

DELIVERY DRIVER PERFORMANCE ANALYSIS

by

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INTRODUCTION



The dataset concerns an **express delivery service** for **food and beverage** orders from restaurants and eateries, which are transported to customers. The data covers the period **in 2022**.

During the process of delivering food to customers, various factors may arise that negatively impact the quality of the delivery service. This analysis aims to **identify the key factors affecting delivery performance** and propose solutions to **improve the overall efficiency and effectiveness of the service**.

- The analysis focuses on the delivery performance of drivers.
- The dataset consists of **11,399 rows and 19 columns**

AGENDA

01 CONTEXT

02 IDENTIFY THE FACTORS AFFECTING DRIVER DELIVERY PERFORMANCE

03 HOW TO OPTIMIZE DELIVERY PERFORMANCE

04 CONCLUSION & RECOMMENDATION



DATA DICTIONARY

Column	Description
ID	Order ID
Delivery_person_ID	Delivery person ID
Delivery_person_Age	Age of the delivery person
Delivery_person_Ratings	Customer rating for the order
Restaurant_latitude	Latitude of the restaurant location (decimal degrees)
Restaurant_longitude	Longitude of the restaurant location (decimal degrees)
Delivery_location_latitude	Latitude of the delivery location (decimal degrees)
Delivery_location_longitude	Longitude of the delivery location (decimal degrees)
Order_Date	Order date
Time_Orderd	Time the order was placed
Time_Order_picked	Time the order was picked up
Time	Time taken for the delivery person to arrive at the restaurant

DATA DICTIONARY

Column	Description
Road_traffic_density	Road traffic density
Vehicle_condition	Vehicle condition (rated from 0 to 2, where 0 = normal and 2 = good)
Type_of_order	Type of food and beverage ordered
Type_of_vehicle	Type of delivery vehicle (mainly two-wheelers used for urban food deliveries)
Multiple_deliveries	Indicates if the delivery includes more than one order
Festival	Indicates whether the order was placed during a festival (Yes) or not (No)
City	Urban classification
Weather	Local weather condition at the time of the order
Day	Day of the week
Distance	Distance from the delivery person to the restaurant

ANALYSIS PERSONAL FACTORS AFFECTING DELIVERY PERFORMANCE

Average Times (Minute)

