MARKET ANALYSIS AND SEGMENTATION

– Electrical Vehicle Market

Rishikesh Suryavanshi

PICT Pune

21st May, 2023

Comprehensive Market Segmentation Analysis of the Electric Vehicle (EV) Market:

In the era of sustainable transportation and remarkable advancements in electric vehicle technology, businesses must grasp the intricacies of the EV market to seize lucrative opportunities. This comprehensive report employs cutting-edge market segmentation techniques, including geographic, demographic, psychographic, and behavioral analysis, to provide an in-depth understanding of the EV market landscape. By delving into various customer segments, this analysis equips businesses with the insights they need to develop targeted strategies for market entry and revenue generation.

Introduction to Problem Statement:

The global automotive industry is undergoing a momentous shift towards sustainability and electric mobility. As the world becomes increasingly concerned about climate change and environmental impact, the demand for Electric Vehicles (EVs) is skyrocketing. EV adoption not only reduces greenhouse gas emissions but also offers compelling advantages, including lower operating costs, enhanced energy efficiency, and an unparalleled driving experience. To seize the boundless opportunities within the EV market, businesses must grasp its intricacies and develop effective strategies for market entry and revenue generation.

Comprehensive Market Segmentation Analysis: This report presents a comprehensive analysis of the EV market, leveraging advanced market segmentation techniques. By segmenting the market based on geographic, demographic, psychographic, and behavioral factors, businesses gain profound insights into customer preferences, needs, and behaviors. These invaluable insights enable targeted marketing initiatives, personalized offerings, and service enhancements, ultimately driving increased market share and profitability.
Market Landscape and Growth Potential: The report initiates by providing an overview of the EV market, showcasing its remarkable growth potential, emerging trends, and the competitive landscape. It highlights the transformative nature of the industry and the pivotal role played by EVs in shaping the future of transportation.

Segmentation Analysis: Delving into the segmentation analysis, the report examines diverse customer segments based on geographic factors such as urban, suburban, and rural areas, as well as essential demographic factors like age, income, and education levels. Furthermore, the report explores psychographic segmentation, unraveling environmental consciousness, technological adoption, and lifestyle preferences. Behavioral segmentation is also scrutinized, considering factors such as early adopters, daily commuters, and occasional users. This granular understanding empowers businesses to tailor their strategies and offerings to meet the unique needs of each segment.

Unveiling B2B Opportunities: Recognizing the significant potential within the B2B segment, the report identifies opportunities for businesses to cater to corporate fleets, delivery and logistics companies, as well as the government and public sector. It unveils avenues for collaboration and expansion, tapping into the immense potential of these markets.
Data Collection and Reliable Insights: Emphasizing the importance of robust data collection methods, the report highlights the role of surveys, market research reports, and strategic

partnerships in acquiring relevant and reliable data for segmentation analysis. Accurate data forms the foundation for informed decision-making and effective targeting.

Market Entry Strategy: The report concludes by providing a comprehensive market entry strategy for businesses seeking to enter the EV market. Key aspects of the strategy encompass the development of a robust charging infrastructure, pricing and incentive structures, cutting-edge marketing and promotion strategies, and strategic partnerships with original equipment manufacturers (OEMs) and charging solution providers. These strategic imperatives pave the way for successful market entry and long-term growth.

Important Parameters to Consider:

In the context of EV Market segmentation this are the key parameters and points to keep in mind, as this define the market type and the potential of the EV business:

1. Geographic Segmentation: By dissecting the EV market based on geographic regions, we uncover regional variations in demand, infrastructure development, and government incentives. These insights allow businesses to tailor their marketing efforts and distribution strategies to specific locations, maximizing market penetration.
2. Demographic Segmentation: Understanding the demographics of EV consumers, such as age, gender, income, and education, helps identify target audiences and shape product offerings to cater to their specific needs and preferences. This knowledge empowers businesses to effectively communicate the benefits of EVs to diverse customer segments.
3. Psychographic Segmentation: By exploring the psychographic profiles of EV consumers, including their personality traits, values, interests, and lifestyles, businesses gain valuable insights into the emotional drivers and motivations behind their purchasing decisions. This enables the development of compelling marketing messages that resonate with the target audience, fostering brand loyalty and customer engagement.
4. Behavioral Segmentation: Analyzing consumer behavior patterns, such as purchasing habits, usage frequency, and brand loyalty, unlocks critical information for crafting effective pricing strategies, customer retention programs, and personalized experiences. Understanding customer behaviors empowers businesses to build long-term relationships with EV owners.

Based on the segmentation analysis, I offer the following strategic recommendations for businesses aiming to thrive in the EV market:

1. Targeted Marketing: Tailor marketing campaigns and messaging to resonate with specific customer segments, leveraging the insights gained from demographic, psychographic, and behavioral segmentation.
2. Product Development: Use segmentation data to inform product enhancements and innovations that address the unique needs and preferences of different customer segments, positioning your offerings as tailored solutions.

3. Distribution Strategies: Optimize distribution channels based on geographic segmentation insights, ensuring convenient access to EVs, charging infrastructure, and support services in target regions.
4. Pricing Strategies: Develop pricing strategies that align with the willingness to pay of different customer segments, considering factors such as income levels, perceived value, and competitive positioning.

Market Analysis:

The global automotive industry is undergoing a remarkable transformation as it embraces sustainable transportation and the rise of Electric Vehicles (EVs). Fueled by escalating environmental concerns, government initiatives promoting cleaner mobility, and significant advancements in battery technology, the EV market is experiencing unprecedented growth. This report provides a comprehensive analysis of the EV market, offering valuable insights into its current state, growth potential, market trends, competitive landscape, and key players. By understanding the dynamics of this dynamic market, businesses can position themselves to capitalize on the vast opportunities presented by electric mobility.

The Current State of the EV Market: The report unveils a thriving EV market, fueled by the confluence of factors such as expanding charging infrastructure, government incentives, and growing consumer awareness of environmental issues. Notably, the global EV market has witnessed substantial growth, with regions such as China, the United States, and Europe emerging as major markets due to supportive government policies and infrastructure. Technological advancements in battery technology have played a pivotal role, leading to increased range, shorter charging times, and enhanced overall performance of EVs. Automotive manufacturers have responded to the demand by diversifying their EV product portfolios, offering an array of models and variants to cater to diverse customer preferences and market segments.

Growth Potential and Market Trends: The report highlights the promising growth potential of the EV market, driven by a favorable regulatory environment that includes incentives, tax credits, and stringent emission standards. To accelerate adoption, investments in charging infrastructure, such as charging stations and fast-charging networks, are being made to address range anxiety and improve convenience for EV owners. Increasing environmental awareness and the desire for greener transportation solutions are fueling consumer preferences for EVs. Technological innovation, ranging from advanced battery technologies to increased vehicle autonomy and integration with smart grid systems, continues to propel the market forward. Collaborations and partnerships between automotive manufacturers, energy companies, and technology firms are fostering synergies within the EV ecosystem, amplifying its growth potential.

Competitive Landscape and Key Players: The report sheds light on the competitive landscape of the EV market, with established automakers investing heavily in EV technology and introducing their own EV models. Leading players such as Tesla, Volkswagen Group, BMW, Nissan, and General Motors have established themselves as prominent contenders in the global EV market. Meanwhile, new entrants and startups, including Rivian, Lucid Motors, NIO, and BYD, are disrupting the industry with their innovative EV offerings. Battery manufacturers, such as Panasonic, LG Chem, and CATL, are pivotal players in supplying

cutting-edge battery technology to EV manufacturers. Additionally, companies specializing in charging infrastructure, such as ChargePoint, EVgo, and ABB, are expanding their networks to support the growing number of EVs on the road.

