Airline Operations & Revenue Intelligence Report

1. Executive Summary

A comprehensive analysis was conducted on the airline operational database consisting of flight operations, ticket bookings, boarding records, aircraft configuration, and airport data. The airline has experienced unstable profitability despite operating a large number of flights and maintaining consistent booking activity.

The analysis revealed that the problem is not insufficient demand, but operational inefficiencies such as underutilized aircraft capacity, passenger no-shows, uneven route demand, and delay-prone airports. By improving aircraft allocation, optimizing route frequency, and applying pricing strategies, the airline can significantly improve profitability.

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2. Business Problem

The airline is facing declining and inconsistent profitability even though thousands of passengers are booking flights. Management suspects that operational inefficiencies rather than demand shortage are causing revenue leakage.

The objective of this project was to analyse airline operations data and identify areas where the company is losing potential revenue and operational efficiency.

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3. Project Objectives

The primary objectives of this analysis were:

- Evaluate route performance and passenger demand
- Measure aircraft seat utilization (Load Factor)
- Identify passenger no-show behaviour
- Analyse fare class revenue contribution
- Detect delay-prone airports and flights
- Assess revenue by aircraft and routes
- Provide actionable business recommendations

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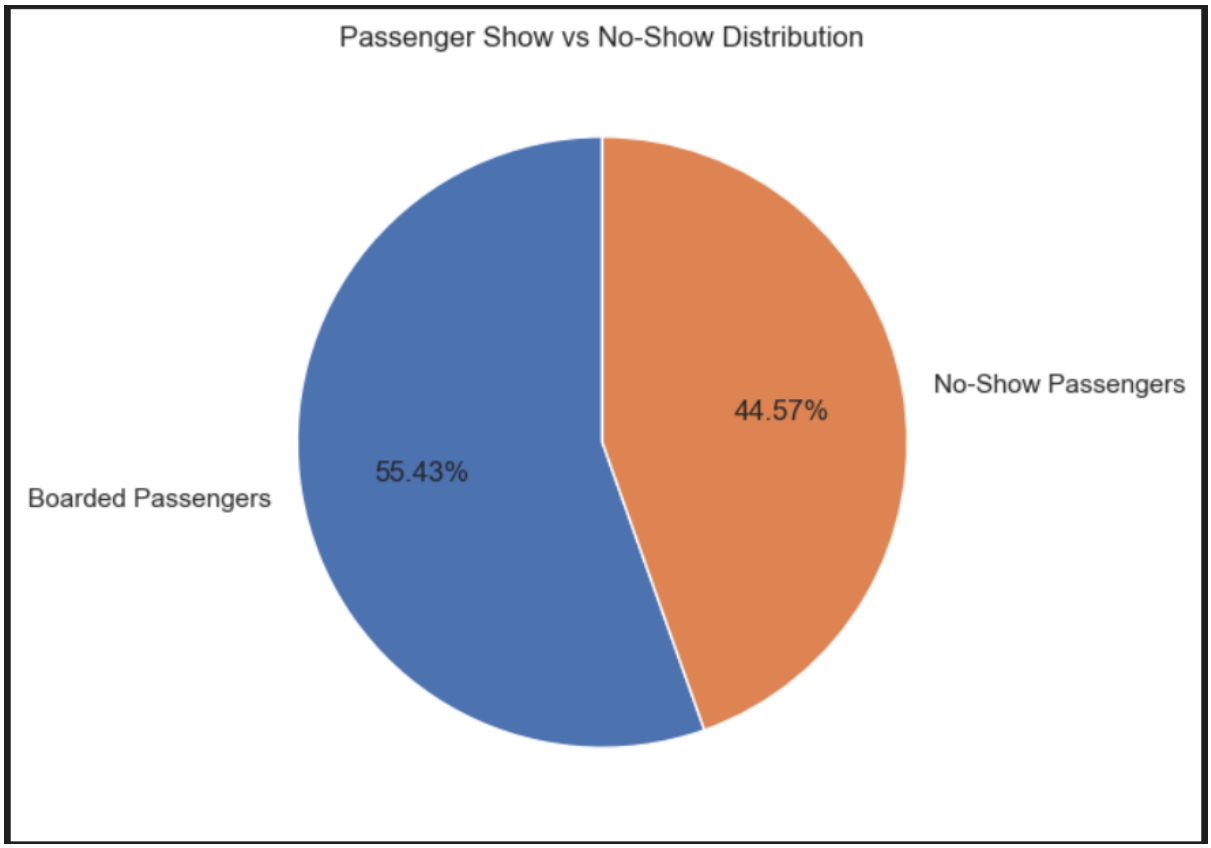
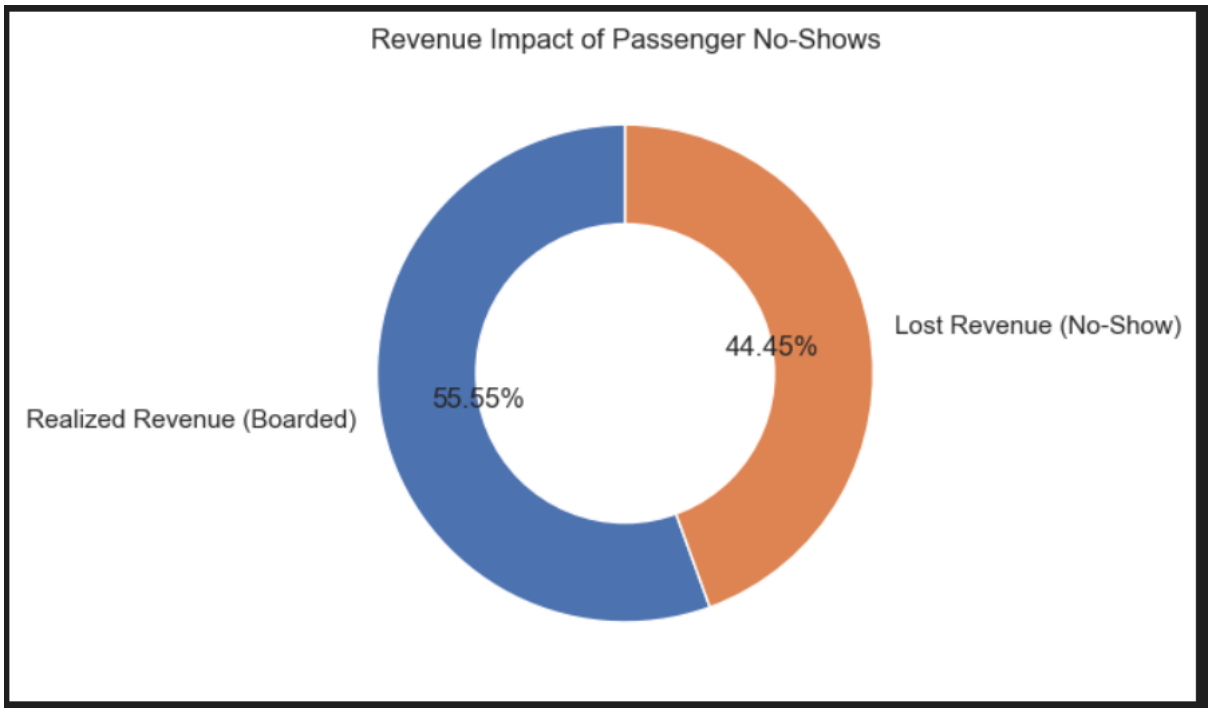
4. Key Findings

