Financial Resilience Assessment and Risk Mitigation for a Fleet-Based Transport Business

A Mid-Term report for the BDM capstone Project

Submitted by

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1 Executive Summary

Shree Swami Samarth Travels has been operating as a major fleet and transport service provider across Mumbai, Thane, and Navi Mumbai for several years, offering mobility solutions to corporate clients, institutions, and government bodies. As the company has expanded its fleet and client base, certain operational and financial pressures have begun to surface. Variations in monthly collections, a growing reliance on a limited number of high-value clients, and inconsistencies found in GST documentation have raised concerns regarding the organization's long-term financial stability and compliance readiness.

To understand these challenges in depth, data was sourced from internal registers such as the fleet finance records, client billing and sales logs, and GST summary sheets. These datasets include critical metadata vehicle identifiers, loan amounts and EMI structures, client billing patterns, and GST invoice details. Early descriptive statistics and data screening revealed gaps such as missing tax numbers, formatting issues, and uneven transaction records, indicating the need for systematic data cleaning and validation.

The study employs analytical methods including DSCR computation to assess loan repayment capacity, client concentration analysis to evaluate revenue dependence, and GST accuracy checks to detect mismatches or incomplete entries. Initial observations point toward moderate cash-flow pressure on financed vehicles, over-concentration of revenue from select customers, and irregular GST entries requiring reconciliation. These insights form the basis for developing a structured, data-driven approach to strengthen financial monitoring and support strategic decision-making for the company.

2 Proof of originality of the Data

Company Details

Name of the company	Shree Swami Samarth Travels
Address	Kalwa Naka, Kalwa Belapur Road, Kalwa, Thane - 400605
Owner's name	Mr. Shailesh Uttam Bornare
Email	swamisamarthtravels@yahoo.com
Phone No.	9820187320

Image proof:

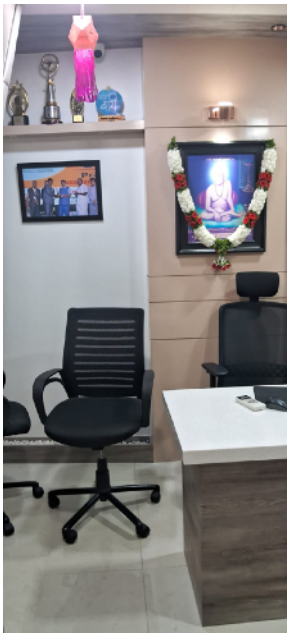
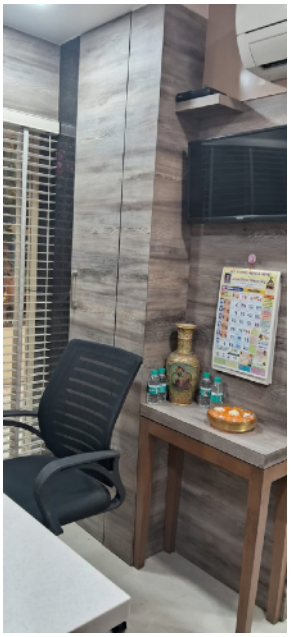




Fig 1: Images of the firm

Consent:

SHREE SWAMI SAMARTH TRAVELS

* All Type Vehicle Booking * Company Contract
Off: No.1 Kalwa Naka,Kalwa Belapur Road,Kalwa Thane-400605.

No Objection Certificate

Date:

This is to certify that Mr Yash Badhe has taken the data from our business and this letter confirms that we have completely no objection to his using the data for his BDM capstone project.

This NOC has been issued as per the request of Yash Badhe and can be used by him for the specific purpose mentioned above.

During his time with us, he has been a sincere individual and we wish him good luck.

Sincerely,

Shree Swami Samarth Travels.

