

Project: Analyzing the Impact of Car Features on Price and Profitability

Project Description

This project will go through to do analysis on Impact of Car Features on Price and Profitability.

Project Approach

In order to find the insights, Excel is used. Using Excel, we performed Data Cleaning and transformation first like understanding data columns, checking for missing data, checking and removing outliers, etc. After that, we did an Exploratory analysis to find the insights and also built dashboards to answer the questions given by the client.

Tech Stack Used

Microsoft Excel 2021, Microsoft Word 2021, and Google Drive

Project Analysis

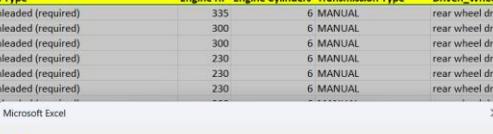
1) Cleaning the Dataset:

At first, removed all the rows which were empty. Found out the number of blank cells in the particular column. To find the blank values we used COUNTBLANK function in Excel.

Checking null values	
Make	0
Model	0
Year	0
Engine Fuel Type	3
Engine HP	69
Engine cylinders	30
Transmission Type	0
Driven_wheels	0
Numbers of Doors	6
Market Category	0
Vechicle size	0
Vechicle Style	0
city mpg	0
Popularity	0
MSRP	0

After using the formula, we found the data to be mostly in good shape as there were hardly any null values in the column.

Next, we removed all the duplicate values in the dataset. Here, is the excel result for that.



A	B	C	D	E	F	G	H	I	J	
1	Make	Model	Year	Engine Fuel Type	Engine HP	Engine Cylinders	Transmission Type	Driven_Wheels	Number of Doors	Market Category
2	BMW	1 Series M	2011	premium unleaded (required)	335	6	MANUAL	rear wheel drive	2	Factory Tuner,Luxury,High-Performance
3	BMW	1 Series	2011	premium unleaded (required)	300	6	MANUAL	rear wheel drive	2	Luxury,Performance
4	BMW	1 Series	2011	premium unleaded (required)	300	6	MANUAL	rear wheel drive	2	Luxury,High-Performance
5	BMW	1 Series	2011	premium unleaded (required)	230	6	MANUAL	rear wheel drive	2	Luxury,Performance
6	BMW	1 Series	2011	premium unleaded (required)	230	6	MANUAL	rear wheel drive	2	Luxury,Performance
7	BMW	1 Series	2012	premium unleaded (required)	230	6	MANUAL	rear wheel drive	2	Luxury,Performance
8	BMW	1 Series	2012	premium unleaded (required)	230	6	MANUAL	rear wheel drive	2	Luxury,Performance
9	BMW	1 Series	2012	premium unleaded (required)	230	6	MANUAL	rear wheel drive	2	Luxury,High-Performance
10	BMW	1 Series	2012	premium unleaded (required)	230	6	MANUAL	rear wheel drive	2	Luxury
11	BMW	1 Series	2013	premium unleaded (required)	230	6	MANUAL	rear wheel drive	2	Luxury
12	BMW	1 Series	2013	premium unleaded (required)	230	6	MANUAL	rear wheel drive	2	Luxury,High-Performance
13	BMW	1 Series	2013	premium unleaded (required)	230	6	MANUAL	rear wheel drive	2	Luxury,Performance
14	BMW	1 Series	2013	premium unleaded (required)	300	6	MANUAL	rear wheel drive	2	Luxury,Performance
15	BMW	1 Series	2013	premium unleaded (required)	230	6	MANUAL	rear wheel drive	2	Luxury
16	BMW	1 Series	2013	premium unleaded (required)	320	6	MANUAL	rear wheel drive	2	Luxury,High-Performance
17	BMW	1 Series	2013	premium unleaded (required)	320	6	MANUAL	rear wheel drive	4	Luxury,High-Performance
18	Audi		100	1992 regular unleaded	172	6	MANUAL	front wheel drive	4	Luxury
19	Audi		100	1992 regular unleaded	172	6	AUTOMATIC	all wheel drive	4	Luxury
20	Audi		100	1992 regular unleaded	172	6	MANUAL	all wheel drive	4	Luxury
21	Audi		100	1993 regular unleaded	172	6	MANUAL	front wheel drive	4	Luxury
22	Audi		100	1993 regular unleaded	172	6	AUTOMATIC	all wheel drive	4	Luxury
23	Audi		100	1993 regular unleaded	172	6	MANUAL	all wheel drive	4	Luxury
24	Audi		100	1994 regular unleaded	172	6	AUTOMATIC	front wheel drive	4	Luxury
25	Audi		100	1994 regular unleaded	172	6	MANUAL	all wheel drive	4	Luxury
26	Audi		100	1994 regular unleaded	172	6	MANUAL	front wheel drive	4	Luxury
27	Audi		100	1994 regular unleaded	172	6	AUTOMATIC	front wheel drive	4	Luxury

