

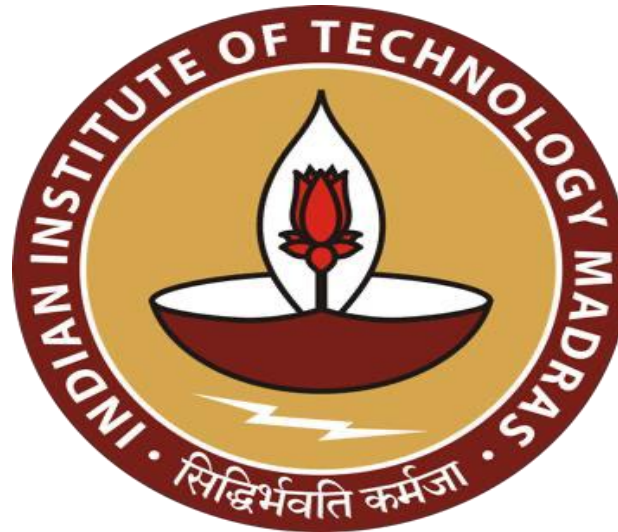
Case Study for VP Fire System Private Limited

Presentation for the BDM Capstone Project

Submitted By

Name: Pragya Tripathi

Roll No: 23f1001699



IITM Online BS Degree Program,
Indian Institute of Technology, Madras,
Chennai Tamil Nadu, India, 600036

BUSINESS OVERVIEW

- **Business Name:** VP Fire System Private Limited
- Established in 2018; headquartered in Dwarka, New Delhi
- B2B leader in fire safety and security systems
- **Portfolio:** Products & services across detection, installation, maintenance, and infrastructure
- **Challenge:** Struggles with demand forecasting, customer base understanding, and low market visibility
- **Competitive Pressure:** Faces giants like Siemens & Honeywell + crowd of local rivals
- **Data analyzed:** 3 months of detailed sales and purchase records (Oct–Dec 2024)
- **Key insight:** Internal inefficiencies—not product quality—drive missed opportunities and stagnant growth

PROBLEM STATEMENTS

1. **Forecasting Seasonal Demand** : Struggles to forecast seasonal demand fluctuations, especially during festive periods like November, when manpower and inventory shortages lead to potential lost sales opportunities.
2. **Limited Customer Insight**: : Lacking comprehensive customer base understanding, the company's ineffective targeting and marketing strategies hinder tailored offerings and communications to specific customer groups, potentially missing sales and loyalty opportunities across market segments.
3. **Low Market Visibility**: New in the competitive space; lacks strong presence in key sectors like hospitality and healthcare

DATA COLLECTION & METHODOLOGY

- **Data Duration:** October 2024 – December 2024 (3 months)
- **Source:** Primary data collected from internal Excel-based accounting system
- **Files Received:** Sales (249 entries) & Purchase Data (90 entries)
- **Key Fields:** Date, Particulars, Type (sales only), Buyer/Supplier Name, Quantity, Unit, Rate, Value

Data Cleaning & Preprocessing:

- Standardized date formats & buyer names
- Introduced TYPE and UNIT columns for clearer categorization
- Filled missing transaction days with zero sales
- Aggregated daily sales for time series modeling

