IMPACT OF CAR FEATURES

PROJECT DISCRIPTION:-

This research will analyse the impact of car features on price and profitability.

PROJECT APPROACH:-

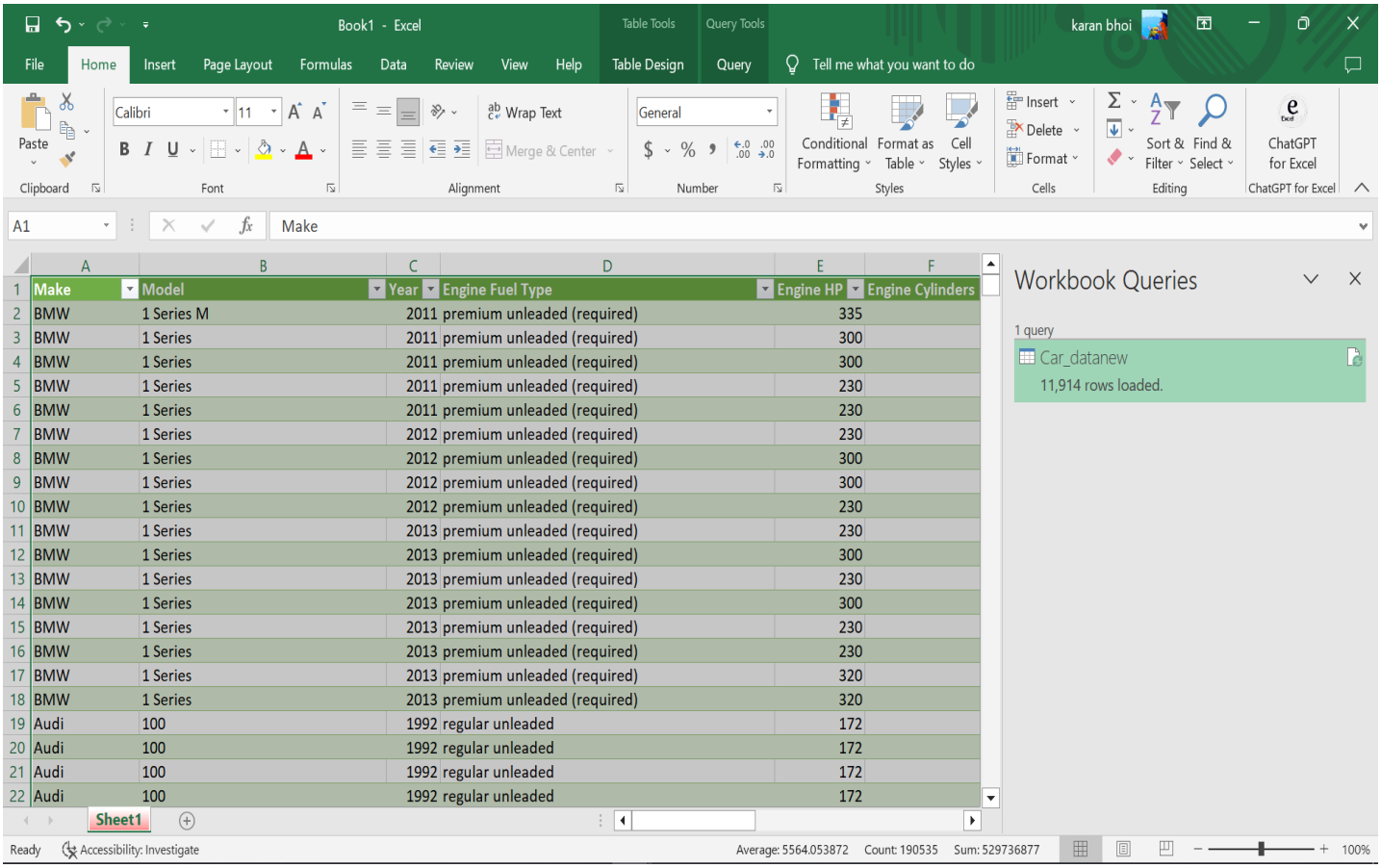
Excel is utilised to uncover the insights. We started with data cleaning and transformation in Excel, such as interpreting data columns, checking for missing data, checking for and removing outliers, and so on.

Following that, we conducted an exploratory analysis to uncover insights and created dashboards to answer the client's inquiries**.**

Tech Stack Used:

Microsoft Excel 2019, Microsoft Word 2019, and Google Drive.

