Impact of Car Features

Project Description

The automotive industry has been rapidly evolving over the past few decades, with a growing focus on fuel efficiency, environmental sustainability, and technological innovation. With increasing competition among manufacturers and a changing consumer landscape, it has become more important than ever to understand the factors that drive consumer demand for cars.

In recent years, there has been a growing trend towards electric and hybrid vehicles and increased interest in alternative fuel sources such as hydrogen and natural gas. At the same time, traditional gasoline-powered cars remain dominant in the market, with varying fuel types and grades available to consumers.

For the given dataset, as a Data Analyst, the client has asked how a car manufacturer can optimize pricing and product development decisions to maximize profitability while meeting consumer demand.

Tech Stack

Excel 2019: Used for data cleaning, analysis, visualization, excel functions and charting tools were utilized for various tasks.

Power BI: Used for creating interactive dashboard creation.

Approach

Data Cleaning:

- Handle missing values.
- Ensure consistency in data formats.

Data Analysis:

Task 1: Analyse the popularity of car models across different market categories.

Task 2: Find the relationship between engine power and price.

Task 3: Identify key car features influencing price through regression analysis.

Task 4: Assess the average car price variation across different manufacturers.

Task 5: Investigate the relationship between fuel efficiency and the number of cylinders.

Interactive Dashboard Creation:

Task 1: Distribution of car prices by brand and body style.

Task 2: Comparison of average MSRPs across different car brands and body styles.

Task 3: Effect of transmission type on MSRP by body style.

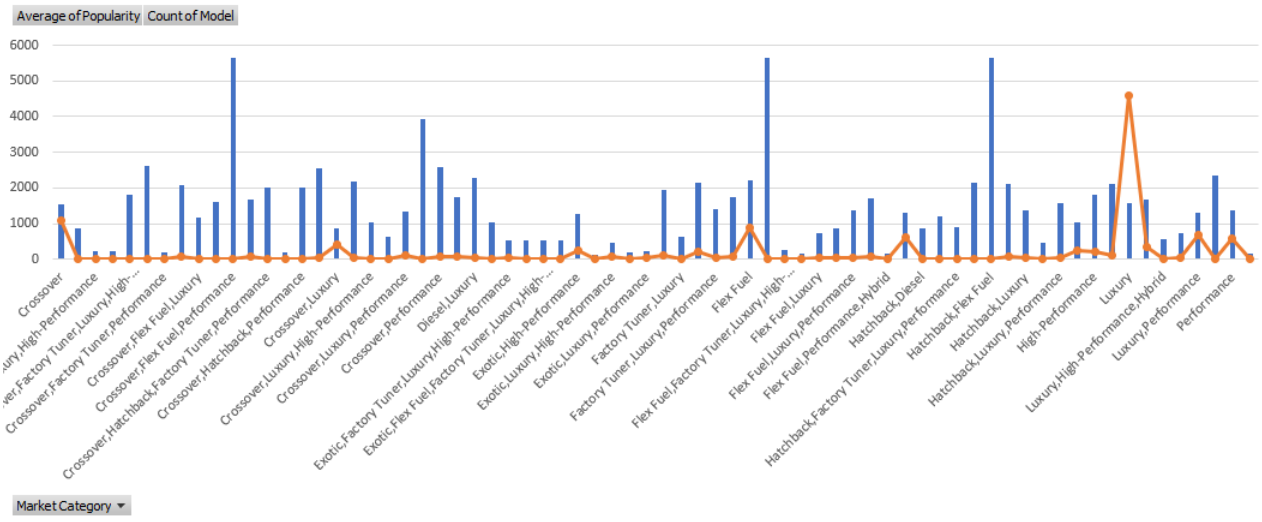
Task 4: Variation in fuel efficiency across different body styles and model years.

Task 5: Relationship between horsepower, MPG, and price across different brands.