4.1 Passenger No-Show Behaviour



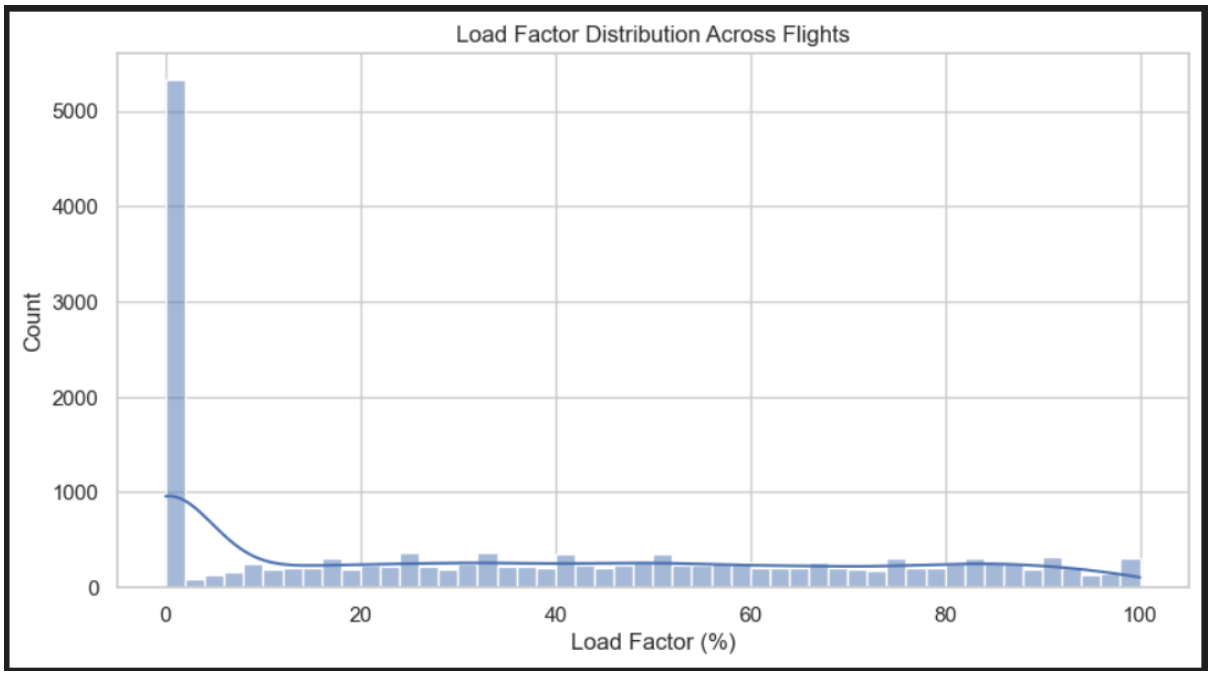
The passenger turnout analysis shows that only **55.43% of booked passengers actually boarded flights**, while **44.57% of passengers did not travel despite holding reservations**.
This indicates that nearly **1 out of every 2 reserved seats flew empty**, significantly lowering effective seat utilization. The no-show behavior directly affects operational planning because the airline schedules aircraft capacity based on bookings rather than actual boarded passengers.

4.2 Revenue Impact of No-Shows



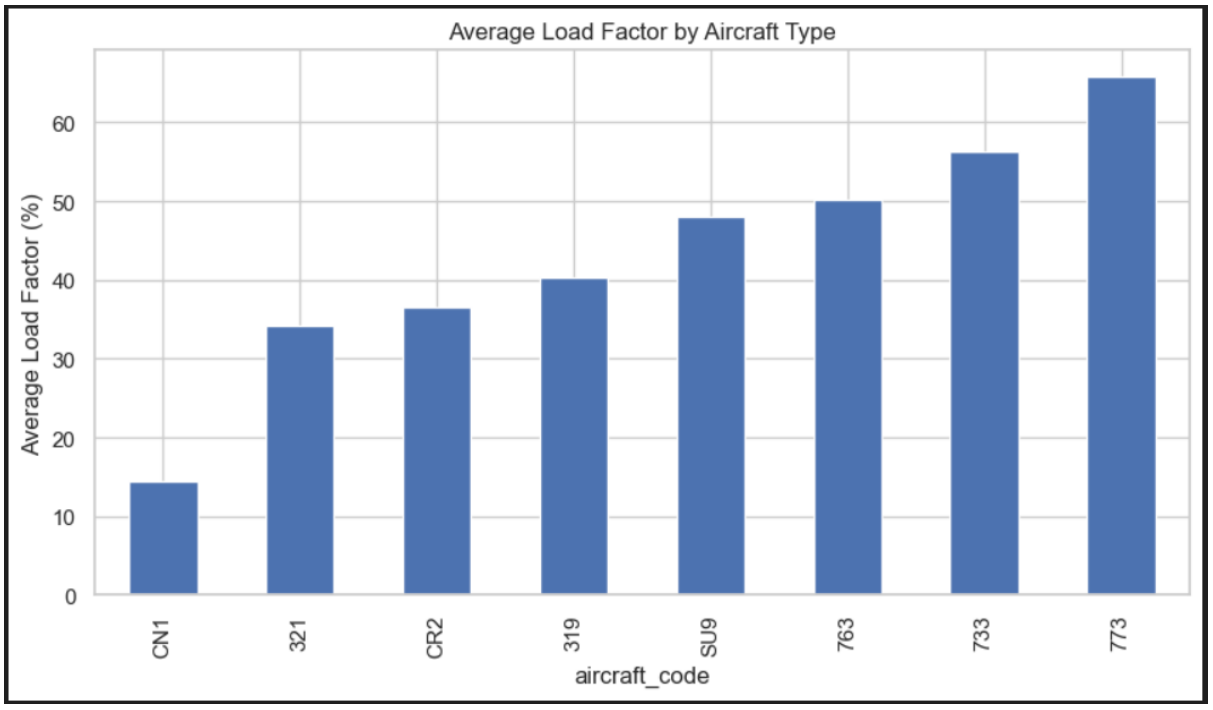
Revenue realization analysis shows that the airline operationally realizes only **55.55% of expected revenue**, while approximately **44.45% of potential operational revenue is lost due to passenger no-shows**.
Although tickets were sold, empty seats reduced the effective earning capacity of each flight and distorted demand forecasting. This demonstrates that bookings alone cannot be considered a reliable indicator of actual travel demand.

