PROJECT – 7 :

Impact of Car Features

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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.

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.

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?

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.

TOOLS & TECHNOLOGY USED :

MICROSOFT EXCEL

INTERNET (RESEARCH)

WORKFLOW:

DATA CLEANING AND PRE-PROCESSING

DATA ANALYSIS

DASHBOARD BUILDING

DATA CLEANING :

- THE FIRST STEP WAS TO CONVERT THE GIVEN DATA INTO TABLE AFTER WHICH WE PERFORMED OUR INITIAL ANALYSIS.

- IN THE MODEL, THE SAAB CAR MAKE MISTAKENLY WRITTEN AS 9-MAR & 9-MAY , AFTER RESEARCH I DISCOVERED THAT IT WAS 9-3 & 9-5 WERE NAME OF MODEL.

- NEXT WAS FIXING THE ENGINE FUEL TYPE AS IT CONTAINS MANY DIFFERENT SECTIONS WITH SAME NAME SO, WE REPLACED THEM WITH THEIR ONE GENERAL FUEL TYPE.

- FOR SOME CARS, ENGINE HP WAS MISSING SO, WITH THE HELP OF INTERNET MISSING DATA WAS FILLED.

- THERE WERE ALSO SOME MISSING VALUES IN CYLINDER COLUMN WHICH AGAIN WAS FILLED WITH DATA AVAILABLE ON INTERNET.

- THERE WERE MISSING VALUES IN THE TRANSMISSION TYPE COLUMN SO WE CALCULATED THE MODE FOR EACH AND FOUND, MOST WERE AUTOMATIC SO, IMPUTED EMPTY CELLS WITH AUTOMATIC.

- FILLING MISSING DOOR VALUES WITH HELP OF DATA ON INTERNET.

- 3742 CELLS HAVE THE MARKET CATEGORY VALUES MISSING SO, WE DROP THOSE CELLS.

- NOW WE SEE A OUTLIER HAVING 354 AS HIGHWAY MPG WHICH IS NOT POSSIBLE FOR A FUEL CAR SO WE DROP THE CELL.

- NOW WE REMOVED DUPLICATES AND NOW OUR DATA IS ALMOST CLEAN AND READY FOR ANALYSIS PART.

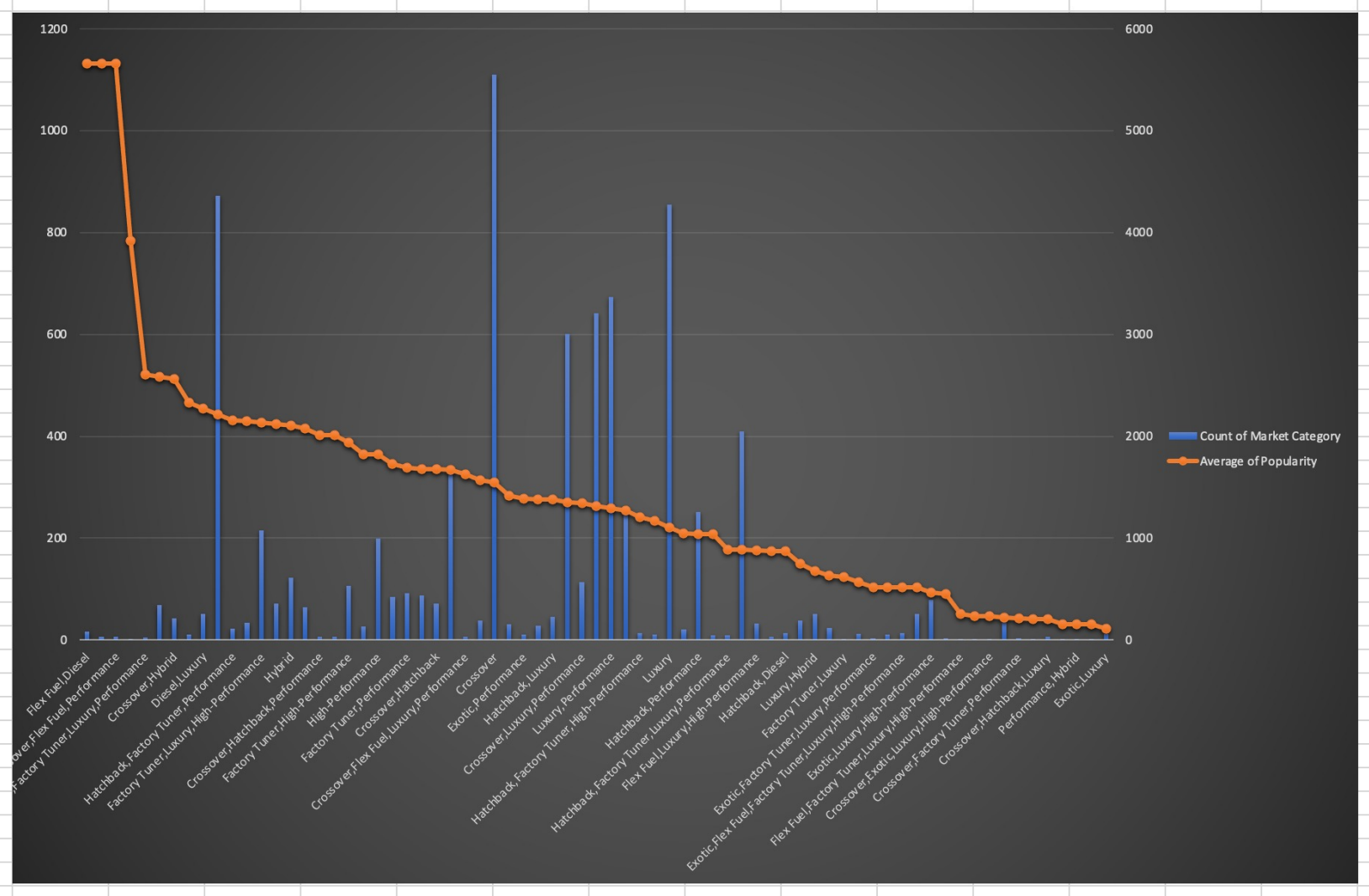
ANALYSIS :