Insights

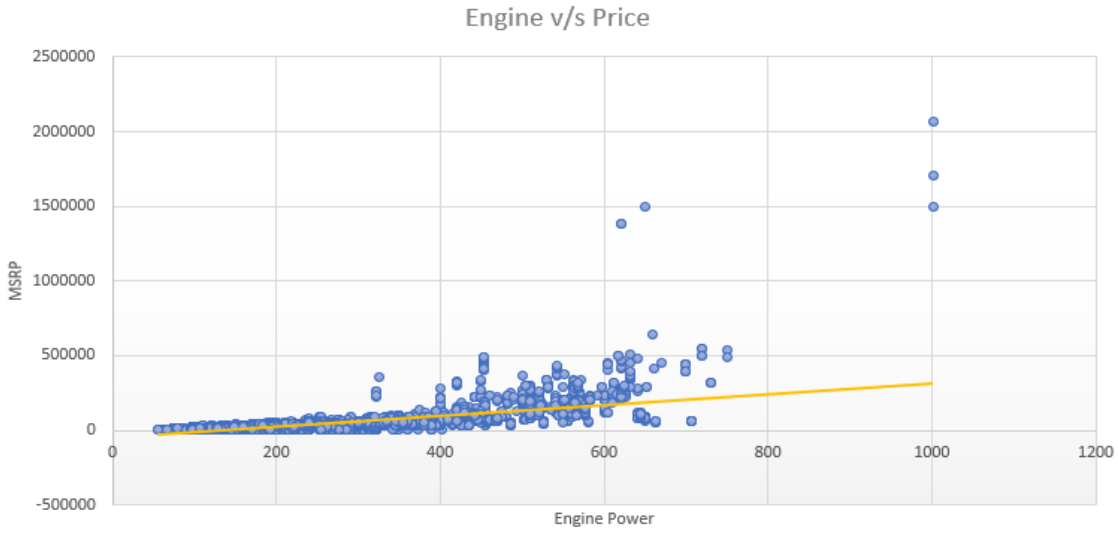
Task 1: Analyse the popularity of car models across different market categories.

- Created a pivot table showing the number of car models in each market category and their popularity scores.
- Visualized the relationship between market category and popularity using a combo chart.
- The popular market category came out to be **Flex Fuel** and the highest count of models were in **Luxury**.



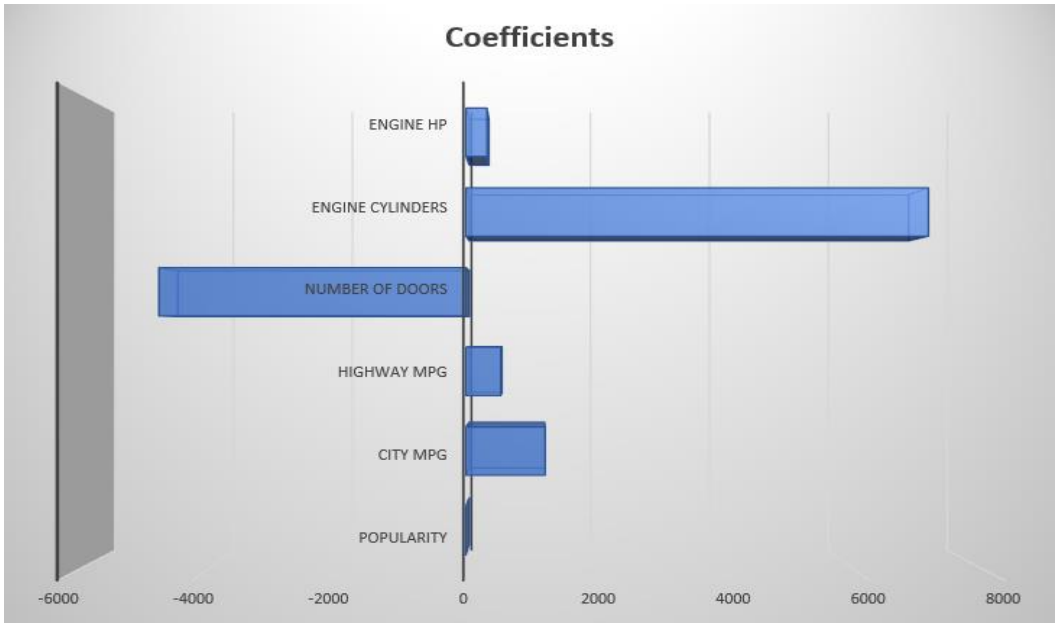
Task 2: Find the relationship between engine power and price.

- Created a scatter chart plotting engine power against price.
- Added a trendline to visualize the relationship, indicating how engine power influences car pricing.
- **Increase** in the Engine power resulted in Increase in the Price of the car. Showing a **positive relationship** between them.



