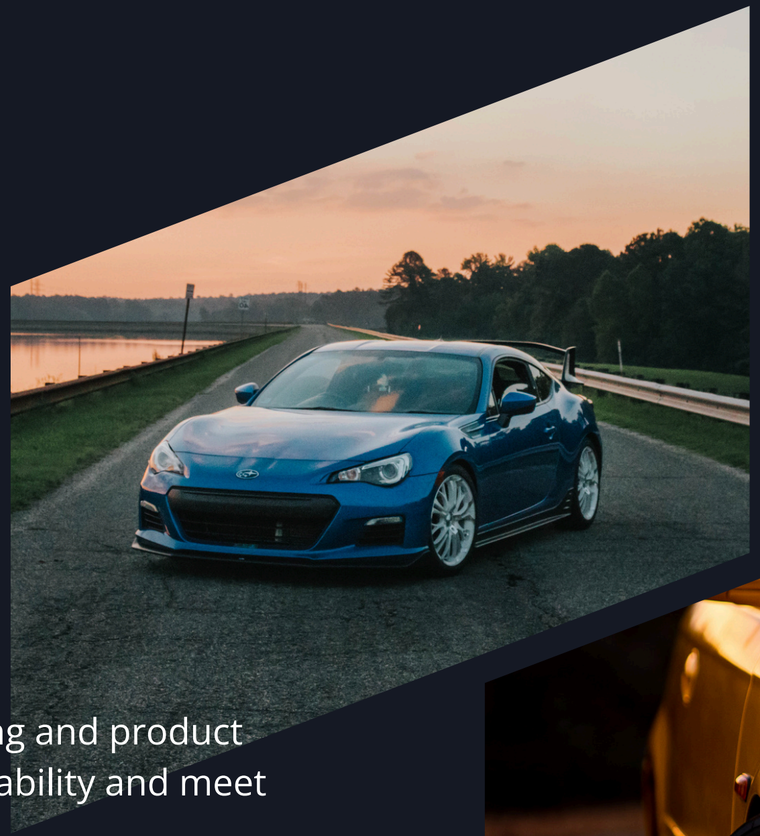
ANALYZING THE IMPACT OF CAR FEATURES ON PRICE AND PROFITABILITY

Project - 7

BY TANNU ANTIL

CONTENT :

PROJECT OVERVIEW



- Objective:
  - To help a car manufacturer optimize pricing and product development decisions to maximize profitability and meet consumer demand.
- Focus Areas:
  - Analysis of car features, market categories, and pricing.
  - Identification of features that influence popularity and profitability.
- Methods:
  - Data Cleaning, Regression Analysis, Market Segmentation, Visualization.

PROBLEM STATEMENT

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.

For the given dataset, as a Data Analyst, the client has asked How can a car manufacturer optimize pricing and product development decisions to maximize profitability while meeting consumer demand?

In recent years, there has been a growing trend towards electric and hybrid vehicles and increased interest in alternative fuel sources such as hydrogen and natural gas. At the same time, traditional gasoline-powered cars remain dominant in the market, with varying fuel types and grades available to consumers.

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. By using data analysis techniques such as regression analysis and market segmentation, the manufacturer could develop a pricing strategy that balances consumer demand with profitability, and identify which product features to focus on in future product development efforts. This could help the manufacturer improve its competitiveness in the market and increase its profitability over time.

DATASET DESCRIPTION

Here is a brief overview of the dataset:

- Number of observations: 11,159
- Number of variables: 16
- File type: CSV (Comma Separated Values)

The variables in the dataset are:

- Make: the make or brand of the car
- Model: the specific model of the car
- Year: the year the car was released
- Engine Fuel Type: the type of fuel used by the car (gasoline, diesel, etc.)
- Engine HP: the horsepower of the car's engine
- Engine Cylinders: the number of cylinders in the car's engine
- Transmission Type: the type of transmission (automatic or manual)
- Driven_Wheels: the type of wheels driven by the car (front, rear, all)
- Number of Doors: the number of doors the car has
- Market Category: the market category the car belongs to (Luxury, Performance, etc.)
- Vehicle Size: the size of the car
- Vehicle Style: the style of the car (Sedan, Coupe, etc.)
- Highway MPG: the estimated miles per gallon the car gets on the highway
- City MPG: the estimated miles per gallon the car gets in the city
- Popularity: a ranking of the popularity of the car (based on the number of times it has been viewed on Edmunds.com)
- MSRP: the manufacturer's suggested retail price of the car

DATASET LINK: CLICK OM IMAGE

Content is no longer available

ANALYSIS APPROACH

Data Cleaning:

- Removed missing values and corrected erroneous entries to ensure data reliability.

Data Transformation:

- Standardized categorical features and normalized numeric data for consistency and accuracy in analysis.

Analytical Techniques:

- Regression Analysis: Identified relationships between features and car pricing, helping to quantify how specific attributes impact MSRP.
- Pivot Tables: Enabled segmentation by key categories (e.g., market category, manufacturer) to uncover patterns and consumer preferences.
- Sensitivity Analysis and Optimization: Explored the impact of varying features on price to guide pricing strategy and maximize profitability.

AVERAGE

Row Labels	Values Average of highway MP	Average of Engine H	Average of city mp	Average of Popularity	Average of Engine Cylinde	Average of MSRP
Acura	28.11111111	244.797619	19.94047619	204	5.333333333	34887.5873
Alfa Romeo	34	237	24	113	4	61600
Aston Martin	18.89247312	484.3225806	12.52688172	259	10.62365591	197910.3763
Audi	28.82317073	277.695122	19.58536585	3105	5.557926829	53452.1128
Bentley	18.90540541	533.8513514	11.55405405	520	9.72972973	247169.3243
BMW	29.24550898	326.9071856	20.73952096	3916	5.958083832	61546.76347
Bugatti	14	1001	8	820	16	1757223.667
Buick	26.94897959	219.244898	18.70408163	155	5.316326531	28206.61224
Cadillac	25.23677582	332.3098237	17.35516373	1624	6.43324937	56231.31738
Chevrolet	25.81567231	246.9722471	19.02137133	1385	5.908117752	28350.38557
Chrysler	26.36898396	229.1390374	17.75935829	1013	5.593582888	26722.96257
Dodge	22.34504792	244.4153355	16.06549521	1851	6.258785942	22390.05911
Ferrari	15.72463768	511.9565217	10.56521739	2774	9.797101449	238218.8406
FIAT	37.33870968	143.559322	30.64516129	819	3.806451613	22670.24194
Ford	24.00681044	243.0979263	17.96027242	5657	5.914869467	27399.26674
Genesis	25.33333333	347.3333333	16.33333333	21	6.666666667	46616.66667
GMC	21.4038835	259.8446602	15.81359223	549	6.454368932	30493.29903
Honda	32.57461024	195.7494407	25.44320713	2202	4.659242762	26674.34076
HUMMER	17.29411765	261.2352941	13.52941176	130	6.058823529	36464.41176
Hyundai	30.39273927	201.9174917	22.34323432	1439	4.666666667	24597.0363
Infiniti	24.77878788	310.0666667	17.82727273	190	6.151515152	42394.21212
Kia	30.65367965	206.8274336	23.84848485	1720	4.588744589	25310.17316
Lamborghini	18.01923077	614.0769231	11.51923077	1158	10.88461538	331567.3077
Land Rover	22.12587413	322.0979021	16.23076923	258	6.125874126	67823.21678
Lexus	25.87623762	277.4158416	20.31188119	454	6.247524752	47549.06931
Lincoln	24.48780488	284.9102564	17.8902439	61	6.073170732	42839.82927
Lotus	26.55172414	275.9655172	18.75862069	613	5.24137931	69188.27586
Maserati	20.29310345	420.7931034	13.32758621	238	7.344827586	114207.7069

