Uber Supply-Demand Gap Analysis

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Abstract

Business Objective:

Identify the root cause of the problem (i.e. cancellation and non-availability of cars) and recommend ways to improve the situation.

Objectives of the Analysis:

- Visually identify the most pressing problems for Uber.

- Find out the gap between supply and demand and show the same using plots.

- Identify Reasons for the supply demand gap.

- Recommendations

Solution Approach:

- R is used for Data preparation, from raw data sources

- Tableau and R are used to plot the graphs, for better understanding of analysis

Data Cleansing

The following cleansing steps were performed on the data:

1. Check for missing values: Missing values were genuine showing no driver assignment for request.
2. Timestamp: Request and drop timestamps were brought to same format and converted to POSXCT.
3. Derived columns: New columns were derived from timestamp columns like hour, weekday, etc. for additional analysis.
4. More columns were derived like RideTime, TimeSlot etc.

Analysis

Univariate Analysis

1. No of requests: 6745

2. No of unique drivers: 300

3. Type of rides: "Airport to city" and "City to Airport".

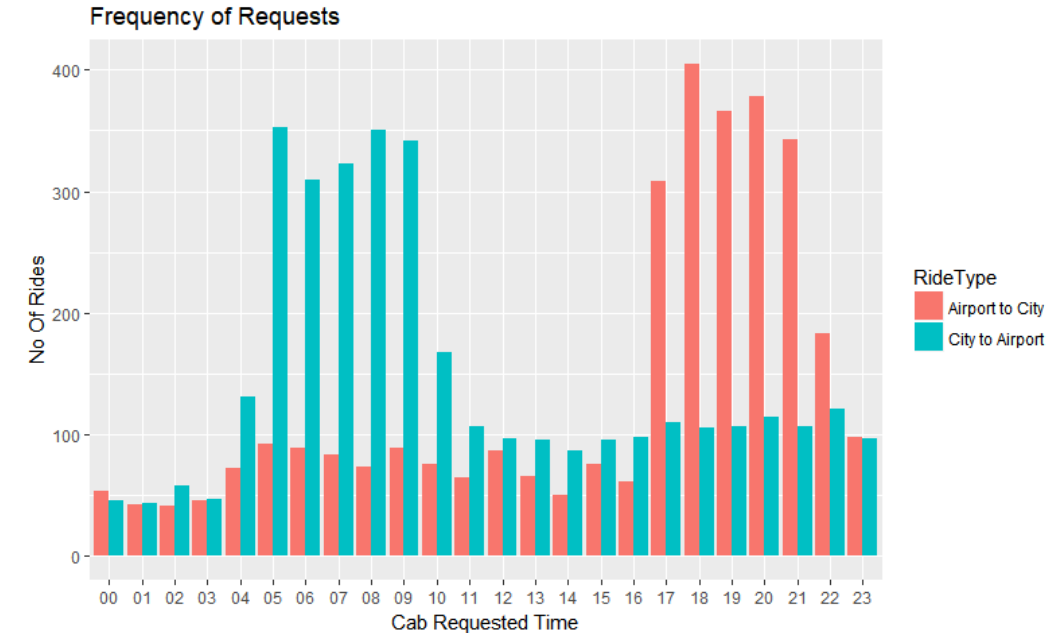4. Ride Status: "cancelled", "No cabs available", "Trip Completed"