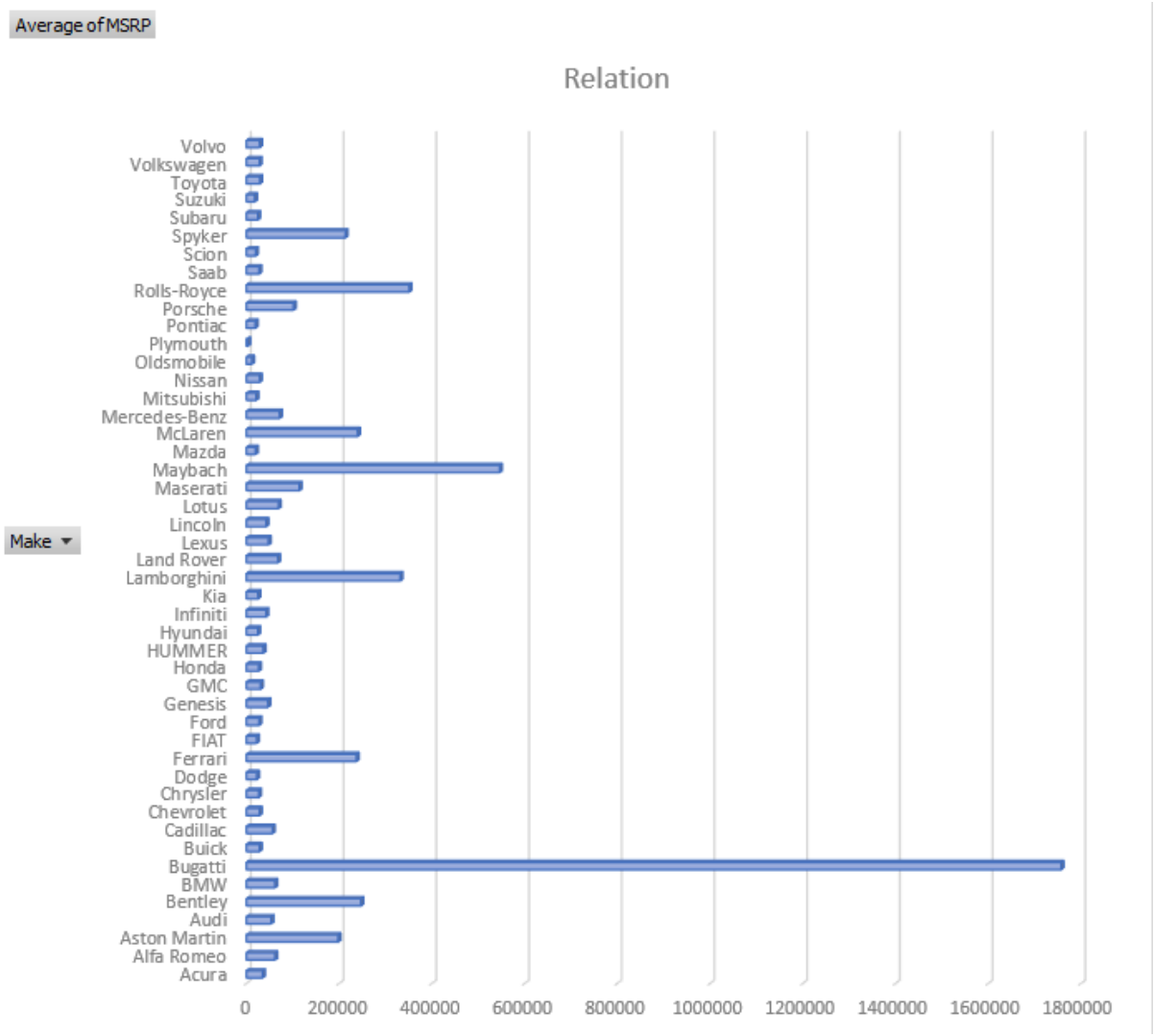
Task 3: Identify key car features influencing price through regression analysis.

- Performed regression analysis to identify the most important features determining car price.
- Created a bar chart to show the coefficient values of each feature, highlighting their relative importance.
- **Engine Cylinders** are the most important feature influencing the price.



Task 4: Assess the average car price variation across different manufacturers.

