **Value:** The numeric values for each period, i.e. Sales M measure.

2) Load Data into Power BI:-

Open Power BI Desktop. Load Automobile dataset in the PowerBI desktop. Once imported, verify the available data in the Data View.

3) Create a Funnel Chart:-

Switch to the Report View. From the Visualizations Pane, select the Funnel Chart icon. Drag the relevant fields into the Funnel chart:

- Calendar Date: Place this field into the Category area.
- Value: Place this field into the Values area that is Sales M measure in this case.

4) Customize the Chart:-

- Sort the Stages:
 - If the date is not in the correct order, select the "Calendar Date T" column in the Fields pane.
- Adjust Colors:
 - Click on the chart. In the Format Pane, customize colors for better visualization.

- Add Titles/Labels:
 - Under Format Pane, enable Data Labels to display values directly on the Sales pipeline chart.

5) Analyze the Funnel: -

The funnel chart will now visually display how values decrease/increase through the sales pipeline over the time period (Yearly, monthly or quarterly basis).

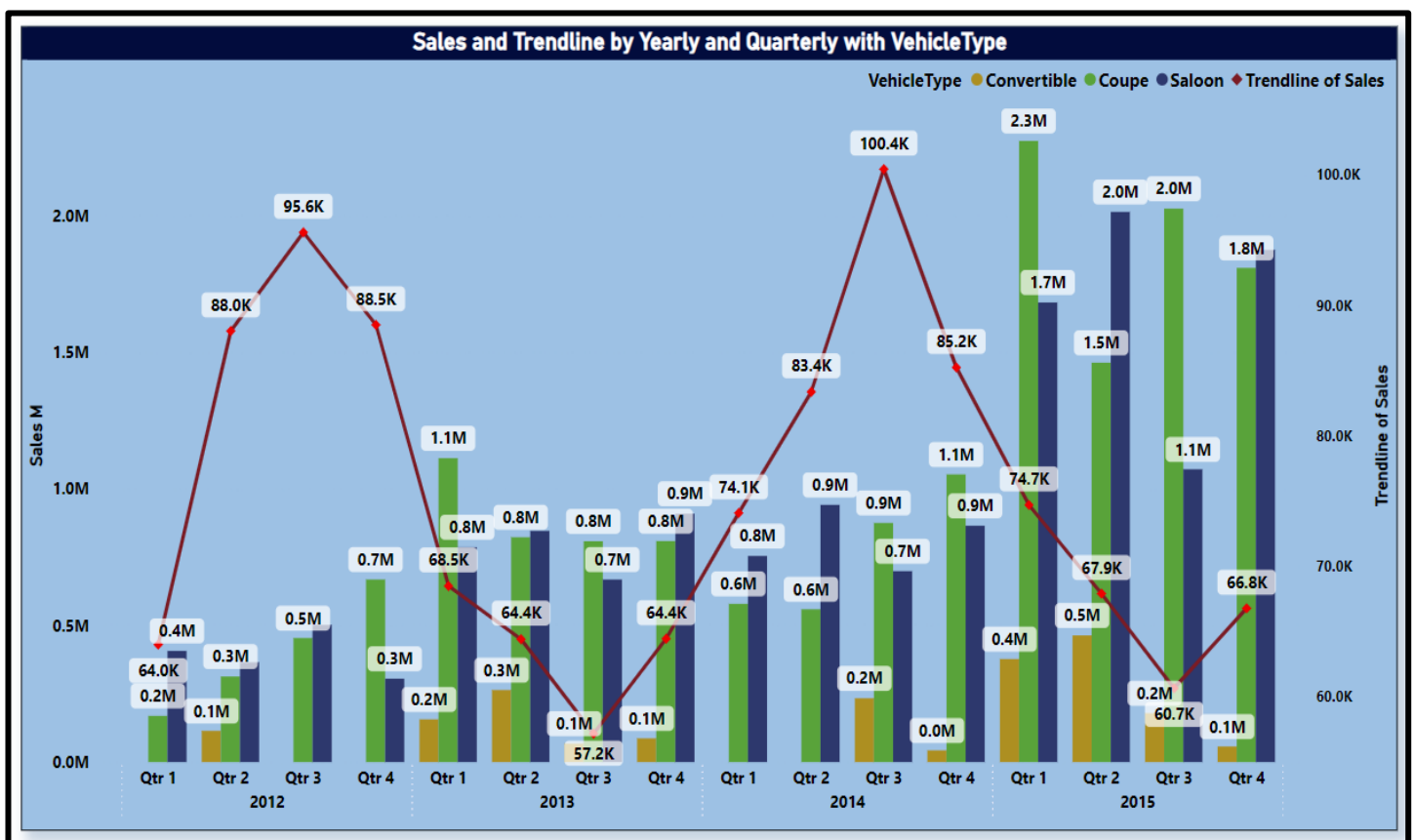
13. How can you use a gauge chart to show the performance against a sales target?