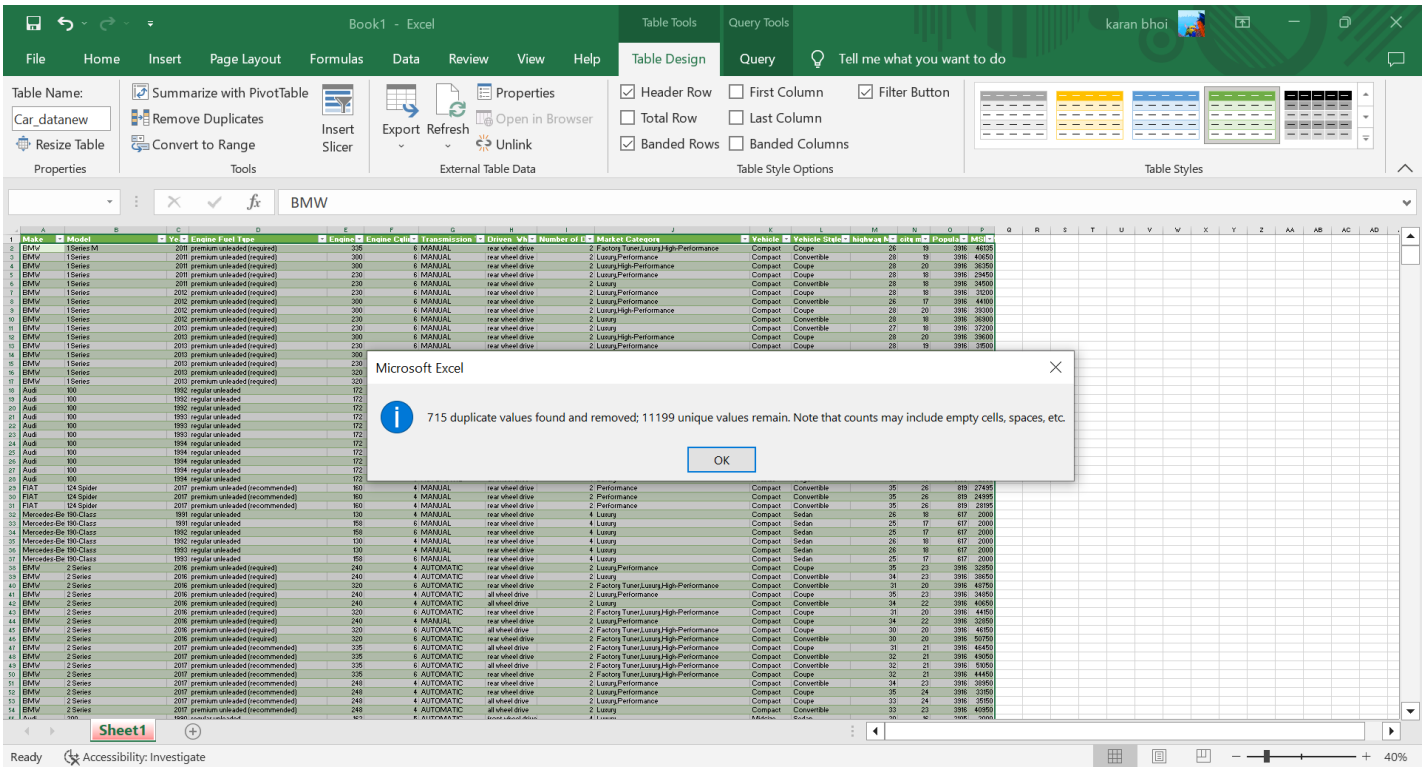
Project Analysis:



Make	Model	Year	Engine Fuel Type	Engine HP	Engine Cylinders
BMW	1 Series M	2011	premium unleaded (required)	335	
BMW	1 Series	2011	premium unleaded (required)	300	
BMW	1 Series	2011	premium unleaded (required)	300	
BMW	1 Series	2011	premium unleaded (required)	230	
BMW	1 Series	2011	premium unleaded (required)	230	
BMW	1 Series	2012	premium unleaded (required)	230	
BMW	1 Series	2012	premium unleaded (required)	300	
BMW	1 Series	2012	premium unleaded (required)	300	
BMW	1 Series	2012	premium unleaded (required)	230	
BMW	1 Series	2013	premium unleaded (required)	230	
BMW	1 Series	2013	premium unleaded (required)	300	
BMW	1 Series	2013	premium unleaded (required)	230	
BMW	1 Series	2013	premium unleaded (required)	300	
BMW	1 Series	2013	premium unleaded (required)	230	
BMW	1 Series	2013	premium unleaded (required)	230	
BMW	1 Series	2013	premium unleaded (required)	320	
BMW	1 Series	2013	premium unleaded (required)	320	
Audi	100	1992	regular unleaded	172	
Audi	100	1992	regular unleaded	172	
Audi	100	1992	regular unleaded	172	
Audi	100	1992	regular unleaded	172	

Cleaning Dataset:

Removing duplicate data: We use the "Remove Duplicates" function to remove any duplicate rows in the dataset.



=SUBTOTAL(103,Car_datanew[Make])

TOTAL ROW
11199

Checking for missing data: We calculate the fraction of null values.

We used the COUNTBLANK tool in Excel to detect the blank numbers. We discovered that the data was mainly in good shape because there were few null values in the column.

COUNT OF NULL VALUE	PERCENTAGE OF NULL VALUE	COLUMNS
0	0%	Make
0	0%	Model
0	0%	Year
3	3%	Engine Fuel Type
69	62%	Engine HP
30	27%	Engine Cylinders
0	0%	Transmission Type
0	0%	Driven_Wheels
6	5%	Number of Doors
0	0%	Market Category
0	0%	Vehicle Size
0	0%	Vehicle Style
0	0%	highway MPG
0	0%	city mpg
0	0%	Popularity
0	0%	MSRP

1.Null in % formula.

=COUNTBLANK(Car_datanew[Engine Fuel Type])/COUNTA(Car_datanew[COLUMN RANGE/NAME])*100

2.Null in total Count.

=COUNTBLANK(Car_datanew[column range/name])

Project 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.