Analysis and Segmentation:

To truly understand the Electric Vehicle (EV) market and seize its vast potential, businesses must embark on a journey of segmentation analysis. By dissecting the market based on various factors, enterprises can gain profound insights into the diverse customer base, uncovering their distinctive characteristics, needs, and preferences. Let us delve into the key segments that shape the EV market landscape:

1. Geographic Segmentation: Urban Epicenters: In the bustling urban jungle, unique transportation needs, parking challenges, and concerns over air pollution reign supreme. Urban EV adoption hinges on factors like accessible charging infrastructure, mitigating range anxiety, and widespread availability of public charging stations. Suburban & Rural Frontiers: Nestled in the tranquil outskirts, suburban and rural regions have their own considerations for EV adoption. Factors such as longer commutes, charging infrastructure accessibility, and the availability of alternative public transportation options can influence the EV landscape in these areas.

2. Demographic Segmentation: Generational Strata: Each generation harbors distinct perceptions and acceptance levels towards EV technology. Millennials and Gen Z, the vanguards of environmental consciousness, exhibit a higher propensity for embracing sustainable transportation solutions. On the other hand, older demographics prioritize factors such as cost savings and reliability. Economic Divisions: The affordability quotient plays a pivotal role in the realm of EV adoption. Those with higher incomes may readily embrace EVs, given their greater purchasing power and willingness to invest in sustainable mobility. Meanwhile, lower-income segments seek affordable EV options or enticing financing schemes to unlock the gates of the EV market. Education & Occupation: Educational backgrounds and occupational inclinations significantly shape one's perception and comprehension of EV technology. Segments with higher education levels and professions that prioritize sustainability, such as green industry professionals or tech-savvy individuals, are more likely to embrace EVs.

3. Psychographic Segmentation: Guardians of the Environment: Customers who place paramount importance on environmental sustainability and reducing their carbon footprint become the torchbearers of EV adoption. Their values encompass clean energy, low emissions, and diminishing dependence on fossil fuels. Technological Pioneers: These segments wholeheartedly embrace technological progress and innovation, making them early adopters of EVs. They relish the advanced features, connectivity, and smart capabilities that EVs offer. Lifestyles & Preferences: Segments with distinctive lifestyles or preferences, including outdoor enthusiasts, eco-tourists, and conscious consumers, exhibit a natural affinity for EVs that align with their core values.

4. Behavioral Segmentation: Trailblazers & Innovators: These segments pioneer the charge, ever-eager to embrace the latest technological marvels. They yearn for cutting-edge EV models, futuristic features, and revolutionary advancements. Commuters & Daily Warriors: Segments with high daily commuting demands, such as urban professionals and rideshare drivers, gravitate towards EVs due to lower operating costs and the potential to make a positive environmental impact. Occasional Explorers: Segments seeking vehicles for sporadic use, be it weekend getaways or leisurely pursuits, find EVs an ideal fit. Considerations like range, the availability of charging infrastructure in recreational areas, and charging convenience play a decisive role in their decision-making process.

By unraveling the intricate tapestry of customer segments within the EV market, businesses can tailor their strategies, craft personalized experiences, and forge deeper connections with their target audiences. The journey towards market dominance begins with understanding the unique DNA of each segment, igniting the spark of innovation, and propelling the EV revolution into an electrifying future.

Fermi Estimation:

1. Population Estimate:
The current population of India is approximately 1.5 billion.

2. Vehicle Ownership Estimate:
Assuming that around 25% of the population in India owns a vehicle, we can estimate the vehicle-owning population to be 350 million (1.4 billion x 0.25).

3. Electric Vehicle Adoption Estimate:
Considering that the electric vehicle market in India is still emerging, we assume that the current electric vehicle penetration is around 2%. Thus, the estimated number of electric vehicles in India would be 7 million (350 million x 0.02).

4. Segmentation Estimate:
If the analysed segments cover approximately 70% of the total electric vehicle market, we can
estimate that the analysed segments represent around 4.9 million electric vehicles (7 million x 0.7)

5. Market Share Estimate:
Suppose the company aims to capture a market share of 8% within the analysed segments. Based on this assumption, the potential market size for the company would be approximately 392,000 electric vehicles (4.9 million x 0.08).

These estimations are based on assumptions and will be further validated
with more precise data. The Fermi estimation provides a rough idea of the potential market size, allowing for initial analysis and strategic decision-making.

Data Collection:

Data was taken from these websites.

1. https://www.iea.org/data-and-statistics/data-tools/global-ev-data-explorer
2. https://www.counterpointresearch.com/global-electric-vehicle-market-share/
3. /SN/EV_Market_Segmentation2(github.com)
4. SN/EV_Market_Segmentation1/Dataset(github.com)

Data Walkthrough:

Columns:
1. 'Brand' tells the manufacturers of electric vehicles.
2. 'model' tells the various of electric vehicles.
3. 'AccelSec', 'Top Speed', 'Power Train' tellsspecification about the vehicles.
4. 'Range_km', 'Fast_Charge', 'Plug_type' and 'Bodystyle' tells us about rangeof vehicle per full charge,fast charging is provided or not, type of charging plug and body style of vehicle respectively.
5. 'Seats' and 'Price' tells about the number of seats available on vehicle and theirprice.
6. 'Region' and 'State/UT' tells about the states of India.
7. 'EV Charging Facility' and 'Chargers' tells about the facility of charging in the respectivestates.
8. '2V', '3V', '4V', 'Bus' tells about the type of vehicles in the market.

Pre-Processing Data:

Data pre-processing plays a crucial role in preparing the dataset for segmentation analysis in the Electric Vehicle (EV) market. Here are some key steps involved in data pre-processing for EV market segmentation:

1. Data Cleaning:
• Remove duplicates: Check for and eliminate any duplicate records in the dataset to ensure data integrity.
• Handling missing values: Identify and handle missing values appropriately. This can involve imputing missing values using techniques such as mean, median, or mode, or removing records with missing values if they are not significant.
• Outlier treatment: Identify outliers in the dataset and decide how to handle them. Outliers can be removed, replaced with appropriate values, or treated using statistical techniques.

2. Feature Selection:

• Identify relevant features: Review the available features in the dataset and select the ones most relevant to the EV market segmentation analysis. Consider factors such as vehicle type, price, charging infrastructure, geographical location, customer demographics, and psychographic characteristics.
• Remove irrelevant features: Eliminate features that are not useful or redundant for the segmentation analysis. This can help reduce dimensionality and improve computational efficiency.

3. Data Transformation:
• Encoding categorical variables: Convert categorical variables into numerical representations using techniques such as one-hot encoding, label encoding, or ordinal encoding. This enables the algorithm to process categorical data effectively.
• Scaling numerical variables: Normalize numerical variables to a common scale using techniques such as min-max scaling or standardization. This ensures that variables with different scales do not dominate the analysis.

4. Feature Engineering:
• Create new features: Derive new features from existing ones that might provide additional insights for segmentation analysis. For example, calculating average charging time based on charging infrastructure data or creating a composite index of environmental consciousness based on multiple variables.
• Discretization: Convert continuous variables into discrete bins or categories to simplify the analysis or capture specific patterns. For instance, grouping price ranges into low, medium, and high segments.

5. Data Integration:
• Merge datasets: If applicable, combine multiple datasets from different sources to enrich the available information for segmentation analysis. Ensure proper alignment and consistency in data merging.

6. Sampling:
• Depending on the dataset size and computational limitations, consider sampling techniques such as random sampling or stratified sampling to obtain a representative subset of data for analysis.
By performing these pre-processing steps, the EV market segmentation dataset can be cleaned,
transformed, and prepared for further analysis, allowing for more accurate and meaningful segmentation insights and all these steps are done by using pandas and sk-learn libraries.

