PROJECT 7:

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.

As a Data Analyst , I need to Analyze trends in car features and pricing over time: By examining the variables in the dataset, a data analyst could identify how car features and prices have changed over time, which could help manufacturers make informed decisions about product development and various aspects of the automotive industry which could provide insights that could inform decisions related to product development, marketing, and pricing. The dataset contains information on over 11,000 car models and their specifications, including details on the car's make, model, year, fuel type, engine power, transmission, wheels, number of doors, market category, size, style, estimated miles per gallon, popularity, and manufacturer's suggested retail price (MSRP).

We were given **11915** rows of Data in a data set , I filtered some of the rows which contains no data in it .After filtering the Data we have **11813** rows.
There are few Analysis which I need to work and answer the following is :

Analyzing trends in car features and pricing over time.
Comparing the fuel efficiency of different types of cars.
Investigating the relationship between a car's features and its popularity.
Predicting the price of a car based on its features and market category.

Approach:

Firstly I read the complete document consists of the questions asked to solve. Then downloaded the dataset. I cleaned the data and also filtered the data which contain null data , I deleted the rows which contain the null values. There was given **11915** rows of Data in a data set , I filtered some of the rows which contains no data in it .After filtering the Data we have **11813** rows. The dataset contains information on over 11,000 car models and their specifications, including details on the car's make, model, year, fuel type, engine power, transmission, wheels, number of doors, market category, size, style, estimated miles per gallon, popularity, and manufacturer's suggested retail price (MSRP).
Then I created pivot table and Analyzed and answered all the below questions. I worked on data analysis techniques such as regression analysis and market segmentation. I Created Interactive Dashboard according to the analysis made on Car features and the car details.

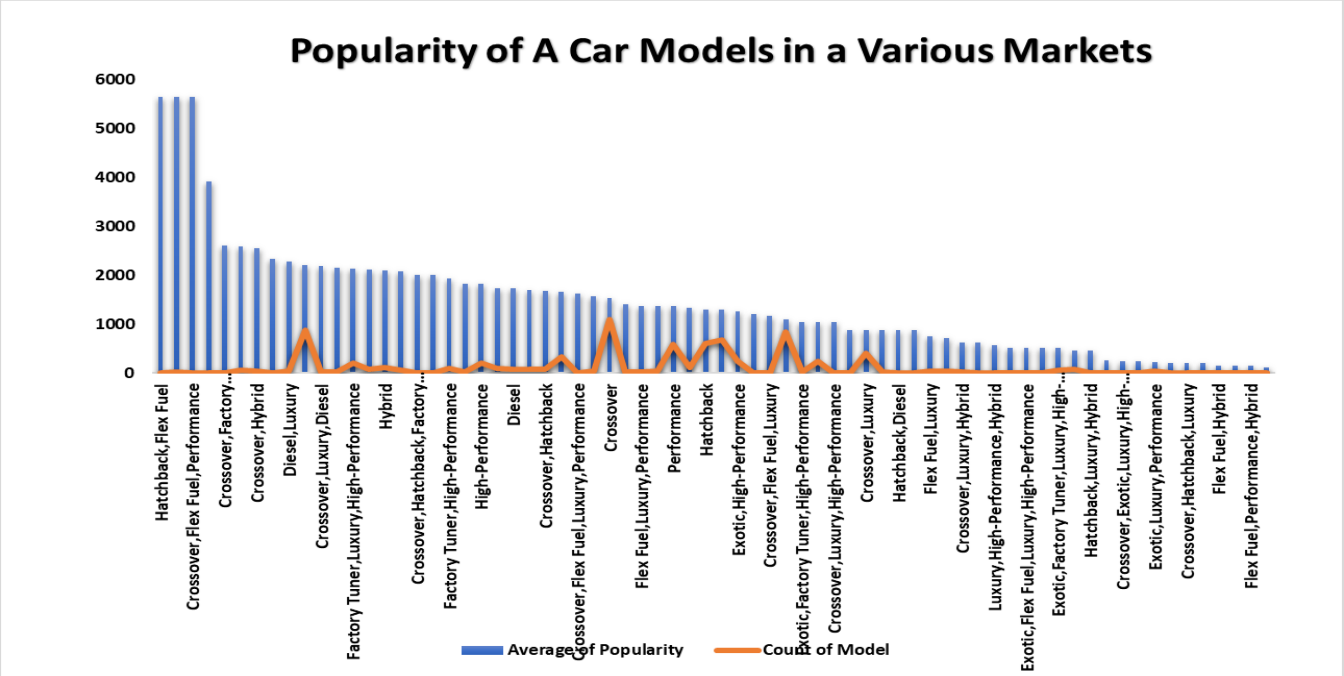
Tech-Stack Used:

