

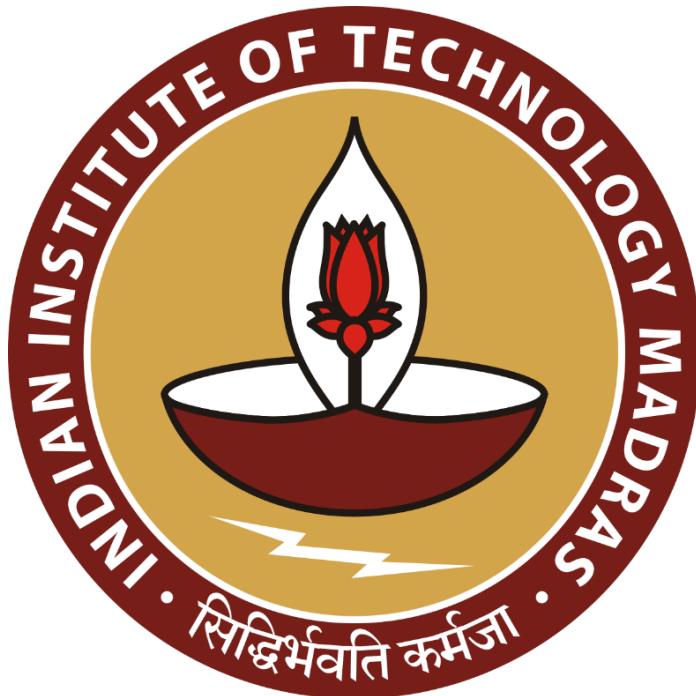
**Carbon Footprint - Environmental Impact &
Business Study of EV Logistics of ZEVO India:
A Complete Analytical Study**

A Proposal report for the BDM capstone Project

Submitted by

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Contents

Declaration Statement	1
1 Executive Summary and Title	2
2 Organization Background	2
3 Problem Statement	3
3.1 Problem statement 1	3
3.2 Problem statement 2	3
4 Background of the Problem	3
5 Problem Solving Approach	4
6 Expected Timeline	5
7 Expected Outcome	5

Declaration Statement

I am working on a Project Title "**Carbon Footprint - Environmental Impact & Business Study of EV Logistics of ZEVO India: A Complete Analytical Study**". I extend my appreciation to **ZEVO India**, 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 primary 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:

Name: Jayanthi Shanmukha Teja

Date: 05/05/2025

1 Executive Summary

The project focuses on the company, **ZEVO India**. *ZEVO India* is a growing B2B startup in the and is an acronym that stands for **Zero Emission Vehicle Operations**. The company has a fleet of nearly 2000 Electric Vehicles spread across 25 cities in India. They are present in all the Metro cities and work with almost all the giant corporates that need Logistics support starting from Amazon, Flipkart, Zomato, Big Basket, etc.. and are Headquartered out of New Delhi. The company is working towards electrifying the Logistics supply chain.

A few areas where the business requires assistance are,

ZEVO has had an impact by substituting electric vehicles for internal combustion engine vehicles, owing to the vast number of vehicles that are deployed throughout the nation. This shift to EV's has given them a significant economic boost by reducing the costs incurred by replacing the traditional IC Vehicles.

Due to the size and diversity of their customer base, there is currently a lack of comprehension regarding location-by-client data. This is affecting their overall efficiency and addressing this will help them in making some efficient decisions therefore boosting their profits.

If these two factors are addressed, the business will be better able to understand its cost saved by using the green energy over the IC vehicles and the geographic distribution of its customer base, which will aid in decision-making and ultimately lead to revenue and profits.

To address these points, the project will employ a range of analytical methods. This includes calculation of the total carbon footprint of all the vehicles and statistical analysis to identify trends and patterns in their customer-geography data.

Optimization techniques to summarize the data points to actionable decisions. By applying these approaches, the project aims to show the impact of the company on the sustainability and Clean Energy front. Also the factors that are affecting their current fleet management efficiency and ultimately leading to some decisions which eventually translate in the company's profitability. The expected outcome is to know the savings made until now to the replacement of ICE Vehicles with EV's and its environmental impact along with the carbon footprint & the current scenario of their existing business and leaks identification which might eventually help them identify and resolve them.