10.04

Average Ratings

4.63

Type_of_order

Buffet

Drinks

Meal

Snack

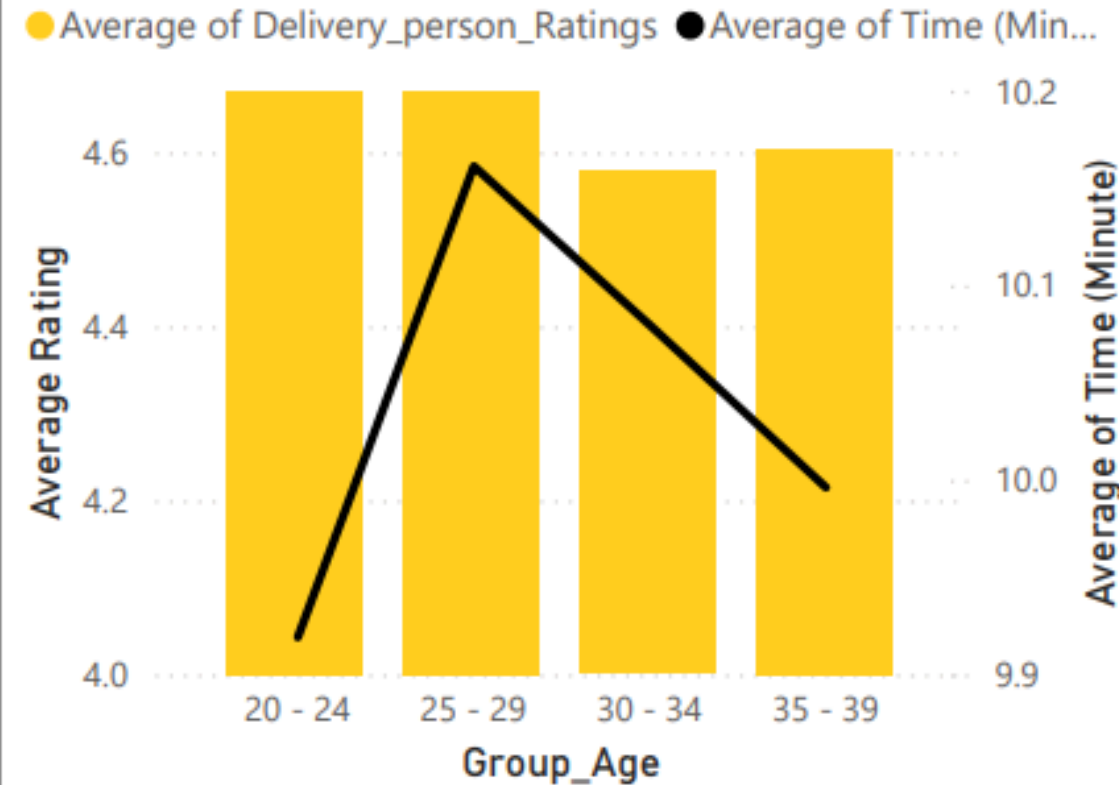
1/3/2022



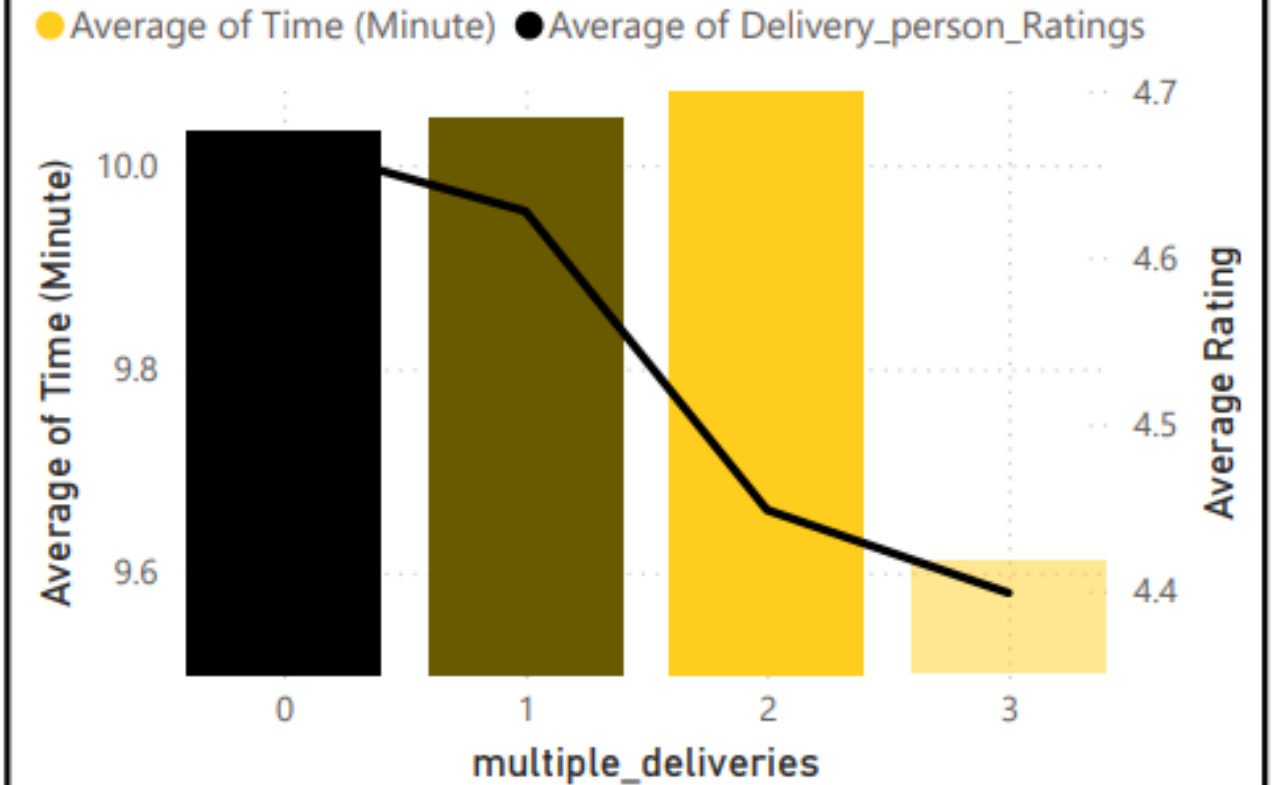
12/3/2022



Average Times and Average Ratings of Group Age

