SEGMENTATION ANALYSIS OF THE EV MARKET

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The need for the transition to electric vehicles:-

- Vehicular pollution is one of the major causes of air pollution. By switching to Electric vehicles, we can solve this issue. As per the report by the government, with this move, carbon emissions will be reduced by 37% by the year 2030. This will also help in our fight against climate change. As India is committed to bringing down its share of global emission by 2030 as per the Paris climate agreement, replacing diesel and petrol vehicles with electric vehicles will help us in achieving this goal.
- As the number of people who are buying vehicles is rising, the air quality will worsen further. So, there is a need to address this challenge.
- As of 2019, India is importing crude oil for 82% of its oil requirement. By using electric vehicles, we can reduce the dependence on other countries for oil imports.

India Electric Vehicle Industry Overview

The India Electric Vehicle Market is moderately consolidated, with the top five companies occupying 53.49%. The major players in this market are Audi AG, Hyundai Motor India, Mahindra & Mahindra Ltd, MG Motor India Pvt. Ltd. and Tata Motors (sorted alphabetically).

India Electric Vehicle Market Leaders

1. Audi AG

2. Hyundai Motor India

3. Mahindra & Mahindra Ltd

4. MG Motor India Pvt. Ltd.

5. Tata Motors

1.Properly Breakdown the Problem Statement using Fermi Estimation (problem breakdown)

We can breakdown the problem statement in many several ways such as Geographic, Demographic, Psychographic, Behavioral segments and etc.

After going through the research papers , journal and website our team has segmented it into :

1.Geographical segmentation.

2.Behavioral segmentation.

3.Psychographic segmentation.

2.SOURCES OF DATA

In the data collection step we have gone through many website such as

https://www.kaggle.com/

https://cea.nic.in/

https://powermin.gov.in/

from Kaggle we have collected data : 1. No of Ev's and non Ev's in each state of india.

2.Electric vehicle stations available in each state of india.

3.Demo data related to Annual salary with EV prices of an individual.

4.dataset related ev and their prices with features.

From cea.nic.in   : collected some data related to power Consumption in each state of india.

From powermin website   :collected state policies regarding Electric Vehicles.

3.DATA PRE-PROCESSING

In data preprocessing step mostly we used pandas and numpy for Analyzing the dataset for non-numerical and null values, Changing non-numerical values to numerical values, checking for null values Removing Null Values or filling null values and Understanding the attributes of dataset

4.SEGMENT EXTRACTION

As we gone through several datasets with several attributes such as vehicle fuel consumption, no of EV's present, annual salary, no .stations and reviews used kPrototypes, PCA, Kmeans clustering, Hierarical clustering algorithms are some of the major clustering method used.

5.PROFILING AND DESCRIBING POTENTIAL SEGMENTS

We have many different types of segments for each data on different criteria.

Coming to behavioral segmentation data we have two different cluster

Segmented them according to the no of ev's and non ev's from each state and also

Used EV stations for analysing more about each state for production of ev's .

Gone through different vehicles and clustered them according to their speed ,brand and also no of seater for some ev's related to cars.

We also analysed the ev's market in india by power consumption data and policies related to ev's .

We brought an idea about transition of vehicles to electric vehicles by collecting data related to different types of fuel consumptions.

6.SELECTION OF TARGET SEGMENT

From the analysis pf each dataset we have selected top potential states are Uttar Pradesh,

Maharashtra, Karnataka.

Stations available mostly Maharashtra, Tamil Nadu, Delhi, Karnataka, Uttar Pradesh

Segment according to the policies and power consumption

segmentation analysis we find that most of the north eastern states along with Jammu and Kashmir, Chhattisgarg and Jharkhand are unsuitable for establishment of an EV startup due to lack of awareness of governments of the corresponding states regarding the adoption of Electric vehicles in their region. It is better to switch to central states like Delhi,Rajasthan, Bihar or states of the south like Maharashtra,Telangana and Karnataka as their government seems to be more aware and involved in process of effective adoption of EVs by their public.These staes are also charcetrized by high consumption of power and higher charging stations(established by PSUs) and would therefore be a suitable choice for production of EVs.This result was visible after analysing all the segmentation techniques on the given data.

From behavioral segmentation with kprototypes clustering we can choose cluster 0 as an targeted segments with all the risk by concentrating on annual income and ev prices.

And also from brand and acceleration with seating we concentrate on one such segment in which customers were interested in 5 seater and with price of 20 – 30 lakhs.

7.Marketing Mix

Marketing is all about putting the right product in the right place, at the right price, at the right time.

To achieve this effectively, however, a lot of hard work needs to go into finding out what customers want, and identifying where they do their shopping. Then you

need to figure out how to produce the item at a price that represents value to them, and get it all to come together at the critical time.

The 4Ps of marketing is a model for enhancing the components of your "marketing mix" – the way in which you take a new product or service to market. It helps you to define your marketing options in terms of price, product, promotion, and place so that your offering meets a specific customer need or demand.

The 4Ps are:

- Product (or Service).
- Place.
- Price.
- Promotion.