2 Organization Background

The company that I am working with is *ZEVO India*, which is an Electric Vehicle based Logistics company based in Delhi, India. The company was founded in 2022, by Aditya

Singh Ratnu and Dhruv Bhatia, initially to work in the clean energy domain. The company operates 6 days a week from 10AM to 6PM. Their operations started in the month of April 2023 with 4 three-wheelers and in less than 20 months the company has deployed 2000 Vehicles on road in more than 25 cities across the country. The company has nearly a 70 member team in their primary office in Delhi, and the team size goes to nearly 1500 people when all the drivers and managers are added from all across the country. The company works on an asset-lite model where they have various financers, banks etc.. helping them with financing the EV's and then they procure it from various OEM's and deploy it at various clientele.

The Fleet composition consists of 47% two-wheelers, 29% three-wheelers, and 24% four-wheelers. The company is done with 2 rounds of funding up until now. Their major client base includes Amazon, Zomato, Swiggy, Flipkart, Big Basket, Zepto, Blinkit, among others. ZEVO in terms of profitability is currently in their breakeven phase i.e. their profits are nearly equivalent to their monthly costs. The current valuation of the company is 160Cr and is bound to increase at 7% CAGR.

3 Problem Statement

- 3.1 Demonstrate the cost savings and environmental impact achieved through sustainable fleet operations by accurately measuring the carbon footprint of all vehicles.
- 3.2 Quantify and Visualize the operations client wise and geography wise thereby, identifying possible leaks bettering the transparency, therefore improving overall efficiency.

4 Background of the Problem

ZEVO India faces challenges in quantifying environmental impact and optimizing operational efficiency amidst rapid expansion. Specifically, there is a need to accurately assess the carbon footprint reduction from EV adoption and to visualize and analyze client-vehicle-location data to identify and mitigate operational inefficiencies."

ZEVO India's rapid growth, from initial operations in April 2023 to a fleet of 2000 vehicles by December 2024, has created both opportunities and challenges. The Cost Savings and the Environmental Impact Quantification have never been translated properly. Investors and clients are increasingly prioritizing companies with demonstrable environmental responsibility. While the shift to EVs has reduced operational costs and carbon emissions, there's a lack of precise data to quantify these benefits. This hinders ZEVO's ability to communicate its environmental achievements and leverage them for fundraising and client acquisition in the long run. The primary cause is the absence of a standardized system for tracking and calculating carbon footprint across the diverse fleet and operational contexts.

Also, the expansion to 28 clients has resulted in a complex client-vehicle-location matrix. The current data structure makes it difficult to visualize and analyze operational efficiency, leading

to potential leaks and redundancies. The lack of a centralized data management system and analytical tools to process and visualize the growing volume of operational data is the core issue. As the company rapidly expanded, the initial data collection and management procedures weren't scaled up to match the growth. This has resulted in data silos and a lack of integrated insights. Client diversity, geographic spread, vehicle type variations, and the absence of a robust data analytics infrastructure are the primary factors contributing to this problem.

In essence, ZEVO's success has outpaced its ability to effectively measure its environmental impact and optimize its operations through data analysis. This creates a critical need for a structured approach to data management and analysis.

5 Problem Solving Approach

5.a. Details about the methods used with Justification:

The analytical methodology incorporates statistical analysis to quantify operational characteristics and relationships. Descriptive statistics, more specifically the mean will summarize key variables like operational days and vehicle health, providing a foundational understanding of the fleet's performance. Regression analysis will then be applied to identify correlations between vehicle usage and operational duration, along with vehicle health and usage patterns. This helps in understanding the underlying drivers of performance and potential areas of influence. Data visualization will be crucial for conveying these insights effectively. Bar charts and scatter plots will visually represent data distributions and identified correlations, making complex patterns more accessible. Geographic maps will illustrate the spatial distribution of clients and vehicles, offering a geographical context to the analysis. Finally, optimization techniques, specifically utilizing Excel's Solver function, will be employed to explore and potentially determine the most efficient allocation of vehicles to clients. The justification for these methods lies in their ability to move from descriptive understanding to identifying relationships, visualizing trends, and ultimately seeking improvements in operational efficiency.

