

**Name:- Yash Rajendra Gaikwad**  
**Data Analytics Trainee**

**Project-7. Analyzing the Impact of Car Features on Price and Profitability.**  
**Software Used:- Microsoft Excel.**

**❖ Analysis done on following Points:-**

- **Task 1:-**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.
- **Task 2:-** What is the relationship between a car's engine power and its price?
  - Task:- 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.
- **Task 3:-**Which car features are most important in determining a car's price?
  - Task :- 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.

- **Task 4:-** 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.
  
- **Task 5:-** 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.
  
- ❖ **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.
  
  - **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.

- **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.

- **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.

- **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.

➤ **Task 1:-**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.

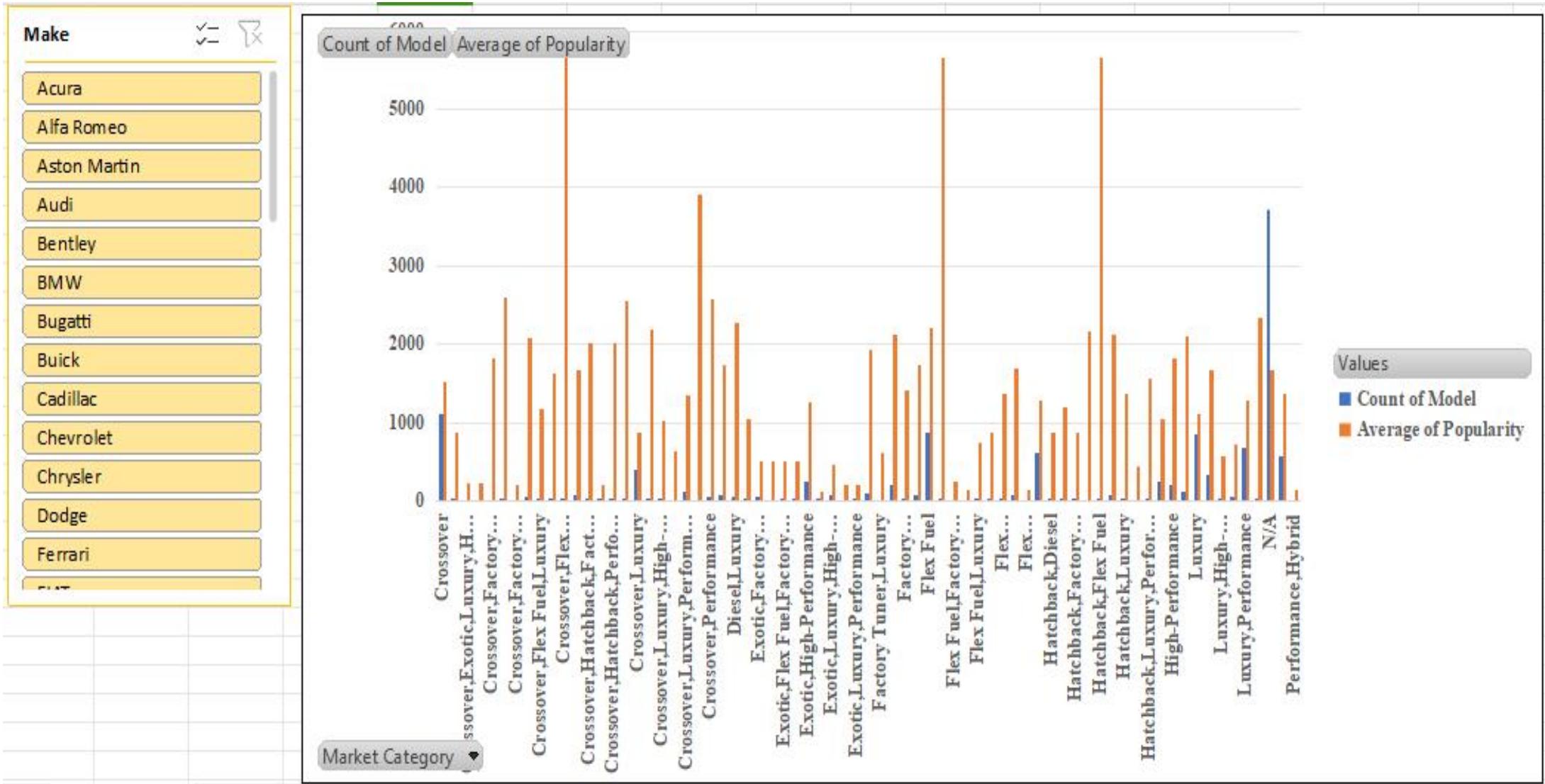
- **Process:-**

- First we use the Pivot table function putting Market Category in Rows and Model & Popularity in values. also take Count of Model and Average Popularity by using Value field setting.
- We also take a slicer for Make i.e Car Company.
- We use the column chart of visuliation.
- **Result:-** Crossover,Flex Fuel,Performance; Flex Fuel,Diesel; & Hatchback,Flex Fuel are the most populer market Categorys of cars.