Answer: - Below are the step-by-step Guide to create a Gauge Chart in Power BI.

- **Open Power BI Desktop:** Start by opening Power BI Desktop.
- **Load Data:** Import Automobile dataset using the "Get Data" option. Here we don't have sales target. So, we have created a Target Sales Measure as follows;
 - ❖ $\text{Target Sales} = \text{SUM}(\text{Automobile}[\text{Final Sales Price}]) * 1.5$
- **Navigate to the Visualizations Pane:** Go to the Visualizations pane on the right side of the screen and select the Gauge visual. This will add a blank gauge chart to the canvas.
- **Add Data to the Gauge Chart:**
 - Value Field: Drag and drop the measure (Sales M measure) (e.g., actual sales) to the "Value" field in the Gauge properties pane.

- Target Value: Add the target sales value (Target Sales measure) to the "Target Value" field. This will help in comparing actual with target sales.
- Minimum and Maximum Values: Optionally, it can be decided to set the minimum and maximum values for the gauge to provide context.
- **Format the Gauge Chart:** Customize the appearance of the gauge chart by adjusting colors, adding labels, and formatting the needle and conditional formatting can be included to highlight different performance levels.

14. Create a histogram to show the distribution of sales amounts.



15. How can you use slicers to filter visualization based on product categories?

Answer:- Using slicers in Power BI to filter visualizations based on product categories is an effective way to enable dynamic and interactive reports. Here's how you can set up and use slicers for this purpose:

1. First load Data: -

Ensure required dataset (Automobile dataset) includes a column for Product Categories and other relevant fields for visualizations, such as sales, region, or date. Since we have no product categories column as such, so we have assumed VehicleType as our respective product categories in this question.

2. Add Visualizations: -

Create visualizations such as bar charts, line charts, or tables.

- Example: Add a bar chart showing Sales M measure or Profit M measure or Quantity Sold M as per your requirements.

3. Add a Slicer: -

Go to the Visualizations Pane and select the Slicer icon. Drag the Product Category column (VehicleType Column) into the slicer's field. Position the slicer on the report canvas.

4. Customize the Slicer: -

Filter Options:

- By default, the slicer will show a list of products categories/VehicleType. Users can click on one or multiple categories to filter.
- Switching slicer:

- Dropdown: More compact and better for reports with many categories.
- List: Default style, useful for easy selection.
- Tile/Horizontal Slicer: Available via the Format Pane for a more visual design.

5. Enable multi-selection: -

In the slicer settings (gear icon or Format Pane), turn on Select Multiple to allow filtering by multiple categories simultaneously.

6. Test the Interactivity: -

Select one or more product categories/VehicleType in the slicer. And observe the linked visualizations update dynamically to reflect only the data for the selected categories.

7. Use Hierarchical Slicers: -

If your data includes a hierarchy (e.g., Product Category > Sub-Category), enable the hierarchical slicer to allow drilling down into subcategories.

8. Formatting: -

In the Format Pane, adjust the slicer's appearance (e.g., font size, color, border) for better visual appeal.

16. What steps would you take to create a combo chart to compare sales with profit?

Answer: A Combo Chart in Power BI is a visualization that combines two or more types of charts into a single

chart. A combo chart is commonly used to show a combination of bar and line. Step-by-Step Guide to Create a Combo Chart in Power BI as follows;

1. Loading of Data: -

- Open Power BI Desktop: Start by opening Power BI Desktop.
- Load Data: Import Automobile dataset using the "Get Data" option into the Power BI from excel file.