While working on this project I used **Microsoft Excel 365.** It help me to Analyze and clean the data easily .The pivot table and chart helped me in bringing up the insightful or meaningful data or summarization from the charts. Excel has good features which helped me to put the slicers in dashboards and made the dashboard interactive.
There are many other features which made me work on Excel for the Data Analysis on Cars.

Insight:

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

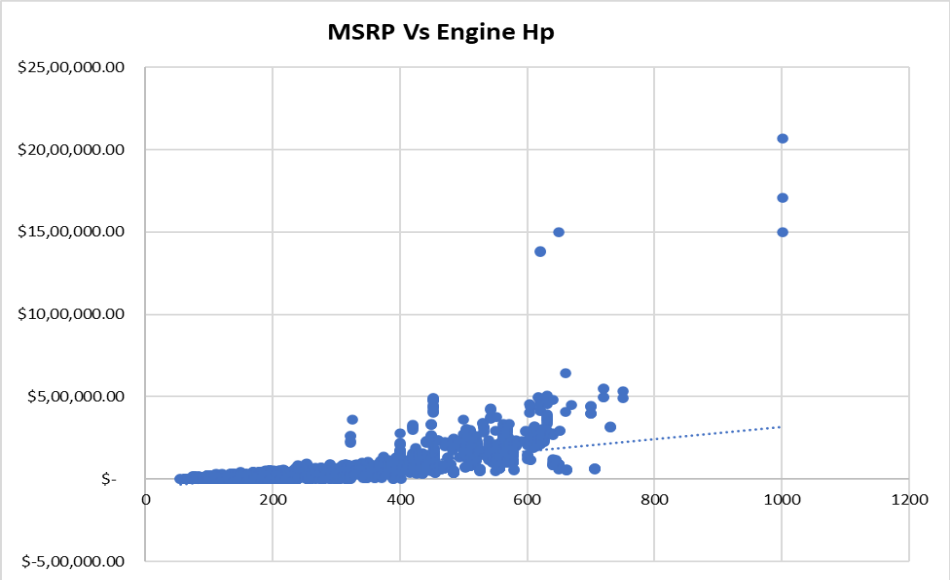
- **Task 1.A:** Create a pivot table that shows the number of car models in each market category and their corresponding popularity scores.
- **Task 1.B:** Create a combo chart that visualizes the relationship between market category and popularity.



- ❖ In market Category we have **Crossover** with huge number of models of cars.
- ❖ The **Hatchback Flex ,Fuel, Crossover** have same popularity. It is very popular among the people .We have almost the same 5657Average popularity of car model in these market categories.
- ❖ Flex,fuel,hybrid is the lowest popular among the people.