Segmented and bivariate analysis

1. Frequency of rides v/s request hour, time slots, only completed rides, status.

2. Time taken for cabs v/s request hour, weekday, timeslots.

3. Frequency of rides vs timeslot for failed requests
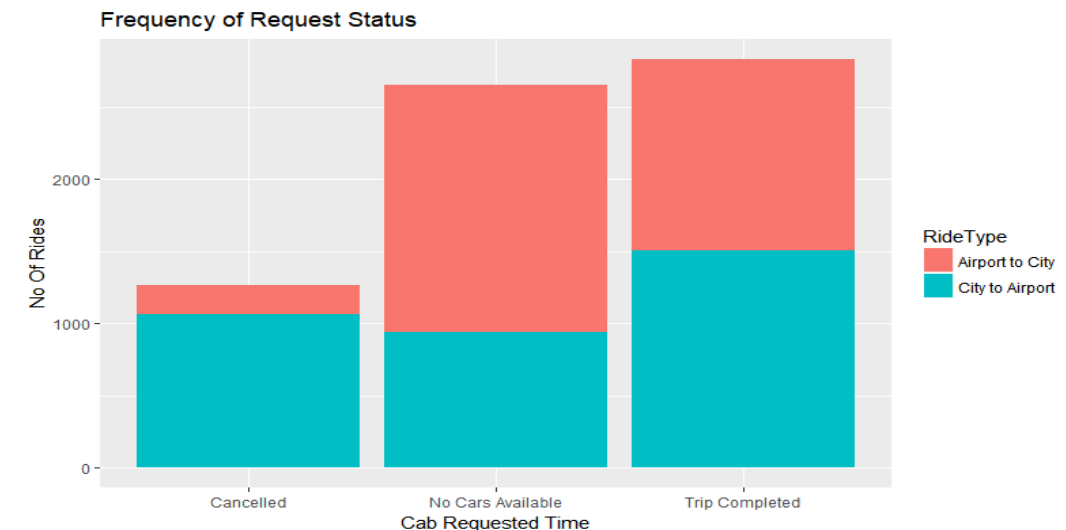
Analysis – Exhibit 1

- Plot 1: Frequency of Cabs requested throughout the days.

Analysis: The plot shows a high number of requests raised between the early morning hours of 5 to 9 am and evening hours of 5 to 9 pm.

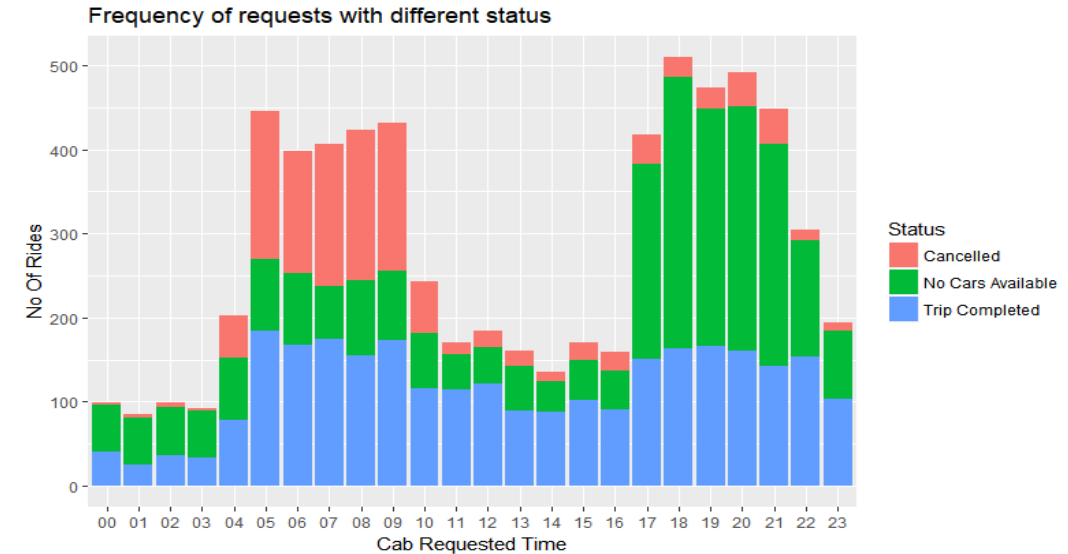- Plot 2: Frequency of cabs requested status.

Analysis: The plot shows a very high number of Request with No Cars Availability status for Airport to city rides and a high no of request cancellations for City to airport rides.