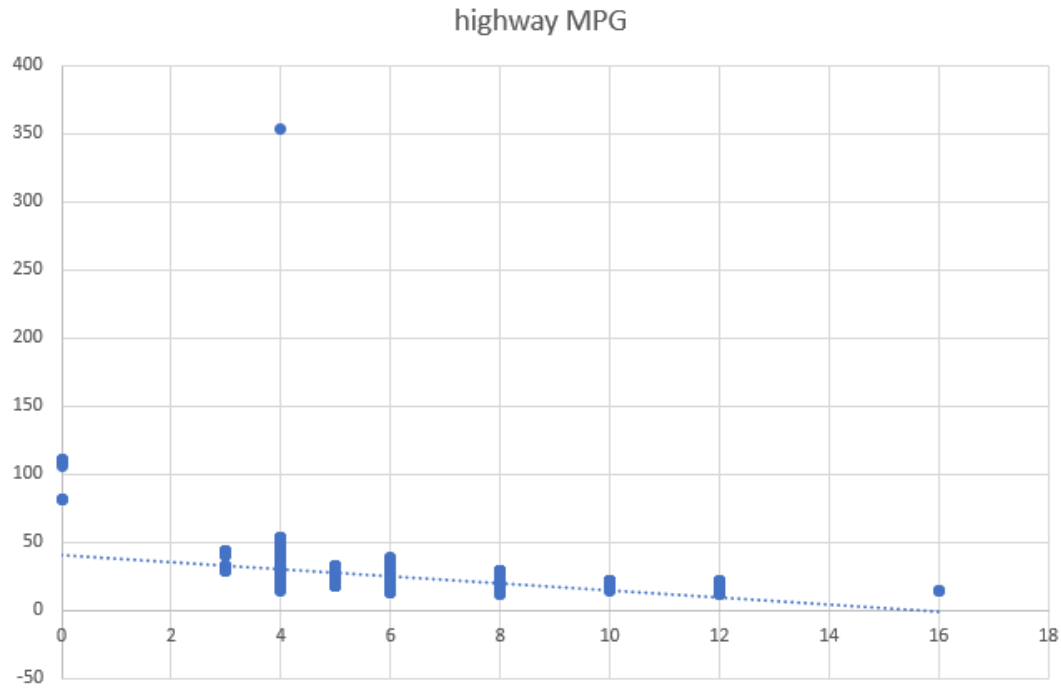
- Created a pivot table showing the average price of cars for each manufacturer.
- Visualized the relationship between manufacturers and average prices using a bar chart.
- **Bugatti** has the highest average price.



Task 5: Investigate the relationship between fuel efficiency and the number of cylinders.

- Created a scatter plot with the number of cylinders on the x-axis and highway MPG on the y-axis.
- Added a trendline to assess the relationship and calculated the correlation coefficient between the number of cylinders and highway MPG.

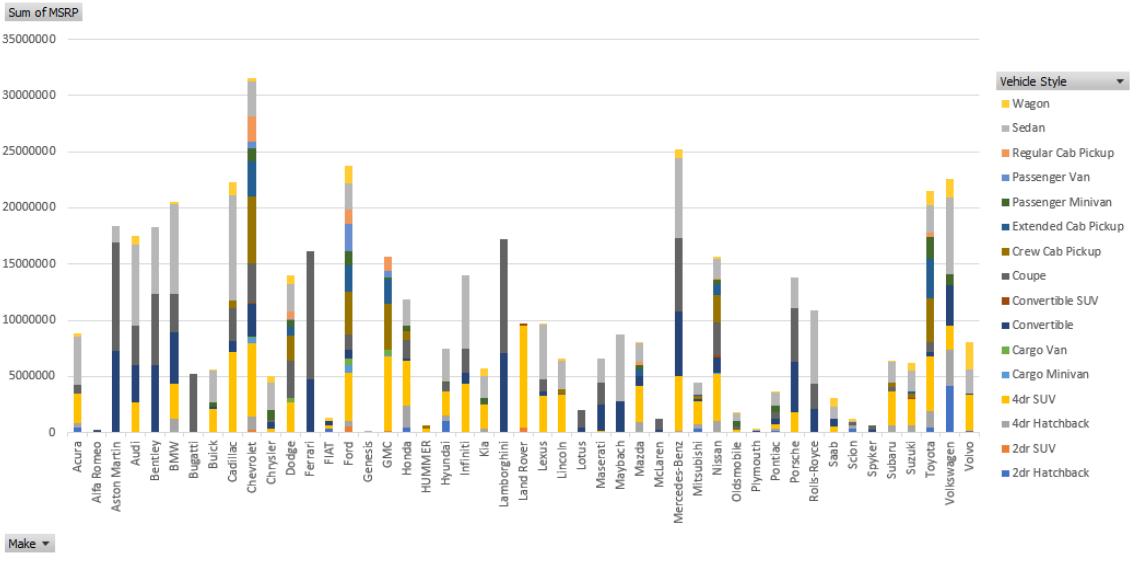
- The relationship between fuel efficiency and the number of cylinders is **negative.** As the no.of cylinder increases the fuel efficiency decreases.
- **The coefficient Corelation -0.620.**