MAX

Row Labels	Values Max of highway MP	Max of city mp	Max of Engine Cylinde	Max of Engine H	Max of Popularit	Max of MSRP	Row Labels
Acura	38	39	6	573	204	156000	Acura
Alfa Romeo	34	24	4	237	113	68400	Alfa Romeo
Aston Martin	22	14	12	568	259	320695	Aston Martin
Audi	354	31	12	610	3105	199900	Audi
Bentley	25	15	12	631	520	363000	Bentley
BMW	111	137	12	600	3916	141200	BMW
Bugatti	14	8	16	1001	820	2065902	Bugatti
Buick	36	28	8	310	155	49625	Buick
Cadillac	33	22	8	640	1624	104215	Cadillac
Chevrolet	110	128	8	650	1385	92395	Chevrolet
Chrysler	36	23	8	385	1013	49470	Chrysler
Dodge	41	28	10	707	1851	120395	Dodge
Ferrari	23	16	12	731	2774	643330	Ferrari
FIAT	108	122	4	180	819	31800	FIAT
Ford	99	110	8	662	5657	149995	Ford
Genesis	28	18	8	420	21	54550	Genesis
GMC	32	22	8	420	549	71665	GMC
Honda	105	132	6	280	2202	47070	Honda
HUMMER	18	14	8	300	130	43130	HUMMER
Hyundai	45	40	8	429	1439	68750	Hyundai
Infiniti	36	29	8	420	190	88850	Infiniti
Kia	92	120	8	420	1720	61900	Kia
Lamborghini	21	15	12	750	1158	1500000	Lamborghini
Land Rover	30	22	8	550	258	199495	Land Rover
Lexus	40	43	10	552	454	375000	Lexus
Lincoln	39	41	8	380	61	76650	Lincoln
Lotus	39	21	8	400	613	93225	Lotus
Maserati	25	17	8	523	238	182009	Maserati

MIN

Row Labels	Values Min of highway MP	Min of city mp	Min of Engine Cylinde	Min of Engine H	Min of Popularit	Min of MSRP	Row Labels
Acura	17	13	4	111	204	2000	Acura
Alfa Romeo	34	24	4	237	113	53900	Alfa Romeo
Aston Martin	15	9	8	420	259	98200	Aston Martin
Audi	18	11	4	108	3105	2000	Audi
Bentley	14	9	8	400	520	177500	Bentley
BMW	18	10	0	170	3916	4697	BMW
Bugatti	14	8	16	1001	820	1500000	Bugatti
Buick	19	14	4	138	155	2000	Buick
Cadillac	18	12	4	140	1624	2000	Cadillac
Chevrolet	15	11	0	55	1385	2000	Chevrolet
Chrysler	17	12	4	100	1013	2000	Chrysler
Dodge	12	10	4	92	1851	2000	Dodge
Ferrari	12	7	8	400	2774	140615	Ferrari
FIAT	29	21	0	101	819	15990	FIAT
Ford	13	11	0	63	5657	2000	Ford
Genesis	23	15	6	311	21	41400	Genesis
GMC	13	10	4	105	549	2000	GMC
Honda	18	14	0	62	2202	2000	Honda
HUMMER	16	13	5	239	130	30750	HUMMER
Hyundai	21	15	4	81	1439	2000	Hyundai
Infiniti	17	12	4	145	190	2000	Infiniti
Kia	20	15	0	125	1720	2000	Kia
Lamborghini	12	8	10	550	1158	187900	Lamborghini
Land Rover	14	11	4	174	258	2561	Land Rover
Lexus	14	11	4	134	454	2000	Lexus
Lincoln	15	11	4	188	61	2000	Lincoln
Lotus	21	14	4	189	613	43995	Lotus
Maserati	15	10	6	345	238	69800	Maserati

STDDEV

Row Labels	Values StdDev of highway MP	StdDev of city mp	StdDev of Engine Cylinde	StdDev of Engine H	StdDev of Popularit	StdDev of MSRP
Acura	3.85952998	3.218538892	0.9319473678	60.98483511	0	19431.5928
Alfa Romeo	0	0	0	0	0	6360.031446
Aston Martin	1.570532765	1.203178741	1.910576845	50.62053229	0	63759.415
Audi	18.77663197	4.180780898	1.744278011	110.4422513	0	38611.61195
Bentley	3.492335714	1.768382063	1.995181162	66.45333772	0	49163.02627
BMW	10.25703717	13.1368791	1.728938619	105.6816587	0	27982.68215
Bugatti	0	0	0	0	0	286438.3973
Buick	3.676320482	3.257210333	1.199118811	54.83917021	0	12682.35187
Cadillac	3.51969318	2.482729189	1.433263836	72.67717626	0	19380.67714
Chevrolet	9.442047846	10.36721003	1.61176925	107.2147049	0	17289.81225
Chrysler	4.15010047	2.464992664	0.9758158965	58.76984382	0	12290.18552
Dodge	5.572714907	3.845478321	1.584967723	118.7327622	0	19457.94979
Ferrari	1.551887446	1.585580807	2.004258042	87.73211813	0	74919.92529
FIAT	15.72295341	20.90658126	0.8653381728	32.1962041	0	3748.364499
Ford	7.349703081	7.714626717	1.462646733	88.38685465	0	16292.91164
Genesis	2.516611478	1.527525232	1.154700538	62.93117934	0	6983.253778
GMC	3.656451107	2.76937984	1.413991831	72.35176141	0	16470.20509
Honda	8.469450163	10.44488103	0.9964940131	56.22851234	0	8450.982262
HUMMER	0.9851843661	0.5144957554	1.477776549	29.53499918	0	3955.034719
Hyundai	5.629941252	4.912581371	1.063128791	76.34517591	0	10537.48468
Infiniti	3.287098995	3.009182778	0.9555854718	60.5480174	0	13763.87051
Kia	10.45285365	14.96978071	1.278468404	66.3520667	0	9882.805048
Lamborghini	2.711561193	1.935128152	1.003012055	64.29644767	0	199177.7487
Land Rover	4.90309924	3.374912221	1.68199719	121.9966702	0	36965.4455
Lexus	4.741006642	6.441219673	1.39584273	69.26239204	0	30684.47964
Lincoln	5.25834167	6.177350471	1.53311494	51.78396461	0	15446.11068
Lotus	3.822734688	2.149005956	1.353703186	64.13183005	0	14199.51567
Maserati	2.961795453	2.138928499	0.9468641529	42.41224526	0	32503.09533

