MARKET SEGMENTATION ANALYSIS OF ELECTRIC VEHICLE MARKET IN INDIA

TEAM - YASH

Yash Bhadiyadra (Team Lead)

Madupu Anunay Reddy

Jahanavi Leela Dudala

Deepika

GITHUB LINK:

https://github.com/deepika-prabakaran/FEYNN-LAB-EV-ANALYSIS

OVERVIEW

More than 90% of vehicles all over the world run on oil, there is a noticeable trend of desire to power vehicles with alternative energy sources. As a result, the subject of electric vehicles (EVs) is gaining popularity. An electric vehicle is one that operates on an electric motor instead of an internal combustion engine, which generates power by burning a mix of fuel and gases. Therefore, an electric vehicle is seen as a possible replacement for the current-generation automobile in the near future. As the problem of rising levels of global air pollution is serious, the use of electric cars can be a response to the achievement of sustainable development goals. With a pressing need for smarter infrastructure and friendlier government policy, electric vehicles have an important role to play in India's energy and mobility markets. In India the current market share of EV/HEV/PHEV is around 0.1%. At present almost all vehicles rely on fossil fuel-based transportation. This pollutes the atmosphere by the emission of greenhouse gases & causes global warming. The Indian transportation sector is growing very fast. The gap between domestic crude oil production and consumption is widening. India is a country which imports around 70% of oil required per year. Hence, there is an urgent need to investigate factors and challenges for the development of sustainable and clean alternatives for transportation systems. Electrified vehicles are one of the promising, clean and sustainable forms of transportation.

The recent scenario of the road transportation sector can be highlighted as:

- Energy consumption : 524 million tons of oil equivalent
- Vehicle to people ratio : 1:56.3
- Per capita energy : 442 kg of oil equivalent
- GHG emissions : 1730 million tons of CO_2 equivalent
- Electric Vehicles sold : 25000 (all) and 2000 (cars)

Unlike other countries the vehicle to people ratio is very high, however, the population is more and emission is high. India stands third with the CO2 emission of 1.726 billion Metric ton. Hence, there is an urgent need to focus towards EV technology which has the capability towards zero emission for sustainable transportation.

In addition, due to urbanization and decentralization of city areas, a rapid increase in personal vehicles has been observed.

EV (Electric Vehicle) /HEV (Hybrid Electric Vehicle) /PHEV (Plug-in Hybrid Electric Vehicle) can be more beneficial for Indian roads due to the following reasons:

1. Hybrid or electric powertrains operate at much higher efficiency at low Indian driving speeds than an Internal Combustion Engine.
2. A higher share of energy per Indian trip is lost in braking, which is almost recovered in a hybrid-electric vehicle (HEV) and EV (Regenerative braking).
3. HEVs and EVs use no fuel during idling and the share of idling time in traffic is much higher in India (than the U.S. & Europe).
4. The average range travelled in India is much smaller than in the U.S. & Europe, making EVs much more feasible and with no range problem with a single charge.
5. Vehicle use and vehicle distance – Urban driving cycle patterns have a frequent start and stop, high traffic benefits to provide high efficiency electric vehicles.

MARKET OVERVIEW

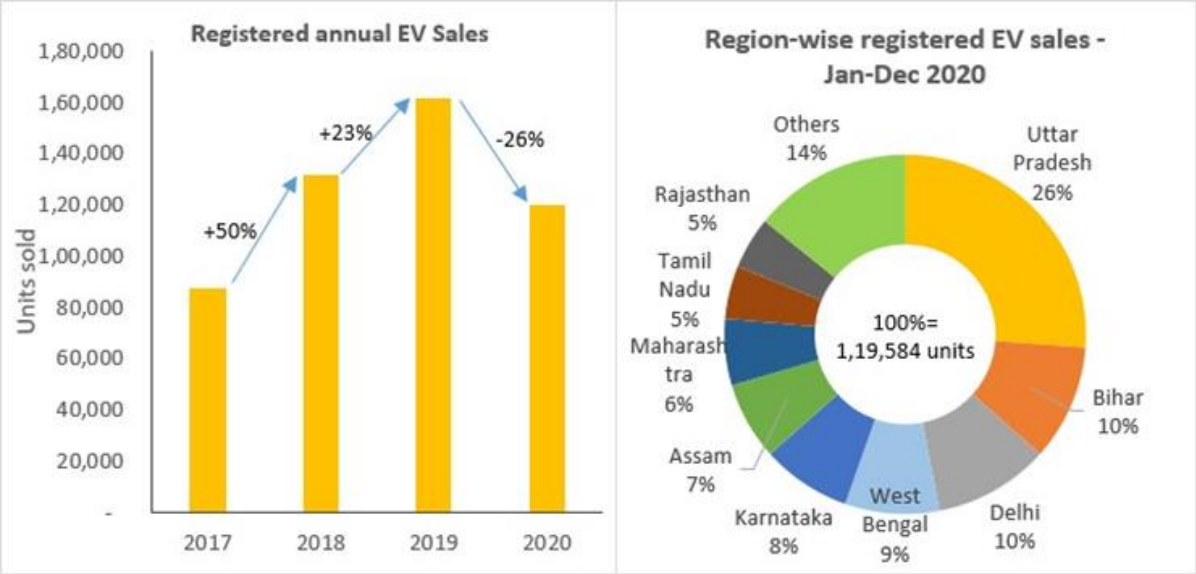
The Indian Electric Vehicle Market is segmented by Vehicle Type and Power Source.

- By Vehicle Type, the market is segmented into Passenger Cars, Commercial Vehicles, and Two- and Three-wheelers.
- By Power Source Type, the market is segmented into Battery Electric Vehicle, Plug-in Electric Vehicle, and Hybrid Electric Vehicle.

Our report mainly focuses on the Indian Electric Vehicle Market segmented by Vehicle Type. However, accessibility to Power Sources for Electric Vehicles affects the market and would be slightly discussed in the report.

The Indian Electric Vehicle Market was valued at USD 5 billion in 2020, and it is expected to reach USD 47 billion by 2026, registering a compound annual growth rate (CAGR) of above 44% during the forecast period (2021-2026).

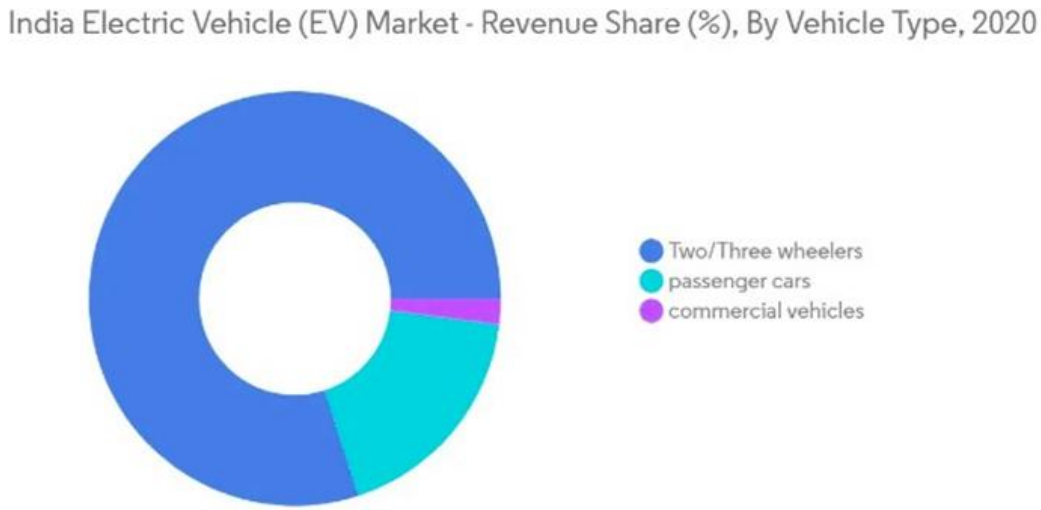
The Indian Electric Vehicle Market has been impacted by the outbreak of the COVID-19 pandemic due to supply chain disruptions and halt of manufacturing units due to continuous lockdowns and travel restrictions across the country. However, the electric vehicle (EV) market is still in its nascent stage in India. It is expected to grow at a much faster rate during the forecast period due to various government initiatives and policies.



E-commerce companies (Amazon, for example) are launching initiatives to use e-Mobility for last-mile deliveries to reduce carbon footprint. India is experimenting with e-Mobility for public transport, and the country has deployed electric intercity buses across some major cities. In addition, state governments are also playing an active role in the deployment of policies encouraging the usage of EVs. For instance,

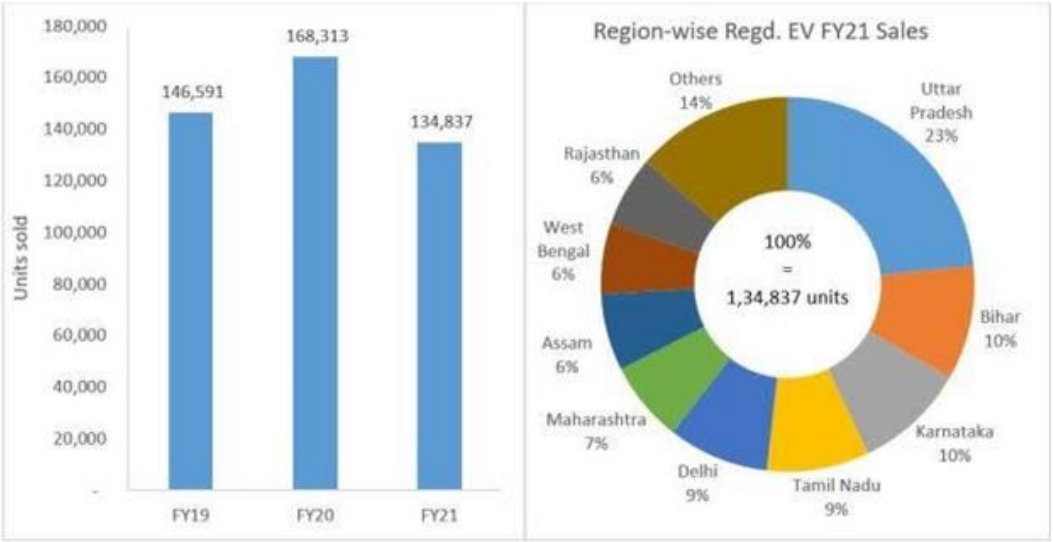
- Kerala aims to put one million EV units on the road by 2022 and 6,000 e-buses in public transport by 2025.
- Telangana aims to have EV sales targets for 2025 to achieve 80% 2- and 3-wheelers (motorcycles, scooters, auto-rickshaws), 70% commercial cars (ride-hailing companies, such as Ola and Uber), 40% buses, 30% private cars, and 15% electrification of all vehicles.

The EV market in India has gained significant momentum after the implementation of the (Faster Adoption and Manufacturing of Hybrid & Electric Vehicles in India) FAME India scheme with its aim of shifting toward e-mobility in the wake of growing international policy commitments and environmental challenges. Moreover, India offers the world's largest untapped market, especially in the electric two-wheeler segment. As 100% foreign direct investment is allowed in this sector, the automatic route market is expected to gain momentum during the forecast period.



MARKET DYNAMICS

In the financial year 2020-21, the leading type of electric vehicles sold in India was two-wheelers, reaching around 144 thousand units. This was a five percent decrease from the previous year's 152 thousand units. The only section that saw growth was four-wheelers.



The Indian EV market is consolidated with the presence of major players in the market, owing to cheap and readily available manpower. However, established players in the market are introducing new models to gain a competitive edge over other player. The start-ups are expanding their presence by raising funds from investors and tapping into new and unexplored cities. Companies are investing a tremendous amount in R&D and launching new models to mark their presence in the market.