2. Add a Combo Chart: -

- Open **Power BI Desktop**: From the Visualizations pane, select the Combo Chart icon (either Clustered Column and Line Chart or Stacked Column and Line Chart).

3. Set up the Combo Chart: -

For a Clustered Column and Line Chart:

- Drag a categorical field (e.g., Month) to the X-Axis field.
- Drag the numeric field for the column (e.g., Sales) into the Column Values Y-Axis field.
- Drag another numeric field for the line (e.g., Profit) into the Line Y-Axis field.

4. Customize the Combo Chart: -

- Dual Axis: Power BI automatically creates a dual axis, one for the column data and one for the line data. You can adjust the axis properties (e.g., scaling, range) in the Format Pane under the Y-Axis settings.

- **Legend and Colors:** Adjust the legend to differentiate between the columns and lines, and customize the color to make it visually appealing.
- **Data Labels:** Turn on data labels for the columns and the line chart for easier interpretation.

5. Format the Combo Chart: -

- **Title:** Add a descriptive title to indicate what the chart represents.
- **Data Labels:** Display data labels to show exact values on both columns and the line chart.

17. How can you use a card visual to display the total sales amount?

Answer: -In Power BI, a Card visual is a simple and effective way to display a single numeric value, such as the total sales amount. Following are the steps to display Total Sales Amount Using Card Visual.

1. Prepare Data: -

Ensure required automobile dataset includes a column for Sales Amount or Final Sales Price.

2. Add the Card Visual: -

Open Power BI Desktop. In the Visualizations pane, select the Card icon (it looks like a single number or value).

3. Set Up the Card Visual: -

- Drag the "Sales Amount" field (Final Sales Price) to

the Values field of the Card visual.

- Power BI will automatically aggregate the field (typically summing it) to show the total sales amount.

4. Customize the Card Visual

Formatting the Number:

- To format the total sales amount (e.g., adding currency symbols, adjusting decimal places):
 - Click on the Format pane (paint roller icon).
 - Expand the Data label section.
 - You can change the number format, such as showing currency (USD, INR, etc.), or adjusting the number of decimal places.

