

Introduction to Car Price and Profitability Analysis

How can a car manufacturer optimize pricing and product development decisions to maximize profitability while meeting consumer demand?



Project Overview

The project aims to understand the factors driving consumer demand for cars to optimize pricing and product development decisions, maximizing profitability while meeting consumer demand.

Business Problem or Question

How can a car manufacturer optimize pricing and product development decisions to maximize profitability while meeting consumer demand?

Description of the Data Sources

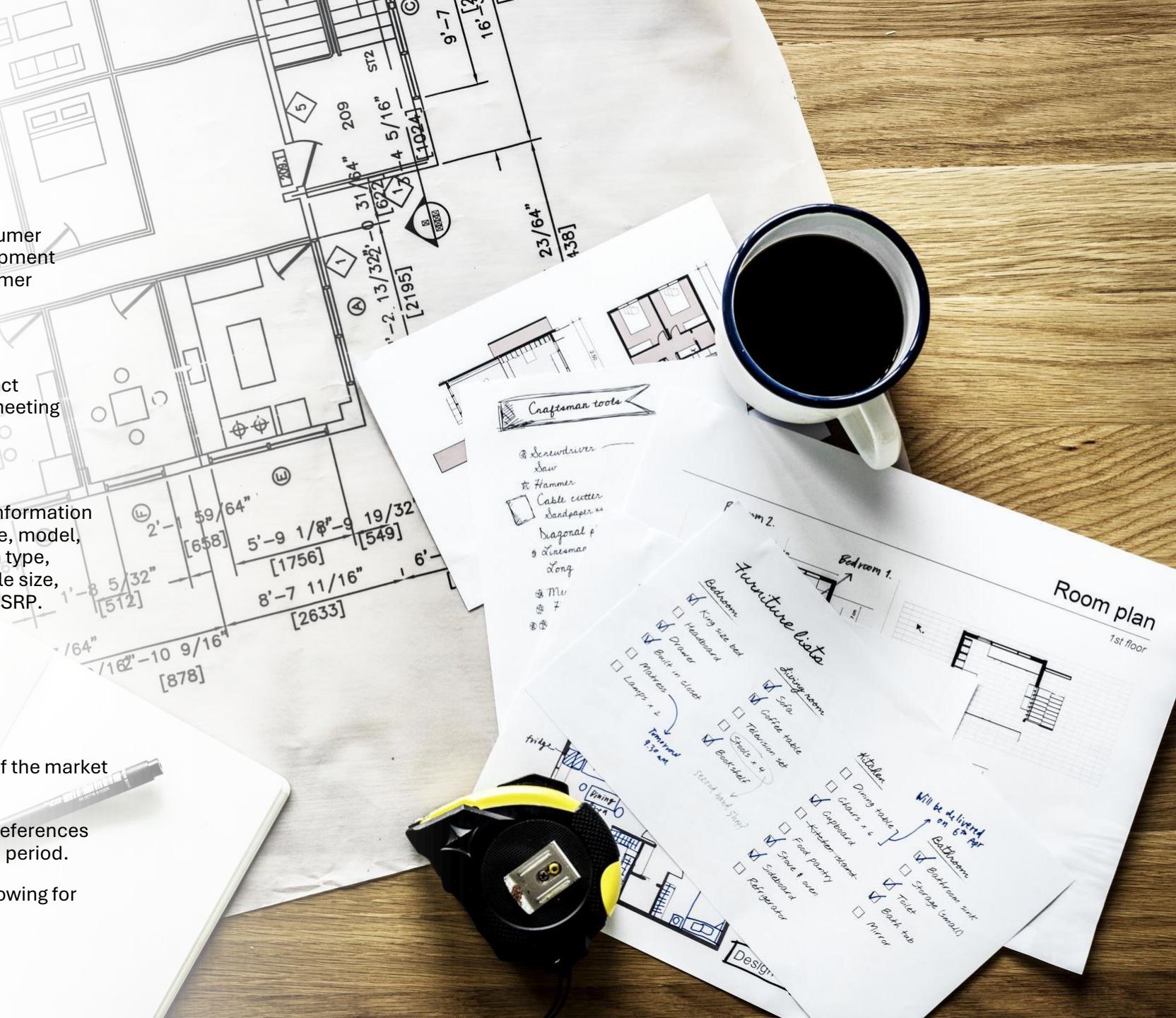
The dataset, titled "Car Features and MSRP," contains information on over 11,000 car models, including variables like make, model, year, engine fuel type, engine horsepower, transmission type, driven wheels, number of doors, market category, vehicle size, vehicle style, highway MPG, city MPG, popularity, and MSRP.

Data Handling

Identified and removed missing values in the dataset.

Assumptions Made

- The dataset is comprehensive and representative of the market trends during that period.
- The factors influencing car prices and consumer preferences remained relatively stable since the data collection period.
- All data entries followed a standardized format, allowing for accurate comparison and analysis.



Approach

Analytical Methods & Reason

Descriptive Statistics: Utilized Excel functions to calculate metrics such as mean, median, standard deviation, and range to summarize and understand the central tendencies and variability in the dataset.

Reason- Provided a foundation for understanding the dataset's overall structure and initial insights.

Visualization: Created charts and graphs using Excel's charting tools, such as histograms, scatter plots, and bar charts, to identify trends, patterns, and relationships.

Reason- Enabled easy identification of trends and patterns that are not immediately apparent from raw data.

Regression Analysis: Used Excel's Data Analysis Toolpak to perform regression analysis and understand the impact of various car features on the price.

Reason- Allowed for prediction of car prices based on multiple features, offering insights into the importance of each feature.

Pivot Tables: Employed pivot tables to segment data, compare categories, and identify key insights related to market categories and profitability.

Reason- Facilitated efficient data summarization and segmentation, helping in detailed comparative analysis.

Challenges:

Faced issues with missing and inconsistent data entries, necessitating extensive cleaning and preprocessing.

