

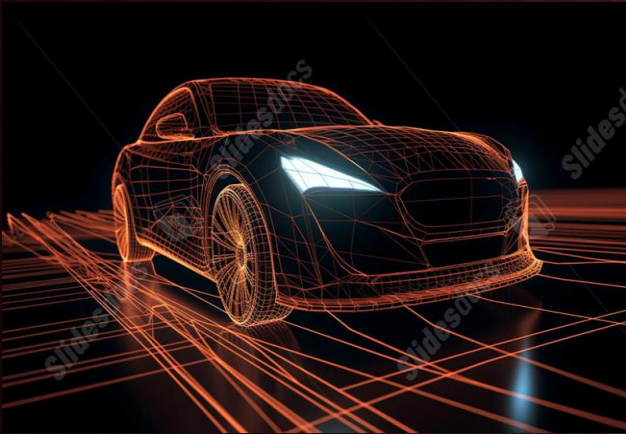
Analyzing the Impact of Car Features on Price & Profitability

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PROJECT OVERVIEW

- The automotive industry has witnessed significant transformations driven by factors such as fuel efficiency, environmental concerns, and technological advancements. Amidst fierce competition and evolving consumer preferences, understanding the dynamics of consumer demand is paramount for manufacturers seeking sustained success.
- This project aims to analyze the relationship between a car's features, market category, and pricing, and identify the key factors that affect profitability and consumer demand.
- Given a comprehensive dataset, the key question posed by our client, a leading car manufacturer, is: How can we strategically set prices and develop products to enhance profitability while meeting consumer demand?



ANALYSIS APPROACH

To gain insights and address the problem, we will:

- Explore trends in car features and pricing over time
- Analyze the relationship between engine power, fuel efficiency, and pricing.
- Identify the most important features influencing a car's price
- Examine pricing variations across manufacturers and market categories.
- Develop an interactive dashboard to visualize the findings.
- By leveraging advanced Excel skills, regression analysis, and data visualization techniques, we aim to provide valuable insights to support informed pricing and product development decisions.
- This presentation structure provides an overview of the project, outlines the problem statement, describes the dataset, and explains the analysis approach. It sets the stage for the subsequent slides, which will delve into the specific analyses, findings, and recommendations



TECH STACK USED



- Microsoft Excel 2020: Used for data analysis, manipulation, and visualization. Excel provides a wide range of functionalities for working with data, including formulas, charts, and pivot tables.
- Microsoft PowerPoint: Utilized for creating presentations to showcase your analysis results, findings, and insights. PowerPoint offers tools for designing visually appealing slides and presenting information in a structured manner.



TASK 1 – POPULARITY OF CAR MODEL

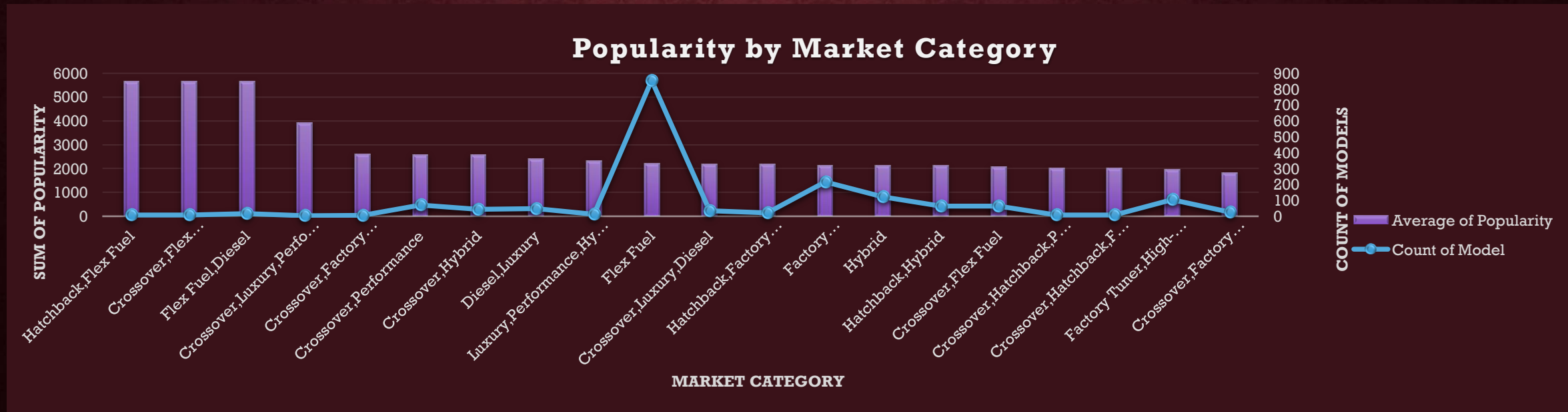
- **Task 1.A:** Create a pivot table that shows the number of car models in each market category and their corresponding popularity scores.

- **Insight :** Top 20 Market Category Popularity of Cars

Market Category	Average of Popularity	Count of Model
Hatchback, Flex Fuel	5657	7
Crossover, Flex Fuel, Performance	5657	6
Flex Fuel, Diesel	5657	16
Crossover, Luxury, Performance, Hybrid	3916	2
Crossover, Factory Tuner, Luxury, Performance	2607	5
Crossover, Performance	2586	69
Crossover, Hybrid	2563	42
Diesel, Luxury	2416	47
Luxury, Performance, Hybrid	2333	11
Flex Fuel	2226	855
Crossover, Luxury, Diesel	2196	33
Hatchback, Factory Tuner, Performance	2174	21
Factory Tuner, Luxury, High-Performance	2133	215
Hybrid	2117	121
Hatchback, Hybrid	2111	64
Crossover, Flex Fuel	2074	64
Crossover, Hatchback, Performance	2009	6
Crossover, Hatchback, Factory Tuner, Performance	2009	6
Factory Tuner, High-Performance	1966	104
Crossover, Factory Tuner, Luxury, High-Performance	1823	26
Grand Total	2262	1720

