# Uber Supply-Demand Gap Analysis – Final Report

**Tools Used:** Excel, SQL, Python (Pandas, Matplotlib, Seaborn)

## Project Overview

Uber experienced a large number of unfulfilled ride requests in July 2016, resulting in lost revenue and dissatisfied customers. This report uses Excel, SQL, and Python to identify the root causes of this supply-demand gap and provide data-driven solutions to address it.

## Problem Statement

More than half of all Uber ride requests were not completed either due to driver cancellations or no available cars, especially during peak hours and at high-traffic pickup points like the Airport. The objective of this project is to analyse when and where these failures occur, uncover the reasons, and recommend corrective actions.

## Dataset Summary

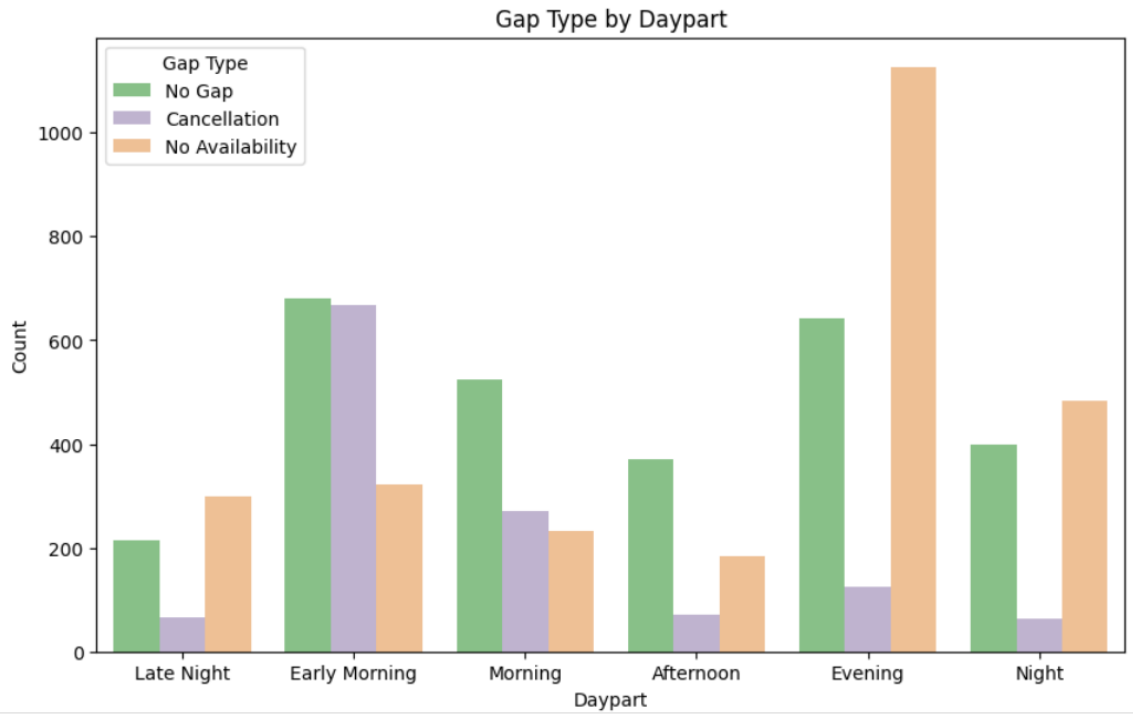
- **Records**: 6,745 Uber requests
- **Columns**: Request ID, Pickup point, Driver ID, Status, Timestamps, Request hour, Daypart, Gap Type
- **Missing Values**: Drop timestamp & Driver id (only for unassigned/incomplete trips)
- **Derived Fields**: Gap Type, Request hour, Daypart (Morning/afternoon/Evening etc.)

