Aeronex GmbH

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Ironhack Data Analytics Bootcamp
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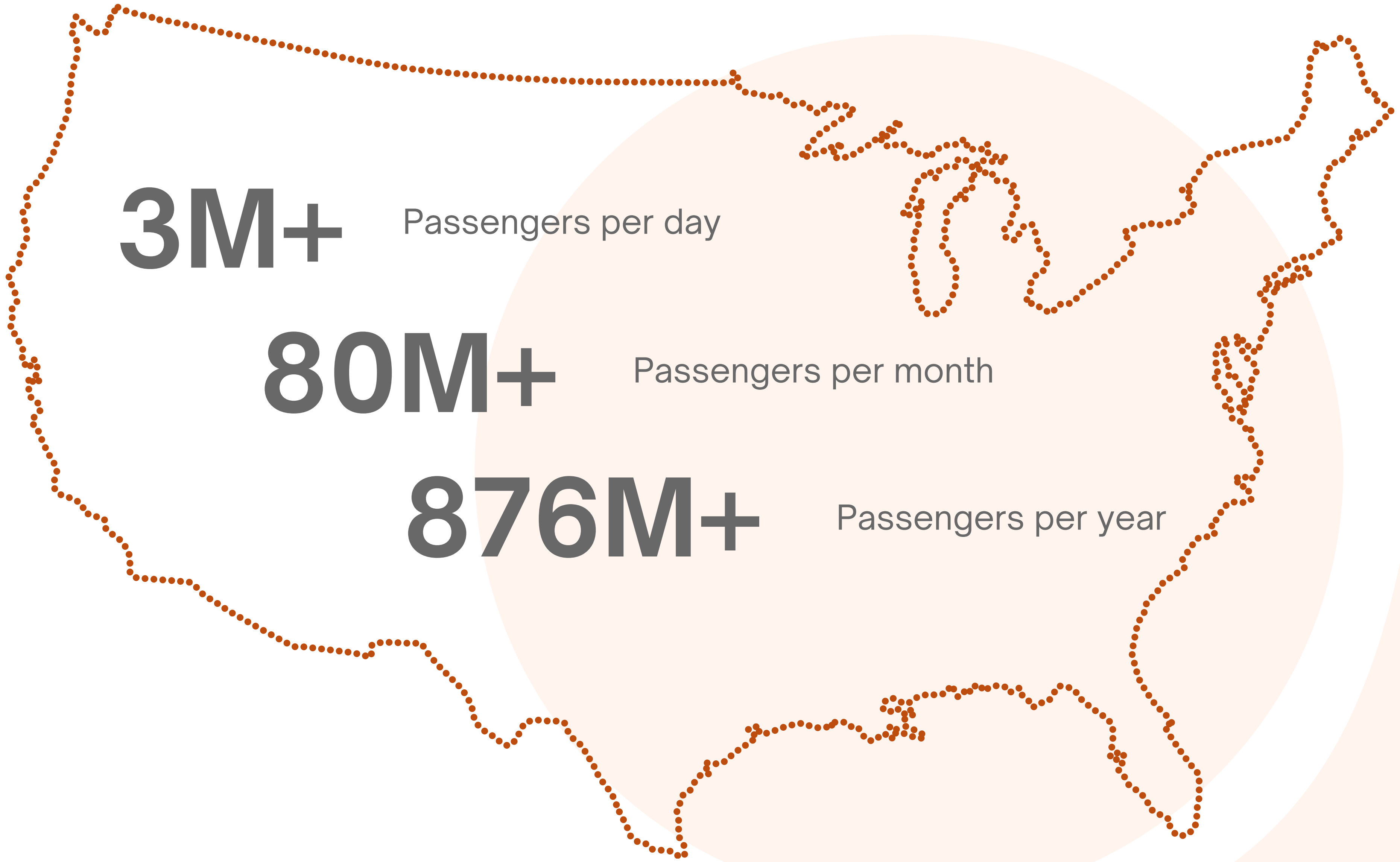
From Feedback to Satisfaction

"A data-driven analysis of what truly drives airlines' passengers satisfaction."

www.aeronex.de



3M+ Passengers per day

80M+ Passengers per month

876M+ Passengers per year

The scale of U.S. air travel

At this scale, even small changes in passenger experience affect millions of journeys.

source: Federal Aviation Administration (FAA)

