**Market Segmentation Analysis of EV market in India**

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**GitHub Link:** <https://github.com/LoguPrasanth-hub/EV-Market-Analysis>

**Problem Statement:**

Identifying the Best Vehicle & Strategy for an EV Startup in India:

# **Background**

The Indian Electric Vehicle (EV) market is growing rapidly, with an estimated annual market size of ₹6 lakh crore ($72 billion USD). However, new EV startups face challenges such as high competition, uneven charging infrastructure, varying state policies, and uncertain demand patterns.

# **Dataset Details**

## **Dataset 1: India vehicle sales yearly**

* **State**: Indicates the Indian state where vehicle sales data was recorded.
* **Year**: Represents the year of vehicle sales ranging from 2010 to 2025.
* **Two Wheelers**: Shows the total number of two-wheelers (like motorcycles and scooters) sold in a particular state and year.
* **Three Wheelers**: Refers to the number of three-wheeled vehicles (such as auto-rickshaws) sold.
* **Cars**: Denotes the count of cars sold, typically used for personal transportation.
* **Buses**: Captures the number of buses sold, often used for public or institutional transport.
* **Trucks**: Represents the number of trucks sold, mainly used for cargo and logistics.

## **Dataset 2: EV Dataset**

* **Year**: Specifies the year in which electric vehicle data was recorded.
* **Month Name**: Denotes the name of the month (e.g., Jan, Feb) for each EV record.
* **Date**: The exact date of the vehicle registration.
* **State**: Indicates the Indian state where the EV was registered.
* **Vehicle Class**: Describes the broader classification of the vehicle (e.g., Ambulance, Bus).
* **Vehicle Category**: Groups vehicles into general categories like Bus, Others, etc.
* **Vehicle Type**: Further defines the type of EV such as Two-Wheeler, Three-Wheeler, etc.
* **EV Sales Quantity**: Shows the number of electric vehicles sold or registered for that specific entry.

# **Formulas and Techniques:**

## **1. Exploratory Data Analysis (EDA)**

* We used charts and graphs to look at sales trends over time.
* This helped us understand how different types of vehicles performed and spot any important patterns.

## **2. Clustering**

* We grouped similar data points together to find natural segments or clusters in the sales data.
* This helped identify which vehicle types or sales patterns were alike.

## **3. Time Series Analysis**

* We analyzed past sales data to predict future sales trends.
* This forecasting helps in planning and decision-making based on historical patterns.

## **4. Year-over-Year Growth and Sales Index**

* We measured how sales changed each year compared to the previous year, showing the growth rate.
* We also compared sales to a base year (2010) to see how sales have increased or decreased over time.

# **Key Insights**

## **1. Dominance of Two Wheelers**

* Two wheelers led sales over 16 years, totaling about 159 million units. Sales peaked around 11.5 million in 2022, then dipped slightly.  
  **Conclusion:** Focus for mass production and market saturation.

## **2. Steady Growth in Three Wheelers**

* Sales grew moderately from about 920K in 2010 to 1.01M in 2025, with some dips in between.  
  **Conclusion:** Ideal for niche targeting and EV transition, especially in shared and public transport.

## **3. Cars Show Volatility**

* Annual sales ranged between 5.3M and 6.2M, with notable dips in 2013, 2017, and 2021.  
  **Conclusion:** Growth not guaranteed — suitable only with value innovation.

## **4. Buses Have Minimal Impact**

* Sales remained low and flat, between 91K and 111K per year, declining after 2015.  
  **Conclusion:** Low priority for high-scale investments.

## **5. Trucks Have Small but Volatile Sales**

* Sales fluctuated between 182K and 235K, with growth spurts in 2019 and 2022.  
  **Conclusion:** Use as a secondary focus, especially for logistics sectors.

# **Final Recommendation**

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| **Rank** | **Vehicle Type** | **Why** |
| 🥇 1 | Two Wheelers | Highest total volume, wide affordability & demand |
| 🥈 2 | Three Wheelers | Moderate growth, less saturated, EV-suited |
| 🥉 3 | Cars | Large market, but unstable — needs innovation & brand name |
| 🚫 4 | Buses | Low, stagnant demand — not scalable |
| 🚫 5 | Trucks | Volatile and small-scale — only good for add-ons |

# **Conclusion**

Based on the analysis, Two Wheelers emerge as the strongest candidate for manufacturing due to their consistently high sales volume and widespread demand across India. Additionally, Three Wheelers show steady growth and are well-suited for electric vehicle adaptation, especially in urban and shared mobility sectors. Together, these two segments present the best opportunities for long-term, scalable manufacturing strategies.