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

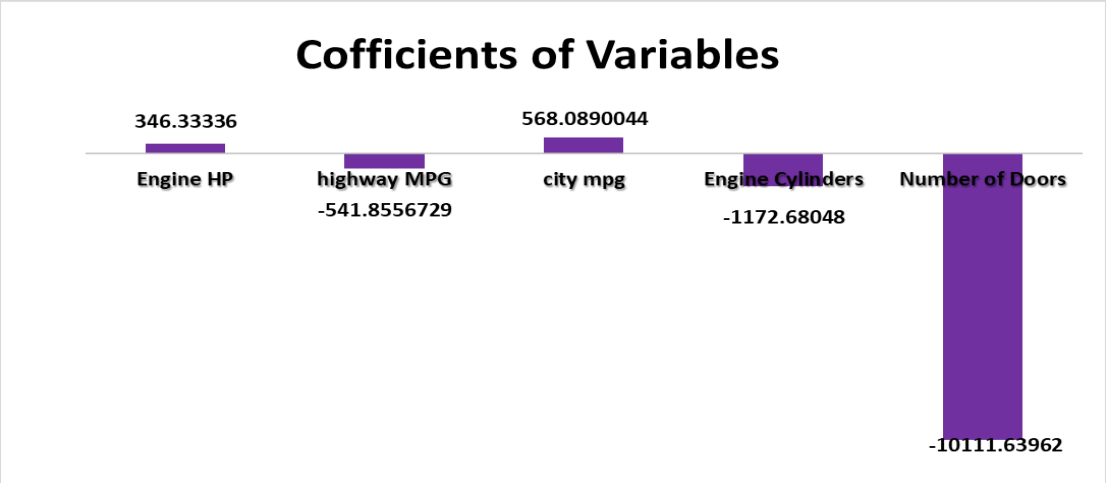
- **Task 2:** Create a scatter chart that plots engine power on the x-axis and price on the y-axis. Add a trendline to the chart to visualize the relationship between these variables.



- ✓ There are few outliers in the on the prices while visualizing the relationship between a car's engine power and its price.
- ✓ Here we can see that the Engine hp is directly proportional to MSRP.
- ✓ As the Engine hp increases the price also increases.
- ✓ According to trendline we can visualize that an increase in price with increase in Engine hp too.

3.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.