Data & Scope

Project Context

- ✓ **Analysis** of U.S. airline passenger satisfaction
- ✓ **Goal:** identify which aspects of the flight experience truly drive satisfaction
- ✓ **Focus** on turning passenger feedback into actionable business insights

Dataset Overview

- **Source:** Airline Passenger Satisfaction Survey (Kaggle, U.S.-based)
- **100,000+ surveys responses**
  → Each row represents one completed passenger survey
- ✓ Data cleaned, standardized, and prepared for analysis

100,000+
psurveys analyzed

+

23
Variables & Columns

Dataset Source

Dataset Structure

Passenger Characteristics

- Age
- Gender
- Customer Type
- Type of Travel

Flight & Travel Details

- Class
- Flight Distance
- Departure Delays
- Arrival Delays

Service Quality Ratings (0–5)

- Seat comfort
- Inflight entertainment & Wi-Fi
- Food & drink
- Gate location
- Online boarding & booking
- Onboard, check-in & inflight services
- leg room
- baggage handling
- Cleanliness

Target Variable

- Overall Satisfaction

Approach & Methodology

Data Collection

Passenger satisfaction survey dataset

Data Cleaning & Preparation

Handling missing values, feature engineering (service scores, delay buckets)

Exploratory Data Analysis (EDA)

Distribution analysis, correlations, segment comparisons, visual exploration

Statistical Testing & Hypotheses

Hypothesis-driven analysis to validate key drivers of satisfaction and segment differences

Data Modeling (ERD & SQL)

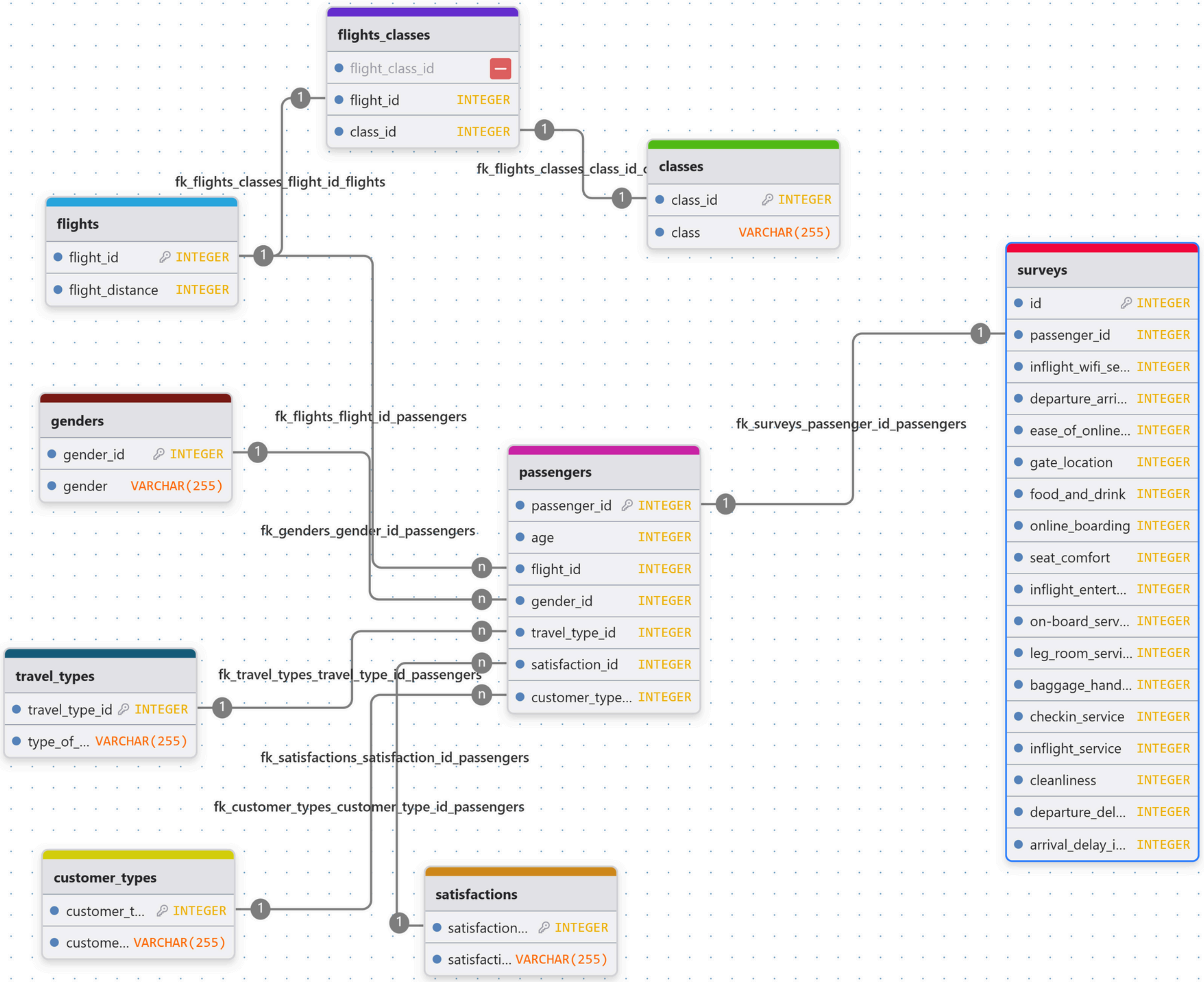
Entity-Relationship Diagram design, relational schema creation, SQL table implementation