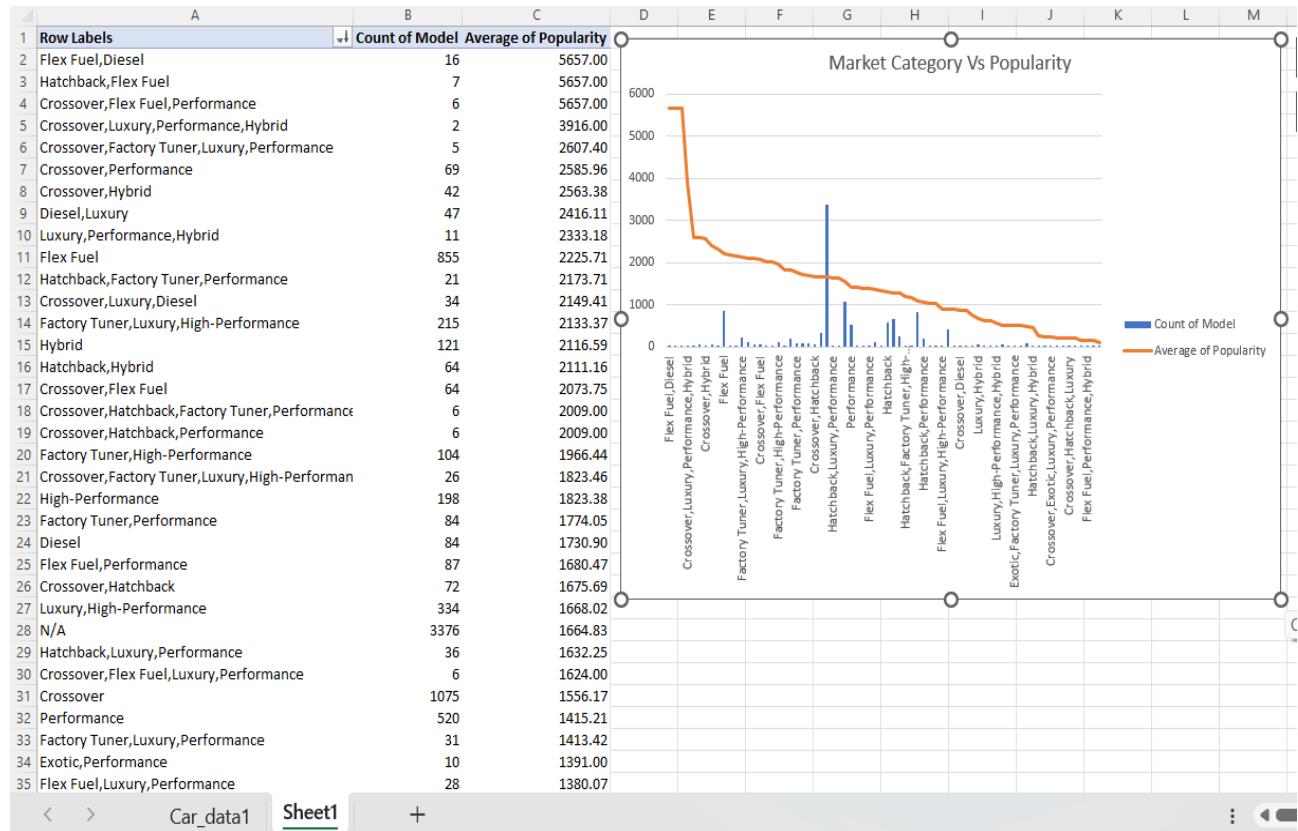
Lastly, switching the columns' datatypes to text and numeric, accordingly.