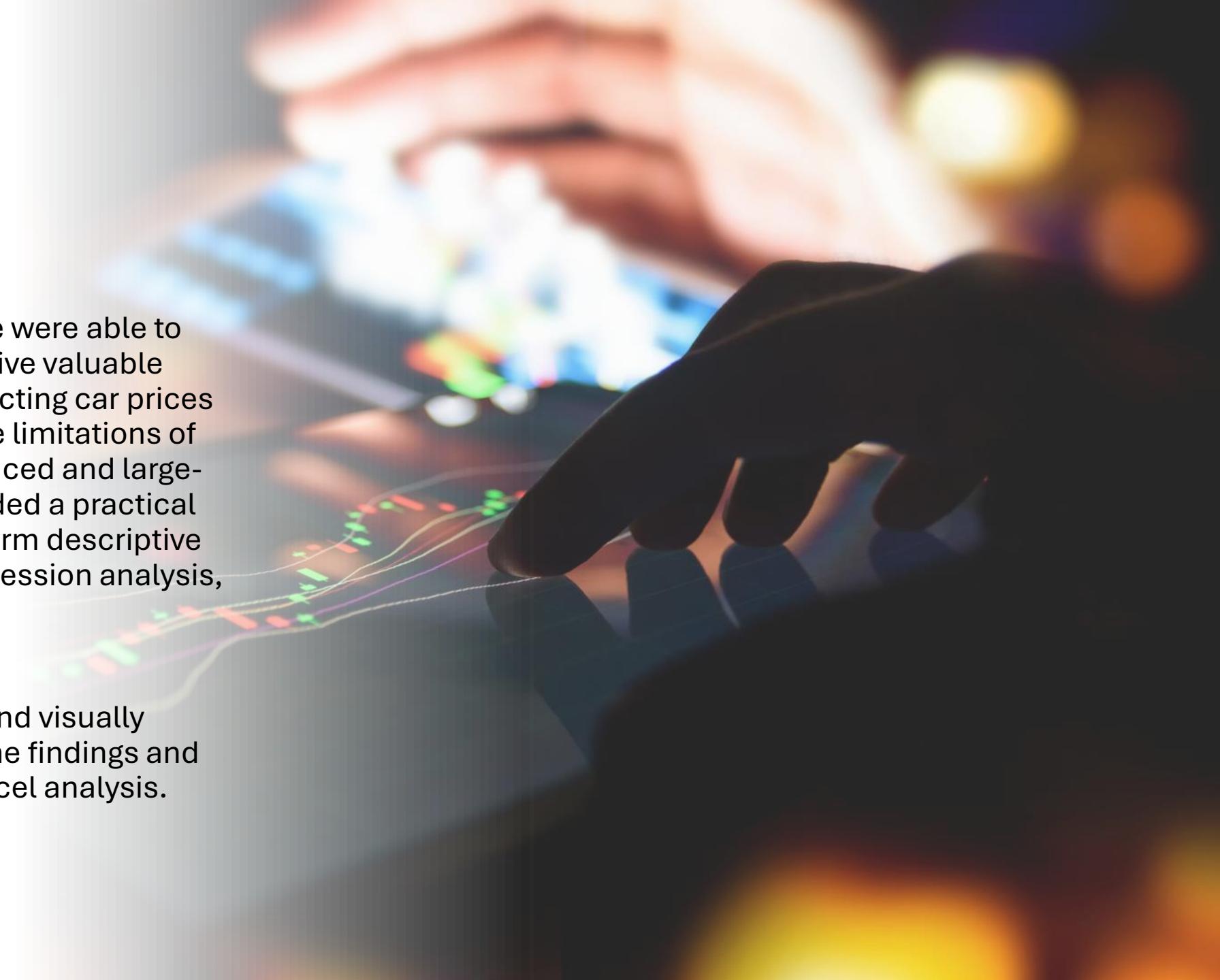
Tech-Stack

Microsoft Excel

By using Microsoft Excel, we were able to analyze the dataset and derive valuable insights into the factors affecting car prices and profitability. Despite the limitations of Excel in handling very advanced and large-scale data analysis, it provided a practical and accessible way to perform descriptive statistics, visualization, regression analysis, and data segmentation.

Microsoft PowerPoint

Created a comprehensive and visually appealing presentation of the findings and insights derived from the Excel analysis.



Tasks: Analysis

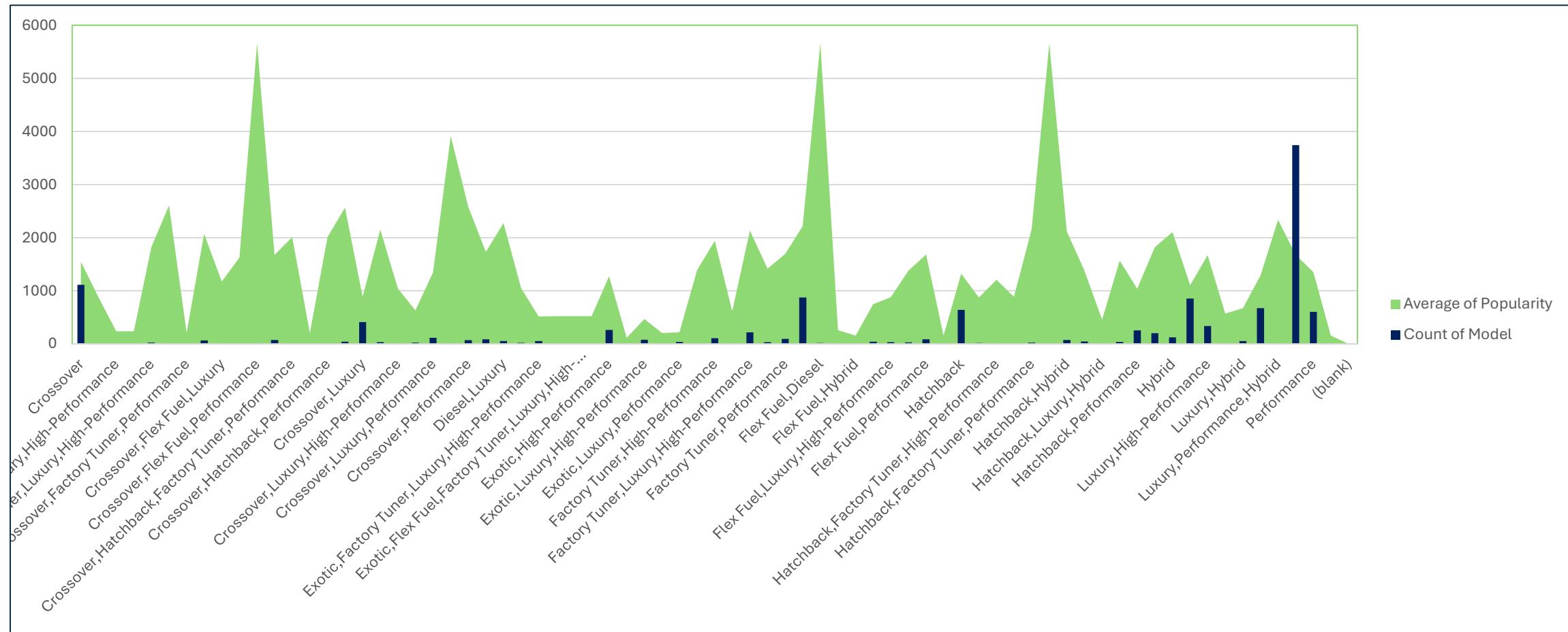
Insight Required: How does the popularity of a car model vary across different market categories?

Task 1.A: Create a pivot table that shows the number of car models in each market category and their corresponding popularity scores.

Task 1.B: Create a combo chart that visualizes the relationship between market category and popularity.



Findings

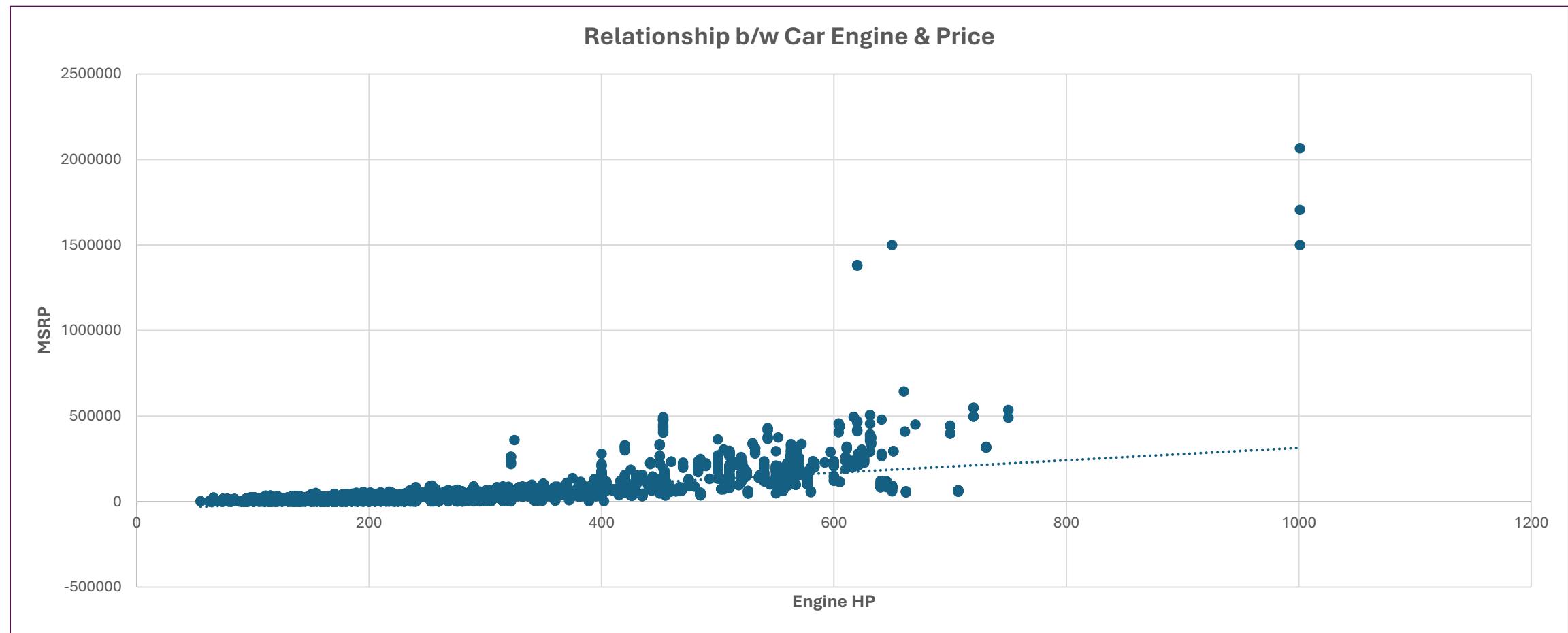


Tasks: Analysis

Insight Required: What is the relationship between a car's engine power and its price?