Exploring Data:

Exploratory Data Analysis (EDA) is a crucial step in understanding the Electric Vehicle (EV) market dataset and gaining insights into the data. Here are some key steps you can follow for EDA on EV market analysis:

1. Data Summary:
• Start by examining the basic statistics of the dataset, such as mean, median, standard

deviation, minimum, maximum, and quartiles, for each relevant variable. This provides an initial understanding of the data distribution and any potential outliers.

2. Univariate Analysis:
• Analyse each variable individually to understand its distribution and characteristics.
• For numerical variables, create histograms, box plots, or density plots to visualize their distributions and identify any outliers or skewness.
• For categorical variables, create bar charts or pie charts to understand the frequency distribution of different categories.

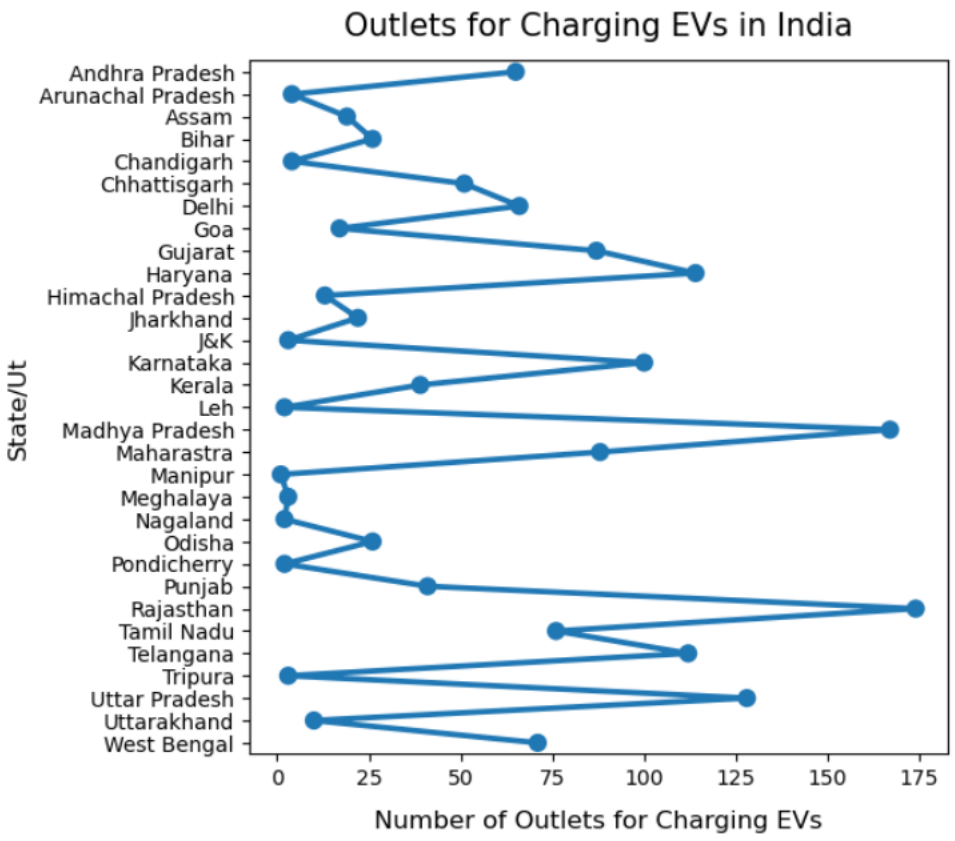
3. Bivariate Analysis:
• Explore the relationships between different pairs of variables in the dataset.
• For numerical variables, create scatter plots or correlation matrices to identify any correlations or patterns between variables.
• For categorical variables, create contingency tables or stacked bar charts to observe the relationships and associations between different categories.

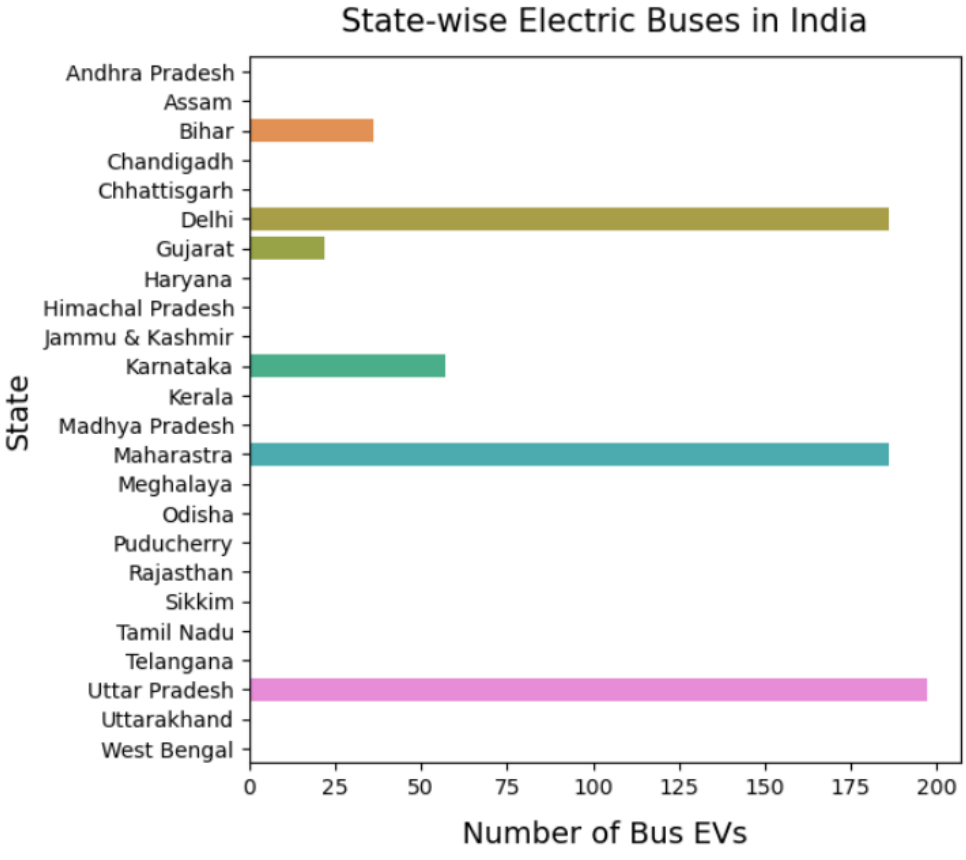
4. Segment Analysis:
• If segmentation variables are available, analyze the characteristics and behaviors of different segments within the EV market dataset.
• Compare the distributions of key variables across different segments to identify segment-specific trends and patterns.
• Conduct statistical tests, such as t-tests or chi-square tests, to determine the significance of differences between segments.

