MARKET SEGMENTATION

Analysing the market in India using Segmentation Analysis for Electric Vehicle Start-up.

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INTRODUCTION:

The electric vehicle (EV) market in India is experiencing significant growth driven by various factors such as government initiatives, environmental concerns, and technological advancements. This report provides an in-depth analysis of the current state and future prospects of the EV market in India.

MARKET OVERVIEW:

The EV market in India has witnessed remarkable growth in recent years, with a surge in the adoption of electric vehicles across different segments including two-wheelers, four-wheelers, and commercial vehicles. Factors contributing to this growth include favorable government policies and subsidies, increasing awareness about environmental sustainability, and advancements in battery technology reducing costs and enhancing performance.

MARKET SEGMENTATION:

The EV market in India can be segmented based on various factors such as vehicle type, battery type, and region. By vehicle type, the market can be segmented into two-wheelers, four-wheelers, and commercial vehicles. Battery type segmentation includes lithium-ion, lead-acid, and other battery technologies. Geographically, the market can be segmented into different regions such as North, South, East, and West India.

KEY PLAYERS:

Several domestic and international companies are actively participating in the Indian EV market. Major players include Tata Motors, Mahindra & Mahindra, Hyundai, and Hero Electric among others. These companies are investing in research and development to introduce new EV models and expand their market presence.

CHALLENGES and OPPORTUNITIES:

Despite the rapid growth, the EV market in India faces challenges such as high upfront costs, limited charging infrastructure, and range anxiety among consumers. However, these challenges present opportunities for innovation and investment in areas such as battery technology, charging infrastructure, and policy support to accelerate the adoption of electric vehicles.

GOVERNMENT INITIATIVES:

The Indian government has launched various initiatives to promote the adoption of electric vehicles in the country. These include the Faster Adoption and Manufacturing of (Hybrid &) Electric Vehicles (FAME) scheme, incentives for EV manufacturers, and tax benefits for consumers purchasing electric vehicles. Additionally, the government is focusing on building EV charging infrastructure to support the growing number of electric vehicles on the roads.

EXPLORATORY DATA ANALYSIS:

Exploratory Data Analysis (EDA) is a crucial initial step in the data analysis process. It involves summarizing the main characteristics of a dataset to better understand its structure, patterns, and relationships between variables.

- **Data Summarization:** EDA includes summarizing data through descriptive statistics, such as mean, median, mode, and standard deviation, to gain insights into central tendencies and variability.

- **Data Visualization:** Visualizing data using plots and charts helps in identifying patterns, trends, outliers, and relationships between variables. Common visualization techniques include histograms, scatter plots, box plots, and heatmaps.

- **Identifying Missing Values:** EDA involves identifying missing values in the dataset and understanding their impact on the analysis. Strategies for handling missing data, such as imputation or deletion, may be explored during this phase.

- **Data Distribution:** Understanding the distribution of variables helps in determining the appropriate statistical methods and models for analysis. EDA techniques like skewness, kurtosis, and normality tests assist in assessing data distribution.

- **Feature Engineering:** EDA aids in feature selection and engineering by identifying relevant variables and creating new features that may improve model performance.

- **Exploring Relationships:** EDA examines relationships between variables through correlation analysis, cross-tabulation, and scatter plots, revealing insights into dependencies and interactions within the data.

