

UBER SUPPLY DEMAND GAP

- **Project Title** : Uber Supply Demand Gap
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- **Company** : LABMENTIX
- **Date** : 22.06.2025
- **Tools Used** : PYTHON, POWER BI, SQL, EXCEL

PROJECT SUMMARY

Uber Supply Demand Gap

This project focuses on analysing cab booking data using **Power BI** to identify key business trends and uncover actionable insights. The goal was to explore trip patterns, driver activity, and supply-demand mismatches using interactive visual dashboards.

The dataset includes fields such as Request ID, Pickup Point, Driver ID, Trip Status, Request Time, and Drop Time. With Power BI's visual tools, we performed detailed data exploration after cleaning the data in Python. We handled missing values, merged date and time columns, created new fields like Trip Duration, and built calculated measures for deeper insights.

Power BI visuals such as **bar charts, slicers, line graphs, and cards** helped break down the performance and patterns. A slicer was used to filter the data based on Trip Status (e.g., Completed, Cancelled), allowing dynamic filtering of visuals.

One key insight showed that most ride **cancellations and “No Cars Available” cases occurred during early morning hours**, especially at the airport pickup point. On the other hand, **trip completions peaked between 6 AM to 9 AM**, highlighting a demand-supply imbalance. Another visual showed the **top 10 drivers** by completed trips, which helped evaluate driver performance.

The **heatmap** in Power BI revealed correlations between numeric fields such as trip duration and request hours. **Line charts** and **bar charts** helped track the number of requests and driver availability across different hours and locations.

Finally, a visual card displayed key metrics like **total ride requests**, and slicers allowed users to analyze specific statuses or time slots. This makes the dashboard highly interactive and informative for business decision-makers.

The project successfully demonstrates how Power BI can turn raw cab booking data into easy-to-understand visuals, helping stakeholders improve **driver allocation, reduce cancellations**, and enhance **overall service efficiency**.

DATA DESCRIPTION

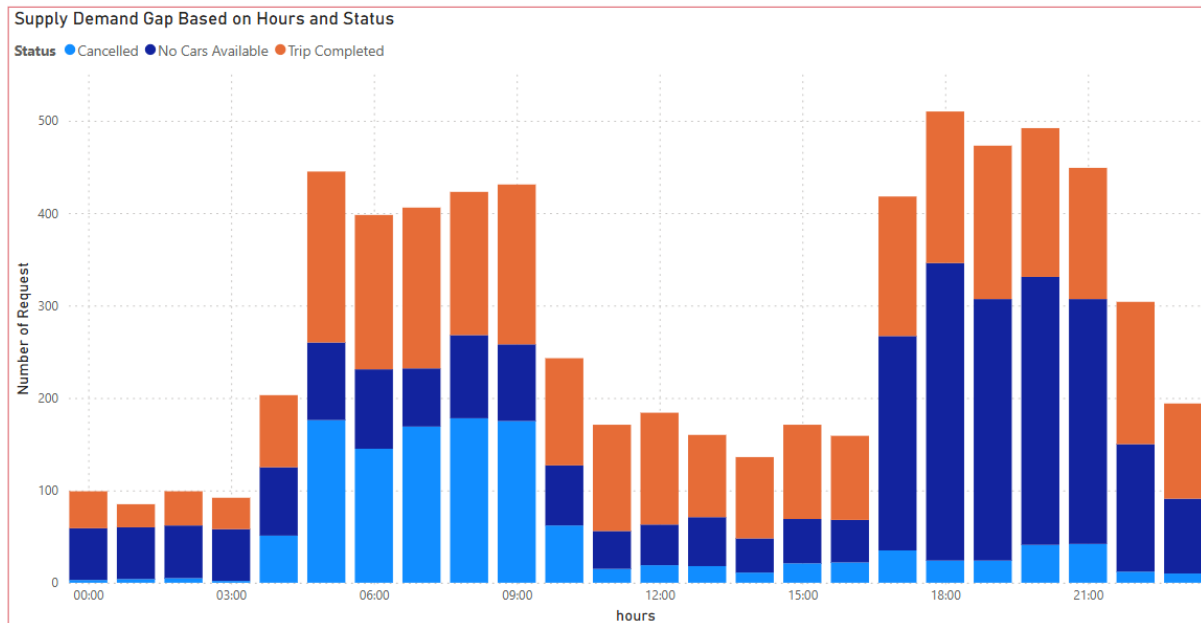
The data we used in this project comes from a cab booking company. Each row in the dataset shows one ride request made by a customer. This information helps us understand when and where people are booking rides, whether they were completed or not, and how the drivers are being assigned.