Frequency of Requests
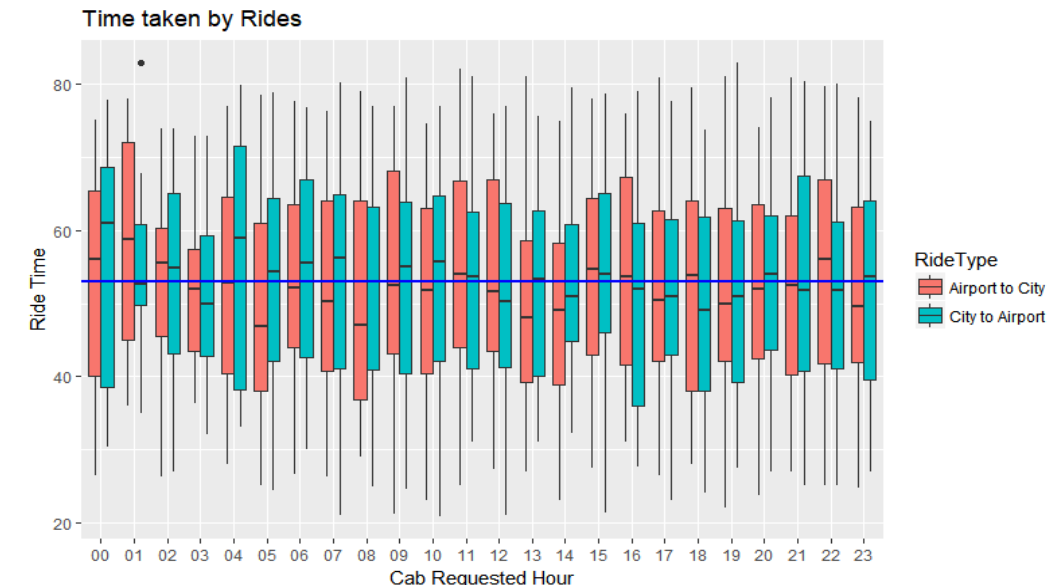

Frequency of Request Status

Analysis – Exhibit 2

- Plot 3: Frequency of Cabs requested throughout.

Analysis: The plot confirms the previous assumptions that a lot of cancellations are seen during the early morning rush hour and there is a shortage of cabs during the evening rush hour.

- Plot 4: Ride time during different hours

Analysis: The plot shows the median of time taken per ride for City to Airport rides is higher then the median of time taken for Airport to city rides.

Frequency of requests with different status
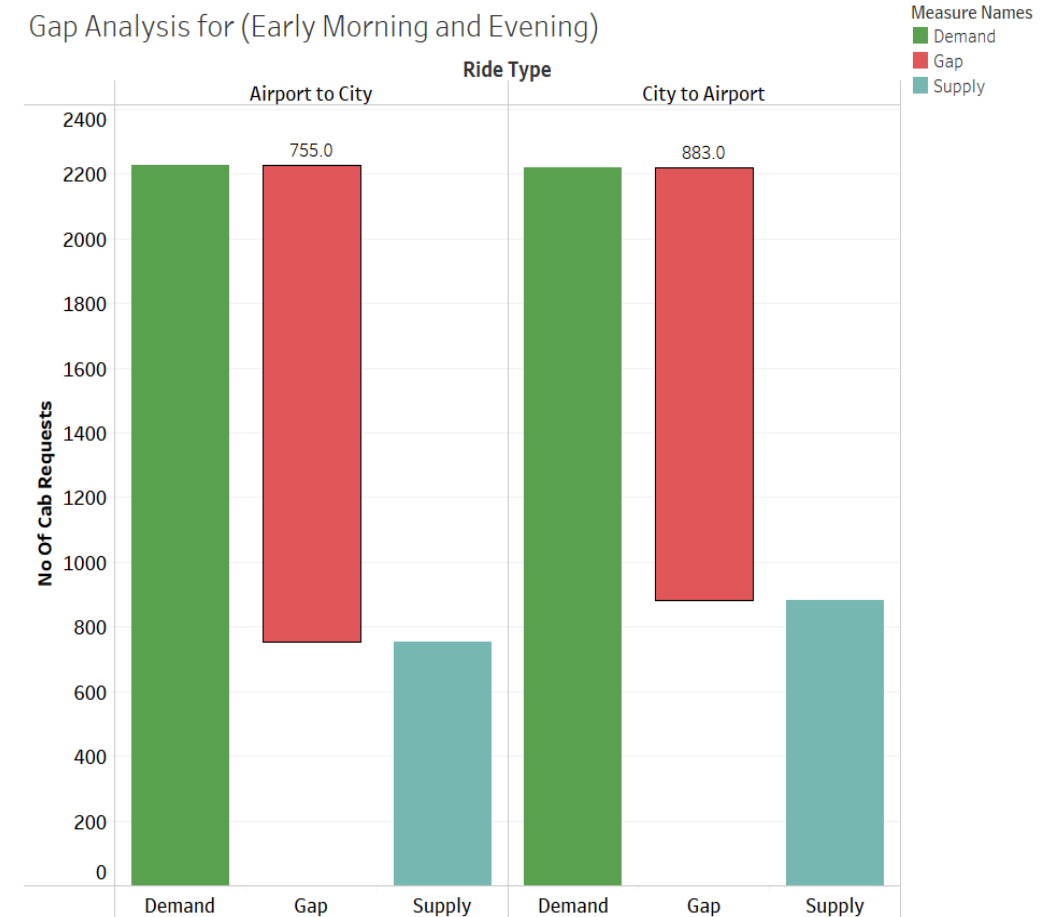