## Python Analysis

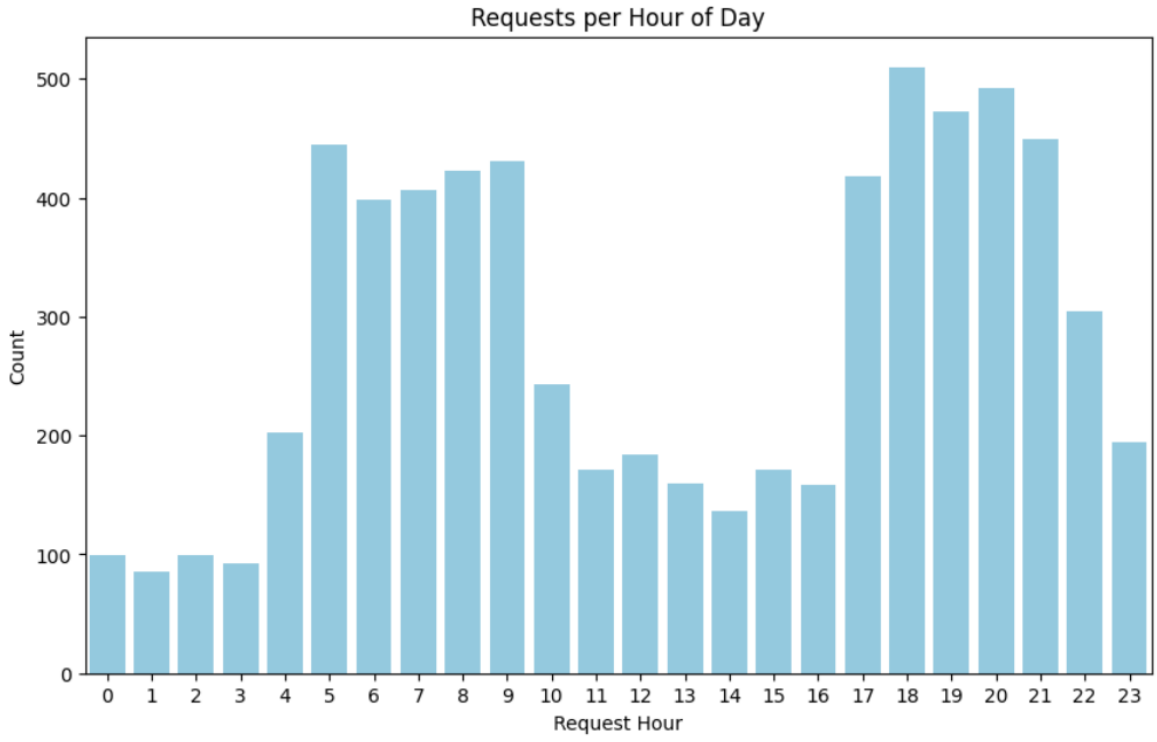
### 1. Gap Type by Daypart

**Insight:** Evening gaps are due to No Cars Available, while Morning gaps are mostly Cancellations.

**Impact**: Tailored actions can reduce specific gaps per time block. Offer driver incentives in evenings and improve app experience.