Task 2: Create a scatter chart that plots engine power on the x-axis and price on the y-axis. Add a trendline to the chart to visualize the relationship between these variables.

Findings



Result: There is a positive relationship between the power and the price of a car.

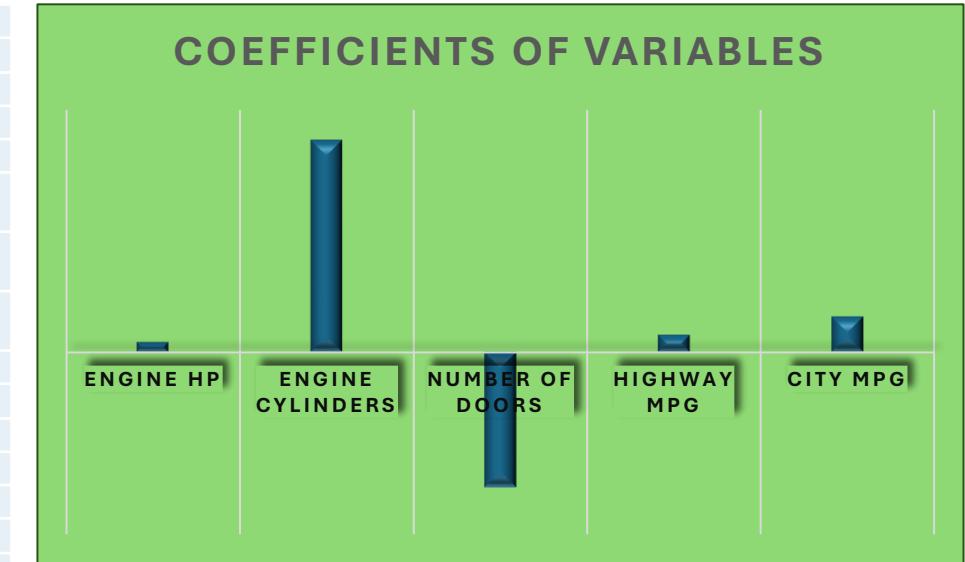
Tasks: Analysis

Insight Required: Which car features are most important in determining a car's price?

Task 3: Use regression analysis to identify the variables that have the strongest relationship with a car's price. Then create a bar chart that shows the coefficient values for each variable to visualize their relative importance.

Findings

SUMMARY OUTPUT								
Regression Statistics								
Multiple R	0.68071381							
R Square	0.46337129							
Adjusted R Square	0.46314408							
Standard Error	44165.5939							
Observations	11815							
ANOVA								
	df	SS	MS	F	Significance F			
Regression	5	19890078069418	3978015613884	2039	0			
Residual	11809	23034631625854	1950599680					
Total	11814	42924709695272						
	Coefficients	Standard Error	t Stat	P-value	Lower 95%	Upper 95%	Lower 95.0%	Upper 95.0%
Intercept	-101612.181	3683.853676	-27.58312088	2.325E-162	-108833.142	-94391.2206	-108833.142	-94391.2206
Engine HP	322.670581	6.014842757	53.64572169	0	310.880497	334.460664	310.880497	334.460664
Engine Cylinders	6993.27114	439.5089745	15.91155482	2.0294E-56	6131.76108	7854.7812	6131.76108	7854.7812
Number of Doors	-4469.66891	465.6339314	-9.599104809	9.6805E-22	-5382.3882	-3556.94963	-5382.3882	-3556.94963
highway MPG	570.553412	105.7686551	5.394352522	7.0098E-08	363.229407	777.877416	363.229407	777.877416



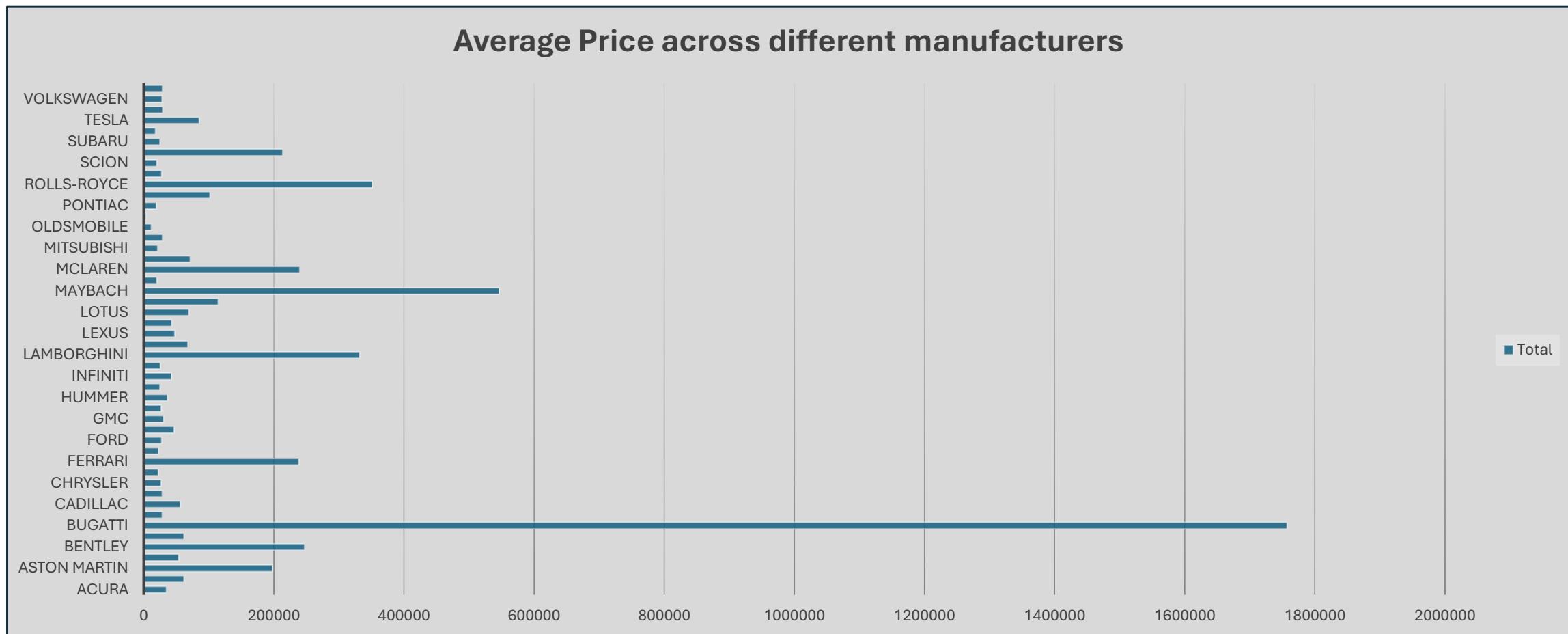
Tasks: Analysis

Insight Required: How does the average price of a car vary across different manufacturers?

Task 4.A: Create a pivot table that shows the average price of cars for each manufacturer.

Task 4.B: Create a bar chart or a horizontal stacked bar chart that visualizes the relationship between manufacturer and average price.