Building the Dashboard

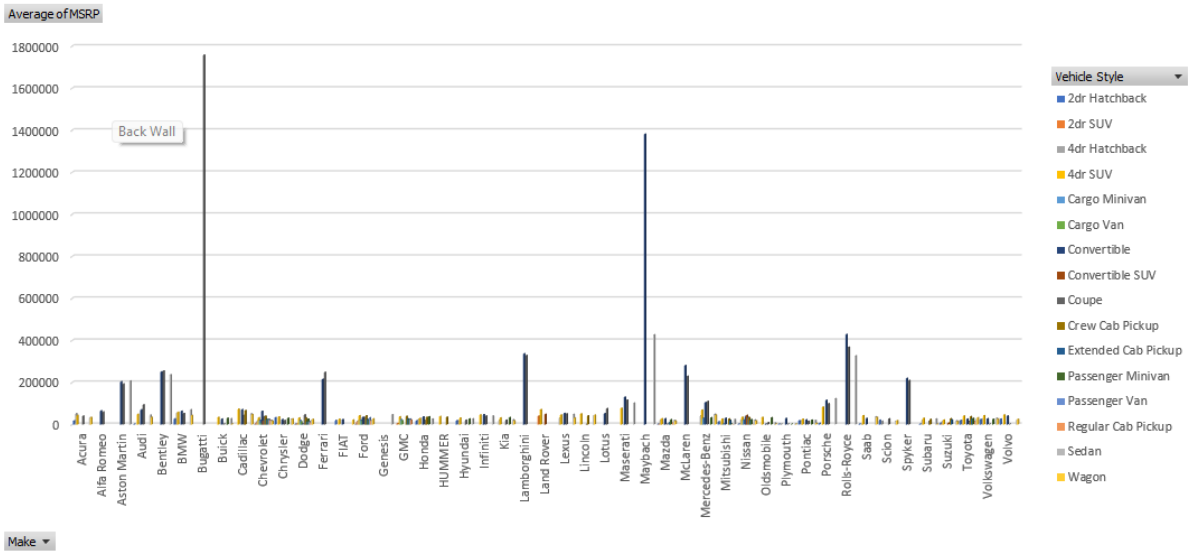
Task 1: Distribution of car prices by brand and body style.

- Created a stacked column chart to show the distribution of car prices by brand and body style.
- Used filters and slicers for interactivity and calculated the total MSRP for each brand and body style.
- **Chevrolet** has the highest price distribution of car prices by brand and body style.



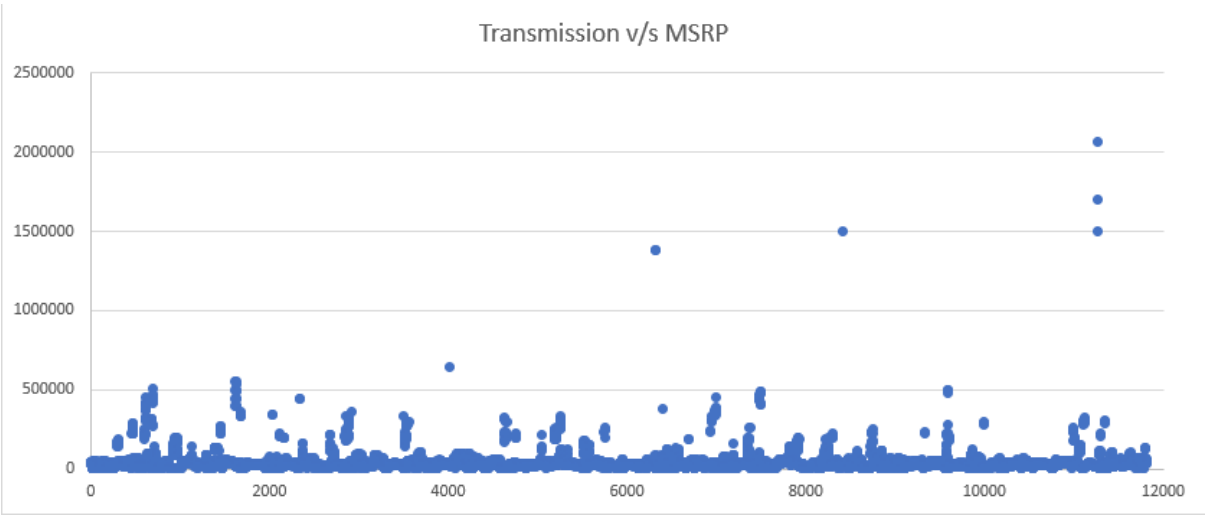
Task 2: Comparison of average MSRPs across different car brands and body styles.

