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

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.

This problem could be approached by analyzing the relationship between a car's features, market category, and pricing, and identifying which features and categories are most popular among consumers and most profitable for the manufacturer.

The given tasks below based on the business problem would require advanced Excel skills and knowledge of data analysis techniques such as regression analysis, pivot tables, sensitivity analysis, optimization, and time series analysis.

However, by answering these questions and building an interactive dashboard, a data analyst could provide valuable insights to a car manufacturer and help them optimize their pricing and product development decisions to maximize profitability while meeting consumer demand.

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).

Approach:

Before diving into the analysis of the given dataset, it is important to perform thorough data cleaning to ensure accurate and reliable results. You need to build an interactive dashboard in Excel from the tasks given below:

Tech-Stack Used:

In this project I have Used Online Microsoft excel

Dataset Cleaning:

This is the list of blank cells of particular columns

- Engine fuel: 3
- Engine hp: 68
- Engine Cylinders:29
- Number of doors: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.

Result:

V1				
fx Make				
A	B	C	D	E
1	Make	Model	Market Category	Sum of Popularity
2	Acura	CL	Factory Tuner,Luxury,Performance	612
3			Luxury	1224
4		CL Total		1836
5		ILX	Luxury	3060
6			Luxury,Performance	204
7		ILX Total		3264
8		ILX Hybrid	Luxury,Hybrid	408
9		ILX Hybrid Total		408
10		Integra	Hatchback,Factory Tuner,Luxury,Performance	408
11			Hatchback,Luxury	1632
12			Hatchback,Luxury,Performance	612
13			Luxury	1632
14			Luxury,Performance	612
15		Integra Total		4896

Task 1.B: Create a stacked column chart that visualizes the relationship between market category and popularity.

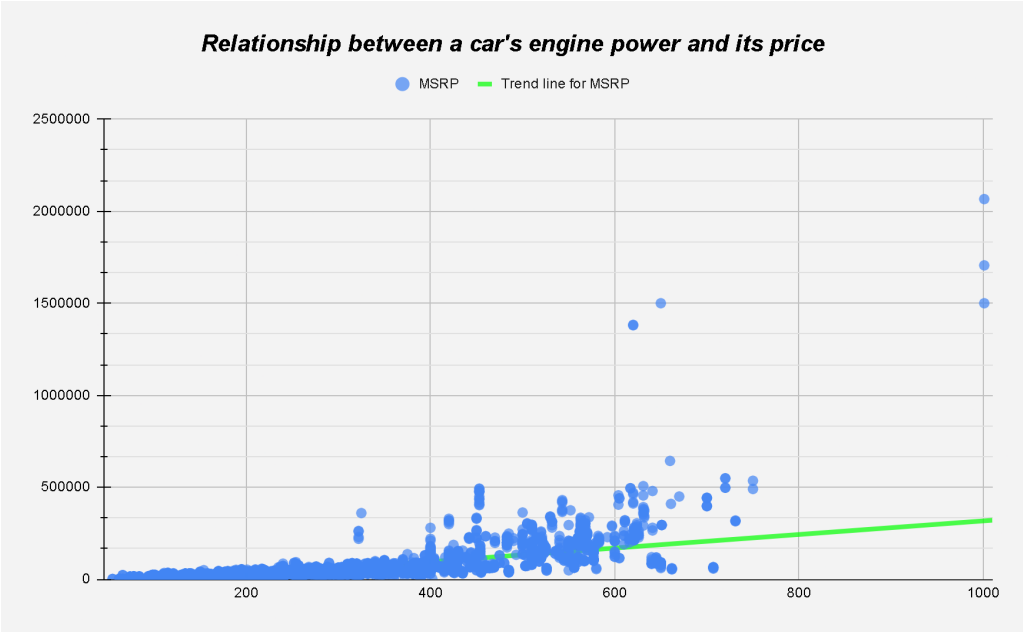
Result:



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.