Project Insights

Insight 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: Created a combo chart that visualizes the relationship between market category and popularity.



Result: -

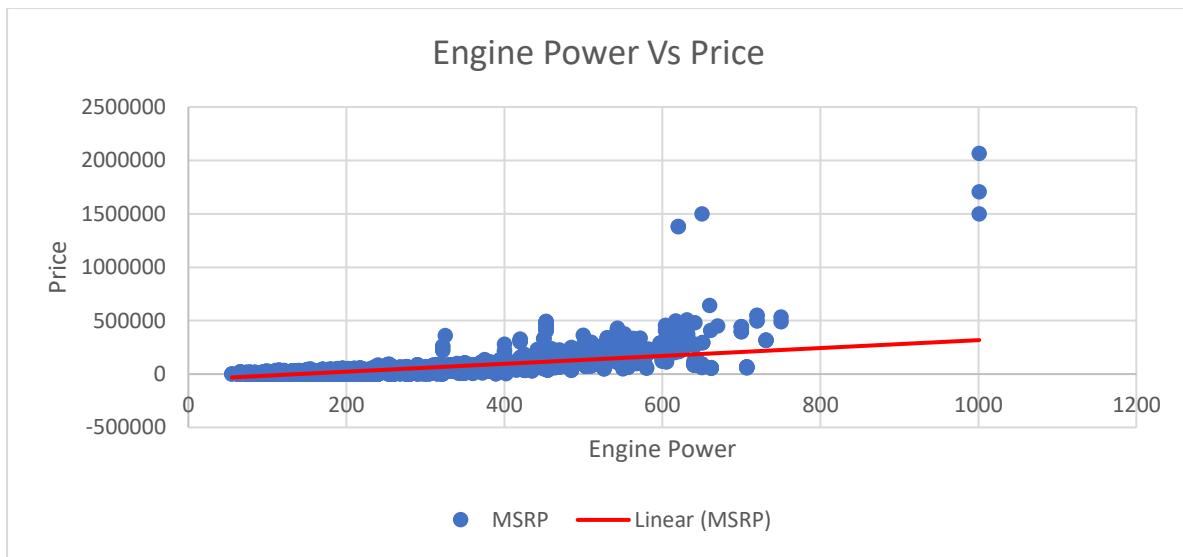
Most Popular market Category – Flex Fuel, Diesel | Hatchback, Flex Fuel | Crossover, Flex Fuel, Performance

Least Popular Market Category – Exotic, Luxury | Flex Fuel, Hybrid

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

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

Result: - The Price will increase with the increasing number of Engine Power.