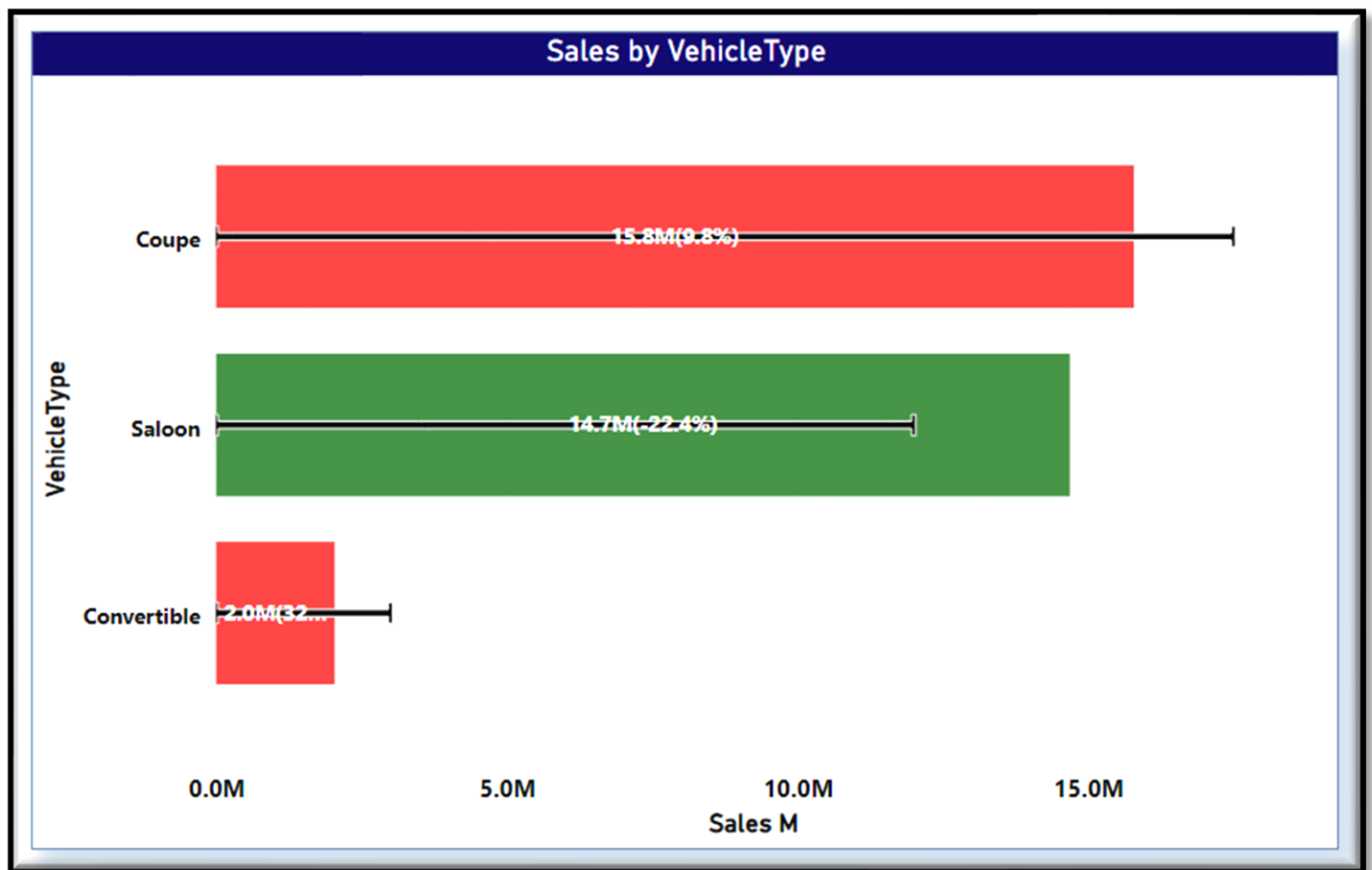
Title:

- To add a title to the Card, go to the Format pane.
- Expand the Title section, turn on the title, and type something like "Total Sales Amount."

Adjust Size:

- Resize the Card to fit required layout. You can also adjust the text size if needed.

18. Create a bullet chart to compare actual sales against a target.



19. How can you use bookmarks to create a storytelling experience in Power BI?

Answer: Bookmarks in Power BI allow to capture specific views of the concerned report, including visual states, filters, and slicers. By linking these bookmarks, you can create an interactive storytelling experience that guides users through a narrative;

1. Plan the Story: -

- Define the key insights and sequence of story through the Automobile dataset and other created measures and tables.

- Message or insights to be highlighted through the sales of different types of automobiles along with models/categories in different regions to various customers.
- Application of visuals, filters, or scorecards of various metrics like Avg Sales, Count of Transactions to support each step of the story?

2. Prepare Report: -

- Create the necessary visuals on report pages including line chart for yearly or quarterly sales, stacked bar chart for categories wise sales records of cars, top 5 selling car models etc.
- Ensure having slicers and filters for sub-categories, quarterly numbers, region-wise specific data points or trends.

3. Enable Bookmarks

- Go to the View tab in Power BI Desktop.
- Check the boxes for Bookmarks Pane and Selection Pane to enable them.

4. Create Bookmarks

- Adjust report to the desired view (e.g., apply slicers, filters, or focus on a specific chart) to display specific part of the report.
- Open the Bookmarks Pane and click Add. "Sales Overview for 2013".
- Repeat this step and thereby creating various bookmark per your requirement (e.g., "Sales

Overview for 2013" or "Regional Insights", "Saloon category Sales", "XK Model Sales" etc.).

- Create buttons, tabs for bookmarks in a separate page as Table of Content (TOC) for easy navigation to various bookmarks in the project.