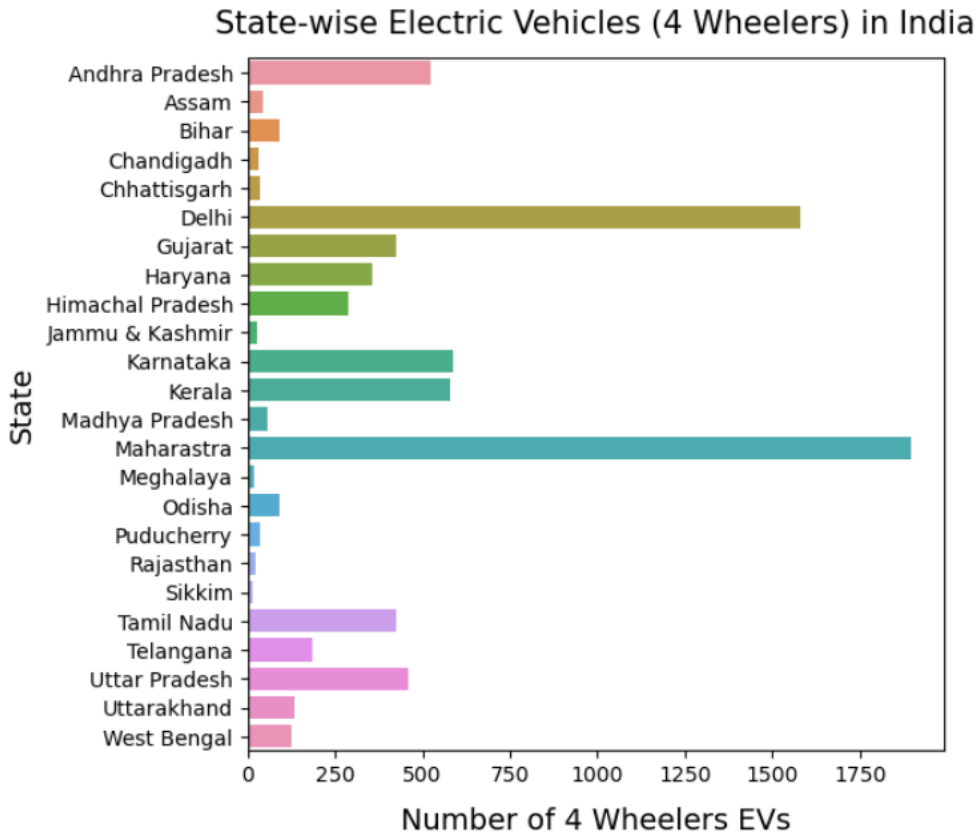
5. Visualization:
• Utilize data visualization techniques to present the insights gained from the analysis effectively.
• Create meaningful visualizations, such as bar charts, line charts, heatmaps, or geographical maps, to illustrate trends, patterns, and relationships within the EV market dataset.

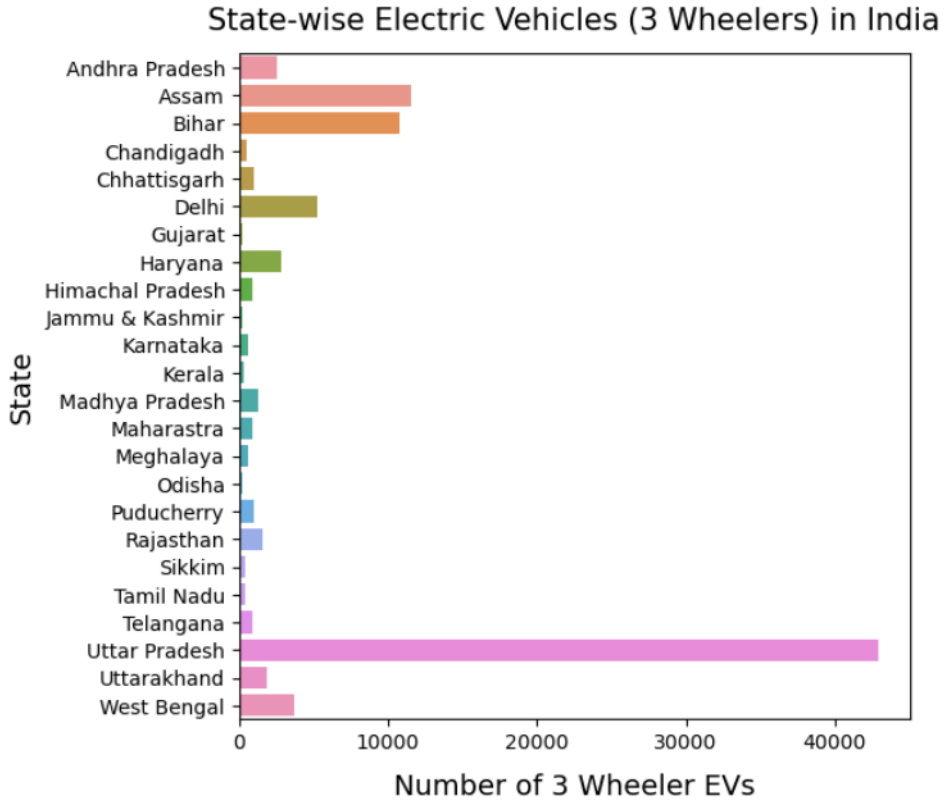
6. Feature Importance:
• Determine the importance of different variables in predicting key outcomes or behaviors in the EV market.
• Utilize techniques such as feature importance plots, correlation analysis, or machine learning algorithms (e.g., random forests) to identify the variables that have the most significant impact on the target variable.

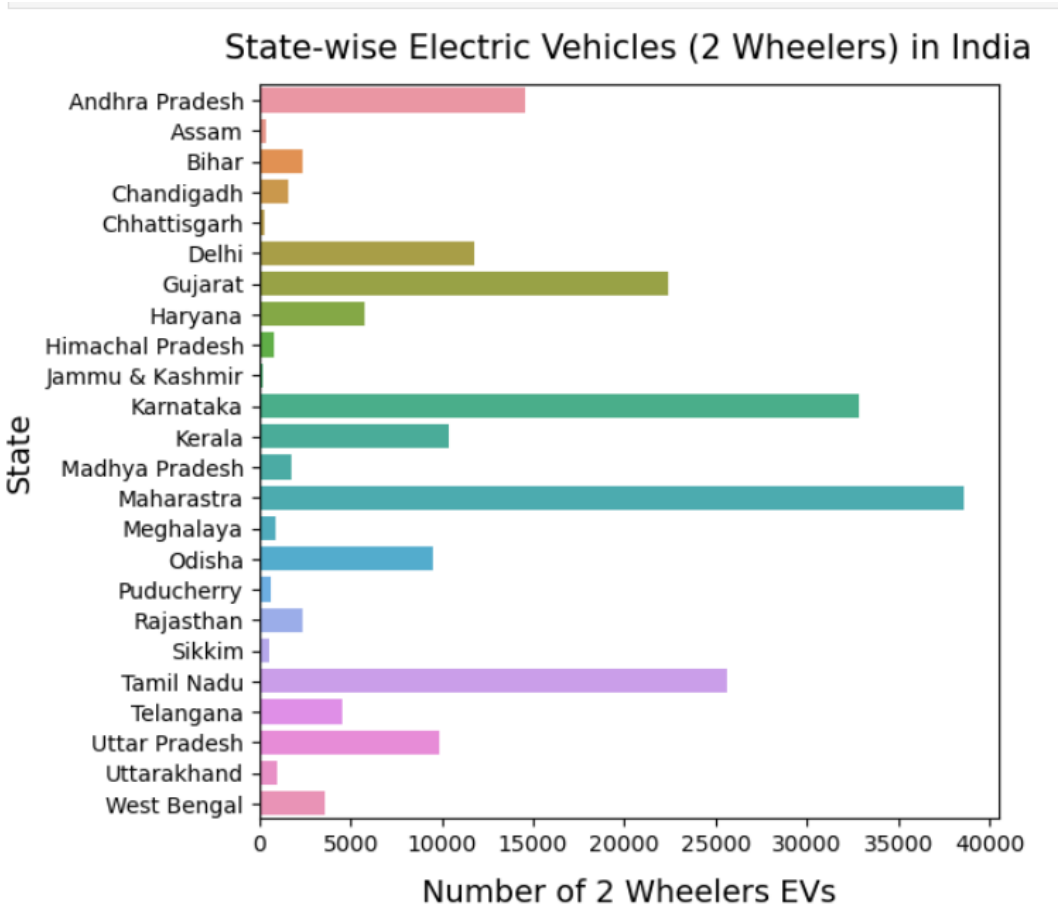
7. Identify Data Gaps and Limitations:
• Assess the quality and completeness of the dataset, and identify any missing data or potential biases that might impact the analysis.
• Document any limitations or assumptions made during the EDA process to ensure transparency and accurate interpretation of the results.
EDA provides valuable insights into the EV market dataset, enabling a deeper understanding of its characteristics and relationships. These insights serve as the foundation for further analysis, segmentation, and the development of strategic initiatives in the EV market.