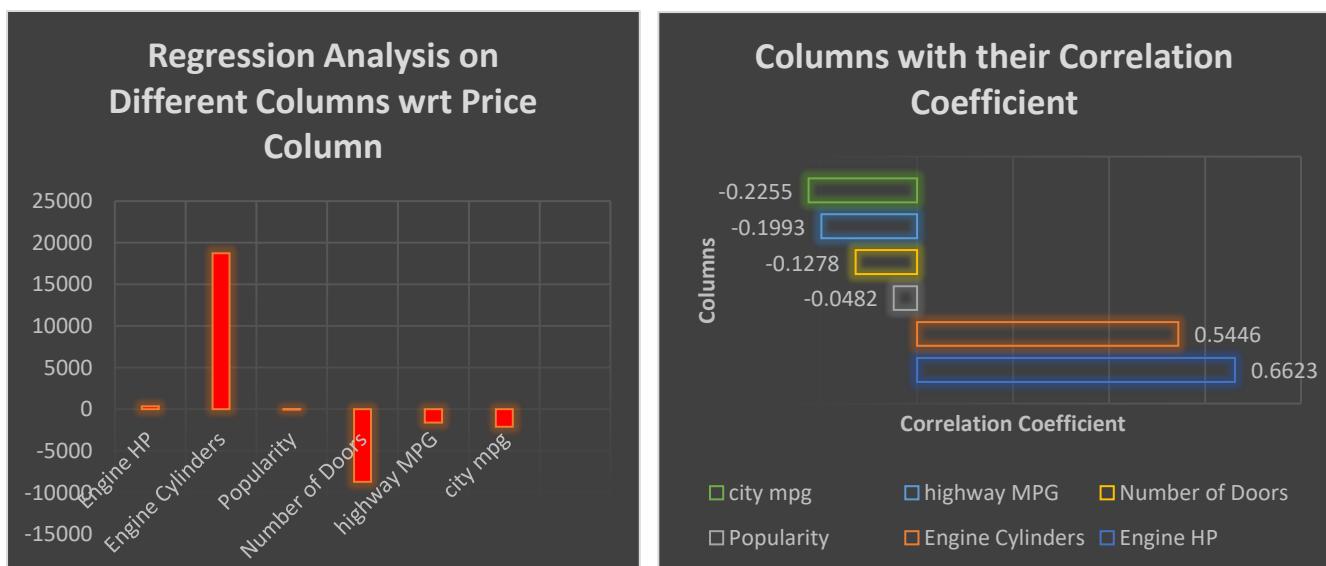


Insight 3- Which car features are most important in determining a car's price?

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

Result:- Engine Horse Power and Engine Cylinders are having a positive relationship with Price whereas Highway MPG, City MPG, Number of Doors, and Popularity is having a negative relationship with Price.

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
Popularity	-2.018886939	43712.2643	-0.0482
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



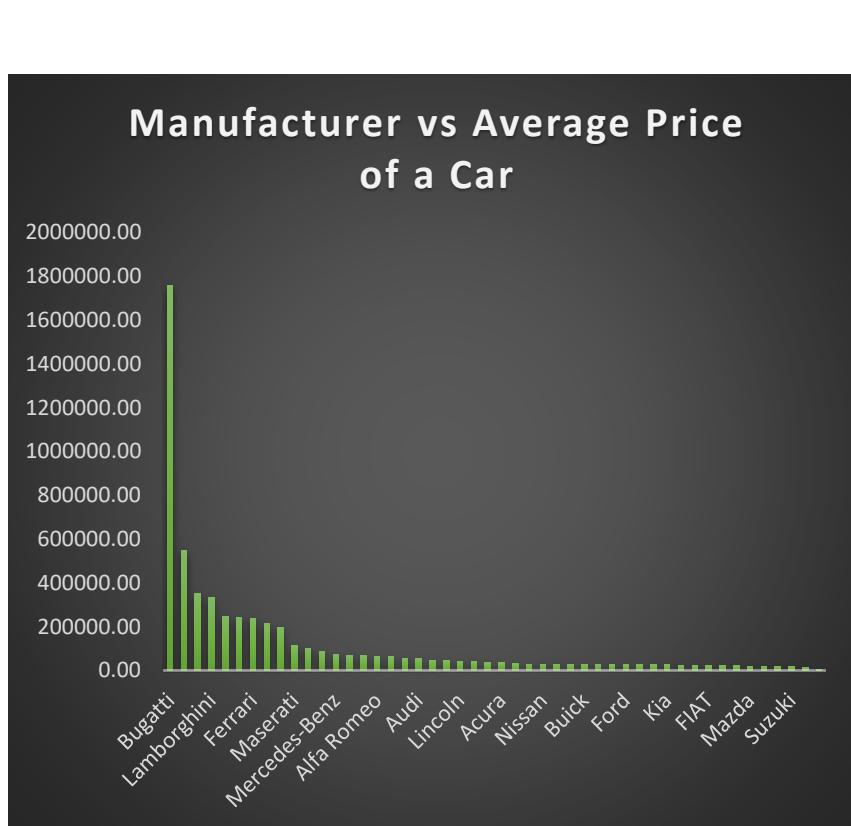
Insight 4- How does the average price of a car vary across different manufacturers?

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

Task 4. B: Created a bar chart that visualizes the relationship between the manufacturer and the average price.

