# Comprehensive Report: Car Sales Dashboard Project

## 1. Introduction

The Car Sales Dashboard was developed in Power BI to provide a comprehensive overview of sales performance for a car dealership. This dynamic and interactive dashboard enables stakeholders to track key performance indicators (KPIs), identify trends, and make data-driven decisions. The project was structured into various phases, including data import, modeling, DAX formula creation, visualization, and optimization.

## 2. Implementation Details

### Data Modeling

- Created a relationship between the Date Table and Calendar Date Table to enable accurate date filtering and time-based calculations.
- Used calendar functions:
    - TOTALYTD: Aggregates values for the year-to-date period.
    - TOTALMTD: Aggregates values for the month-to-date period.
    - SAMEPERIODLASTYEAR: Returns a table with the same period in the previous year.

### Filters

Filters added for user interactivity:

- Body Style
- Dealer Region
- Transmission
- Engine

**sAdditional DAX Functions**

- ALLSELECTED:
    - Returns all values in the specified column or table that are visible, considering the current filters.
    - Example: Used to find the maximum value in a filtered range for highlighting peaks in a chart.
- FORMAT:
    - Converts a value into a specified format, such as currency or percentages, for better readability.
    - Example: Used to display KPIs like MTD Sales as "$0.00M."
- MAXX:
    - Evaluates an expression for each row in a table and returns the largest value.
    - Example: Used in the formula for identifying the highest weekly sales point in the line chart.

**3. DAX Formulas and Their Role**

**Sales Overview**

- **YTD Total Sale**:

TOTALYTD(SUM(car_data[Price ($)]), 'Calander Table'[Date])

    - Aggregates total sales from the start of the year to the current date.
    - Helps track cumulative sales performance year-to-date.
- **PYTD**:

CALCULATE(SUM(car_data[Price ($)]), SAMEPERIODLASTYEAR('Calander Table'[Date]))

    - Calculates sales for the same period in the previous year.
    - Used for year-over-year comparison.
- **Sales Difference**:

[YTD Total Sale] - [PYTD]

- Provides the absolute difference in sales between the current and previous year-to-date.

- **YoY Sales Growth**:

[Sales Difference] / [PYTD]

- Calculates year-over-year sales growth as a percentage.

- **MTD Total Sales**:

TOTALMTD(SUM(car_data[Price ($)]), 'Calander Table'[Date])

- Aggregates sales for the current month.

- **MTD KPI**:

CONCATENATE("MTD Total Sales :", FORMAT([MTD Total Sales] / 1000000, "$0.00M"))

- Formats the MTD sales into a user-friendly KPI card.

**Average Price Analysis**

- **YTD Avg Price**:

TOTALYTD([Avg Price], 'Calander Table'[Date])

- Tracks average car price year-to-date.

- **Avg Price**:

SUM(car_data[Price ($)]) / COUNT(car_data[Car_id])

- Calculates the average price of cars sold.

- **Avg Price Diff**:

[YTD Avg Price] - [PYTD Avg Price]

- Shows the change in average price year-over-year.

- **PYTD Avg Price**:

CALCULATE([Avg Price], SAMEPERIODLASTYEAR('Calander Table'[Date]))

    - Computes the average price for the same period last year.

- **YoY Avg Price Growth**:

[Avg Price Diff] - [PYTD Avg Price]

    - Indicates the year-over-year growth in average price.

- Sales Price KPI

AVG Price MTD KPI = CONCATENATE("MTD Average Price :",FORMAT([MTD Avg Price]/1000,"$0.00K") )

**Average Price Analysis**

- **YTD Avg Price**:

TOTALYTD([Avg Price], 'Calander Table'[Date])

    - Tracks average car price year-to-date.

- **Avg Price**:

SUM(car_data[Price ($)]) / COUNT(car_data[Car_id])

    - Calculates the average price of cars sold.

- **Avg Price Diff**:

[YTD Avg Price] - [PYTD Avg Price]

    - Shows the change in average price year-over-year.

- **PYTD Avg Price**:

CALCULATE([Avg Price], SAMEPERIODLASTYEAR('Calander Table'[Date]))

    - Computes the average price for the same period last year.

- **YoY Avg Price Growth**:

[Avg Price Diff] - [PYTD Avg Price]

    - Indicates the year-over-year growth in average price.

**Cars Sold Metrics**

- **YTD Cars Sold**:

TOTALYTD(COUNT(car_data[Car_id]), 'Calander Table'[Date])

- Counts the number of cars sold year-to-date.

- **Car Sold Diff**:

[YTD Car Sold] - [PYTD Car Sold]

- Shows the difference in cars sold between the current and previous year-to-date.

- **MTD Cars Sold**:

TOTALMTD(COUNT(car_data[Car_id]), 'Calander Table'[Date])

- Counts the cars sold month-to-date.

- KPI Car Sold

MTD Car Sold KPI = CONCATENATE("MTD Car Sold: ", FORMAT([MTD Cars Sold]/1000,"0.00K"))

**4. Charts Requirement**

**1. YTD Sales Weekly Trend**

- **Visualization**: Line chart.

- **DAX Formula for Highlighting Max Point**:

Max Point = IF(MAXX(ALLSELECTED('Calander Table'[Week]), [Total Sale]) = [Total Sale], MAXX(ALLSELECTED('Calander Table'[Week]), [Total Sale]), BLANK())

- Highlights the peak sales point on the chart.

**2. YTD Total Sales by Body Style**

- **Visualization**: Pie chart.

- Displays the distribution of sales across car body styles.

**3. YTD Total Sales by Color**

- **Visualization**: Pie chart.

- Represents the contribution of different car colors to total sales.

**4. YTD Cars Sold by Dealer Region**

- **Visualization**: Map chart.

- Geographically illustrates sales distribution by dealer regions.

**5. Company-Wise Sales Trend**

- **Visualization**: Tabular grid.
- Added columns for:
    - Company name.
    - YTD cars sold, YTD average price, YTD total sales.
    - % Growth in YTD total sales.
    - Embedded bar charts in columns for visual cues.

**6. Detailed Grid Showing All Car Sales Information**

- **Visualization**: Tabular grid.
- Includes comprehensive columns: car model, body style, color, sales amount, dealer region, date, and more.

**5. Navigation and Interactivity**

- Implemented page navigation to separate dashboard pages for better user experience.

## 6. Conclusion

The Car Sales Dashboard effectively meets the outlined objectives by leveraging advanced DAX calculations, meaningful visualizations, and interactive features. This tool empowers stakeholders with actionable insights, facilitating data-driven decision-making and enhancing sales performance tracking.