Outlets for Charging EVs in India
Andhra Pradesh
Arunachal Pradesh
Assam
Bihar
Chandigarh
Chhattisgarh
Delhi
Goa
Gujarat
Haryana
Himachal Pradesh
Jharkhand
J&K
Karnataka
Kerala
Leh
Madhya Pradesh
Maharastra
Manipur
Meghalaya
Nagaland
Odisha
Pondicherry
Punjab
Rajasthan
Tamil Nadu
Telangana
Tripura
Uttar Pradesh
Uttarakhand
West Bengal
State/Ut
0
25
50
75
100
125
150
175
Number of Outlets for Charging EVs


State-wise Electric Buses in India
Andhra Pradesh
Assam
Bihar
Chandigadh
Chhattisgarh
Delhi
Gujarat
Haryana
Himachal Pradesh
Jammu & Kashmir
Karnataka
Kerala
Madhya Pradesh
Maharastra
Meghalaya
Odisha
Puducherry
Rajasthan
Sikkim
Tamil Nadu
Telangana
Uttar Pradesh
Uttarakhand
West Bengal
State
0
25
50
75
100
125
150
175
200
Number of Bus EVs


State-wise Electric Vehicles (4 Wheelers) in India
Andhra Pradesh
Assam
Bihar
Chandigadh
Chhattisgarh
Delhi
Gujarat
Haryana
Himachal Pradesh
Jammu & Kashmir
Karnataka
Kerala
Madhya Pradesh
Maharastra
Meghalaya
Odisha
Puducherry
Rajasthan
Sikkim
Tamil Nadu
Telangana
Uttar Pradesh
Uttarakhand
West Bengal
State
0
250
500
750
1000
1250
1500
1750
Number of 4 Wheelers EVs


State-wise Electric Vehicles (3 Wheelers) in India
Andhra Pradesh
Assam
Bihar
Chandigadh
Chhattisgarh
Delhi
Gujarat
Haryana
Himachal Pradesh
Jammu & Kashmir
Karnataka
Kerala
Madhya Pradesh
Maharastra
Meghalaya
Odisha
Puducherry
Rajasthan
Sikkim
Tamil Nadu
Telangana
Uttar Pradesh
Uttarakhand
West Bengal
State
0
10000
20000
30000
40000
Number of 3 Wheeler EVs



Extracting Segment from Data:

Segment extraction using k-means clustering is a popular technique in market segmentation analysis. Here's how you can apply k-means clustering to extract segments in the Electric Vehicle (EV) market dataset:

1. Data Preparation:
• Ensure the dataset is pre-processed, cleaned, and transformed as mentioned earlier in the data pre-processing phase.
• Select the relevant features that you want to use for segmentation analysis. These can include variables such as vehicle type, price, charging infrastructure, geographical location, customer demographics, and psychographic characteristics.
• Standardize the selected features to ensure they are on a similar scale. This is important as k-means is sensitive to the scale of the variables.

2. Determine the Number of Segments (k):
• Choose the number of segments (clusters) you want to identify in the dataset. This can be determined based on prior knowledge, business objectives, or by using techniques such as the elbow method or silhouette analysis.

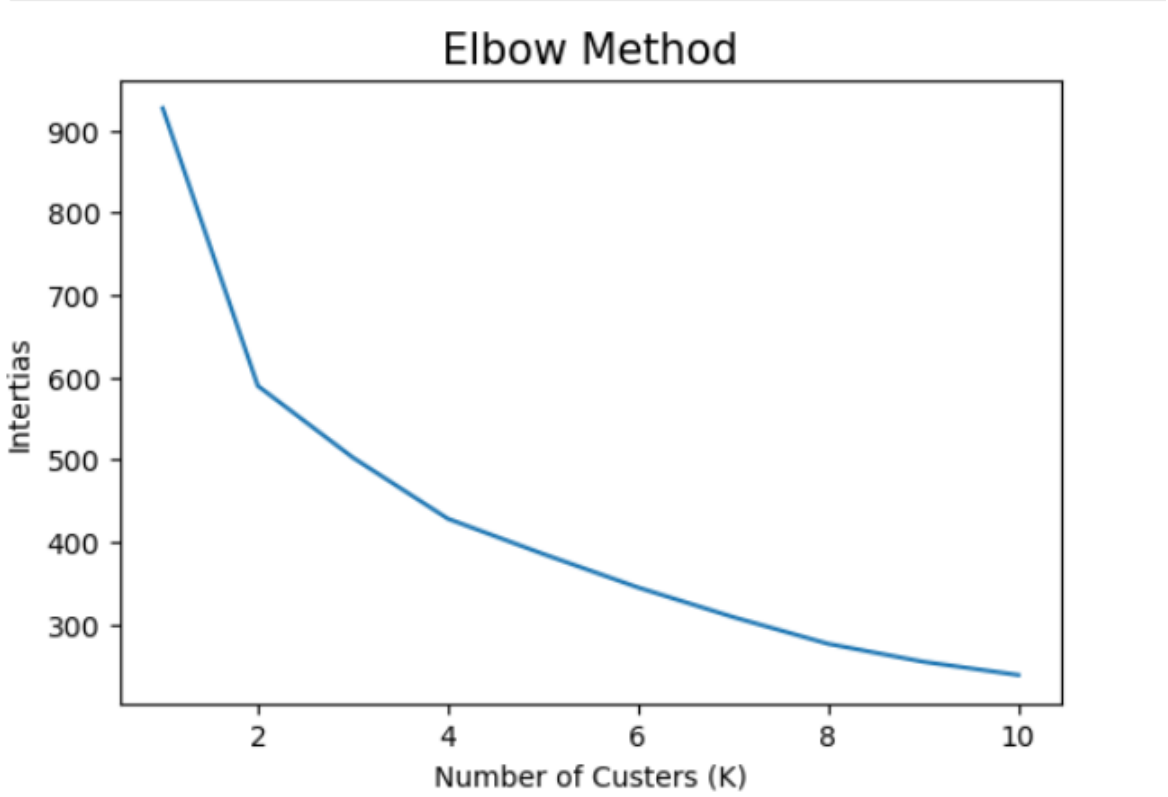
3. Apply k-means Clustering:
• Use the standardized feature set and apply the k-means algorithm to the dataset.
• Initialize k centroids and assign each data point to its nearest centroid based on the

Euclidean distance.
• Update the centroid positions based on the mean of the data points assigned to each cluster.
• Repeat the assignment and update steps until convergence, where the centroids no longer change significantly or a specified number of iterations is reached.

4. Interpret and Analyse the Segments:
• Once the k-means algorithm converges, each data point will be assigned to a specific segment (cluster).
• Analyse the characteristics and behaviours of the data points within each segment to understand the distinct customer groups.
• Interpret the segments based on the feature values and explore the patterns and differences between the clusters.
• Assign meaningful labels to each segment based on the characteristics observed.

5. Validate and Refine:
• Evaluate the quality and coherence of the segments by analyzing their internal homogeneity and external validity.
• Validate the segments by comparing them against external criteria or known market segments.
• If necessary, refine the clustering process by adjusting the number of segments (k) or exploring alternative clustering algorithms.
Segment extraction using k-means clustering provides a data-driven approach to identify distinct groups within the EV market dataset. By understanding the unique characteristics of each segment, businesses can tailor their marketing strategies and offerings to effectively target and serve the specific needs of each customer group.