Visualization & Storytelling

Interactive dashboards in Tableau to communicate insights and business implications

Tableau Dashboard

Aeronex Airline



flights_classes

flight_class_id	⊖
flight_id	INTEGER
class_id	INTEGER

classes

class_id	🔑 INTEGER
class	VARCHAR(255)

flights

flight_id	🔑 INTEGER
flight_distance	INTEGER

genders

gender_id	🔑 INTEGER
gender	VARCHAR(255)

passengers

passenger_id	🔑 INTEGER
age	INTEGER
flight_id	INTEGER
gender_id	INTEGER
travel_type_id	INTEGER
satisfaction_id	INTEGER
customer_type...	INTEGER

travel_types

travel_type_id	🔑 INTEGER
type_of_...	VARCHAR(255)

customer_types

customer_t...	🔑 INTEGER
custome...	VARCHAR(255)

satisfactions

satisfaction...	🔑 INTEGER
satisfacti...	VARCHAR(255)

surveys

id	🔑 INTEGER
passenger_id	INTEGER
inflight_wifi_se...	INTEGER
departure_arri...	INTEGER
ease_of_online...	INTEGER
gate_location	INTEGER
food_and_drink	INTEGER
online_boarding	INTEGER
seat_comfort	INTEGER
inflight_entert...	INTEGER
on-board_serv...	INTEGER
leg_room_servi...	INTEGER
baggage_hand...	INTEGER
checkin_service	INTEGER
inflight_service	INTEGER
cleanliness	INTEGER
departure_del...	INTEGER
arrival_delay_i...	INTEGER

