Project by –

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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 data

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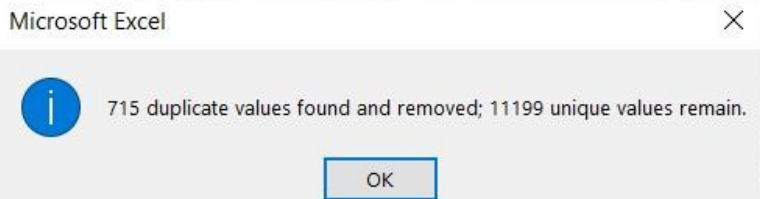
To find the blank values we used COUNTBLANK function in Excel.

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.

715 duplicate values found and removed; 11199 unique values remain.

Formatted Model Column to Text.

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

Market Category	Number of Models	Average Popularity
Flex Fuel,Diesel	16	5657.00
Hatchback,Flex Fuel	7	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,Performa	6	2009.00
Factory Tuner,High-Performance	106	1941.42
Crossover,Factory Tuner,Luxury,High-Perform	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

Car_data | **Insight-1** | Insight-2 | Regression Analysis Sheet | Insight-3 | Insight-4 | Insight-5 A | Brand vs Total MSRP | Vehicl ...

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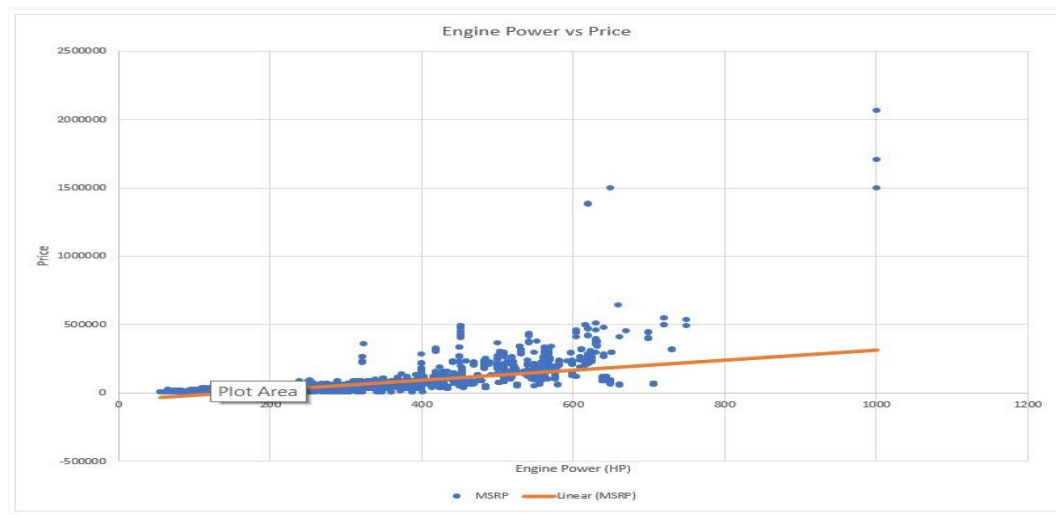
Insight 3- Which car features are most important in determining a car's price?

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

	A	B	C	D	E
1	Columns	Regression Analysis (On Price) - b	a	Correlation Coefficient	
2	Engine HP	365.6216009	-50651.97909	0.6623	
3	Engine Cylinders	18745.09728	-65334.84992	0.5446	
4	Popularity	-2.018886939	43712.2643	-0.0482	
5	Number of Doors	-8733.708219	70554.78374	-0.1278	
6	highway MPG	-1614.95867	83081.18734	-0.1993	
7	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

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.