KEY INSIGHTS DERIVED FROM ANALYSIS

1. Car Features and Pricing Trends:
   - Analysis of trends over time showed shifts in consumer preferences, such as increased demand for vehicles with higher horsepower and enhanced safety features.
   - Notable growth in market categories like Luxury and Performance segments, reflecting consumer willingness to invest in premium features.
2. Fuel Efficiency Comparison:
   - MPG analysis highlighted that hybrid and electric vehicles consistently lead in fuel efficiency.
   - Traditional SUVs and larger vehicles generally exhibit lower MPG, aligning with industry expectations but emphasizing opportunities for innovation in these categories.
3. Popularity and Feature Relationship:
   - Features such as automatic transmission, higher horsepower, and advanced safety technologies have a positive impact on popularity scores.
   - Popularity aligns strongly with the SUV and Luxury categories, underscoring consumer interest in both utility and premium options.
4. Price Prediction Model:
   - Using regression analysis, a predictive model was developed to estimate car prices based on features like Engine HP, Transmission Type, Market Category, and Fuel Type.
   - This model provides manufacturers with a powerful tool to set competitive prices that reflect consumer demand and maximize profitability.

TASK 1 - POPULARITY BY MARKET CATEGORY

01

Objective:

- To analyze how car model popularity varies across different market categories and understand which segments attract the most consumer attention.

02

Method:

- Developed a Pivot Table to summarize data by Market Category.
- Calculated the number of models in each category and average popularity scores to assess consumer interest across segments.

03

Visualization:

- Created a Combo Chart displaying both model counts (as clustered columns) and average popularity scores (as a line).
- This dual visualization enables easy comparison of the number of models and popularity trends across categories, highlighting the most favored segments.

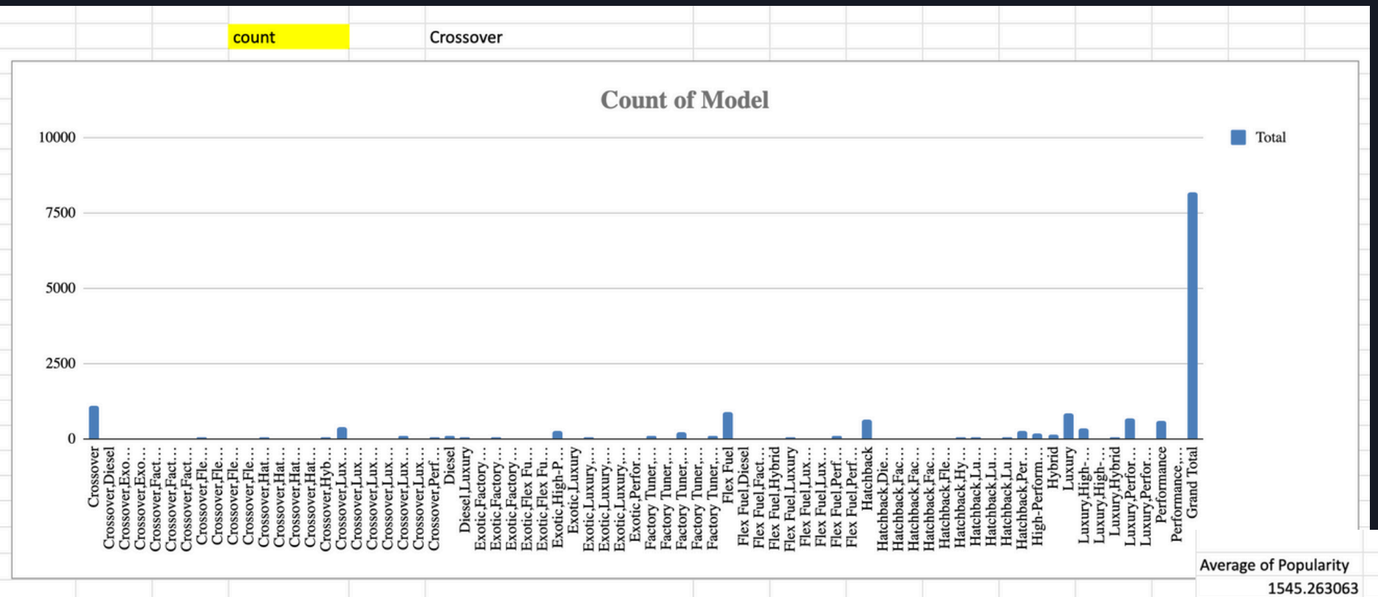
04

Insight:

- The chart illustrates which market categories have higher model diversity and consumer popularity, providing insights into target segments for future product development.