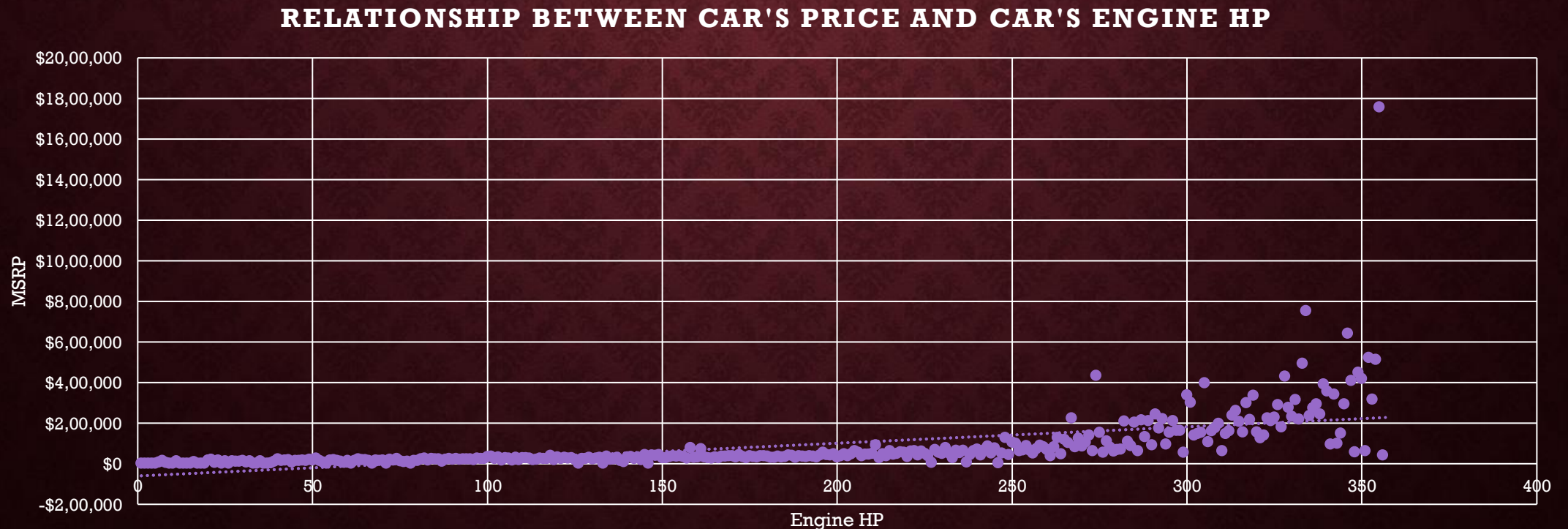
TASK 1 – POPULARITY OF CAR MODEL

- **Task 1.B:** Create a combo chart that visualizes the relationship between market category and popularity.
- **Insight :** The Most Popular Category of Cars is Hatchback, Flex Fuel/Diesel, Crossover and Luxury Cars.



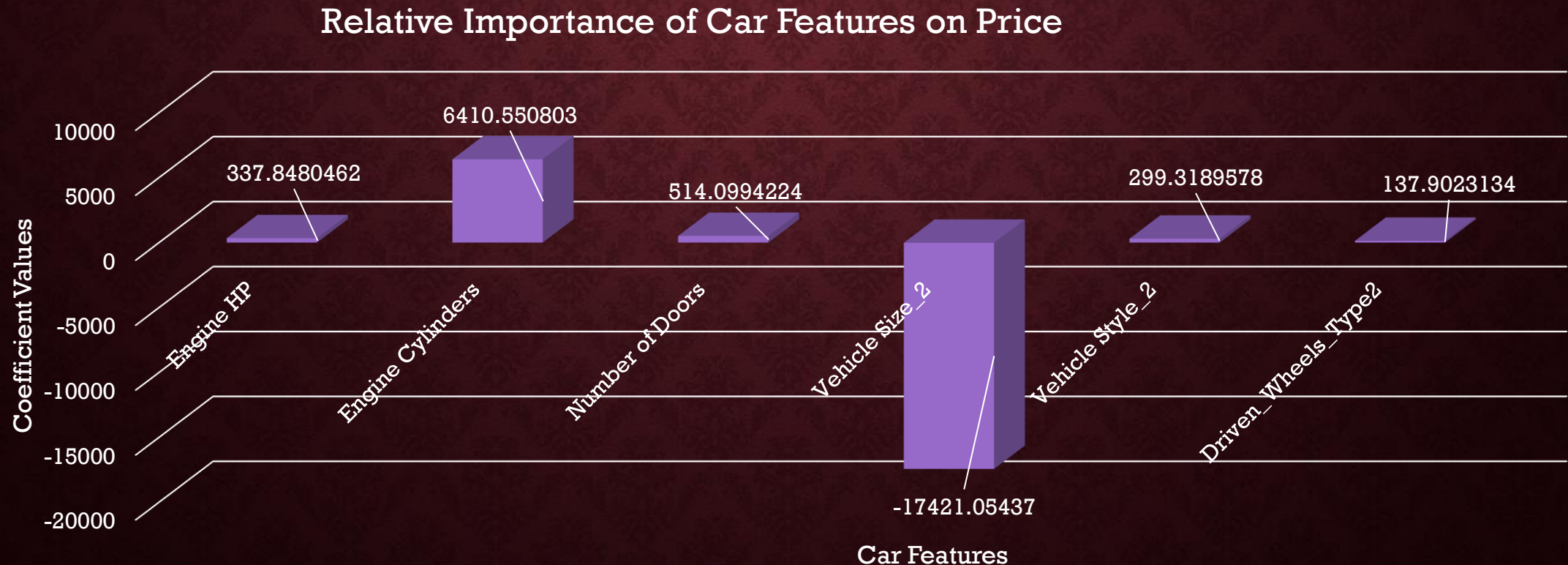
TASK 2 - RELATIONSHIP BETWEEN A CAR'S ENGINE POWER AND ITS PRICE?

- **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.
- **Insight :** Below is the Scatter Chart Plot which shows that as the Engine Power i.e HP Increases Prices also increases and can say that it is directly proportional.



TASK 3 -WHICH FEATURES ARE MOST IMPORTANT FOR DETERMINING 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.
- **Insight:** The Features which is important with respect to price is Engine Cylinders, Engine HP (Power) and then Least is Vehicle Size. That is why Cars which are expensive like Sports Car are the Costliest.



TASK 4 - AVERAGE PRICE BY MANUFACTURER

- **Task 4.A:** Create a pivot table that shows the average price of cars for each manufacturer.
- **Insight :** Below is the List of Average Price of Cars of Each Manufacturer or Maker, where Bugatti is the Most Expensive Car Maker by Average Price.