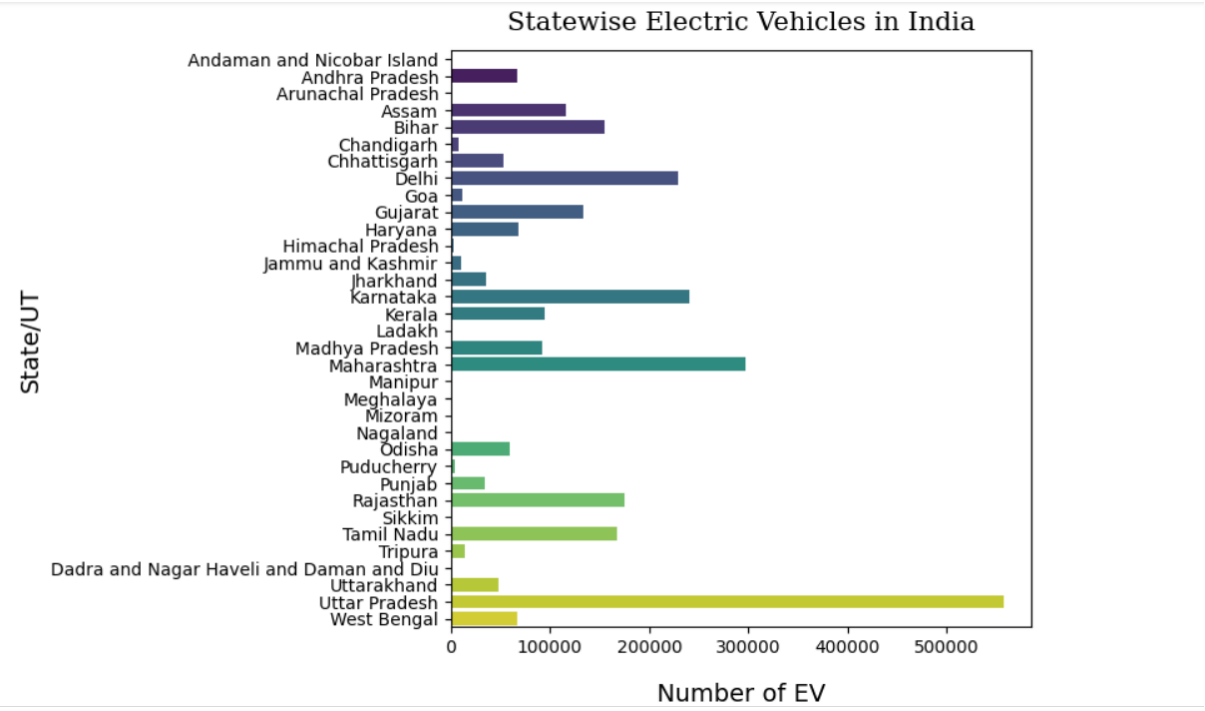

Fig1.1: State-wise Number of Electric Vehicles in India

In the fig 1.1 we can observe that Uttar Pradesh state has the highest number of electric vehicles in India.

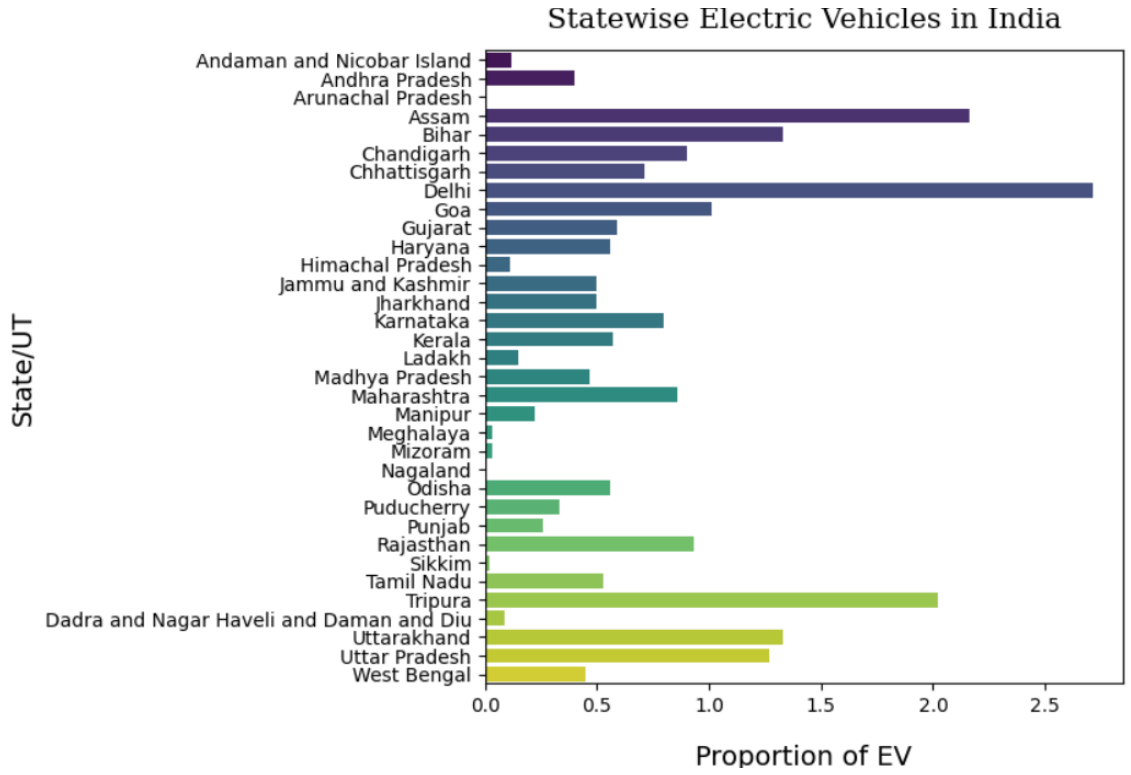

Fig1.2: State-wise Proportion of Electric Vehicles

In fig1.2 we can see that the percentage of vehicles registered as Electric Vehicles across all states. Here Delhi, Assam and Tripura had more percentage of electric vehicles registered.

