

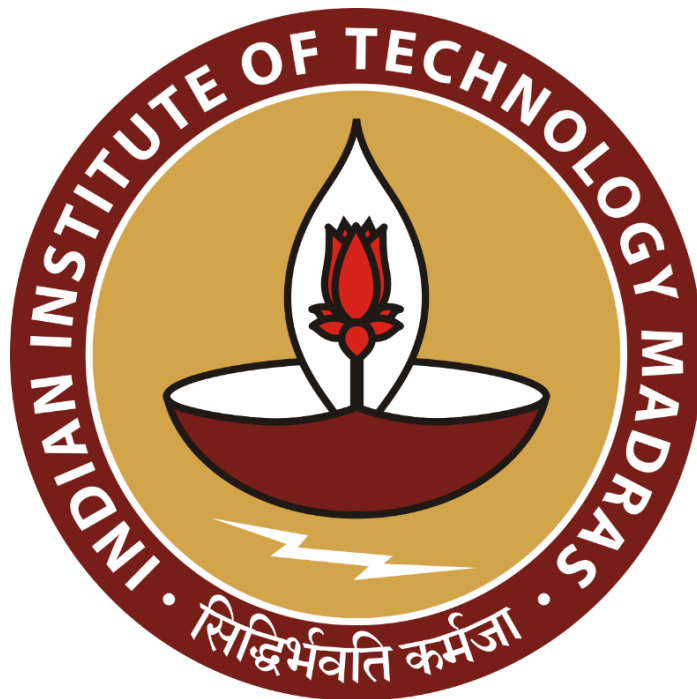
**Carbon Footprint - Environmental Impact &
Business Study of EV Logistics of *ZEVO India*:
A Complete Analytical Study**

A Mid Term report for the BDM capstone Project

Submitted by

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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: 06/06/2025

1 Executive Summary

ZEVO India is a growing B2B startup specializing in Zero Emission Vehicle Operations (EV logistics) across 25 cities in India, with a fleet of nearly 2000 electric vehicles. They partner with major corporations like Amazon, Flipkart, Zomato, and Big Basket, aiming to electrify the logistics supply chain. The company faces challenges in quantifying its environmental impact and optimizing operational efficiency amidst rapid expansion. Specifically, there's a need to accurately measure carbon footprint reduction from EV adoption and to visualize and analyze client-vehicle-location data to identify and mitigate operational inefficiencies.

The primary dataset for this project originates from ZEVO India and provides a comprehensive view of their fleet operations. Key metadata includes 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. Supplemental data on electricity consumption per vehicle and regional electricity emission factors will also be collected from ZEVO records to quantify cost savings and environmental impact.

The analytical methodology incorporates statistical analysis to quantify operational characteristics and relationships. Descriptive statistics, specifically the mean, will summarize key variables like operational days and vehicle health. Regression analysis will be applied to identify correlations between vehicle usage, operational duration, vehicle health, and usage patterns. Data visualization using bar charts, scatter plots, and geographic maps will convey insights effectively. Optimization techniques, specifically using Excel's Solver function, will explore efficient vehicle allocation to clients. As of early May, initial data analysis has commenced, and the project proposal has been prepared. The aim is to successfully analyze and provide conclusive recommendations by the end of June.

2 Proof of Originality

- Business Name: ZEVO (Zero Emission Vehicle Operation)

- Parent Company Name: Reinvent Agrochain Private Limited
- Address: 601, 602, 603, Sixth Floor, DLF South Court Mall, 601, Saket District Centre, New Delhi, Delhi 110017
- Founder's Name: Aditya Singh Ratnu and Dhruv Bhatia

Video of Interaction: 📺 Meeting Recording.mp4

Video of Office Visit: 📺 Office Visit.mp4





Pictures of the Office and with the Founders Team

3 Meta Data

The primary dataset for this project originates from ZEVO India and provides a comprehensive view of their fleet operations. I have personally engaged with ZEVO India's team, and their accounts and intern teams, who manage the company's data, have directly shared the necessary spreadsheets.

The dataset includes essential details such as 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. Additionally, supplemental data on electricity consumption per vehicle and regional electricity emission factors will be collected from ZEVO records to quantify cost savings and environmental impact.