- Created a clustered column chart to compare average MSRPs across different car brands and body styles.
- Used AVERAGEIF or Pivot Tables to calculate the average MSRP for each brand and body style.
- **Bugatti** has the highest average MSRP and the lowest average MSRP is Plymouth Brand.

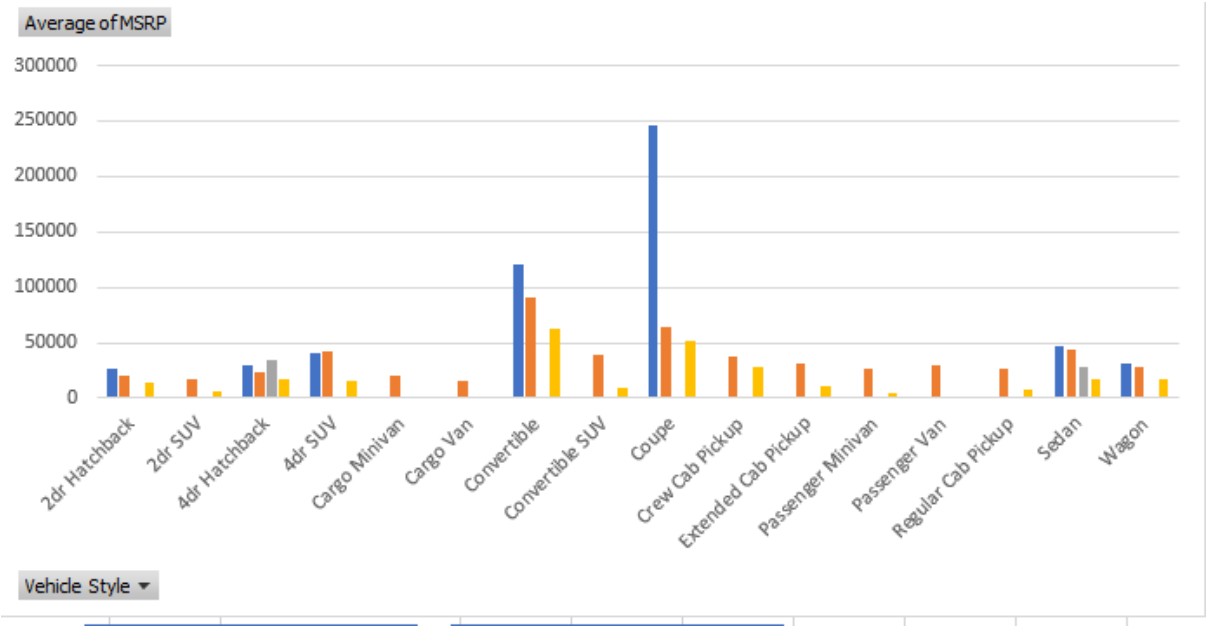


Task 3: Effect of transmission type on MSRP by body style.

- Created a scatter plot to visualize the relationship between MSRP and transmission type.