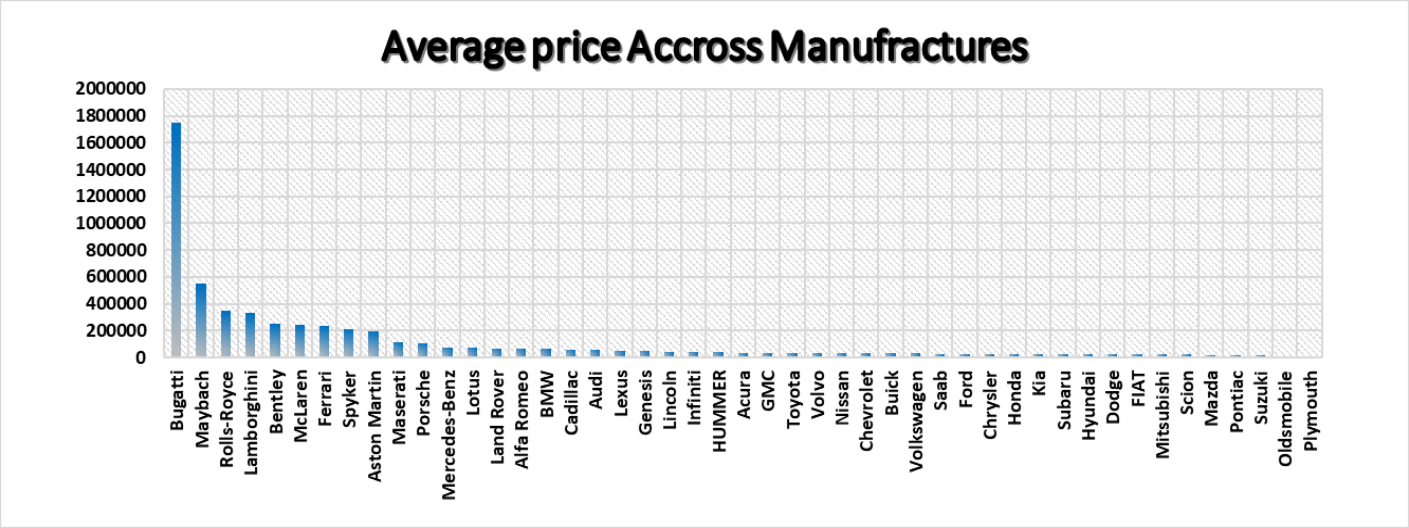
Cofficient:	0.620312551

- The most important features for determining the car price is City MPG. It has coefficient value higher than the others .
- The lowest features which are neglected by the users before buying car is determining the number of doors in the car.
- 2nd highest for determining the price would be Engine Horsepower (HP).

- The most user Needs good City mpg and Engine HP before buying the car.

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

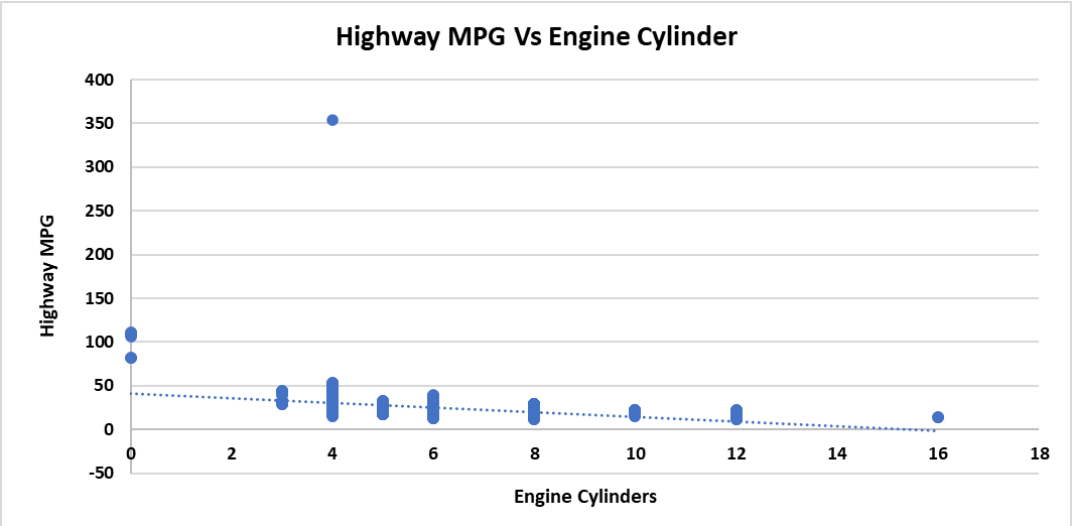
- **Task 4.A:** Create a pivot table that shows the average price of cars for each manufacturer.
- **Task 4.B:** Create a bar chart or a horizontal stacked bar chart that visualizes the relationship between manufacturer and average price.



- The Bugatti Wins the Race which can be seen that there are higher chances of varying the prices across the manufacturers.
- Then comes the Maybach and Rolls-Royace.
- The Suzuki which has good mpg and lesser rate of varying prices among the manufacturers.

5.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.