Time taken by Rides
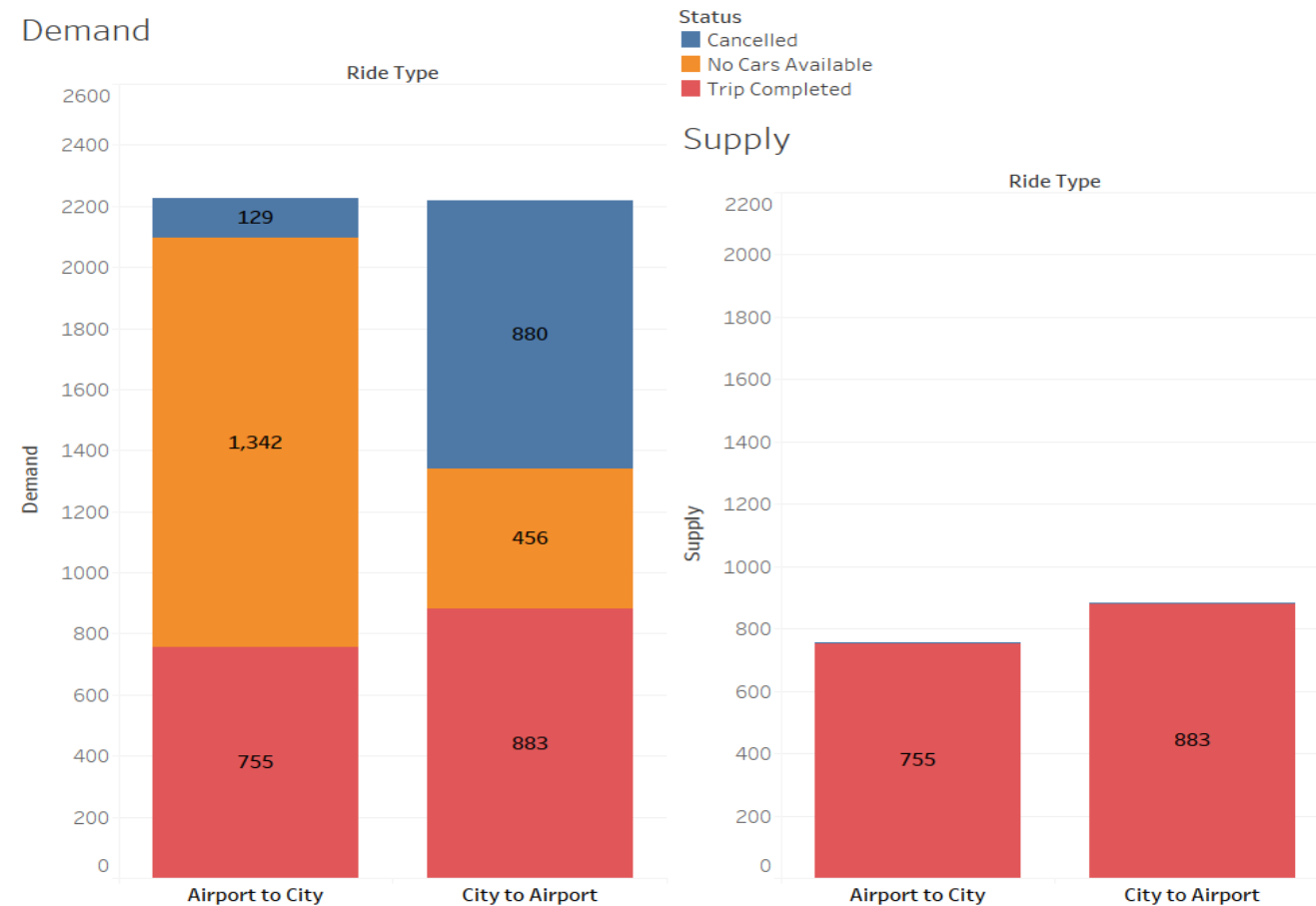
Analysis – Summary

From the analysis done we can identify two major problems for Uber from the given data