❖ **MICROSOFT EXCEL FILE:-**

[https://docs.google.com/spreadsheets/d/1AXEN7ZavvI2flP0aMnhRSenWHz6BH7jO/edit?usp=drive\\_link&ouid=103974361659264463652&rtpof=true&sd=true](https://docs.google.com/spreadsheets/d/1AXEN7ZavvI2flP0aMnhRSenWHz6BH7jO/edit?usp=drive_link&ouid=103974361659264463652&rtpof=true&sd=true)

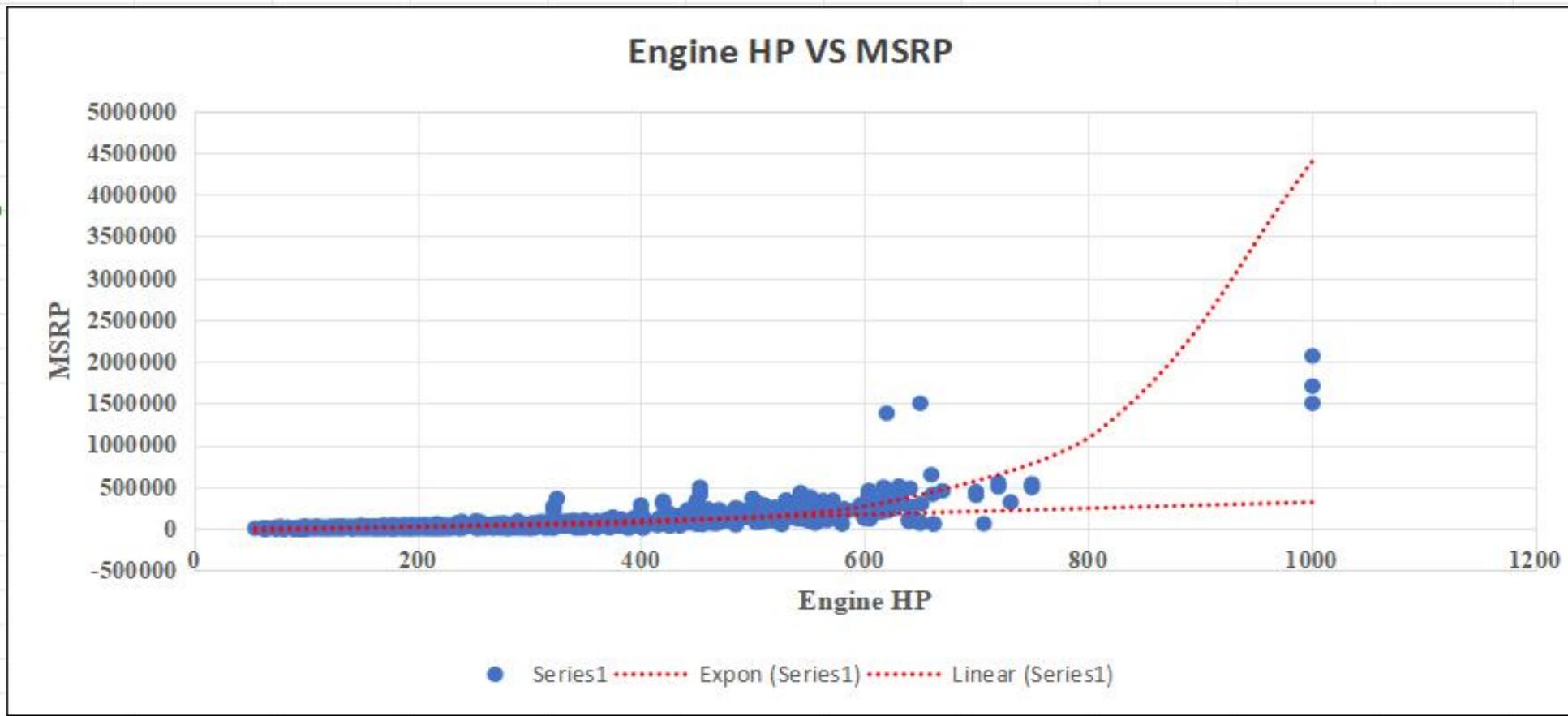
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➤ **Task 2:-** What is the relationship between a car's engine power and its price?

**Task:-** 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.

- **Result:-** The Price of car increase with increase in Car Engine Power.



➤ **Task 3:-** Which car features are most important in determining a car's price?

**Task :-** 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.

- **Process:-**

- First we use the CORREL function for finding corelations.
- Then, we go to data bar select data analysis and select the Regreassion function.
- After that, we get the coefficient values and finally we use Stacked Column chart.