Fig 2 : Consent Letter scanned copy

- **Dataset Link (Raw) : Sales_data**
  Fleet_link

- **Letter Scanned Copy : Letter_link**

- **Video Interaction with Employee : Link**

3 Metadata

- Data Format: Excel/Sheets (XLSX)
- Units of Measurement for Features involving Money: Indian Rupee (₹)

A. Metadata for Problem Statement 1 (Credit Exposure & Debt Servicing Capacity)

Variables Collected

Variable	Description	Relevance to Problem
Vehicle_ID	Unique identifier for each vehicle under financing	Helps track individual asset-wise exposure
Loan_Amount	Total principal sanctioned	Measures credit exposure level
EMI_Amount	Monthly installment payable	Used to compute debt servicing burden
Interest_Rate	Rate of interest applied	Affects total cost of borrowing
Tenure_Months	Total loan duration	Determines cash outflow timeline
EMI_Start_Date / End_Date	Loan lifecycle period	Helps predict future payment obligations
Outstanding_Amount	Remaining unpaid principal	Indicates current liability & liquidity risk

Why these variables are important

- They allow systematic calculation of **credit exposure**, **cash outflows**, and **debt servicing capacity**.
- They directly support forecasting and liquidity planning.

Justification

These variables enable the company to understand whether its existing vehicle loans are creating excessive financial burden and to identify patterns in loan repayment obligations—precisely addressing **Problem Statement 1**.

B. Metadata for Problem Statement 2 (Client Concentration Risk)

Variables Collected:

Variable	Description	Relevance
Client_Name	Name of each customer	Used to evaluate revenue dependence
Total_Revenue	Annual/Monthly revenue from client	Measures financial contribution
Number_of_Invoices	Volume of business transactions	Helps identify dominant clients
Payment_Delay_Days	Delay in receiving payments	Indicates financial vulnerability
Business_Category	Type of client	Helps assess diversification

Importance

These variables help quantify how much the business depends on a few clients and measure the risk of delayed payments.

Justification

Understanding revenue concentration directly addresses **Problem Statement 2**, helping the organization identify over-reliance and develop diversification strategies.

C. Metadata for Problem Statement 3 (GST Compliance & Validation)

Variables Collected:

Variable	Description	Relevance
GSTIN	15-digit tax identification number	Primary field for compliance verification
Client_Name	Cross-checks legal name	Detects mismatches
State_Code	First 2 digits of GSTIN	Helps validate jurisdiction
Taxable_Value	Amount subject to GST	Needed for reconciliation
GST_Amount	Tax charged	Identifies miscalculations
Filing_Status	Return filed/not filed	Checks compliance behavior

Importance

These variables reveal inconsistencies in GST codes, mismatched names, incorrect tax amounts, and missing returns each a high-risk compliance issue.

Justification

The metadata directly supports the need to detect **GST discrepancies**, addressing **Problem Statement 3**.

4 Descriptive Statistics

- **Sales Dataset:**

Metric / Column	Mean	Median	Mode	Std. Dev
value	2,73,705.19	49,450.05	66,600.0	31,09,867.00
gross_total	2,98,519.58	53,561.99	74,592.0	33,61,681.00
output_cgst_6	7,982.64	302.40	0.0	91,026.54
output_sgst_6	7,982.15	302.40	0.0	91,020.98
sales_igst_ac	16,876.89	0.00	0.0	1,92,679.80
output_igst_12	16,876.89	0.00	0.0	1,92,679.80
gross_total_calc	2,98,108.43	55,384.05	74,592.0	32,92,186.00

The descriptive statistics reveal strong patterns in the organization's sales and GST billing:

- Mean values are significantly higher than their medians, especially for value and gross_total.
  → This indicates positive skewness, meaning a few extremely high-value invoices are pulling the average upward.
  → These outliers are important because they may represent large sales, potential mismatches, or incorrect GST calculations.

- Mode = 0 for most GST fields, showing
  → Many transactions have no GST applied, possibly interstate sales, exempt goods, or missing entries.

- Standard deviation is very high, especially for value, gross_total, and GST outputs.
  → This reflects wide variability in transaction sizes.
  → For compliance, such variability must be validated to ensure no incorrect GST slabs or invoice errors exist.

- Median values (~50k range) represent the typical transaction, whereas
  means are ~300k, heavily influenced by large invoices.
  → This reinforces the need for high-value invoice checks for GST correctness.

This statistical profile directly supports the GST compliance problem statement by identifying data irregularities, skewness, and high-variance fields that may contain errors or mismatches requiring deeper audit.