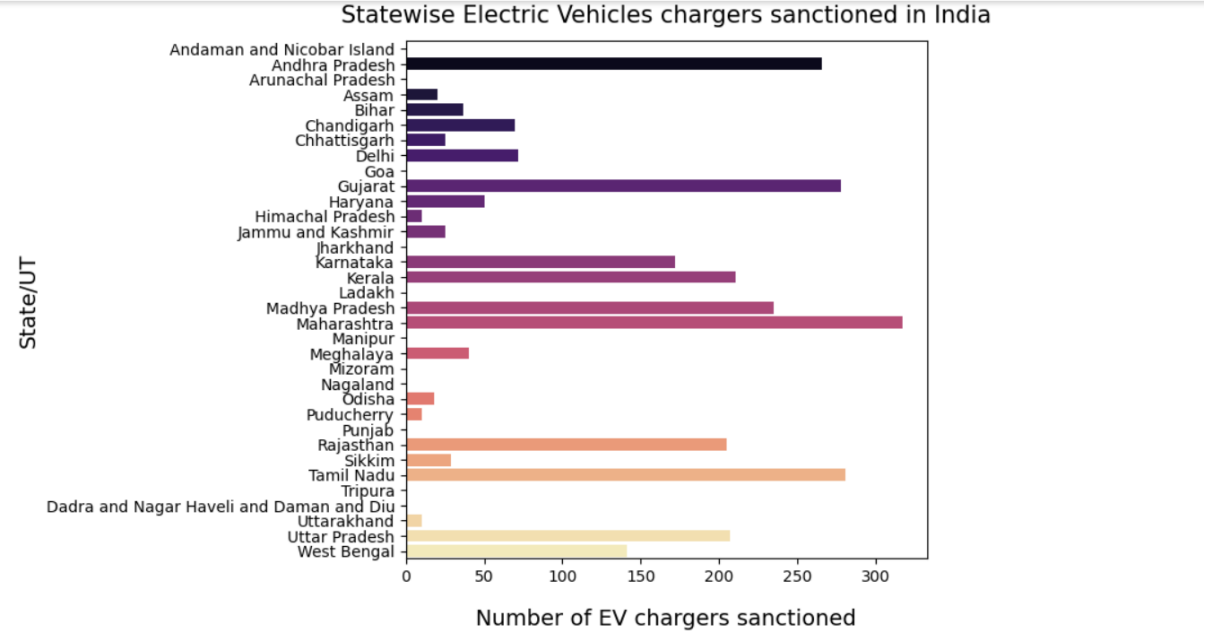

Fig1.3: State-wise Number of Electric Vehicles Chargers Sanctioned in India

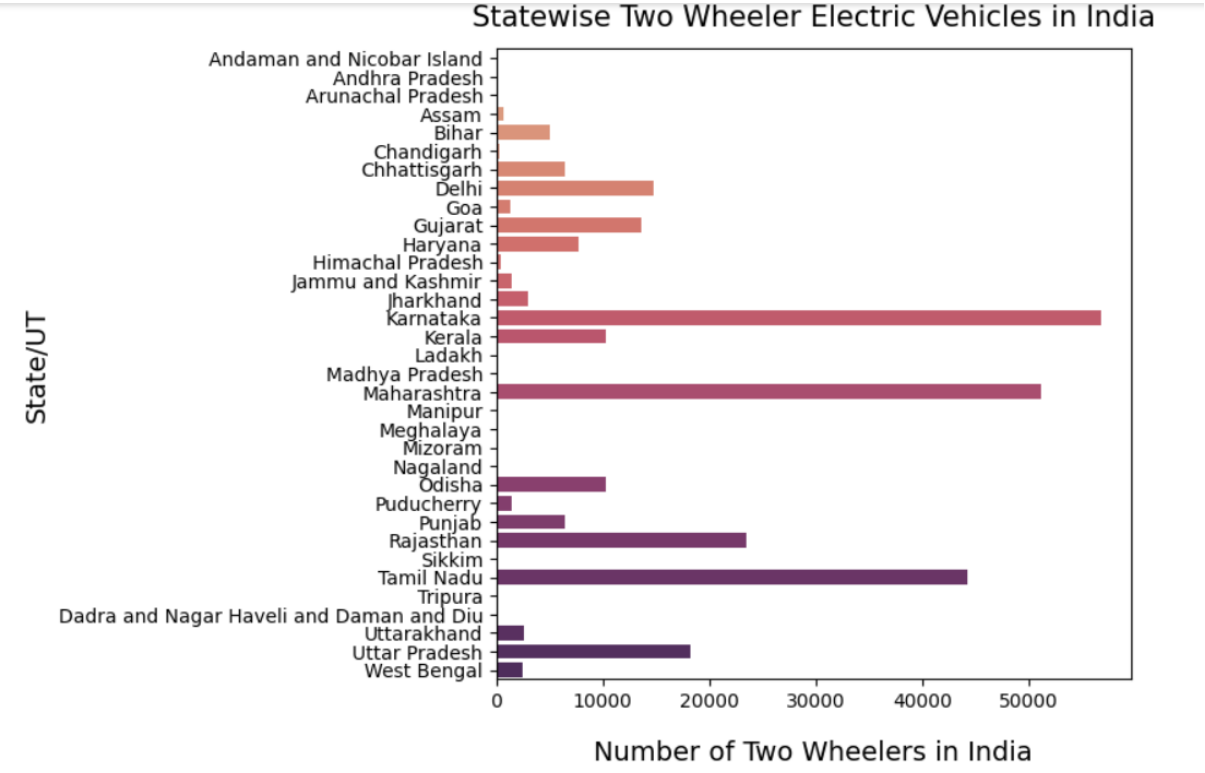

Fig2.1 State-wise Two-Wheeler Electric Vehicles in India

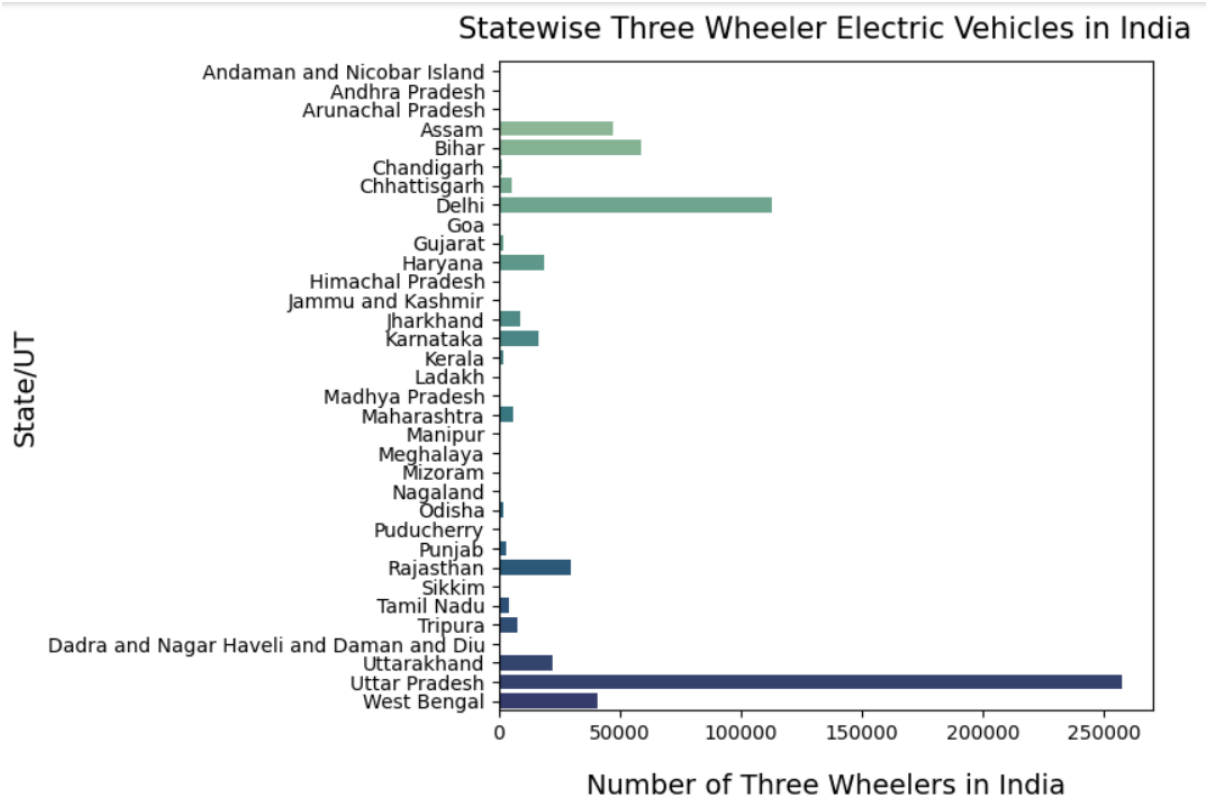