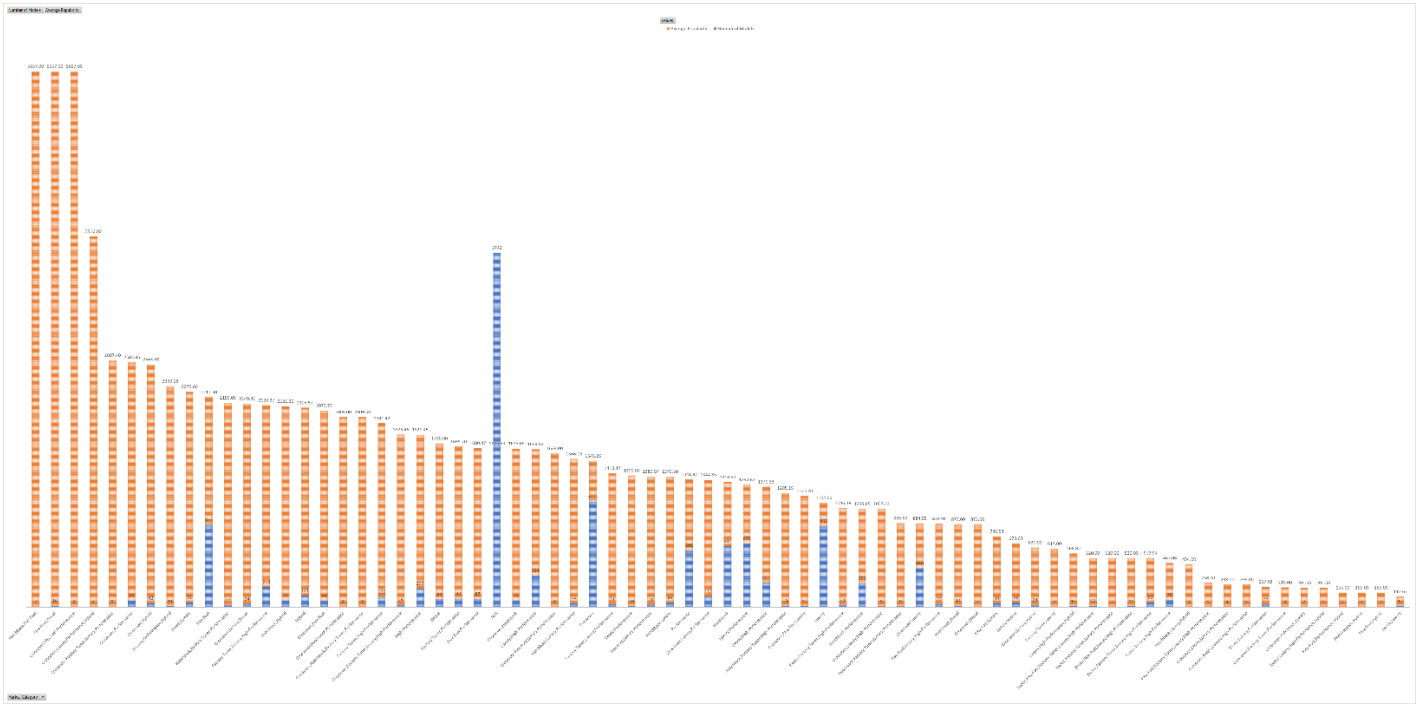
Market Category	Number of Models	Average Popularity
Hatchback,Flex Fuel	7	5657.00
Flex Fuel,Diesel	16	5657.00
Crossover,Flex Fuel,Performance	6	5657.00
Crossover,Luxury,Performance,Hybrid	2	3916.00
Crossover,Factory Tuner,Luxury,Performance	5	2607.40
Crossover,Performance	69	2585.96
Crossover,Hybrid	42	2563.38
Luxury,Performance,Hybrid	11	2333.18
Diesel,Luxury	51	2275.00
Flex Fuel	872	2217.30
Hatchback,Factory Tuner,Performance	22	2159.05
Crossover,Luxury,Diesel	34	2149.41
Factory Tuner,Luxury,High-Performance	215	2133.37
Hatchback,Hybrid	72	2121.25
Hybrid	123	2105.57
Crossover,Flex Fuel	64	2073.75
Crossover,Hatchback,Performance	6	2009.00
Crossover,Hatchback,Factory Tuner,Performance	6	2009.00
Factory Tuner,High-Performance	106	1941.42
Crossover,Factory Tuner,Luxury,High-Performance	26	1823.46
High-Performance	199	1821.45
Diesel	84	1730.90
Factory Tuner,Performance	92	1695.70
Flex Fuel,Performance	87	1680.47
N/A	3742	1676.89
Crossover,Hatchback	72	1675.69
Luxury,High-Performance	334	1668.02
Crossover,Flex Fuel,Luxury,Performance	6	1624.00
Hatchback,Luxury,Performance	38	1566.13
Crossover	1110	1545.26
Factory Tuner,Luxury,Performance	31	1413.42
Exotic,Performance	10	1391.00
Flex Fuel,Luxury,Performance	28	1380.07
Hatchback,Luxury	46	1379.50
Performance	601	1348.87
Crossover,Luxury,Performance	113	1344.85
Hatchback	641	1318.87
Luxury,Performance	673	1292.62
Exotic,High-Performance	261	1271.33
Hatchback,Factory Tuner,High-Performance	13	1205.15
Crossover,Flex Fuel,Luxury	10	1173.20
Luxury	855	1102.66
Exotic,Factory Tuner,High-Performance	21	1046.38
Hatchback,Performance	252	1039.65
Crossover,Luxury,High-Performance	9	1037.22
Hatchback,Factory Tuner,Luxury,Performance	9	886.89
Crossover,Luxury	410	884.55
Flex Fuel,Luxury,High-Performance	33	878.91
Hatchback,Diesel	14	873.00
Crossover,Diesel	7	873.00
Flex Fuel,Luxury	39	746.54
Luxury,Hybrid	52	673.63
Crossover,Luxury,Hybrid	24	630.92
Factory Tuner,Luxury	2	617.00
Luxury,High-Performance,Hybrid	12	568.83
Exotic,Flex Fuel,Factory Tuner,Luxury,High-Performance	13	520.00
Exotic,Factory Tuner,Luxury,Performance	3	520.00
Exotic,Flex Fuel,Luxury,High-Performance	11	520.00
Exotic,Factory Tuner,Luxury,High-Performance	52	517.54
Exotic,Luxury,High-Performance	79	467.08
Hatchback,Luxury,Hybrid	3	454.00
Flex Fuel,Factory Tuner,Luxury,High-Performance	1	258.00
Crossover,Exotic,Luxury,Performance	1	238.00
Crossover,Exotic,Luxury,High-Performance	1	238.00
Exotic,Luxury,Performance	36	217.03
Crossover,Factory Tuner,Performance	4	210.00
Crossover,Hatchback,Luxury	7	204.00
Exotic,Luxury,High-Performance,Hybrid	1	204.00
Flex Fuel,Performance,Hybrid	2	155.00
Performance,Hybrid	1	155.00
Flex Fuel,Hybrid	2	155.00
Exotic,Luxury	12	112.67
Grand Total	11914	1554.91

