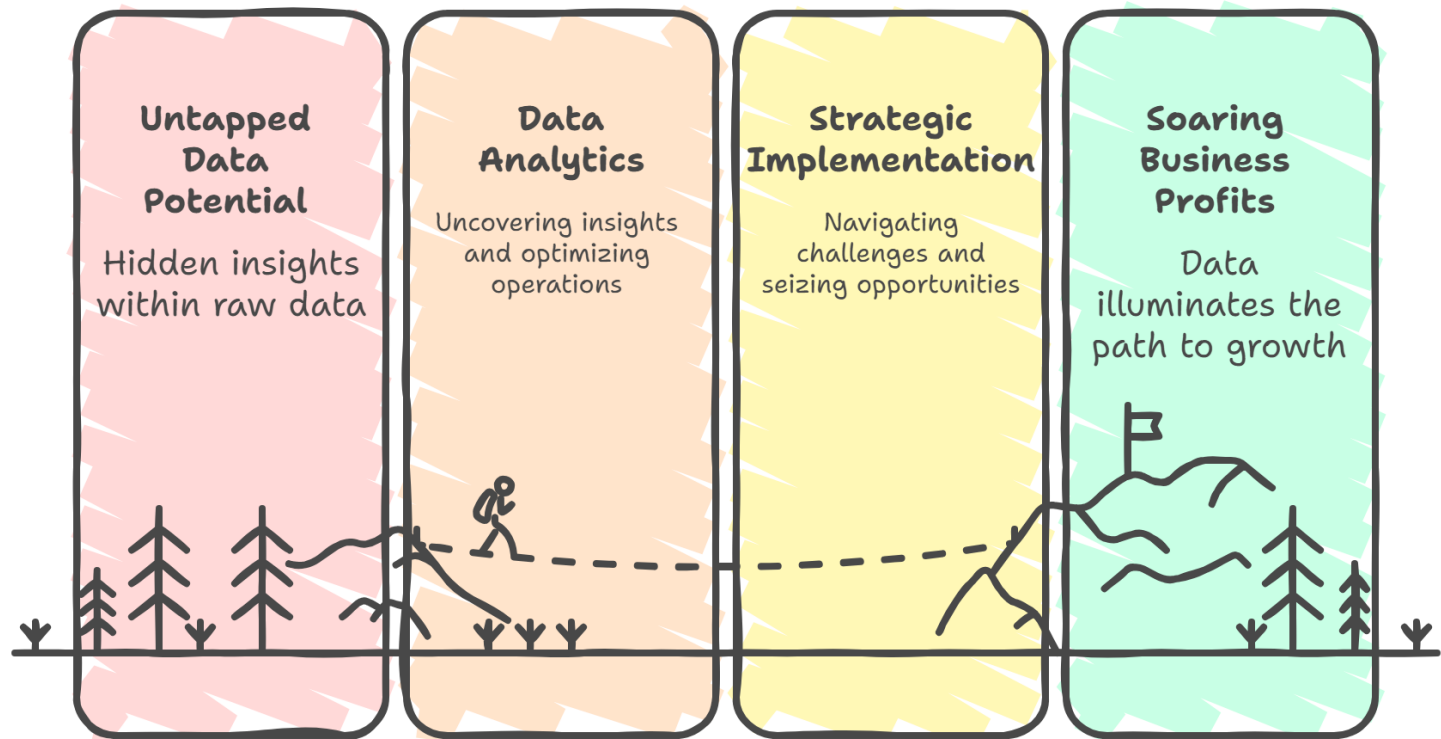


A Tale of Soaring Profits: How Data Lights the Path

Data-Driven Profit Growth



Presented by Gajarajan V Y

Executive Summary

Objective: Generate actionable insights to enhance profitability, customer retention, and operational efficiency.

Analytical Approach

- **Data Cleaning:** Multiple Imputation by Chained Equations (MICE) using LightGBM
- **Sentiment Scoring:** Natural Language Processing on customer feedback
- **Hypothesis Testing:** Kruskal–Wallis, Mann–Whitney U, Chi-Square for independence
- **Statistical Modeling:** Linear regression; association strength via Cramér's V
- **Multivariate Analysis:** Principal Component Analysis (PCA); Multiple Correspondence Analysis (MCA)

Scope of Analysis

1. Examined ~1,200 bivariate and multivariate variable combinations
2. Bivariate Findings:
 - 25 significant numerical–numerical relationships
 - 40 significant numerical–categorical relationships
 - 14 significant categorical–categorical relationships
 - 4 significant time–metric relationships
3. Multivariate Findings: 54 statistically significant patterns

Airline Data Analysis Process

Load Data

Import dataset into the environment using Python and pandas.

Clean Data

Remove exact duplicate rows, handle missing values using MICE and LightGBM for imputation, and convert data types.

Feature Engineering

Create metrics like Combined_Sentiment and Revenue_Loss_per_Decline.

Statistical Analysis

Summarize central tendency, spread, and distributions; detect anomalies in numerical, categorical, and date columns.

Explore Data

Understand columns, data types, non-null counts, and thematic groupings for initial insights.

Validate Data

Verify critical fields like flight capacity and exchange rates for plausibility, addressing outliers.