Result:- Highest Average Price of Cars Manufacturer – Bugatti | Maybach | Rolls-Royce | Lamborghini

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

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

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

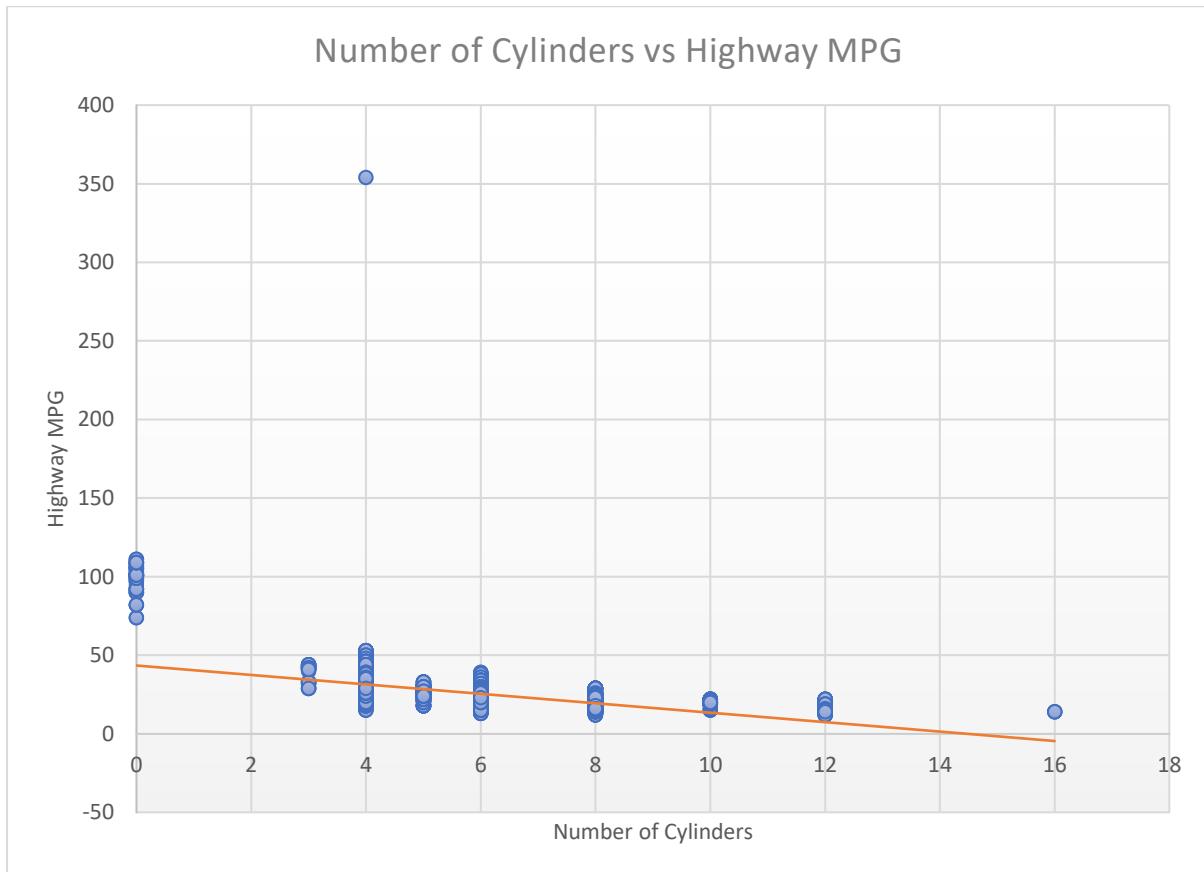
Task 5. B: Calculated the correlation coefficient between the number of cylinders and highway MPG to quantify the strength and direction of the relationship.

Result:- The Trendline for the relationship between the number of Cylinders and Highway MPG is negative which means a lesser number of cylinders will give more highway mpg.