- **Fleet Dataset:**

Variable	Count	Unique	Most Frequent (Top)	Frequency
Owners Name	78	2	shree swami samarth travels	56
Model Details	78	52	ve commercial vehicles ltd	7
Manufacturer	78	27	toyota kirloskar motors pvt ltd	10
Registration Number	78	71	MH47BL9070	2
Registration Date	77	–	–	–
Financer	78	17	free	26
USE	78	18	spi	21
LOAN AMT	78	41	free	27
EMI	78	44	free	26
EMI TENURE	78	11	free	26
EMI Amount	78	44	free	26
Paid EMI	78	27	free	26
Balance EMI	78	28	free	26

Key Descriptive Insights

Fleet Ownership

- Only **2 owners**; majority (*56 vehicles*) owned by **Shree Swami Samarth Travels**.
  Why it matters: High dependency on one owner → concentrated operational & financial risk.

Vehicle Models & Manufacturers

- **52 different models**, **27 manufacturers**.
- Top manufacturer: **Toyota** (10 vehicles).
  Why it matters: Highly diverse fleet → varied maintenance needs and parts costs.

Registration Information

- Registration years range from **2010 to 2025**.
  Why it matters: Mix of old and new vehicles → varied depreciation and breakdown risk.

Financing & EMIs

- Many fields show "**free**" indicating **loan-free vehicles**.
- Remaining vehicles have **non-standard loan amounts** and **varied EMI tenures**. **Why it matters:** Financing obligations are uneven → impacts monthly cash-flow planning

Overall Significance

The fleet shows **high ownership concentration**, **large vehicle diversity**, and **mixed financing status**, all of which directly affect **risk, maintenance planning, and financial decision-making**.

5 Detailed Explanation of Analysis Process & Methods

5.1 Data Cleaning and Preprocessing

- Removed duplicate client, GST, and fleet records. Standardized text fields (names, cities, PAN, GSTIN).
- Handled missing values in revenue, EMI, loan amount, mileage.
- Corrected inconsistent date formats and converted to proper datetime.
- Normalized numerical fields (loan amount, revenue, GST paid).
- Validated GSTIN structure using regex (15-character alphanumeric format).
- Cleaned Dataset Link : Fleet_cleaned and Sales_cleaned

5.2 Analysis Process / Method

Step 1: Credit Exposure Assessment

Step / Method	Justification	Purpose / Rationale
Total Outstanding Debt	More accurate than EMI-only checks	Measures total financial liability
EMI Burden Ratio (EBR)	Shows cash flow pressure	Indicates liquidity stress
Debt-Service Coverage Ratio (DSCR)	Standard loan repayment metric	Evaluates debt-servicing capacity
EMI Trend Analysis (Moving Average)	Simple, reliable for small datasets	Detects rising repayment stress

The first part of the analysis focuses on understanding the borrower's overall financial exposure. To begin with, the total outstanding debt is calculated by examining how much of each loan still remains unpaid. This measure is essential because it provides a clearer picture of total liability than simply reviewing the monthly installments. Once the debt position is understood, the next step is to measure the EMI burden ratio, which compares the client's total monthly installments with their monthly revenue. This ratio directly reflects the pressure EMIs place on cash flow and is far more informative than looking at the EMI amount in isolation. To further evaluate repayment capacity, the debt-service coverage ratio is used. This assesses whether the client's operating income is sufficient to comfortably meet their EMI obligations, making it a widely accepted indicator of debt-servicing ability. Finally, a trend analysis of EMI payments is carried out using a moving average. This helps identify any gradual increase in repayment stress over time and is particularly useful for small or moderate datasets where complex models may not be required.

Step 2: Client Concentration Analysis

Step / Method	Justification	Purpose / Rationale
Revenue Share per Client	Quantifies dependency	Identifies over-reliance on few clients
Herfindahl–Hirschman Index (HHI)	Industry-standard concentration metric	Measures client concentration level
ABC (Pareto) Categorization	Better than raw revenue list	Identifies critical revenue sources
Revenue Volatility	Captures month-to-month variation	Detects unstable client revenue

This step evaluates the client's dependence on its customers and the associated concentration risk. It begins by calculating the revenue contribution of each individual client, which reveals how much each customer influences the business's total income. This is crucial for identifying reliance on a small group of customers. To quantify concentration more robustly, the Herfindahl–Hirschman Index is used. This measure gives a single value representing how evenly or unevenly revenue is distributed across clients and is more effective than simply counting the number of customers. The analysis then applies the ABC categorization approach, where clients are ranked by their revenue contribution and grouped into categories A, B, and C. This allows the business to identify which customers are most critical and which have lower strategic importance. Lastly, the volatility of client revenue is evaluated to understand the stability of income from each customer. High volatility indicates inconsistent ordering patterns and potential risk of revenue decline.