GOVERNMENT INITIATIVES AND POLICIES SUPPORTING THE EV INDUSTRY

The Indian government has also taken initiatives, like FAME, which will contribute towards the boom in the EV market. The Indian government announced its National Electric Mobility Mission Plan (NEMMP), to support the manufacturing capabilities of local automakers. With this roadmap, the government plans to make electric vehicles economically viable and self-sustaining, by 2020. The government also announced investments of over INR 13,000 crore for demand incentives, INR 1,800 crore for R&D investments, INR 5,000 crore for power infrastructure, and INR 1,200 crore for charging infrastructure. This plan aims at encouraging reliable, affordable, and efficient EVs that can meet the consumers' performance and price expectations. Additionally, it involves a collaboration between the government and the industry for the promotion and development of indigenous manufacturing capabilities, consumer awareness, technology, and required infrastructure, thereby, helping the country emerge as a global leader in the global two-wheeler and four-wheeler electric vehicles market, by 2022.

MARKET CHALLENGES

The push for electric vehicles (EVs) in India seems to be coming at a rapid pace, but the hype does not seem to match the sales of electric vehicles in the country. The slow progress of EV sales is due to various factors, such as limited options in the passenger car segment, driving range of vehicles, lack of affordability, and lack of charging infrastructure.

Affordability is playing a significant role in hindering the growth of the market studied. India is a price-sensitive country, where the majority of people consider the price of the vehicle first rather than any other factor or aspect. At present, EVs are not affordable for a large section of people who cover a significant sales share of vehicles in the country.

As the electric vehicles market (EVs) in India is at its very nascent stage, the charging infrastructure is also at its minimum, whereas developed countries have well-established charging stations that are more accessible to people for charging their vehicles. Considering the expected increase in the sales of EVs, the development of charging infrastructure becomes very important for the development of a suitable ecosystem. Further, in terms of driving range, very few variants available in the market go beyond 150 km/charge.

COMPETITIVE LANDSCAPE

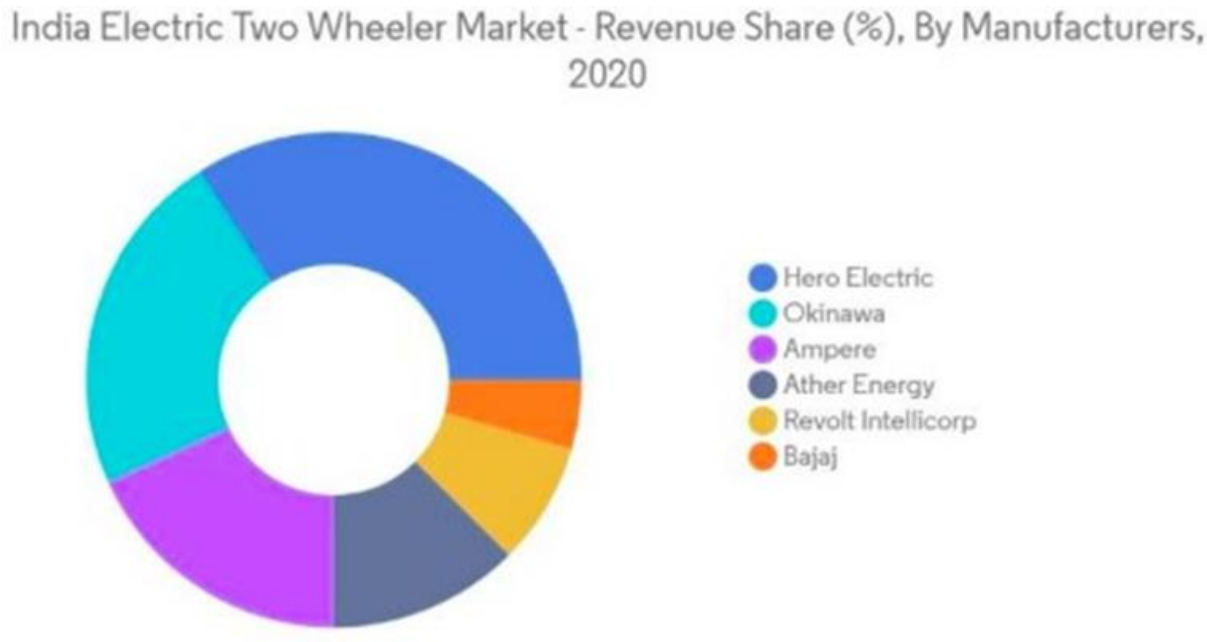
The Indian EV market is consolidated with the presence of major players in the market, owing to cheap and readily available manpower. However, established players in the market are introducing new models to gain a competitive edge over other player. For instance,

- In 2019, Tata Motors announced its EV technology ZIPTRON, which will power all future Tata electric cars. It consists of a highly efficient permanent magnet AC motor, providing excellent performance. It will also offer a dust and waterproof battery system.
- In January 2020, Morris Garages Motor India launched its first electric internet SUV, and the car has a driving range of 340 km on a full charge.

The start-ups are expanding their presence by raising funds from investors and tapping into new and unexplored cities. Companies are investing a tremendous amount in R&D and launching new models to mark their presence in the market.

OPTIMISTIC GROWTH FOR ELECTRIC BUSES AND TWO-WHEELER VEHICLES

India is also pushing hard for the electrification of buses. Many state governments have already started procuring electric buses from Chinese and local electric bus manufacturers. Many local bus manufacturers who are in collaboration with some Chinese manufacturers are trying to cater to the rising demand for electric buses in India. With transportation still being a challenge in India, a lot of people in these segments look forward to the two-wheeler industry in India. As a result of the surging pollution, the national government has launched stringent policies to curb vehicular emissions. Furthermore, the availability of a considerable number of electric two-wheeler models, their low cost, as well as their availability as a substitute for conventional fuel-based vehicles. These aforementioned factors are fuelling the demand in the Indian electric vehicle market.



ASSUMPTIONS

- In India, there are 30 crore registered vehicles.
- There are approximately 22 crore registered two-wheelers in India, with the remaining 8 crores being four-wheelers; trucks and other types of transport/construction vehicles are not included.
- The average increase for two-wheelers is 75% year on year, while the average increase for four-wheelers is 25% year on year.

- As of 2020, there are approximately 6 lakh electric vehicles in the country, with approximately 5.4 lakh being two-wheelers and 0.6 lakh being four-wheelers.
- The total number of vehicles remains constant.
- EVs are the only green substitute technology for gasoline/diesel vehicles.

CALCULATIONS

Let's see how long it will take for EVs to produce 80% of vehicles in each category.

- For two-wheelers,
  $18 = 0.054 \times (1 + 0.75)^t$
  $t = 10.38$ years

- For four-wheelers,
  $8 = 0.006 \times (1 + 0.25)^t$
  $t = 32$ years

CONCLUSION

So, by 2030 for two-wheelers and 2050 for four-wheelers, 80% of India's total vehicles will be electric.

From the above analysis of the Indian automobile industry, we can see that there is a lot of potential to grow, as the market has just started picking up the pace.

SITUATIONAL ANALYSIS

Before developing a marketing strategic plan, a situation analysis must be completed. EV adoption is rapidly increasing across all market segments. With the government's encouragement and benefits such as subsidies and low fuel costs, customers across all demographics are eager to adopt EVs as their primary mode of transportation.

1. **Customer Usage:**
   Whether a customer will adopt EV or not will depend on their daily routines, i.e., the average distance they travel each day, the higher their average daily run, the higher will be the savings in the long run.

2. **Mileage:**
   Mileage will also play a key role especially in the Indian market as most customers look for higher range in less charge, compromising in speed.

3. **Safety:**
   EVs built quality has to be at par with their gasoline counterparts as there have been numerous reported incidents of batteries catching fire. Dealing with this issue will be critical especially for the hot climate in many parts of India for most of the duration in a year.

4. **Quality:**
   Comfort, build quality of the materials used, additional features will help in attracting new customers.

DATA SOURCES

Data was scraped from multiple websites using Selenium, such as bikewale and carwale, and user reviews were collected in which they shared their experiences with the available EV products on the market.

We have considered multiple datasets for the analysis.

1. The first dataset consists of user reviews for **E4W**.

	review	Exterior	Comfort	Performance	Fuel Economy	Value for Money	Condition	driven	rating
0	Need to improve body style.It's amazing and dr...	5.0	5.0	5.0	5.0	5.0	New	Few thousand kilometers	5.0
1	Tata EV has lot of flaws, worst part is servic...	3.0	2.0	1.0	2.0	1.0	New	Few thousand kilometers	0.0
2	Very nice car , environmental friendly i like ...	5.0	5.0	5.0	5.0	5.0	New	Few thousand kilometers	5.0
3	Company did not provide slow charging station ...	2.0	2.0	1.0	1.0	1.0	New	Haven't driven it	0.0
4	Servicing and maintenance overall good and goo...	5.0	5.0	5.0	5.0	5.0	Not Purchased	Few hundred kilometers	5.0

2. The second dataset consists of user reviews for **E2W**.

	review	Used it for	Owned for	Ridden for	rating	Visual Appeal	Reliability	Performance	Service Experience	Extra Features	Comfort	Maintenance cost	Value for Money
0	Wanna buy this bike so i gave basic informatio...	Everything	Never owned	NaN	1	3.0	1.0	3.0	1.0	4.0	NaN	NaN	NaN
1	This is simply amazing and exceptionally well ...	Everything	> 1 yr	< 5000 kms	5	5.0	5.0	5.0	5.0	NaN	5.0	NaN	NaN
2	Battery life is good, I like this bike very mu...	Everything	< 3 months	< 5000 kms	5	4.0	4.0	5.0	3.0	NaN	4.0	NaN	NaN
3	I seen this bike on road. Very nice bike and g...	Everything	Never owned	NaN	5	5.0	5.0	5.0	5.0	NaN	5.0	NaN	NaN
4	I have a rv400 I have the bike for almost more...	Daily Commute	> 1 yr	5000-10000 kms	1	2.0	1.0	1.0	2.0	NaN	3.0	NaN	NaN

3. EVStats.csv : This data source has the information about each state in India and sales about the Electric vehicles line two wheelers and three wheelers. It gives total sales in each state.

	Sl. No	State	Two Wheelers (Category L1 & L2 as per Central Motor Vehicles Rules	Two Wheelers (Category L2 (CMVR))	Two Wheelers (Max power not exceeding 250 Watts)	Three Wheelers (Category L5 slow speed as per CMVR)	Three Wheelers (Category L5 as per CMVR)	Passenger Cars (Category M1 as per CMVR)	Buses	Total in state
0	1	Meghalaya	0	0	0	0	0	6	0	6
1	2	Nagaland	0	20	3	0	0	1	0	24
2	3	Manipur	16	8	11	0	5	12	0	52
3	4	Tripura	28	9	36	0	0	8	0	81
4	5	Andaman & Nicobar islands	0	0	0	0	0	82	0	82

4. Indian automobile buying behaviour study 1.0.csv : This dataset Indian Consumers Automobiles (Cars) buying behaviour. By observing different brands and their sales pattern, we can predict customer demand and bring up new products that would reach customer satisfaction.