RESULT:-

Most Popular Market Categories:- (Hatchback,Flex Fuel) , (Flex Fuel,Diesel),(Crossover,Flex Fuel,Performance)

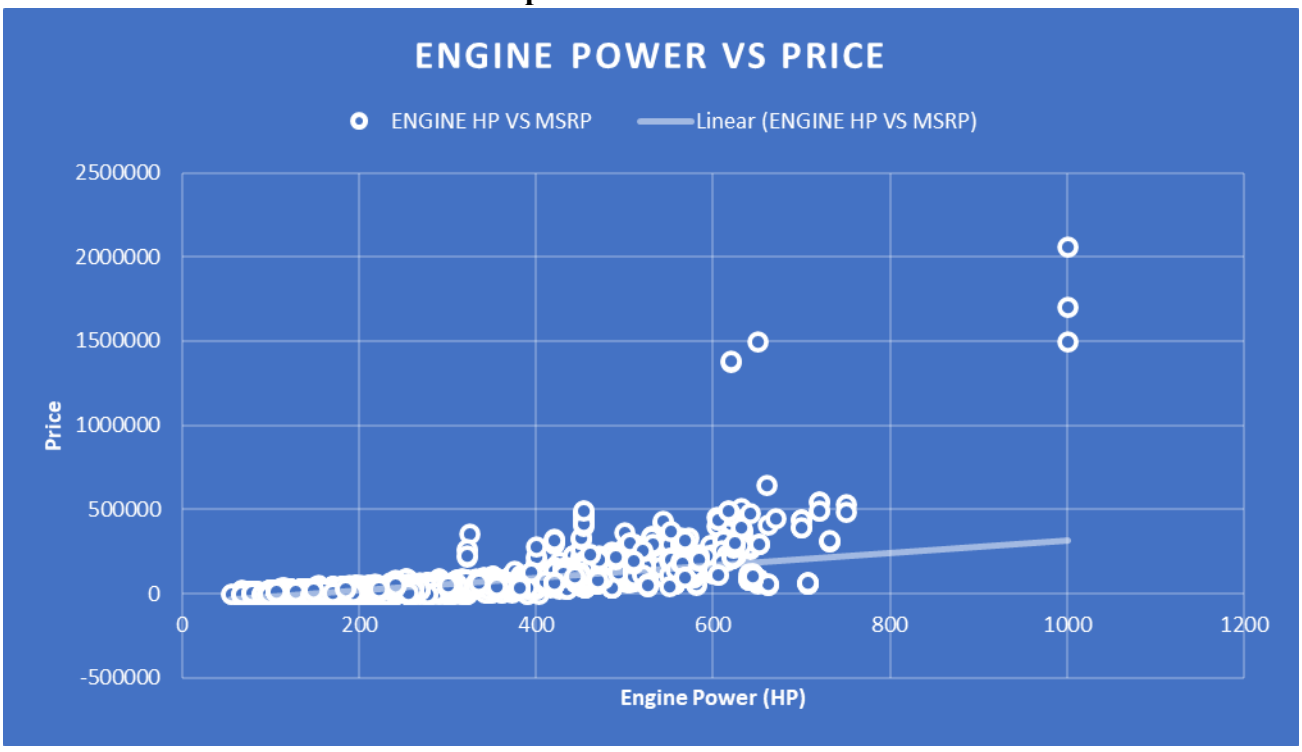
Least Popular Market Categories:- (Exotic,Luxury),(Flex Fuel,Hybrid),(Performance,Hybrid)

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



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

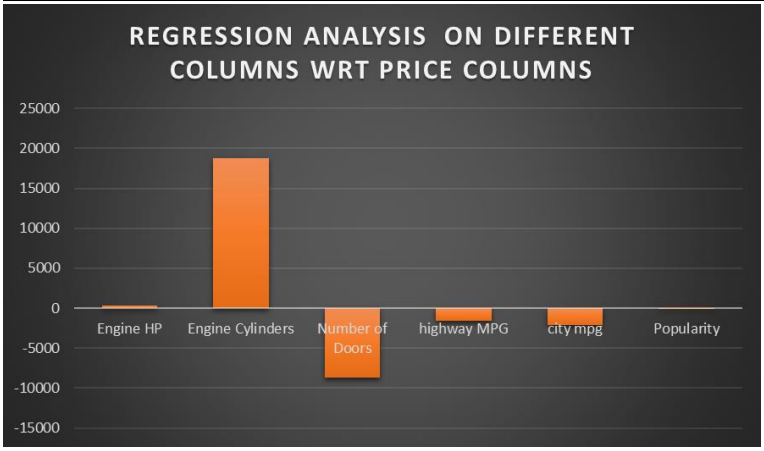
Task 2: Create a scatter chart that plots engine power on the x-axis and price on the y-axis. Add a trendline to the chart to visualize the relationship between these variables.

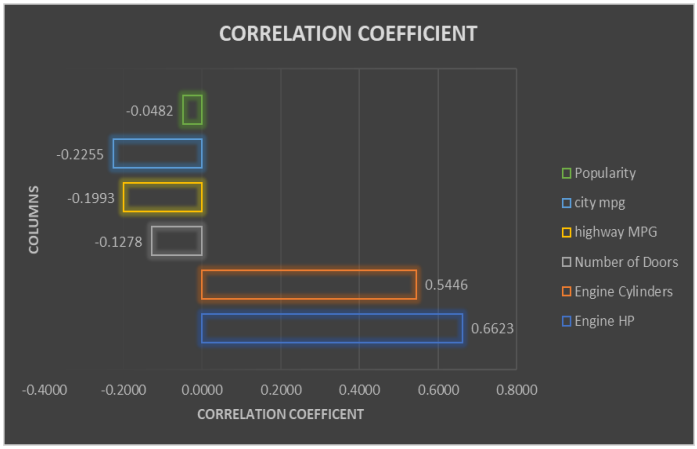


RESULT:- **there appears to be a positive correlation between a car's engine power and its price.The price will rise as the number of Engine Power increases.**

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.