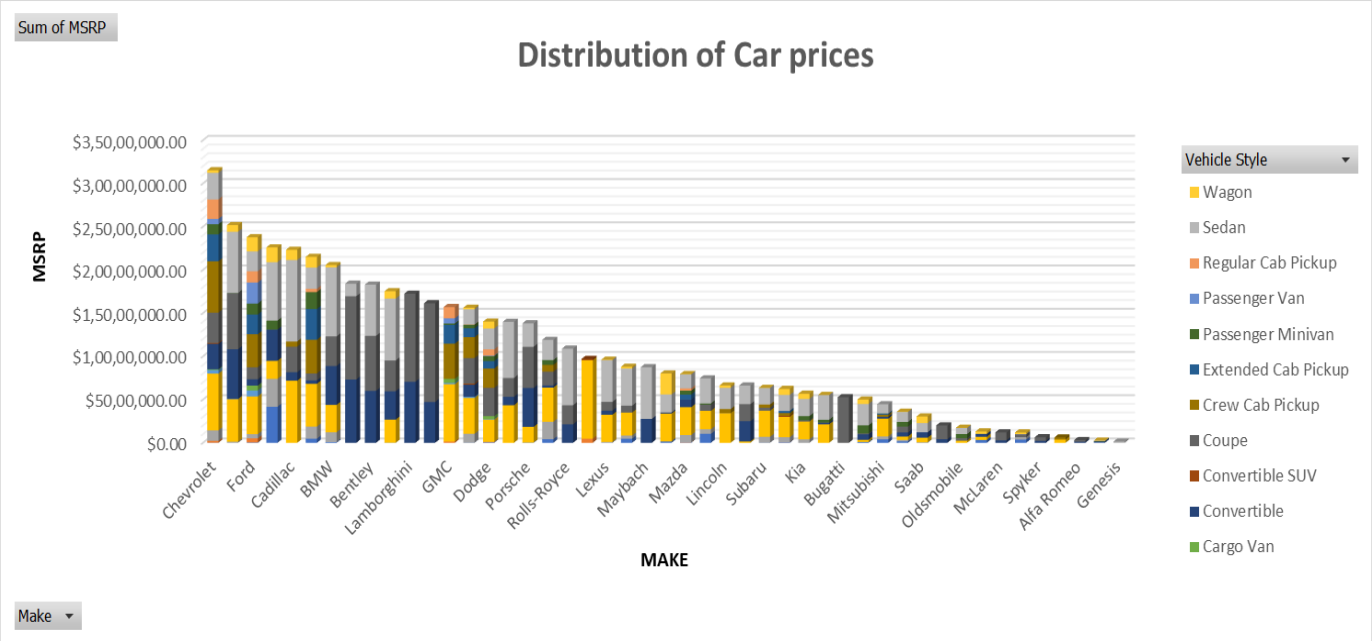


- ✓ The Highway mpg is inversely proportional to the Engine Cylinder.
- ✓ With decrease of Engine cylinder we can see that the chances of of increase in MPG.
- ✓ We can conclude that if Number of cylinders are decreased in the cars , then the rate of MPG of the car will be increased.

DASHBOARD:

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

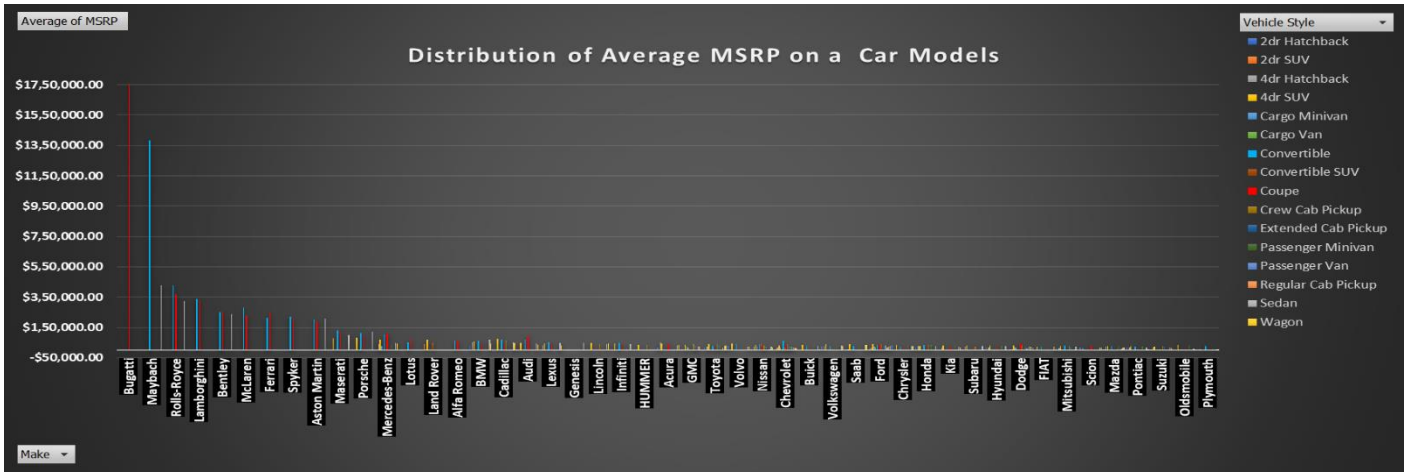
- **Hints:** Stacked column chart to show the distribution of car prices by brand and body style. Use filters and slicers to make the chart interactive. Calculate the total MSRP for each brand and body style using SUMIF or Pivot Tables.