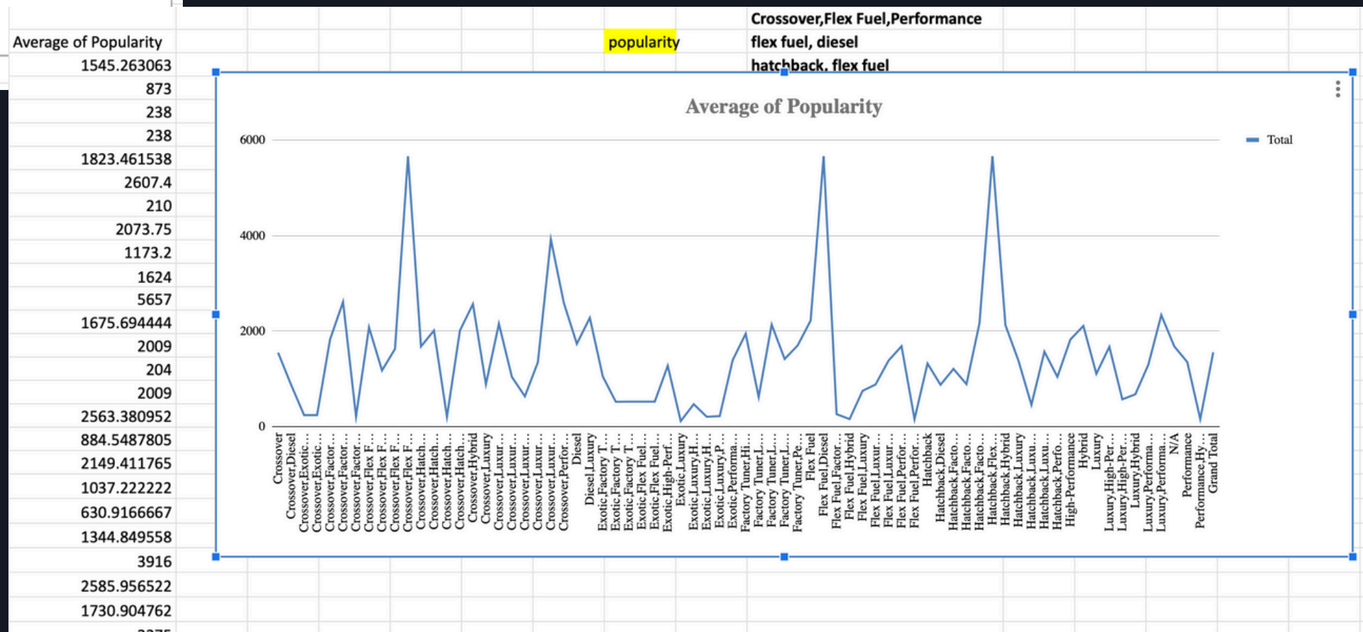
OUTPUTS :

count: Crossover



popularity:

Crossover, Flex Fuel, Performance
flex fuel, diesel
hatchback. flex fuel



TASK 2 - ENGINE POWER VS. PRICE

01

Objective:

- To examine the relationship between a car's engine horsepower (HP) and its price (MSRP) and determine if higher horsepower correlates with higher pricing.

02

Method:

- Created a Scatter Plot with Engine Horsepower (HP) on the x-axis and MSRP on the y-axis.
- Added a trendline to visualize the correlation between these variables and displayed the R-squared value for the strength of this relationship.

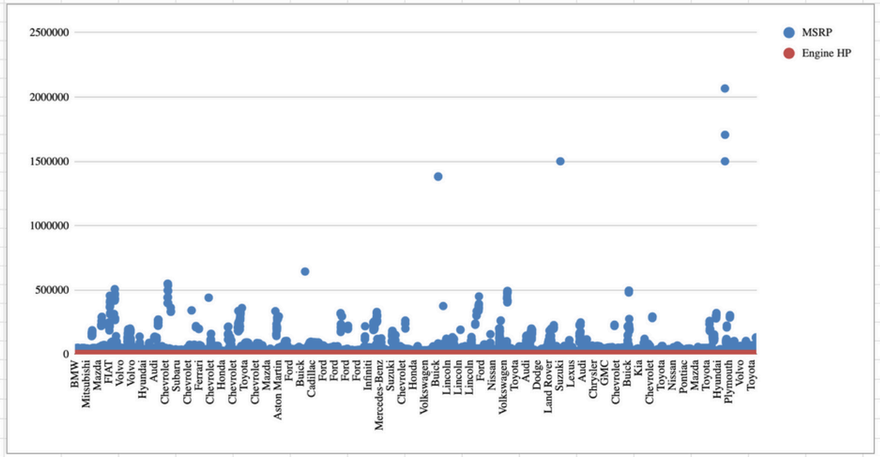
03

Insight:

- The R-squared value helps to quantify the degree of correlation, showing how much of the price variation can be explained by horsepower.
- This analysis provides insights into consumer valuation of performance features, helping manufacturers adjust pricing strategies based on engine power.

OUTPUTS :

	Make	MSRP	Engine HP
2	BMW	46135	335
3	BMW	40650	300
4	BMW	36350	300
5	BMW	29450	230
6	BMW	34500	230
7	BMW	31200	230
8	BMW	44100	300
9	BMW	39300	300
10	BMW	36900	230
11	BMW	37200	230
12	BMW	39600	300
13	BMW	31500	230
14	BMW	44400	300
15	BMW	37200	230
16	BMW	31500	230
17	BMW	48250	320
18	BMW	43550	320
19	Audi	2000	172
20	Audi	2000	172
21	Audi	2000	172
22	Audi	2000	172
23	Audi	2000	172
24	Audi	2000	172
25	Audi	2000	172
26	Audi	2000	172
27	Audi	2000	172
28	Audi	2000	172
29	Audi	2000	172
30	Audi	2000	172