1) HOW DOES POPULARITY OF CAR MODEL VARY ACROSS DIFFERENT MARKET CATEGORIES?

FROM THE FOLLOWING GRAPH IT IS OBVIOUS THAT :

- FLEX FUEL, DIESEL MARKET CATEGORY IS MOST POPULAR
- WHEREAS, CROSSOVERS HAVE THE MOST NUMBER OF COUNT AMONG ALL IN MARKET CATEGORY.

GRAPH :

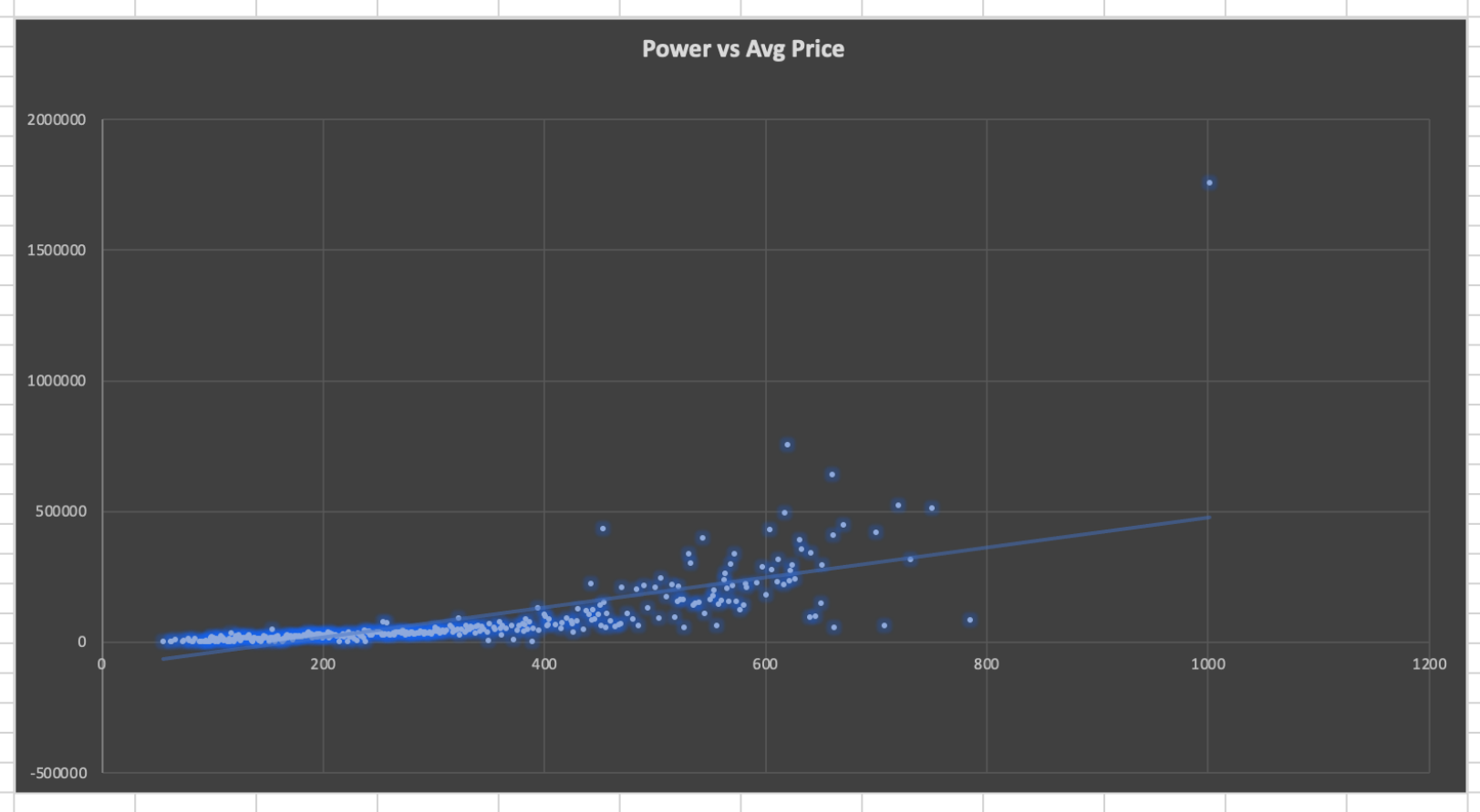

1200
1000
800
600
400
200
0
6000
5000
4000
3000
2000
1000
0
Count of Market Category
Average of Popularity
Flex Fuel,Diesel
Factory Tuner,Luxury,Performance
Crossover,Hybrid
Diesel,Luxury
Hatchback,Factory Tuner,Performance
Factory Tuner,Luxury,High-Performance
Hybrid
Crossover,Hatchback,Performance
Factory Tuner,High-Performance
High-Performance
Factory Tuner,Performance
Crossover,Hatchback
Crossover,Flex Fuel,Luxury,Performance
Crossover
Exotic,Performance
Hatchback,Luxury
Crossover,Luxury,Performance
Luxury,Performance
Hatchback,Factory Tuner,High-Performance
Luxury
Hatchback,Performance
Hatchback,Factory Tuner,Luxury,Performance
Flex Fuel,Luxury,High-Performance
Hatchback,Diesel
Luxury,Hybrid
Factory Tuner,Luxury
Exotic,Factory Tuner,Luxury,Performance
Exotic,Flex Fuel,Factory Tuner,Luxury,High-Performance
Exotic,Luxury,High-Performance
Flex Fuel,Factory Tuner,Luxury,High-Performance
Crossover,Exotic,Luxury,High-Performance
Crossover,Factory Tuner,Performance
Crossover,Hatchback,Luxury
Performance,Hybrid
Exotic,Luxury

2) WHAT IS THE RELATIONSHIP BETWEEN A CAR'S ENGINE POWER AND ITS PRICE?

FROM THE FOLLOWING GRAPH IT IS OBVIOUS THAT :

- THE SCATTER PLOT ALMOST FOLLOWS A LINEAR TREND AND IT IS OBVIOUS THAT, AS THE ENGINE POWER INCREASES SO INCREASES ITS PRICE AS IT IS FAST COMPARED TO LOW POWER ENGINE

GRAPH :