- ❖ Chevrolet model has highest different no.of Vehicle style.
- ❖ Chevrolet has Sum of MSRP is highest among other car models.
- ❖ Gensis has the lowest model ever.
- ❖ Ford is the second highest MSPS among the others.

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

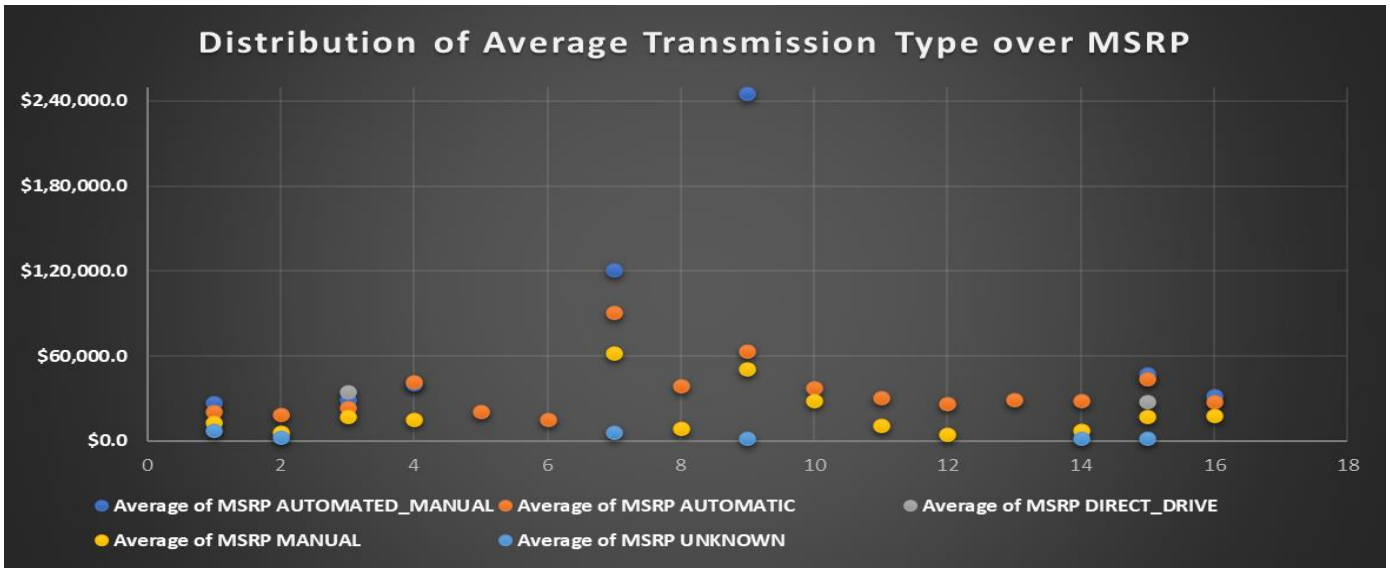
- **Hints:** Clustered column chart to compare the average MSRPs across different car brands and body styles. Calculate the average MSRP for each brand and body style using AVERAGEIF or Pivot Tables.