Findings



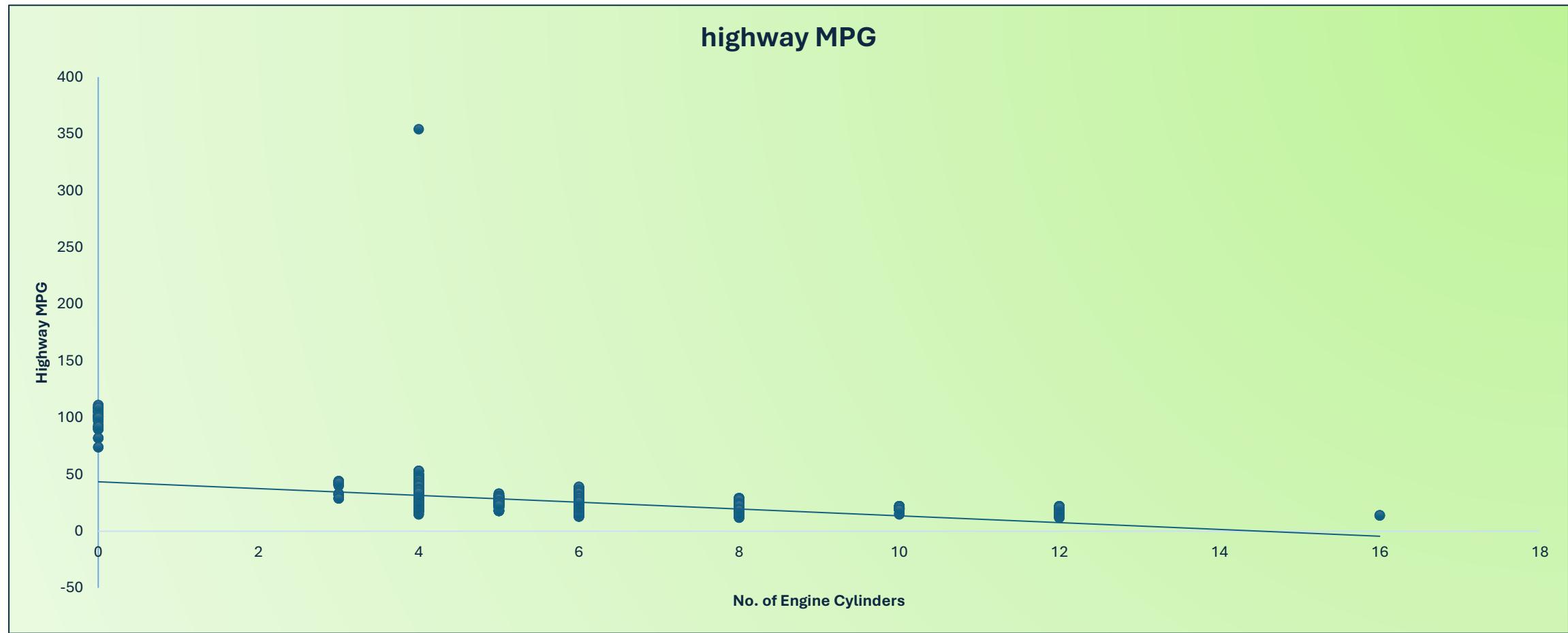
Tasks: Analysis

Insight Required: What is the relationship between fuel efficiency and the number of cylinders in a car's engine?

Task 5.A: Create a scatter plot with the number of cylinders on the x-axis and highway MPG on the y-axis. Then create a trendline on the scatter plot to visually estimate the slope of the relationship and assess its significance.

Task 5.B: Calculate the correlation coefficient between the number of cylinders and highway MPG to quantify the strength and direction of the relationship.