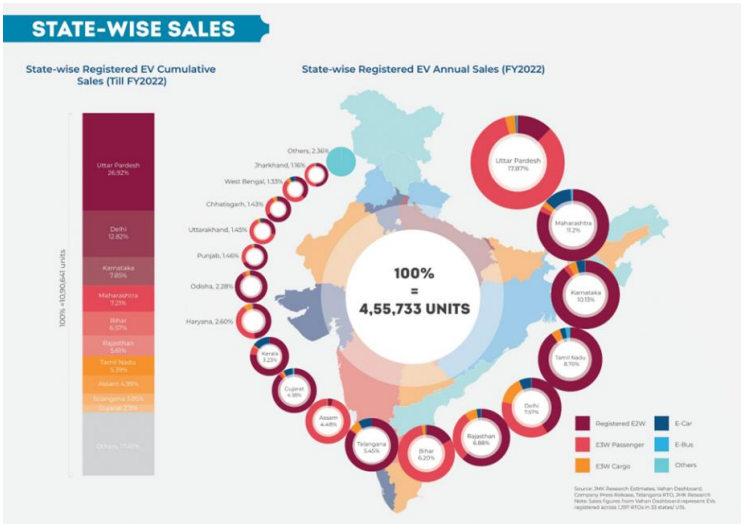
	Brand	Model	AccelSec	TopSpeed_KmH	Range_Km	Efficiency_WhKm	FastCharge_KmH	RapidCharge	PowerTrain	PlugType	BodyStyle	Segment	Seats	PriceEuro
0	Tesla	Model 3 Long Range Dual Motor	4.6	233	450	161	940	Yes	AWD	Type 2 CCS	Sedan	D	5	55480
1	Volkswagen	ID.3 Pure	10.0	160	270	167	250	Yes	RWD	Type 2 CCS	Hatchback	C	5	30000
2	Polestar	2	4.7	210	400	181	620	Yes	AWD	Type 2 CCS	Liftback	D	5	56440
3	BMW	iX3	6.8	180	360	206	560	Yes	RWD	Type 2 CCS	SUV	D	5	68040
4	Honda	e	9.5	145	170	168	190	Yes	RWD	Type 2 CCS	Hatchback	B	4	32997

5. ElectricCarData_Clean.csv : This dataset has a detailed information on buying behaviour of Indians and factors that affects their probability of buying an electric vehicle.

	Age	Profession	Marrital Status	Education	No of Dependents	Personal loan	House Loan	Wife Working	Salary	Wife Salary	Total Salary	Make	Price
0	27	Salaried	Single	Post Graduate	0	Yes	No	No	800000	0	800000	i20	800000
1	35	Salaried	Married	Post Graduate	2	Yes	Yes	Yes	1400000	600000	2000000	Ciaz	1000000
2	45	Business	Married	Graduate	4	Yes	Yes	No	1800000	0	1800000	Duster	1200000
3	41	Business	Married	Post Graduate	3	No	No	Yes	1600000	600000	2200000	City	1200000
4	31	Salaried	Married	Post Graduate	2	Yes	No	Yes	1800000	800000	2600000	SUV	1600000

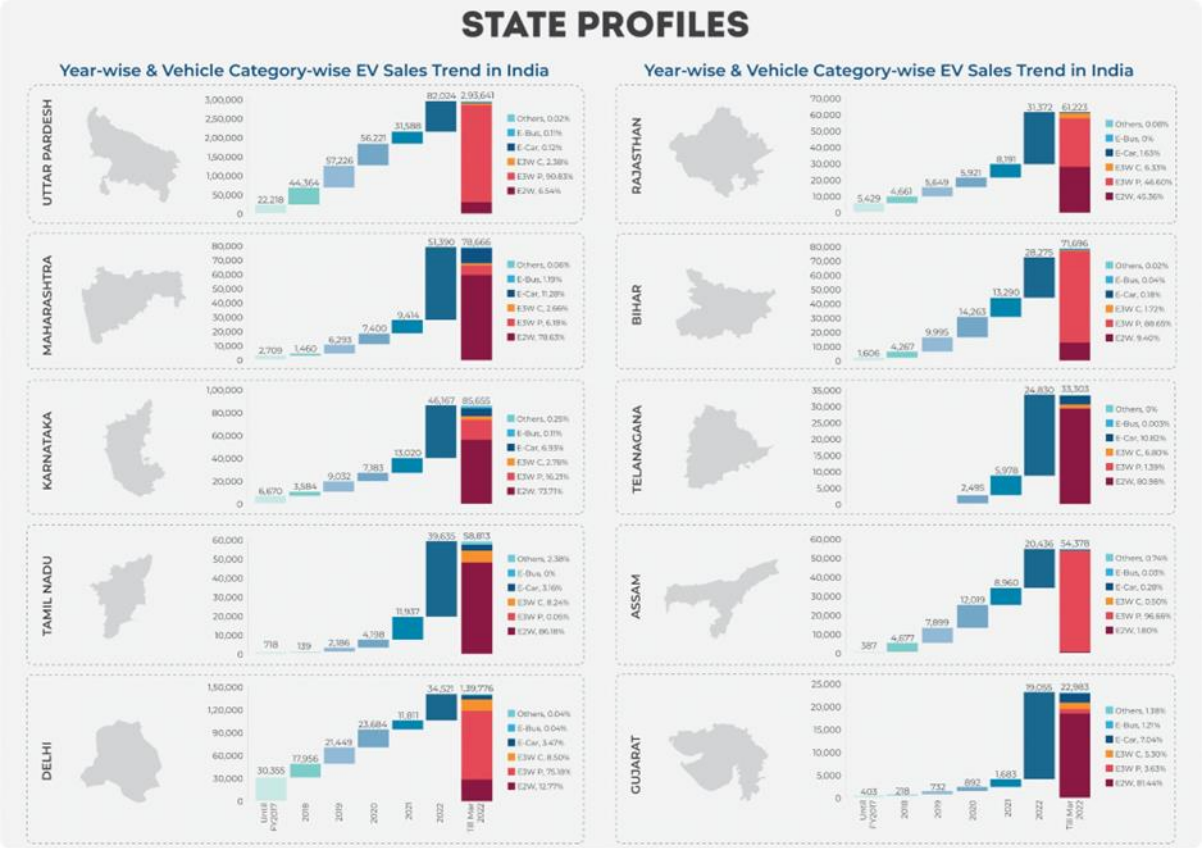
GEOGRAPHY ANALYSIS

[2021]



[FY-2022]

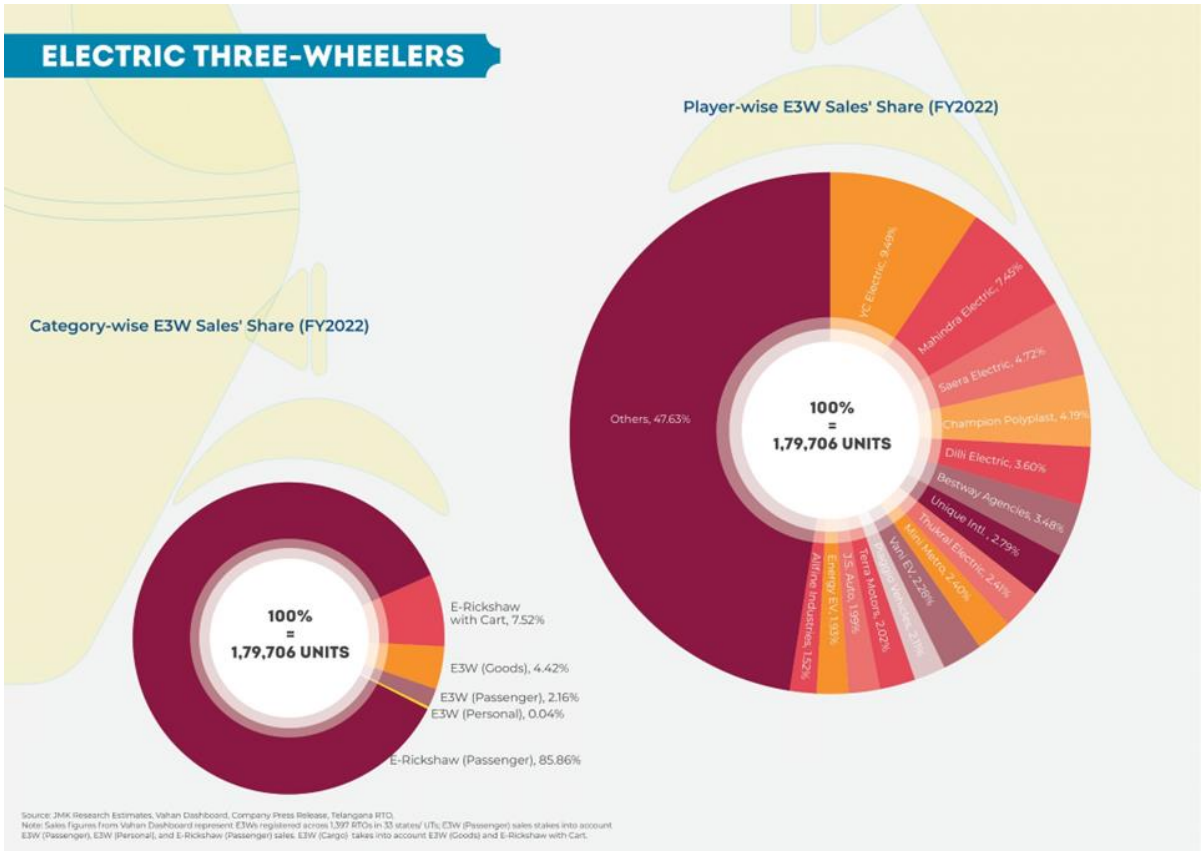
From the above data we can see that UP leads the way in the total number of EV sales.



But if we look at the top states in EV sales closely, some important insights we can make from the available data.

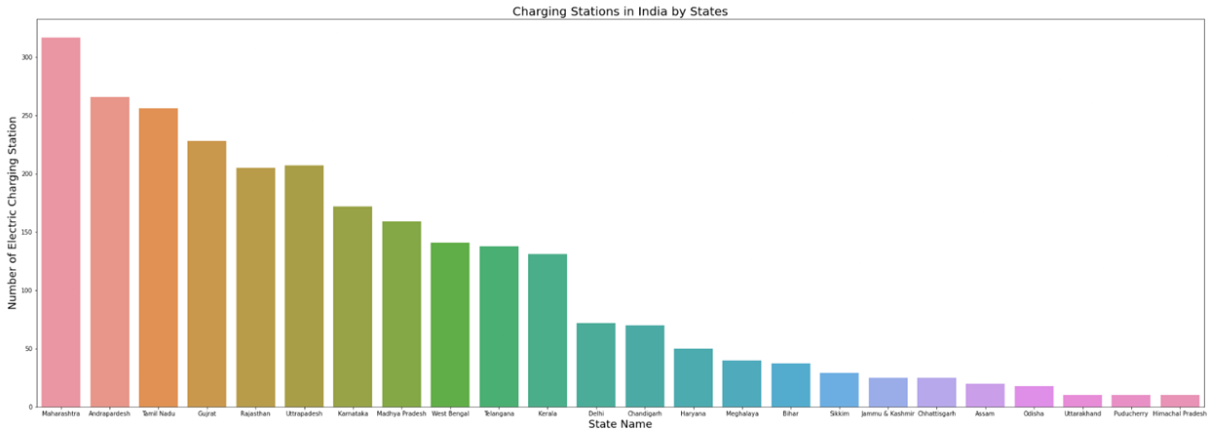
- UP leads the number in total EV sales but most sales are in the 3-wheeler segment i.e., for transport.
- Tamil Nadu has the highest percentage of two-wheeler EV sales of the total sales in that state i.e., 86%.
- Maharashtra has the highest percentage of four-wheeler EV sales of the total sales in those states i.e., 11%.
- Likewise, we can observe percentage sales in other segments.