Sentiment Analysis

Use NLP to derive sentiment scores from text fields like remarks and comments.






Deeper Analysis

Analyze individual columns, explore relationships, quantify business impacts, and apply PCA and MCA for complex pattern detection.



Key Outcomes

- Identified the top five insights with the strongest statistical support, practical relevance, and clear interpretability

Lever	Impact
 Customer Retention Risk	+255% profit per 1% risk increase, -223% costs
 High-Tier Customers	40% higher revenue, 12% cost savings
 Customer Sentiment	+39.56% conversion gains, boosted revenue
 Influential Merchants/Regions	32.82% higher route dynamics
 Flight Operations/Pricing	29.52% complexity cut, 22.12% pricing agility, 12.01% booking lift

Strategic Initiatives

1. Retention Pilot

Target high-risk, high-value customers.

2. Upsell & Expand

Focus on premium tiers and flagship routes.

3. Streamline Ops

Implement dynamic pricing and simplify schedules.

9-Month Rollout Plan



Turning Data into Altitude (The Story Time)

- Imagine charting a course through turbulence—our insights are the stars guiding us from risk to reward, unlocking new layers of profitability and efficiency.

Chapter 1: The Retention Risk Frontier

What

- High retention-risk segments correlate with significantly higher profits and lower costs, creating a high-risk, high-reward opportunity

Proof

- A 1% increase in retention risk → ~255% higher profitability; ~223% lower costs

Impact (So What)

- Targeting high-risk segments can drive massive profit gains and cost reductions
- If left unmanaged, these segments risk long-term churn and loss of market share

Next Steps (Now What)

- Pilot targeted loyalty and retention programs for high-risk, high-return customers
- Measure ROI and churn metrics, then scale the most effective initiatives

Chapter 2: The Golden Tier

What

- High-tier customers deliver substantially more revenue and incur lower costs compared to Medium-tier
- Low-tier customers generate less revenue while adding higher costs

Proof

- Versus Medium-tier:
 - High-tier → ~40% higher fares, revenue, prices, and taxes; ~12% lower costs
 - Low-tier → ~48% lower fares and revenue; ~20% higher costs

Impact (So What)

- Prioritizing High-tier can boost revenue by ~40% and reduce costs by ~12%
- Continuing to serve Low-tier segments at current levels risks eroding overall margins

Next Steps (Now What)

- Launch A/B pilots for upselling, premium services, and tailored loyalty programs targeting High-tier customers
- Review Low-tier offerings to optimize cost structures or reallocate resources toward higher-value segments

Chapter 3: The High-Value Odyssey

What

- Focusing on influential merchants and regions amplifies demand on key routes, creating cascading benefits in global route dynamics and customer preferences

Proof

- 1% increase in merchant and regional influence → 32.82% higher global route dynamics
- 1% rise in international travel patterns → 25.86% boost to merchant influence
- 1% uptick in global route dynamics → 21.42% higher customer location and route preferences

Impact (So What)

- Captures 32.82% more demand on flagship routes, driving significant revenue growth and market expansion

Next Steps (Now What)

- Expand capacity on high-value corridors (e.g., MEL–LHR, HKG–FRA) to capitalize on surging demand

Chapter 4: The Streamlined Horizon

What

- Streamlining flight operations and sentiment management reduces route complexity
- Optimizing pricing and discounts enhances revenue and booking dynamics

Proof

- 1% increase in flight ops and sentiment → 29.52% reduction in route complexity
- 1% rise in sentiment and currency impact → 22.12% boost in pricing variability
- 1% lift in discounts → 12.01% increase in revenue and booking dynamics

Impact (So What)

- Delivers a 29.52% drop in complexity
- Enables 22.12% more pricing agility
- Drives a 12.01% uplift in bookings, boosting efficiency and profitability

Next Steps (Now What)

- Eliminate unnecessary layovers on high-demand routes
- Implement dynamic pricing and discount strategies aligned with real-time sentiment and currency signals

Chapter 5: The Echo of Sentiment

What

- Improving customer sentiment drives uplifts in conversion rates, revenue, and overall satisfaction through both direct and indirect effects

Proof

- A 1% rise in sentiment and conversion \Rightarrow 39.56% increase in sentiment dynamics
- 17.05% of that uplift comes from direct effects; 19.31% comes from indirect effects

Impact (So What)

- Up to a 39.56% boost in conversion, revenue, and satisfaction
- Strengthens customer loyalty and sharpens our competitive edge

Next Steps (Now What)

- Deploy a real-time sentiment analytics dashboard with instant-alert triggers
- Monitor feedback dynamically and act within minutes to turn sentiment shifts into business gains

The Flight Path Forward

Implementation Roadmap

Quarter	Initiative
Q4 '25	Launch pilot loyalty and retention programs for high-risk, high-return customers
Q1 '26	Roll out A/B tests for High-tier upsells and Low-tier cost-optimization
Q2 '26	Deploy real-time sentiment analytics platform with instant-alert workflows
Q3 '26	Expand capacity on flagship routes (MEL–LHR, HKG–FRA)
Q4 '26	Simplify operations—eliminate unnecessary layovers and implement dynamic pricing

Thank You & Full Report

Questions?

- Thank you for your time and insights.

Download Full Project Report (21 pages): [Detailed Report](#)

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