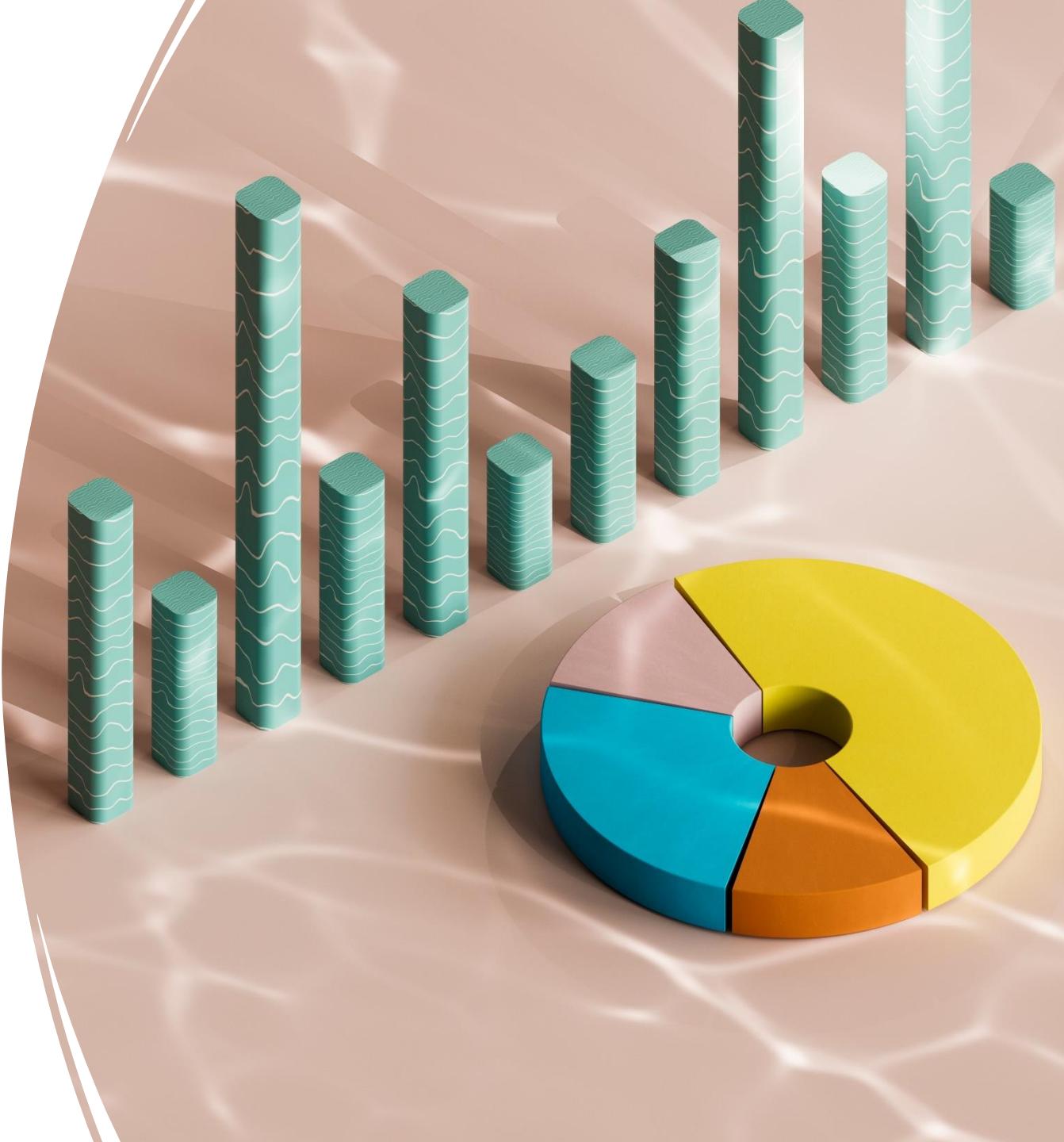
Findings



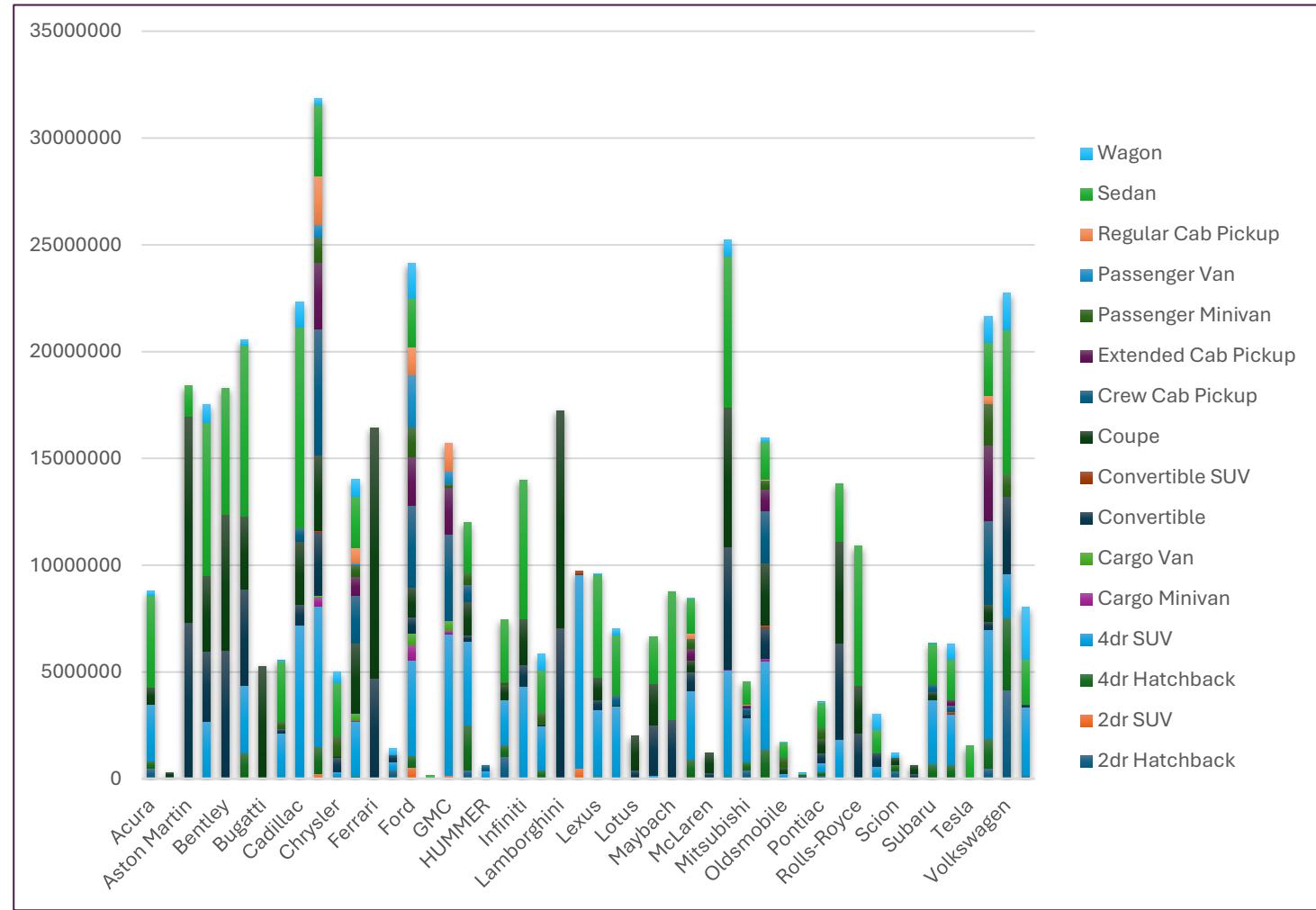
Building the dashboard

Task 1: How does the distribution of car prices vary by brand and body style?

Hints: Stacked column chart to show the distribution of car prices by brand and body style. Use filters and slicers to make the chart interactive. Calculate the total MSRP for each brand and body style using SUMIF or Pivot Tables.



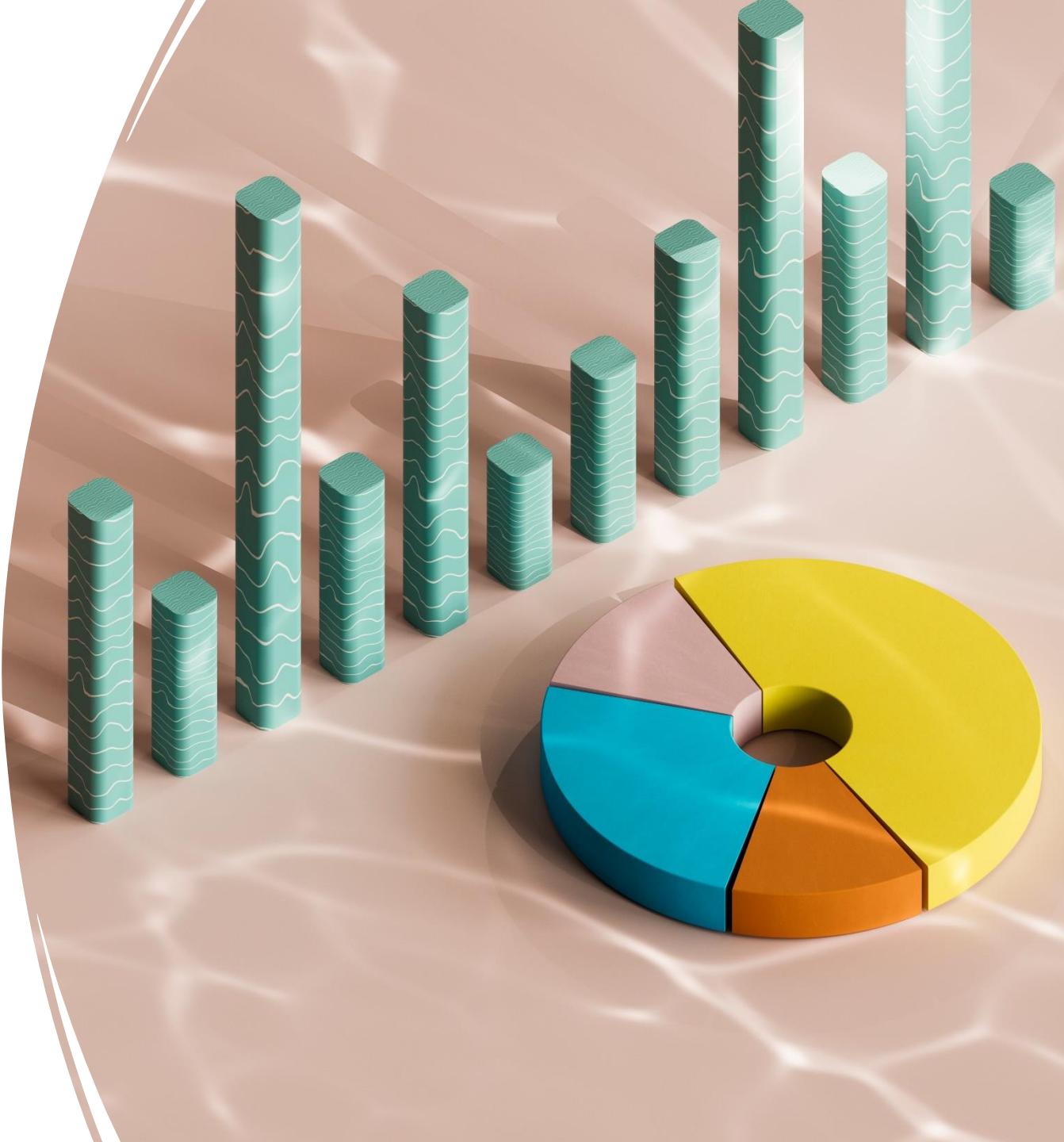
Findings



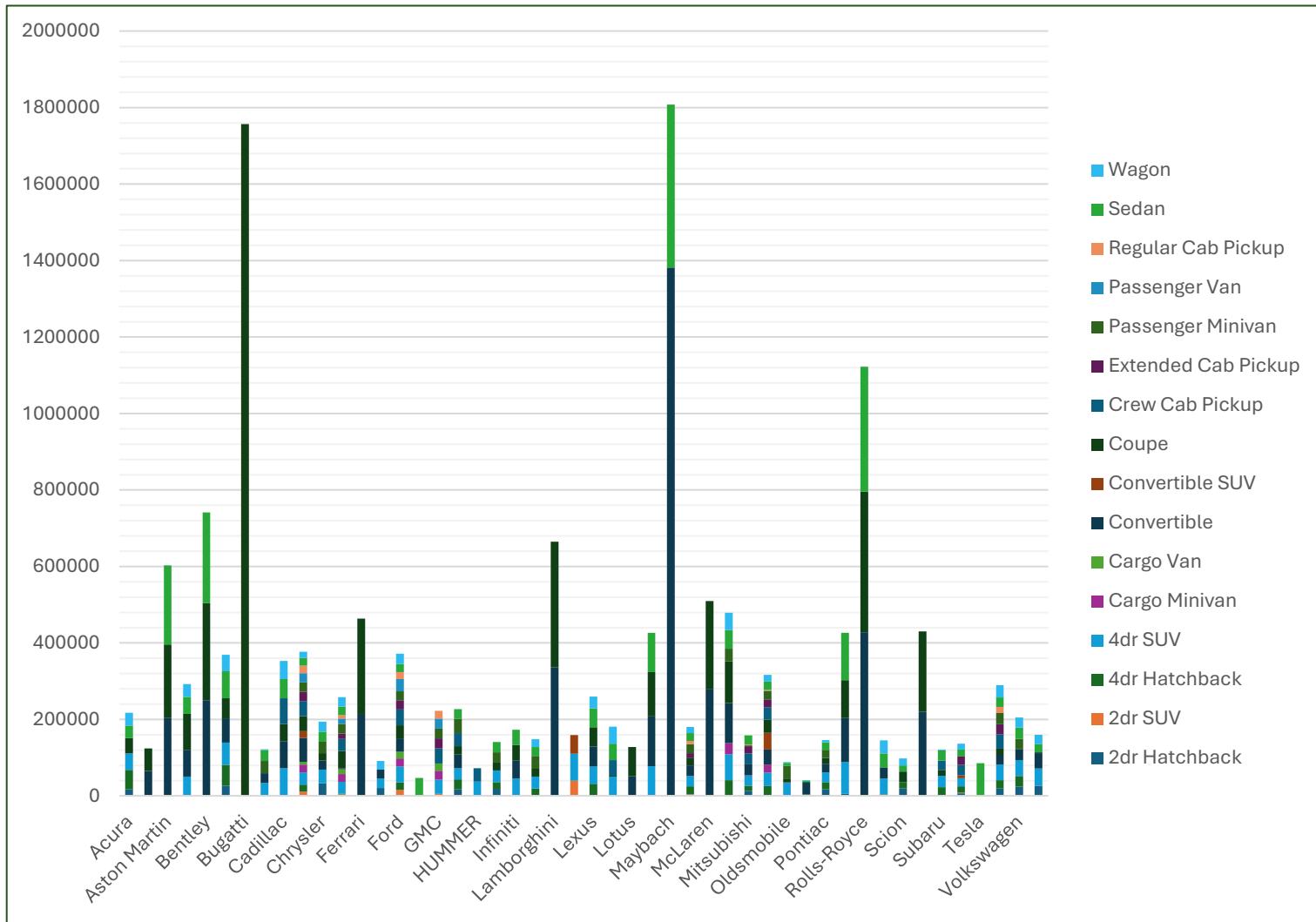
Building the dashboard

Task 2: Which car brands have the highest and lowest average MSRPs, and how does this vary by body style?