Total EV sales are dominated by E3W and E2W (i.e., three-wheelers and two-wheelers). So, when starting an EV business, one can also decide in which segment they want to provide EV's for maximum initial sales and fast growth.



Above graph shows the breakdown of sales for E2Ws and E3Ws for FY-2022.

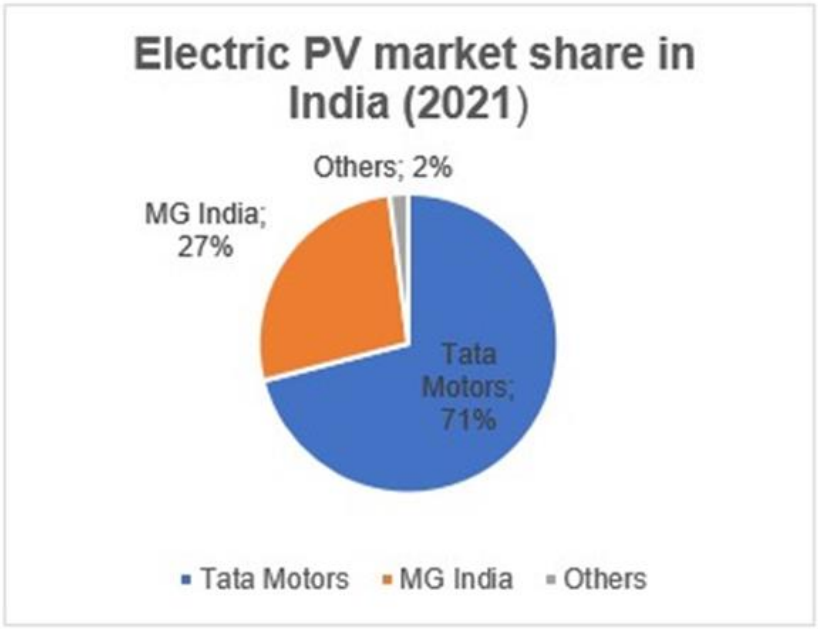
EV charging stations also play a key role in Geographical analysis as range anxiety is one of the major concerns for EV users.



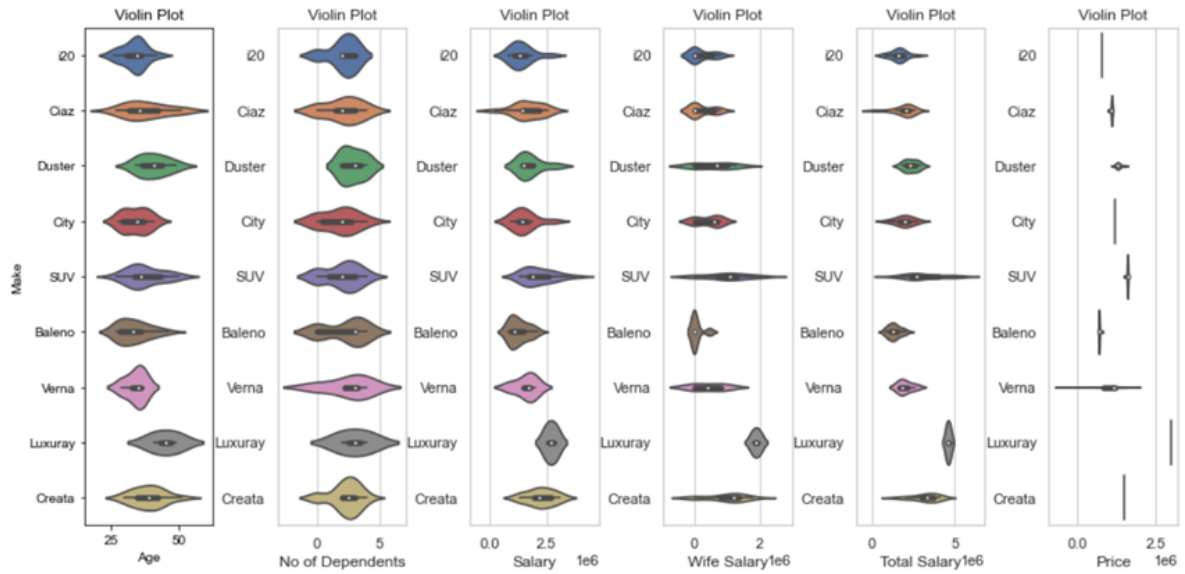
Top 5 States with most charging stations include: Maharashtra, Andhra Pradesh, Tamil Nadu, Gujarat, Rajasthan.

DEMOGRAPHIC ANALYSIS

In the passenger car segment, Tata Motors leads the electric vehicle segment with a market share of 71%, with two flagship models, the Nexon and the Tigor EV, leading the pack. MG Motors India came in second, offering the longest line-up of electric vehicles (the MG EZS offers a range of 39 km on a single charge). Other Indian manufacturers have already announced their models and are expected to launch in the future.



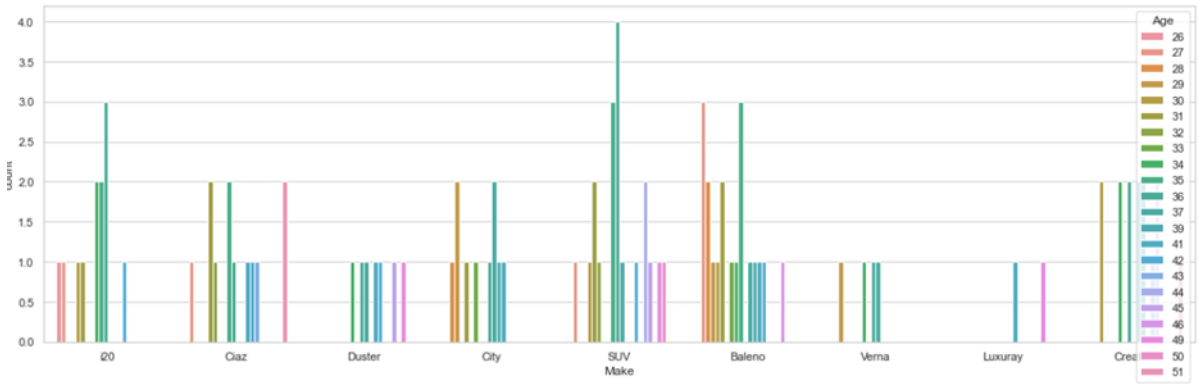
We will visualize the dataset to gain knowledge on customer preferences.



Observations:

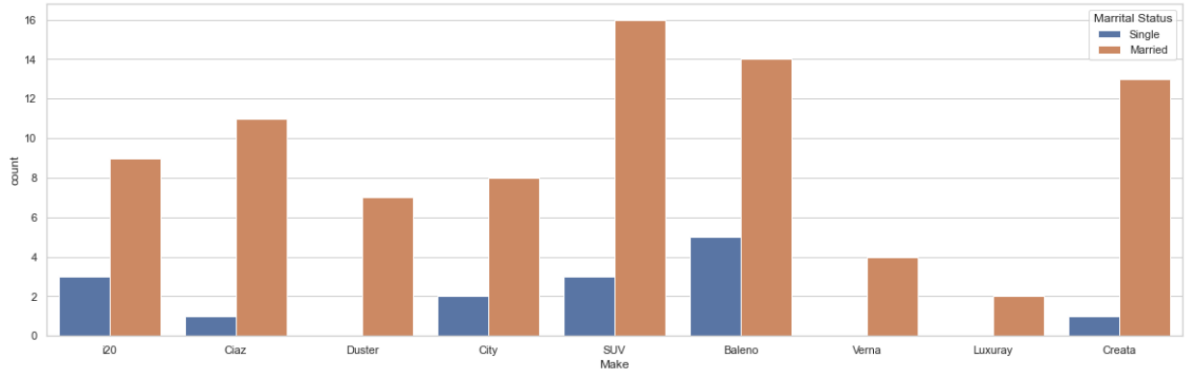
- Age: Younger consumers buy cheaper cars.
- Number of dependents: More dependents make consumers buy cars with more seats, so they prefer SUVs.
- Salary: If you fit the normal salary chart with the price chart, you'll notice that the average violin salary chart corresponds to the price of the car, which is a very direct relationship.

Plot for Relationship between consumers age and the vehicles they purchase.



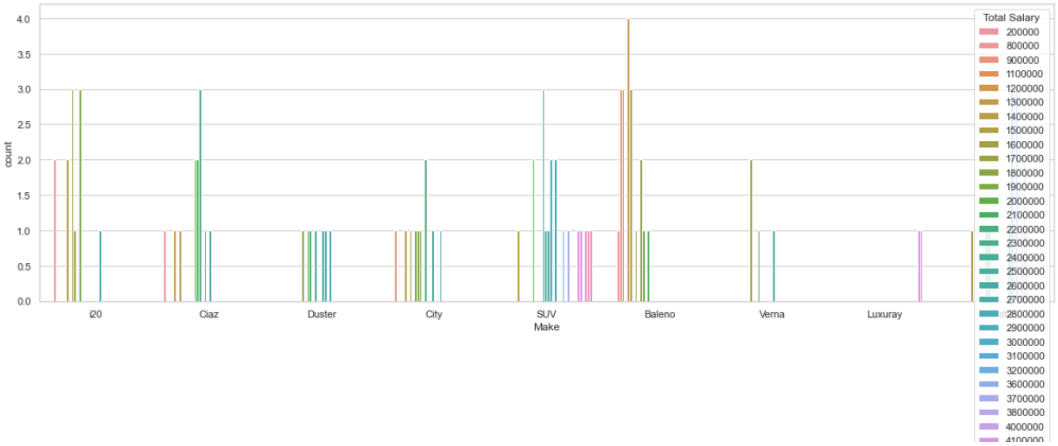
Observation: People in their 30s including early 40s and late 20s tend to buy electric vehicle comparatively than others.

Plot for Relation between consumers' marital status and the vehicles they purchase.



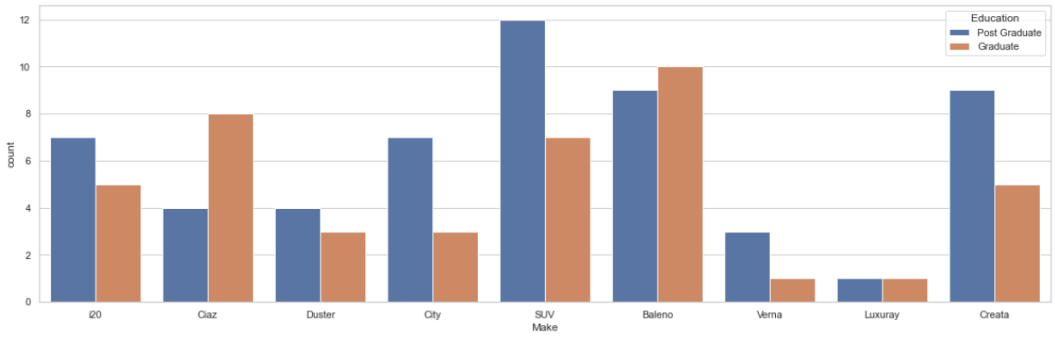
Observation: From the above plot it is clearly notable that married persons are more likely to purchase an electric vehicle when compared to a single person.

Plot for Relation between consumer's total salary and the vehicles they purchase.