- The Bugatti of Car model Coupe has the highest Average MSRP .
- The Plymouth car model has the lowest Average MSRP ever.
- Maybach has the 2nd highest Average MSRP.

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

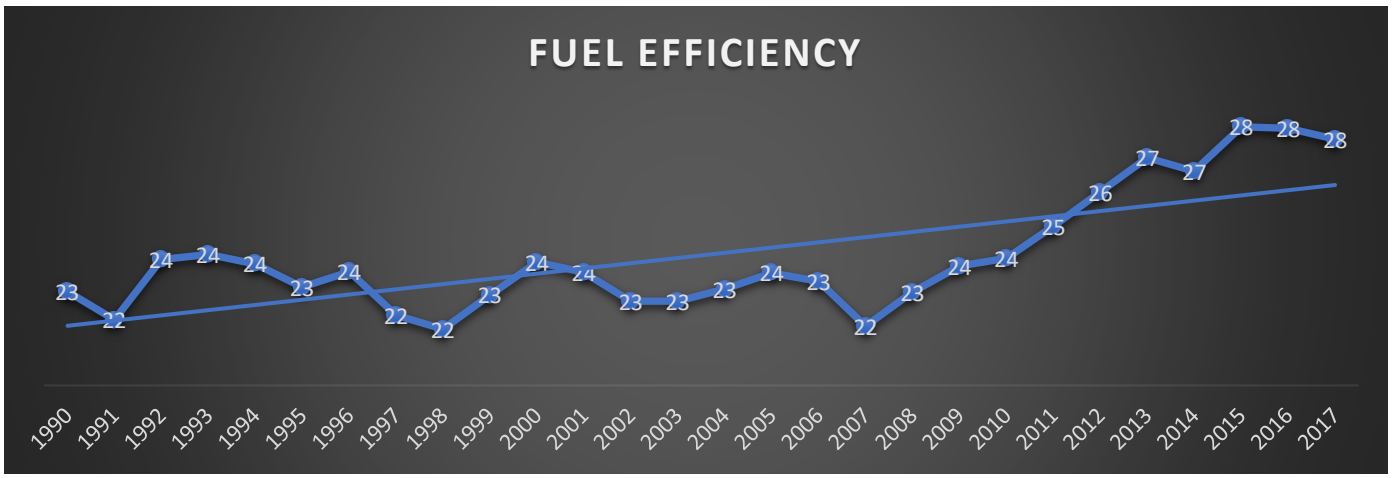
- **Hints:** Scatter plot chart to visualize the relationship between MSRP and transmission type, with different symbols for each body style. Calculate the average MSRP for each combination of transmission type and body style using AVERAGEIFS or Pivot Tables.



- This is the distribution for Average transmissions types over a MSRP.
- We can see increase in transmission type over the MSRP.

