

# **Train Ticket Sales and Operations Analysis (Power BI Project)**

## **Introduction**

This report presents an analytical overview of train ticket sales, customer behavior, and operational metrics across various routes and stations. Built using Power BI, the goal was to transform raw transaction data into actionable insights that drive strategic decision-making across pricing, customer experience, and operational performance.

## **Dashboards and KPIs**

- Interactive Power BI dashboards were developed to visualize and track key performance indicators, including:
- Revenue Metrics: Gross and net revenue, average ticket price, and refund rate
- Customer Metrics: Ticket type distribution, travel class breakdown, and payment preferences
- Booking Trends: Monthly transaction trends and booking channel usage
- Operational Metrics: Journey punctuality (on-time, delayed, cancelled), weather-related delays, and station traffic
- Route Insights: High-traffic routes and departure/arrival stations

## **Data Cleaning & Transformation**

Performed in Power BI using Power Query and DAX to ensure data integrity and enable robust analysis:

- Created a Month column from transaction dates for time-based trend visualisation
- Parsed and merged fields under "Reason for Delay" to identify weather-related delays
- Generated a Route column by combining Departure and Arrival stations
- Filtered out incomplete or null entries in critical fields like Payment Method and Journey Status
- Standardised inconsistent values in Ticket Type, Railcard, and Payment Method fields

## **Key Insights**

### **Ticket Sales and Distribution**

- "Anytime" tickets were most frequently sold (55.52% of total sales)
- Advance tickets, while lower in volume, generated the highest net revenue (~£290,000)
- Off-Peak tickets made up roughly 27% of total sales

### **Revenue & KPIs**

- Gross Revenue: £741,921
- Net Revenue: £703,219
- Average Ticket Price: £23.44
- Refund Rate: 3.53%

### **Customer Preferences**

- Most used Payment Method: Credit Card (60.46%)
- Top Booking Channel: Online (19,000+ bookings vs. 13,000+ in-station)
- Majority of passengers travelled in Standard Class (29,000 vs. 3,000 in First Class)

### **Route & Station Traffic**

- Top Departure Stations: Manchester Piccadilly, London Euston
- Top Arrival Stations: Birmingham New Street, Liverpool Lime Street
- Peak travel hours: 7 AM – 9 AM

## **Operational Performance**

- On-time journeys: 86.82%
- Delayed journeys: 7.24%
- Cancelled journeys: 6%
- Weather-related delays were more common in winter months, especially February

## **Recommendations**

1. Introduce dynamic pricing to boost Advance ticket uptake.
2. Promote value-added services to increase First-Class usage.
3. Enhance digital experience by improving app usability and personalizing online booking promotions.
4. Integrate predictive weather models to minimize seasonal disruption impacts.
5. Adjust train schedules or increase service frequency during peak hours to meet demand.
6. Encourage contactless payments through incentives and UX improvements.

## **Conclusion**

Developed entirely in Power BI, this analysis provided a comprehensive and interactive view of train ticketing and operations. Key findings helped identify performance strengths—such as the dominance of “Anytime” tickets and the popularity of online bookings—while revealing areas for commercial and operational improvement.

By leveraging these insights:

- The commercial team can refine pricing strategies and increase high-margin ticket adoption.
- Marketing can promote underutilized routes and increase premium class uptake.
- Operations can improve punctuality through weather-informed planning and better capacity management.

This Power BI-driven project serves as a foundation for data-informed decision-making, empowering stakeholders to drive profitability, enhance customer satisfaction, and plan for long-term growth across the network.

Appendices

1. Dashboard