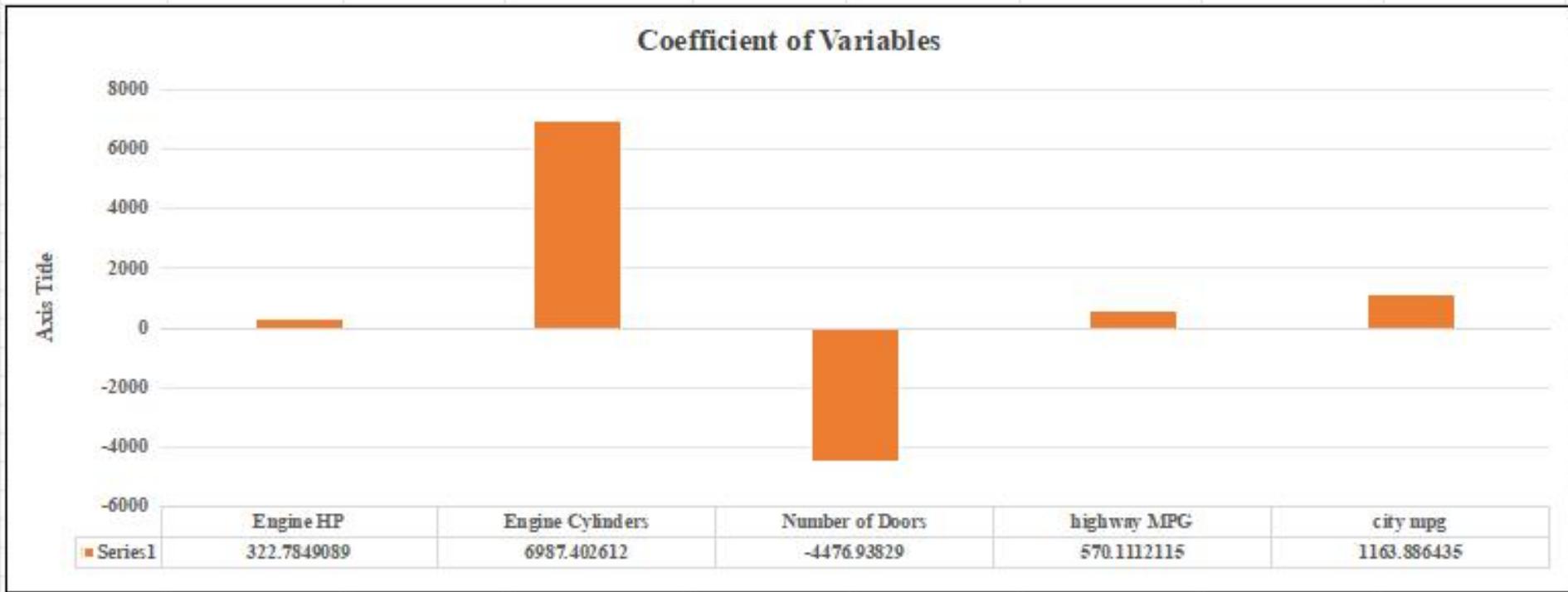
Variables	Engine HP	Engine Cylinders	Number of Doors	highway MPG	city mpg	MSRP
Engine HP	1					
Engine Cylinders	0.780	1.000				
Number of Doors	-0.102	-0.138	1			
highway MPG	-0.414	-0.138	0.121	1		
city mpg	-0.466	-0.620	0.137	0.847	1	
MSRP	0.662	0.544	-0.127	-0.199	-0.225	1

Variables	Corellation	SUMMARY OUTPUT	
Engine HP	0.662	Regression Statistics	
Engine Cylinders	0.544	Multiple R	0.680723581
Number of Doors	-0.127	R Square	0.463384593
highway MPG	-0.199	Adjusted R Square	0.46315731
city mpg	-0.225	Standard Error	44171.76782
		Observations	11811

ANOVA					
	df	SS	MS	F	Significance F
Regression	5	1.989E+13	3.97799E+12	2038.799132	0
Residual	11805	2.30333E+13	1951145073		
Total	11810	4.29232E+13			

- Result:-** The car Engine Cylinders and HP is the most important car feature to determine the car price.

	Coefficients	Standard Error	t Stat	P-value	Lower 95%	Upper 95%	Lower 95.0%	Upper 95.0%
Intercept	-101583.0015	3684.535353	-27.57009818	3.2724E-162	-108805.2985	-94360.70436	-108805.2985	-94360.70436
Engine HP	322.7849089	6.018068067	53.63596843	0	310.9885027	334.581315	310.9885027	334.581315
Engine Cylinders	6987.402612	439.6624488	15.89265272	2.72809E-56	6125.591686	7849.213538	6125.591686	7849.213538
Number of Doors	-4476.938289	465.7805688	-9.611689685	8.57588E-22	-5389.945039	-3563.931539	-5389.945039	-3563.931539
highway MPG	570.1112115	105.7863963	5.389267729	7.21058E-08	362.7524244	777.4699987	362.7524244	777.4699987
city mpg	1163.886435	122.0006959	9.53999833	1.7072E-21	924.7449463	1403.027925	924.7449463	1403.027925



➤ **Task 4:-** 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.