Insight-5 Task B

Correlation coefficient between number of cylinders and highway mpg

-0.620345938

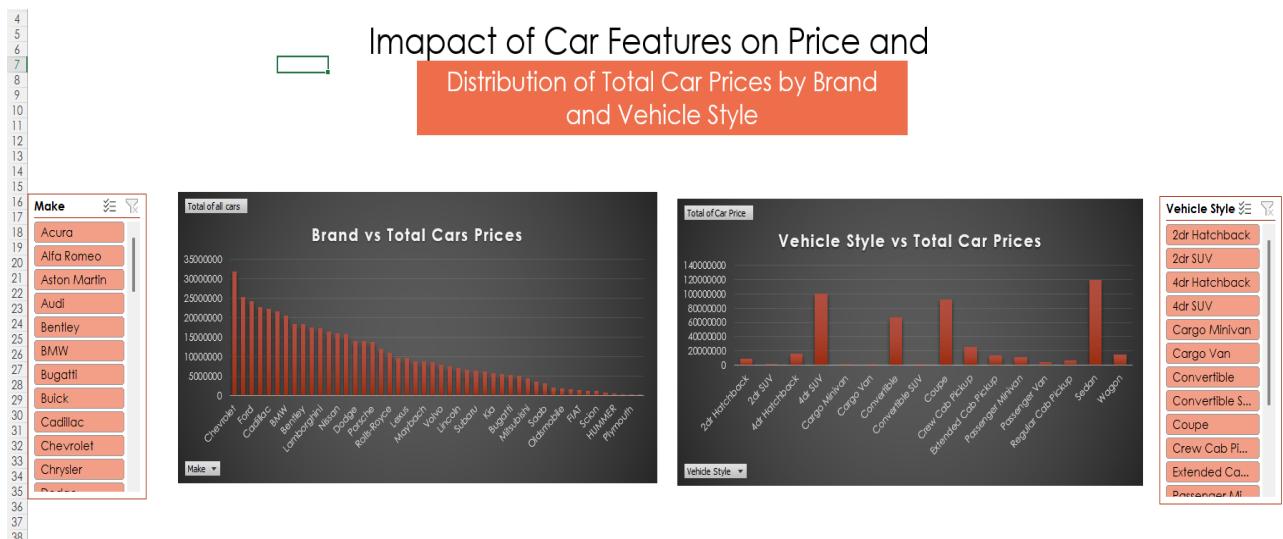


Building the Dashboards:

The client has requested these questions given below. For answering the questions, we will be creating Interactive Dashboards using filters and slicers.

Dashboard 1- How does the distribution of car prices vary by brand and body style?

Result:- Chevrolet Brand and Sedan Vehicle Types will likely have greater MSRP.



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

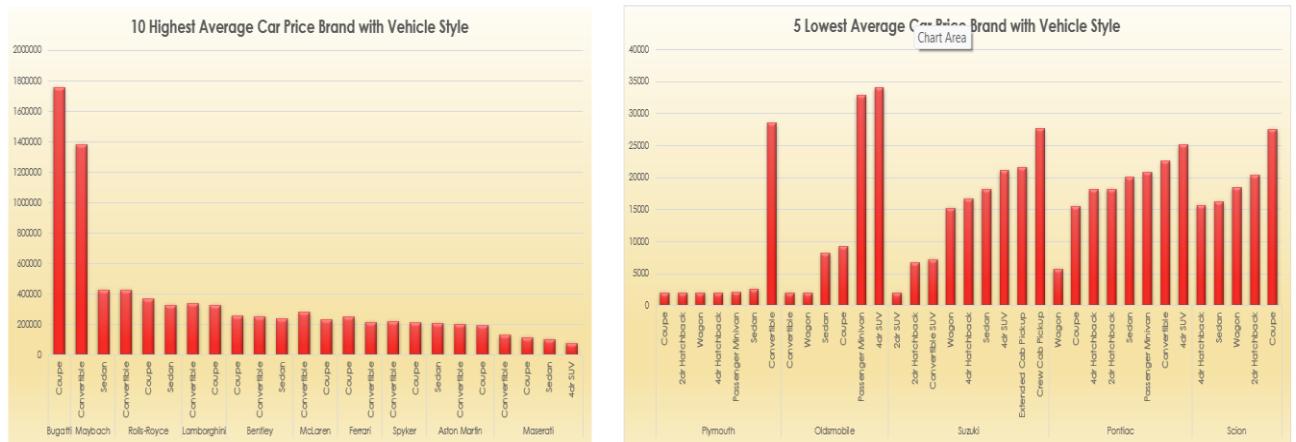
Result: -

The Highest Average Car Price Brand with Vehicle Style is Bugatti's Coupe and Maybach's Convertible.

The Lowest Average Car Price Brand with Vehicle Style is Plymouth's Coupe & 2dr hatchback and Oldsmobile's Wagon & Convertible.