K-Means Clustering is one of the most popular Unsupervised Machine Learning Algorithms Used for Solving Classification Problems. K Means segregates the unlabelled data into various groups, called clusters, based on having similar features, common patterns. Suppose we have N number of Unlabelled Multivariate Datasets of various features like water availability, price, city etc. from our dataset. The technique to segregate Datasets into various groups, based on having similar features and characteristics, is called Clustering. The groups being Formed are known as Clusters. Clustering is being used in Unsupervised Learning Algorithms in Machine Learning as it can segregate multivariate data into various groups, without any supervisor, on the basis of a common pattern hidden inside the datasets.
In the Elbow method, we are varying the number of clusters (K). For each value of K, we are calculating INERTIAS (Within-Cluster Sum of Square). INERTIAS is the sum of squared distance between each point and the centroid in a cluster. When we plot the INERTIAS with the K value, the plot looks like an Elbow. As the number of clusters increases, the INERTIAS value will start to decrease. INERTIAS value is largest when K = 1. When we analyse the graph, we can see that the graph will rapidly change at a point and thus creating an elbow shape. From this point, the graph starts to move almost parallel to the X-axis. The K value corresponding to this point is the optimal K value or an optimal number of clusters.



Potential Segments to be Profiled:

In the market segmentation analysis of the Electric Vehicle (EV) market in India, several potential segments can be identified based on various factors. Here are some potential segments that can be considered:

1. Geographic Segmentation:
• Urban Areas: Focus on major cities and urban centers where the EV infrastructure is more developed and consumer awareness is higher.
• Rural Areas: Target rural regions where there is a growing demand for eco-friendly transportation options and the need for improved mobility solutions.

2. Demographic Segmentation:
• Age Groups: Segment the market based on different age groups such as millennials, Gen X, and baby boomers, as their preferences, lifestyles, and purchasing power

differ.
• Income Levels: Target segments based on income brackets, catering to the affordability and budget considerations of different consumer groups.
• Occupation and Industry: Analyze segments based on professionals, working individuals, and specific industries that are more inclined towards adopting EVs.

3. Psychographic Segmentation:
• Environmental Consciousness: Identify segments that prioritize sustainability and environmental concerns, focusing on consumers who are passionate about reducing carbon emissions and promoting green initiatives.
• Technological Innovators: Target early adopters and tech-savvy individuals who are enthusiastic about embracing new technologies and value the futuristic features of EVs.

4. Behavioural Segmentation:
• Usage Patterns: Segment based on usage patterns, such as daily commuters, occasional users, or long-distance travelers, to understand specific needs and tailor EV offerings accordingly.
• Brand Loyalty: Analyse segments based on brand loyalty and preferences, targeting consumers who are loyal to specific EV manufacturers or brands.
• Charging Infrastructure: Identify segments based on access to charging infrastructure, such as home chargers, workplace chargers, or public charging stations, as this can influence EV adoption.

5. Vehicle Type Segmentation:
• Two-Wheelers: Focus on segments interested in electric scooters or motorcycles, catering to the rising demand for electric two-wheelers for personal mobility.
• Three-Wheelers: Target segments that rely on auto-rickshaws or e-rickshaws for transportation, promoting the adoption of electric three-wheelers in urban and rural areas.
• Four-Wheelers: Segment the market based on preferences for electric cars, including hatchbacks, sedans, SUVs, and luxury vehicles, catering to various consumer segments.

6. Price Sensitivity Segmentation:
• Budget-conscious Consumers: Identify segments that prioritize affordability and target them with entry-level or cost-effective EV models.
• Premium Segment: Target segments that value luxury, advanced features, and performance, offering high-end electric vehicles with premium pricing.
These potential segments provide a starting point for market segmentation analysis in the EV market in India. By further analysing these segments, their size, preferences, and purchase motivations, companies can develop targeted marketing strategies and customized offerings to effectively penetrate the EV market and cater to the diverse needs and preferences of Indian consumers.