Columns	Regression Analysis (On Price) - B	A	Correlation Coefficient
Engine HP	365.6216009	-50651.97909	0.6623
Engine Cylinders	18745.09728	-65334.84992	0.5446
Number of Doors	-8733.708219	70554.78374	-0.1278
highway MPG	-1614.95867	83081.18734	-0.1993
city mpg	-2084.370422	80860.20555	-0.2255
Popularity	-2.018886939	43712.2643	-0.0482





RESULT:- **Engine Horse Power and Engine Cylinders are positively related to price, but Highway MPG, City MPG, Number of Doors, and Popularity are negatively related to price.**

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.

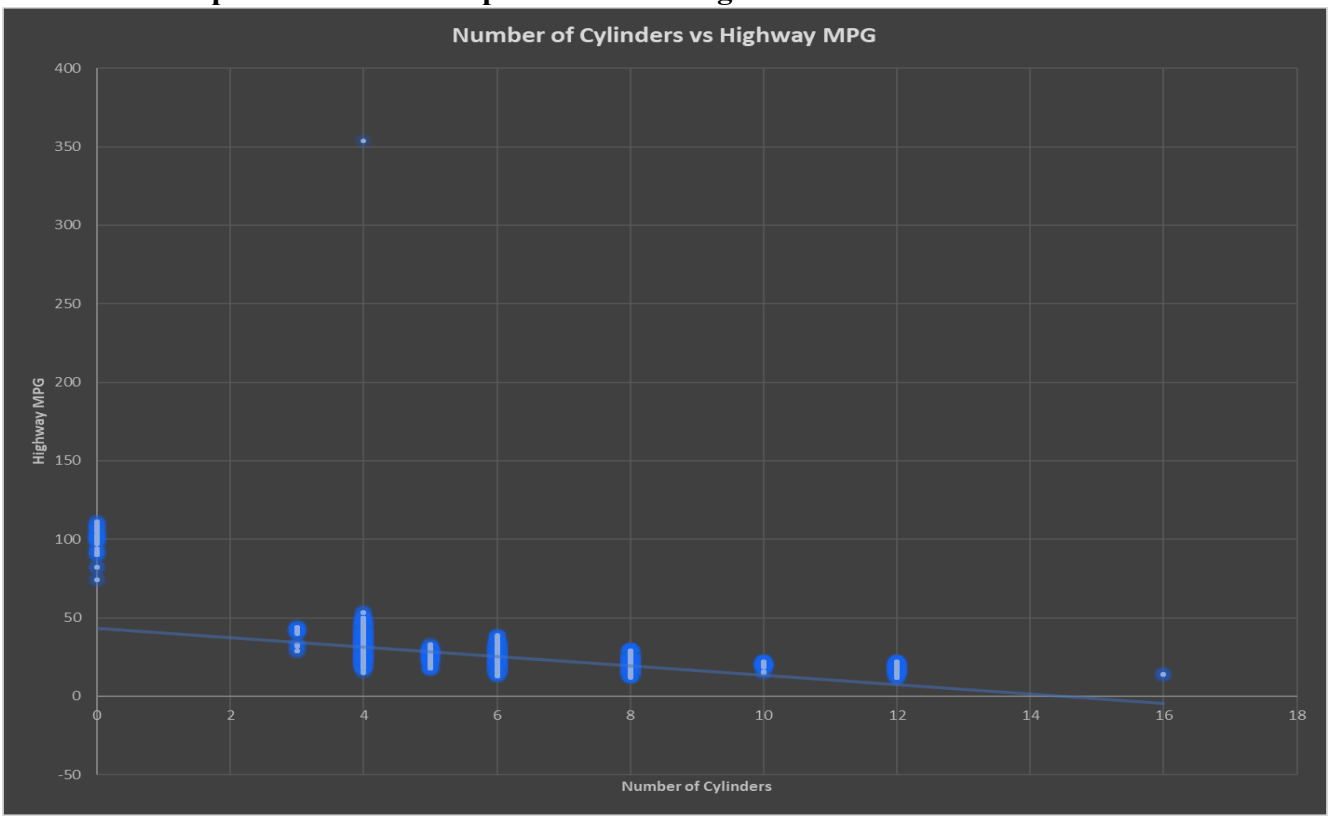
RESULT:-
Highest Average Price of Cars Manufacturer – Bugatti , Maybach , Rolls-Royce .
Lowest Average Price of Cars Manufacturer – Plymouth , Oldsmobile , Suzuki.

Manufacturer	Average Price of Car
Bugatti	1757223.67
Maybach	546221.88
Rolls-Royce	351130.65
Lamborghini	331567.31
Bentley	247169.32
McLaren	239805.00
Ferrari	238218.84
Spyker	213323.33
Aston Martin	197910.38
Maserati	114207.71
Porsche	101622.40
Tesla	85255.56
Mercedes-Benz	71476.23
Lotus	69188.28
Land Rover	67823.22
Alfa Romeo	61600.00
BMW	61546.76
Cadillac	56231.32
Audi	53452.11
Lexus	47549.07
Genesis	46616.67
Lincoln	42839.83
Infiniti	42394.21
HUMMER	36464.41
Acura	34887.59
GMC	30493.30
Toyota	29030.02
Nissan	28583.43
Volvo	28541.16
Chevrolet	28350.39
Buick	28206.61
Volkswagen	28102.38
Saab	27413.50
Ford	27399.27
Chrysler	26722.96
Honda	26674.34
Kia	25310.17
Subaru	24827.50
Hyundai	24597.04
FIAT	22670.24
Dodge	22390.06
Mitsubishi	21240.54
Mazda	20039.38
Scion	19932.50
Pontiac	19321.55
Suzuki	17907.21
Oldsmobile	11542.54
Plymouth	3122.90
Grand Total	**40594.74**

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

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.**

INSIGHT-5 Task B
Correlation coefficient between number of cylinders and highway mpg
-0.637872212

RESULT:-The trendline for the association between the number of Cylinders and Highway MPG is negative, indicating that fewer cylinders provide more highway mpg.