Make (Manufacturer)	Average of MSRP
Bugatti	\$17,57,224
Maybach	\$5,46,222
Rolls-Royce	\$3,51,131
Lamborghini	\$3,31,567
Bentley	\$2,47,169
McLaren	\$2,39,805
Ferrari	\$2,37,384
Spyker	\$2,14,990
Aston Martin	\$1,98,123
Maserati	\$1,13,684
Porsche	\$1,01,622
Mercedes-Benz	\$72,135
Lotus	\$68,377
Land Rover	\$68,067
BMW	\$62,163
Alfa Romeo	\$61,600
Cadillac	\$56,368
Audi	\$54,574
Lexus	\$47,549
Genesis	\$46,617
Grand Total	\$97,004

TASK 4 - AVERAGE PRICE BY MANUFACTURER

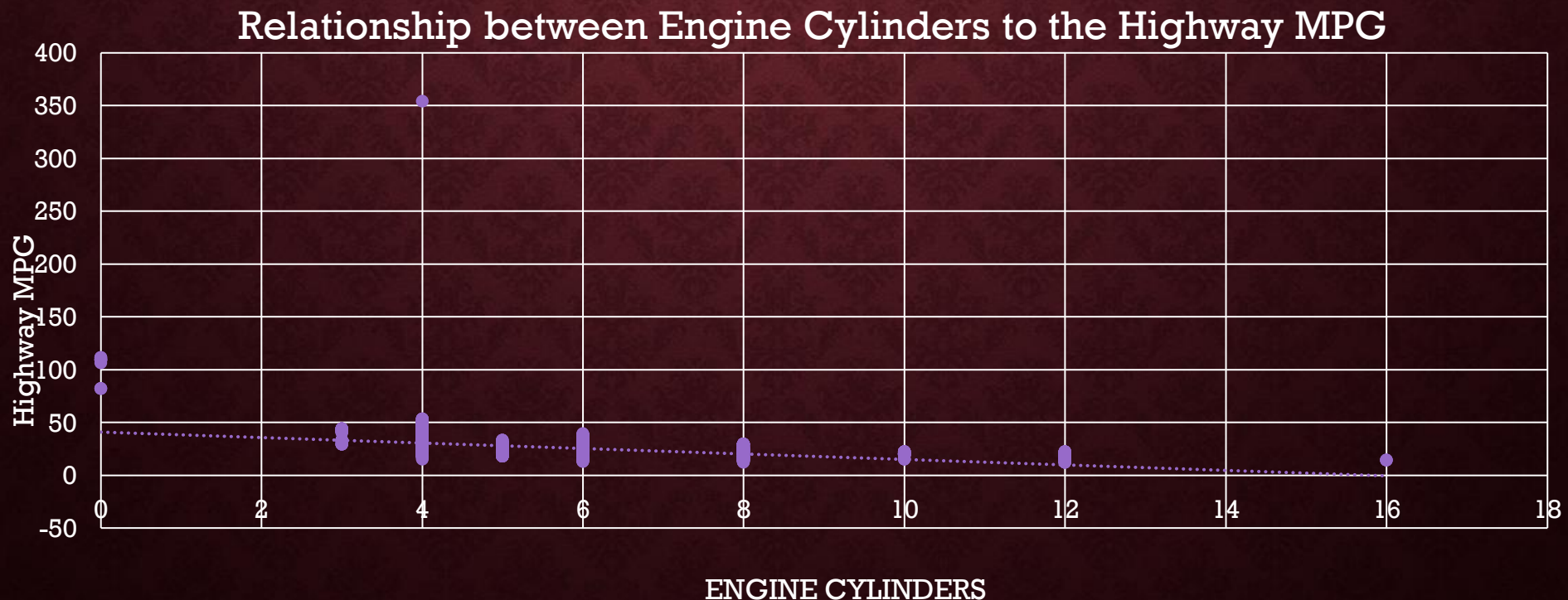
- **Task 4.B:** Create a bar chart or a horizontal stacked bar chart that visualizes the relationship between manufacturer and average price.
- **Insight :** As per the Analysis, Bugatti has the Most Expensive Average Price of Cars followed by Maybach, Rolls-Royce and Least expensive is Plymouth, Suzuki

AVERAGE PRICE OF CAR ACROSS DIFFERENT MANUFACTURERS



TASK 5- RELATIONSHIP BETWEEN FUEL EFFICIENCY AND ENGINE CYLINDERS

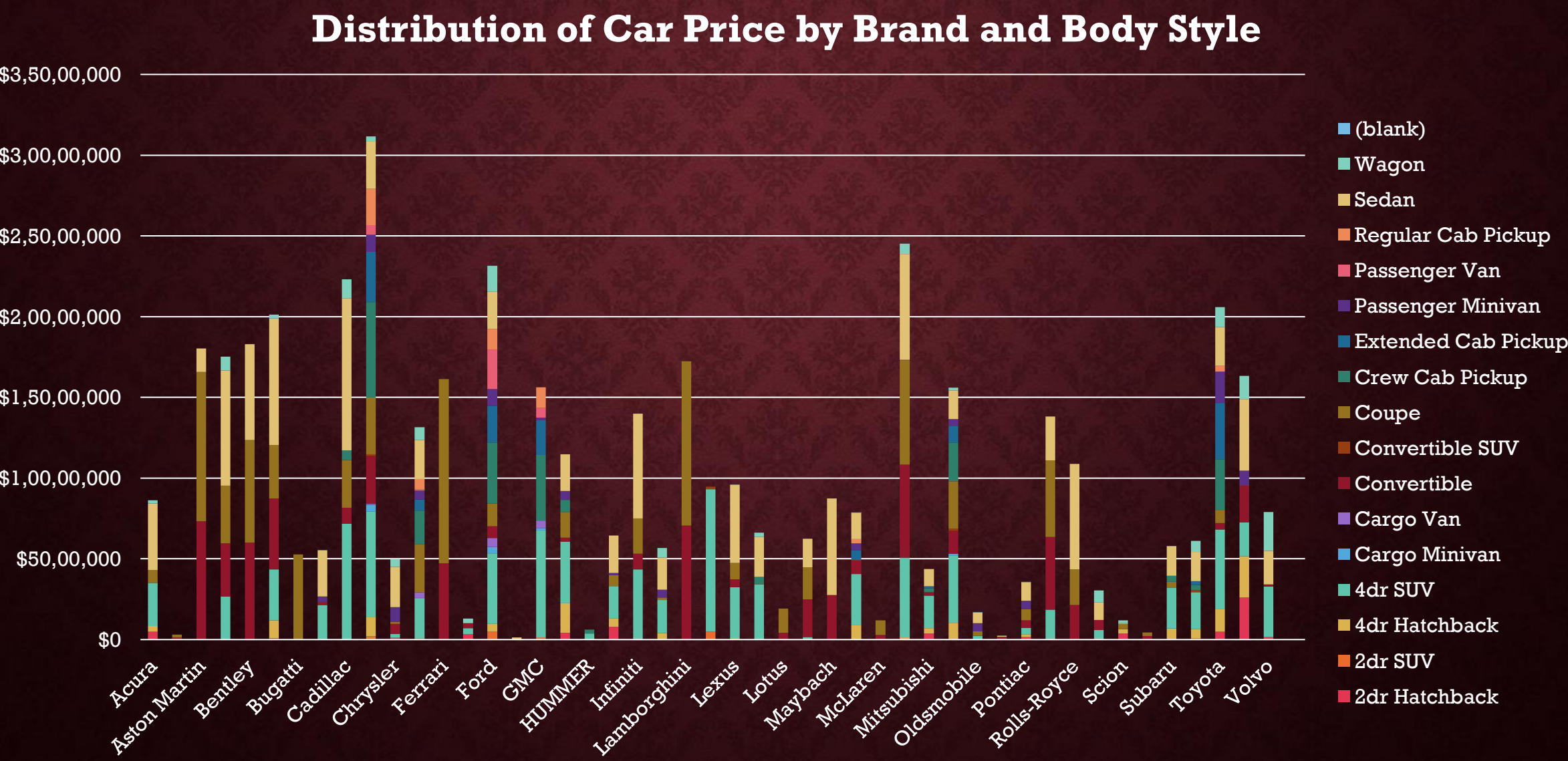
- **Task 5.A:** Create a scatter plot with the number of cylinders on the x-axis and highway MPG on the y-axis. Then create a trendline on the scatter plot to visually estimate the slope of the relationship and assess its significance
- **Insight :** As per the Analysis, When the Engine Cylinders are Higher then the Highway MPG is Lower because More Cylinders More Powerful Engine thus Lower MPG