Impact of Car Features on Price and Profitability

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

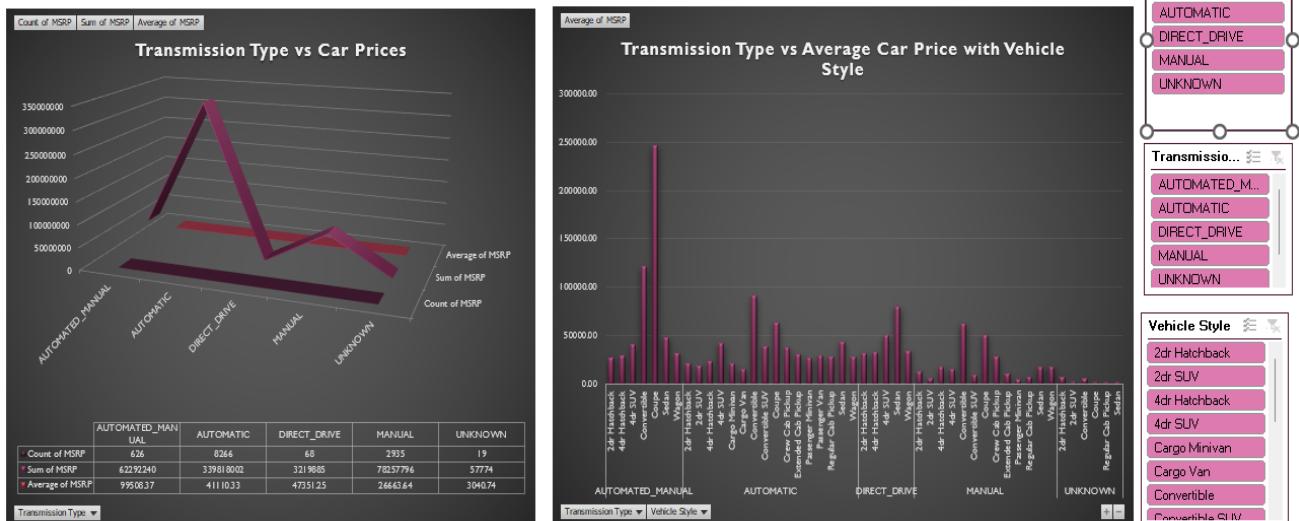


Dashboard 3- How do the different features such as transmission type affect the MSRP, and how does this vary by body style?

Result: - Upon analysis, we found out that **Automated_Manual** has the highest Average MSRP while **Manual** is having lowest Average MSRP.

Impact of Car Features on Price and Profitability

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

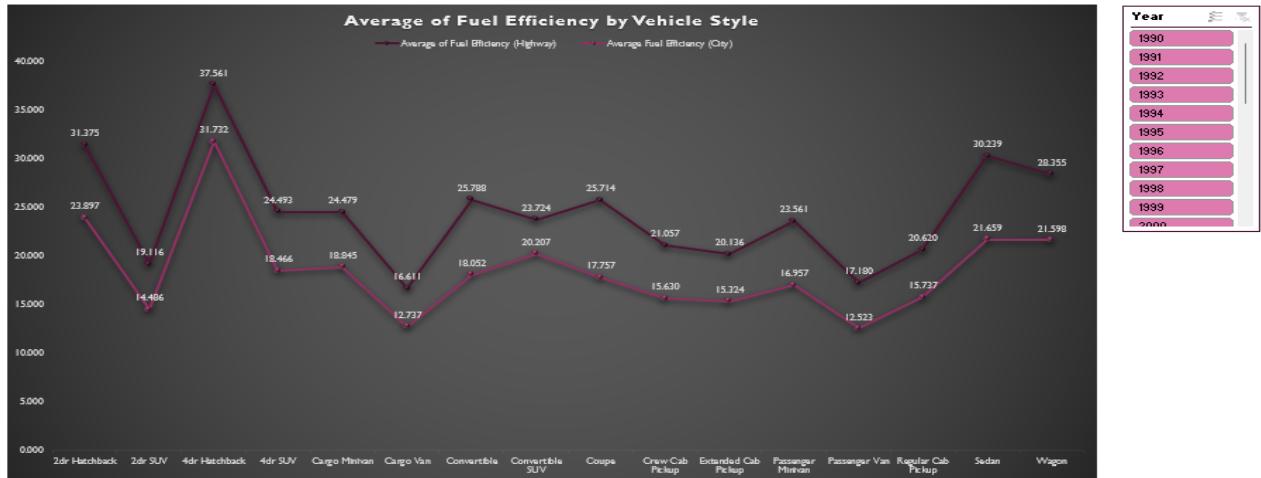


Dashboard 4- How does the fuel efficiency of cars vary across different body styles and model years?