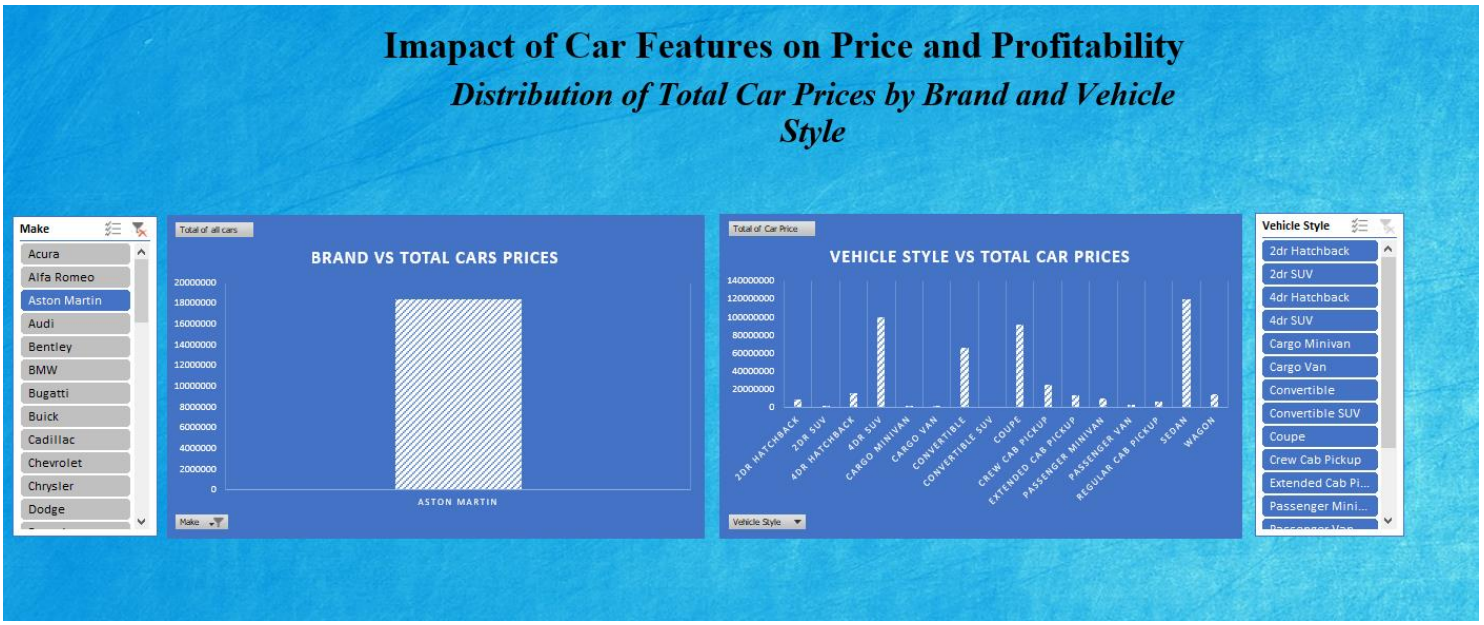
Building the Dashboard:

The client has requested these questions given below , Using filters and slicers, we will create interactive dashboards.

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.**

DASHBOARD-1



RESULT:- Chevrolet Brand and Sedan Vehicle Types will almost certainly have higher MSRPs.

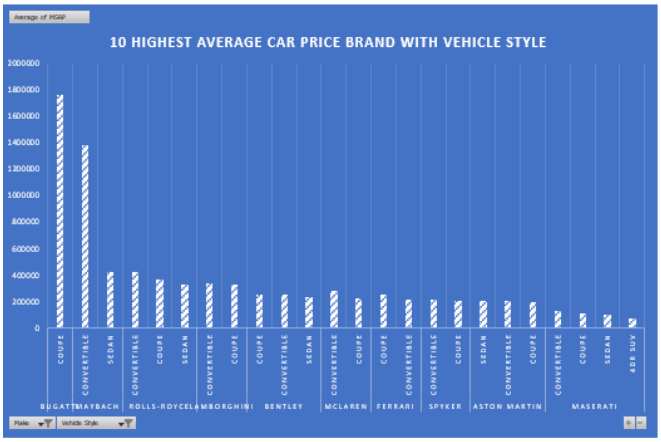
Task 2: Which car brands have the highest and lowest average MSRPs, and how does this vary by body style?

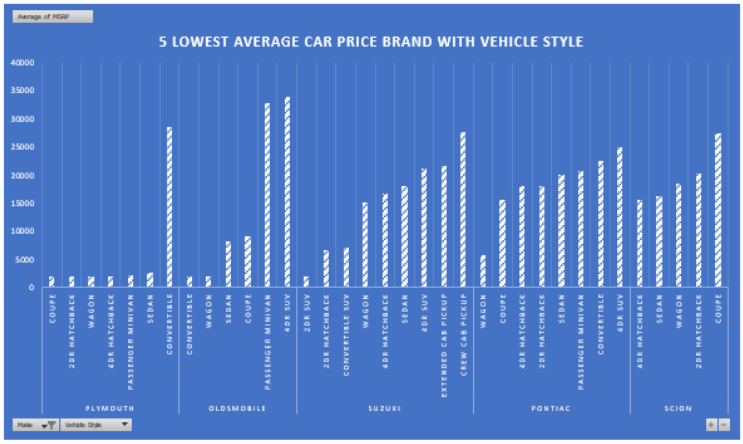
● Hints: Clustered column chart to compare the average MSRPs across different car brands and body styles. Calculate the average MSRP for each brand and body style using AVERAGEIF or Pivot Tables.