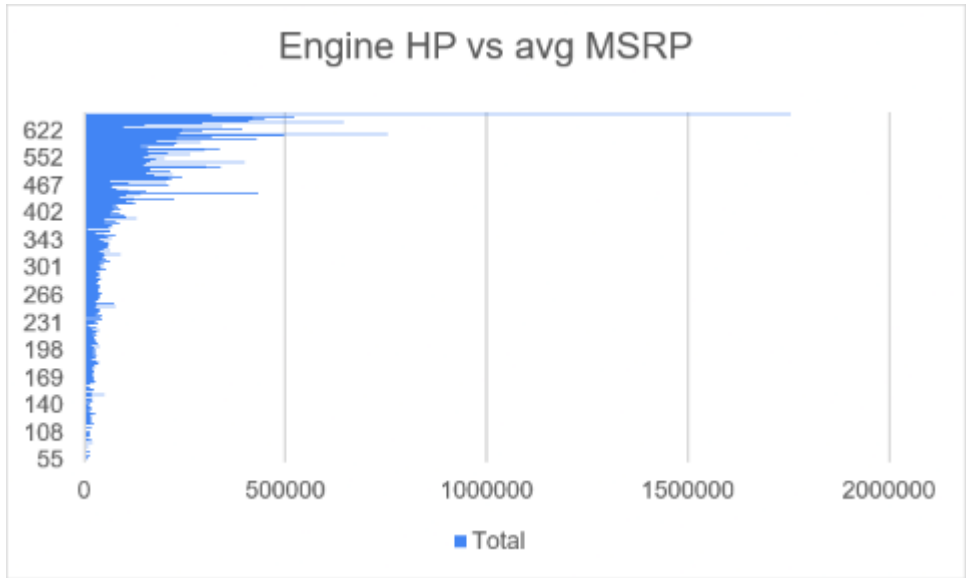
Result:



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.

Result:



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:

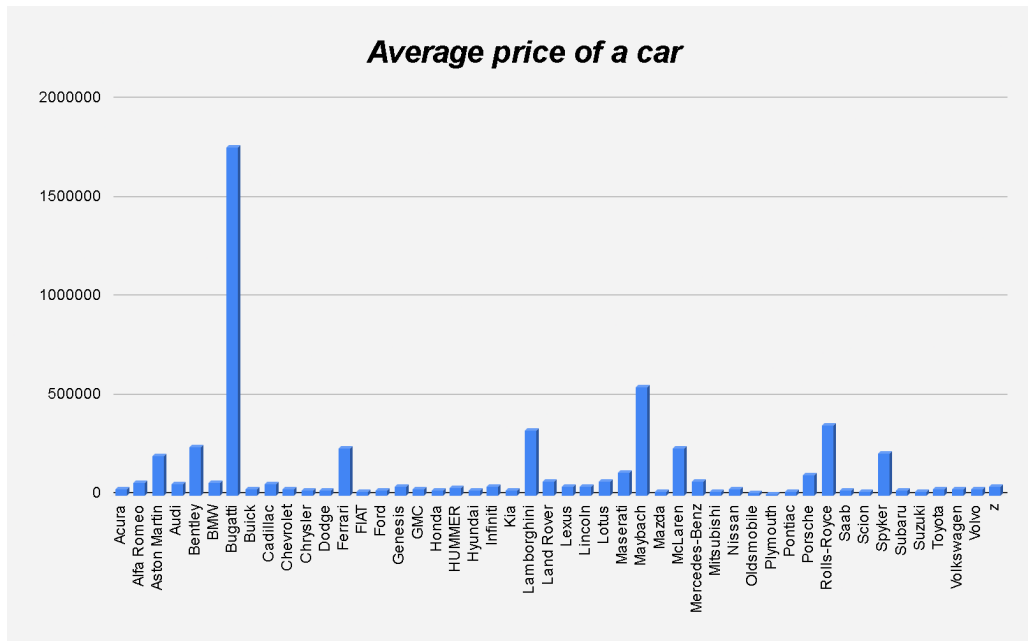
Make	Average of MSRP
Acura	35087.4878
Alfa Romeo	61600
Aston Martin	198123.4615
Audi	54574.1215
Bentley	247169.3243
BMW	62218.47988