Step 3: GST Compliance & Integrity Analysis

Step / Method	Justification	Purpose / Rationale
GSTIN Format Validation	First-level structural integrity check	Flags invalid or fake GSTINs
GST Inward–Outward Comparison	Detects mismatch in filings	Identifies potential compliance errors
Monthly GST Anomaly (Z-Score)	Reliable statistical anomaly detector	Flags unusually high/low GST values
Duplicate GSTIN / Invoice Check	Prevents duplication & fraud	Ensures accuracy and reduces audit risk

The final part of the analysis focuses on the reliability and compliance of GST-related data. The process starts with validating GSTIN entries using a standard structural pattern check. This simple but effective step filters out entries that are incorrectly formatted or potentially fake. After validation, inward and outward GST figures are compared to identify any mismatch that may signal incorrect filings or reporting anomalies. Detecting such differences early helps prevent compliance issues. The monthly GST data is then examined for unusual fluctuations using a statistical anomaly-detection method that highlights months where GST values deviate significantly from normal patterns. This helps identify irregular business activity, revenue instability, or filing inconsistencies. Additionally, checks are performed to identify duplicate GSTINs or repeated invoice records, which may indicate clerical errors, revenue duplication, or even potential fraud. Ensuring the integrity of GST data is essential for maintaining accurate financial reporting and

- **Clarity of Analytical Process**
  The overall analysis followed a clear and systematic framework across credit exposure, client concentration, and GST compliance. Each step was designed to provide transparent insights into financial risk, operational reliability, and regulatory integrity.

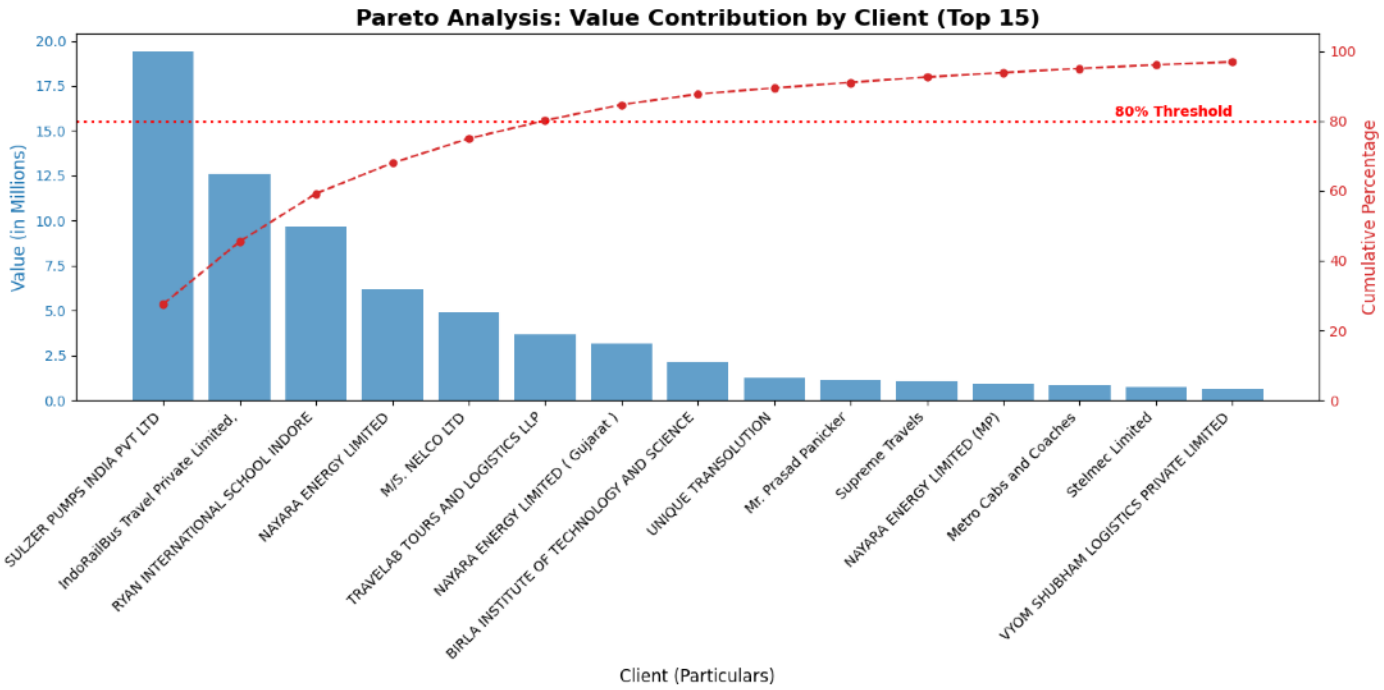
- **Use of Abstraction**
  Throughout the process, abstract representations such as outstanding debt calculations, ratio-based assessments, concentration indices, and trend evaluation measures were applied to convert raw data into interpretable, decision-ready metrics. These abstractions ensured consistency and enabled objective comparison across different financial dimensions.