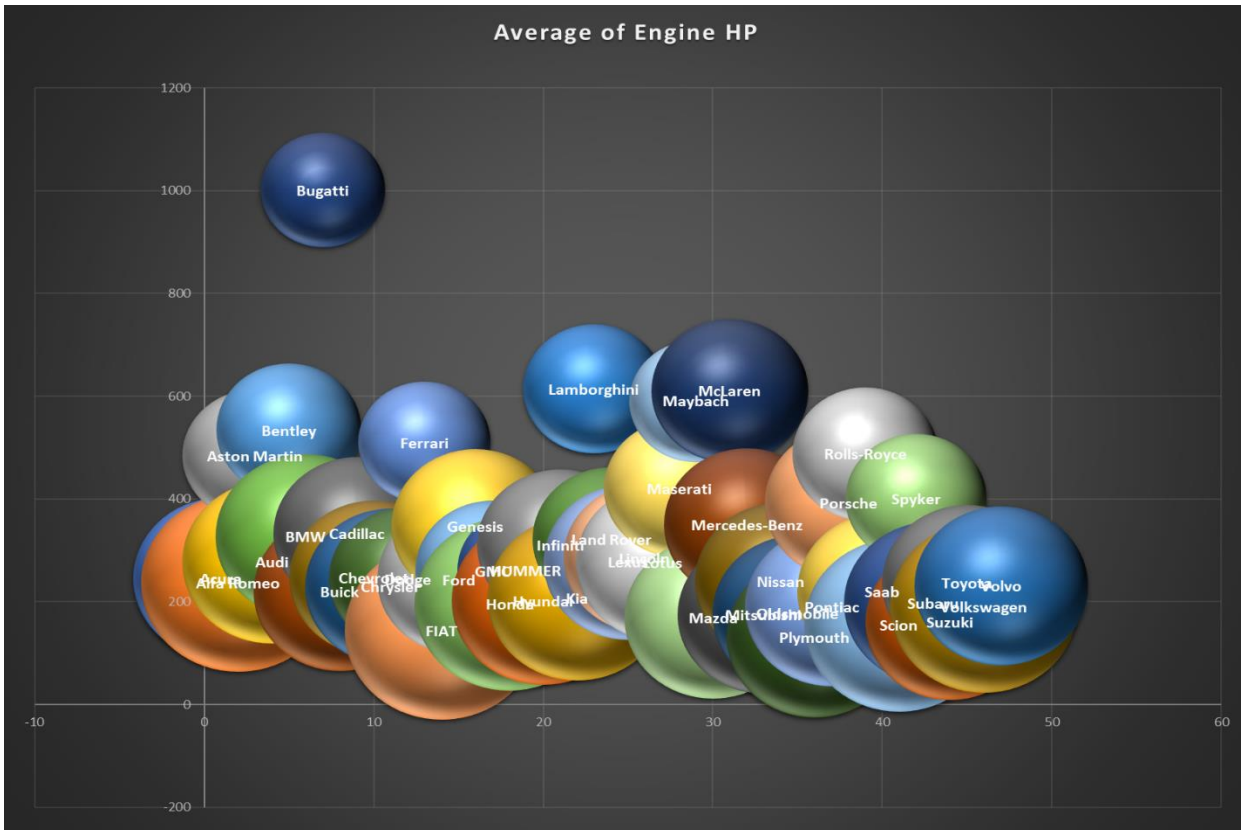
Task 4: How does the fuel efficiency of cars vary across different body styles and model years?

- **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.



- We can see that the result of fuel efficiency is much better and giving a good performance.
- Over the years, we can say the there is an increase in the fuel efficiency in the cars.
- After 2017 also we can predict to have same increment in the fuel efficiency as shown in the trendline.

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.



- The Bugatti car model has higher Average car's HorsePower.
- The rest cars has almost the same Average HP as the others.

Result:

We can conclude few points based on our Analysis:

1. Chevrolet model has highest different number of Vehicle style and its Sum of MSRP is almost the highest among all other cars.

2. The Bugatti of Car model Coupe has the highest Average MSRP.

3. We can see that the result of fuel efficiency is increasingly and giving a good performance. After 2017 also we can predict to have same increment in the fuel efficiency as shown in the trendline.

4. The Bugatti car model has higher Average car's Horsepower.

5. We can conclude that if Number of cylinders are decreased in the cars, then the rate of MPG of the car will be increased.

6. The Engine hp is directly proportional to MSRP

7. The Bugatti Wins the Race which can be seen that there are higher chances of varying the prices across the manufacturers.

8. The most important features for determining the car price is City MPG. It has coefficient value higher than the others.

Video presentation link: https://www.loom.com/share/3725b2d406864a6b89a30246d2da68b8?sid=16138036-721a-4180-ae89-e50b73b263f8

Excel File Link: https://docs.google.com/spreadsheets/d/1UpVGLlA5-LP8kHhPNvkpSEzHHvQgbZlH/edit?usp=drive_link&ouid=113818516476537685883&rtpof=true&sd=true
[Download .xlsx file]**

THANK YOU!!