DATA COLLECTION & METHODOLOGY

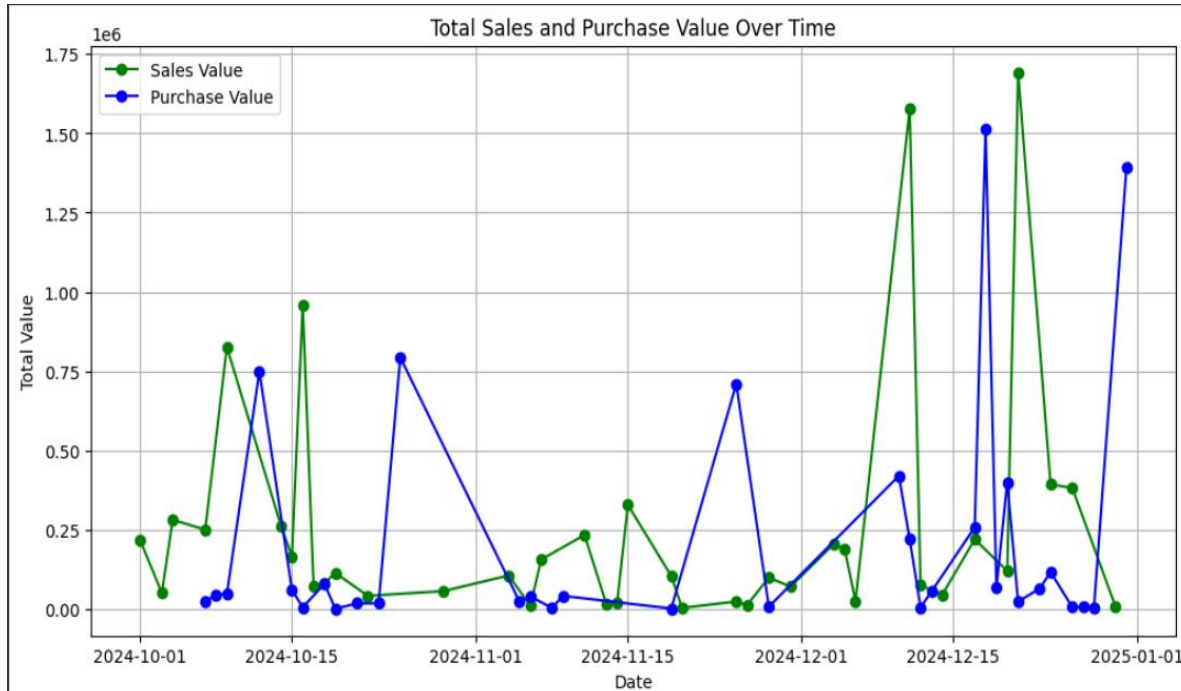
Customer Segmentation Strategy:

- RFM (Recency, Frequency, Monetary) analysis
- K-Means clustering preferred for dynamic, data-driven segmentation
- Enables identification of high-value and loyal customer groups

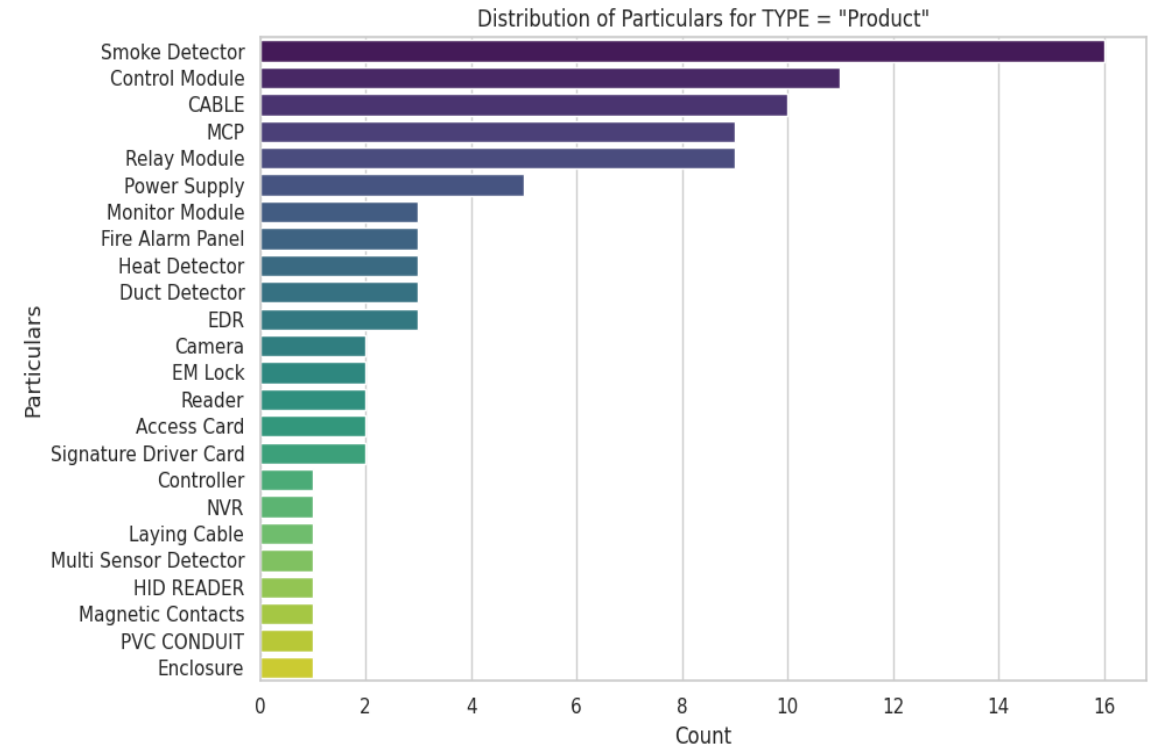
Forecasting Model Used: ARIMA/SARIMA

- Chosen for its ability to model both trend and seasonality
- Suitable for volatile and irregular sales data