DASHBOARD-2

Imapact of Car Features on Price and Profitability

Car Brands having the Highest and Lowest Car Prices varying by Vehicle Style





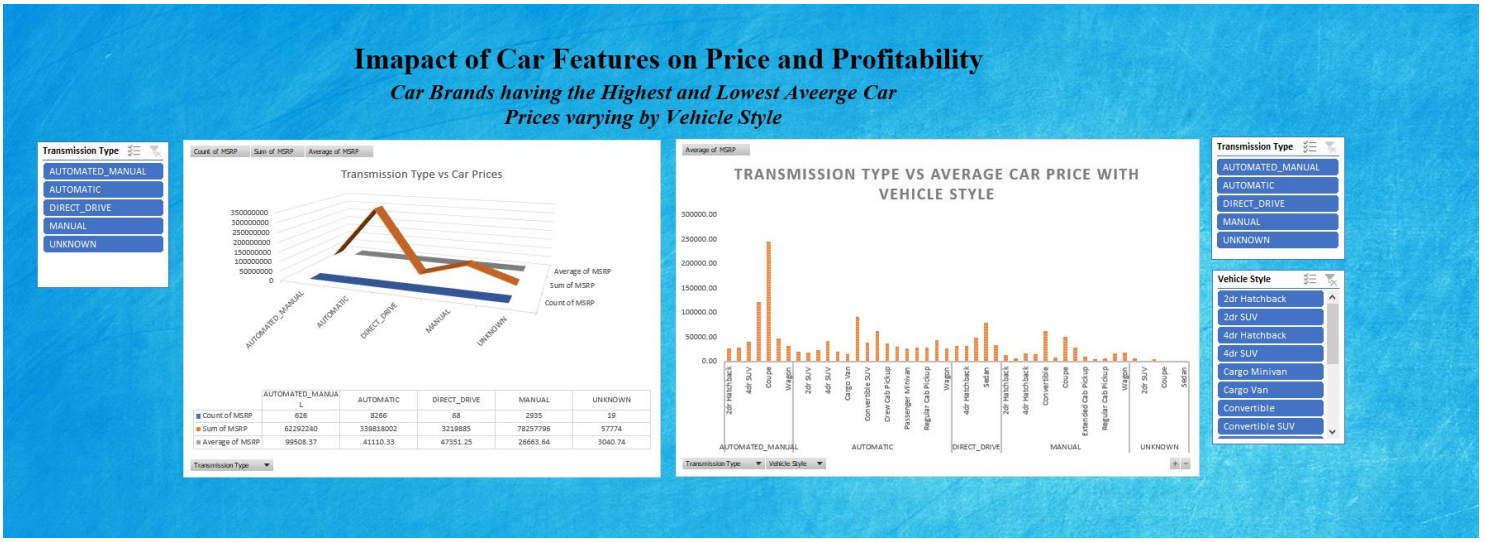
RESULT:- Bugatti's Coupe and Maybach's Convertible have the highest average car price with vehicle style.

Plymouth's Coupe & 2dr hatchback and Oldsmobile's Waggon & Convertible have the lowest average car price by vehicle style.

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.