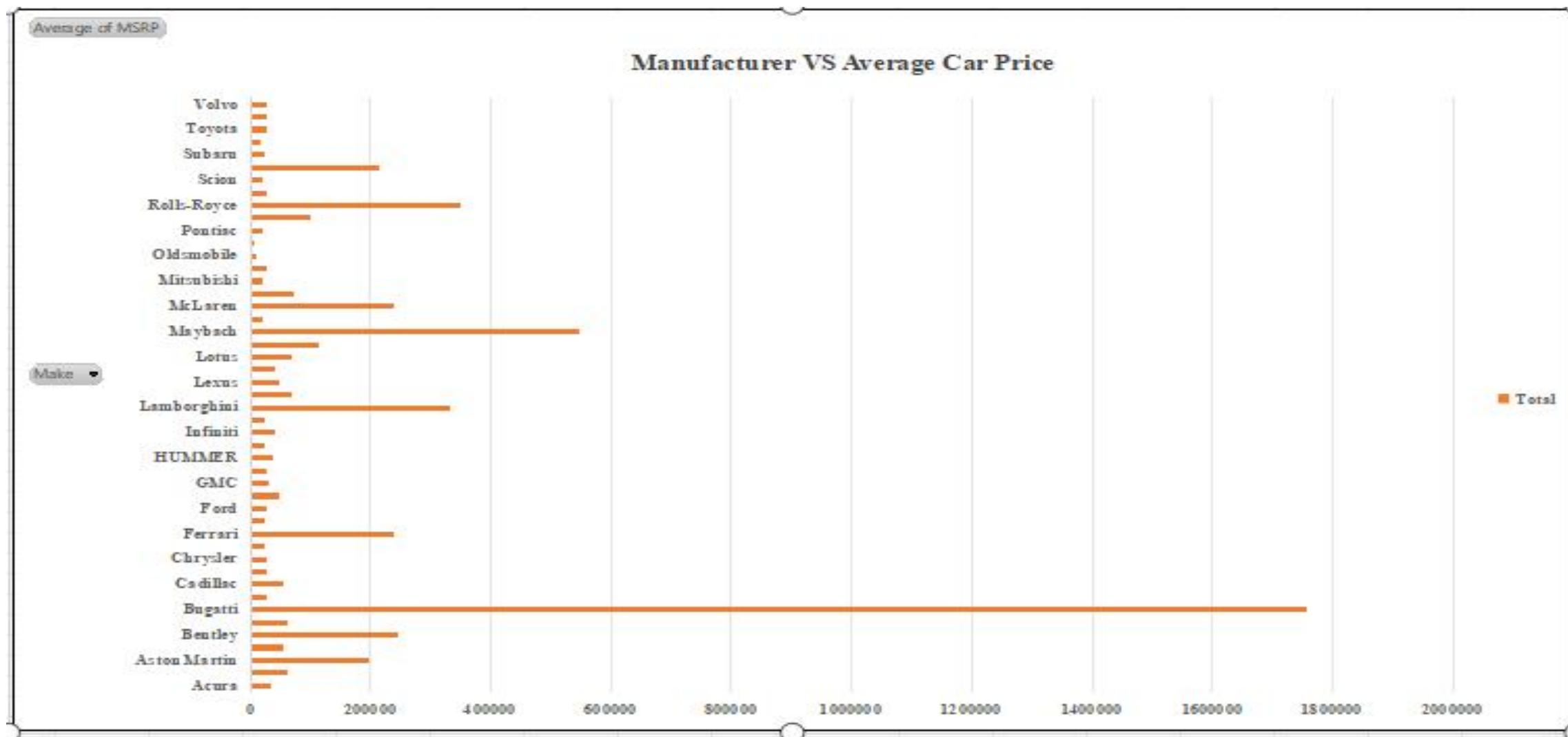
**Task 4.B:-** Create a bar chart or a horizontal stacked bar chart that visualizes the relationship between manufacturer and average price.

- **Process :-**

- First we use the Pivot table by placing Make column in row and MSRP in Values.
- We use Average function for MSRP from the Value field setting.
- Lastly we use the Bar chart for representing the Manufacturer and Average Price.

Make	Average of MSRP
Acura	34887.5873
Alfa Romeo	61600
Aston Martin	197910.3763
Audi	53452.1128
Bentley	247169.3243
BMW	61546.76347
Bugatti	1757223.667
Buick	28206.61224
Cadillac	56231.31738
Chevrolet	28273.35695
Chrysler	26722.96257
Dodge	22390.05911
Ferrari	237383.8235
FIAT	22206.01695
Ford	27393.42051
Genesis	46616.66667
GMC	30493.29903
Honda	26629.81879
HUMMER	36464.41176
Hyundai	24597.0363
Infiniti	42394.21212
Kia	25112.38938
Lamborghini	331567.3077
Land Rover	67823.21678
Lexus	47549.06931
Lincoln	42494.37179
Lotus	69188.27586
Maserati	114207.7069
Maybach	546221.875
Mazda	19719.05707
McLaren	239805
Mercedes-Benz	71537.80966
Mitsubishi	21215.47143
Nissan	28513.36679
Oldsmobile	11542.54
Plymouth	3122.902439
Pontiac	19321.54839
Porsche	101622.3971
Rolls-Royce	351130.6452
Saab	27413.5045
Scion	19932.5
Spyker	213323.3333
Subaru	24827.50391
Suzuki	17900.9569
Toyota	28946.15343
Volkswagen	28076.2
Volvo	28541.16014
<b>Grand Total</b>	<b>40559.93532</b>

- Result:- The Audi car manufacturers have the high Average Car Price.