RESULTS & FINDING

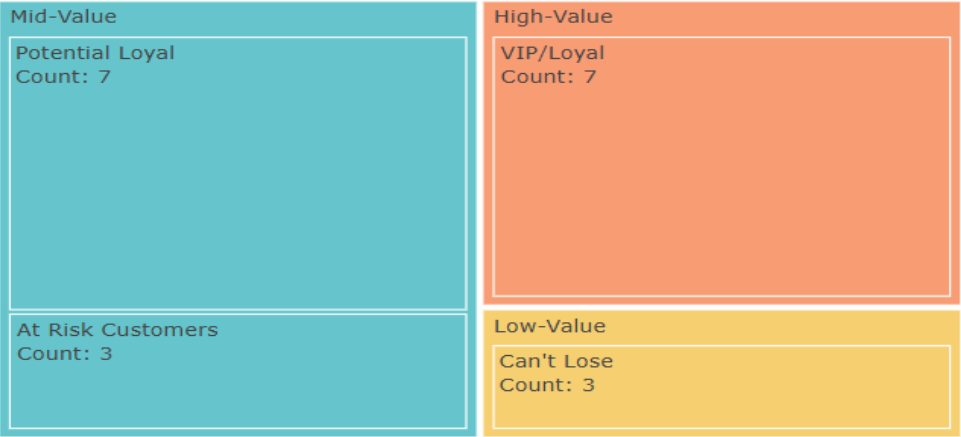


- **Volatile Sales & Purchase Patterns:** Sharp peaks in mid-Dec; flat activity in Nov
- **High Sales Spikes = Year-End Demand:** Likely driven by project closures, contracts, and festive season
- **Purchase Spikes Precede Sales:** Indicates **proactive stocking**, especially in Oct & early Dec



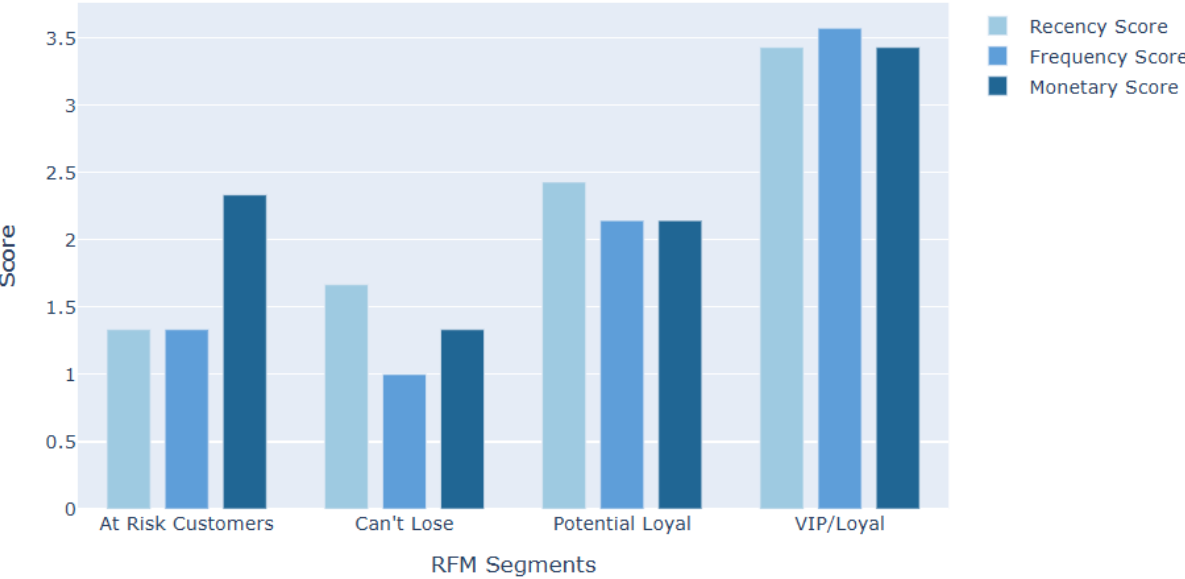
- **Product Sales Dominate:** Products form the **largest share** of revenue; services underperform
- **Top Products Drive Visibility:** *Smoke Detector, Control Module, CABLE, MCP, Relay Module* lead sales
- **Service Offerings Lack Traction:** Low share for Installation, Labor & Misc. Services