fk_flights_classes_flight_id_flights

fk_flights_classes_class_id_c

fk_flights_flight_id_passengers

fk_genders_gender_id_passengers

fk_travel_types_travel_type_id_passengers

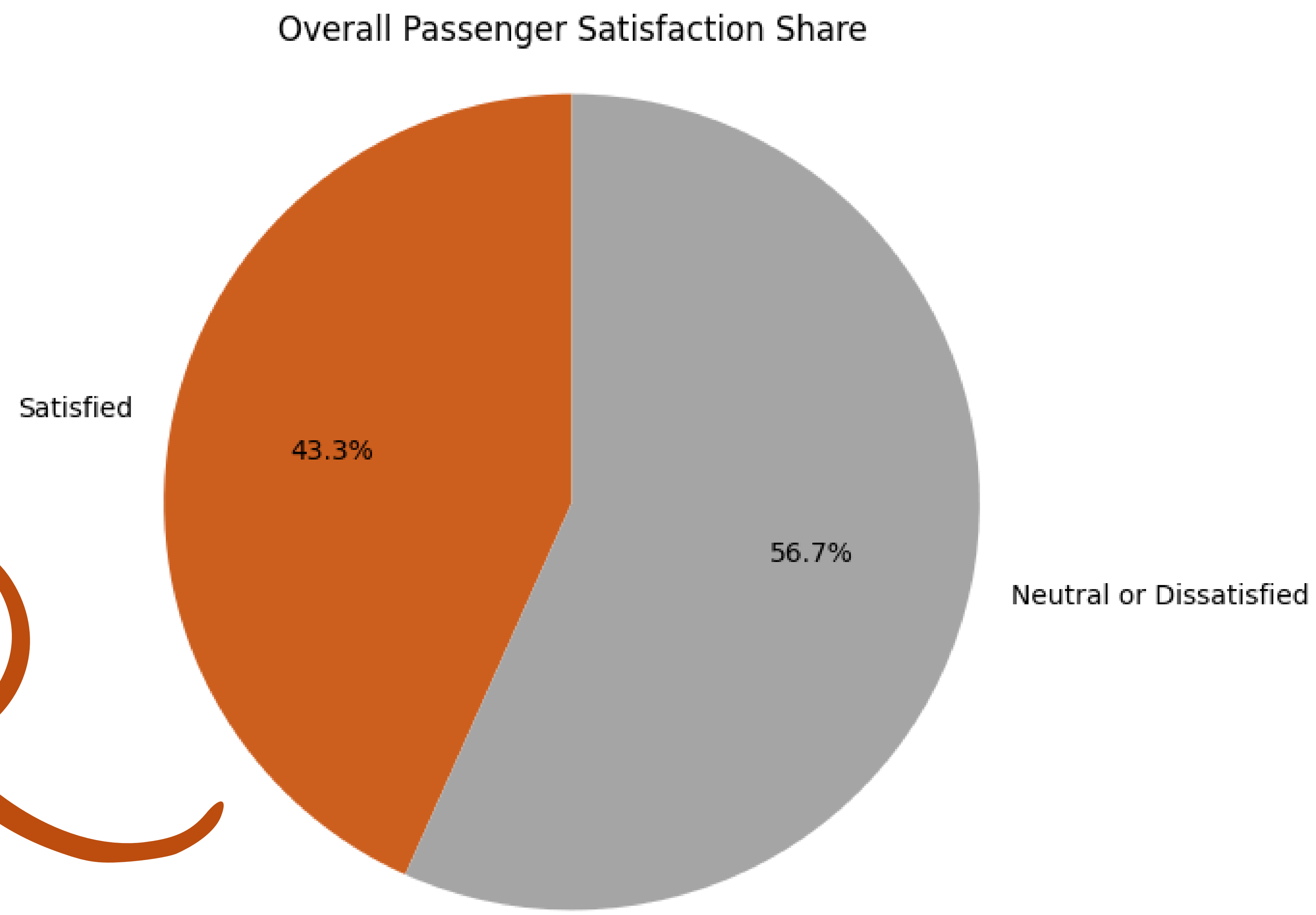
fk_satisfactions_satisfaction_id_passengers

