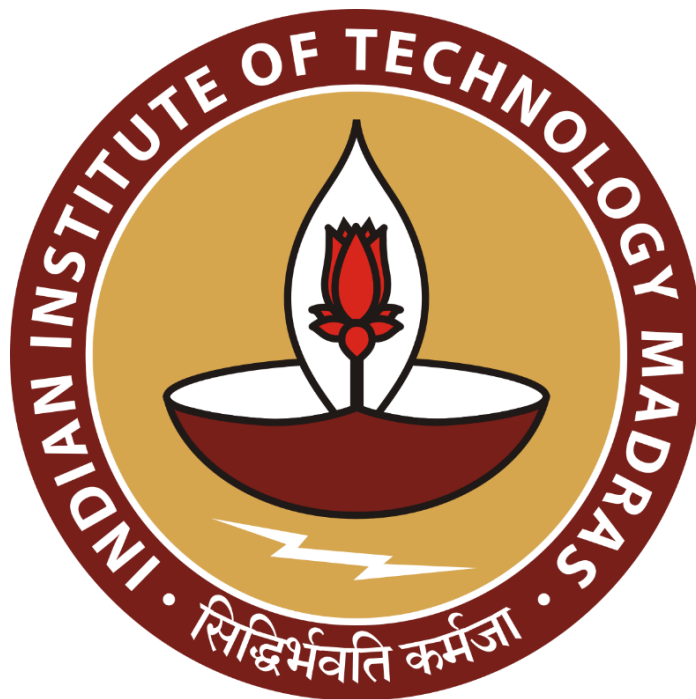# Driving India's EV Revolution: Uncovering Sales Trends and Market Opportunities

A Proposal Report for the BDM Capstone Project

Submitted by

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Declaration Statement

I am working on a Project Title "Driving India's EV Revolution: Uncovering Sales Trends and Market Opportunities". I extend my appreciation to Kaggle Repository, for providing the necessary resources that enabled me to conduct my project.

I hereby assert that the data presented and assessed in this project report is genuine and precise to the utmost extent of my knowledge and capabilities. The data has been gathered through secondary sources and carefully analyzed to assure its reliability.

Additionally, I affirm that all procedures employed for the purpose of data collection and analysis have been duly explained in this report. The outcomes and inferences derived from the data are an accurate depiction of the findings acquired through thorough analytical procedures.

I am dedicated to adhering to the information of academic honesty and integrity, and I am receptive to any additional examination or validation of the data contained in this project report.

I understand that the execution of this project is intended for individual completion and is not to be undertaken collectively. I thus affirm that I am not engaged in any form of collaboration with other individuals, and that all the work undertaken has been solely conducted by me. In the event that plagiarism is detected in the report at any stage of the project's completion, I am fully aware and prepared to accept disciplinary measures imposed by the relevant authority.

I agree that all the recommendations are business-specific and limited to this project exclusively, and cannot be utilized for any other purpose with an IIT Madras tag. I understand that IIT Madras does not endorse this.

Signature of Candidate: (**Digital Signature**)

Name: Devansh Rungta

Date: 01-11-2024

1   Executive Summary

This project looks at the growing market for electric vehicles (EVs) in India, using sales data to provide useful insights. The dataset includes state-wise EV sales for different vehicle types, giving a clear picture of the EV market.

Some key challenges include understanding how well EVs are sold in different regions, analyzing the demand for various vehicle types, and spotting trends in commercial and passenger EV sales. It's important to address these challenges for market planners, infrastructure builders, and policymakers who want to promote EV adoption in India.

This project will use data analysis to study regional EV sales trends, identify the most popular vehicle types, and highlight differences between commercial and passenger EV sales. These insights will help stakeholders make better decisions about building infrastructure, planning the market, and targeting customers, which will support the growth of India's EV sector.