4.3 Load Factor Performance



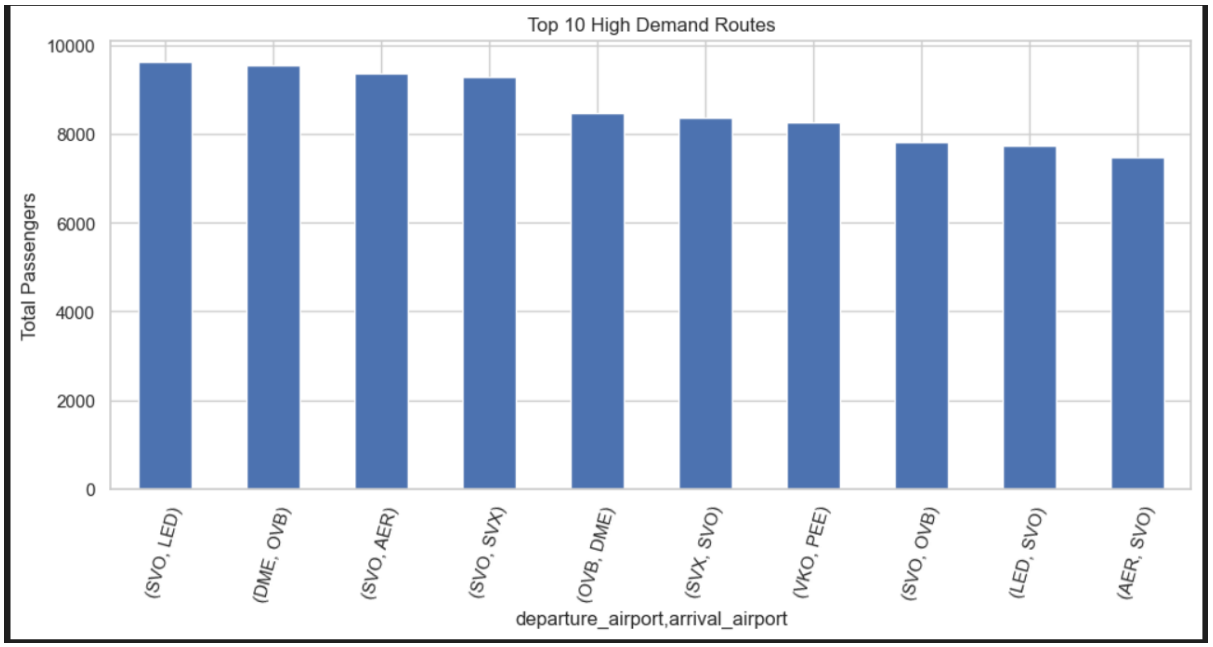
The load factor distribution reveals that a large number of flights operate at very low seat occupancy levels, with many flights carrying less than 50% of their available capacity. Only a smaller portion of flights reach high occupancy levels near **70–100%**, which are typically considered operationally efficient.
This indicates that a significant part of the airline network is operating below optimal capacity, leading to underutilized aircraft and higher cost per passenger.