Through our analysis we can segment such that

Products

This represents an item or service designed to satisfy customer needs and wants. To effectively market a product or service, it's important to identify what differentiates it from competing products or services. It's also important to determine if other products or services can be marketed in conjunction with it.

- mostly brands : car, scooty..three wheelers and four wheelers.

Place

The location where the product can be purchased is important for optimizing sales.

In our market segmentation analysis we suggest places according to their population, pollution, EV stations, Power consumption and their policies for buying EV's.

- Segmented places such as Maharashtra, Uttar Pradesh, Tamil nadu, Delhi and Karnataka.
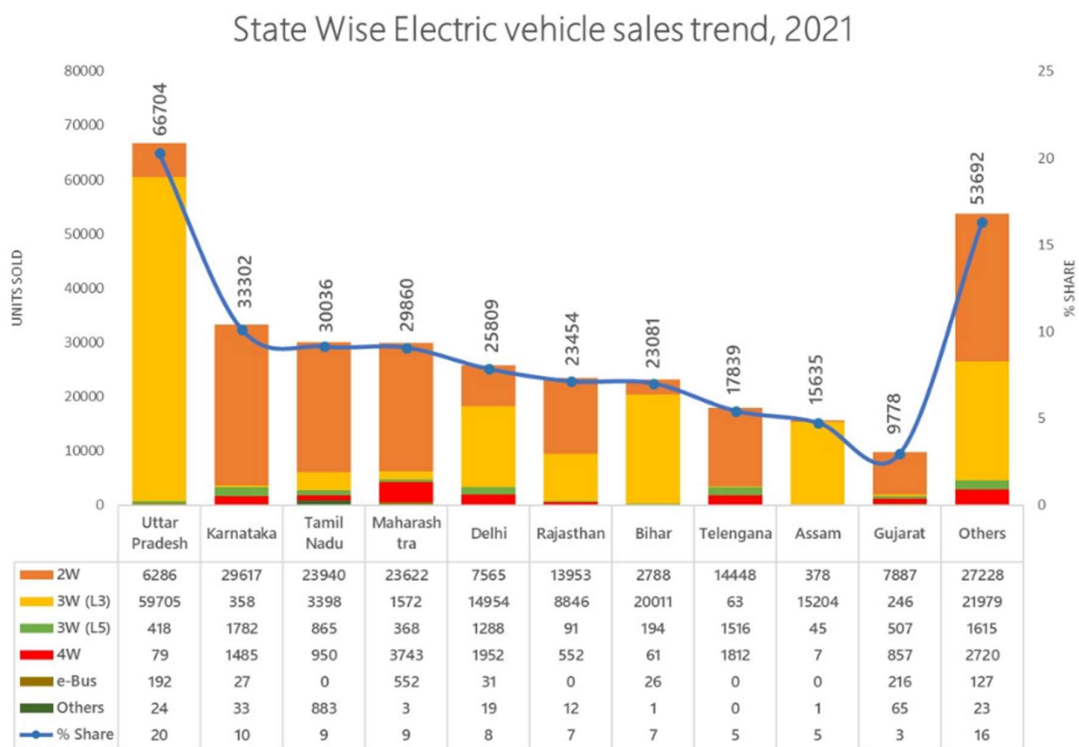
Price

Price is the cost of the product that the consumer pays. During product marketing, it is important to set a price that reflects the current market trends and is affordable for consumers, yet at the same time is profitable for the business. Price can fluctuate based on the [supply and demand](#) and the product's sales cycle. While some businesses might lower the price to compete with the market, others might inflate it -- especially if they are promoting a luxury brand.

- After analysis some behavioral segmentation we came to know that we need to concentrate one type of cluster in which an annual salary of around 36,00,000 can buy a EV of price 16,00,000.
- And also if it is EV cars, cars were clustered according to the acceleration ,seater and price suggested to produce a 5 seating EV car which costs around 20 -30 lakhs.

promotion

- When is the right time to reach the target audience?
- Which channels or mediums will the target audience get their information from?
- What advertising approaches will be the most fruitful for the target audience?

Mostly promotions are encouraged during festivals for more demands and customers will keep interest on buying EV according to the offers and features of EV produced.

State Wise Electric vehicle sales trend, 2021

	Uttar Pradesh	Karnataka	Tamil Nadu	Maharashtra	Delhi	Rajasthan	Bihar	Telengana	Assam	Gujarat	Others
2W	6286	29617	23940	23622	7565	13953	2788	14448	378	7887	27228
3W (L3)	59705	358	3398	1572	14954	8846	20011	63	15204	246	21979
3W (L5)	418	1782	865	368	1288	91	194	1516	45	507	1615
4W	79	1485	950	3743	1952	552	61	1812	7	857	2720
e-Bus	192	27	0	552	31	0	26	0	0	216	127
Others	24	33	883	3	19	12	1	0	1	65	23
% Share	20	10	9	9	8	7	7	5	5	3	16

Github link :
https://github.com/bhavyasrin2/ElectricVehicle_Market_Segmentation_Analysis