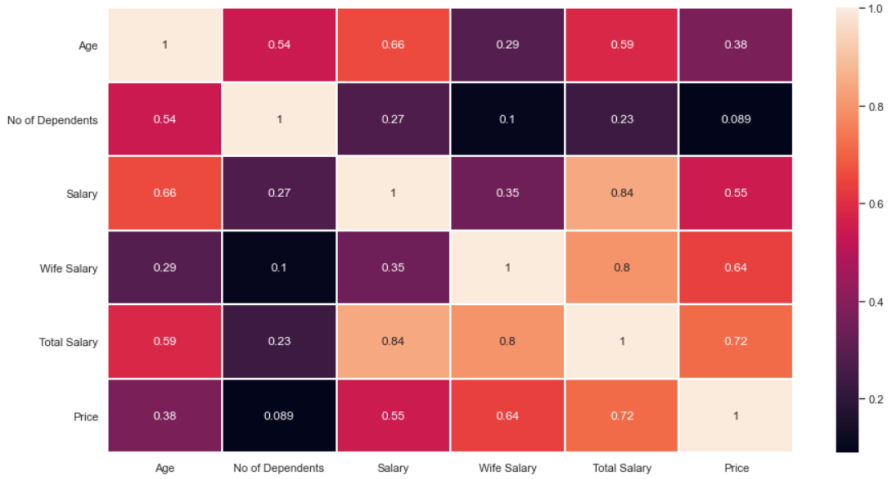
Observation: From the above plot we can analyse that salary is directly proportional to type of Electric vehicle a person tends to buy.

Plot for Relation between consumer's education and the vehicles they purchase.



Observation: In this plot both graduate and undergraduate have equal probability of buying an e vehicle.

CORRELATION PLOT

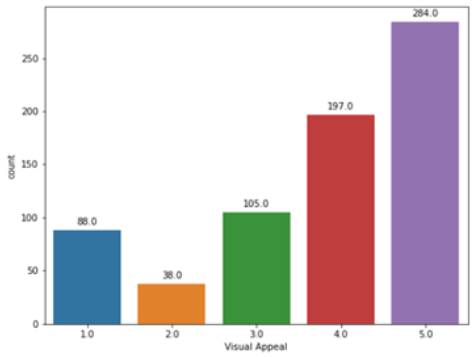


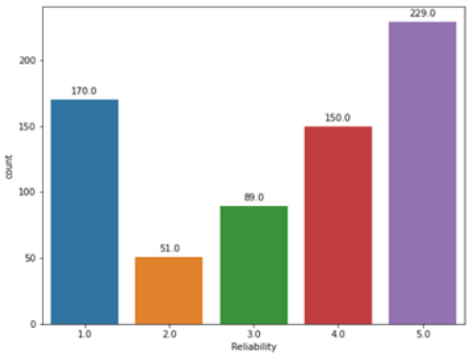
This correlation plot can clearly convey the attributes that affects the buying preference of any person.

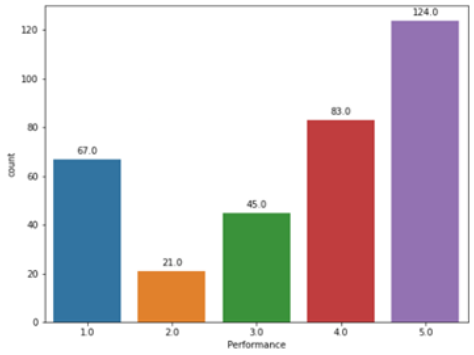
PSYCHOGRAPHIC ANALYSIS

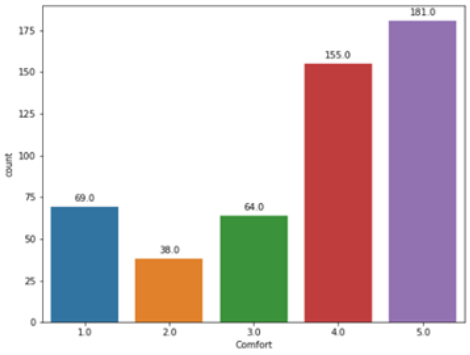
Here we can analyse all the preferences and reviews of the customers on various aspects.

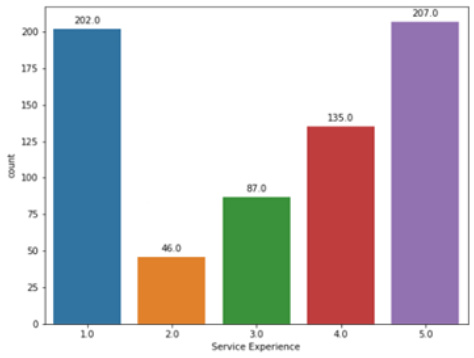
For **E2Ws**:

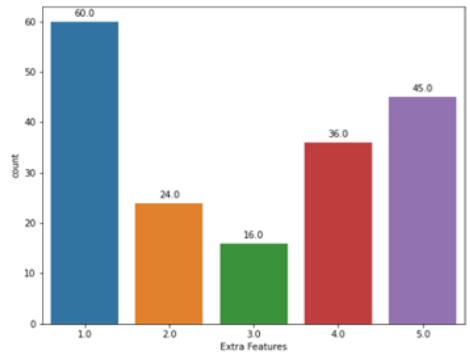


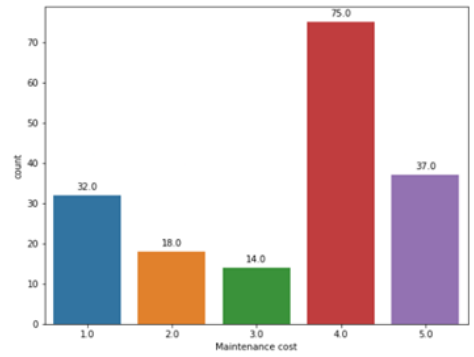


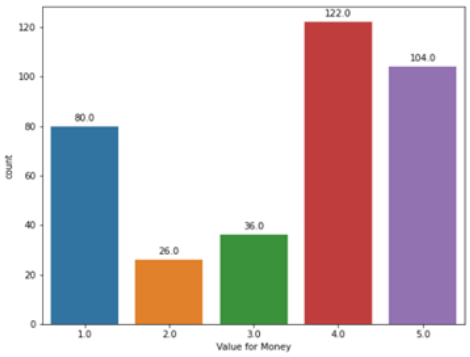




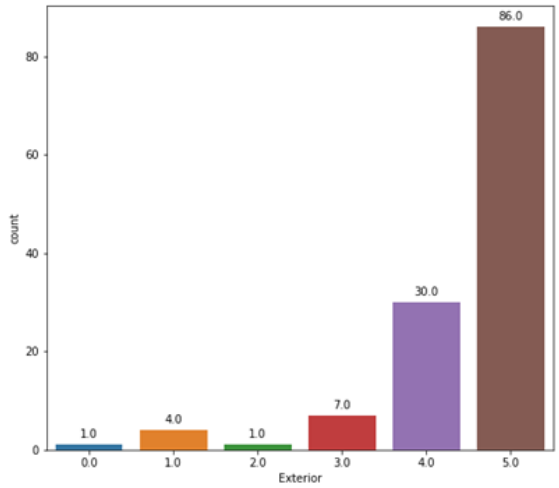


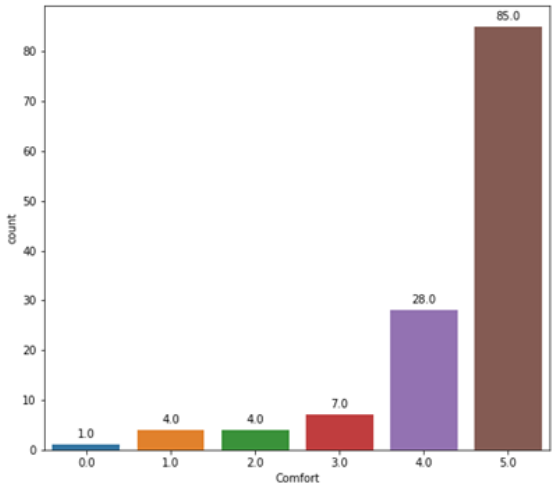


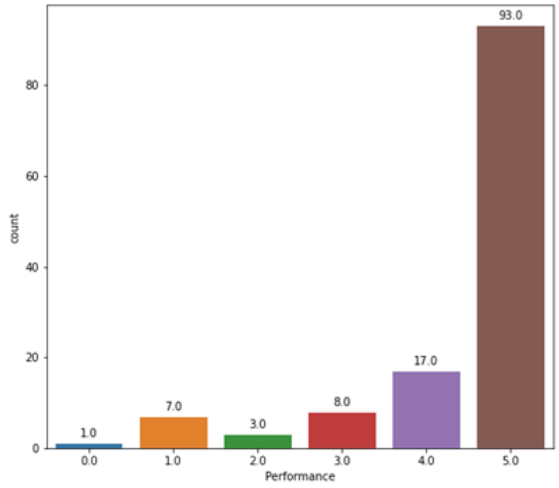


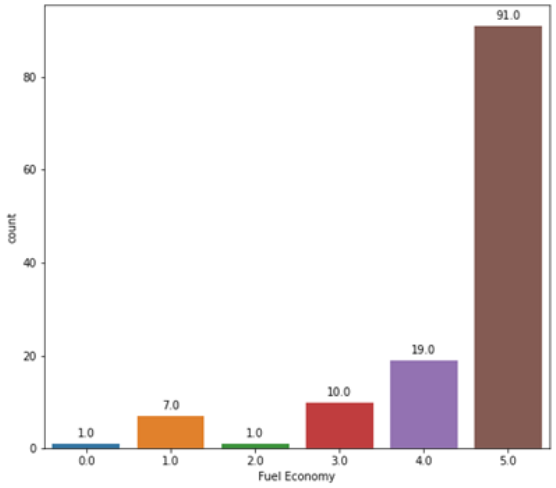


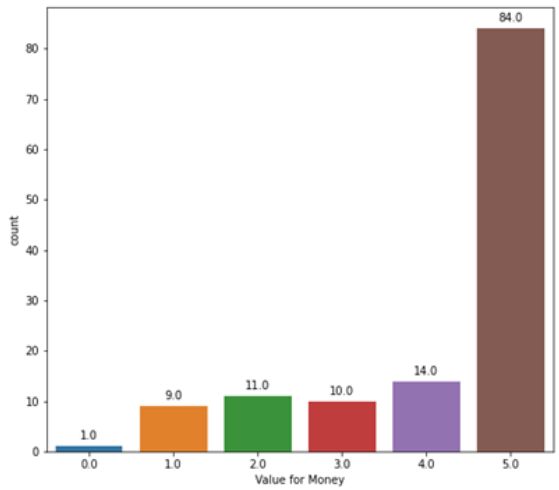
For **E4Ws**:

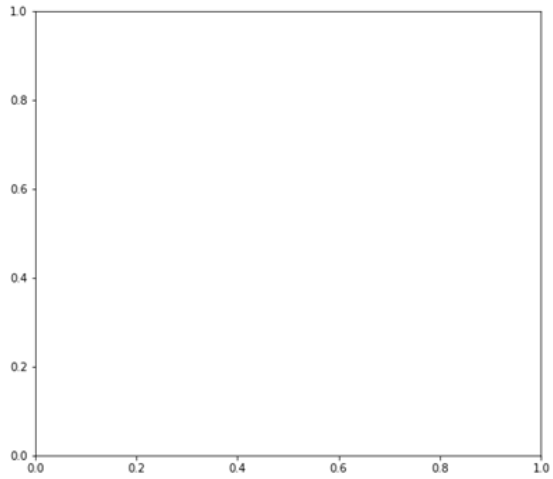

count
Exterior
1.0
4.0
1.0
7.0
30.0
86.0


count
Comfort
1.0
4.0
4.0
7.0
28.0
85.0


count
Performance
1.0
7.0
3.0
8.0
17.0
93.0

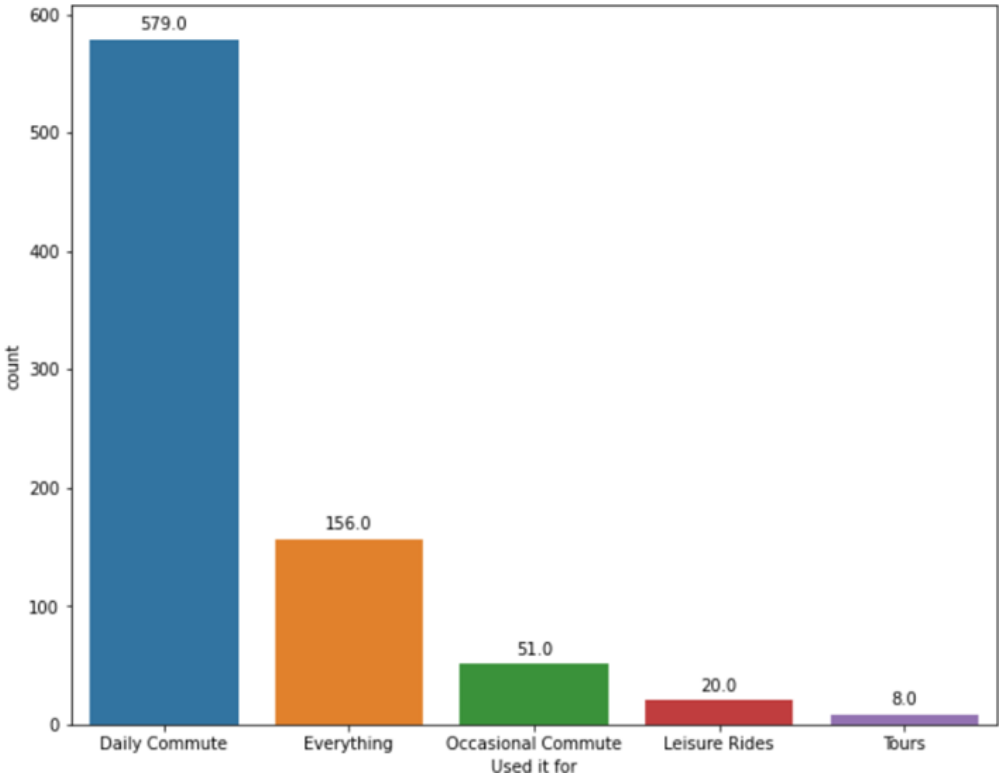

count
Fuel Economy
1.0
7.0
1.0
10.0
19.0
91.0

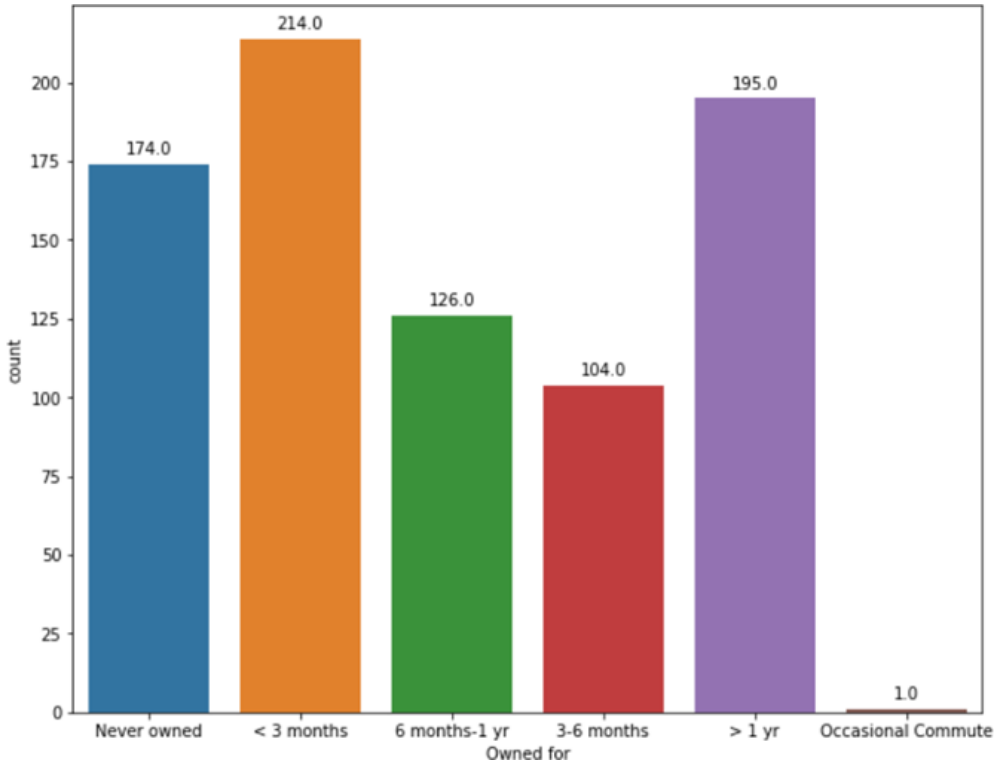

count
Value for Money
1.0
9.0
11.0
10.0
14.0
84.0

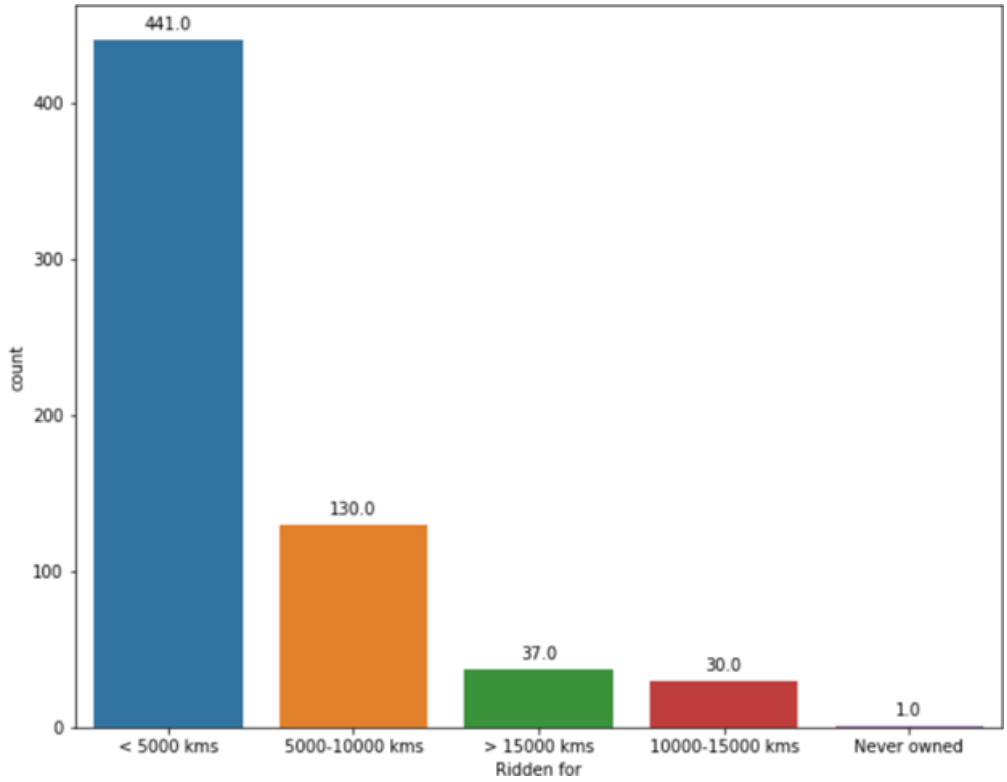


BEHAVIORAL ANALYSIS

We can look into the behavioral aspect of users.
For **E2Ws**:

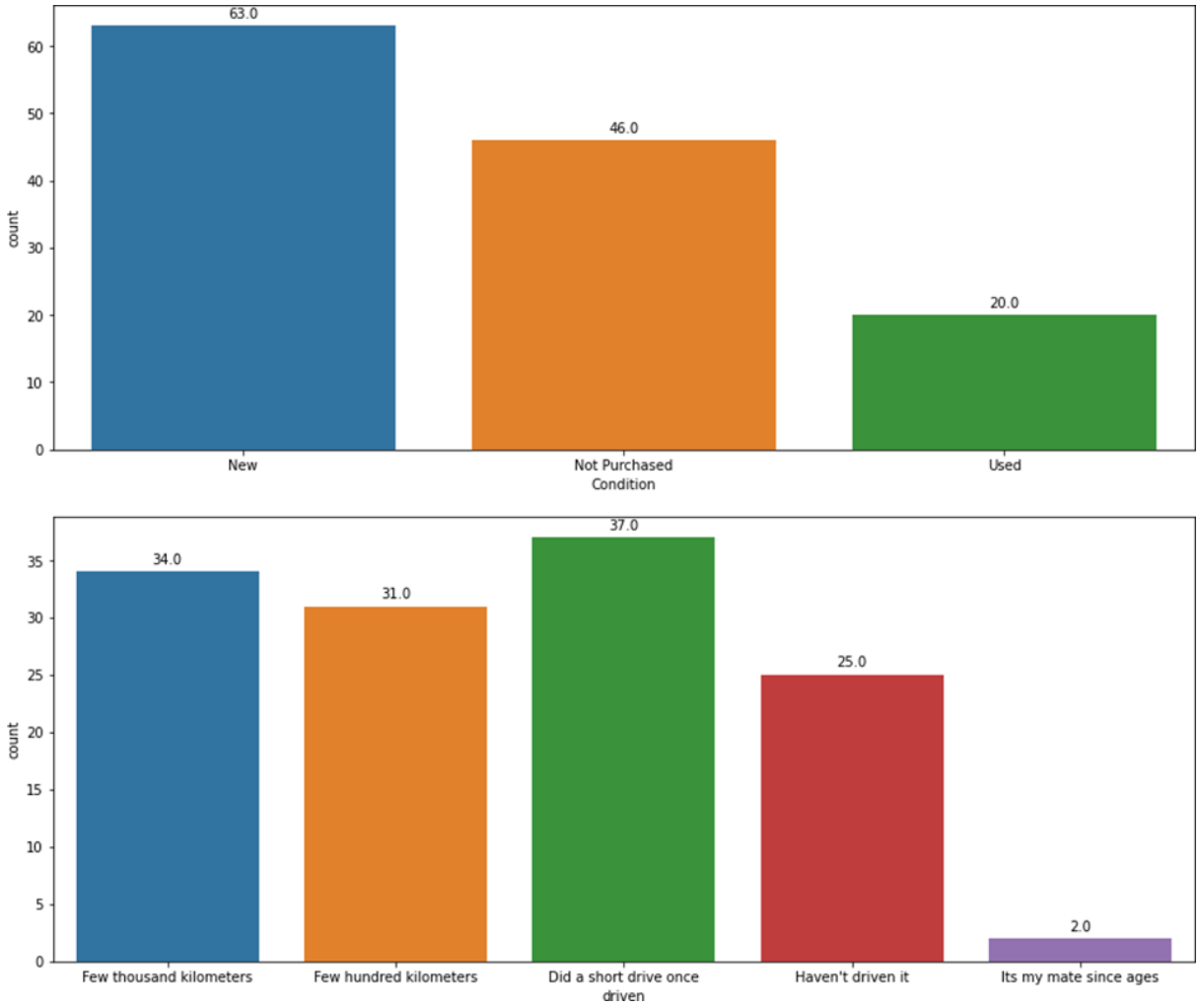






We can see that most users use E2Ws for daily commute only and many people who haven't owned an E2W also posted reviews, shows the interest of people towards EVs.