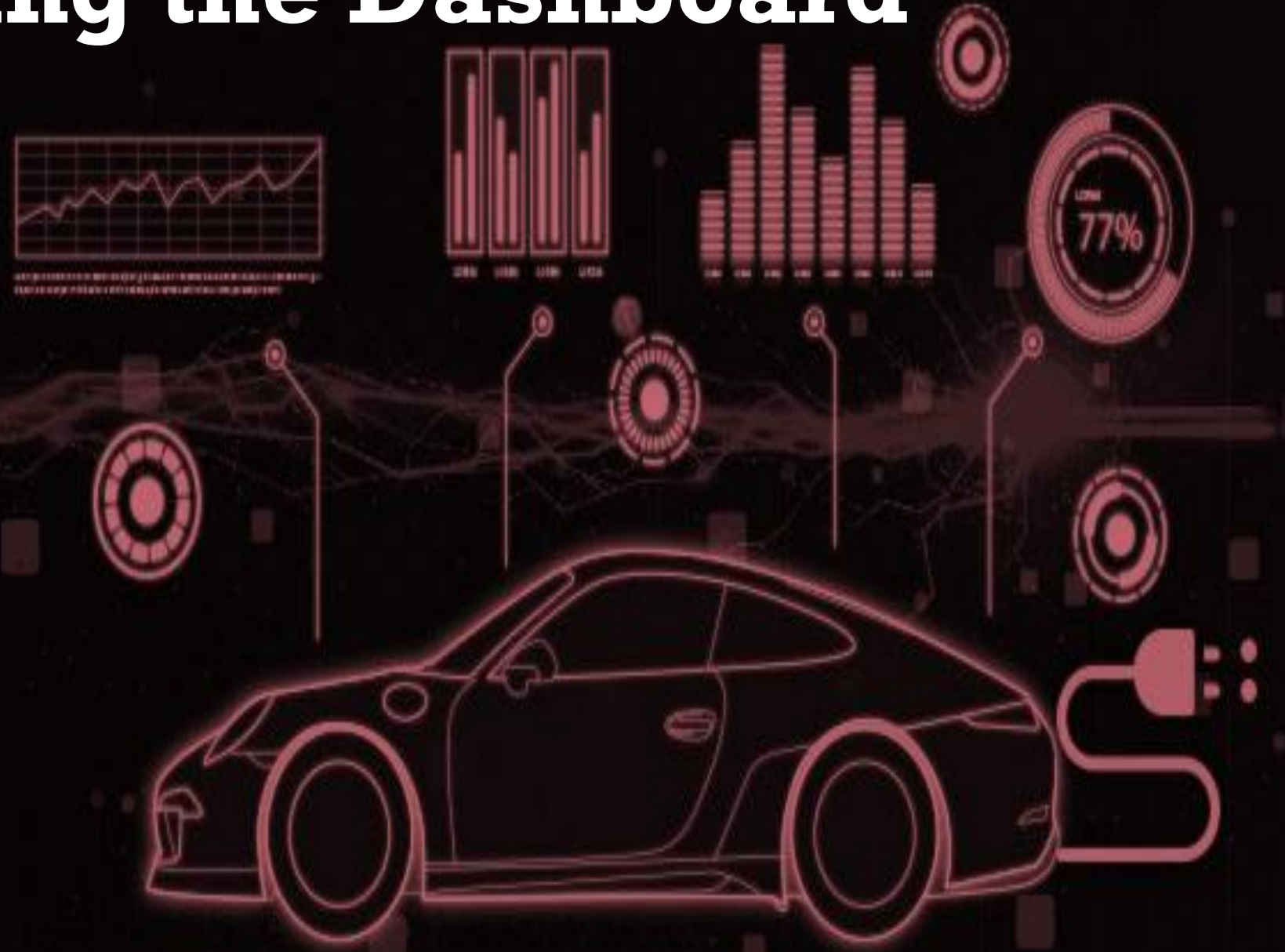
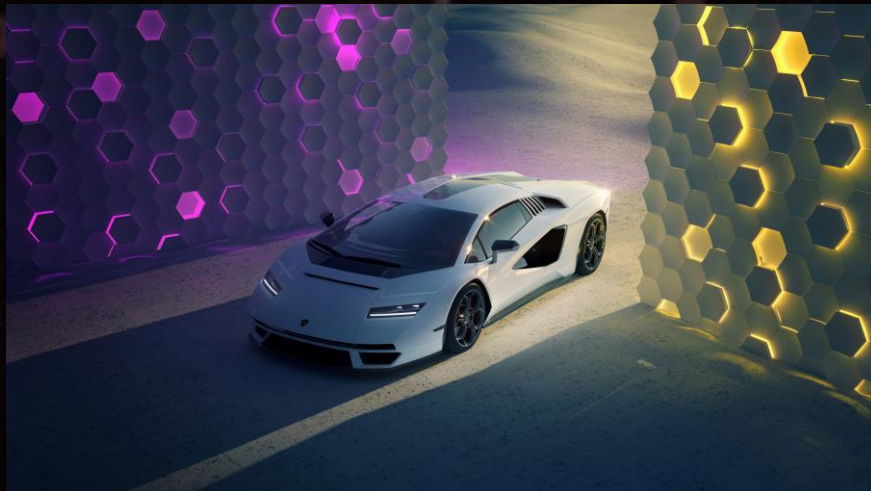
TASK 5- RELATIONSHIP BETWEEN FUEL EFFICIENCY AND ENGINE CYLINDERS

- 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: Correlation Coefficient is $\{-0.614703148\}$

Task 1: How does the distribution of car prices vary by brand and body style?