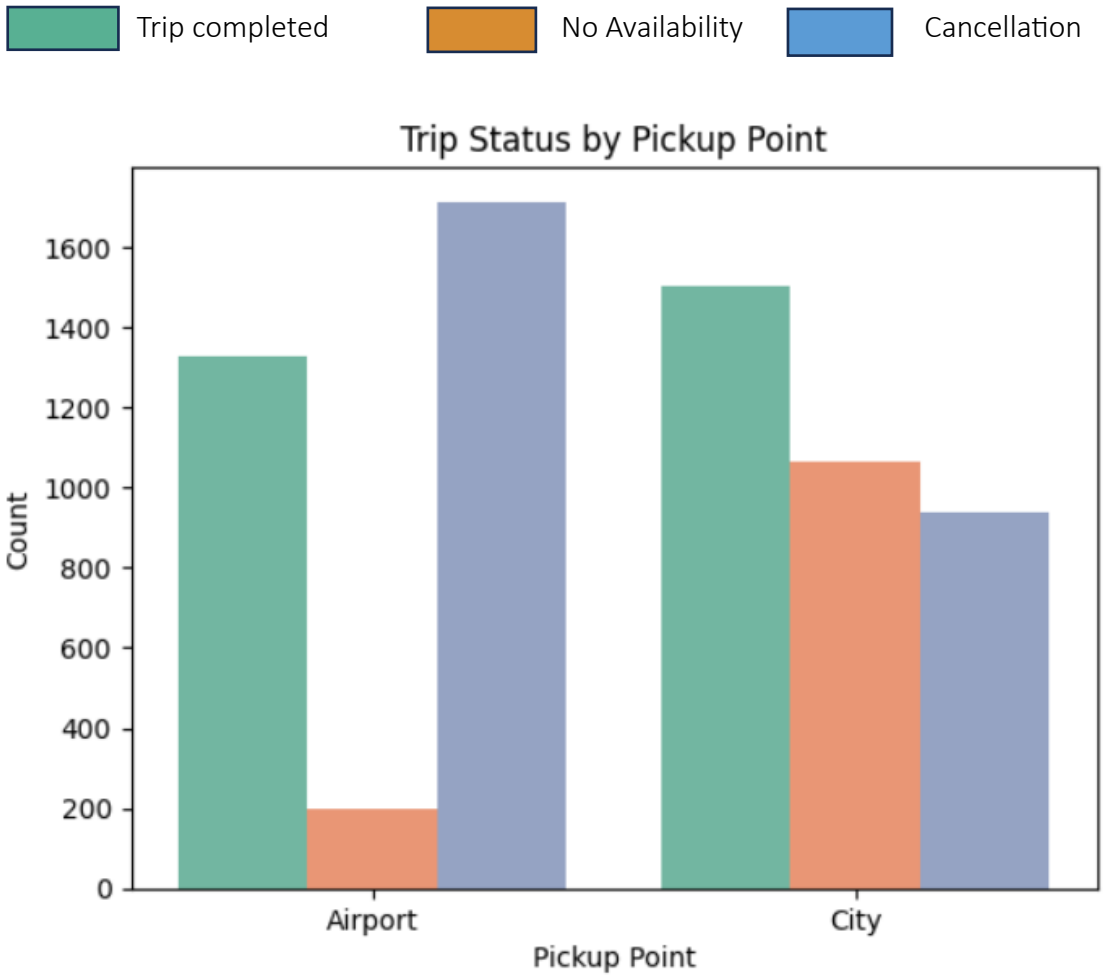

## 2. Trip Status by Hour



**Insight:** Hourly breakdown shows growing demand between 5–10 AM and 5–9 PM. These are rush hours, failing to serve them reduces profit and loyalty. Prioritize driver coverage during these windows.

**Impact:** These are rush hours; failing to serve them reduces profit and loyalty. Prioritize driver coverage during these windows.