Insight-5 Task B
Correlation coefficient between number of cylinders and highway mpg
-0.620345938

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.
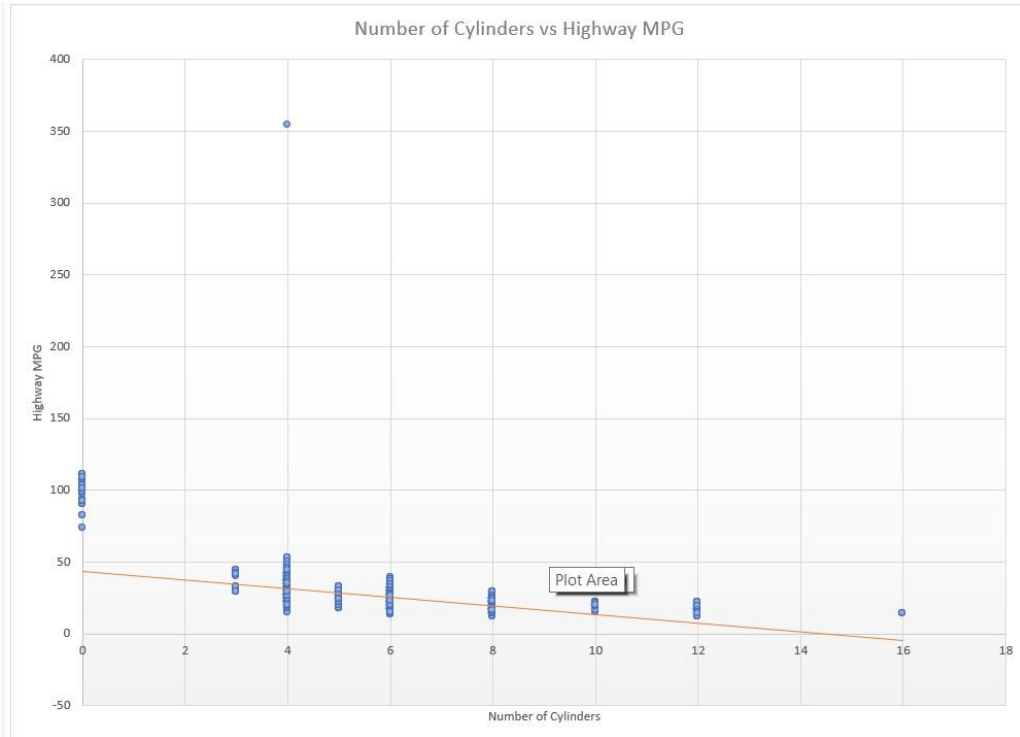
Building the Dashboards:

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?

Stacked column chart to show the distribution of car prices by brand and body style. Used filters and slicers to make the chart interactive. Calculated the total MSRP for each brand and body style using Pivot Tables.

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?

Clustered column chart to compare the average MSRPs across different car brands and body styles. Calculated the average MSRP for each brand and body style using Pivot Tables.

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.

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

3-D line chart to visualize the relationship between MSRP and transmission type, with different symbols for each body style. Calculatde the average MSRP for each combination of transmission type and body style using Pivot Tables.

Result-

Upon analysis, we found out that Automated/Manual has the highest Average MSRP while Manual is having lowest Average MSRP.

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

Line chart to show the trend of fuel efficiency (MPG) over time for each body style. Calculated the average MPG for each combination of body style and model year using Pivot Tables.