For **E4Ws**:



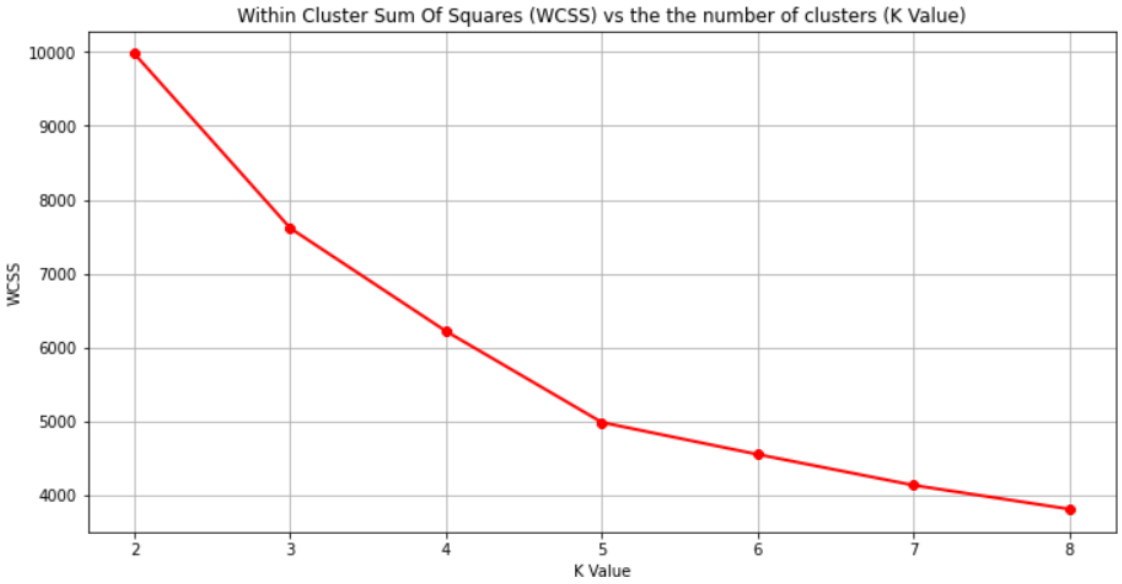
For E4W's, most people own a new EV and most of them have driven for short distances only, so no long-term review is available.

SEGMENTATION

USING K-MEANS

- For **E2Ws**:

➢ Using Elbow method to find the optimum K value.



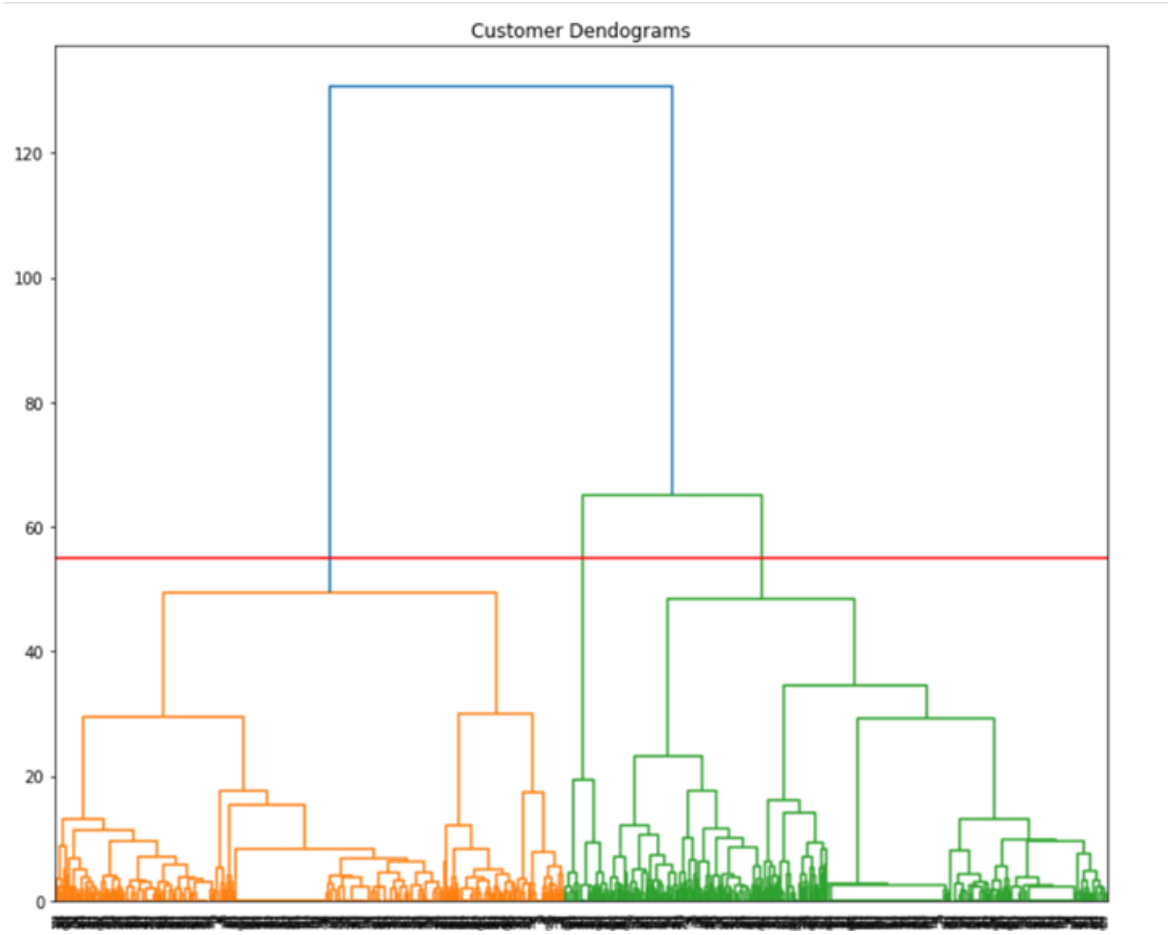
We clearly observe an elbow at k=3.

➢ Using Silhouette Score

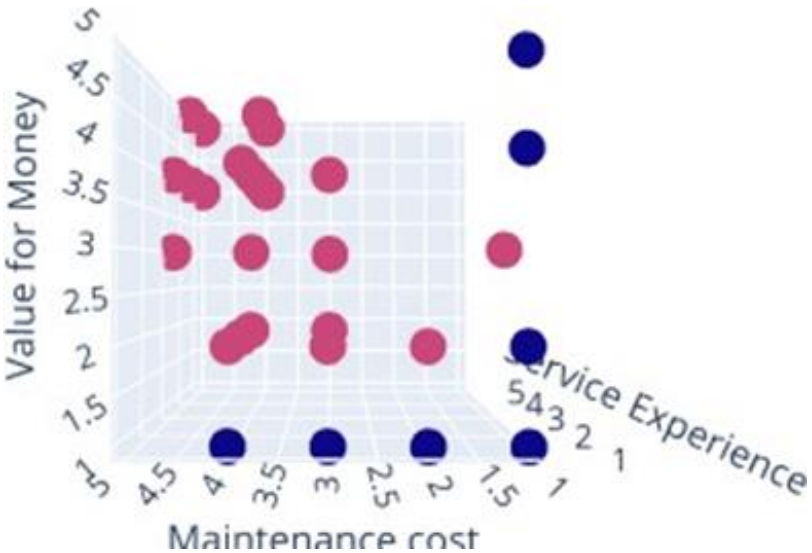
```
For n_clusters = 2 The average silhouette_score is : 0.4382798385117127
For n_clusters = 3 The average silhouette_score is : 0.47197983697315826
For n_clusters = 4 The average silhouette_score is : 0.44966426821874844
For n_clusters = 5 The average silhouette_score is : 0.4110356880565707
For n_clusters = 6 The average silhouette_score is : 0.3803659233066803
For n_clusters = 7 The average silhouette_score is : 0.38054950742527416
For n_clusters = 8 The average silhouette_score is : 0.3717438932186394
```

Silhouette Score also gives optimal clusters as 3.

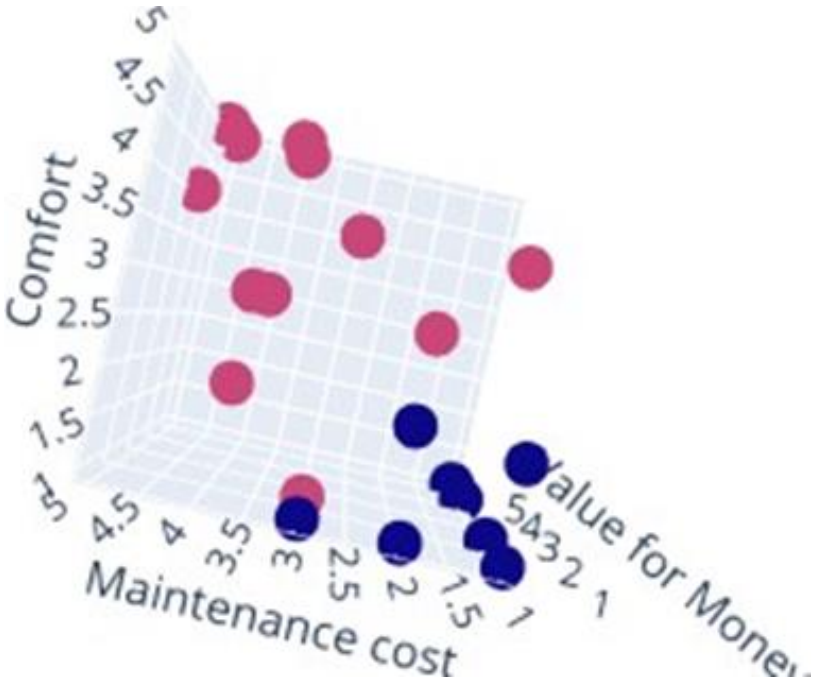
- Using Dendrograms



This also gives optimal clusters as 3.



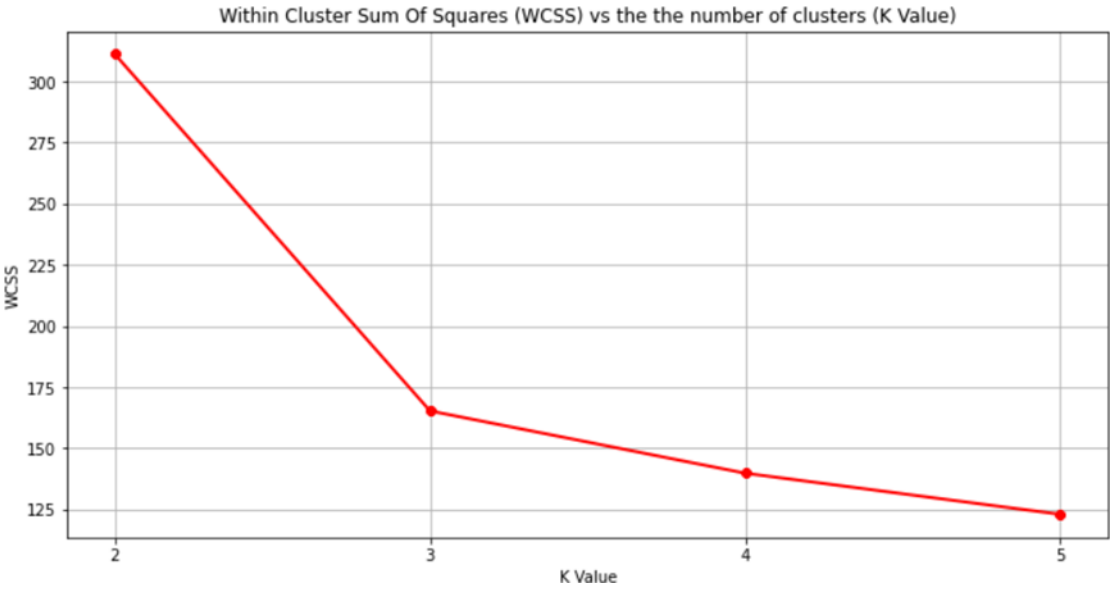
Cluster Plot for Service Experience, Maintenance cost and Value for Money.