1. There are a huge number of cancellations during the Early Morning (5 am to 9 am) for cabs going from city to airport.

2. During the evening (5 to 9pm) there is an acute shortage of cabs for Airport to city rides.

Demand and Supply Analysis for problematic timeslots

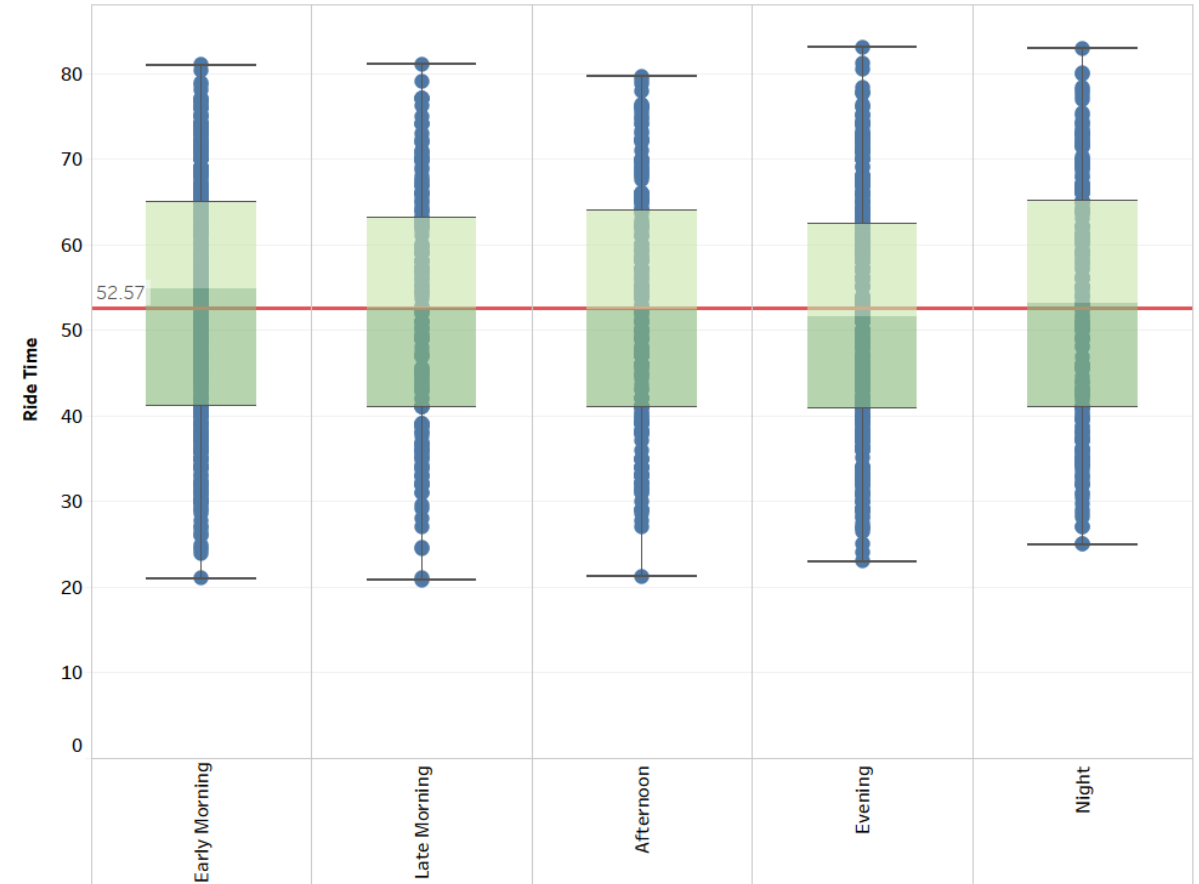- Below plot shows the how demand and supply is defined based on status of requests

Below plot shows the gap in demand and supply in different ride types.