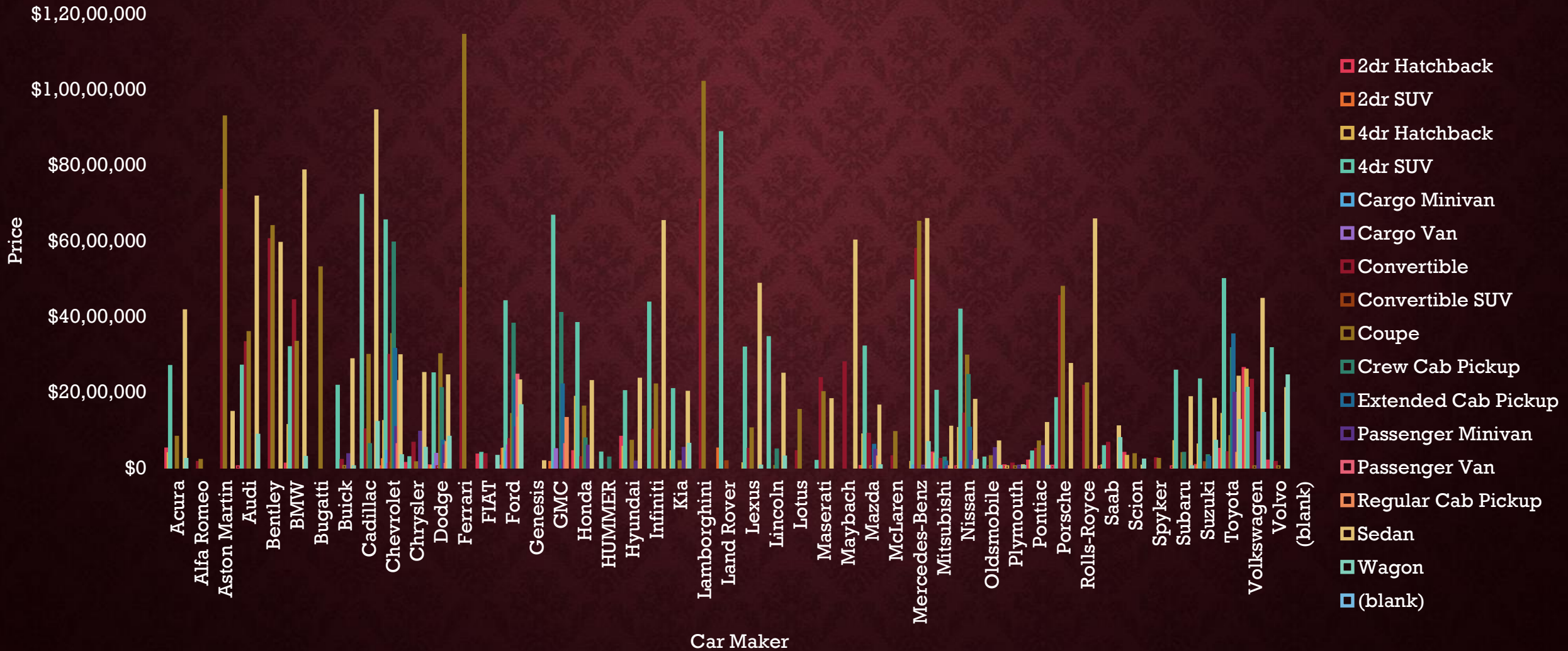


Building the Dashboard

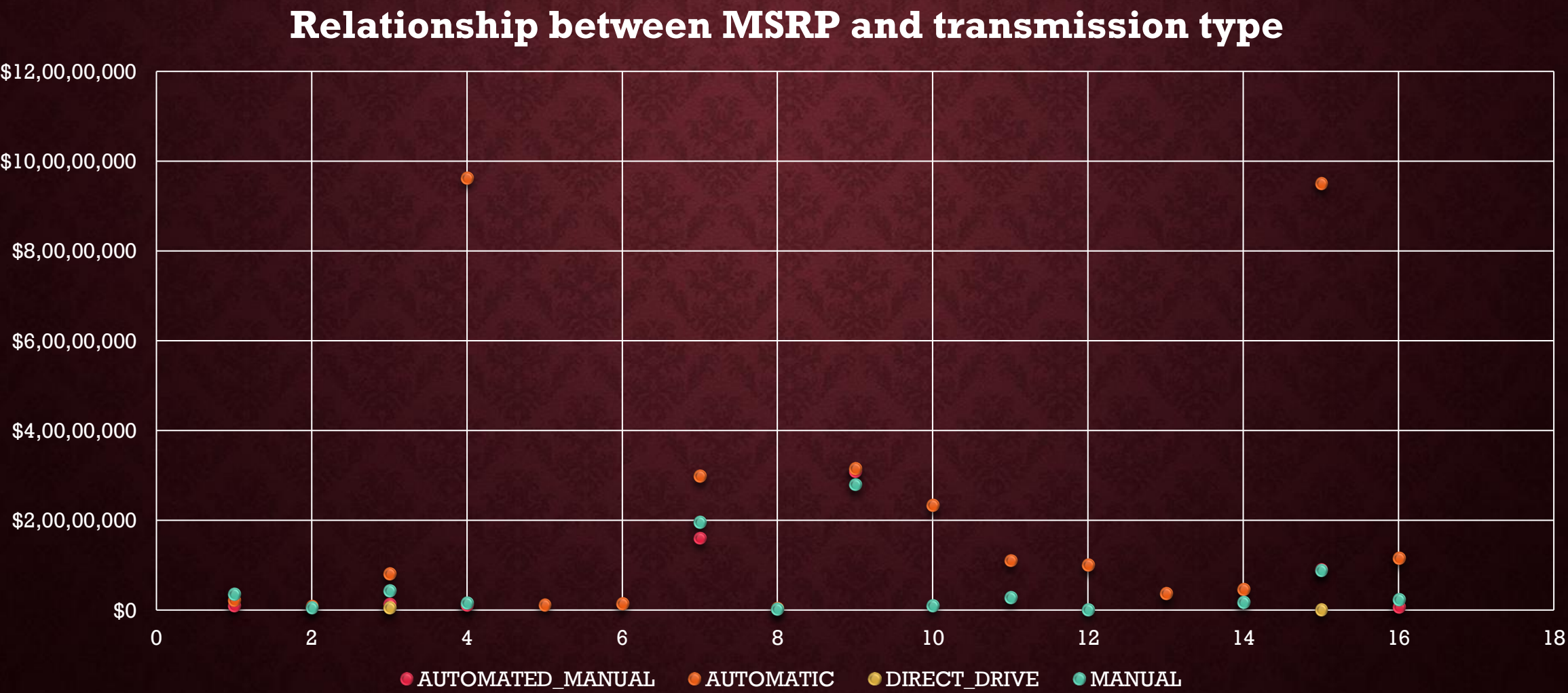


Task 2: Which car brands have the highest and lowest average MSRPs, and how does this vary by body style?