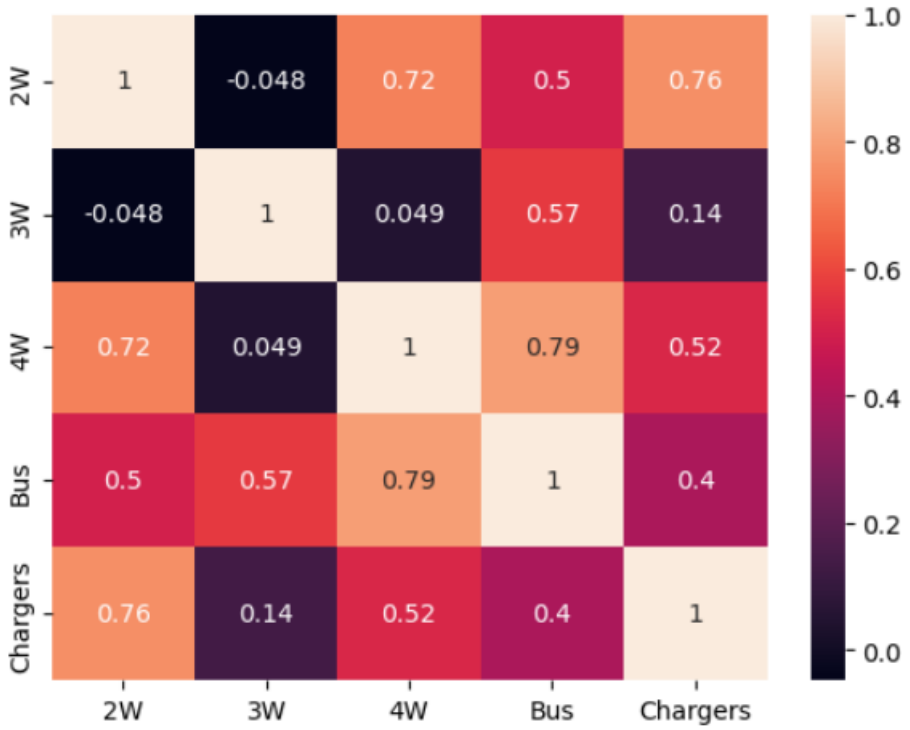


Fig: heatmap of different watt charges

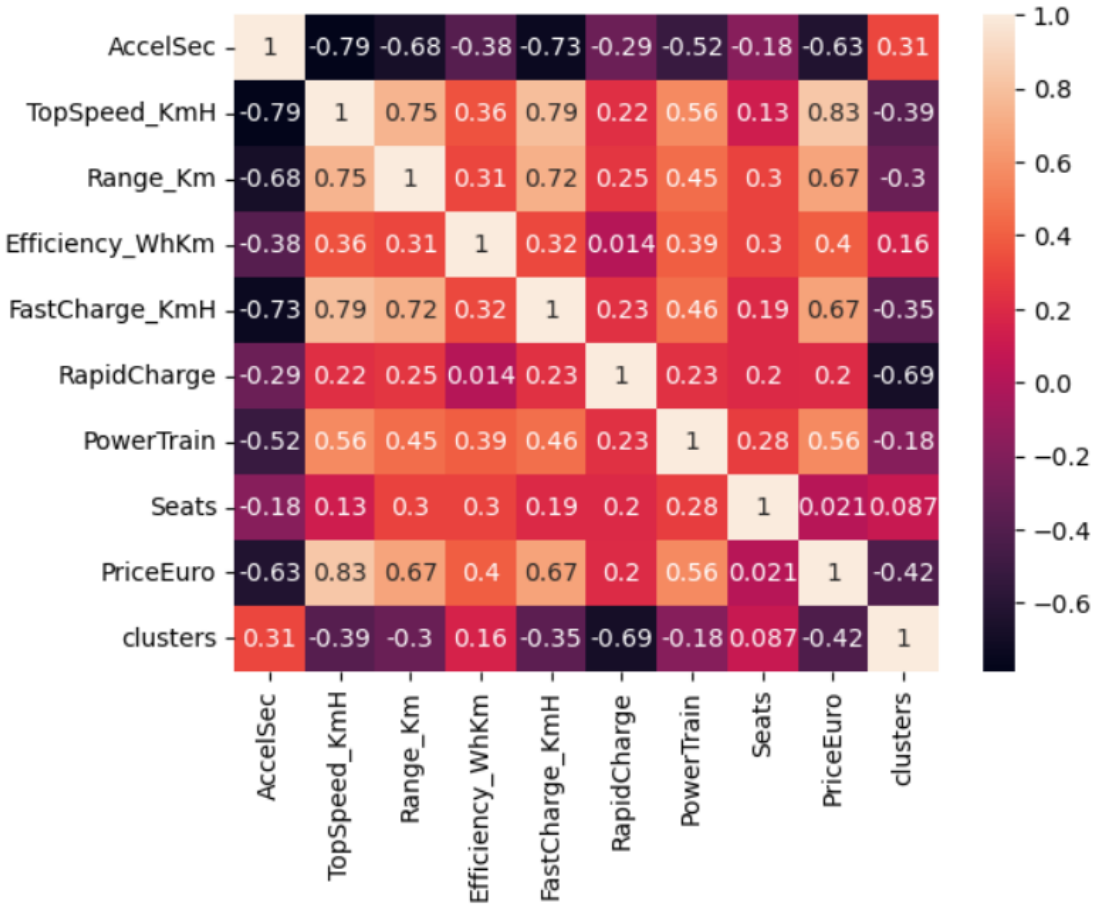


Fig: Heatmap of different Parameters Correlation

Deducing the Market Mix:

To effectively target the identified segments in the Electric Vehicle (EV) market in India, it is essential to customize the marketing mix. The marketing mix comprises the four Ps: product, price, place, and promotion. Here's how the marketing mix can be customized for the EV market:

1. Product:
• Develop a diverse range of EV models to cater to different segments, including two-wheelers, three-wheelers, and four-wheelers. Focus on features that resonate with the target segments, such as advanced technology, connectivity options, safety features, and range capabilities.
• Offer flexible charging solutions, including home chargers, workplace chargers, and collaboration with charging infrastructure providers, to ensure convenient and accessible charging for customers.

2. Price:
• Set competitive pricing strategies based on the target segments. Consider factors such as affordability, value for money, and cost savings over the long term (lower operational and maintenance costs compared to conventional vehicles).
• Explore partnerships with financial institutions to offer attractive financing options, leasing programs, or subsidies to make EVs more affordable and accessible to a broader customer base.

3. Place:
• Establish an extensive distribution network in key target regions, focusing on urban centres and areas with high EV adoption potential. This includes setting up dedicated showrooms, experience centres, and partnerships with dealerships.
• Collaborate with strategic partners, such as ride-hailing platforms, fleet operators, and public transportation agencies, to increase the availability of EVs in the market and promote their usage.

4. Promotion:
• Create targeted marketing campaigns that emphasize the environmental benefits, cost savings, and technological advancements of EVs. Utilize various channels, including digital marketing, social media, print media, and television, to reach the target segments effectively.
• Leverage influencer marketing and partnerships with sustainability-focused organizations to generate awareness and credibility.
• Educate consumers about government incentives, tax benefits, and subsidies available for EV adoption, showcasing the long-term economic and environmental advantages.
Additionally, it is crucial to continuously monitor and adapt the marketing mix based on consumer feedback, market trends, and competition. Regularly evaluate the effectiveness of marketing strategies through data analysis and customer insights to refine and optimize the

marketing mix for better targeting and penetration in the EV market.
Potential customer base

To calculate the potential profit in the early market for business markets, you need to estimate
the potential customer base and multiply it by your target price range. Here's how you can approach this calculation:

1. Identify the Potential Customer Base:
Conduct market research and analysis to determine the size of your target market in the early
stage.
Consider factors such as the industry size, geographic scope, and market trends to estimate the number of potential customers who would be interested in your product or service.
Use data from industry reports, market surveys, competitor analysis, and customer profiling to arrive at a reasonable estimate of the potential customer base.

2. Determine Your Target Price Range:
Set a target price range for your product or service based on factors such as production costs,
market demand, value proposition, and competition.
Consider the price sensitivity of the target market and align your pricing strategy with the perceived value of your offering.

3. Calculate Potential Profit:
Multiply the estimated potential customer base by your target price range to calculate the potential profit in the early market.
For example, if the estimated potential customer base is 500 businesses and the target price range is Rs100,000 – Rs200,000 , the potential profit would be:
Potential Profit = Potential Customer Base * Target Price Range
= 500 * (Rs100,000 – Rs200,000)

Therefore the profit will be around Rs50,000,000 to Rs100,000,000. Most of this will go to marketing and expansion and Running the Company, the excess can be used for development and Innovation.