bugatti has hihest engine hp and msrp

tesla has higest highway mpg

ford id most popular

Popularity Analysis									
Make	Popularity	Make	MSRP		Values			Row Labels	Average of MSRP
BMW	3916	BMW	46135	Row Labels	Average of highway MPG	Average of Popularity	Average of Engine HP	Acura	34887.5873
BMW	3916	BMW	40650	Acura	28.11111111	204	244.797619	Alfa Romeo	61600
BMW	3916	BMW	36350	Alfa Romeo	34	113	237	Aston Martin	197910.3763
BMW	3916	BMW	29450	Aston Martin	18.89247312	259	484.3225806	Audi	53452.1128
BMW	3916	BMW	34500	Audi	28.82317073	3105	277.695122	Bentley	247169.3243
BMW	3916	BMW	31200	Bentley	18.90540541	520	533.8513514	BMW	61546.76347
BMW	3916	BMW	44100	BMW	29.24550898	3916	326.9071856	Bugatti	1757223.667
BMW	3916	BMW	39300	Bugatti	14	820	1001	Buick	28206.61224
BMW	3916	BMW	36900	Buick	26.94897959	155	219.244898	Cadillac	56231.31738
BMW	3916	BMW	37200	Cadillac	25.23677582	1624	332.3098237	Chevrolet	28350.38557
BMW	3916	BMW	39600	Chevrolet	25.81567231	1385	246.9722471	Chrysler	26722.96257
BMW	3916	BMW	31500	Chrysler	26.36898396	1013	229.1390374	Dodge	22390.05911
BMW	3916	BMW	44400	Dodge	22.34504792	1851	244.4153355	Ferrari	238218.8406
BMW	3916	BMW	37200	Ferrari	15.72463768	2774	511.9565217	FIAT	22670.24194
BMW	3916	BMW	31500	FIAT	37.33870968	819	143.559322	Ford	27399.26674
BMW	3916	BMW	48250	Ford	24.00681044	5657	243.0979263	Genesis	46616.66667
BMW	3916	BMW	43550	Genesis	25.33333333	21	347.3333333	GMC	30493.29903
Audi	3105	Audi	2000	GMC	21.4038835	549	259.8446602	Honda	26674.34076
Audi	3105	Audi	2000	Honda	32.57461024	2202	195.7494407	HUMMER	36464.41176
Audi	3105	Audi	2000	HUMMER	17.29411765	130	261.2352941	Hyundai	24597.0363
Audi	3105	Audi	2000	Hyundai	30.39273927	1439	201.9174917	Infiniti	42394.21212
Audi	3105	Audi	2000	Infiniti	24.77878788	190	310.0666667	Kia	25310.17316
Audi	3105	Audi	2000	Kia	30.65367965	1720	206.8274336	Lamborghini	331567.3077
Audi	3105	Audi	2000	Lamborghini	18.01923077	1158	614.0769231	Land Rover	67823.21678
Audi	3105	Audi	2000	Land Rover	22.12587413	258	322.0979021	Lexus	47549.06931
Audi	3105	Audi	2000	Lexus	25.87623762	454	277.4158416	Lincoln	42839.82927
Audi	3105	Audi	2000	Lincoln	24.48780488	61	284.9102564	Lotus	69188.27586
Audi	3105	Audi	2000	Lotus	26.55172414	613	275.9655172	Maserati	114207.7069

TASK 3 - FEATURE IMPORTANCE FOR PRICING

01

Objective:

- To analyze how car model popularity varies across different market categories and understand which segments attract the most consumer attention.

02

Method:

- Developed a Pivot Table to summarize data by Market Category.
- Calculated the number of models in each category and average popularity scores to assess consumer interest across segments.

03

Visualization:

- Created a Combo Chart displaying both model counts (as clustered columns) and average popularity scores (as a line).
- This dual visualization enables easy comparison of the number of models and popularity trends across categories, highlighting the most favored segments.

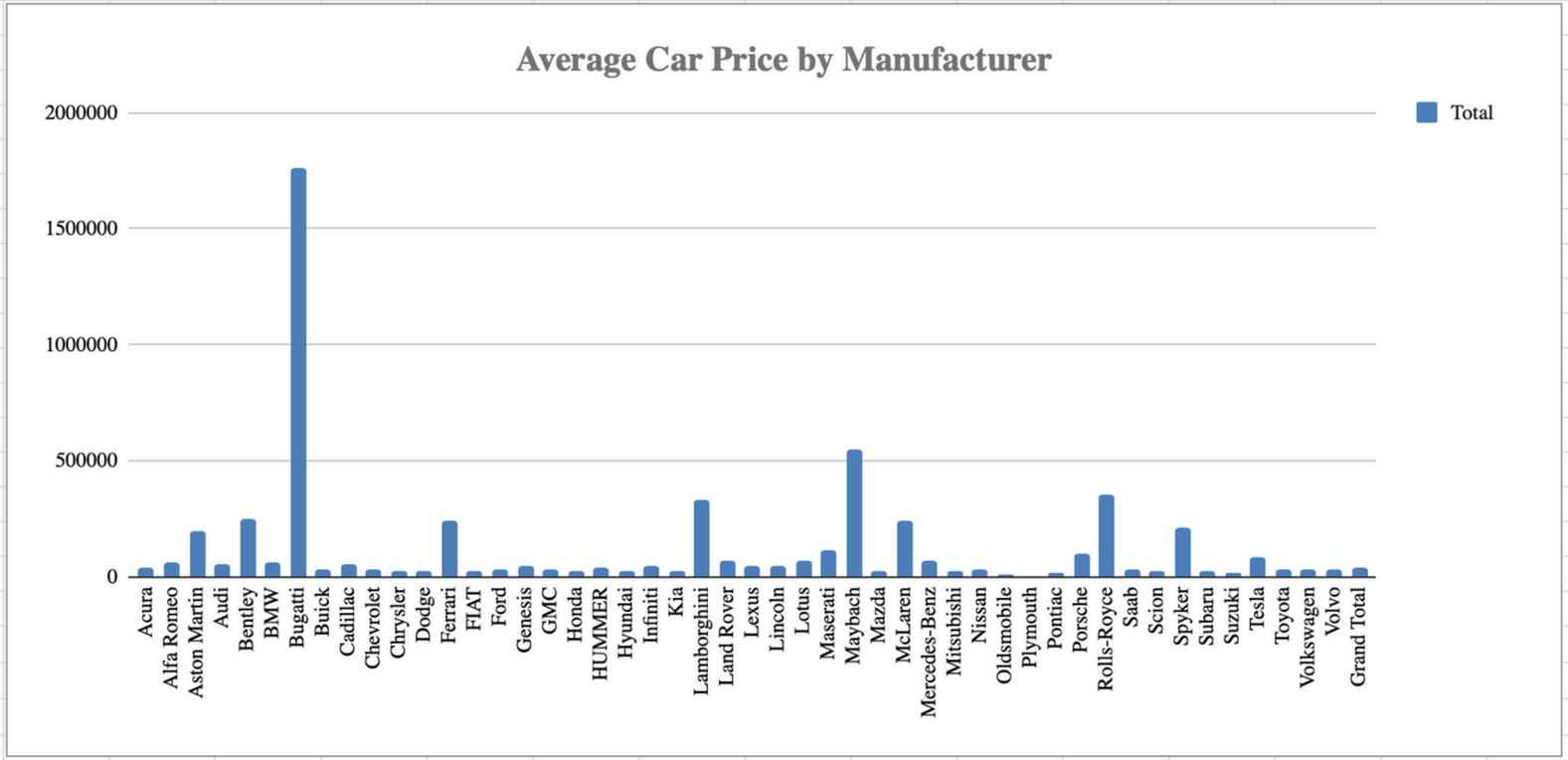
04

Insight:

- The chart illustrates which market categories have higher model diversity and consumer popularity, providing insights into target segments for future product development.