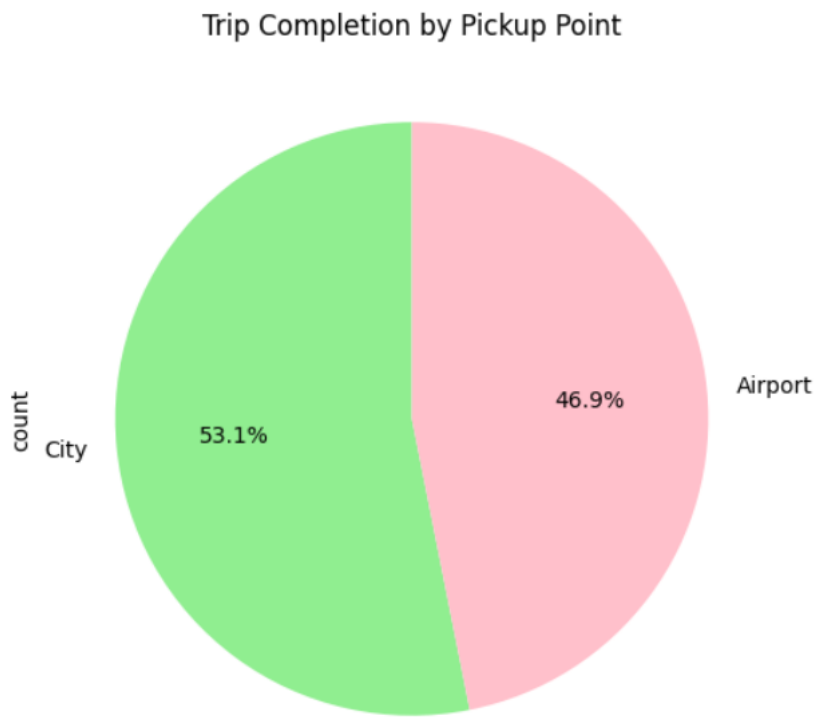
## 3. Trip Status by Pickup Point




**Insight:** Airport has higher cancellations and no car availability compared to City.

**Impact:** Airport needs targeted driver allocation. Increase driver shifts near Airport during peak times.

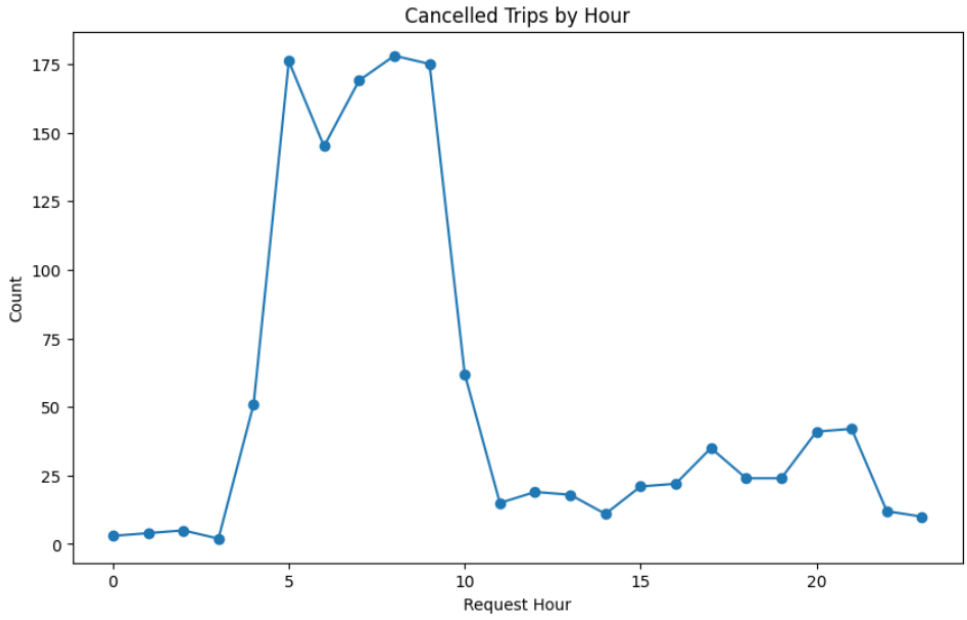
## 4. Trip Completion Rate by Pickup Point