RFM Customer Segments by Value

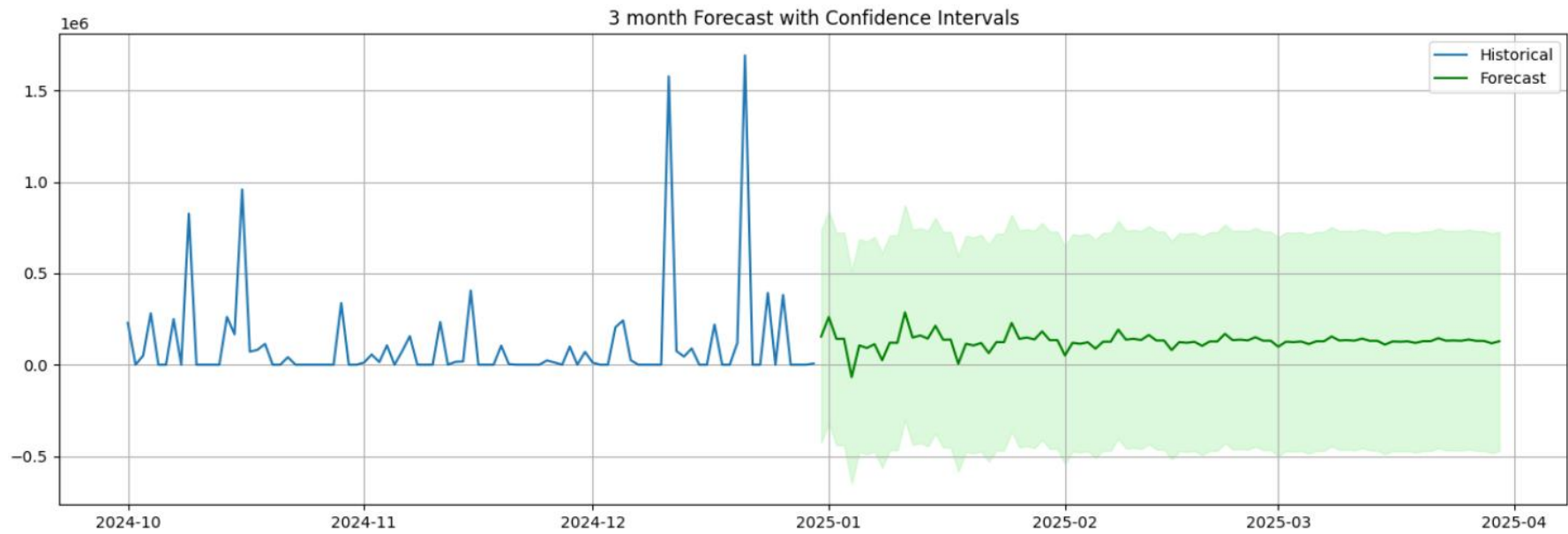


Cluster	Cluster Label	Recency	Frequency	Monetary	Count
0	Loyal Customers	25.166667	9.166667	356110.0	12
1	Top VIP Customer	1.000000	110.000000	4474156.6	1
2	At Risk / Churned Customers	79.857143	2.285714	105275.0	7