Below is a simple explanation of each column in the data:

- **Request ID**
This is a unique number given to every ride request. Think of it like a booking number for each trip.
- **Driver ID**
This tells us which driver was assigned to the ride. If no driver was available or if the ride was cancelled, this box might be empty.
- **Pickup Point**
This shows where the ride was requested from — usually either **City** or **Airport**. It helps us see which locations have more demand.
- **Status**
This tells us what happened with the ride. The status can be:
 - "Trip Completed" — the ride was successful.
 - "Cancelled" — the customer or driver cancelled the ride.
 - "No Cars Available" — there were no drivers available to accept the ride.
- **Request Timestamp**
This tells us exactly when the customer made the booking — including both the date and time. We used this to find out what time of day people usually book rides.
- **Drop Timestamp**
This shows when the ride ended (only if the trip was completed). Using this and the request time, we can calculate how long the trip took.

VISUAL INSIGHTS

1. Supply Demand Gap Based on Hours and Status



Insights:

This is a **stacked bar chart** showing the **supply-demand gap based on hours and trip status** (Completed, Cancelled, No Cars Available).

1. Peak Demand Hours:

- The number of ride requests is **highest during morning hours (5 AM to 10 AM) and evening hours (5 PM to 10 PM)**.
- These are the **busiest hours** of the day when people likely commute to and from work or travel to the airport.

2. Supply Issues (Gaps):

- During these peak hours, we see a **large portion of orange (Cancelled) and blue bars (No Cars Available)**.
- This means many users could not get a cab due to **driver shortage or cancellations**, especially during morning and evening rush hours.

3. Unmet Demand:

- Even though trip requests are high, not all of them are getting completed.
- **The presence of a large number of "No Cars Available" between 5–9 AM and 6–9 PM indicates a clear supply-demand mismatch.**

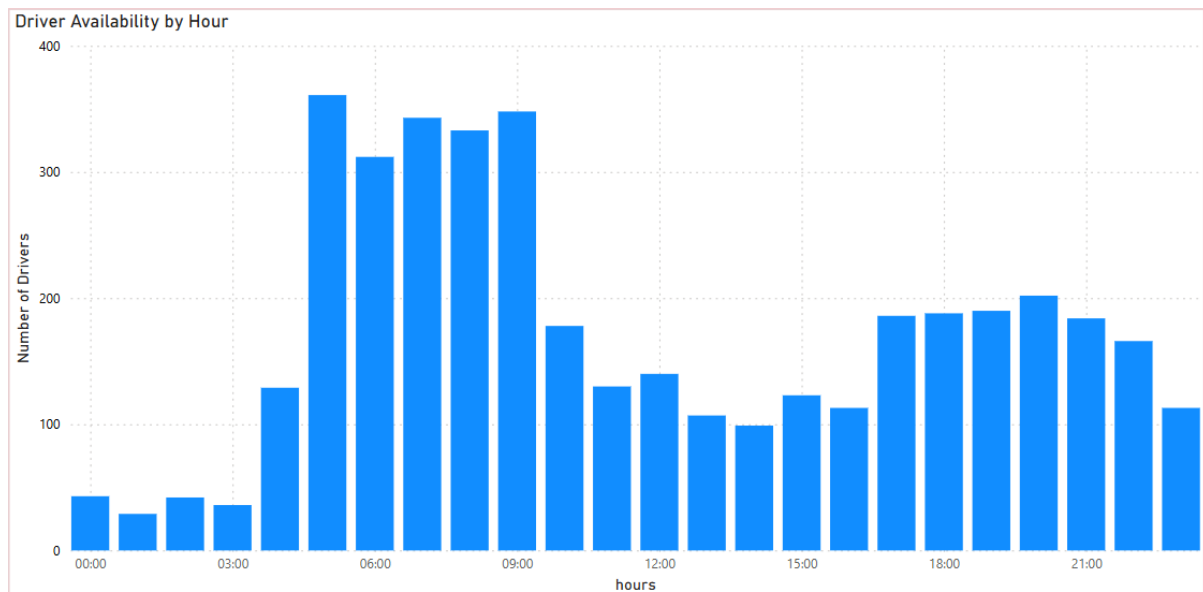
4.Operational Bottleneck:

- Between **5 AM and 10 AM**, the unavailability is quite prominent — pointing to a need for **more drivers during these hours** or **better driver allocation**.

Business Impact:

- This visual tells us **when customers face the most trouble getting a ride**, which helps the company plan better:
 - **Add more drivers** during high-demand hours.
 - **Incentivize drivers** to work at peak times.
 - Use demand prediction to **reduce cancellations and improve customer satisfaction**.