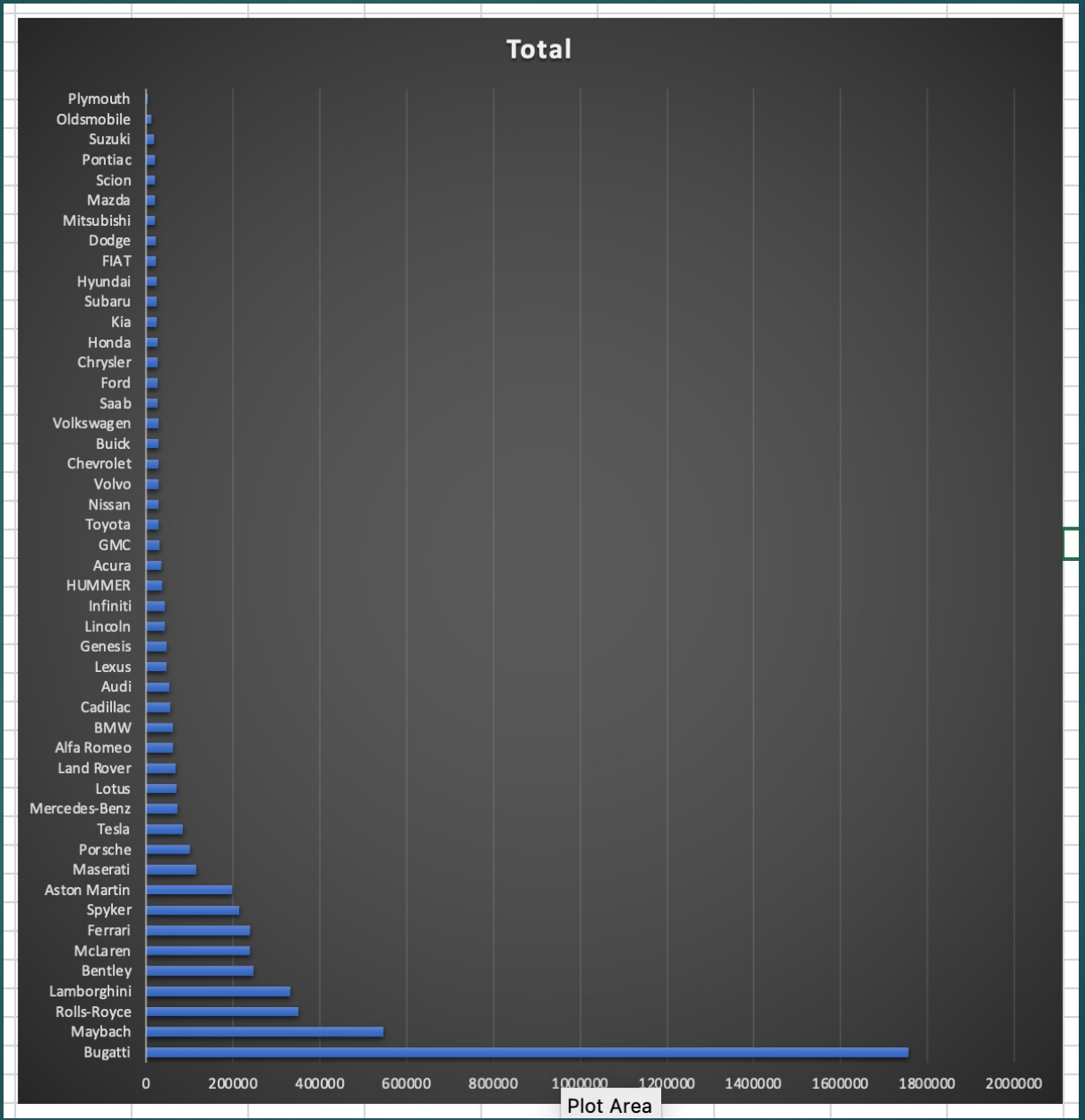

Power vs Avg Price
2000000
1500000
1000000
500000
0
-500000
0
200
400
600
800
1000
1200

4) DOES THE AVERAGE PRICE OF A CAR VARY ACROSS DIFFERENT MANUFACTURERS?

FROM THE FOLLOWING GRAPH IT IS OBVIOUS THAT :

- SOME CAR MANUFACTURERS ARE EXPENSIVE THAN OTHERS BECAUSE THEIR CAR HAVE EXTRA ORDINARY POWER AND OTHER LUXURY FEATURES WHICH MAKE THEM FAMOUS AND EXPENSIVE.

GRAPH :