Comparison of RFM Segments based on Recency, Frequency, and Monetary Scores

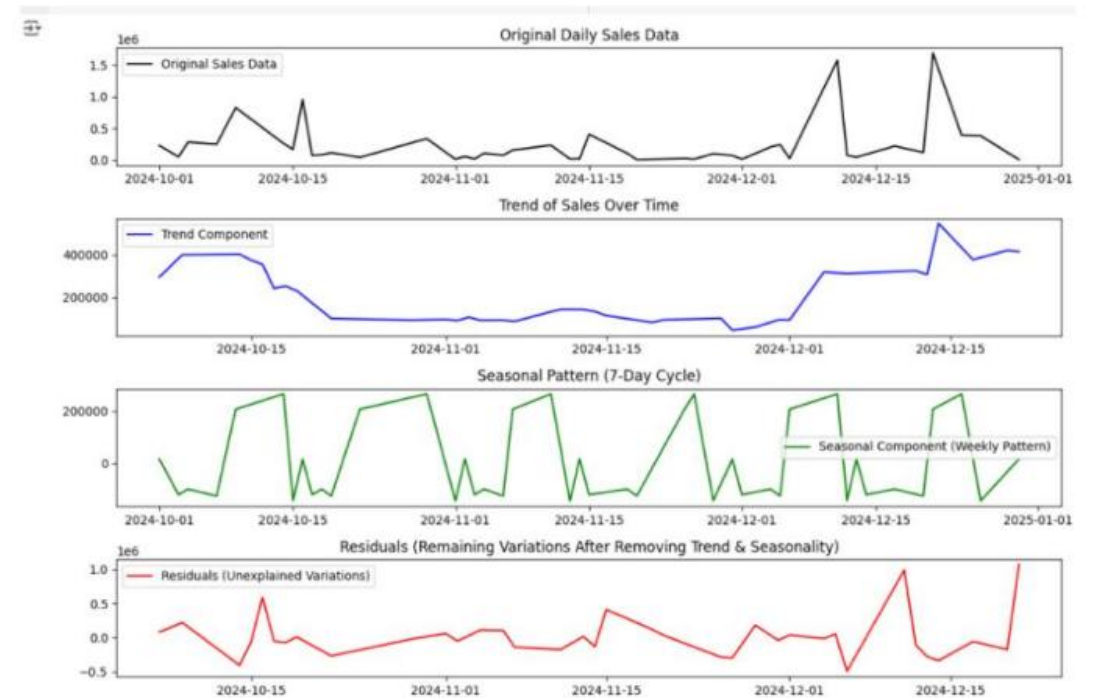


- **35% VIP Clients:** High RFM scores; recent, frequent, high-spending
- **50% Mid-Value:** Potential Loyalists with stable engagement
- **15% Low-Value:** At Risk / Can't Lose clients showing disengagement
- **Top Client:** *Honeywell* (RFM = 12) — major revenue contributor
- **K-Means Clusters (k=3)** confirm RFM segments



3 Month Forecast Graph using SARIMA(1,1,2)(1,0,1)[7]

- **Strong Weekly Seasonality Detected:** Confirmed via Seasonal-Trend Decomposition (STL) and ACF plots (Lag 7)
- **Series is Stationary:** ADF Test (stat = -9.95, p = 0.0000)
- **Best Model Selected:** SARIMA(1,1,2)(1,0,1)[7]
- Lowest AIC: **520.94**, MAE: **₹1.13L**, WAPE: **101.82%**
- **Model Captures Trend + Seasonality Well:**
- **Limitation:** Cannot fully predict irregular holiday/event-driven surges



Time Series Decomposition of Daily Sales Data

INTERPRETATION & RECOMMENDATION

1. Customer Segmentation Insights

Interpretation:

RFM and K-Means clustering identified clear customer segments: 50% Mid-Value, 7 VIPs, and 3 Low-Value clients. While the company has a loyal core, engagement with dormant and at-risk clients is limited, reducing cross-sell and upsell opportunities.

Recommendations:

- Develop personalized outreach for VIP, Loyal, and At-Risk segments using CRM tools (Loyalty Rewards, Subscription Plans, Exclusive offers, limited-time discount etc.)
- Launch win-back programs for dormant clients within 30 days and evaluate results after 2 months
- Integrate cluster labels into CRM and refresh segments quarterly

2. Forecasting Seasonal Demand

Interpretation:

Time series analysis revealed weekly seasonality in sales.

SARIMA(1,1,2)(1,0,1)[7] offered the best performance, enabling reliable short-term forecasting, though irregular demand spikes remain harder to predict.

Recommendations:

- Deploy SARIMA for rolling 3-month forecasts and update monthly
- Align inventory based on weekly demand forecasts, especially pre-festive seasons
- Use forecasted peaks to schedule additional manpower in advance

INTERPRETATION & RECOMMENDATION

3. Market Visibility and Product Focus

Interpretation:

Sales are concentrated around a few best-selling items like Smoke Detectors, while many products and services are underperforming. There's also limited presence in sectors like hospitals and hotels, suggesting missed revenue potential.

Recommendations:

- Broaden marketing focus beyond top sellers to include overlooked services (Installation, Labor, etc.)
- Promote underrepresented product categories with focused campaigns
- Launch product-specific promotions to improve recognition and sales diversity
- Expand digital marketing (SEO, paid ads, email campaigns, social media) targeting decision-makers in untapped sectors

Expected Business Impact

- Increased customer retention and satisfaction through targeted engagement
- Improved inventory and workforce planning based on forecasted demand
- Enhanced brand reach and category-wise revenue through broader, strategic marketing