4.4 Aircraft Utilization



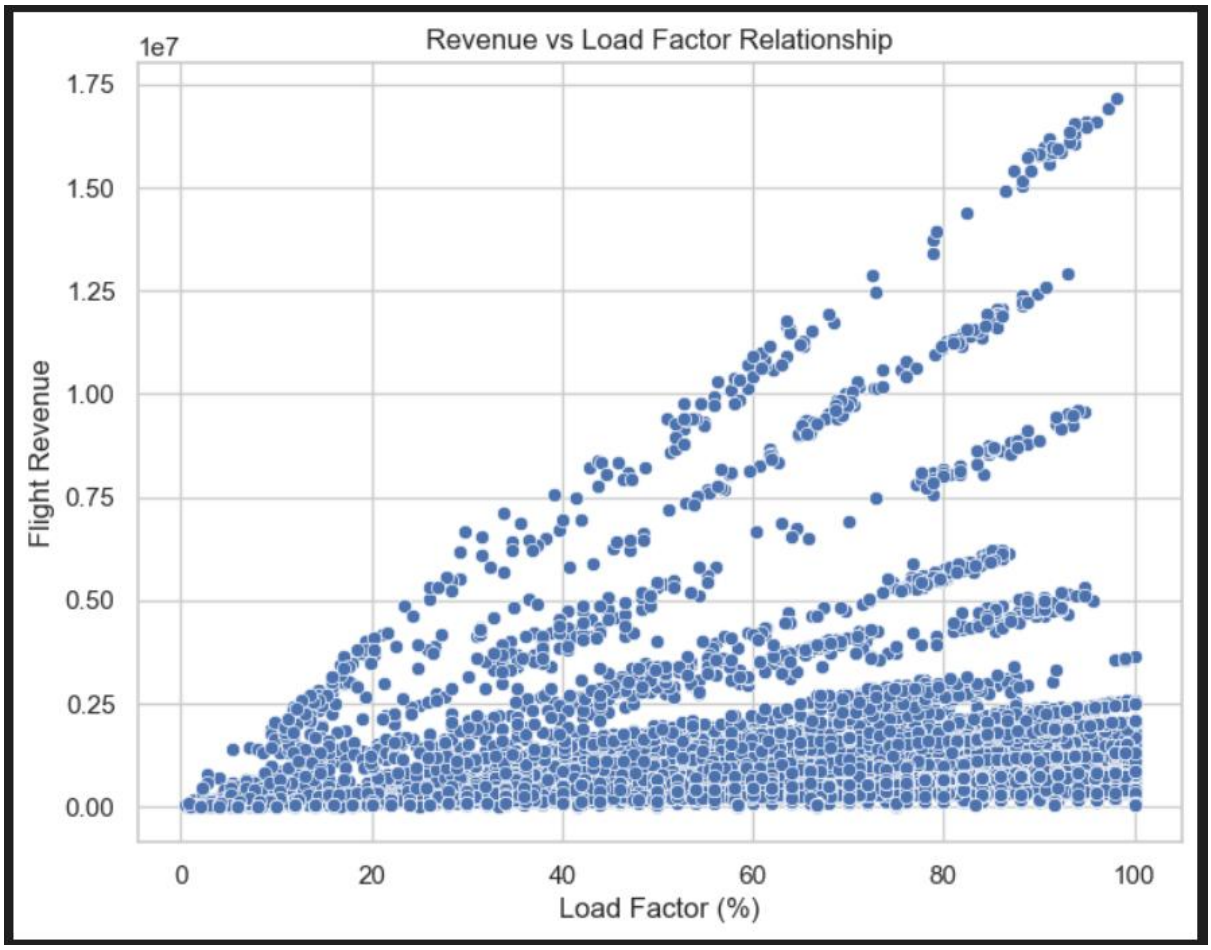
Average load factor varies significantly by aircraft type.
The **CN1 aircraft operates at only ~15% average load factor**, while larger aircraft such as **733 (~56%) and 773 (~66%)** maintain comparatively higher occupancy levels.
This variation shows that certain aircraft types are consistently under-utilized, while others are comparatively well-utilized, indicating imbalance in aircraft assignment relative to passenger demand.