fk_customer_types_customer_type_id_passengers

fk_surveys_passenger_id_passengers

Satisfaction Rate

43.3%

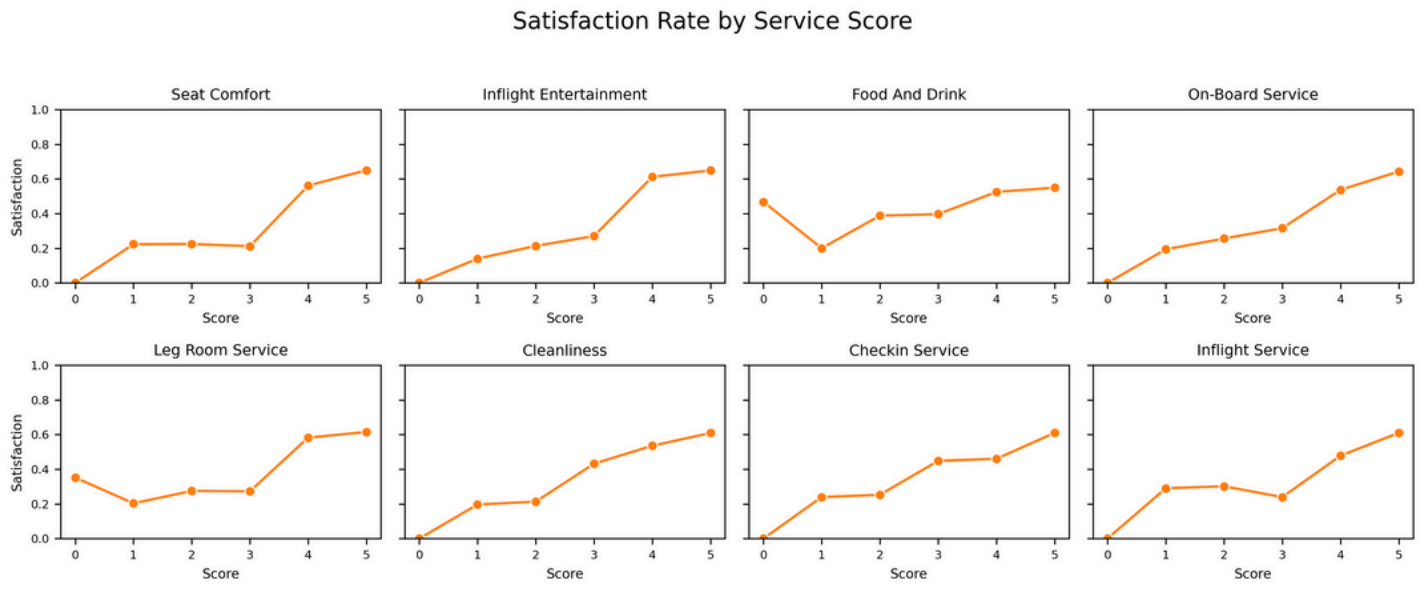


What Really Drives Passenger Satisfaction?

Understanding whether airlines should prioritize service improvements or operational performance

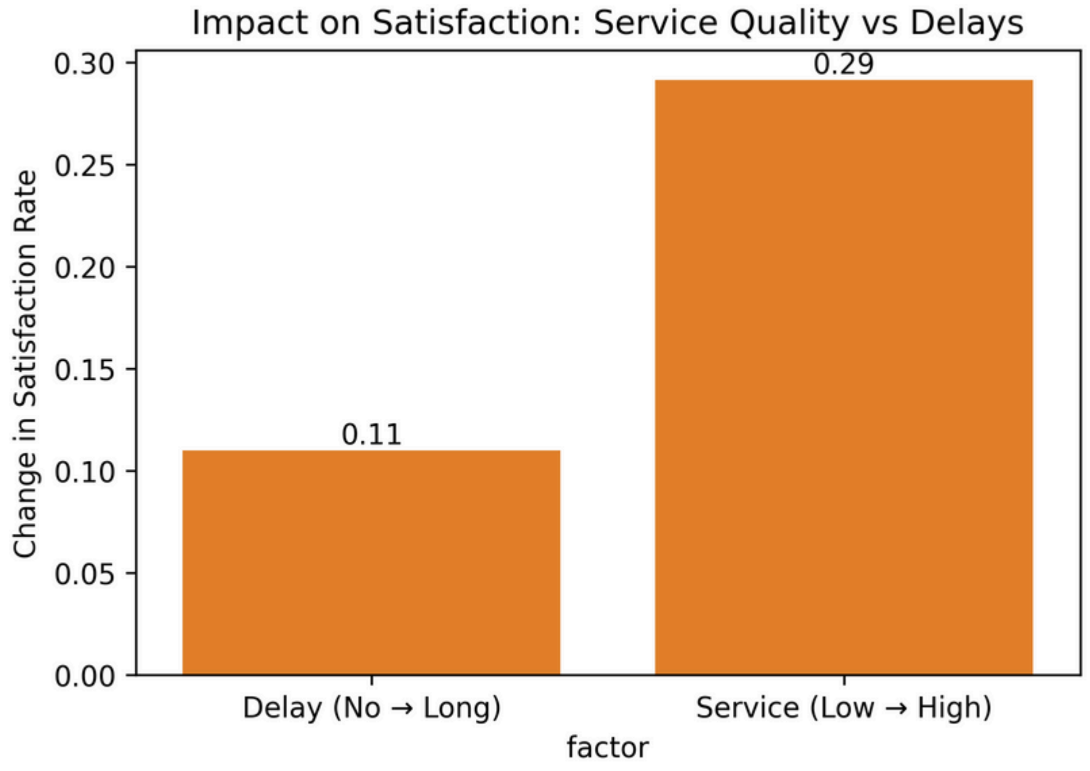
What really matters to passengers in shaping overall satisfaction?

- Average scores don’t explain satisfaction
- Satisfaction jumps only at excellence (4–5)
- Digital experience & onboard comfort matter most



Do flight delays matter more than service quality?