Fig2.2 State-wise Three-Wheeler Electric Vehicles in India

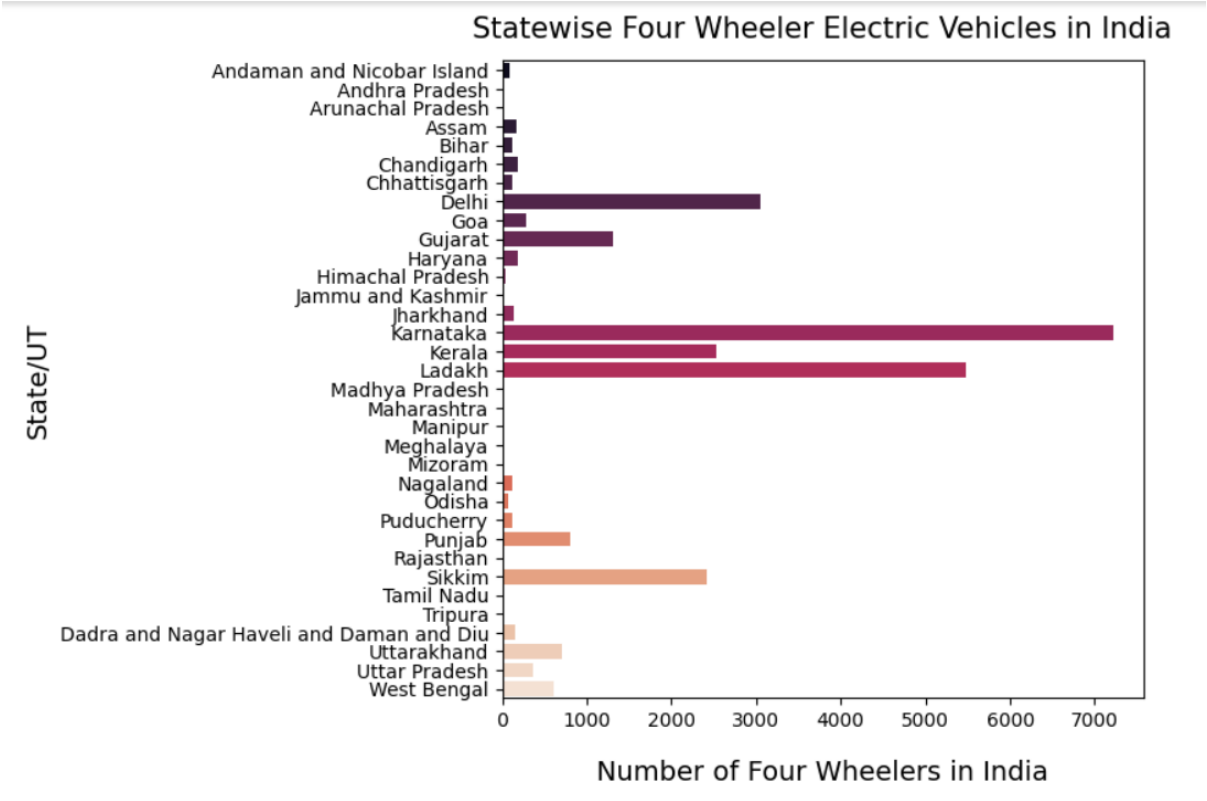

Fig2.3 State-wise Four-Wheeler Electric Vehicles in India

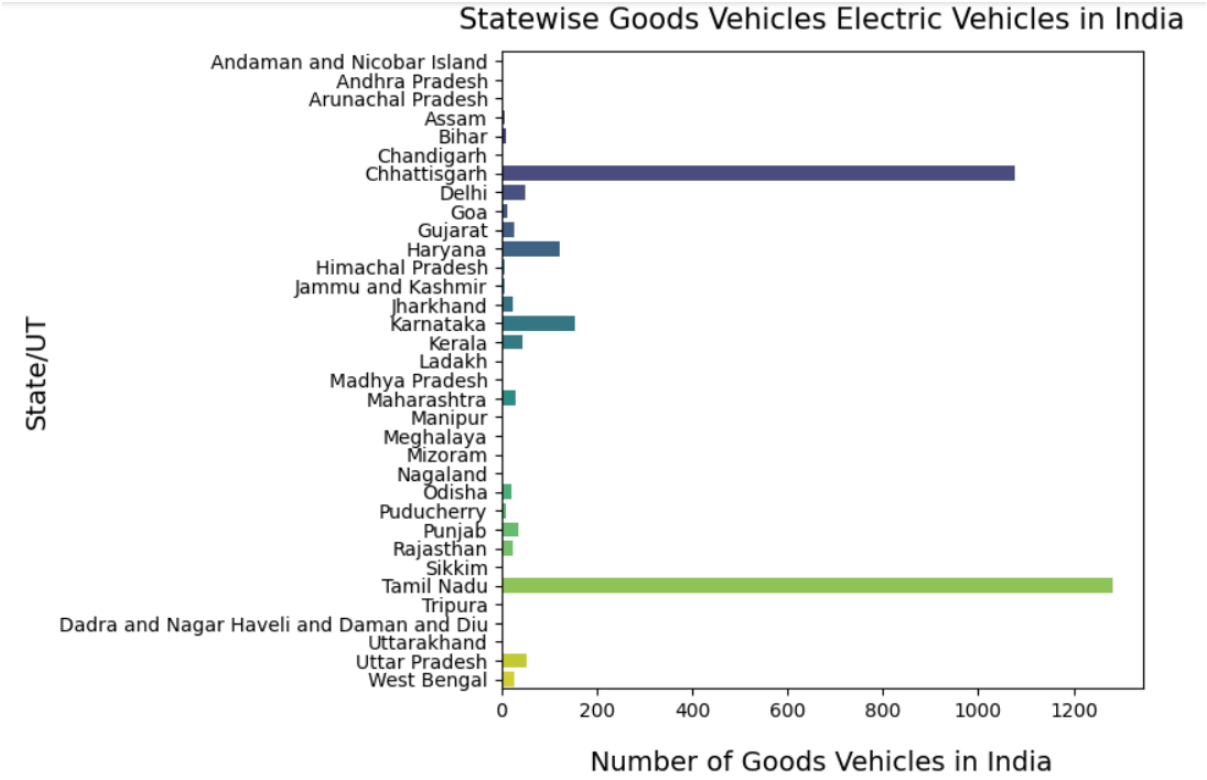

Fig2.4 State-wise Goods Electric Vehicles in India