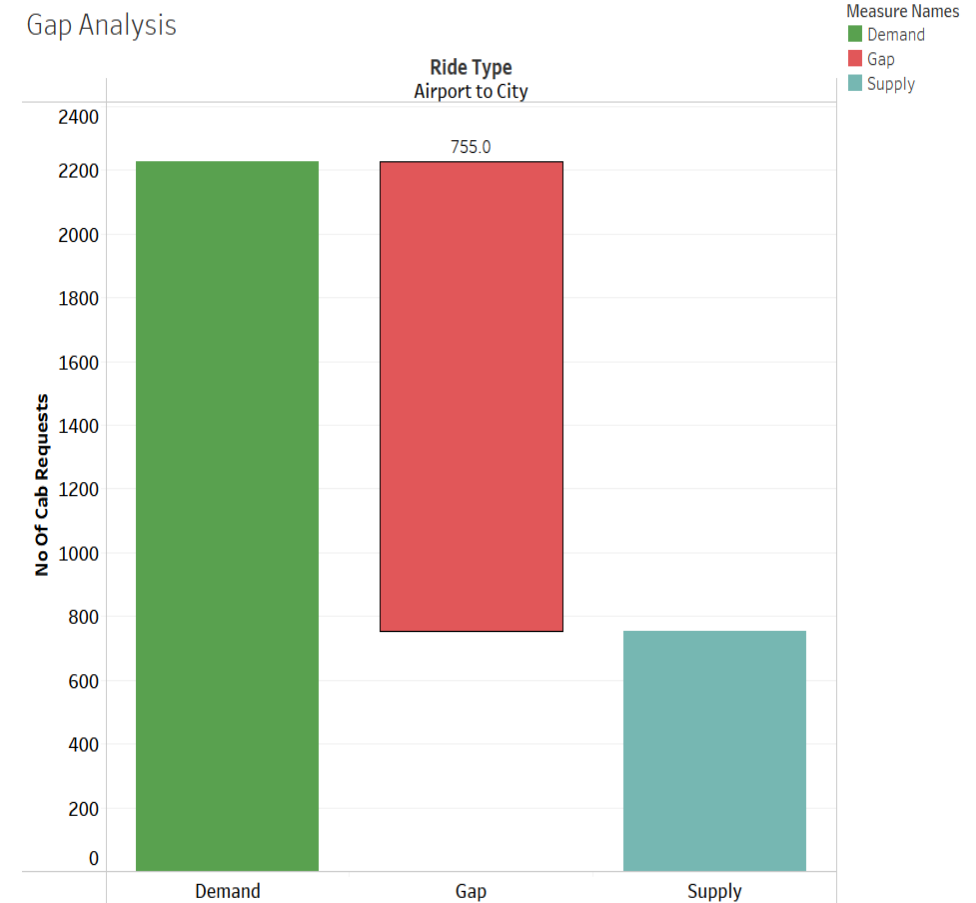# Analysis conclusion: Early Morning peak hour issue.

- Early morning (5 am to 9 am) peak hour issue as identified in previous slides can be due to the fact that the early morning rides have a higher median of time taken to reach the airport than the rides throughout the day.

- Exhibit plot: Median for Early morning drops are higher than full data average of 52.57.

Average Ride Time

Analysis conclusion: Evening no cabs available.

- Evening (5 pm to 9 pm) no cabs issue as identified in previous slides can be associated to the fact that there is a big shortage of cabs as compared to the amount of requests coming in between those hours.

- Additionally as seen in the analysis very less number of cabs are completing rides to airport before the demanding hours which is also a cause of less influx of cabs.

- Exhibit plot confirms this. Only 34% of requests were fulfilled during this time.

Gap Analysis

Ride Type
Airport to City

Measure Names
Demand
Gap
Supply

Recommendations

- Problem 1: Early morning high cancellations seen during the hours of 5 to 9 am are caused due to the facts:
    1. It takes more time for the cabs to reach airport. This could be attributed to heavy traffic.
    2. There lot of flights departing from the airport and very less landing causing a lot of idle time for drivers.

It is recommended to give some monetary incentive to drivers during this time so they accept more requests in spite heavy traffic. This could include charging the passengers more.

- Problem 2: Evening high number of cab unavailability between 5 to 9pm as seen is caused by a heavy shortage of cabs. This might be due to less number of outgoing flights hence less number of cabs coming from city to airport.

It is suggested to increase the number of cabs during this time to make up for the shortage of cabs.