5. Customize Bookmarks

- Right-click on each bookmark and select Properties.
- Decide what the bookmark captures:
 - **Data:** Slicers, filters, and drill-through regions, categories, models, year then quarter then months data.
 - **Display:** Spotlight or focus modes for critical visuals or scorecards or textbooks.
 - **Current Page:** Ensures the bookmark applies to the specific visuals of a page not to full page.

6. Test Story

- Use the Bookmarks Pane or TOC navigation buttons to move between bookmarks. You can also club the relevant bookmarks in a specific group as per your requirements.
- Verify the story flows smoothly and transitions accurately reflect the intended insights.

20. What is the process to create a matrix visual to display sales data in a tabular format?

Answer: Creating a Matrix Visual in Power BI to display sales data in a tabular format is straightforward and helps to analyse data across multiple dimensions (e.g., by

product, region, or time period). Here's the process to create a matrix that shows sales data in a structured table:

1. Prepare the Data

Ensure dataset includes the necessary columns, such as: Product Category, Sales Amount, Region and Date or Month etc.

2. Add a Matrix Visual

- Open Power BI Desktop. In the Visualizations pane, select the Matrix icon (it looks like a table with rows and columns).
- A blank matrix visual will appear on the report canvas.

3. Set Up the Matrix Visual

Fields can be now defined that will be displayed as rows, columns, and values:

▪ Add Fields to Rows: -

Drag a field you want to appear as rows (e.g., Product Category/VehicleType Column) into the Rows field well. This will display each product category in its own row.

▪ Add Fields to Columns: -

Drag a field you want to appear as columns (e.g., Month or Region) into the Columns field well. This will display the months or regions across the top of the matrix as column headers.

▪ Add Values: -

- Drag the field for summarization (e.g., Sales Amount measure) into the Values field well.
- Power BI will automatically aggregate the sales data (usually summing it), and this will be displayed in the cells of the matrix.

4. Customize the Matrix

- Expand/Collapse Hierarchies: In case of a hierarchical field (e.g., Year > Quarter > Month), it can be expanded or collapsed these levels in the rows or columns.
- Right-click on the row or column header to access the expand/collapse options.

Formatting: -

- Data Labels: Adjust the number formatting (e.g., currency, decimal places) in the Format Pane under Values.
- Column/Row Headers: Adjust font size, font color, and alignment for headers in the Format Pane under Row headers and Column headers.

Conditional Formatting (Optional): -

Conditional formatting can be applied to the cells to highlight certain values (e.g., high sales) using color scales or data bars.

Insights from the Charts & Dashboards

Sales Analysis and Key Insights

From the comprehensive analysis of sales data across yearly, quarterly, and monthly trends, several critical observations have emerged:

1. Revenue and Profit Growth Trends:

- Annual revenue exhibited a robust upward trajectory, increasing from **\$3.3M** in 2012 to **\$15.3M** in 2015, representing a compound annual growth rate (CAGR) of **67%**.
- Profit growth mirrored this trend, achieving a higher CAGR of **74%** over the same period.
- However, performance in 2014 fell short of expectations, potentially due to the cyclicity of the business.

2. Quarterly and Monthly Performance Insights:

- Quarterly data revealed significant cyclicity, with **Q3** and **Q4** consistently outperforming **Q1** and **Q2** generally.
- On a monthly basis, November, December, and January demonstrated peak sales performance compared to other months within the financial year.
- The average profit margin across the analyzed period stood at **37.2%**, with the highest quarterly margin reported in Q3 2014 (**57.3%**), followed by Q1 2013 (**52.8%**). The lowest margin was recorded in Q1 2012

(30.1%).

3.Top-Selling Models and Vehicle Categories:

- The top-performing models included Camargue, Continental, DB9, Vanquish, and XK, which contributed significantly to sales.
- By vehicle type, Coupes dominated sales with a **48.5%** share, followed by Saloons at **45.1%**, and Convertibles accounting for the remainder.
- Profitability analysis revealed that Convertibles had the highest profit margin at **46.8%**, followed by Saloons (**40.1%**), and Coupes (**33.3%**).