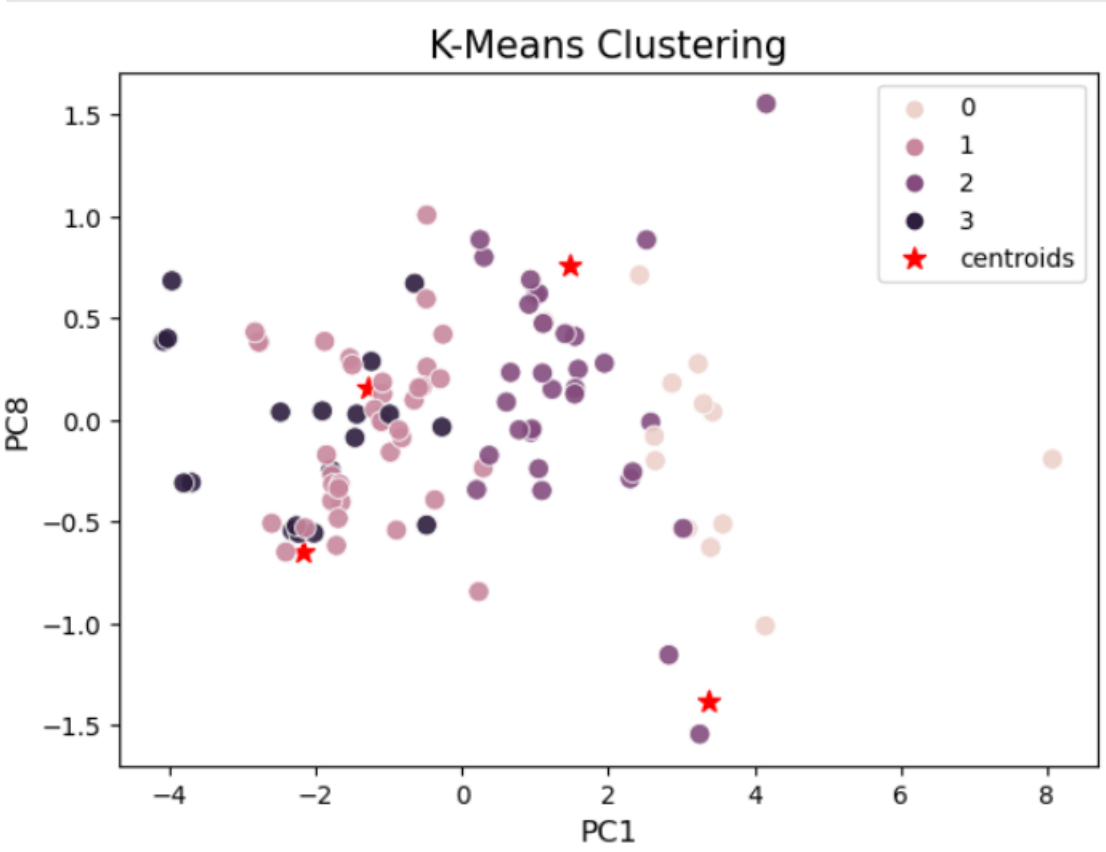
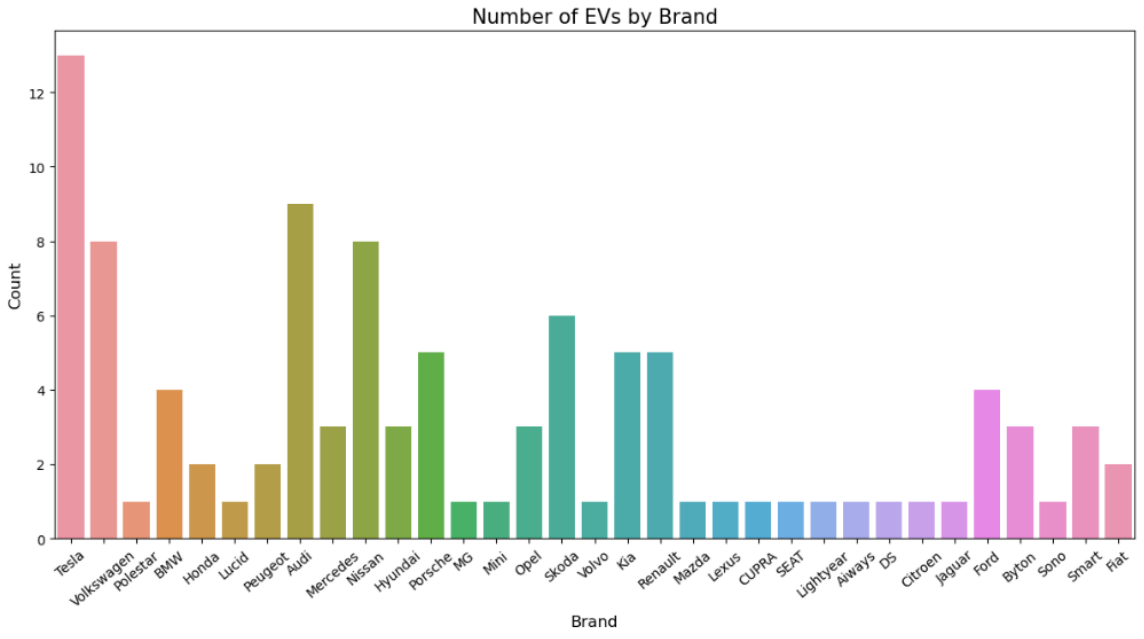
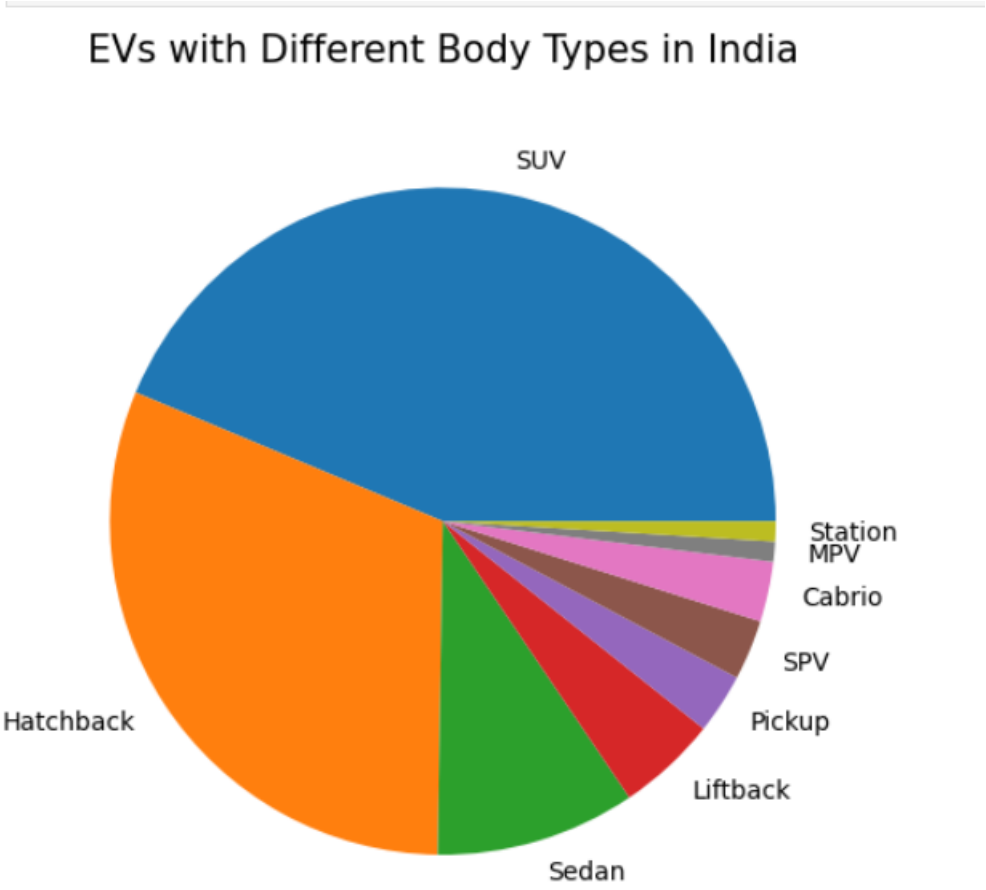


Fig: To Determine Optimal Market Segment



Optimal Market Segement:



Based on the analysis, the target segment for electric vehicles (EVs) can be refined to focus on specific criteria. The ideal EV for this target segment should exhibit psychographic factors such as comfort and value for money. Additionally, it should possess behavioral factors like good acceleration and fall within a viable price range. From a geographic perspective, the target segment should concentrate on states that are more receptive to the EV market, such as Maharashtra, Karnataka, Tamil Nadu, and Rajasthan. To summarize, the target segment for EVs would consist of vehicles with an acceleration time of 7.5-10 seconds, high ratings for comfort and value for money, priced between 20-30 lakhs, and targeted primarily at the states of Maharashtra, Karnataka, Tamil Nadu, and Rajasthan.

Based on the market research and segmentation analysis conducted, the most optimal market
segments to target in the EV market in India are:

1. Urban Commuters:
This segment consists of individuals residing in major cities who heavily rely on daily commuting. They are environmentally conscious and seek efficient and sustainable transportation options. Targeting this segment with electric two-wheelers and compact electric cars can be highly beneficial.

2. Fleet Operators:
Fleet operators, including ride-hailing companies, delivery services, and corporate fleets, are increasingly adopting electric vehicles to reduce operational costs and carbon footprint. Offering customized electric vehicle solutions, such as electric fleet packages or commercial electric vehicles, can attract this segment and provide a significant market opportunity.

3. Government and Public Sector:
The Indian government has been actively promoting the adoption of electric vehicles through various policies and incentives. Targeting this segment involves collaborating with government entities, public transportation authorities, and municipal corporations to supply electric buses, taxis, and other public transportation solutions. This segment offers a substantial market potential due to the scale of government initiatives and the need for sustainable public transportation options.

4. Luxury Segment:
High-income individuals who value luxury, performance, and exclusivity can be targeted with premium electric vehicles. This segment is willing to invest in high-end EVs that offer advanced features, cutting-edge technology, and superior driving experiences. Customizing EVs for this segment can yield higher profit margins and brand recognition.

5. Rural Mobility:
The rural segment represents an emerging market for EVs, particularly for e-rickshaws and electric tractors. Targeting rural areas with affordable and durable electric vehicles suited for agricultural and transportation purposes can tap into this growing market. Collaborating with local government bodies, cooperatives, and agricultural associations can help penetrate this segment effectively.
These market segments have been identified as the most optimal based on their size, growth potential, and alignment with the key trends and demands in the EV market in India. However, it's essential to continually monitor the market dynamics, competition, and consumer preferences to adjust strategies and seize emerging opportunities.