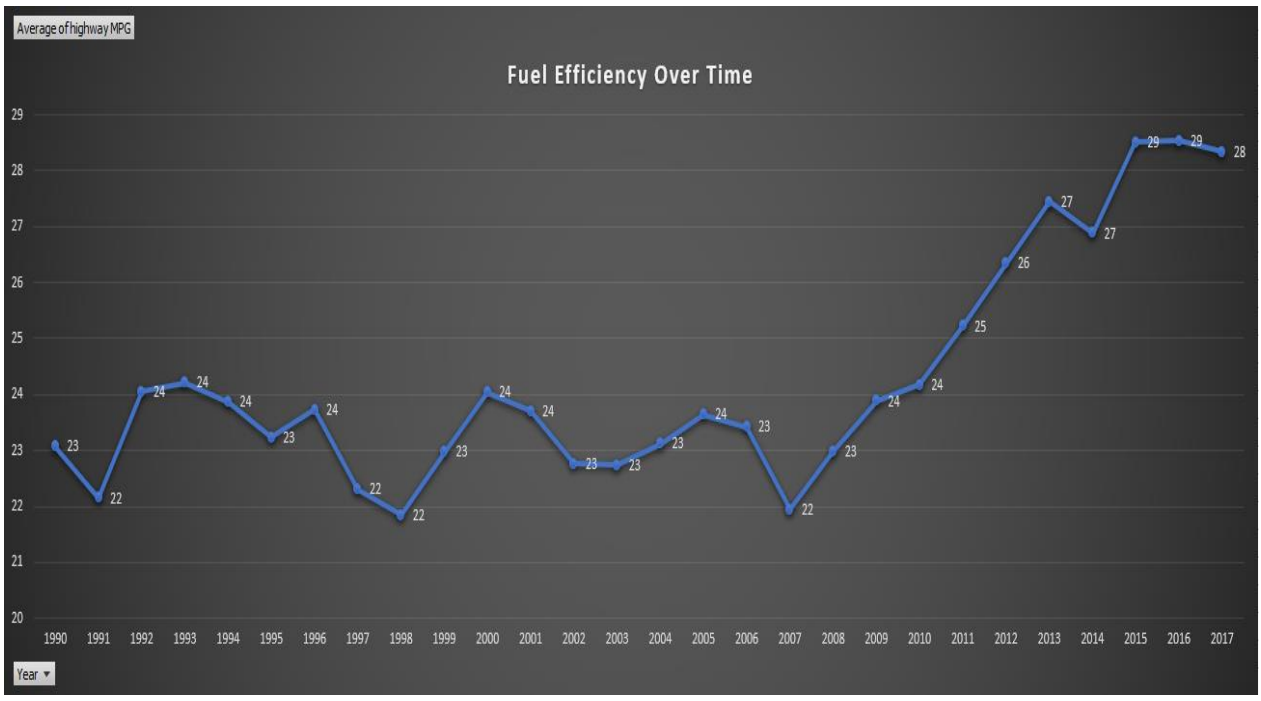


- **Automated_Manual** with **coupe body style** is the most expensive transmission.

