ELECTRIC VEHICLE SALES ANALYSIS (2015-2024)

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Github - link

The Electric Vehicle (EV) sector in India has shown remarkable growth and transformation over the past decade. From a niche segment in 2015 to a rapidly expanding industry by 2024, the data reveals several key trends and insights:

About Dataset:

The dataset used for this analysis contains detailed information on Electric Vehicle (EV) sales in India from 2015 to 2024, segmented by:

- Manufacturer (Maker) – EV-producing companies across two-wheeler, three-wheeler, and four-wheeler categories.

- Category (Cat) – Denotes the type of vehicle:

->2W for two-wheelers,
->3W for three-wheelers,
->LMV for four-wheelers,
->along with subcategories such as E-Cart, E-Bus, etc.

- Sales figures – Number of units sold by each maker per year from 2015 to 2024.

- Additional fields (if applicable) – Such as vehicle type, region, or mode of transport.

Preprocessing Summary:

- Cleaned inconsistent maker names (e.g., removed extra quotes and whitespace).
- Aggregated sales data by year, category, and maker.
- Derived metrics such as year-over-year (YoY) growth, total sales, and cluster labels.
- Normalized sales data for clustering and pattern analysis.

This dataset enables comprehensive trend analysis, forecasting, and market segmentation across India's rapidly evolving EV ecosystem.

1. Exponential Growth in Sales

- EV sales have surged significantly since 2020, with the highest YoY growth observed in 2016 and 2022.
- Post-2020, EV adoption accelerated, largely driven by government incentives, infrastructure development, and increased public awareness.

2. Dominance of Two-Wheelers (2W)

- Two-wheelers (2W) dominate the market in terms of volume, with consistent year-on-year growth.
- Makers like OLA Electric, TVS, Ather, and Hero Electric have led the 2W segment with substantial market penetration.

3. Leading Makers and Market Shares

- OLA Electric Technologies Pvt. Ltd. emerged as the top-selling EV maker (especially post-2020).
- Traditional automotive giants like TVS, Bajaj, and Mahindra continue to show consistent performance.
- Several new players entered the market post-2020, contributing significantly to the total sales.

4. Sales Trends and Clustering Patterns

- Cluster analysis revealed three distinct growth patterns among manufacturers:
- Slow growers (steady low volume),
- Moderate growers (gradual rise),
- Explosive entrants (sharp spike post-2021).
- This insight can guide competitive benchmarking and investment decisions.

5. Regional Sales (if available)

- (Optional) If regional data was included: Sales patterns vary by region, with urban centers leading EV adoption due to better infrastructure and policy support.

6. Three-Wheeler (3W) Growth Slower

- Though present, 3W EV sales have grown at a slower pace compared to 2W, with fewer dominant players and more fluctuation in annual performance.

7. Forecasting Suggests Continued Growth

- Forecasting models predict continued sales growth over the next few years, though the rate may stabilize as the market matures.
- Seasonal and economic factors may influence this growth curve.

8. Export Market Opportunity

- Several top players have begun exploring exports, particularly in South Asia and Africa.
- Export trends are expected to grow as India becomes a hub for affordable electric mobility.

Recommendations for Stakeholders

- Manufacturers: Focus on innovation, cost reduction, and expanding 3W and 4W portfolios.
- Investors: Watch for emerging players in the 2W and 3W clusters.
- Policy Makers: Support infrastructure, subsidies, and incentives to maintain momentum.
- Analysts: Regularly monitor sales clusters and regional growth for real-time insights.