2   Organization Background

India's electric vehicle (EV) market is growing quickly. This increase is due to government support, higher fuel prices, and concerns about the environment. The data for this project comes from Kaggle. The author collected information from Clean Mobility Shift, a platform that promotes sustainable transportation in India.

As India works to lower its carbon emissions and use cleaner energy, electric vehicles are a major focus for policymakers, car companies, and consumers. The EV market is expected to grow significantly in the next few years, with more investments in infrastructure, charging stations, and new vehicle models. The state-wise EV sales data shows how different regions are adopting these vehicles. This information helps market analysts, investors, and government officials identify growth opportunities and infrastructure needs in both cities and rural areas.

3 Problem Statement

3.1 **Problem Statement 1**: Market Penetration – Find insights into regional EV market penetration that hinders strategic decision-making for new infrastructure investments and sales strategies.

3.2 **Problem Statement 2:** Vehicle Type Demand – Analyzing the demand for different types of EVs (e.g., two-wheelers vs. four-wheelers) across regions.

3.3 **Problem Statement 3:** Commercial vs Passenger Sales – Understanding the demand dynamics between commercial and passenger EVs.

4 Background of the Problem

The Indian government aims to boost electric vehicle (EV) use with programs like the Faster Adoption and Manufacturing of Hybrid and Electric Vehicles (FAME) scheme. However, EV adoption rates vary widely between states due to factors like infrastructure, consumer knowledge, and local economies.

One major challenge is uneven market penetration, leading to gaps in infrastructure and wasted resources. Manufacturers often struggle to identify which types of EVs are in high demand. This uncertainty can result in poor production strategies and lost business opportunities.

The EV market has two main segments: commercial and passenger vehicles. Commercial vehicles are crucial for logistics and transportation, while passenger vehicles cater to personal mobility needs. Without understanding how these two segments perform in different areas, businesses may find it hard to create effective sales strategies. Additionally, policymakers might not be able to meet specific infrastructure needs.

5 Problem Solving Approach

To address the identified business problems, the project will use a structured data-driven approach to analyze EV sales trends across India. Below is the stepwise approach that will be implemented:

1. **Data Exploration and Preprocessing**

   We will start with an exploratory data analysis (EDA) of the EV dataset. This will help us identify patterns and key variables, as well as find any outliers. We'll use visual tools like histograms, heatmaps, and bar charts to understand how EV sales vary by state and type of vehicle (commercial vs. passenger). This step will give us a clearer picture of EV distribution.

2. **Regional Market Penetration Analysis**

   Next, we will look at how well different states have adopted electric mobility. We will calculate the EV adoption rate for each state by comparing sales data with population. This will help us spot potential areas for market growth. We will also group states with similar adoption rates using cluster analysis.

3. **Vehicle Type Demand Analysis**

   We will divide the dataset by vehicle type (like two-wheelers, four-wheelers, etc.) to identify demand trends. We will use simple statistics and time-series analysis to see if consumer preferences are changing for certain vehicle types.

4. **Commercial vs Passenger Vehicle Demand Analysis**

   To understand the differences in commercial and passenger EV sales, we will apply a comparative analysis. This involves breaking down the dataset by vehicle category, then applying machine learning models (e.g., logistic regression, etc.) to predict sales trends based on vehicle type, state, and other factors. The analysis will show how demand patterns for commercial and passenger vehicles differ across regions..

By following these steps, this project aims to thoroughly analyze India's EV market and provide useful insights for market strategies and policy decisions.