**Task 5:-** What is the relationship between fuel efficiency and the number of cylinders in a car's engine?

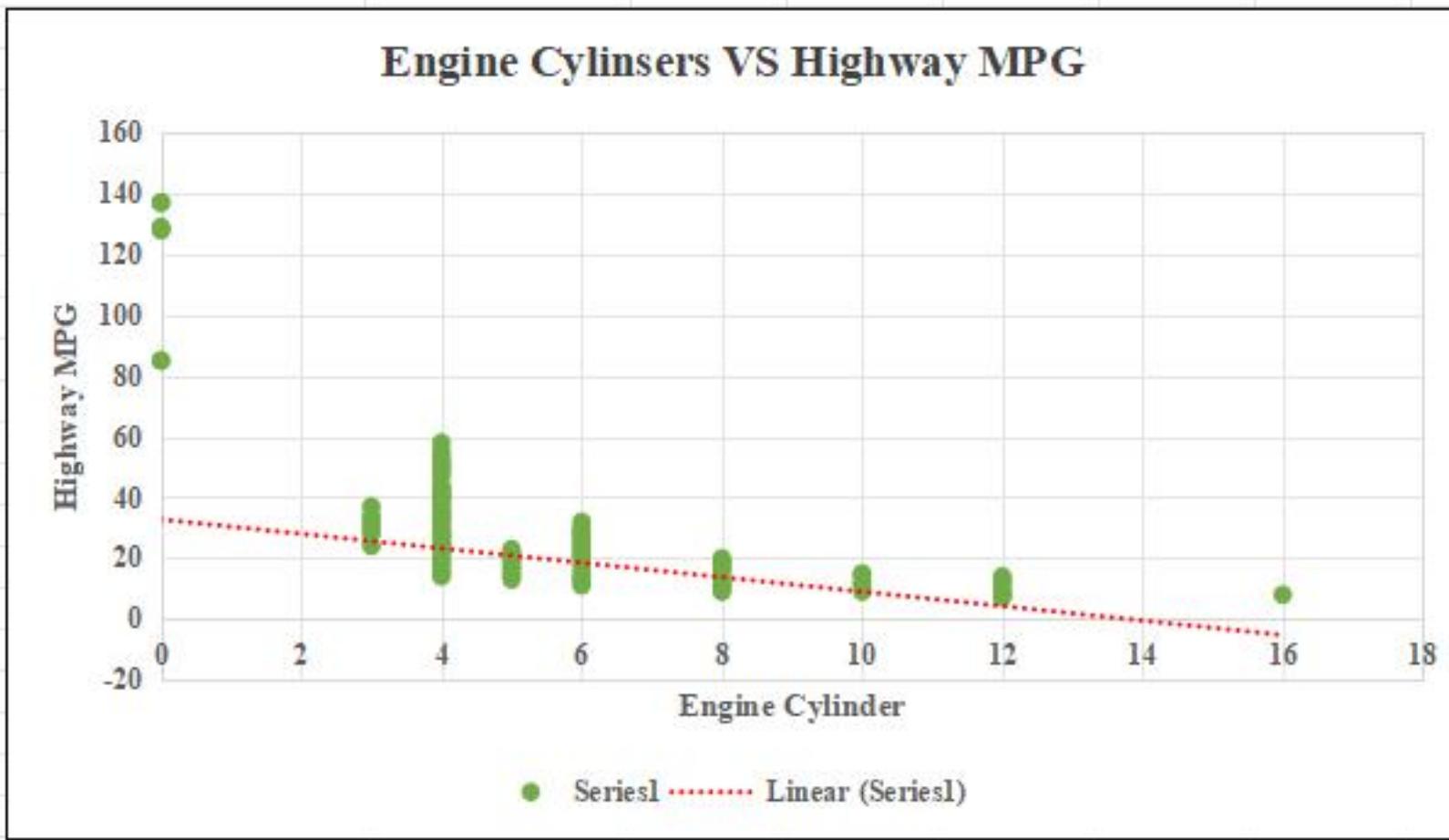
**Task 5.A:-** Create a scatter plot with the number of cylinders on the x-axis and highway MPG on the y-axis. Then create a trendline on the scatter plot to visually estimate the slope of the relationship and assess its significance.

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

- **Process:-**

- First we take City MPG and Engine Cylinder column in another sheet.
  - After that, we use the Correl Function and find the corelatio between City MPG and Engine Cylinder column.
  - Then, we use the Scatter Plot chart for the visulization.
  - we also add the trendline.
- 
- **Result:-** If the number of Engine Cylinder increased then the Fuel Efficiency will decrease.

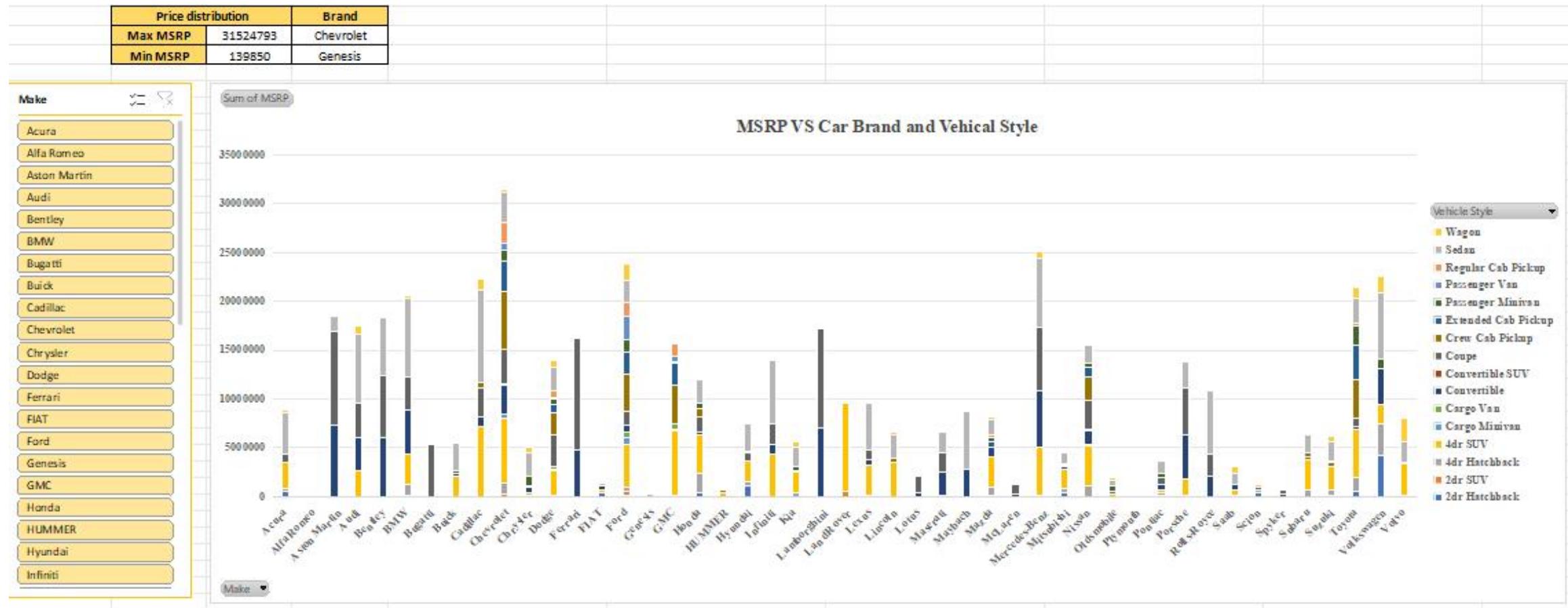
Correlation Coefficient	-0.638
Sign	Negative
Magnitude	0.638