DASHBOARD-3

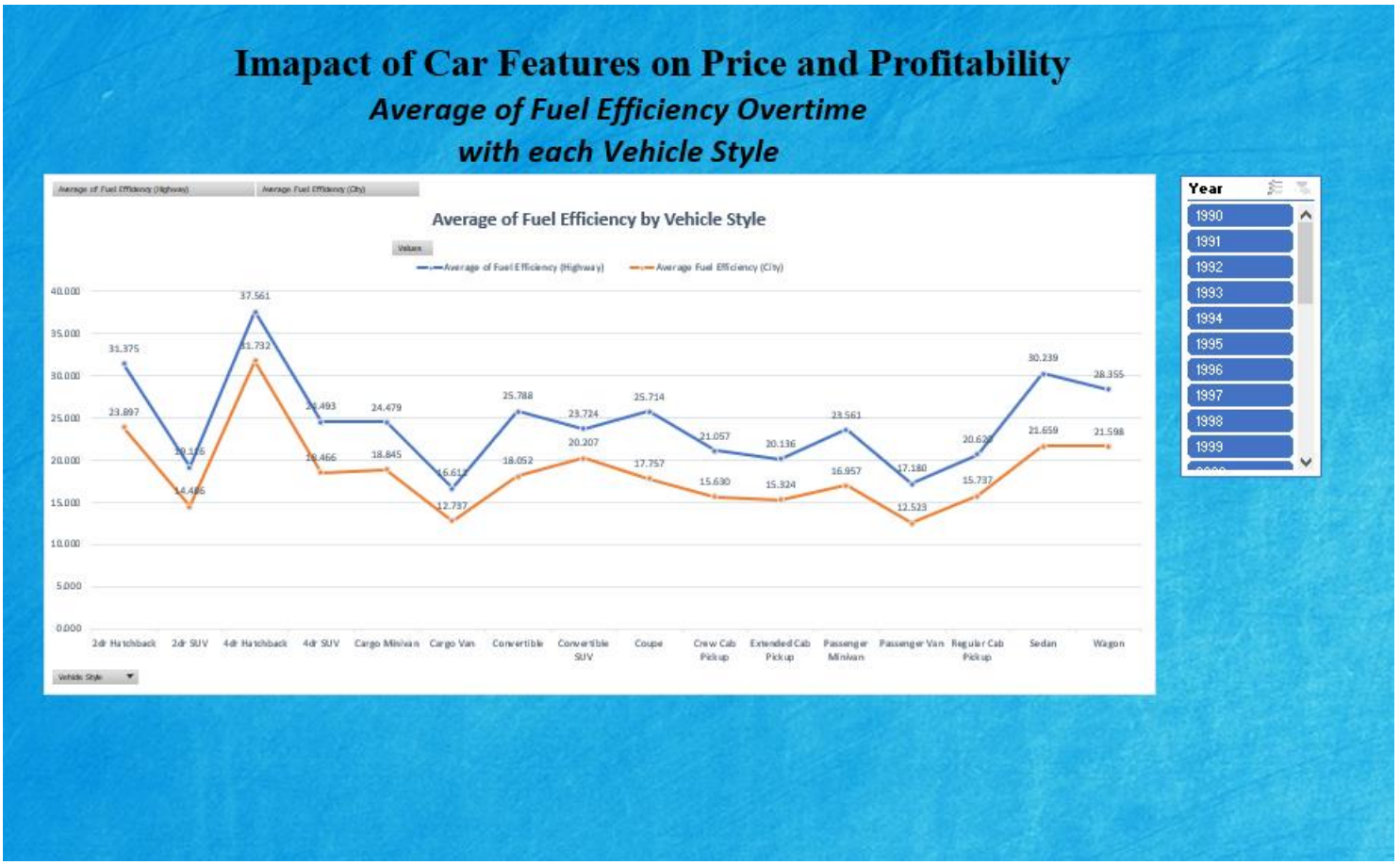


RESULT:- **We discovered that Automated/Manual has the highest Average MSRP, while Manual has the lowest Average MSRP.**

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.

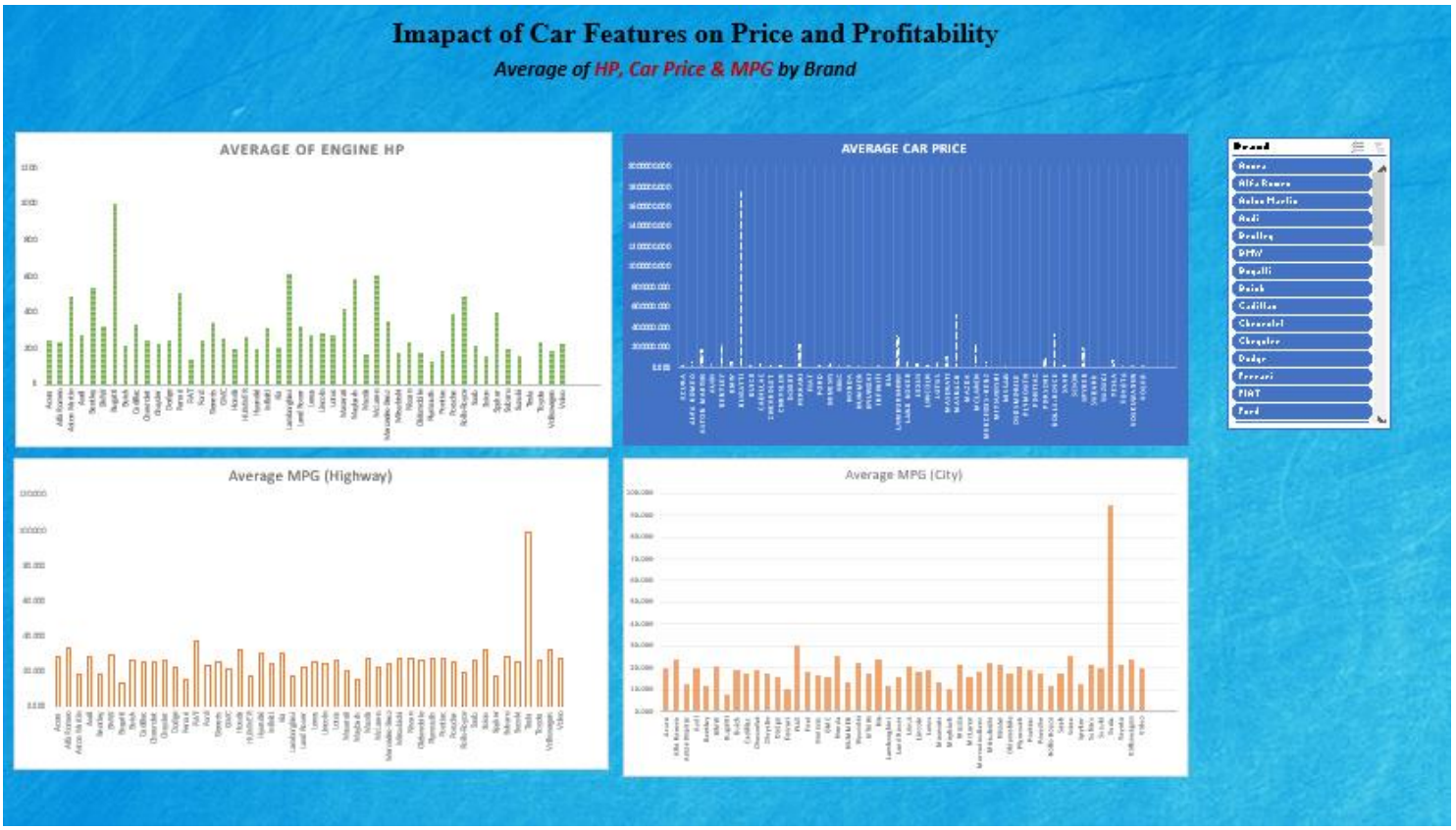
DASHBOARD-4



RESULT:- The 4dr Hatchback has the maximum fuel efficiency, while the Cargo Van and Passenger Van have the lowest.

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.

DASHBOARD-5



RESULT:- Bugatti has the most engine horsepower and car price, but Tesla has the highest MPG (both highway and city).

PROJECT RESULT:- Several important insights were uncovered while studying the data set provided, which could not have been obtained by manually scanning the dataset for insights.

We might also use the Excel-2021 tool to gain some more expertise with it, as well as

In order to find insights, numerous formulas, pivot tables, graphs, and dashboards are used.

DOC LINK-

https://docs.google.com/spreadsheets/d/1eoHD47T1_bxd9cDf0WUxFE-Tyzfovkpg/edit?usp=sharing&ouid=101188167225626516731&rtpof=true&sd=true

DRIVE LINK

https://drive.google.com/drive/folders/1yjQeorAwFMxNfZswCQylsJ_np2voX3bv?usp=share_link