6 Expected Timeline

6.1 Work Breakdown Structure:

1. Day 1-17: Exploratory data analysis
2. Day 3-4: Regional Market Penetration Analysis
3. Day 5-6: Vehicle type demand Analysis
4. Day 7-8: Commercial vs Passenger Analysis
5. Day 9-10: Finding more insights
6. Day 11-17: Finding Solutions
7. Day 13-14: Preparing Final Submission
8. Day 15-16: Buffer
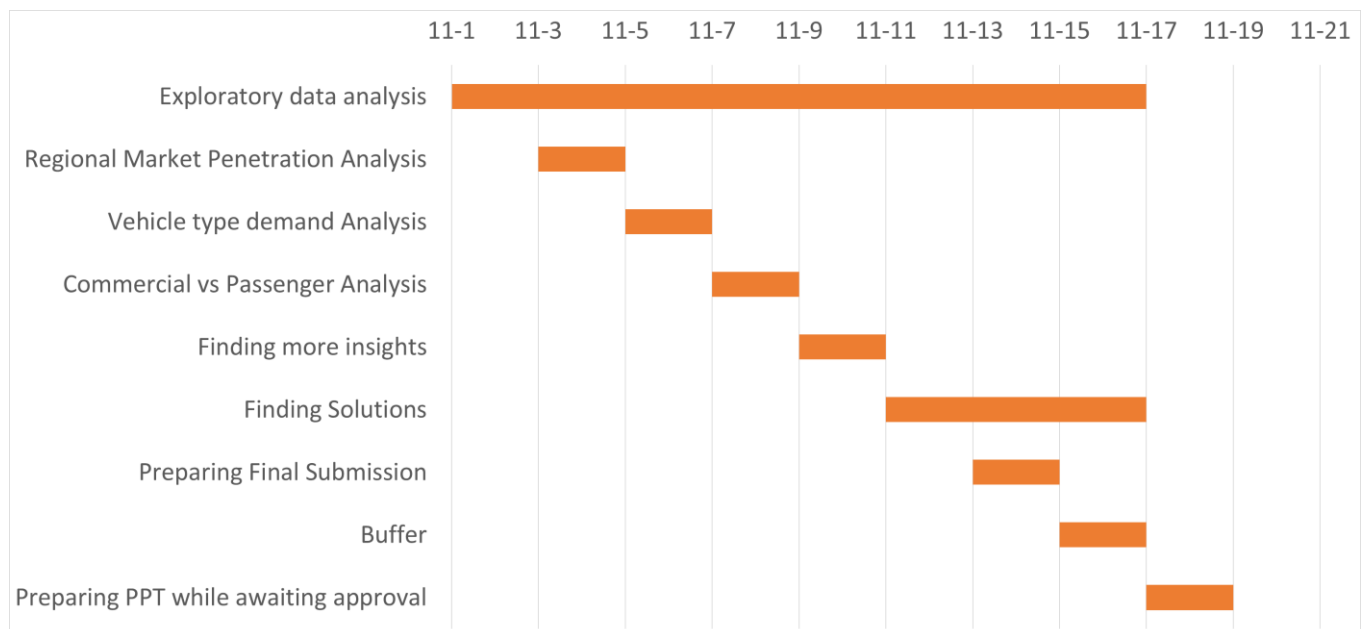9. Day 17-18: Preparing PPT while awaiting approval

6.2 Gantt chart

Figure 1 Expected timeline for completion of project.

7 Expected Outcome (Briefly explain in 150-200 words)

The expected outcomes of this project are as follows:

7.1 **Insights into Regional EV Adoption**: The analysis will provide a clear picture of EV adoption trends across different Indian states, helping businesses and policymakers identify high-growth markets.

7.2 **Vehicle Type Demand Trends**: By breaking down the dataset into different vehicle types, the analysis will reveal which types of EVs are gaining popularity in specific regions, assisting manufacturers in optimizing their production strategies.

7.3 **Commercial vs Passenger Vehicle Dynamics**: The analysis will offer a detailed comparison of commercial and passenger EV sales, allowing businesses to tailor their sales and marketing strategies based on the distinct needs of each category.

7.4 **Predictive Sales Trends**: The project will provide forecasts for future EV sales trends, enabling infrastructure planners and policymakers to make informed decisions about resource allocation and infrastructure investments.

These insights will help industry stakeholders better understand the complexities of the Indian EV market and develop data-driven strategies to accelerate EV adoption.