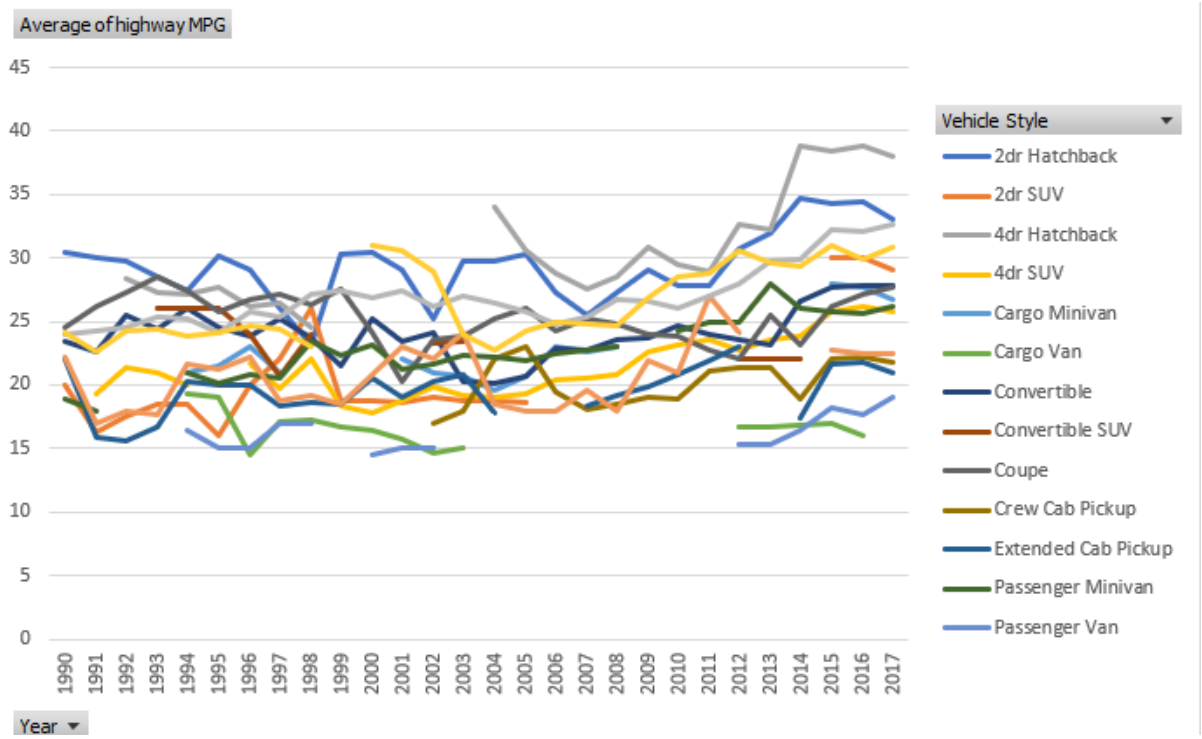


Task 4: Variation in fuel efficiency across different body styles and model years.

- Created a line chart to show the trend of fuel efficiency (MPG) over time.
- Used Pivot Tables to calculate the average MPG for each combination of body style and model year.

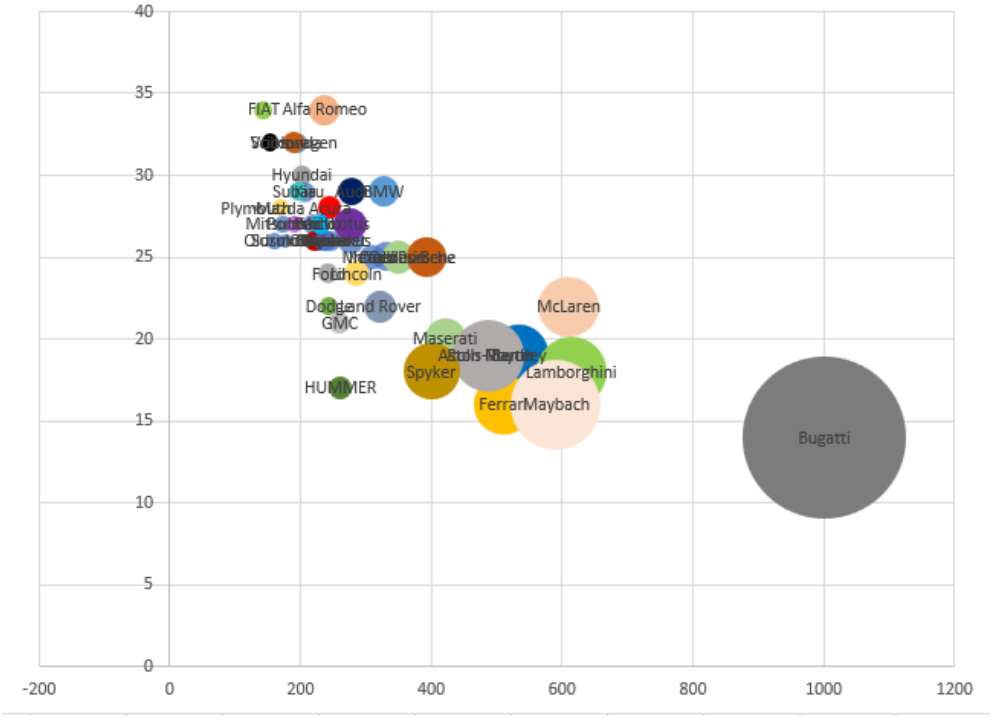


- Fuel efficiency of cars **increased over time**. **4dr Hatchback body style** has highest fuel efficiency in 2017.



Task 5: Relationship between horsepower, MPG, and price across different brands.

- Created a bubble chart to visualize the relationship between horsepower, MPG, and price across different car brands.
- Assigned different colours to each brand and labelled the bubbles with the car model name.



- As the Engine HP goes high, Highway MPG goes down and also the price is increased, Bugatti has highest price and Highway MPG is also low and Engine HP is High.

Dashboard

Results

This project provided actionable insights into optimizing pricing and product development decisions in the automotive industry. By understanding consumer demand and identifying key features influencing pricing, the car manufacturer can enhance its market competitiveness and profitability. This comprehensive analysis has yielded valuable insights into various aspects of the automotive market, enabling more informed decision-making for optimizing pricing and product development.

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