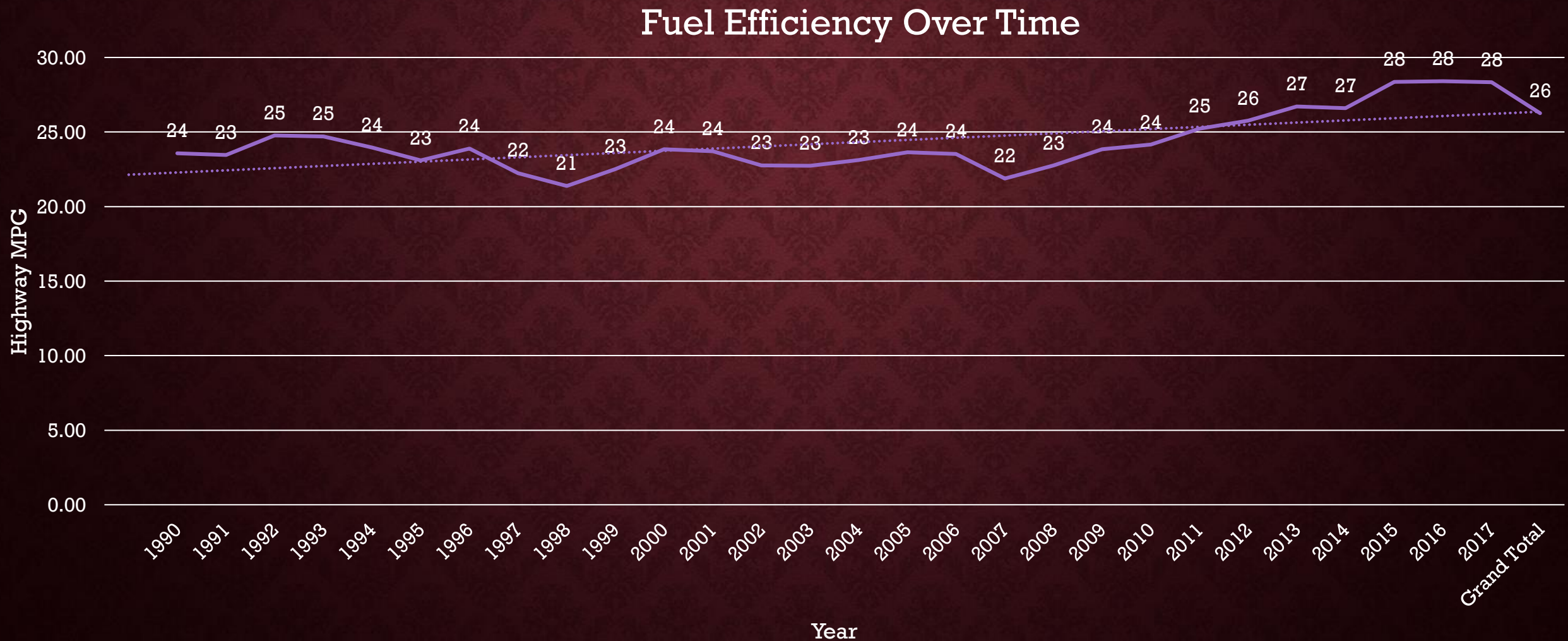
Average Price of Car and Body Style



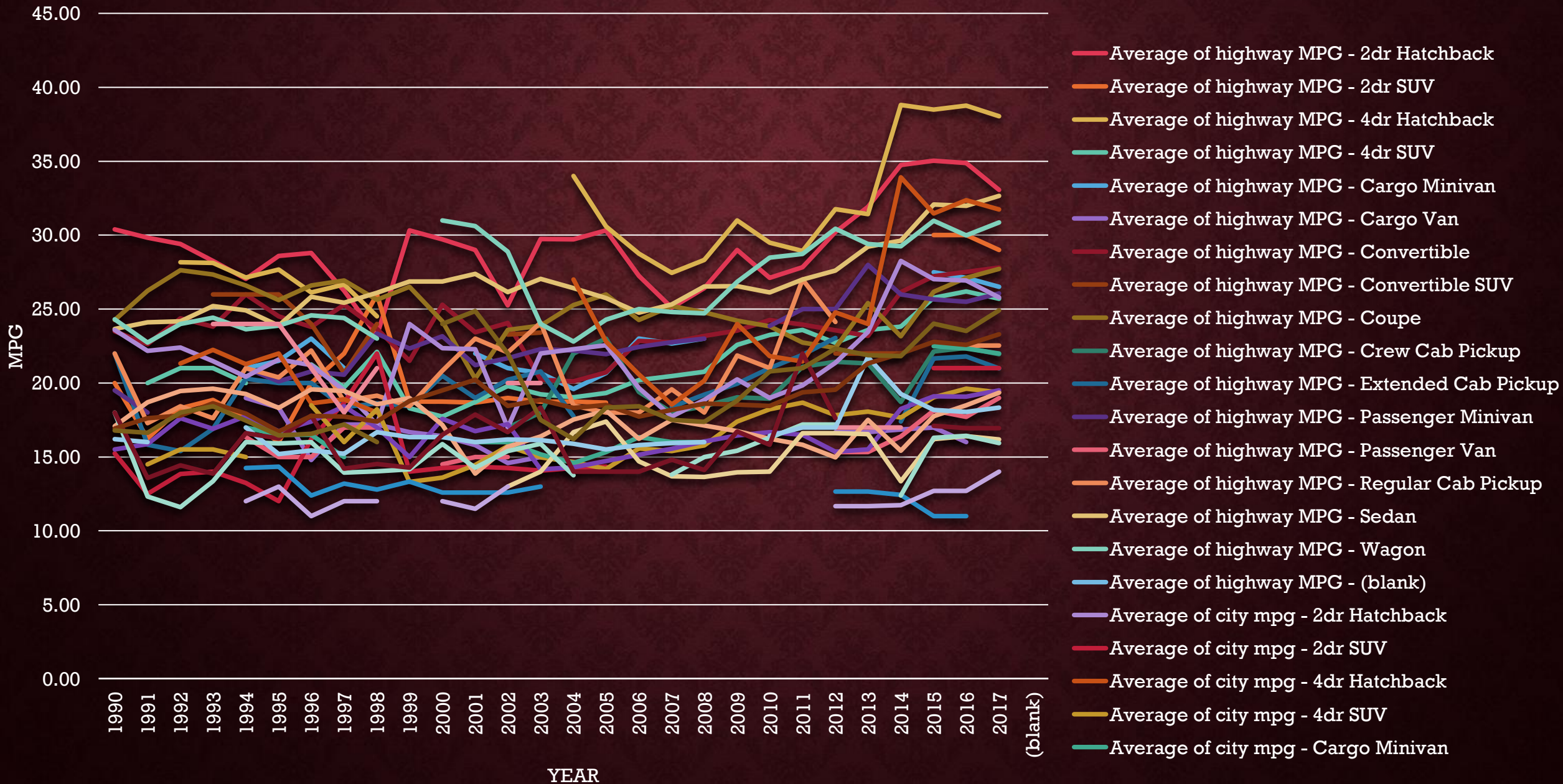
Task 3: How do the different feature such as transmission type affect the MSRP, and how does this vary by body style?