5.b. Details about the intended data collection with Justification:

The primary dataset for this project originates from ZEVO India and is designed to provide a comprehensive view of their fleet operations. It includes all the essential details starting with vehicle registration, product specifications, financing information, vehicle type, client details, hub location, city, state, charging and parking information, billing status, vehicle health, handover date, and operational days. The data spans from September 30, 2023, to February 20, 2025, offering a substantial timeframe for analysis. The justification for collecting this wide array of data points is to enable a multi-faceted analysis, allowing for the examination of operational efficiency, geographical trends, and factors influencing vehicle performance. Furthermore, depending on the depth of the carbon footprint analysis, supplemental data on electricity consumption per vehicle and regional electricity emission factors will be collected from ZEVO records. This additional data is specifically required to quantify the cost savings along with environmental impact of the electric vehicle fleet.

5.c. Details about the analysis tools with Justification:

The primary analysis tool will be Microsoft Excel. The justification for this lies in its robust capabilities for data cleaning, preprocessing, and initial exploratory analysis. Excel's built-in functions and pivot tables allow for efficient data manipulation and summarization. Furthermore, its charting features will be utilized for basic data visualization. For statistical analysis, including descriptive statistics and regression, Python libraries would be used namely Pandas, Numpy, Scipy, providing the necessary functionalities. Excel's Solver add-in will be employed for optimization tasks, such as determining the optimal vehicle-to-client ratio. While more advanced tools like Power BI would be used for visualizing operational efficiency. Excel serves as a versatile and accessible starting point for the core analytical tasks, integrating data management, statistical analysis, and visualization within a single platform.

6 Expected Timeline

6.1 Work Breakdown Structure

- *Data Collection* : Collected the data in March & April. (30 days)
- *Data Cleaning and Preparation* : I have successfully cleaned the data until the end of April.
- *Initial Data Analysis* : Started basic data analysis in the beginning of May.
- *Proposal Preparation* : I prepared the Project proposal at the beginning of May.
The aim is to successfully analyse and provide conclusive recommendations by the end of May.

6.2 Gantt chart

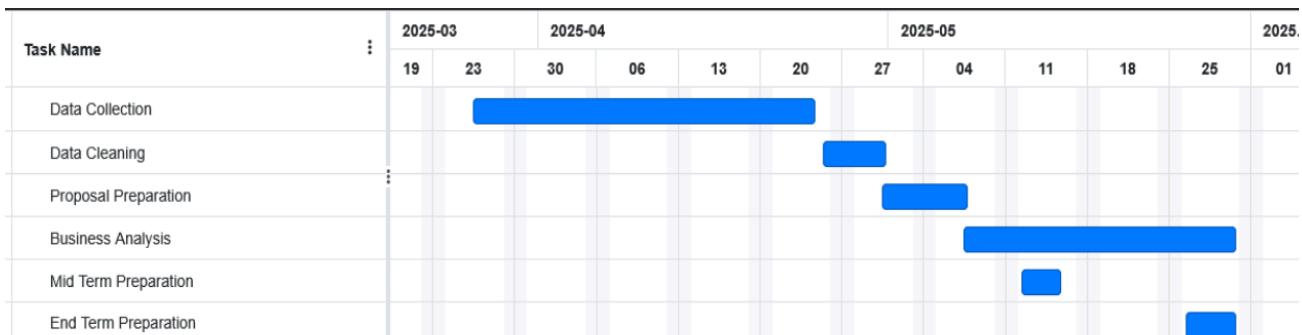


Figure 6.2.1: Timeline for completion of project.

7 Expected Outcome

- 7.1 *Cost Savings & Impact:* To effectively show the actual Environmental Impact created by the company until now from the carbon emissions saved that in turn leading to their overall costs reduced over traditional ICE vehicles, affecting the overall profitability.
- 7.2 *Redundancies & Efficiencies:* The complete business picture from the above said matrices

will help understand and identify redundancies and leaks. This eventually will lead them in taking a few important decisions to cut unnecessary assets and manpower in the company.

- 7.3 *Overall Profitability:* As a geography based detailed study is being conducted, this directly can make them see the locations where they are losing and where they are earning, again helping them make a proper data driven decision.