## ❖ 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.

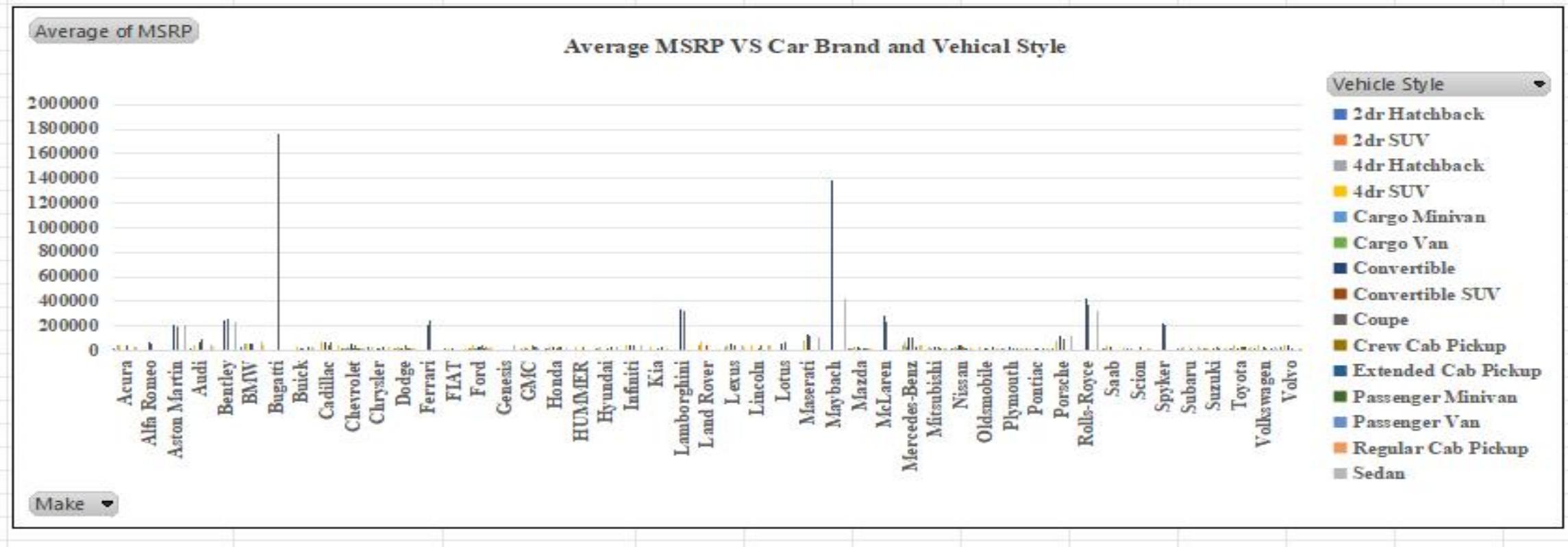


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Hints:- Clustered column chart to compare the average MSRPs across different car brands and body styles.