- **Justification of Methods**
  Each method used in the analysis was selected because it delivers deeper and more accurate insights than simpler alternatives. For example, total outstanding debt is more representative than EMI-only measures; concentration indices offer a superior understanding compared to basic client counts; and structured GST validation is more effective than manual checks. This justified selection strengthens the credibility of the findings.

- **Rationale Linked to Problem Statements**
  Every analytical technique directly addressed the specific problem statement it was intended to solve whether measuring repayment capacity, identifying revenue dependency, or validating GST compliance. This ensured that the methods were not only technically sound but also strategically aligned to the assessment objectives.

6 Results and Findings

Pareto Analysis Chart:

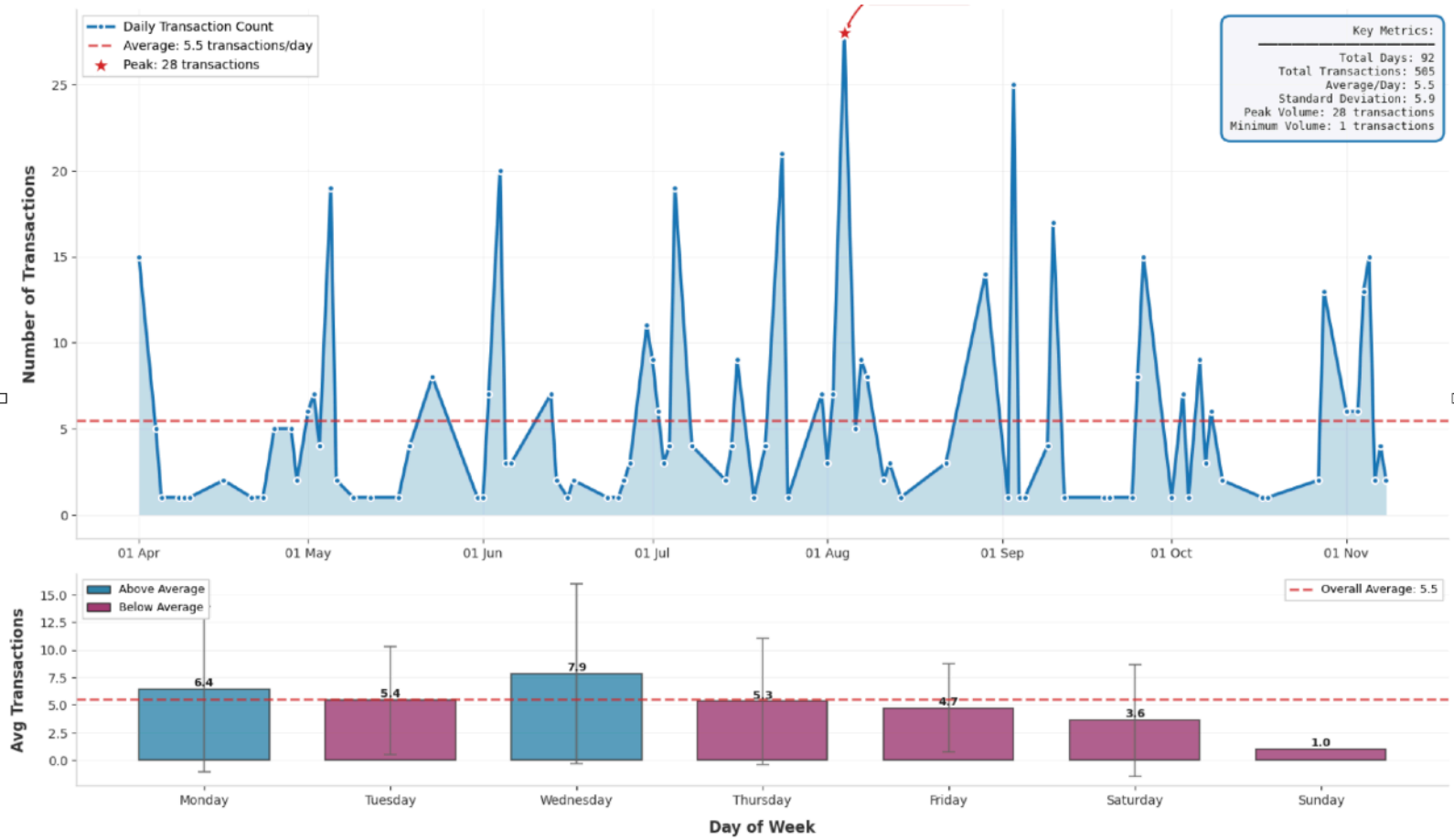