OUTPUTS :

Row Labels	Average of MSRP
Acura	34887.5873
Alfa Romeo	61600
Aston Martin	197910.3763
Audi	53452.1128
Bentley	247169.3243
BMW	61546.76347
Bugatti	1757223.667
Buick	28206.61224
Cadillac	56231.31738
Chevrolet	28350.38557
Chrysler	26722.96257
Dodge	22390.05911
Ferrari	238218.8406
FIAT	22670.24194
Ford	27399.26674
Genesis	46616.66667
GMC	30493.29903
Honda	26674.34076
HUMMER	36464.41176
Hyundai	24597.0363
Infiniti	42394.21212
Kia	25310.17316



TASK 4 - AVERAGE PRICE BY MANUFACTURER

01

Objective:

- To identify which car features most strongly impact pricing (MSRP), helping inform decisions on feature prioritization for profitability.

02

Method:

- Conducted a Regression Analysis using MSRP as the dependent variable and key car features (e.g., Engine HP, Engine Cylinders, Vehicle Size, Fuel Type, MPG ratings) as independent variables.
- The resulting coefficients from the regression model indicate each feature's relative impact on price.

03

Visualization:

- A Bar Chart displaying the regression coefficients for each feature, highlighting the strength and direction of each feature's influence on pricing.
- This chart provides a clear view of which features consumers value the most in terms of price, aiding in product development and pricing strategies.

TASK 5 - FUEL EFFICIENCY VS. ENGINE CYLINDERS

01

Objective:

- To analyze the relationship between fuel efficiency (Highway MPG) and the number of engine cylinders, providing insights into how engine design affects fuel consumption.

02

Method:

- Created a Scatter Plot with Engine Cylinders on the x-axis and Highway MPG on the y-axis.
- Added a Trendline to visualize the trend and displayed the R-squared value to gauge the strength of the relationship.

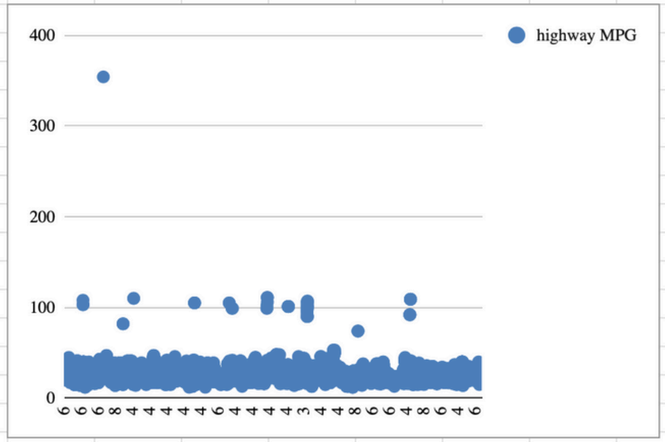
03

Additional Metric:

- Calculated the Correlation Coefficient to quantify the strength and direction of the relationship between cylindersand MPG.
- This analysis reveals whether fuel efficiency generally increases or decreases as the number of cylinders changes, informing design and marketing strategies focused on fuel-efficient models.

OUTPUTS :

	A	B	C	D	E	F	G	H	I	J	K	L
1	Engine Cylinders	highway MPG										Correlation Cylinders and Highway MPG
2	6	26										-0.6216057333
3	6	28										(negative value suggests an inverse relationship)
4	6	28										
5	6	28										
6	6	28										
7	6	28										
8	6	26										
9	6	28										
10	6	28										
11	6	27										
12	6	28										
13	6	28										
14	6	28										
15	6	28										
16	6	28										
17	6	25										
18	6	28										
19	6	24										
20	6	24										
21	6	20										
22	6	24										
23	6	21										
24	6	24										
25	6	20										



Correlation Cylinders and Highway MPG
-0.6216057333
(negative value suggests an inverse relationship)

Correlation Cylinders and Highway MPG
-0.6216057333
(negative value suggests an inverse relationship)

DASHBOARD CREATION

Goal:

- To develop an interactive dashboard in Excel that provides real-time insights for decision-making.

Components:

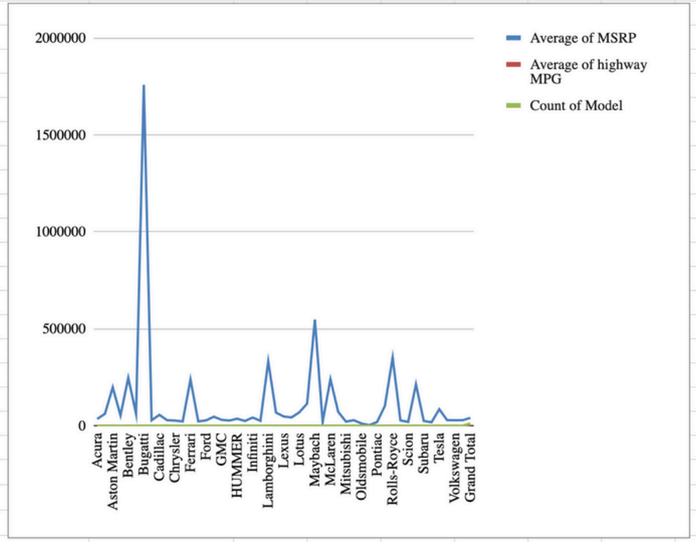
- Pivot Tables: Enable segmentation by market category and manufacturer, allowing users to drill down into specific data segments.
- Charts: Include a variety of visualizations such as scatter plots, bar charts, and combo charts to illustrate key insights:
  - Trends in engine power vs. price
  - Popularity across market categories
  - Average price by manufacturer
  - Fuel efficiency relationships
- Data Interactivity: Incorporate filters and slicers to adjust segments dynamically, enabling in-depth analysis across different car models, features, and market categories.

Outcome:

- The dashboard offers a comprehensive view of the dataset and supports strategic decisions on pricing, product development, and market positioning based on real-time analysis.