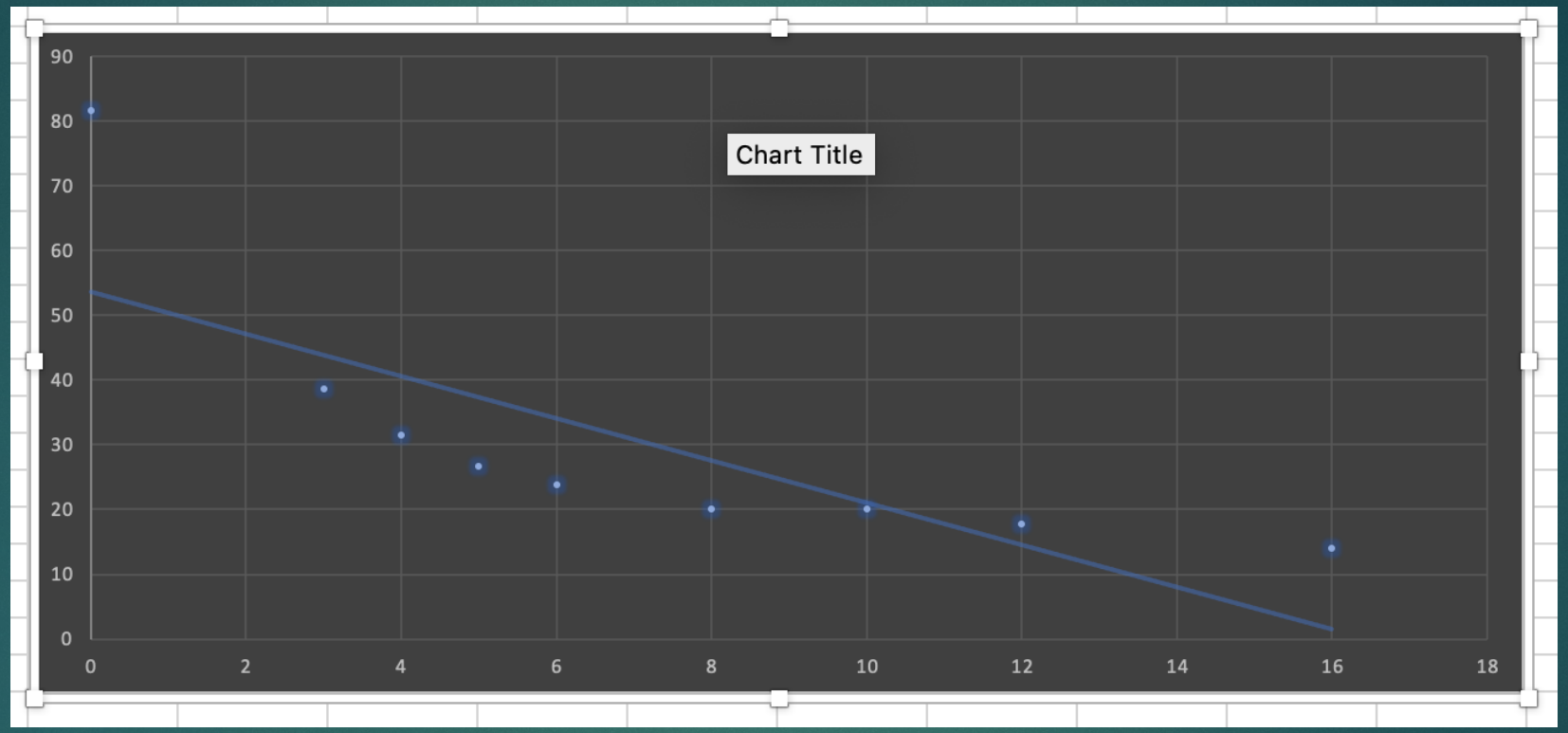

Total
Plymouth
Oldsmobile
Suzuki
Pontiac
Scion
Mazda
Mitsubishi
Dodge
FIAT
Hyundai
Subaru
Kia
Honda
Chrysler
Ford
Saab
Volkswagen
Buick
Chevrolet
Volvo
Nissan
Toyota
GMC
Acura
HUMMER
Infiniti
Lincoln
Genesis
Lexus
Audi
Cadillac
BMW
Alfa Romeo
Land Rover
Lotus
Mercedes-Benz
Tesla
Porsche
Maserati
Aston Martin
Spyker
Ferrari
McLaren
Bentley
Lamborghini
Rolls-Royce
Maybach
Bugatti
0
200000
400000
600000
800000
1000000
1200000
1400000
1600000
1800000
2000000
Plot Area

5) WHAT IS THE RELATIONSHIP BETWEEN FUEL EFFICIENCY AND THE NUMBER OF CYLINDERS IN A CAR'S ENGINE?

FROM THE FOLLOWING GRAPH IT IS OBVIOUS THAT :

- AS NUMBER OF CYLINDERS IN CAR INCREASES THEN POWER ALSO INCREASES MAKING IT LESS FUEL EFFICIENT LEADING TO CONCLUSION THAT, NUMBER OF CYLINDER IS INVERSELY PROPORTIONAL TO FUEL EFFICIENCY.

GRAPH :



DASHBOARD:

THE NEXT STEP WAS TO BUILD AN INTERACTIVE DASHBOARD AND THEN IT CONNECT ALL THE GRAPHS THROUGH SLICERS.

THANK YOU