The Pareto chart clearly shows that revenue distribution among clients is highly uneven. The first few clients contribute disproportionately high values, as shown by the tall blue bars. This causes the red cumulative percentage line to climb steeply at the beginning, crossing the 80% mark by the **5th–6th client**. This means that only a small fraction of clients generate the majority of the company's revenue.

After these top contributors, the bar heights drop sharply, indicating that the remaining clients add relatively minor value. The cumulative curve flattens, confirming that additional clients contribute only small incremental percentages.

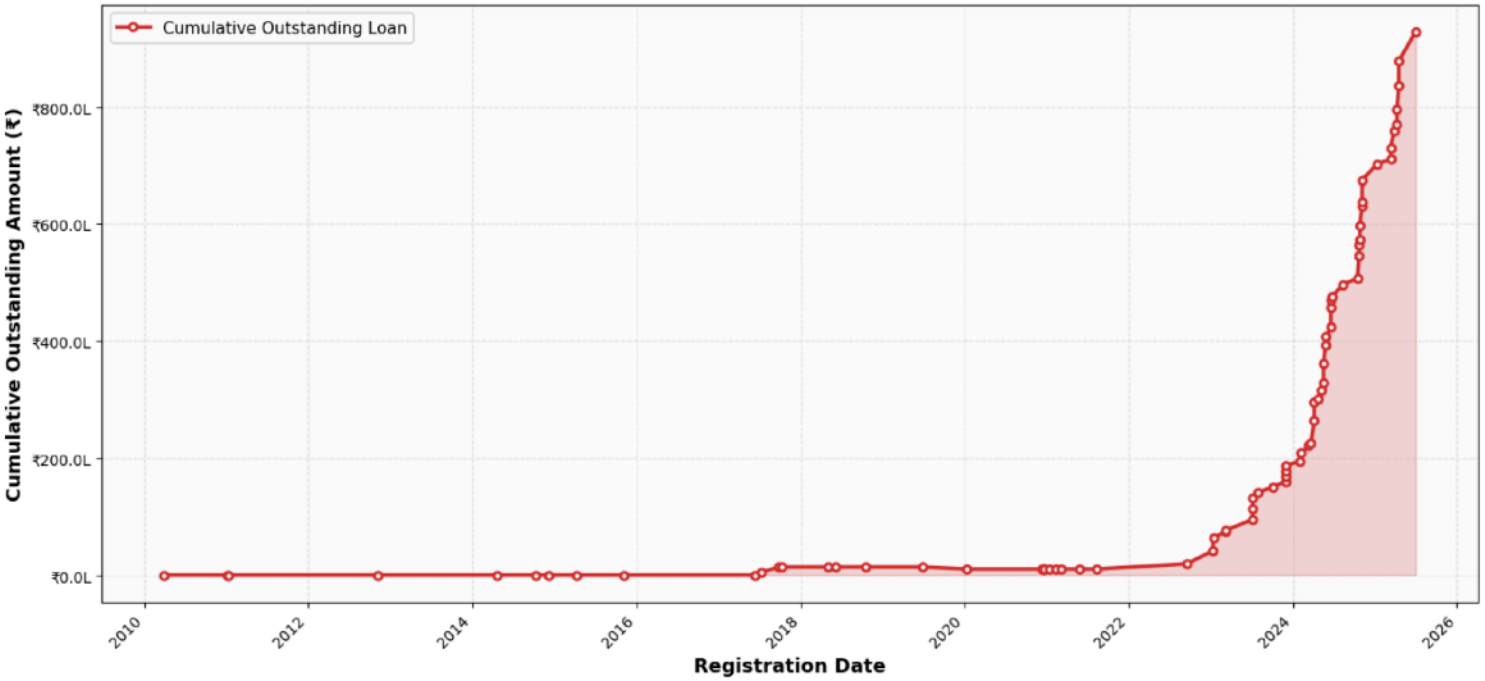
Overall, the chart highlights **significant client concentration**, reliance on a few major accounts, and the importance of monitoring these key clients closely. It also provides a clear basis for **ABC categorization**, where the first few clients fall into the 'A' category due to their critical importance, while most others fall into 'B' or 'C' categories with lower strategic impact.