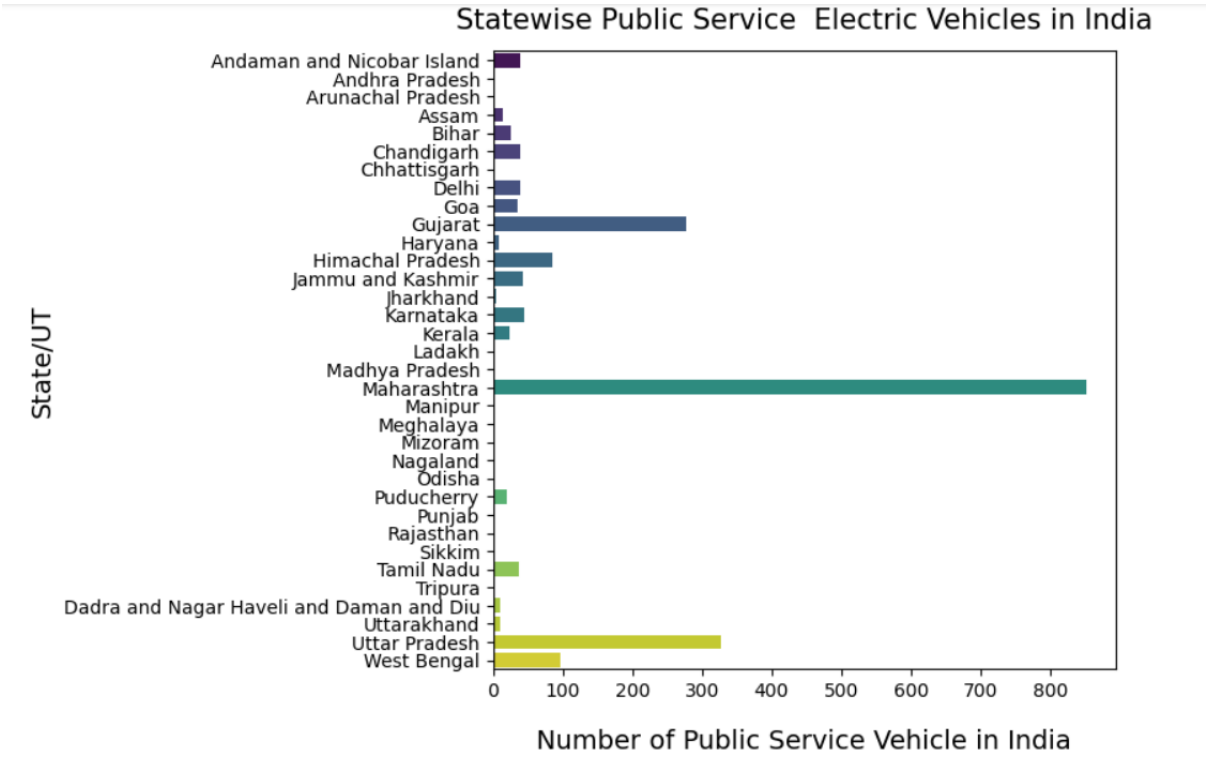

Fig2.5 State-wise Public Service Electric Vehicles in India

From the figs: 2.1,2.2,2.3,2.4,2.5 we can observe the visualizations that talks about in which state how many vehicles and what type of vehicles are present.

We can see that Two-Wheeler EV are more in Karnataka, Maharashtra, Tamil Nadu.
Three-Wheeler EV are more in Uttar Pradesh and Delhi.
Four-Wheeler EV are more in Karnataka and Ladakh.
Goods EV are more in Tamil Nadu and Chhattisgarh.
Public Service EV are more in Maharashtra.