Result: - 4dr Hatchback's fuel efficiency is the highest whereas Cargo Van and Passenger Van's fuel efficiency is the lowest.

Impact of Car Features on Price and Profitability

Average of Fuel Efficiency Overtime with each Vehicle Style



Dashboard 5- How do the car's horsepower, MPG, and price vary across different Brands?

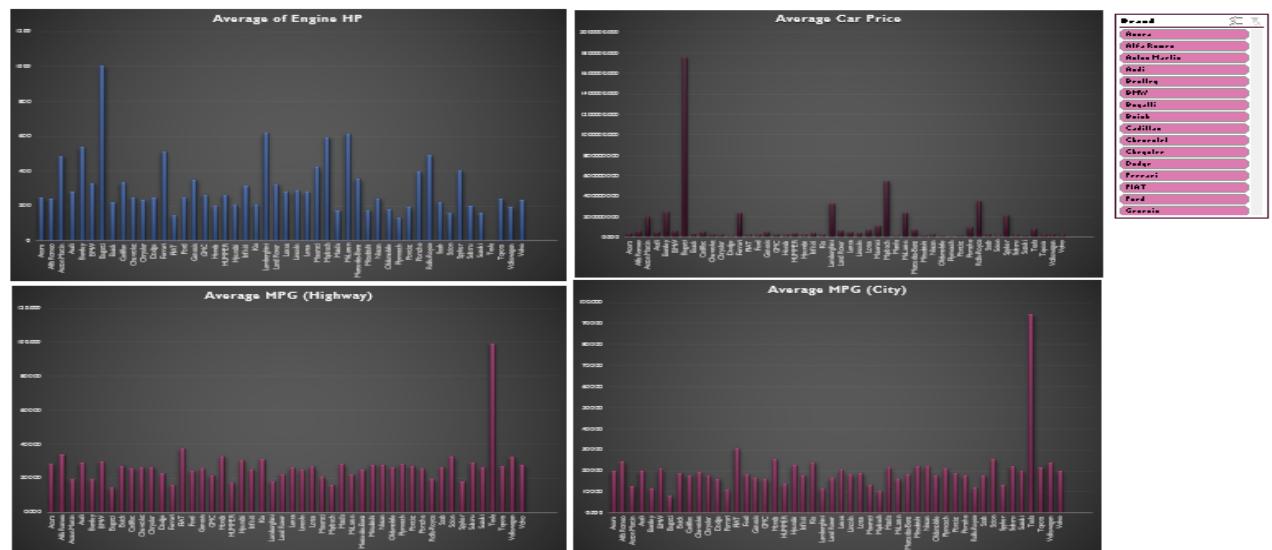
Column Charts to visualize the relationship between horsepower, MPG, and price across different car brands. Assign different colors to each brand and label the bubbles with the car model name.

Calculate the average horsepower, MPG, and MSRP for each car brand using AVERAGEIFS or Pivot Tables.

Result: - Bugatti is having the highest Engine HP and Car Price while Tesla is having the highest MPG (both on Highway and in City).

Impact of Car Features on Price and Profitability

Average of HP, Car Price & MPG by Brand



Project Conclusion

While analysing the data set provided, several meaningful insights were discovered that could not have been discovered by manually searching the dataset for insights.

We could also leverage the Excel-2021 tool and got a little more experienced in using the tool and also injecting different formulas and pivot tables and graphs and dashboards to look for insights.

Drive Link for the Excel sheet:

https://docs.google.com/spreadsheets/d/1loN30qRwCVKgDBnc5CLGFTlZ0FTFLWOK/edit?usp=share_link&ouid=116077077614362440241&rtpof=true&sd=true

Loom Video Link:

<https://www.loom.com/share/6f851ebb81c54808bf9102e956da92bd>

Drive Link for the Project:

https://drive.google.com/drive/folders/1m1YV1NUoN7EgpBvP7HVukx2IlgCJZoSj?usp=share_link