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

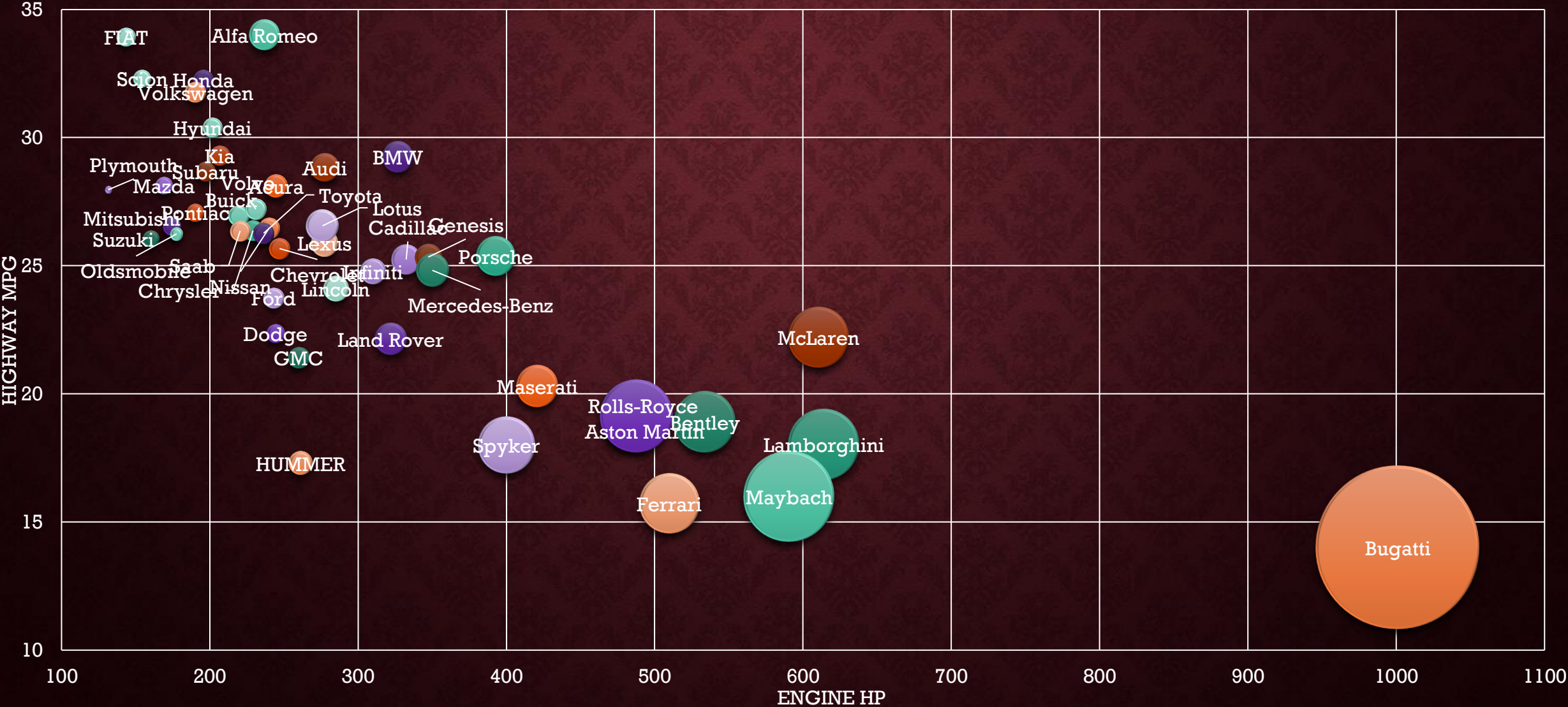


Fuel efficiency of cars vary across different body styles and model years

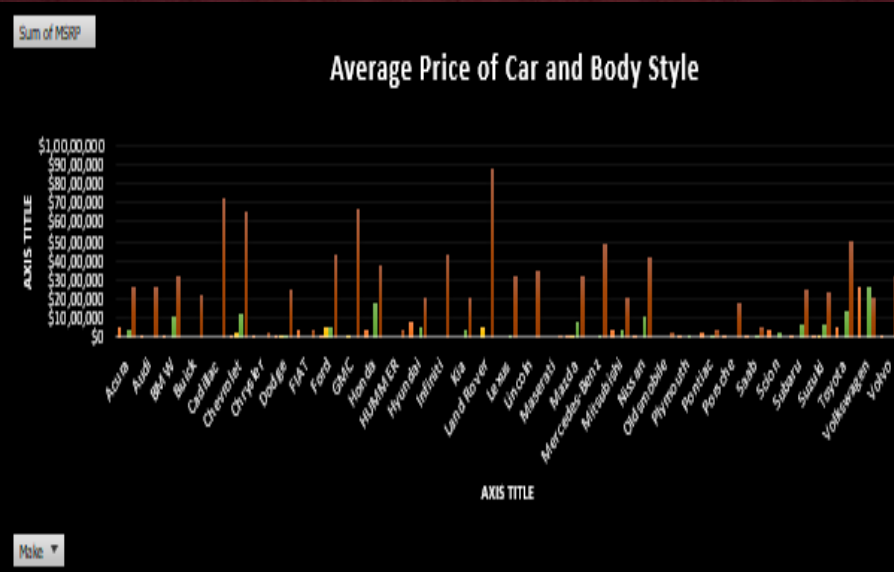
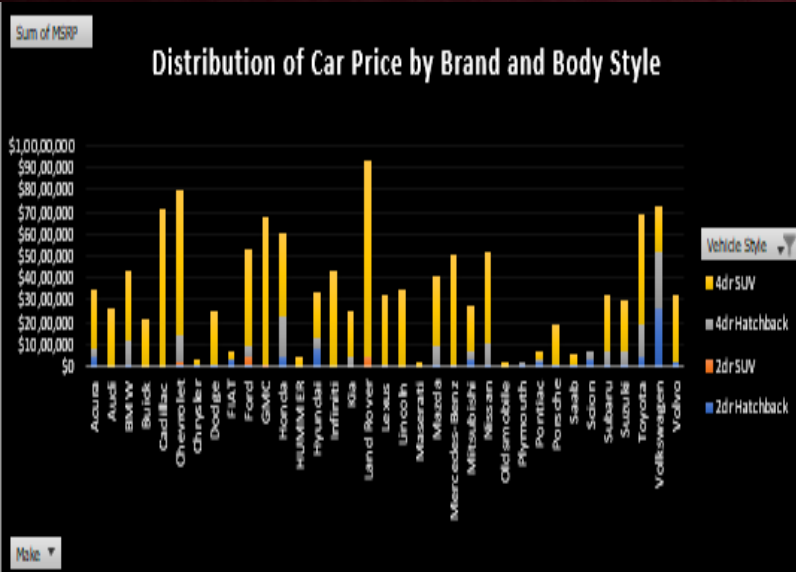


Task 5: How does the car's horsepower, MPG, and price vary across different Brands?