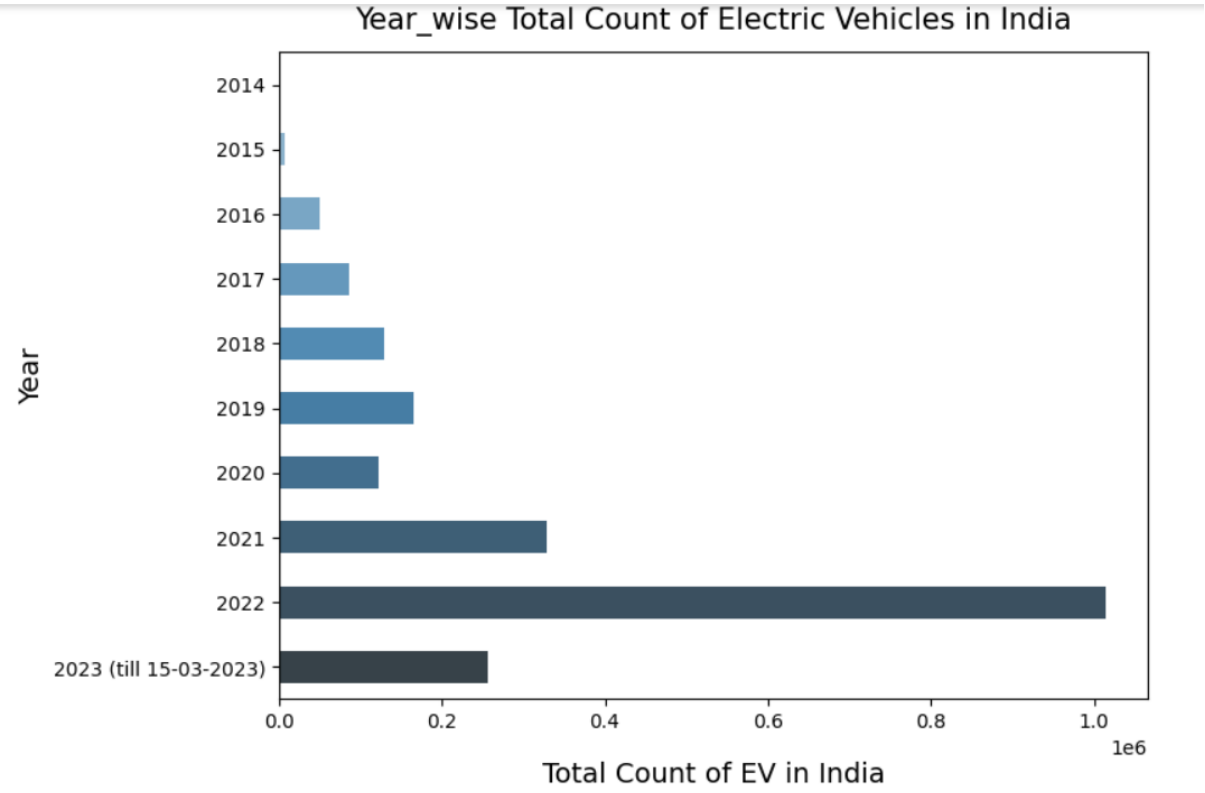

Fig3: Year-wise Total Electric Vehicles in India

Analysis of Two-Wheeler Electric Vehicles in India

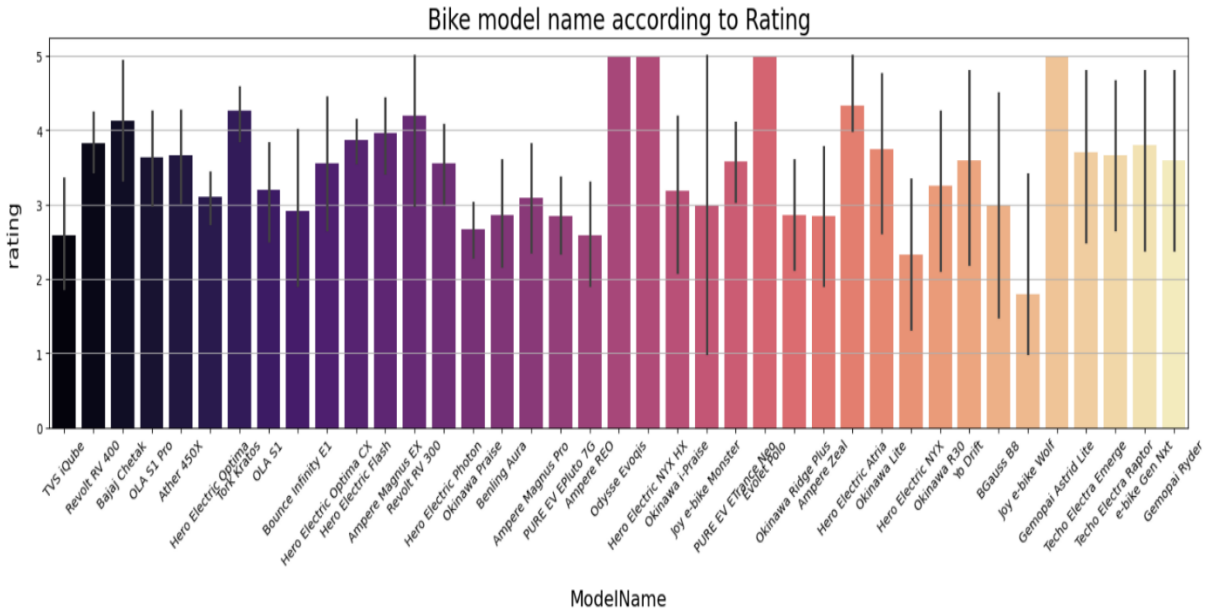

Fig4.1: Two-Wheeler EV Model Name according to Rating

The Two-Wheeler EV with highest Rating are “Okinawa-j Praise”, “Okinawa Ridge Plus”, “Hero electric NYX HX”, “Joy e-bike wolf” these bike models are the highest rating among all models.

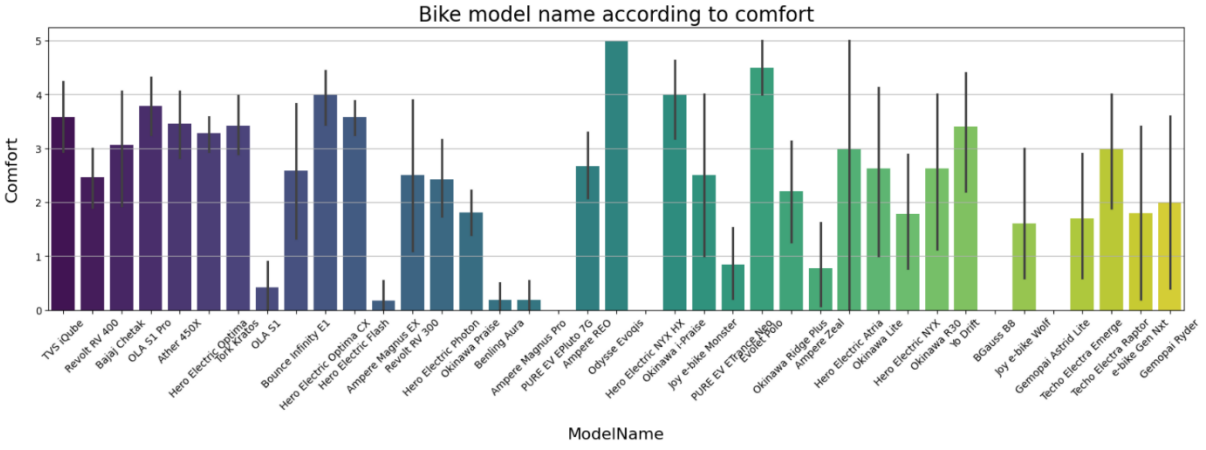

Fig4.2: Two-Wheeler EV Model Name according to Comfort

The Two-Wheeler EV with Comfort and highest Rating is “Hero electric NYX HX”.