**Insight:** City accounts for more than 50% of completed trips.

**Impact:** Airport zone is underperforming. Evaluate Airport-specific issues like waiting time or miscommunication.

## 5. Cancelled Trips by Hour



**Insight:** Cancellation peaks in early morning and late evening.

**Impact:** These hours represent lost demand. Remind drivers and verify bookings before these windows.

## SQL Analysis

### 1. Cancelled Trips by Hour

| Request hour | Cancelled requests |
|---|---|
| 0 | 3 |
| 1 | 4 |
| 2 | 5 |
| 3 | 2 |
| 4 | 51 |
| 5 | 176 |
| 6 | 145 |
| 7 | 169 |
| 8 | 178 |
| 9 | 175 |
| 10 | 62 |
| 11 | 15 |
| 12 | 19 |
| 13 | 18 |
| 14 | 11 |
| 15 | 21 |
| 16 | 22 |

| | |
|---|---|
| 17 | 35 |
| 18 | 24 |
| 19 | 24 |
| 20 | 41 |
| 21 | 42 |
| 22 | 12 |
| 23 | 10 |

**Insight:** Cancellations peak in early morning and late evening, likely due to drivers rejecting or abandoning rides.

## 2. Completion Rate by Pickup Point

| Pickup point | Completion rate percent |
|---|---|
| Airport | 40.98 |
| City | 42.89 |

**Insight:** The City contributes the majority of completed trips. The Airport contributes far less, showing an allocation issue.

## 3. Requests by Pickup Point

| Pickup point | Total requests |
|---|---|
| Airport | 3238 |
| City | 3507 |

**Insight:** The City accounts for a slightly higher number of total ride requests (3,507) compared to the Airport (3,238). This suggests that while both locations experience high demand, the city contributes a marginally larger share of overall ride volume.

However, considering that the Airport often has higher rates of cancellations and unavailability, even this slightly lower demand becomes critical in terms of service quality.

## 4. Status Distribution

| Status | count |
|---|---|
| Cancelled | 1264 |
| No Cars Available | 2650 |
| Trip Completed | 2831 |

**Insight:** Out of 6,745 total ride requests, only **42% (2,831)** were **successfully completed**. The remaining **58% failed**, with **"No Cars Available" (2,650 rides)** being the most frequent issue, followed by **"Cancellations" (1,264 rides)**. This indicates a significant supply-demand mismatch, especially due to driver unavailability, which is the dominant cause of failed trips.

## 5. No Cars Available by Pickup Point

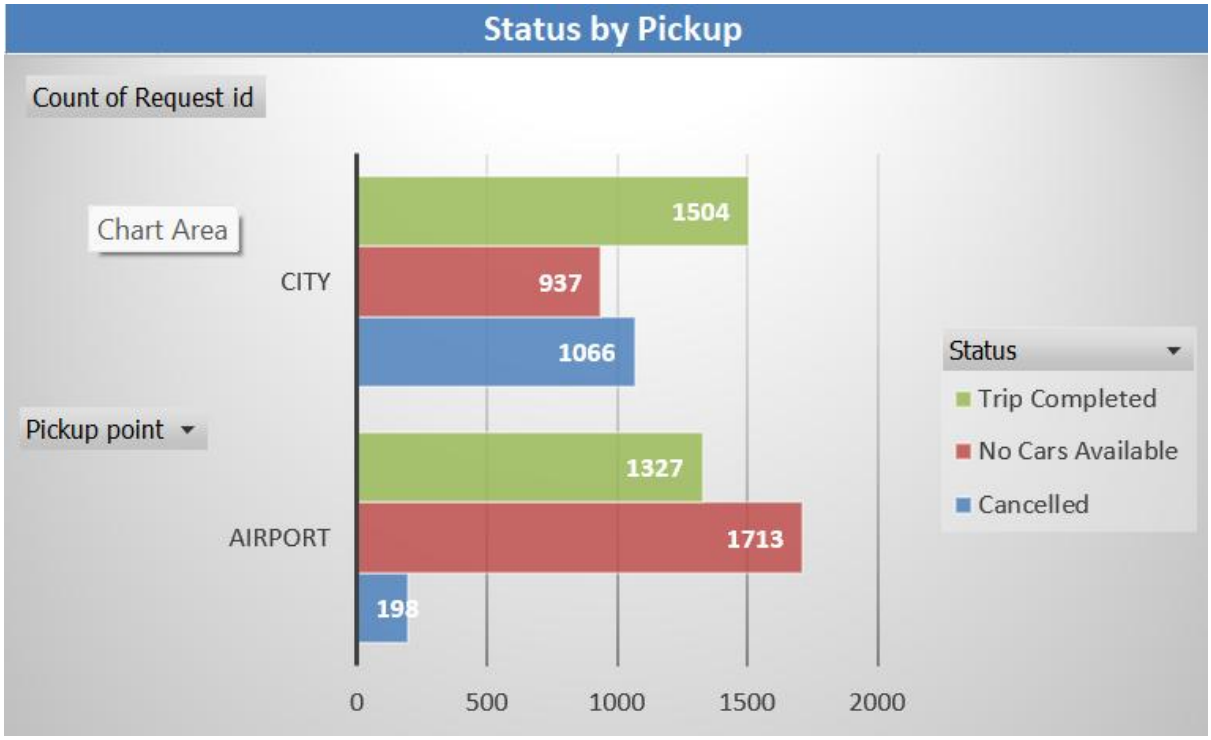
| Pickup point | No cars available count |
|---|---|
| Airport | 1713 |
| City | 937 |