The project's analytical foundation rests on a comprehensive dataset procured directly from ZEVO India. This dataset is meticulously designed to provide a holistic view of the company's fleet operations. It encompasses a wide array of crucial variables, including vehicle registration numbers for individual vehicle tracking, detailed product specifications, and essential financing information that sheds light on ZEVO's asset-lite business model. The data also categorizes vehicles by type (e.g., two-wheelers, three-wheelers, four-wheelers), enabling granular analysis of fleet composition and performance variations. Crucially, it includes extensive client details and geographical information such as hub location, city, and state, which are vital for understanding the spatial distribution of operations and clients. Further operational insights are derived from data on charging and parking information, billing status, and vehicle health, which are integral for assessing efficiency and identifying areas for improvement.

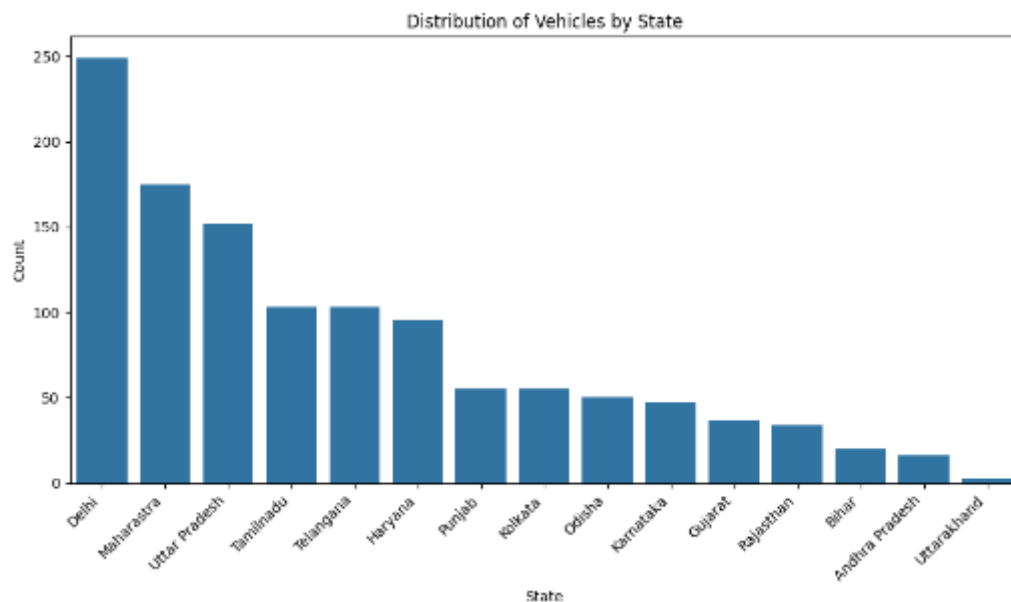
The handover date and operational days are also recorded, providing a historical context and enabling the measurement of fleet performance over time. This extensive primary dataset covers a significant period from September 30, 2023, to February 20, 2025, ensuring a substantial timeframe for robust analysis. Beyond this core operational data, supplemental information will be gathered from ZEVO records, specifically focusing on electricity consumption per vehicle and regional electricity emission factors. This additional data is explicitly required to accurately quantify the cost savings and environmental impact of ZEVO's electric vehicle fleet, directly addressing key objectives of the project.

Link of Data: [Raw Data](#)

4 Descriptive Statistics

The descriptive statistics of these can't be the typical mean, median, mode, etc.. but other important variables have been captured.

Vehicle Type			State wise	
3W	Altigreen	294	Delhi	249
3W	Euler	269	Maharashtra	175
4W	Tata Ace	207	Uttar Pradesh	152
3W	Bajaj	139	Tamilnadu	103
3W	Grevol	111	Telangana	103
3W	Mahindra	61	Haryana	95
3W	OSM	34	Punjab	55
3W	Log9	32	Kolkata	55
3W	Greaves	12	Odisha	50
3W	Piaggio	12	Karnataka	47
3W	OSM Exponent	11	Gujarat	37
4W	Eka	6	Rajasthan	34
4W	Switch	6	Bihar	20
			Andhra Pradesh	16
		1194	Uttarakhand	3



5 Detailed Explanation of Analysis, Process & Method

Financing information is part of the dataset, offering insights into the financial arrangements that underpin ZEVO's asset-lite business model, where various financiers and banks assist in financing the EVs. The data also categorizes the fleet by vehicle type (e.g., 47% two-wheelers, 29% three-wheelers, and 24% four-wheelers), enabling granular analysis of their diverse composition and performance variations across different vehicle categories. A genuine problem that occurred while working on this is the data for the 2 wheelers is not being tracked and is a problem that the team is facing. This will surely add up to the final analysis as 2 wheelers are a significant chunk of their total fleet.