Hints: Clustered column chart to compare the average MSRPs across different car brands and body styles. Calculate the average MSRP for each brand and body style using AVERAGEIF or Pivot Tables.



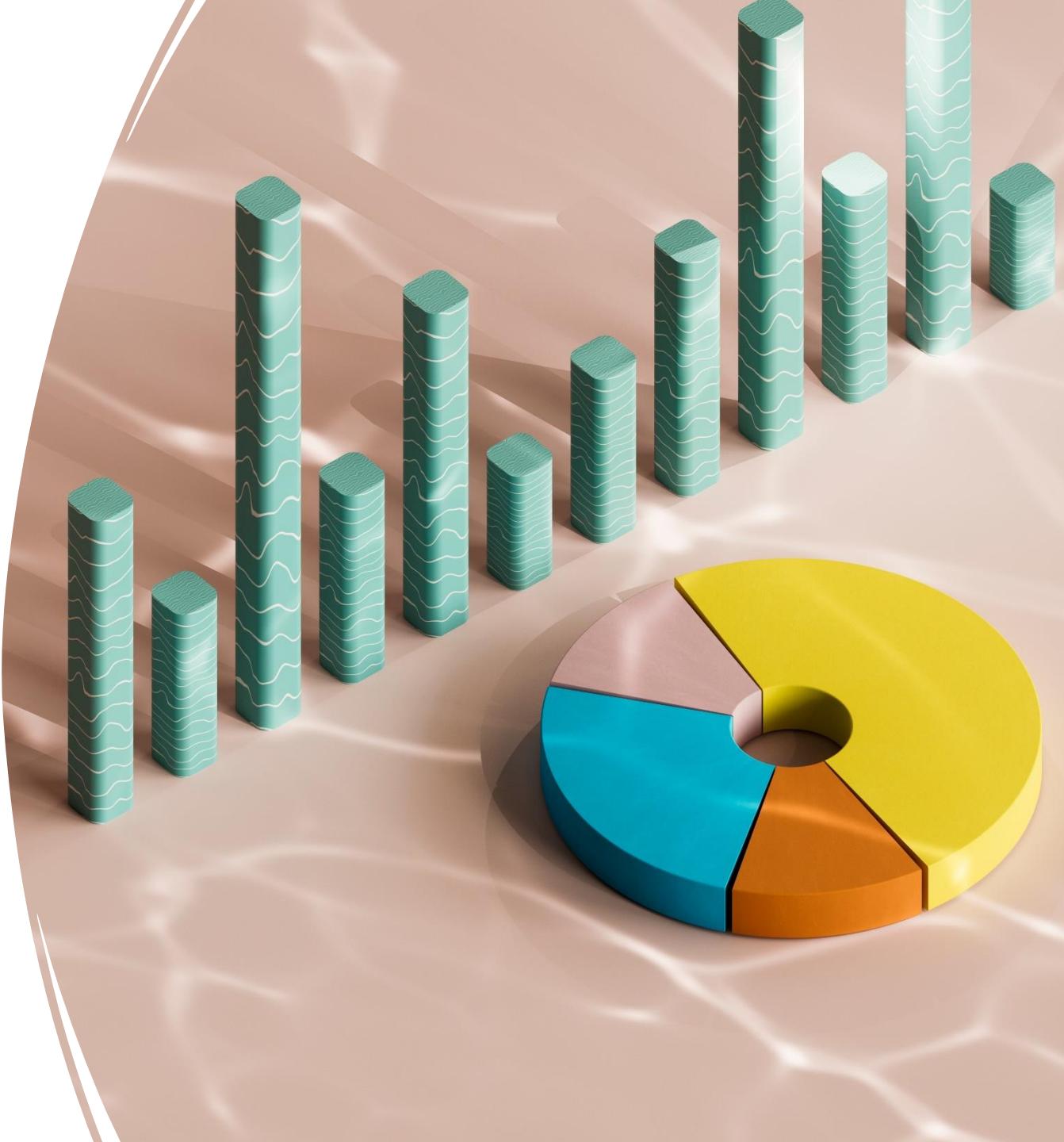
Findings



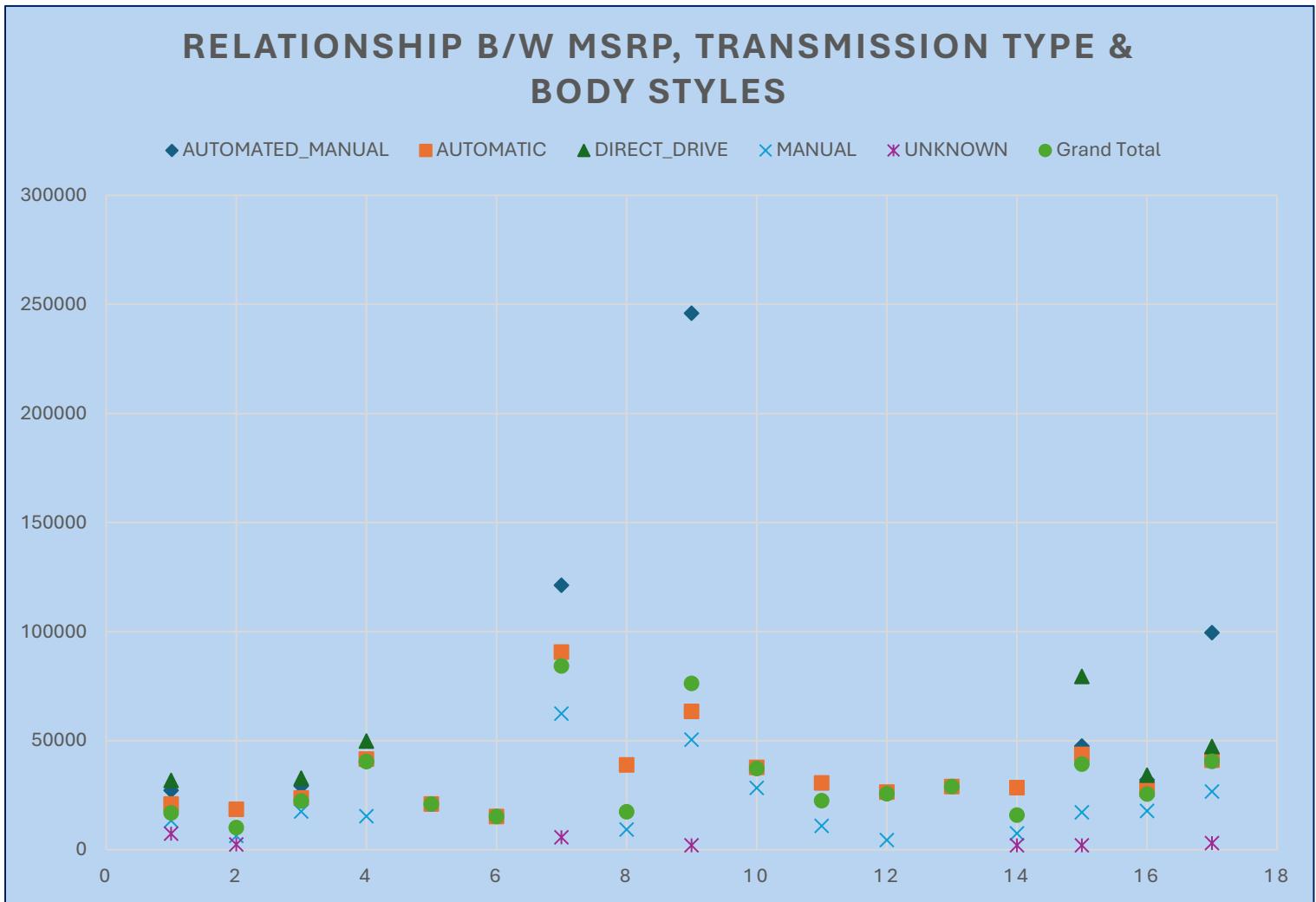
Building the dashboard

Task 3: How do the different feature such as transmission type affect the MSRP, and how does this vary by body style?