2.Driver Availability by Hour



Insights:

This chart titled "**Driver Availability by Hour**" shows how many drivers are available throughout the day on an hourly basis.

1.Morning Peak Availability (5 AM – 10 AM):

- The **highest number of drivers are available in the morning**, especially between **5 AM to 9 AM**.
- This is likely because drivers know that ride demand is high during early office and airport rush hours, so they log in early to earn more.

2.Midday Drop (11 AM – 4 PM):

- There is a **noticeable drop in driver availability** during the late morning to afternoon period.
- This might be due to drivers taking breaks or assuming low demand during this off-peak period.

3.Evening Rise (5 PM – 9 PM):

- Driver availability picks up again in the evening, though **not as strongly as in the morning**.

- Still, a fair number of drivers are active, trying to catch evening office return trips and other ride requests.

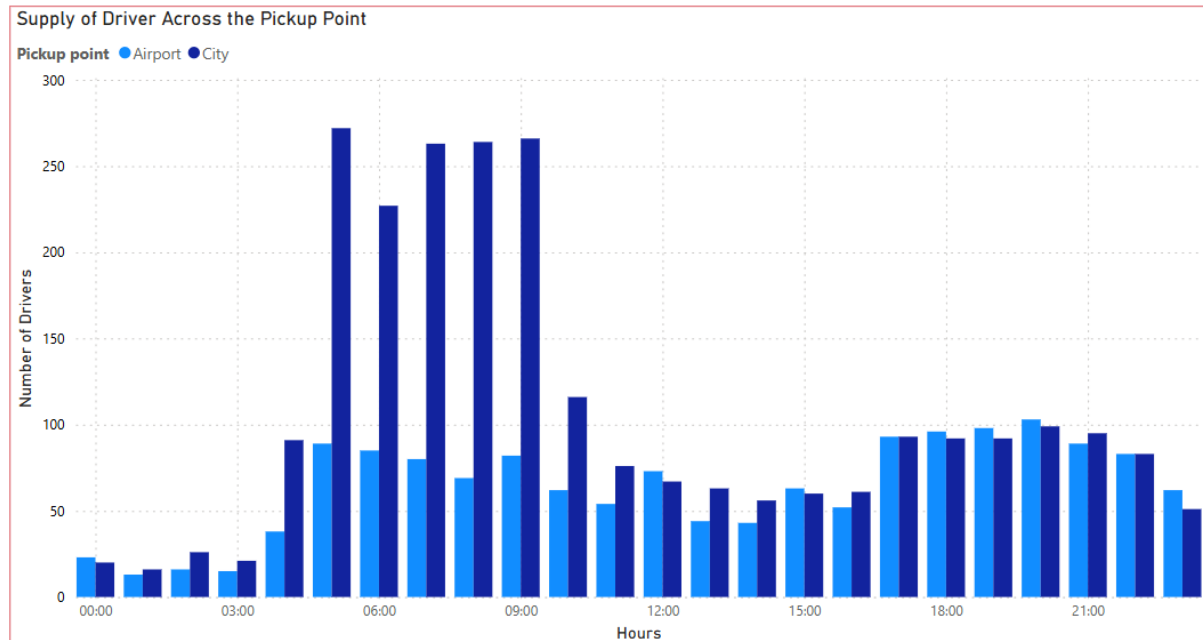
4.Late Night Low Availability (10 PM – 3 AM):

- Driver numbers drop sharply after 10 PM, with **very low availability during midnight to early morning hours.**
- This could lead to many unfulfilled requests during these hours and reflects a **service gap.**

Business Impact:

- **Driver Allocation Strategy:** The chart shows that **driver availability does not fully align with demand** in all time slots. The business could **incentivize drivers to cover low-availability hours.**
- **Improving Service at Night:** Boosting driver presence during the **late night and early morning** could reduce cancellations and improve customer satisfaction.
- **Data-Driven Shift Planning:** Helps operations team plan **shift rotations** for optimal driver distribution throughout the day.

3. Supply of Drivers Across the Pickup Point



Insights:

1. Uneven Distribution of Drivers:

- The chart clearly shows that one pickup point (e.g., **City**) has **more drivers available** compared to the other (e.g., **Airport**).
- This **imbalance in supply** can lead to issues like delays or cancellations in the underserved location.

2. Airport Pickup Point Faces Shortages:

- If the **Airport** has fewer drivers than the City, it can cause problems for passengers landing early or late at night.
- This is often where demand is **high but unpredictable**, especially during flight arrivals.