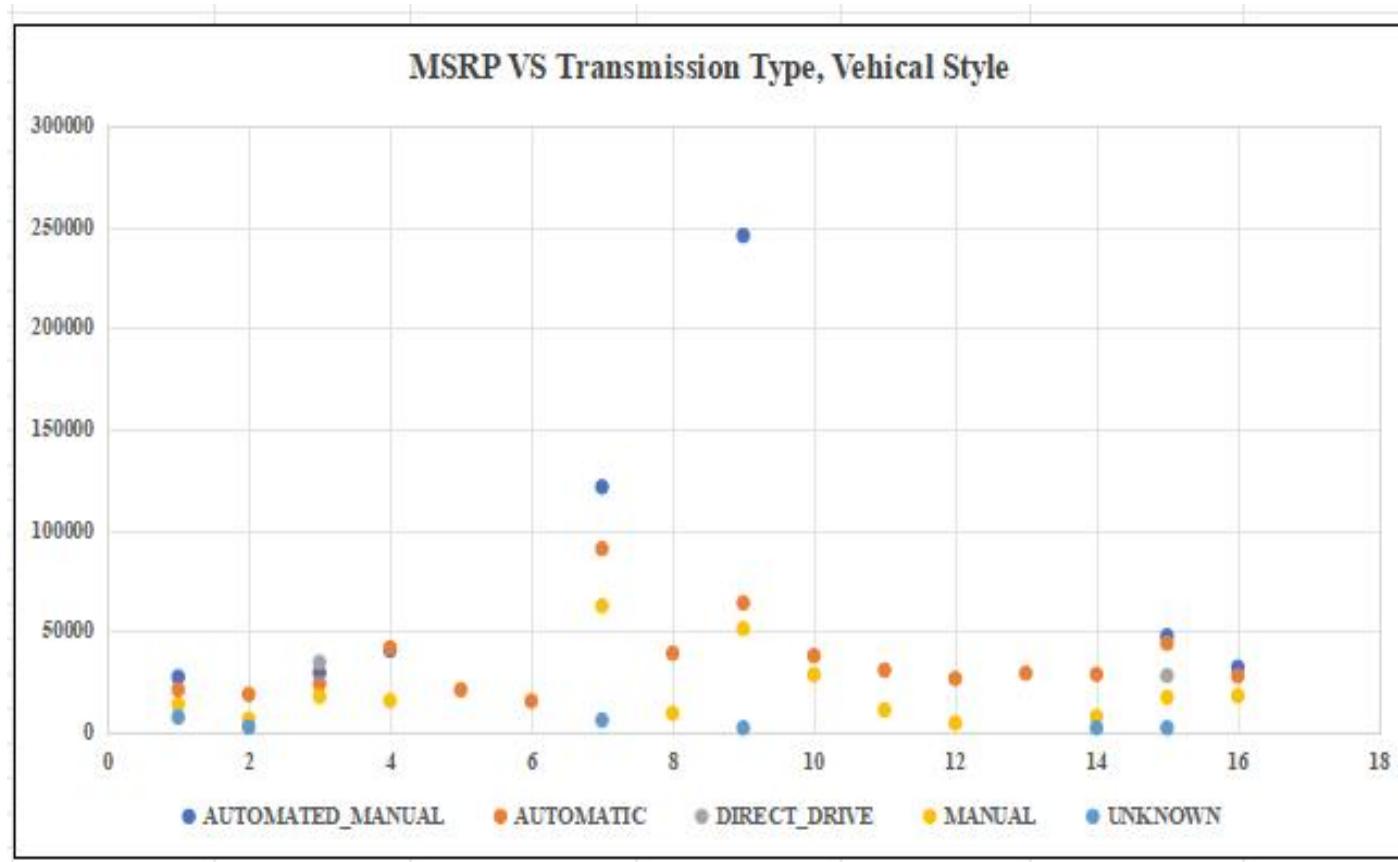
Calculate the average MSRP for each brand and body style using AVERAGEIF or Pivot Tables.