- Delays reduce satisfaction, but gradually
- Service quality matters more than delay reduction
- Great service outweighs delays

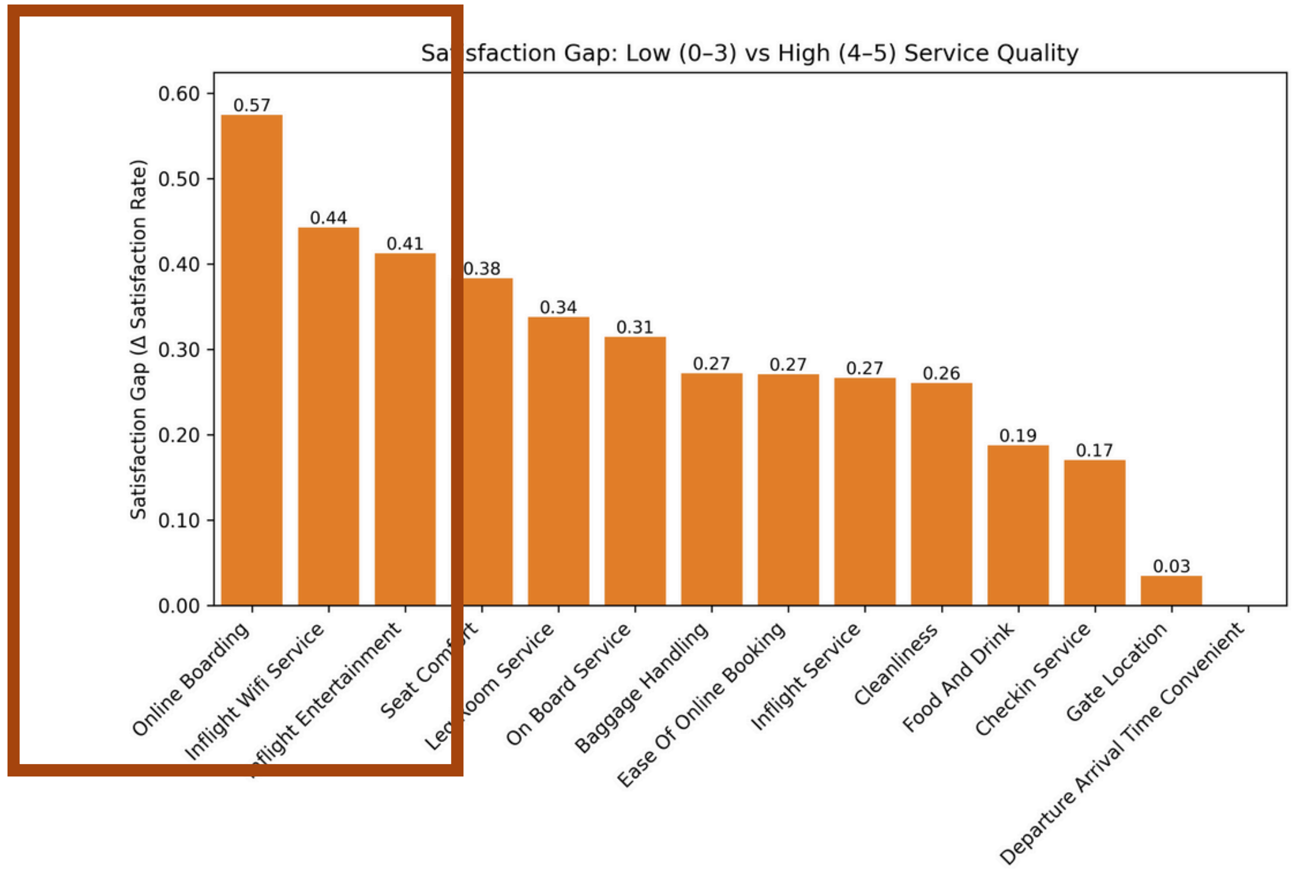


Target the Right Passengers, Invest in the Right Services

Matching passenger needs with high-impact service investments

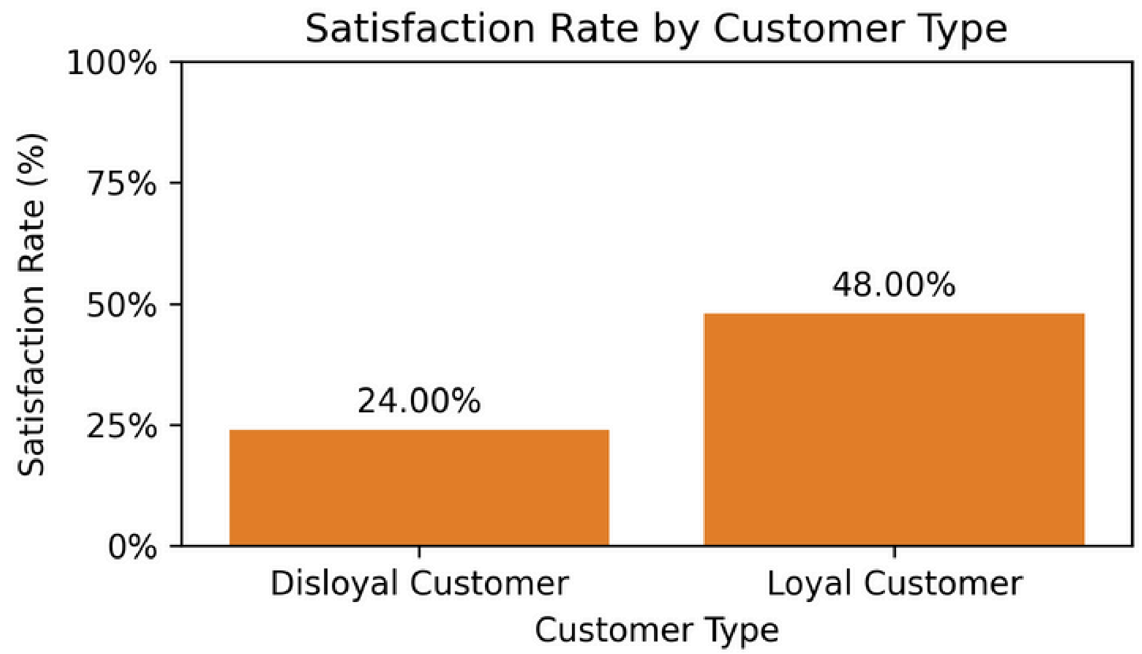
Do different passenger groups value different aspects of the airline experience?

- ✓ Satisfaction varies strongly by passenger segment
- ✓ Different segments value service and tolerate disruptions differently
- ✓ One-size-fits-all service strategies fall short



Are airlines investing in the right service improvements?

- ✓ High average ratings don’t always drive satisfaction
- ✓ Satisfaction gains come from a few high-impact services
- ✓ Several tracked service metrics deliver low ROI when improved



From Insight to Action

How airlines can predict dissatisfaction and prioritize the most effective improvements

Can passenger dissatisfaction be predicted early?

- ✓ Satisfaction varies strongly by passenger segment
- ✓ Different segments value service and tolerate disruptions differently
- ✓ One-size-fits-all service strategies fall short

Which service improvements are most likely to increase passenger satisfaction under realistic constraints?

- ✓ High average ratings don’t always drive satisfaction
- ✓ Satisfaction gains come from a few high-impact services
- ✓ Several tracked service metrics deliver low ROI when improved