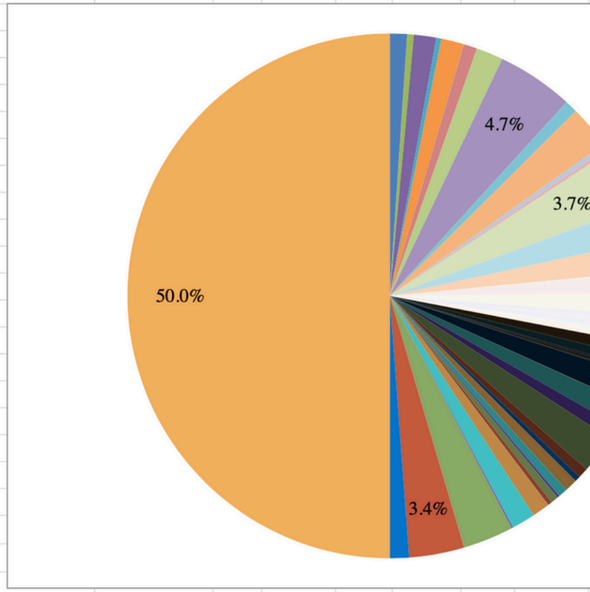
OUTPUTS :

	Values		
Row Labels	Average of MSRP	Average of highway MPG	Count of Model
Acura	34887.5873	28.11111111	252
Alfa Romeo	61600	34	5
Aston Martin	197910.3763	18.89247312	93
Audi	53452.1128	28.82317073	328
Bentley	247169.3243	18.90540541	74
BMW	61546.76347	29.24550898	334
Bugatti	1757223.667	14	3
Buick	28206.61224	26.94897959	196
Cadillac	56231.31738	25.23677582	397
Chevrolet	28350.38557	25.81567231	1123
Chrysler	26722.96257	26.36898396	187
Dodge	22390.05911	22.34504792	626
Ferrari	238218.8406	15.72463768	69
FIAT	22670.24194	37.33870968	62
Ford	27399.26674	24.00681044	881
Genesis	46616.66667	25.33333333	3
GMC	30493.29903	21.4038835	515
Honda	26674.34076	32.57461024	449
HUMMER	36464.41176	17.29411765	17
Hyundai	24597.0363	30.39273927	303
Infiniti	42394.21212	24.77878788	330
Kia	25310.17316	30.65367965	231
Lamborghini	331567.3077	18.01923077	52

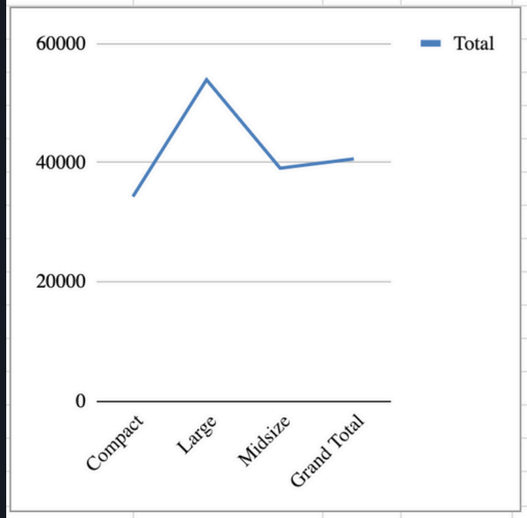


Popularity Analysis | task1 | task2 | task3 | task5 | Interactive Dashboard Design | Sheet3 | Sheet2

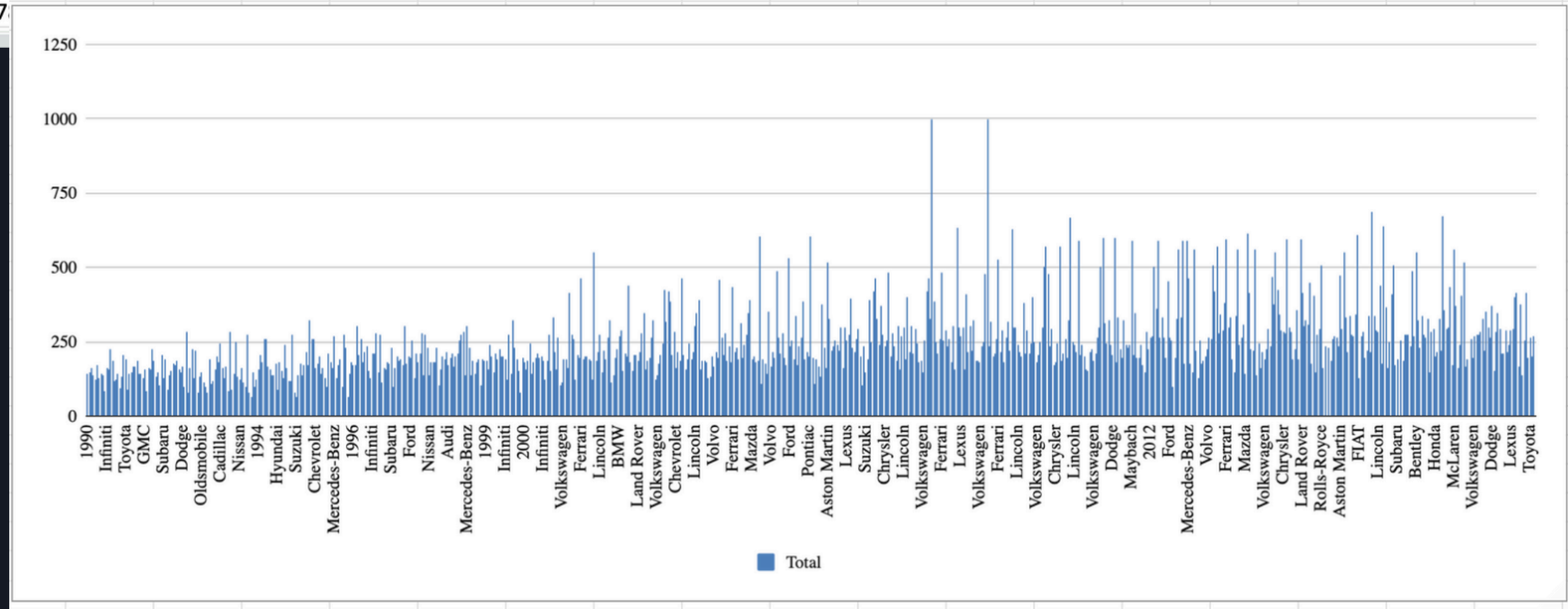
	Values					
Row Labels	Average of MSRP	Average of city mpg	Average of highway MPG		Row Labels	Count of Market Category
Acura	34887.5873	19.94047619	28.11111111		Acura	252
Alfa Romeo	61600	24	34		Alfa Romeo	5
Aston Martin	197910.3763	12.52688172	18.89247312		Aston Martin	93
Audi	53452.1128	19.58536585	28.82317073		Audi	328
Bentley	247169.3243	11.55405405	18.90540541		Bentley	74
BMW	61546.76347	20.73952096	29.24550898		BMW	334
Bugatti	1757223.667	8	14		Bugatti	3
Buick	28206.61224	18.70408163	26.94897959		Buick	196
Cadillac	56231.31738	17.35516373	25.23677582		Cadillac	397
Chevrolet	28350.38557	19.02137133	25.81567231		Chevrolet	1123
Chrysler	26722.96257	17.75935829	26.36898396		Chrysler	187
Dodge	22390.05911	16.06549521	22.34504792		Dodge	626
Ferrari	238218.8406	10.56521739	15.72463768		Ferrari	69
FIAT	22670.24194	30.64516129	37.33870968		FIAT	62
Ford	27399.26674	17.96027242	24.00681044		Ford	881
Genesis	46616.66667	16.33333333	25.33333333		Genesis	3
GMC	30493.29903	15.81359223	21.4038835		GMC	515
Honda	26674.34076	25.44320713	32.57461024		Honda	449
HUMMER	36464.41176	13.52941176	17.29411765		HUMMER	17
Hyundai	24597.0363	22.34323432	30.39273927		Hyundai	303
Infiniti	42394.21212	17.82727273	24.77878788		Infiniti	330
Kia	25310.17316	23.84848485	30.65367965		Kia	231
Lamborghini	331567.3077	11.51923077	18.01923077		Lamborghini	52
					Land Rover	143