Result-

4dr Hatchback's fuel efficiency is the highest whereas Cargo Van and Passenger Van's fuel efficiency is the lowest.
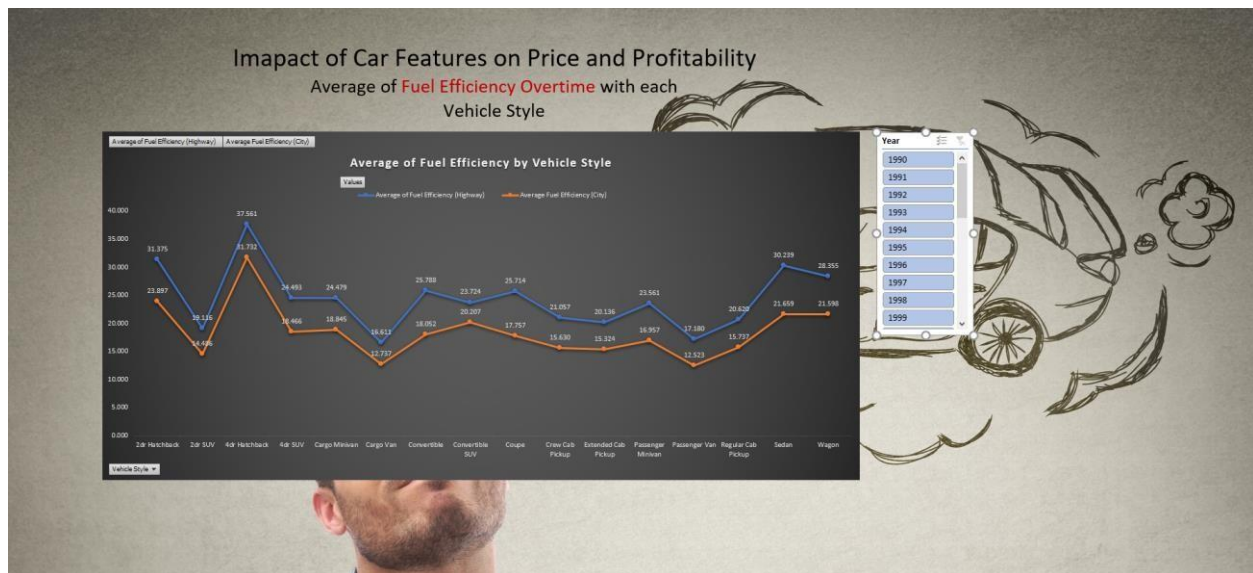
Dashboard 5- How do the car's horsepower, MPG, and price vary across different Brands?

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).
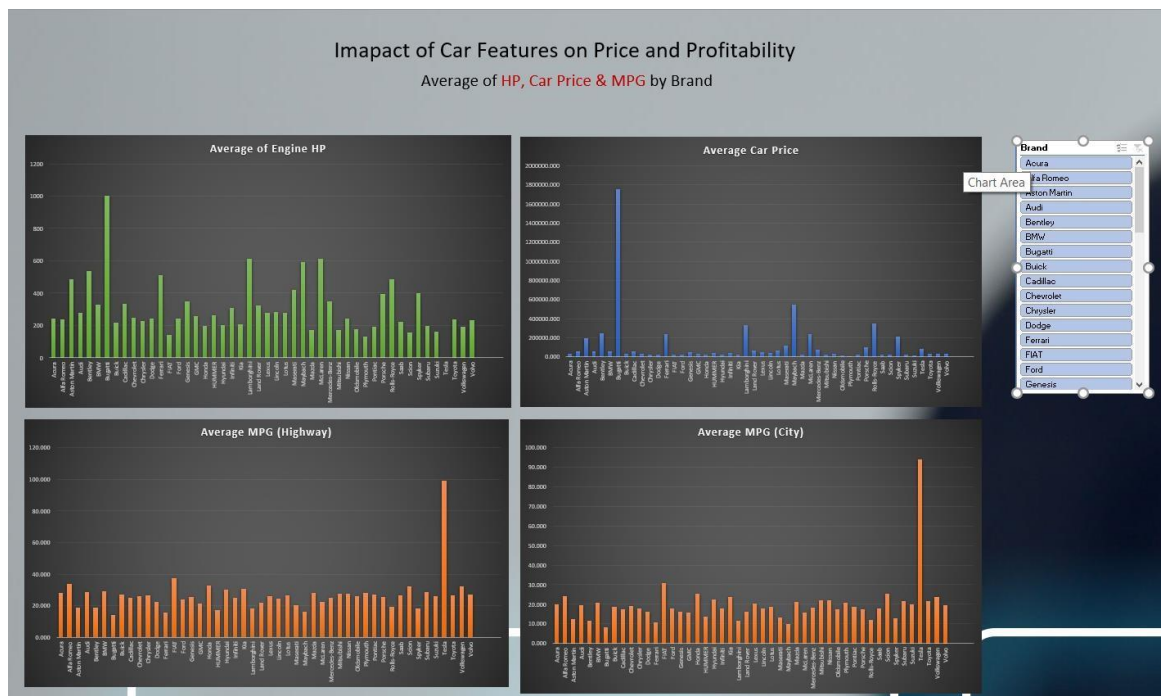
Project Conclusion

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.