Relationship between Engine HP,MPG and Price of Cars.

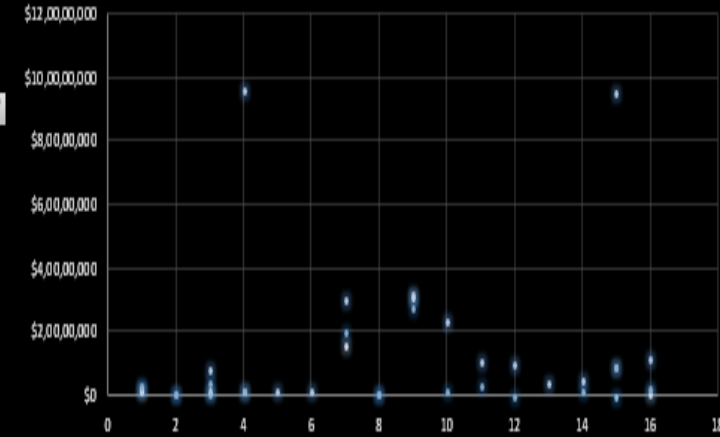


Dashboard



Relationship Between MSRP And Transmission Type

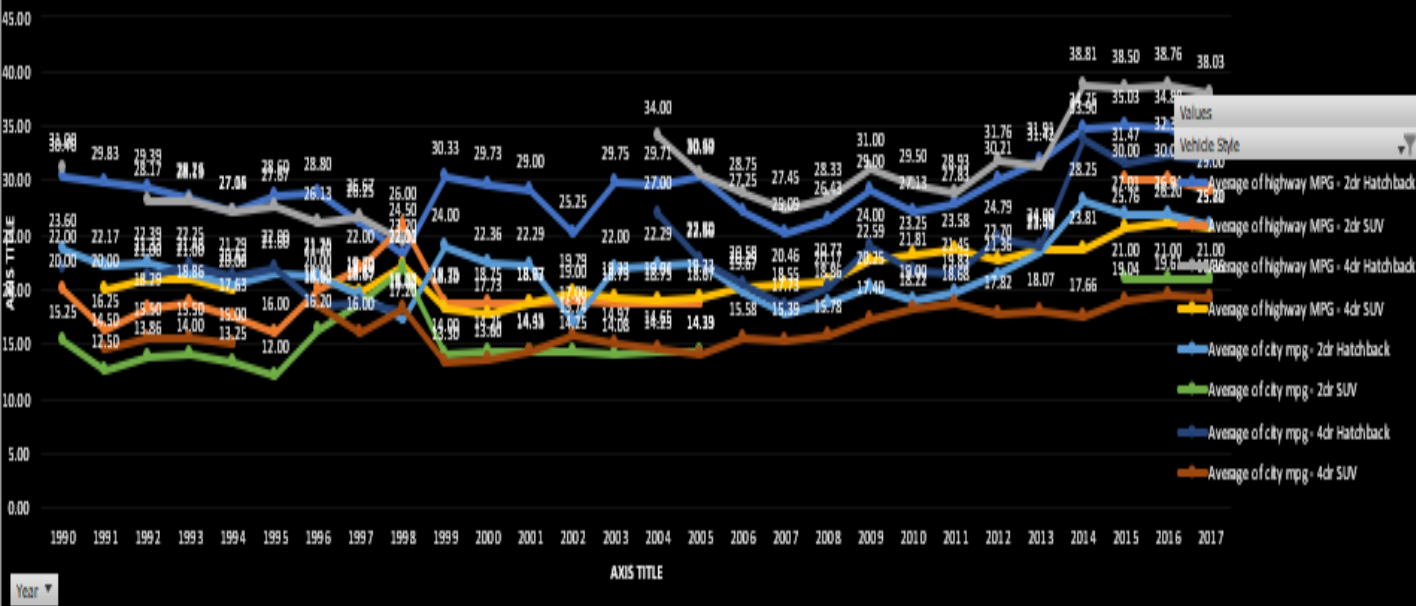
AUTOMATED_MANUAL AUTOMATIC DIRECT_DRIVE MANUAL



Average of highway mpg

Average of city mpg

Fuel Efficiency Of Cars Vary Across Different Body Styles And Model Years



Relationship Between Engine HP, MPG & Price Of Cars



RESULT & CONCLUSION

- **Popular Car Categories:** The most popular categories of cars based on our analysis are Hatchback, Flex Fuel/Diesel, Crossover, and Luxury Cars.
- **Price and Engine Power Relationship:** There is a direct proportionality between engine power (Horse Power) and car prices. As engine power increases, so do prices, indicating that consumers are willing to pay more for higher performance.
- **Key Features Impacting Price:** The most important features influencing car prices are Engine Cylinders and Engine HP (Power), followed by Vehicle Size. This explains why cars with expensive features like Sports Cars tend to be the costliest.
- **Average Price by Manufacturer:** Bugatti emerges as the most expensive car maker with an average price of \$1,757,224 USD, while Plymouth offers the cheapest cars with an average price of \$3,297 USD.
- **Engine Cylinders and MPG:** Analysis reveals that as engine cylinders increase, highway MPG decreases. This is because higher cylinder counts typically indicate more powerful engines, resulting in lower fuel efficiency.

- **Popular Car Category and Brand:** Sedan is identified as the most popular car category, with Chevrolet being the most popular brand among consumers.
- **Fuel Efficiency:** Passenger Vans exhibit the lowest fuel efficiency with an average MPG of 12.53, while 4dr Hatchback Cars show the highest fuel efficiency with an average MPG of 35.39.
- **Performance and Efficiency:** Bugatti boasts the highest HP with the lowest MPG, making it the most costly car maker. Conversely, Fiat has the lowest HP, while Alfa Romeo achieves the highest highway MPG. Plymouth stands out as the cheapest car maker overall.
- In conclusion, these insights offer valuable guidance for car manufacturers in understanding consumer preferences, optimizing pricing strategies, and focusing on key features to meet market demands effectively.

THANK YOU!



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