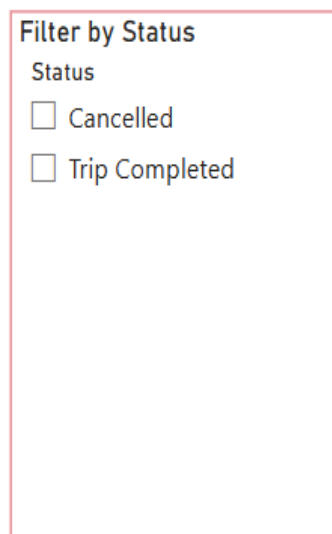
3. City Gets More Driver Attention:

- Drivers may prefer the **City** because it offers **shorter rides and higher trip frequency**, making it more profitable in less time.
- However, this can **leave the Airport under-served** during key hours.

Business Impact:

- **Driver Reallocation:**
 - The business can use this data to **reassign more drivers to the Airport during high-demand hours**, closing the service gap.
- **Incentives for Balance:**
 - Offering **incentives for drivers who choose Airport pickups** during peak hours can help distribute the supply better.
- **Improve User Satisfaction:**
 - By balancing supply across locations, **cancellations and wait times are reduced**, leading to better **customer experience**.

4 . Filter by Status



Filter by Status

Status

☒ Cancelled

☐ Trip Completed

Insights:

1.Trip Completion Trend:

- When filtered on “Trip Completed”, you can see which hours of the day or which pickup points have higher success rates in serving customers.
- For example, if most completions happen between 6 PM and 9 PM, it shows driver availability and customer satisfaction is strong in that period.

2.Trip Cancellation Analysis:

- Switching to “Cancelled” shows when and where the system fails to complete rides.
- You might observe that cancellations peak during morning hours or at a specific pickup point like the City — indicating operational issues, driver shortages, or low acceptance rates.

3.Identifying Problem Hours:

- Comparing both filters reveals what hours consistently struggle to convert requests into completed trips.
- These time slots become targets for improvement strategies, such as scheduling more drivers or reducing app wait times.

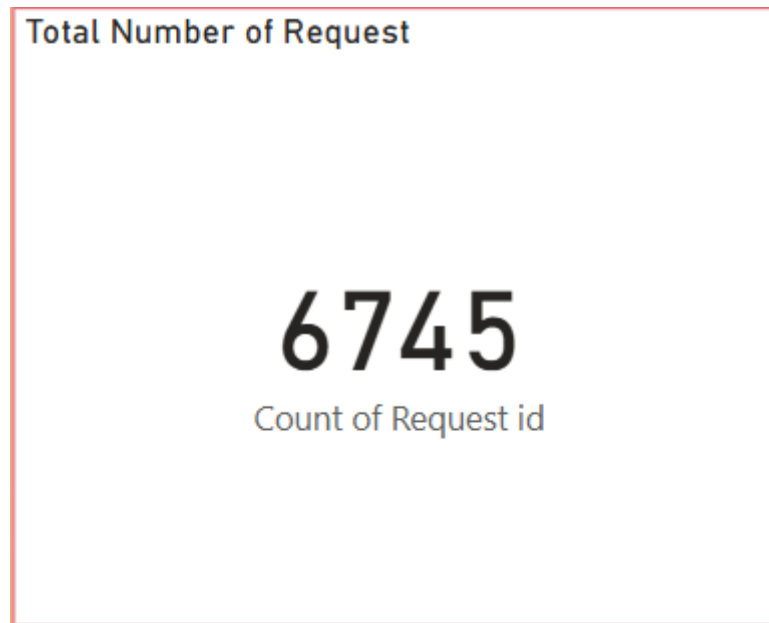
4.Demand vs. Fulfilment Clarity:

- This slicer-based view clearly shows how much of the demand gets fulfilled (completed) vs unfulfilled (cancelled), helping decision-makers act faster.

Business Impact:

- Operational Improvements: Identify hours with frequent cancellations and assign more drivers accordingly.
- Customer Retention: Understanding why cancellations happen helps improve customer experience and reduce app uninstalls.
- Smart Incentives: Give driver bonuses for completing trips during high-cancellation time slots.
- Data-Driven Planning: Helps align supply (drivers) better with demand (requests).

5.Total Number of Request:



Insights:

1.Overall Demand Measurement:

- The total number of Request_id reflects the total trip requests made by users during the given period.
- This is a direct indicator of customer demand and platform usage.

2.Business Scale Indicator:

- A high number of trip requests means the business is actively used, and there's strong customer engagement.
- It gives a sense of how busy or popular the service is.

3.Baseline for Comparison:

- This value helps in comparing performance across different time periods (e.g., this month vs last month).
- It also helps evaluate the success rate (completed trips vs total requests).