Bugatti	1757223.667
Buick	29034.18947
Cadillac	56368.26515
Chevrolet	29018.35005
Chrysler	26722.96257
Dodge	24857.04537
Ferrari	238218.8406
FIAT	22206.01695
Ford	28522.86207
Genesis	46616.66667
GMC	32444.08506
Honda	26608.88399
HUMMER	36464.41176
Hyundai	24926.26255
Infiniti	42640.27134
Kia	25318.75
Lamborghini	331567.3077
Land Rover	68067.08633
Lexus	47549.06931
Lincoln	43560.01316
Lotus	68377.14286
Maserati	113684.4909
Maybach	546221.875
Mazda	20416.62379
McLaren	239805
Mercedes-Benz	72135.02647

Mitsubishi	21332.57005
Nissan	28856.42329
Oldsmobile	12843.79545
Plymouth	3296.873239
Pontiac	19800.0442
Porsche	101622.3971
Rolls-Royce	351130.6452
Saab	27879.80734
Scion	19932.5
Spyker	214990
Subaru	24240.67364
Suzuki	18021.0531
Toyota	28788.11297
Volkswagen	28978.52289
Volvo	29724.68421
z	44100
Grand Total	41889.

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

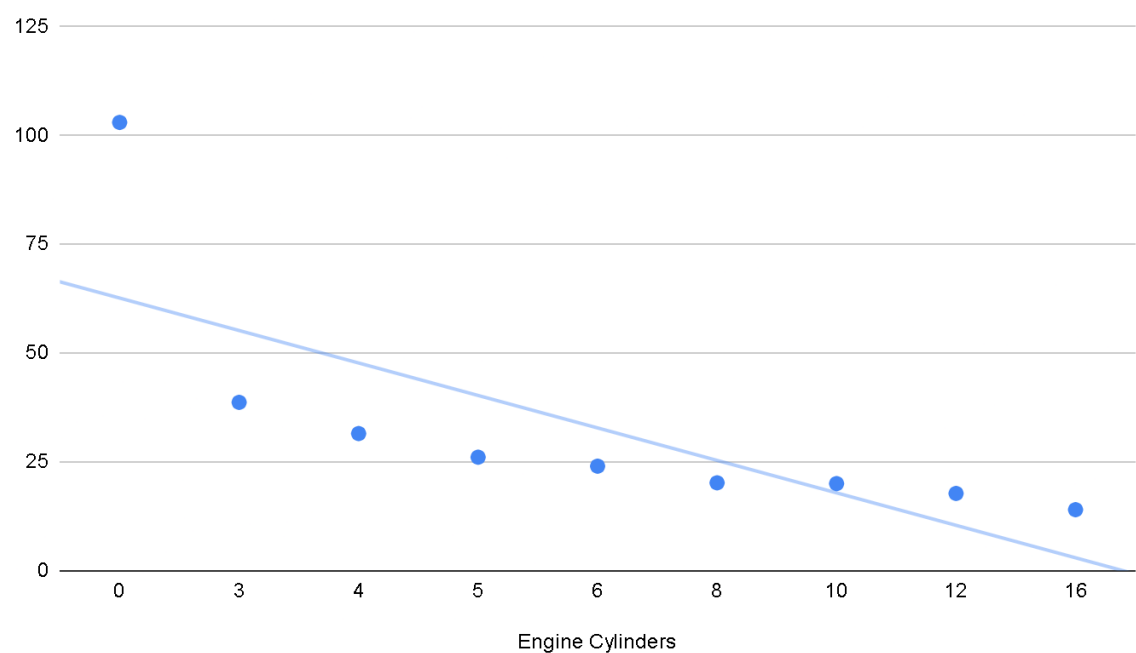
Result:



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.

Result:



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

Result:

```
=CORREL(A:A,B:B)  
-0.6147395141
```

Negative correlation is sometimes described as inverse correlation.

In statistics, positive correlation describes the relationship between two variables that change together, while an inverse correlation describes the relationship between two variables which change in opposing directions.

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 Pivot Tables.

[Dashboard](#)

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 Pivot Tables.

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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.

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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 Pivot Tables.

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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 Pivot Tables.

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Thank You