K-MEANS CLUSTERING:

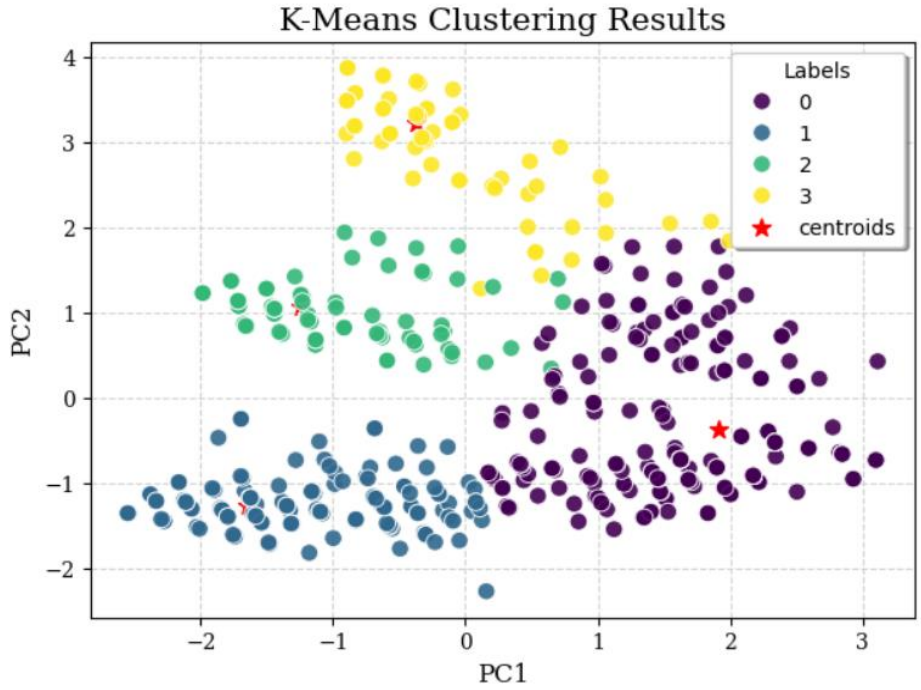

Fig5.1: K-Means Clustering analysis

In the fig5.1 PC1 means “Rating” and PC2 means “Comfort”

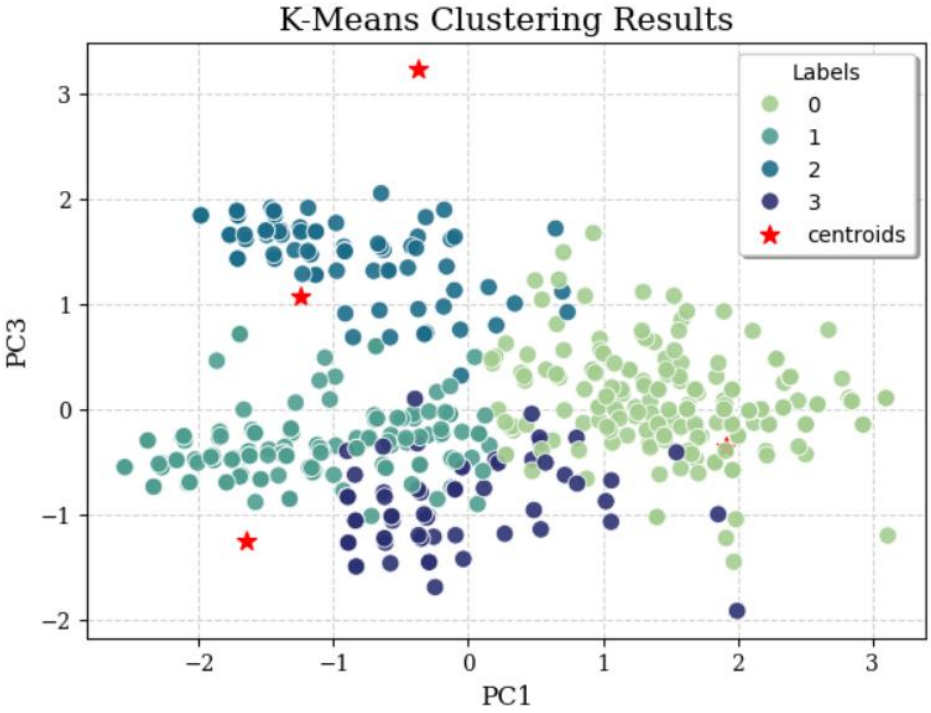

Fig5.2: K-Means Clustering analysis

In the fig5.2 PC1 means “Rating” and PC3 means “Value of Money”

CONCLUSION:

The two-wheeler electric vehicle market in India is witnessing rapid growth driven by factors like government incentives, increasing environmental awareness, and technological advancements. With major players entering the market and expanding their offerings, coupled with the improving charging infrastructure, the future looks promising for the two-wheeler electric vehicle segment in India. Continued support from the government and innovation in battery technology are expected to further fuel the growth of this market, making electric two-wheelers a popular choice among Indian consumers for their convenience, affordability, and eco-friendliness.