Electric Vehicle (EV) Market Segmentation Strategy Report

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1. Introduction

India's rapidly urbanizing landscape, rising fuel costs, and increasing focus on sustainability have created fertile ground for the Electric Vehicle (EV) industry. While central and state-level policy incentives and subsidies have stimulated early interest, the market is still in a formative phase and requires precise targeting to convert interest into large-scale adoption. For startups aiming to enter this space, a well-structured market segmentation strategy is critical. This report explores and analyzes potential segments using multiple datasets, machine learning techniques, and strategic frameworks to outline the most promising entry strategy.

2. Fermi Estimation & Problem Breakdown

India's urban population (2024 est.): ~400 million
Vehicle ownership ratio: ~0.2 vehicles per person
Registered vehicles: ~300+ million (as per MoRTH)
Current EV adoption:
- 2W: 6.2% of new sales
- 3W: 24.2%, especially cargo and shared mobility
- 4W: 2.5%, primarily in personal use or government fleets

Assuming 5% of urban India qualifies as innovators/early adopters and 1% can be converted in the first year:
Early Market Size = 400 million × 0.05 × 0.01 = 200,000 potential customers

3. Data Sources & Description

Dataset Name	Description	Fields Used
EV Maker by Place.csv	Manufacturer-wise distribution of EV makers across Indian states and cities	State, Place, EV Maker
Vehicle Class - All.csv	Class-wise total EV registrations over time	Vehicle Class, Total Registration
EV Sales by Maker & Category 2015–2024.csv	Yearly sales data by company and class	Year-wise unit sales

Data Collection Sources:
- Ministry of Road Transport & Highways (MoRTH)
- Open Government Data Platform (data.gov.in)
- EV Reporter (2024 Annual Sales Summary)

4. Data Preprocessing

Tasks Performed:
- Removed null and incomplete rows
- Standardized column formats
- Cleaned and converted numeric fields
- Aggregated and restructured data for analysis

Tools and Libraries: Python, Pandas, NumPy, Seaborn, Matplotlib, Scikit-learn

5. Exploratory Data Analysis (EDA)

a) State-wise Manufacturer Distribution:
- Karnataka, Maharashtra, and Tamil Nadu have the highest EV manufacturer presence
- Bengaluru is a hub for companies like Ather, Mahindra, Ola Electric

b) Category Breakdown:
- 2W and 3W dominate EV registrations due to affordability and practicality

c) Sales Trend Analysis (2015–2024):
- Rapid sales growth post-2020, especially in 2Ws
- 4W sales remain limited but are rising gradually

6. Market Segmentation (Clustering-Based)

Clustering used synthetic variables (Age, Income, EV Adoption Score) to simulate psychographic/behavioral segments.
KMeans with 3 clusters yielded:

Segment	Key Traits
Cluster 0	Age 25–35, income > Rs. 10L, EV-friendly mindset (early adopters, sustainability advocates)
Cluster 1	Age 30–45, income Rs. 6L–10L, moderate awareness, price-conscious
Cluster 2	Age 40+, income < Rs. 6L, hesitant, prefers conventional vehicles

7. Target Segment Selection

Segment 0 (Early Urban Adopters):
- Metro cities like Bengaluru, Pune, Delhi NCR
- Profile: Tech-savvy, smartphone users, high sustainability interest
- Behavior: Willing to pay premium for EV innovation and green mobility

8. Strategic Marketing Mix (4Ps)

Marketing Mix	Plan
Product	Electric scooters (2W), delivery 3Ws with smart connectivity
Price	Rs. 1–3L for 2W, Rs. 3–6L for commercial 3W
Place	Metro cities with EV infra and state subsidies
Promotion	Digital ads, clean-tech influencers, student outreach

9. Early Market Profit Estimation

Metric	Value
Estimated Early Adopters	100,000
Conversion Rate	5%
Avg Price (2W)	Rs. 1,20,000
Expected Revenue	Rs. 60 Crores

10. Final Recommendations

1. Launch Phase 1 in Bengaluru, Pune, Delhi NCR
2. Prioritize urban professionals (age 25–35)
3. Start with 2Ws and commercial 3Ws
4. Use digital and B2B channels for awareness and sales
5. Measure retention, charging behavior, and campaign conversion

11. GitHub Repository

https://github.com/gnanreddy11/EV_Market_Analysis