Hypothesis Testing

Service quality differs between satisfied vs dissatisfied.

H_0: Mean Seat comfort is the same for satisfied and not satisfied passengers.

H_1: Mean Seat comfort is different (or higher for satisfied passengers).

$t = 122.35$
$p < 0.001$

Do Service Quality and Delays Significantly Affect Satisfaction?

H_0: Among delayed flights, satisfaction does not differ by service quality level.
H_1: Among delayed flights, passengers with higher service quality report higher satisfaction.

$\chi^2 = 4149.12$
$p < 0.001$

Different passenger segments value different things.

H_0: Passenger satisfaction is independent of the type of travel.
H_1: Passenger satisfaction is associated with the type of travel.

$\chi^2 = 20945.23$
$p < 0.001$

Business Implications

Key Implications

Prioritize High-Impact Services

Invest in digital experience and onboard maximum satisfaction gains.

Use Service Quality to Buffer Disruptions

Excellent service can mitigate the negative impact of delays.

Adopt Segment-Specific Strategies

Tailor services for business vs. leisure and loyal vs. non-loyal passengers.

Actionable Recommendations

Focus on top satisfaction drivers, not average ratings.

Maintain high service standards during delays to protect satisfaction.

Customize service design and communication by travel purpose and customer type.

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Let’s Create Exceptional Passenger Experience.

Thank You!

Ghazal Hassanzadeh