**Insight**: The Airport accounts for 1,713 cases of "No Cars Available," which is almost double the number seen in the city (937 cases). This clearly indicates that the Airport is severely underserved, even though demand there is nearly equal to the city. It confirms a critical supply shortage at the Airport, especially during peak hours.

Riders at the Airport are far more likely to experience unavailability, which can lead to customer frustration, brand damage, and lost revenue.

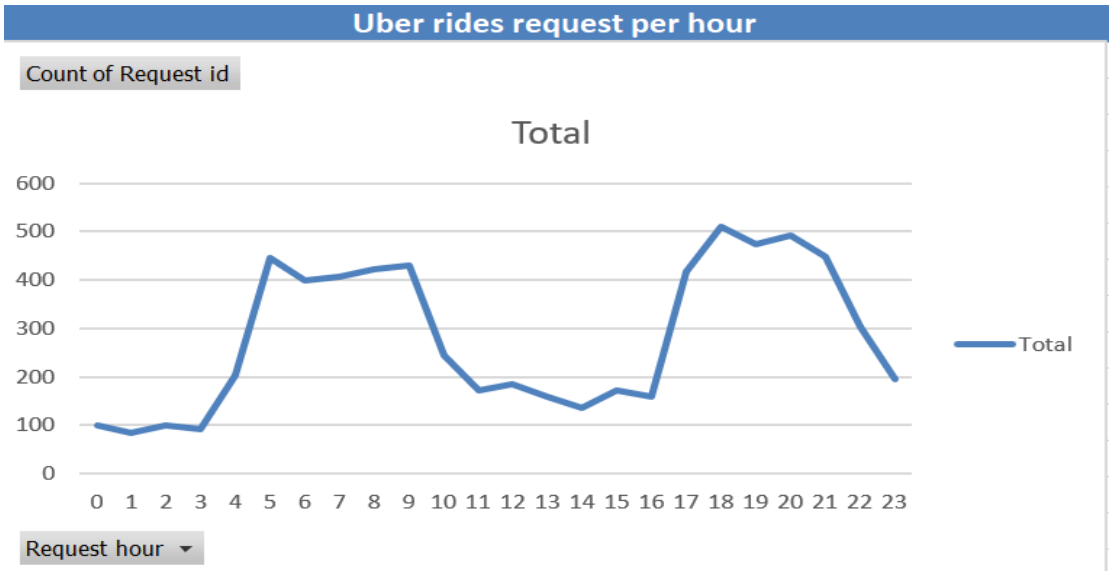
# Excel Analysis

## 1. Trip Status by Pickup Point




**Insight:** The Airport had a much higher failure rate (cancellations and no cars) than the city. Driver coverage was far better in City areas.