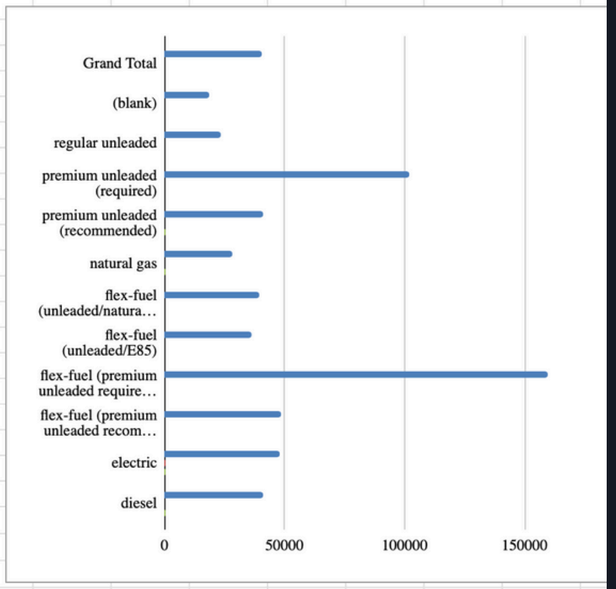
Row Labels	Average of MSRP
Compact	34275.33648
Large	53890.50054
Midsize	39035.91905
Grand Total	40594.73703

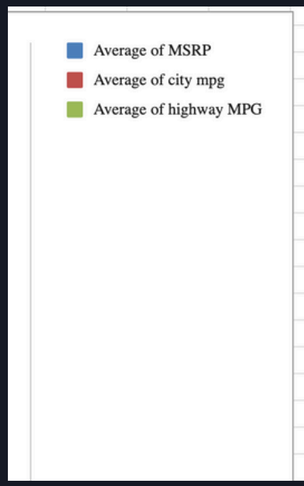


Row Labels	Average of Engine HP
1990	141.1300813
Audi	148
Buick	161.4285714
Cadillac	140
Chevrolet	122.5
Chrysler	170.5
Dodge	131
Ford	144.2857143
GMC	138
Honda	87.33333333
Infiniti	162
Lexus	156
Lincoln	225
Mercedes-Benz	189
Mitsubishi	118.6666667
Nissan	125.5555556
Oldsmobile	144.5454545
Plymouth	93
Pontiac	134
Porsche	208
Toyota	190
Volkswagen	90
Volvo	142
1991	147.7

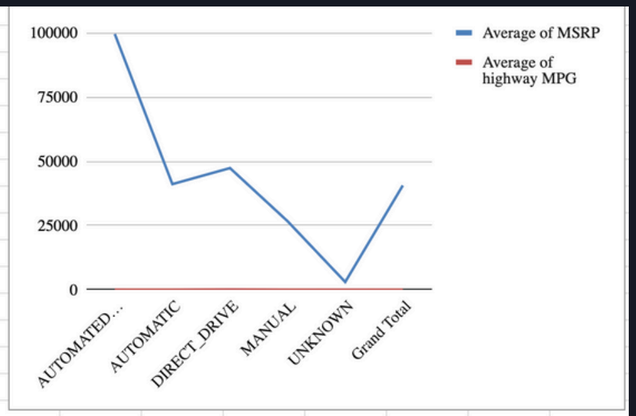


	Values		
Row Labels	Average of MSRP	Average of city mpg	Average of highway MPG
diesel	40788	26.37662338	36.56493506
electric	47943.0303	112.6969697	99.59090909
flex-fuel (premium unleaded recommended/E85)	48641.92308	16.92307692	25.34615385
flex-fuel (premium unleaded required/E85)	159429.3519	13.2962963	19.92592593
flex-fuel (unleaded/E85)	36258.26029	16.16907675	22.62958843
flex-fuel (unleaded/natural gas)	39194.16667	17	25
natural gas	28065	27	38
premium unleaded (recommended)	40812.83125	20.40643467	28.67235719
premium unleaded (required)	101627.0936	16.68093579	23.89696366
regular unleaded	23013.95552	19.95398773	26.64500837
(blank)	18632.33333	17	25
Grand Total	40594.73703	19.73325499	26.63748531





	Values	
Row Labels	Average of MSRP	Average of highway MPG
AUTOMATED_MANUAL	99508.37061	29.21405751
AUTOMATIC	41110.33172	25.78296637
DIRECT_DRIVE	47351.25	97.97058824
MANUAL	26663.64429	26.88177172
UNKNOWN	3040.736842	20.47368421
Grand Total	40594.73703	26.63748531



CONCLUSIONS

Pricing Optimization

- Leverage insights from feature importance analysis and consumer preferences to develop data-driven pricing strategies that align with market demand.

Product Development Focus

- Prioritize development of car features that are most popular among consumers, enhancing market relevance and appeal.

Profitability Strategy

- Balance fuel-efficient features with high-demand attributes to create offerings that maximize market appeal and profit margins.

Future Potential

- Expand analysis with additional datasets or updated data to monitor evolving trends and continuously refine strategies for sustained competitiveness in the automotive market.

THANK YOU