Hints: Scatter plot chart to visualize the relationship between MSRP and transmission type, with different symbols for each body style. Calculate the average MSRP for each combination of transmission type and body style using AVERAGEIFS or Pivot Tables.



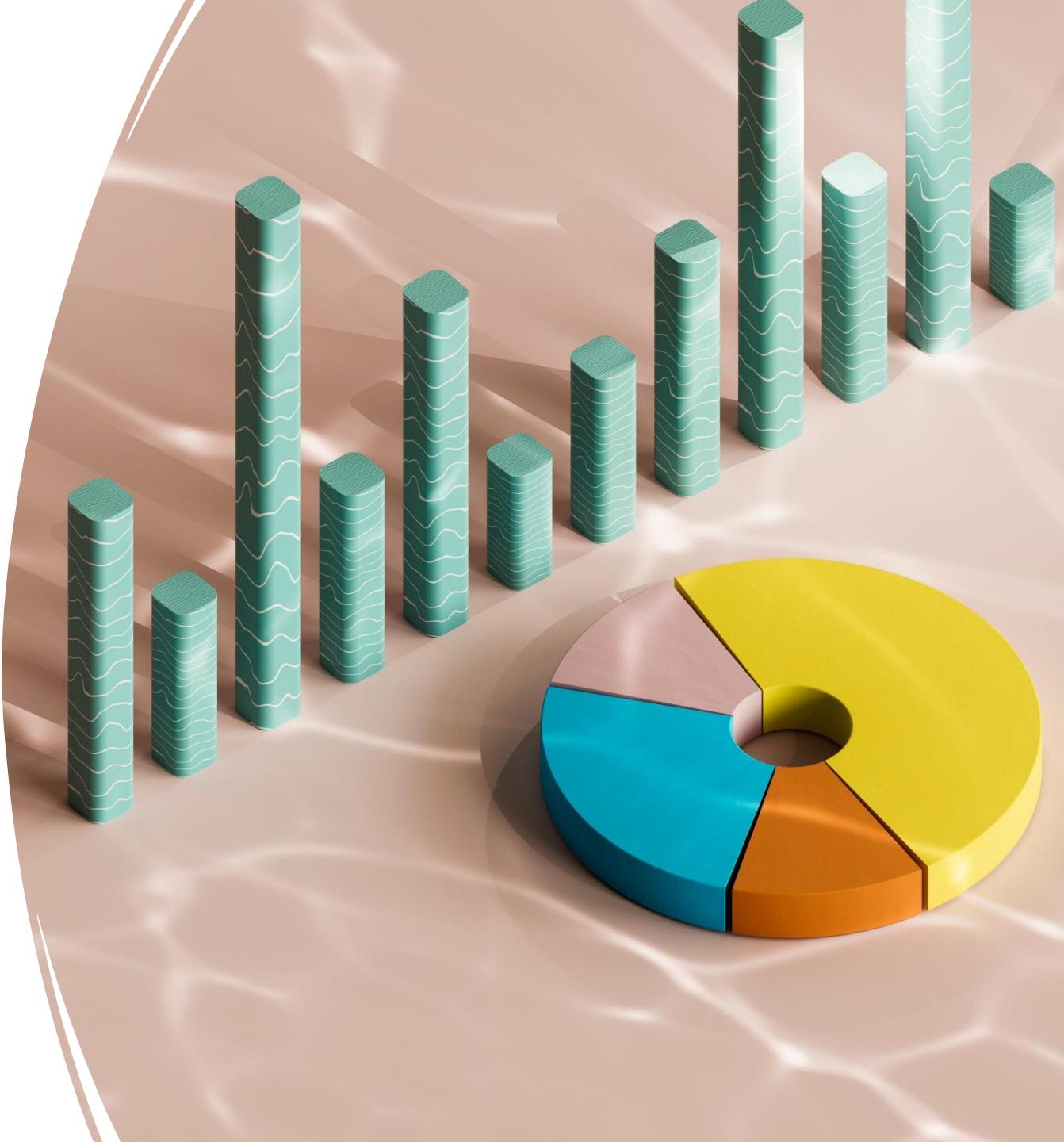
Findings



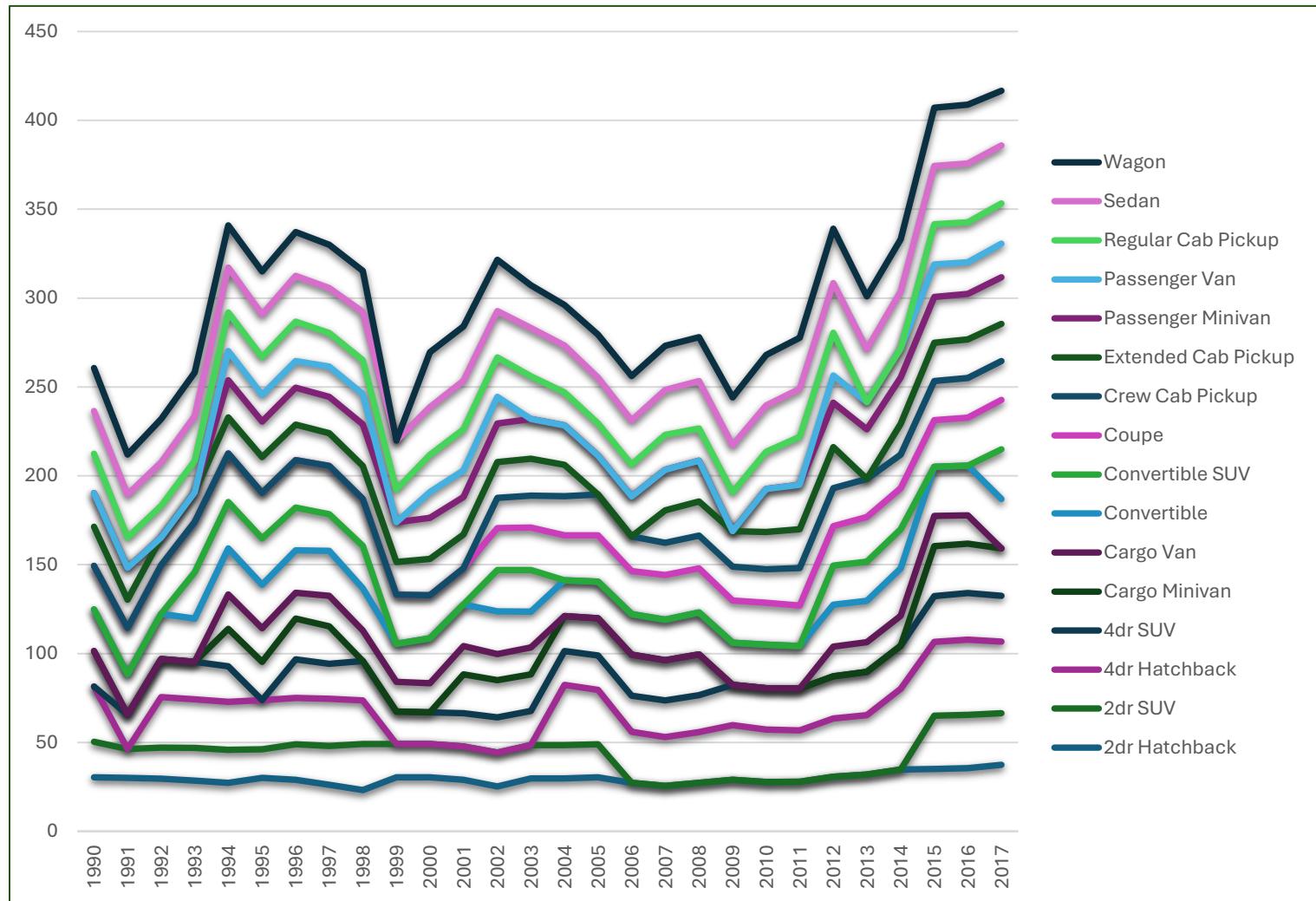
Building the dashboard

Task 4: How does the fuel efficiency of cars vary across different body styles and model years?