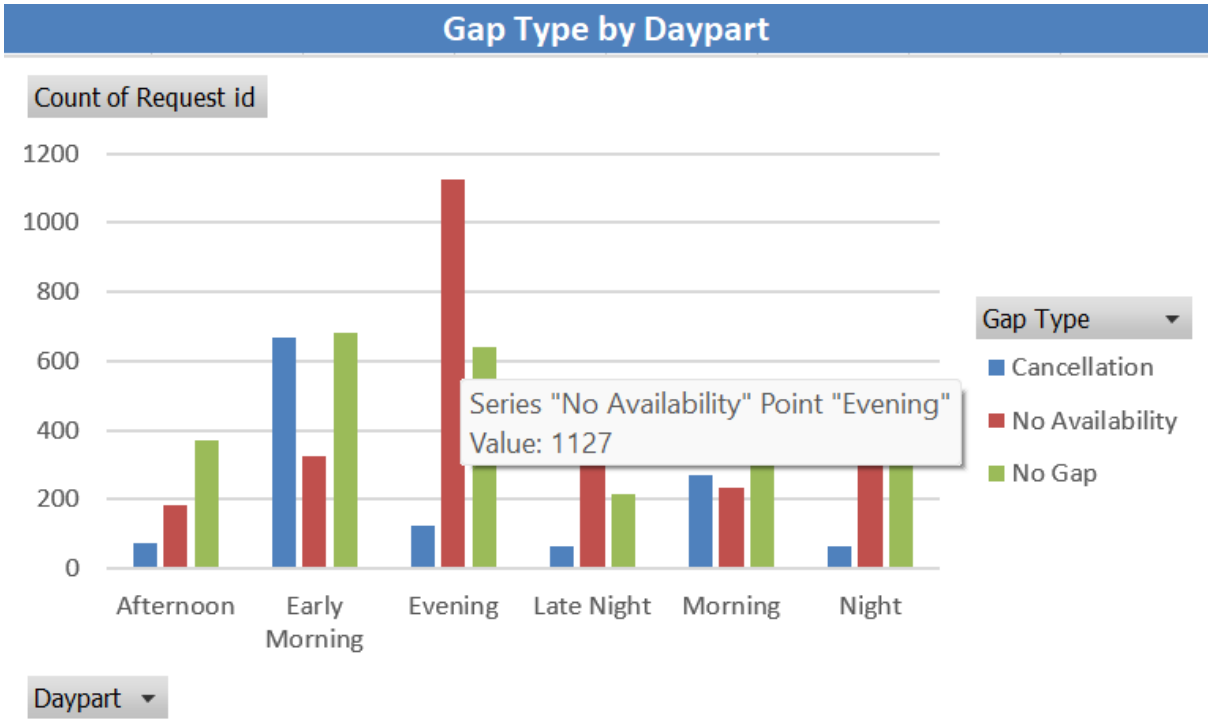
## 2. Uber Rides request per hour



**Insight**: Ride requests peak during 7–10 AM and 5–9 PM, clearly defining morning and evening rush hours.

**Impact**: Uber should prioritize driver availability during these hours to meet demand.

## 3. Gap Type Distribution



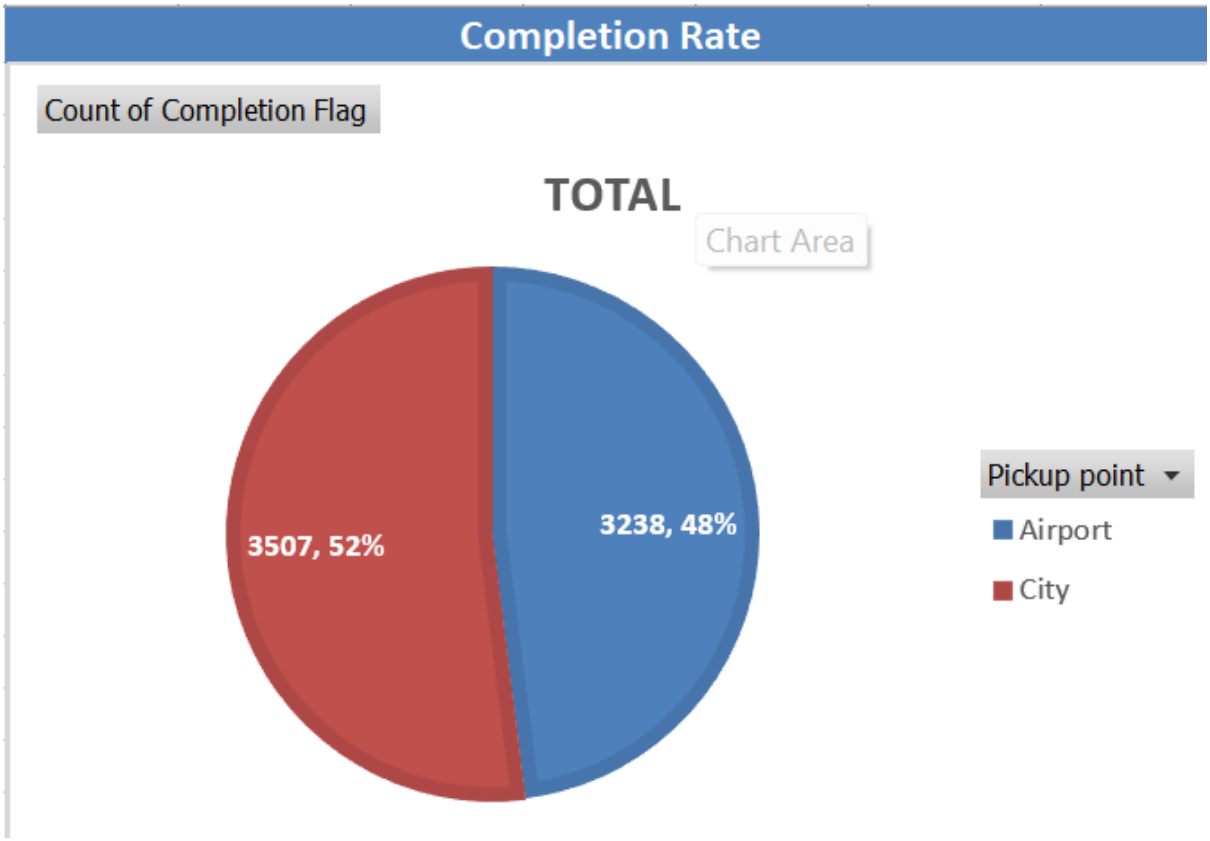

**Insight**: 'No Cars Available' mostly happens in the Evening and Late Night, while 'Cancellations' are more common in the Morning.

**Impact:** These patterns may reflect shift gaps, traffic issues, or driver availability—optimize shift rotations accordingly.

## 4. Completion Rate

**Insight:** The City has a higher trip completion rate than the Airport.

**Impact:** This could be due to higher driver density or easier pickup logistics.




## Final Conclusion

Across all three tools, the data clearly reveals Uber's operational weaknesses:

- Peak hour failures due to lack of available drivers
- Airport zone is the worst-affected location
- Evenings lack cars, mornings have cancellations
- A large number of failures are avoidable with better planning

## Recommendations

1. Incentivize drivers to work at the Airport during peak demand times.
2. Implement predictive demand mapping to alert drivers where to go.
3. Introduce cancellation penalty or bonus programs to discourage last-minute cancellations.

4. Balance driver distribution between Airport and City zones dynamically.

## Business Impact

Implementing these solutions can:

- Increase completion rates
- Reduce trip failures by 30–40%
- Improve customer satisfaction and retention
- Boost revenue during peak demand periods