4.Planning for Resources:

- Knowing the total requests helps the business plan for driver supply, especially during peak hours or in high-demand locations.

Business Impact:

- **Helps in Demand Forecasting:**

Knowing the total number of requests helps the business predict future demand and plan accordingly. It ensures the right number of drivers are available at the right time and place.

- **Improves Service Efficiency:**

By tracking request volume, the company can identify peak hours and allocate resources better, reducing customer wait time.

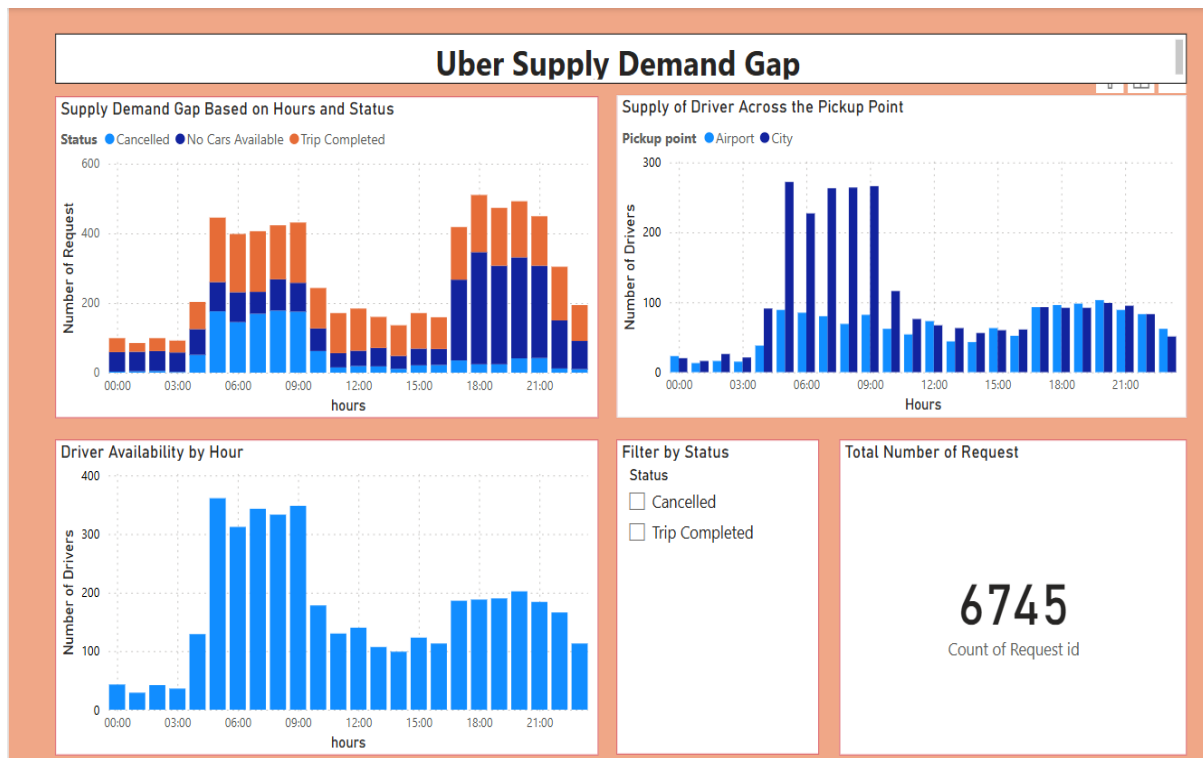
- **Supports Decision Making:**

Business teams can use this data to make strategic decisions — like launching offers during high-demand periods or boosting driver incentives.

DASHBOARD OVERVIEW

The dashboard below brings together all the visuals in one place, helping to analyze the data more effectively.

Each chart has already been explained, but this full view shows how they work together to uncover patterns, trends, and insights for better decision-making.



CONCLUSION

In this project, I used **Power BI** to turn the cab booking data into easy-to-understand visuals. These charts helped me clearly see **when people book rides, how many trips get completed, and where problems like cancellations or no cars available happen.**

One of the key things I found was that during busy hours—like early morning or evening—**many ride requests don't get completed**, especially from places like the **Airport**. This shows that there aren't always enough drivers available when demand is high.

By putting all the visuals together in one dashboard, I was able to see **how everything is connected** — like how trip status changes by time or location. This makes it easier for the company to understand what's going wrong and where they can improve.

Overall, Power BI helped me **analyze the data quickly, visually, and more clearly**, which can help the business **make smarter decisions and give a better experience to their users.**