Hints: Line chart to show the trend of fuel efficiency (MPG) over time for each body style. Calculate the average MPG for each combination of body style and model year using AVERAGEIFS or Pivot Tables.



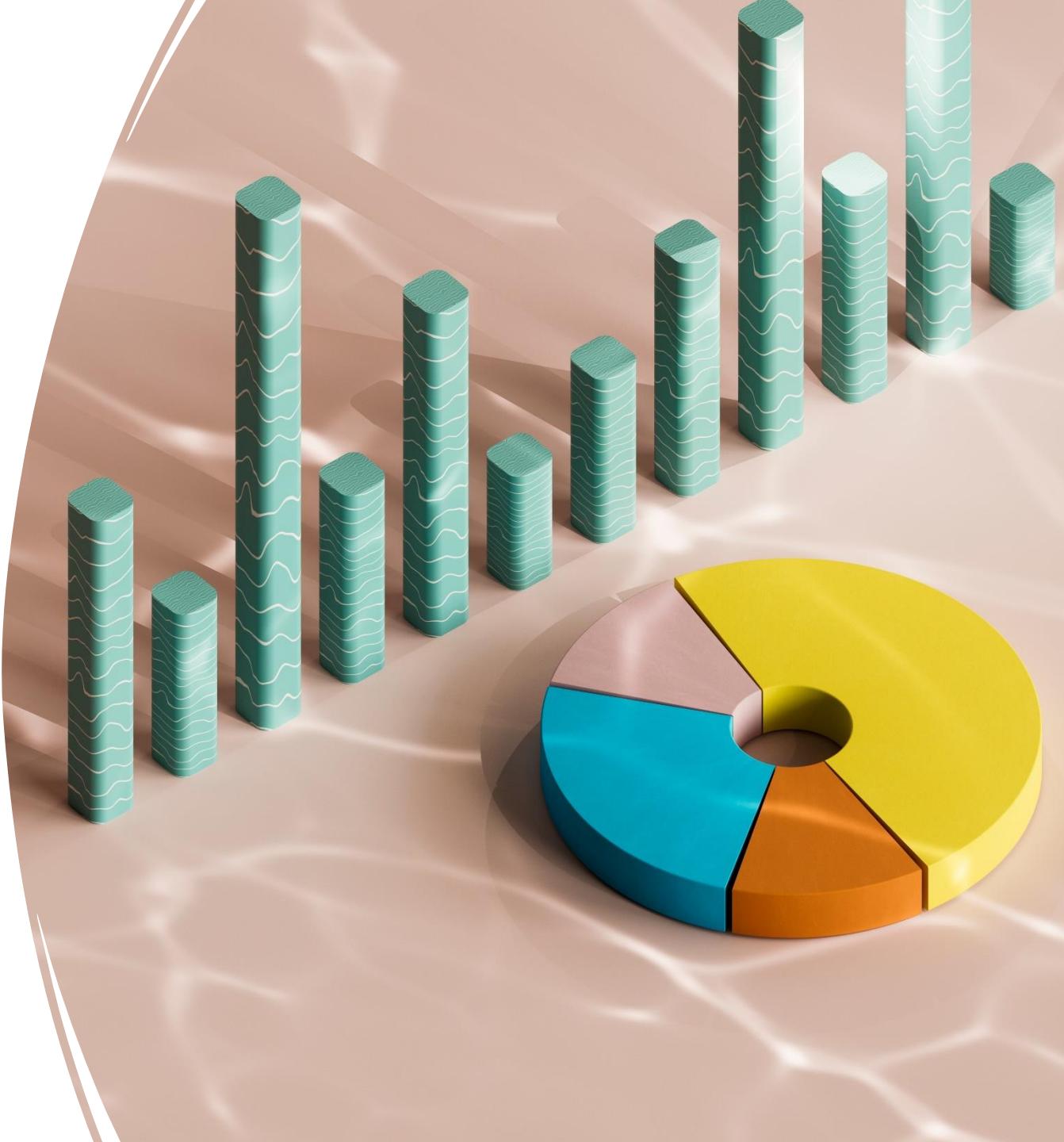
Findings



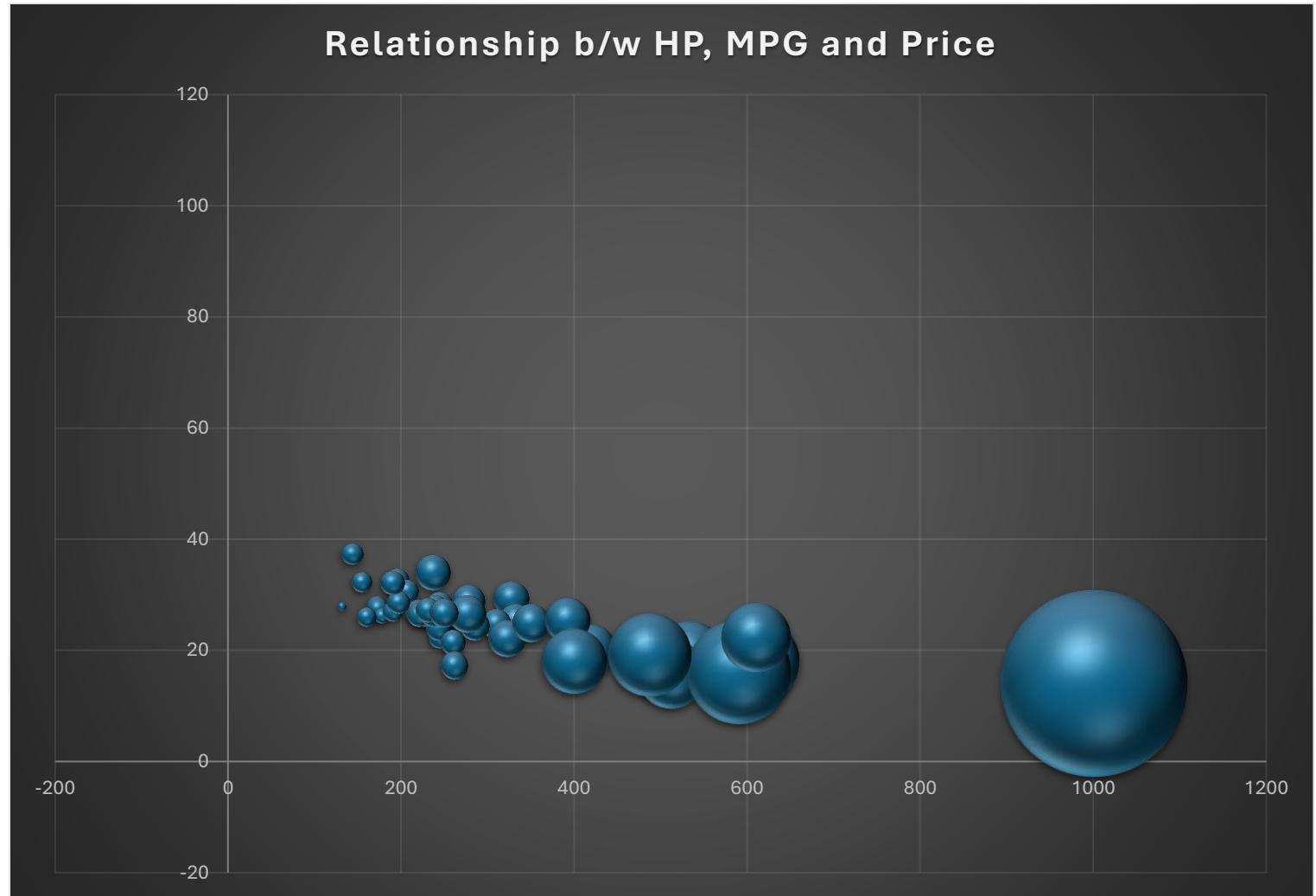
Building the dashboard

Task 5: How does the car's horsepower, MPG, and price vary across different Brands?

Hints: Bubble chart to visualize the relationship between horsepower, MPG, and price across different car brands. Assign different colors to each brand and label the bubbles with the car model name. Calculate the average horsepower, MPG, and MSRP for each car brand using AVERAGEIFS or Pivot Tables.



Findings



Thank you!