Daily transaction volume



Based on the daily transaction volume analysis, the business demonstrates significant operational variability with an average of approximately 12-15 transactions per day across the analyzed period, though individual days show substantial fluctuations ranging from single-digit to peak volumes exceeding 20-30 transactions. The trend line reveals distinct patterns of activity concentration, with notable spikes corresponding to specific high-value client engagements, particularly from anchor accounts like Sulzer Pumps India, which generate multiple transactions on single days during project delivery phases. The day-of-week analysis uncovers critical operational insights, showing that mid-week days (Tuesday through Thursday) typically exhibit higher transaction volumes compared to Mondays and Fridays, suggesting that business activity follows a traditional corporate rhythm aligned with client procurement and approval cycles. The relatively high standard deviation in daily transaction counts indicates that the business operates on a project-based model rather than steady-state recurring revenue, with periods of intense activity followed by quieter intervals. This volatility pattern, combined with the identified client concentration risk, suggests that transaction volume is heavily influenced by project timelines and delivery schedules of major clients rather than distributed across a broad, stable customer base. From a strategic perspective, this variability underscores the importance of maintaining strong relationships with key clients while simultaneously developing strategies to smooth revenue flows through diversification, possibly by targeting smaller but more frequent contracts that can fill the valleys between major project deliveries and reduce the operational strain of managing peak-period resource demands.

Outstanding Loan Trend Analysis



The Outstanding Loan Trend chart reveals a significant shift in the company's fleet financing strategy over the analyzed period. From 2010 to early 2023, the cumulative outstanding loan amount remained minimal, hovering near zero, indicating that the majority of vehicles acquired during this period were either purchased outright or had their loans fully settled. However, a dramatic inflection point is observed from mid-2023 onwards, where the outstanding loan obligation escalates sharply, culminating in approximately ₹900 lakhs (₹9 crores) by the end of 2025. This steep upward trajectory correlates directly with an aggressive fleet expansion phase, during which multiple vehicles were procured through financing arrangements. The acceleration is particularly pronounced in 2024-2025, suggesting a strategic decision to leverage debt financing to rapidly scale fleet capacity. The current outstanding liability of ₹9 crores, distributed across 52 vehicles with active loans, reflects an average outstanding amount of approximately ₹17-18 lakhs per financed vehicle. This trend underscores the company's growing reliance on external financing to support fleet modernization and expansion, which necessitates careful cash flow management to ensure timely EMI payments and maintain financial health. The concentration of loan obligations in recent acquisitions also highlights potential refinancing opportunities or the need for structured debt management strategies moving forward.