4.5 Route Demand Concentration



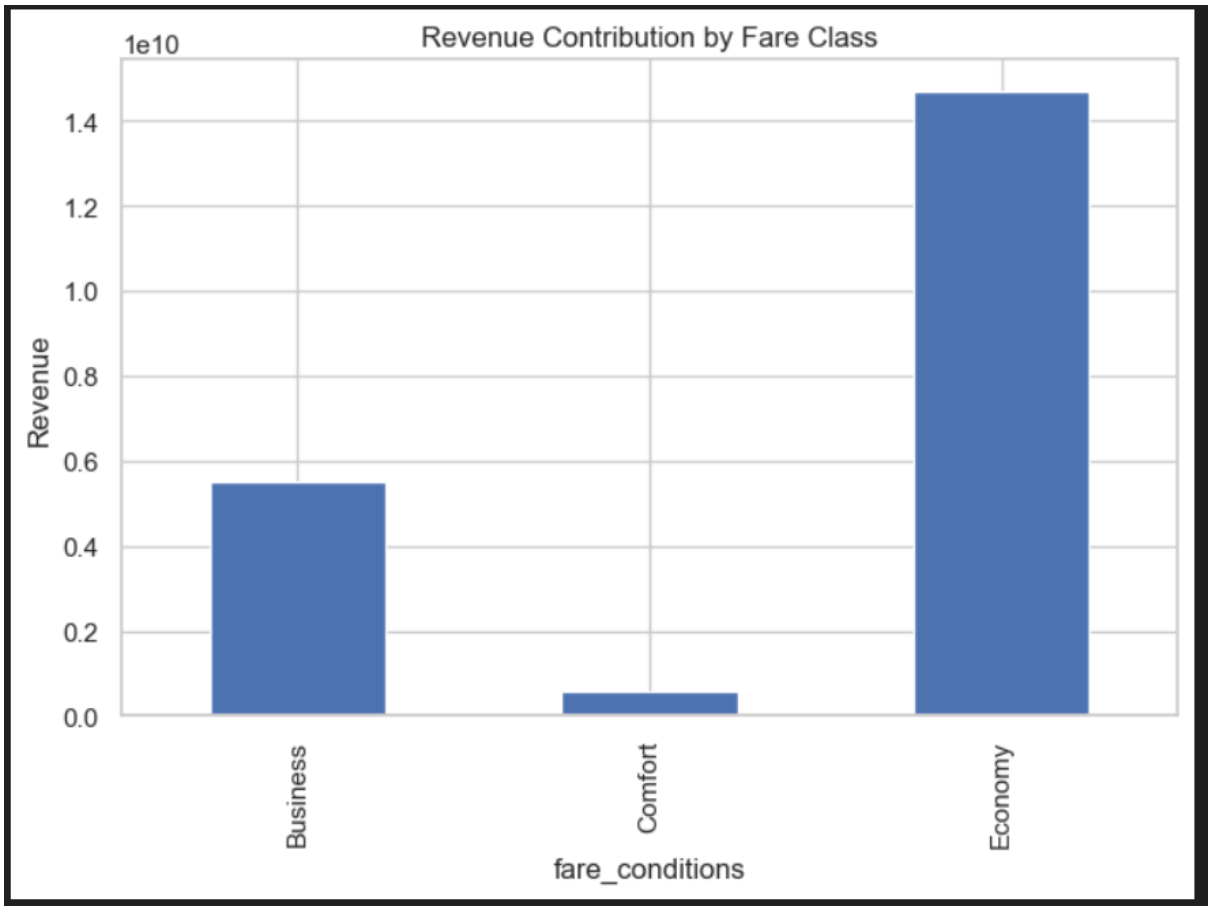
Passenger demand is concentrated on specific routes. The **SVO–LED and DME–OVB routes serve approximately 9,500+ passengers each**, while other top routes still maintain traffic above **7,500 passengers**. This suggests that a limited set of routes carries a disproportionately large share of total passengers, whereas other routes experience comparatively lower demand.