4.Pricing and Model Performance:

- The average car price across all sales was approximately **\$71,156**.
- High-end models such as Zagato, Wraith, Phantom, Silver Shadow, and Vanquish showcased impressive average sales prices of **\$182,632.5**, **\$182,461.5**, **\$181,916.5**, **\$157,548**, and **\$152,410.5**, respectively.
- In contrast, models such as **Tuscan**, **Cerbera**, **GT**, **TR5**, **TR4**, and **TR7** underperformed, with average sales prices ranging from **\$25,668.75** to **\$37,967.5**.

5.Performance by Make:

- Rolls-Royce and Jaguar emerged as the most profitable brands, achieving margins of **45%**, while Triumph reported a moderate 30% profit margin.
- **TVR** had the **lowest** profitability, with a negative margin of (**12.5%**).

6. Client Distribution and Preferences:

- The company served **31 clients**, predominantly concentrated in the **United Kingdom (50%)**, **USA (37%)**, and **France (8%)**, with smaller contributions from **Germany** and **Switzerland**.
- Prominent customers included **Aldo Motors**, **Bright Orange**, **Cut'n'Shut**, **Sporty Types Corp**, and **Wheels'R'Us** etc.
- Regional preferences highlighted those customers in the **USA**, **United Kingdom**, and **France** favored Coupes and Saloons.

Conclusion on Automobile Dashboard

The analysis of sales data from 2012 to 2015 reveals a consistently upward trajectory in both revenue and profit, reflecting the company's strong market presence and operational efficiency. The compound annual growth rates (CAGR) of 67% for revenue and 74% for profit highlight good financial standing. Despite an overall positive trend, the underperformance in 2014 suggests an impact of business cyclicality, particularly evident in quarterly trends where Q3 and Q4 consistently outperformed Q1 and Q2 in sales and profit margins.

Seasonal trends also played a significant role, with November, December, and January emerging as peak months for sales, underscoring the need for focused marketing and inventory strategies during this period and maintaining optimal inventory in other part of the year for better utilization of business resources. The average profit margin across the analysis period stood at 37.2%, with Q3 2014 achieving the highest margin of 57.3%, further emphasizing the importance of quarterly performance optimization.

Product-wise, the company's top-selling models, such as Camargue, Continental, DB9, Vanquish, and XK, drove significant revenue, while Coupes dominated sales with a 48.5% share, followed by Saloons (45.1%). Although Convertibles accounted for a smaller portion of sales, they demonstrated the highest profit margin at 46.8%, indicating their potential as a high-value segment and required urgent attention to push more sales of Convertible across different regions to further drive the bottom line and outperform expectation of analyst and its peers. Conversely, underperforming models like Tuscan, Cerbera, GT, TR5, TR4, and TR7 require strategic evaluation, possibly warranting

discontinuation or repositioning to improve profitability. It is critical for the business to assess above models to determine its future course of action that will further determine its long-term sustainability and profitability from above low earning legacy models.

The analysis also highlighted pricing dynamics, with high-end models such as Zagato, Wraith, Phantom, Silver Shadow, and Vanquish commanding premium prices exceeding \$150,000, reinforcing their value proposition to affluent customers.

From a brand perspective, Rolls-Royce and Jaguar emerged as the most profitable with margins of 45%, while TVR underperformed, recording a negative margin of (12.5%). These insights point to the need for a strategic focus on high-margin brands and the potential restructuring of low-margin offerings or even discounting TVR brand so as to reduce/eliminate losses from its books.

Client distribution is heavily concentrated in the United Kingdom (50%), USA (37%), and France (8%), with customers in these regions showing a marked preference for Coupes and Saloons. Key accounts, including Aldo Motors, Bright Orange, Cut'n'Shut, Sporty Types Corp, and Wheels'R'Us, highlight the importance of sustaining and nurturing strong client relationships in these markets but considering heavy dependence of these region may jeopardize the numbers of the business so it is required to explore other potential regions like Asia, Middle East, and South Asia, South America for diversification of its revenues.

In conclusion, the company's overall performance is commendable, driven by robust growth in revenue and profitability, strong product offerings, and strategic market positioning. However, there are clear opportunities for improvement in addressing cyclicalities, optimizing the portfolio of underperforming models, foray into the underpenetrated markets



Thank you