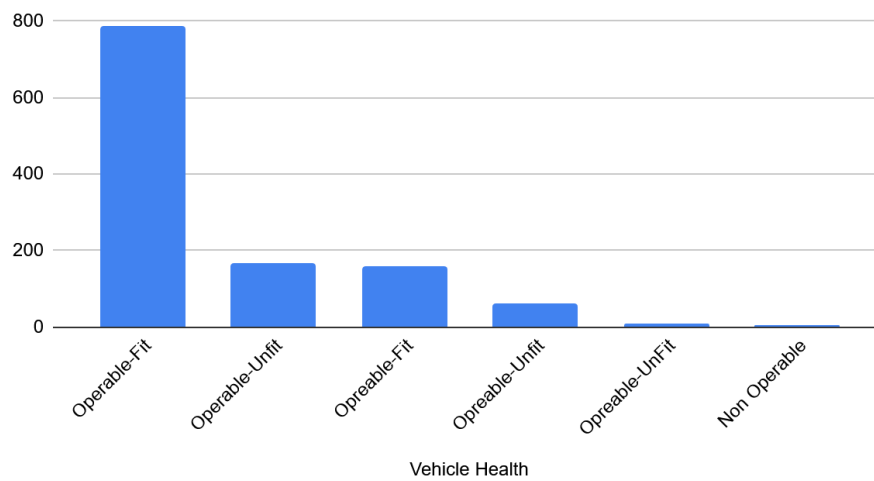
A significant portion of the dataset focuses on operational geography and client engagement, including extensive client details (such as Amazon, Zomato, Swiggy, Flipkart, Big Basket, Zepto, Blinkit) and geographical information like hub location, city, and state. This geographical data is vital for understanding the spatial distribution of ZEVO's operations across its 25 cities in India and for analyzing location-by-client data, which is currently a challenge for the company

Further operational insights are derived from data on charging and parking information, billing status, and vehicle health. These metrics are integral for assessing overall operational efficiency, identifying potential "leaks" or inefficiencies in fleet management, and understanding the financial performance of the operations. The handover date and operational days are also meticulously recorded, providing a historical context for vehicle deployment and enabling the measurement of fleet performance and utilization over time.

This extensive primary dataset covers a substantial timeframe, spanning from September 30, 2023, to February 20, 2025, ensuring a robust period for in-depth analysis. Beyond this core operational data, supplemental information will be diligently gathered from ZEVO records. This includes critical details such as electricity consumption per vehicle and regional electricity emission factors. This additional data is explicitly required to accurately quantify the significant cost savings achieved by replacing traditional Internal Combustion Engine (ICE) vehicles with EVs, and to precisely measure the positive environmental impact, particularly the reduction in carbon footprint, directly addressing the project's core objectives.

		Vehicle Health	
3W	4W	Operable-Fit	788
		Operable-Unfit	168
		Opreable-Fit	160
		Opreable-Unfit	62
		Opreable-UnFit	10
		Non Operable	6
975	219		

Vehicle Health



6 Results & Findings

A big concern while dealing with the data that came up is with respect to the 2 Wheeler data which, because of the data loggers redundancy, they have been unable to track since the beginning. Which means the analysis for the project will be done only for the 3 and 4 Wheelers, though these both contribute to majority of their operations.

I have divided the whole operations into Zones as that will help in further narrowing down the operational challenges region wise. The data for the same has been processed and by this, the bottle necks can be addressed region wise which therefore will help in getting a clarity without affecting the other regions.

Zone	
N	554
S	269
W	246
E	125

With respect to calculating the carbon emissions for the complete fleet including the 2 Wheelers, a rough assumption based on the fleet will be considered for the 2 Wheelers segment which will in turn help in calculating the overall approximate value, at least giving a rough picture of the same.