4.6 Revenue and Seat Occupancy Relationship



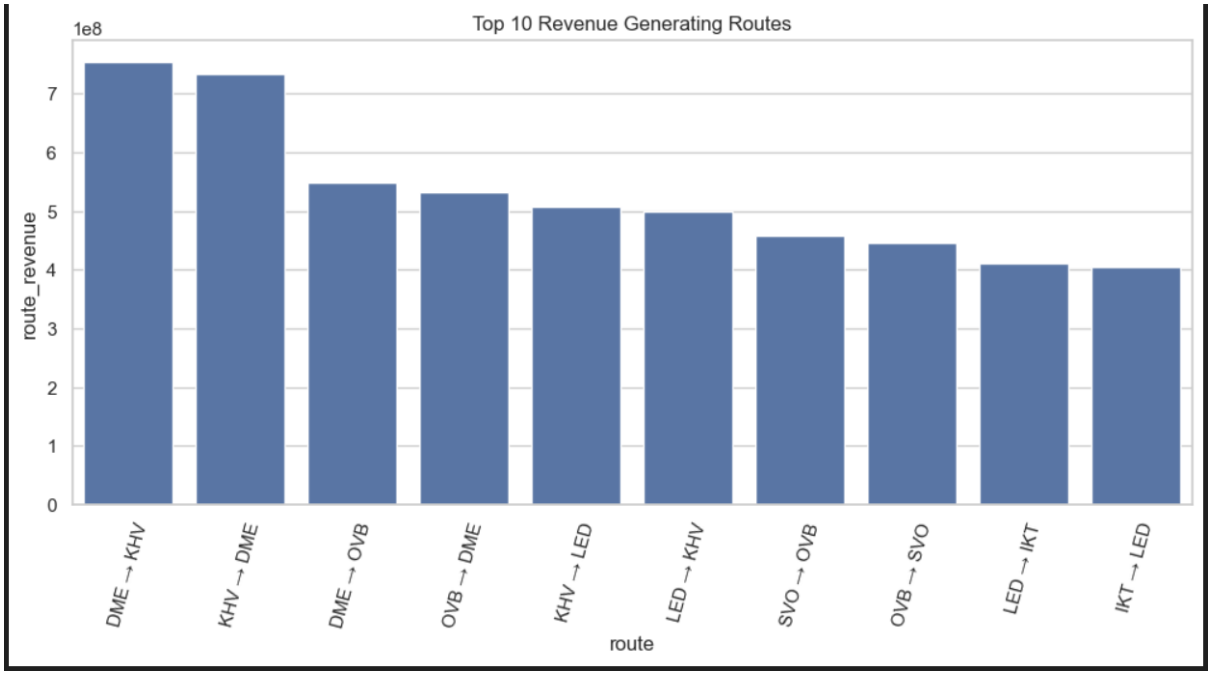
The relationship between load factor and revenue shows a clear positive correlation. Flights operating at **80–100% load factor generate the highest revenue**, while low-occupancy flights produce significantly lower revenue.
This confirms that seat utilization is a primary driver of flight profitability.

4.7 Fare Class Contribution



Revenue contribution by fare class shows that **Economy class generates the largest portion of total revenue (~14+ billion)** due to high passenger volume.
Business class contributes around 5+ billion, while **Comfort class contributes only a very small share**.
This indicates that airline revenue is volume-driven rather than premium-seat driven.

4.8 Revenue by Aircraft Type



Revenue generation differs across aircraft models.
The **SU9 aircraft produces the highest total revenue (~5+ billion)** followed by **763 and 773 aircraft**, while **CN1 generates extremely low revenue**.
This suggests uneven revenue performance across the fleet.

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5. Business Recommendations

1. **Implement Controlled Overbooking**
   Since approximately 44% of booked passengers do not board, the airline can safely introduce controlled overbooking based on historical no-show patterns to improve actual seat occupancy.
2. **Optimize Aircraft Allocation**
   Aircraft such as CN1 with ~15% load factor should be assigned to routes with lower passenger demand, while higher capacity aircraft should be used on high-traffic routes.
3. **Adjust Route Frequency**
   High-demand routes (e.g., SVO–LED and DME–OVB) may support additional flight frequency, while low-occupancy routes should have reduced scheduling.
4. **Use Load Factor as a Planning KPI**
   Flights consistently operating below ~60% load factor should be reviewed for rescheduling, aircraft downsizing, or consolidation.
5. **Improve Demand Forecasting**
   Because bookings do not reflect actual travel behavior, planning should incorporate historical boarding data rather than booking counts alone.
6. **Focus on Economy Passenger Volume**
   Since the majority of revenue comes from Economy passengers, maintaining strong seat occupancy in this class should be prioritized for operational efficiency.

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6. Final Conclusion

The analysis shows that the airline's profitability challenges are primarily caused by operational inefficiencies rather than lack of passenger demand. A high passenger no-show rate, low load factors on many flights, uneven aircraft utilization, and concentrated route demand collectively reduce effective revenue generation.

Improving seat utilization, aligning aircraft capacity with actual passenger turnout, and planning flights based on boarding behaviour instead of booking counts can significantly enhance operational efficiency. The findings demonstrate that data-driven operational planning can improve airline performance without increasing fleet size or ticket prices.