Avg MSRP Distribution	Brand
Max of AVG MSRP	Bugatti
Min of AVG MSRP	Plymouth



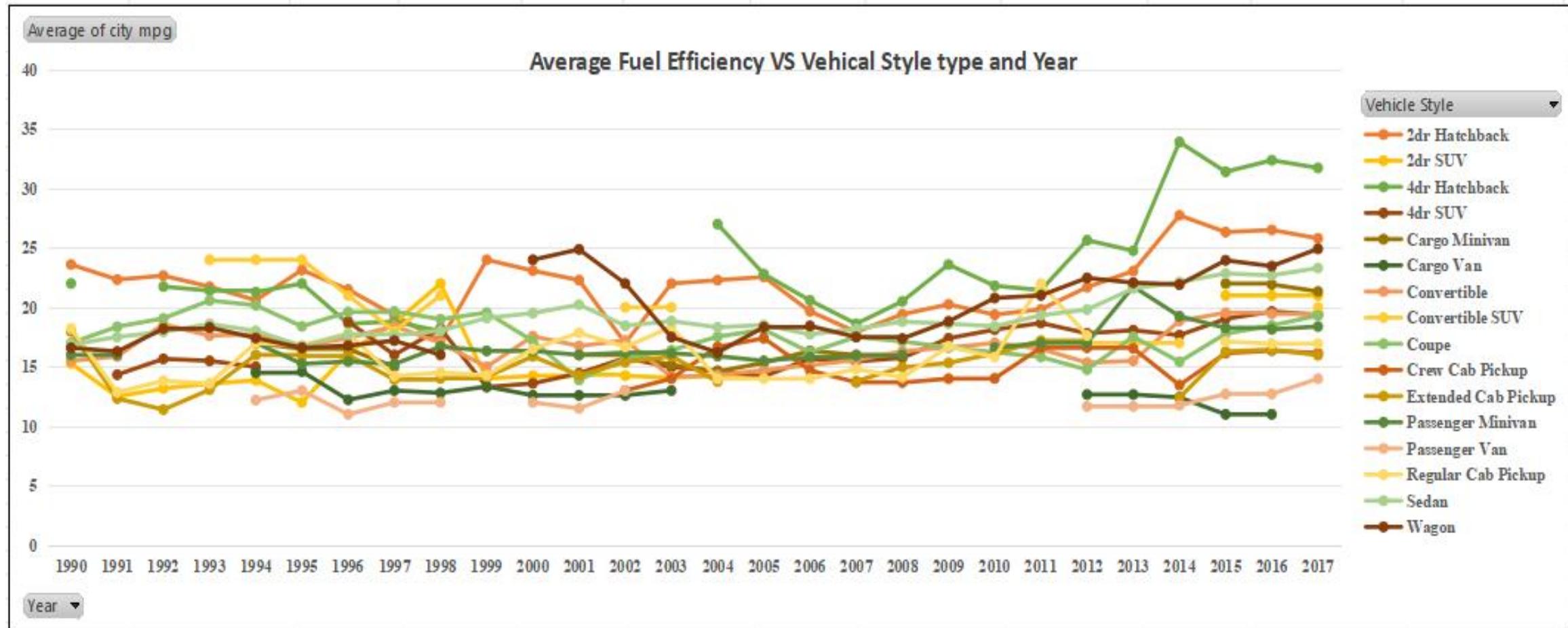
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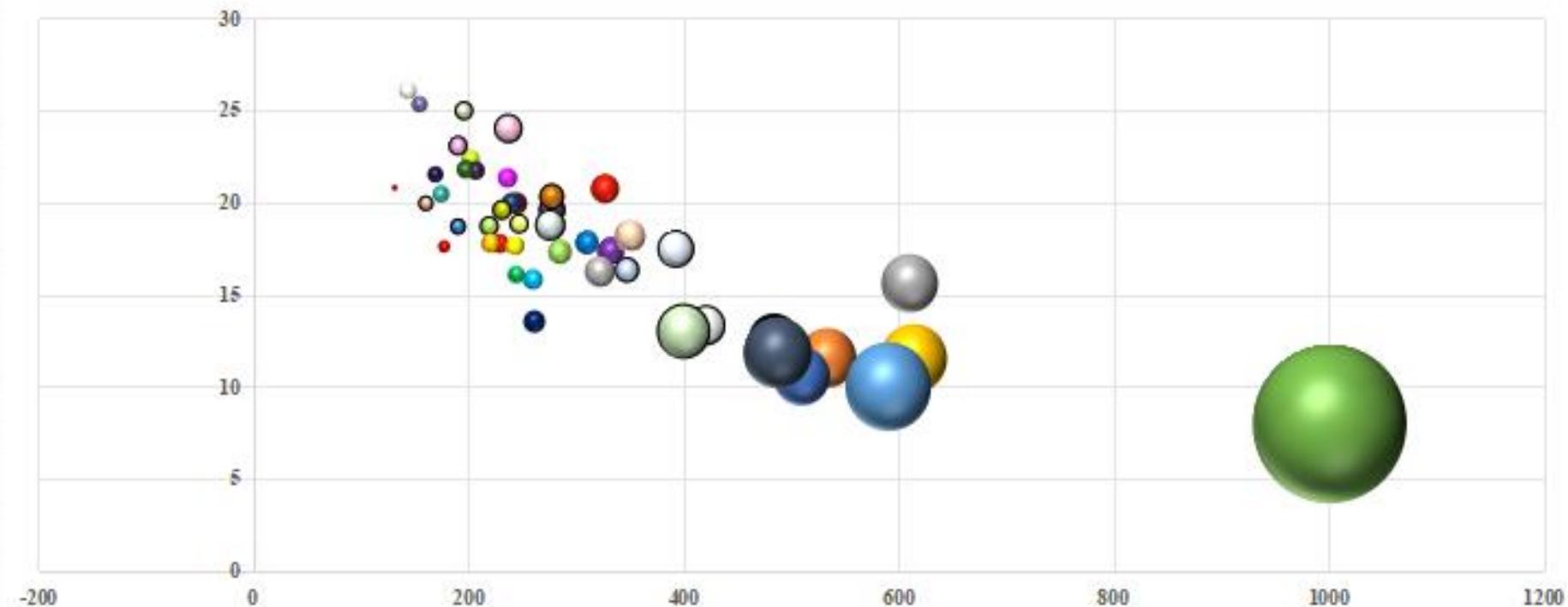
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Make	Average of Engine HP	Average of city mpg	Average of MSRP	Chart
Acura	245	20	34888	
Alfa Romeo	237	24	61600	
Aston Martin	484	13	197910	
Audi	278	20	53452	
Bentley	534	12	247169	
BMW	327	21	61547	
Bugatti	1001	8	1757224	
Buick	219	19	28207	
Cadillac	332	17	56231	
Chevrolet	247	19	28273	
Chrysler	229	18	26723	
Dodge	244	16	22390	
Ferrari	510	11	237384	
FIAT	144	26	22206	
Ford	243	18	27393	
Genesis	347	16	46617	
GMC	260	16	30493	
Honda	196	25	26630	
HUMMER	261	14	36464	
Hyundai	202	22	24597	
Infiniti	310	18	42394	
Kia	207	22	25112	
Lamborghini	614	12	331567	
Land Rover	322	16	67823	

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Lexus	277	20	47549	
Lincoln	285	17	42494	
Lotus	276	19	69188	
Maserati	421	13	114208	
Maybach	591	10	546222	
Mazda	169	22	19719	
McLaren	610	16	239805	
Mercedes-Benz	350	18	71538	
Mitsubishi	174	20	21215	
Nissan	240	20	28513	
Oldsmobile	177	18	11543	
Plymouth	132	21	3123	
Pontiac	190	19	19322	
Porsche	393	17	101622	
Rolls-Royce	488	12	351131	
Saab	221	18	27414	
Scion	154	25	19933	
Spyker	400	13	213323	
Subaru	197	22	24828	
Suzuki	160	20	17901	
Toyota	236	21	28946	
Volkswagen	190	23	28076	
Volvo	231	20	28541	

### Relationship Between Engine HP, MPG and MSRP



❖ **MICROSOFT EXCEL FILE:-**

[https://docs.google.com/spreadsheets/d/1AXEN7ZavvI2flP0aMnhRSenWHz6BH7jO/edit?usp=drive\\_link&ouid=103974361659264463652&rtpof=true&sd=true](https://docs.google.com/spreadsheets/d/1AXEN7ZavvI2flP0aMnhRSenWHz6BH7jO/edit?usp=drive_link&ouid=103974361659264463652&rtpof=true&sd=true)

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