Cluster Plot for Comfort, Maintenance cost and Value for Money.

- For **E4Ws**:

➢ Using Elbow method to find the optimum K value.



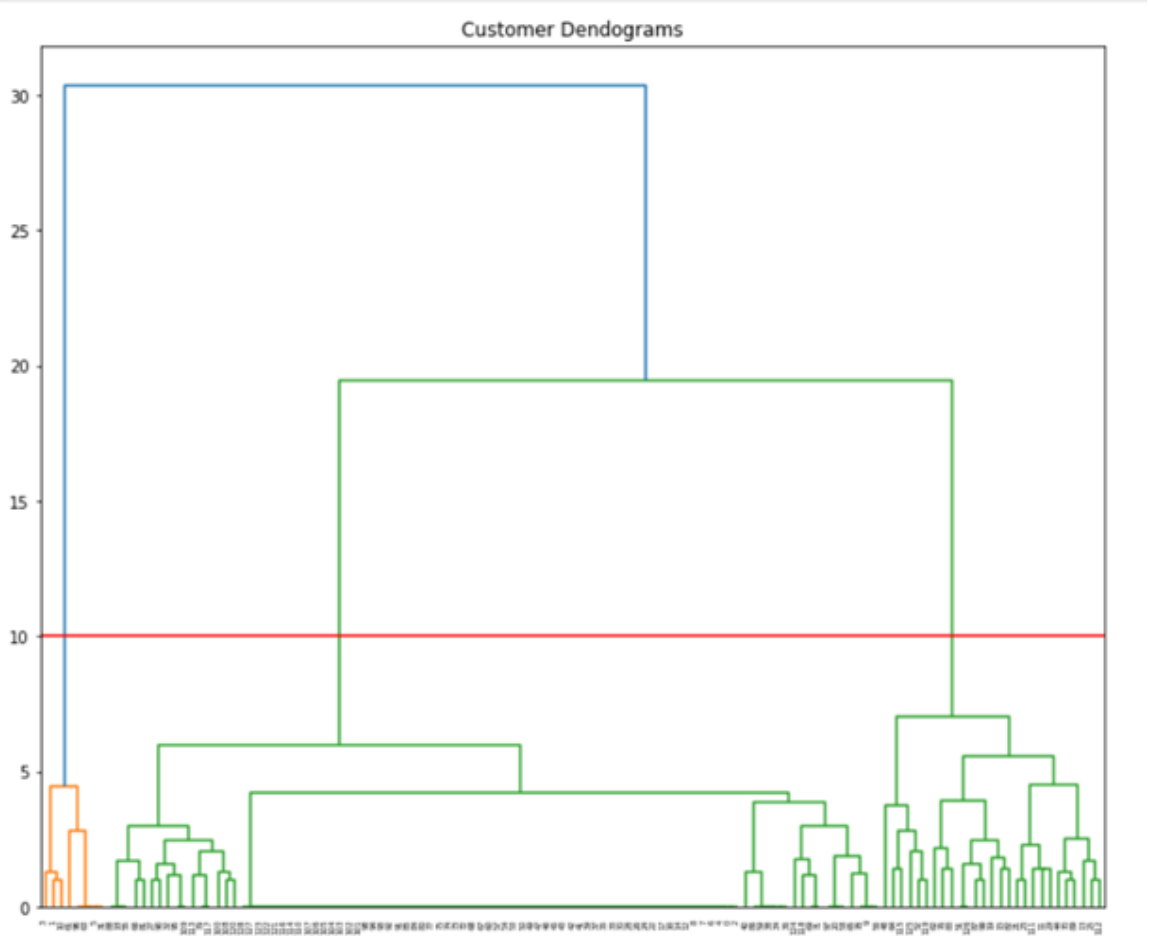
We clearly observe an elbow at k=3.

- Using Silhouette Score

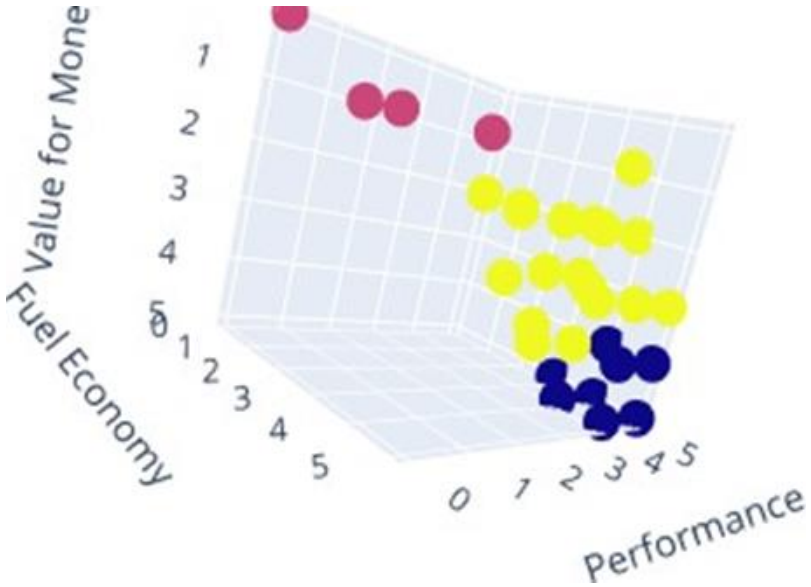
```
For n_clusters = 2 The average silhouette_score is : 0.7219919432326541
For n_clusters = 3 The average silhouette_score is : 0.6315470424676867
For n_clusters = 4 The average silhouette_score is : 0.5479325325802188
For n_clusters = 5 The average silhouette_score is : 0.542824572239918
```

Silhouette Score also gives optimal clusters as 3.

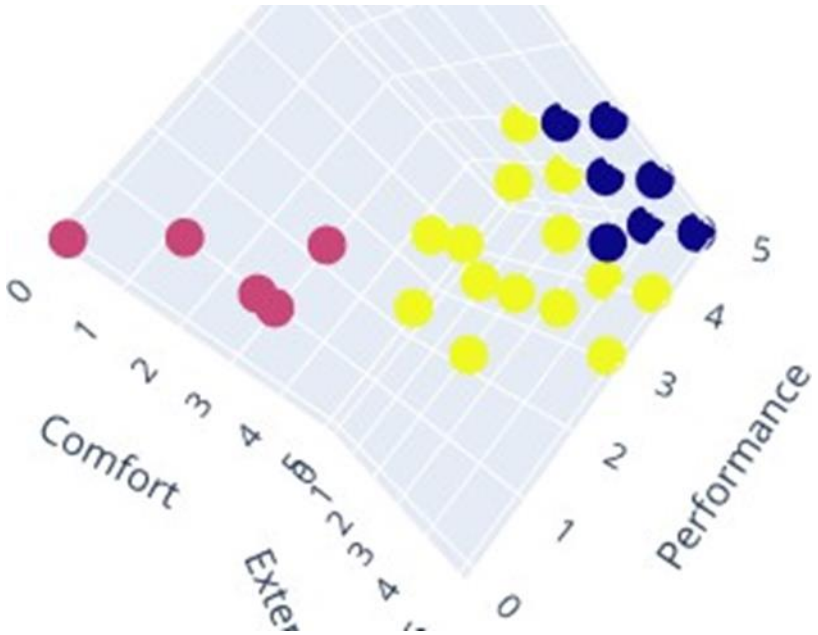
- Using Dendrograms



This also gives optimal clusters as 3.



Cluster Plot for Performance, Fuel Economy and Value for Money.



Cluster Plot for Performance, Comfort and Exterior.

TARGET SEGMENT

For **E2Ws**:

So, from the analysis we can see that the company can target for E2W's vehicles in many parts of the country as many states have reported high E2W sales, but the most favourable location seems to be southern India as many states there like Karnataka, Tamil Nadu, Telangana, Kerala has high percentage sales of E2Ws of the total EV sales also they have high numbers of charging stations which makes convenient for the customer to adopt an EV. The company should also focus on many aspects of vehicle especially on reliability, comfort and service cost, as most people use the vehicle for daily commute and hence provide suitable customer experience. Age doesn't seem to matter as people from every age group are interested to adopt E2W's there is definitely anxiety in terms of range, service costs and safety of battery which have been already mentioned if the company can solve those issues, it would help in building customer trust, which would eventually help grow the business.

For **E4Ws**:

So, from the analysis we can see that the company can target for E4W's vehicles in many parts of the country as many states have reported high E4W sales, but the most favourable location again seems to be southern India as many states there like Karnataka, Tamil Nadu, Telangana, Kerala has high percentage sales of E4Ws of the total EV sales and they have high numbers of charging stations which makes convenient for the customer to adopt an EV. The company should also focus on many aspects of vehicle especially on Performance, Range and service cost, as people buy cars for long term. Age doesn't seem to matter as people from every age group are interested to adopt E4W's, there is definitely anxiety in terms of range, service costs and safety of battery which have been already mentioned if the company can solve those issues, it would help in building customer trust, which would eventually help grow the business.

MARKETING MIX

Setting prices for our products is both an art and a science. Most importantly, you must know and understand your cost of production. From there you can adjust based on product characteristics, a specific pricing strategy, customer price sensitivity, customer values, and other factors. Marketing Mix helps understand what our product or service can offer to our customers and helps plan a successful product offering. Helps with planning, developing and executing effective marketing strategies. Help determine whether your product or service is suitable for your customers.

The 4Ps helps companies to review and define key issues that affect the marketing of its products and services and are often now referred to as the 7Ps framework for the digital marketing mix.

IMPORTANCE OF MARKETING MIX

It helps understand what our product or service can offer to our customers and helps plan a successful product offering. Helps with planning, developing and executing effective marketing strategies. Help determine whether your product or service is suitable for your customers.

- **Product:** Since the company is starting with EVs, the product should manage all the concerns that have been mentioned.

- **Price:** Price will largely depend on service parts and battery cost, i.e., whether company sources them locally or imports them.

- **Place:** Through the analysis we have seen that southern states are the best suitable for the company to register initial high sales.

- **Promotion:** Promotion can be based on the analysis. More offers and promotions can be given to the segments that are more valuable to the company.

New start up should focus on the range and affordability of the e-vehicle.

GITHUB LINKS:

https://github.com/Yashbhadiyadra/EV-Market-Segmentation-Analysis
https://github.com/reddyanunay/EV_market
https://github.com/jahanavi09/EV

REFERENCES

https://www.kaggle.com
https://data.world
https://www.sciencedirect.com/science/article/abs/pii/S0019850118307557
https://www.carwale.com
https://www.bikewale.com
https://www.ceew.in/sites/default/files/CEEW-IndiaElectricVehicleTransitionReportPDF26Nov19.pdf
https://www2.deloitte.com/content/dam/insights/us/articles/22869-electric-vehicles/DI_Electric-Vehicles.pdf