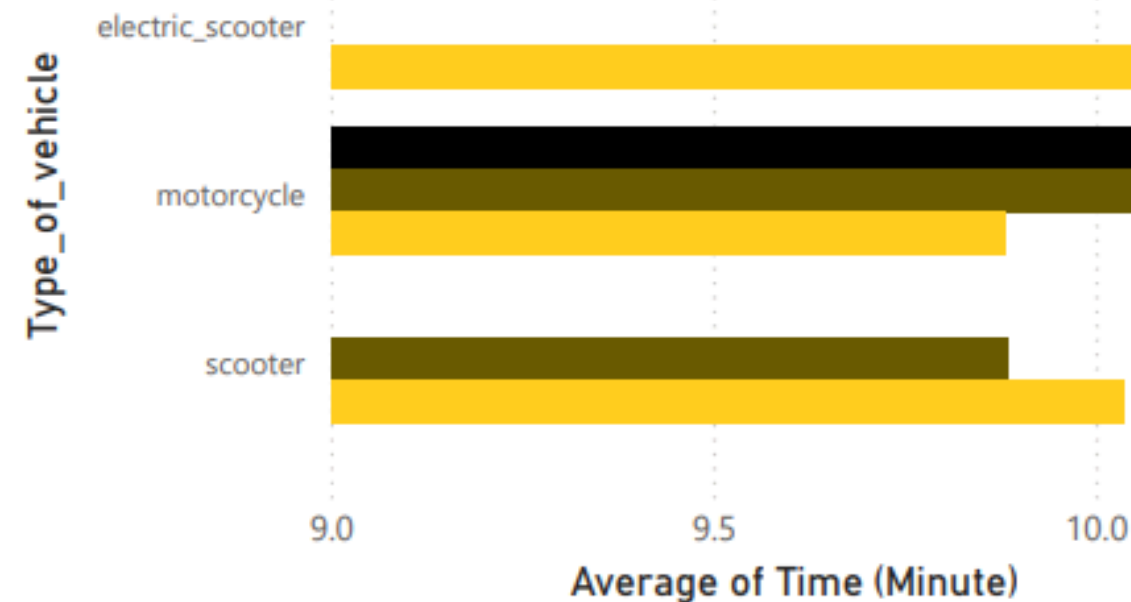


Average Times and Average Ratings of Multiple deliveries



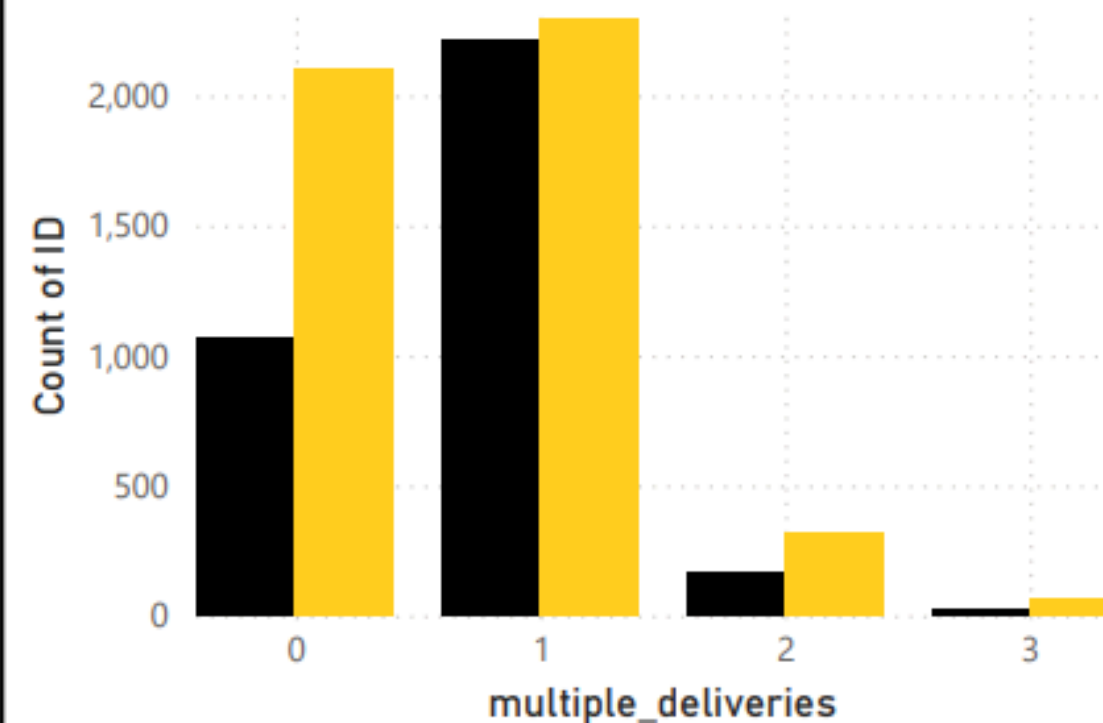
Type and condition of vehicle

Vehicle_condition ● 0 ● 1 ● 2



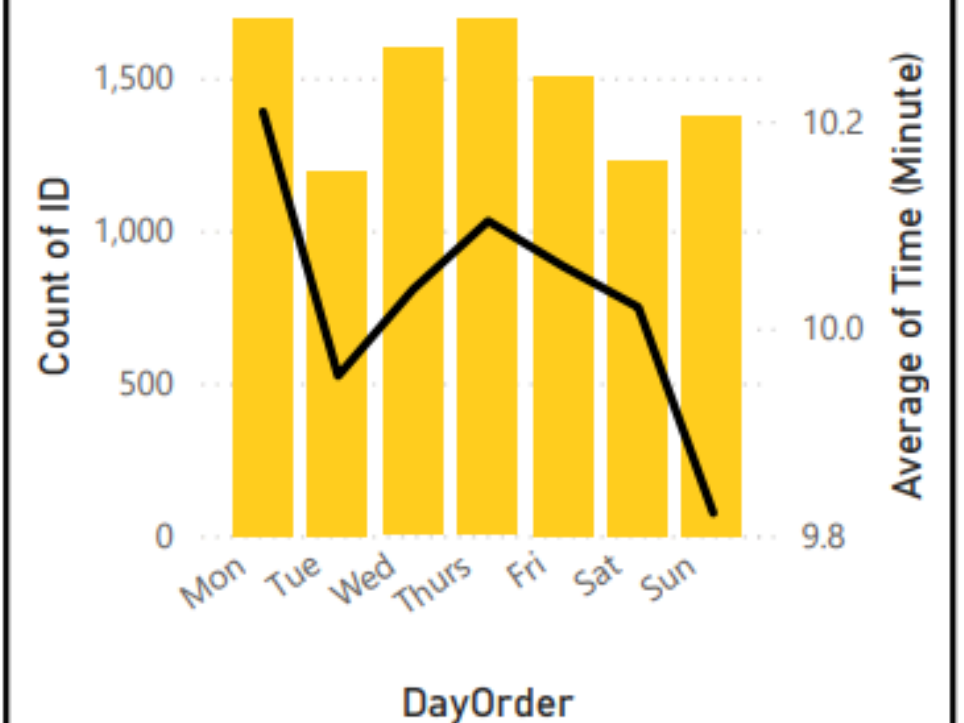
Delivery Status of Multiple deliveries

Delivery Status ● Late ● On time



Average Time by Day of the Week

● Count of ID ● Average of Time (Minute)



ANALYSIS ENVIROMENTAL FACTORS AFFECTING DELIVERY PERFORMANCE

1/3/2022



12/3/2022



Type_of_order



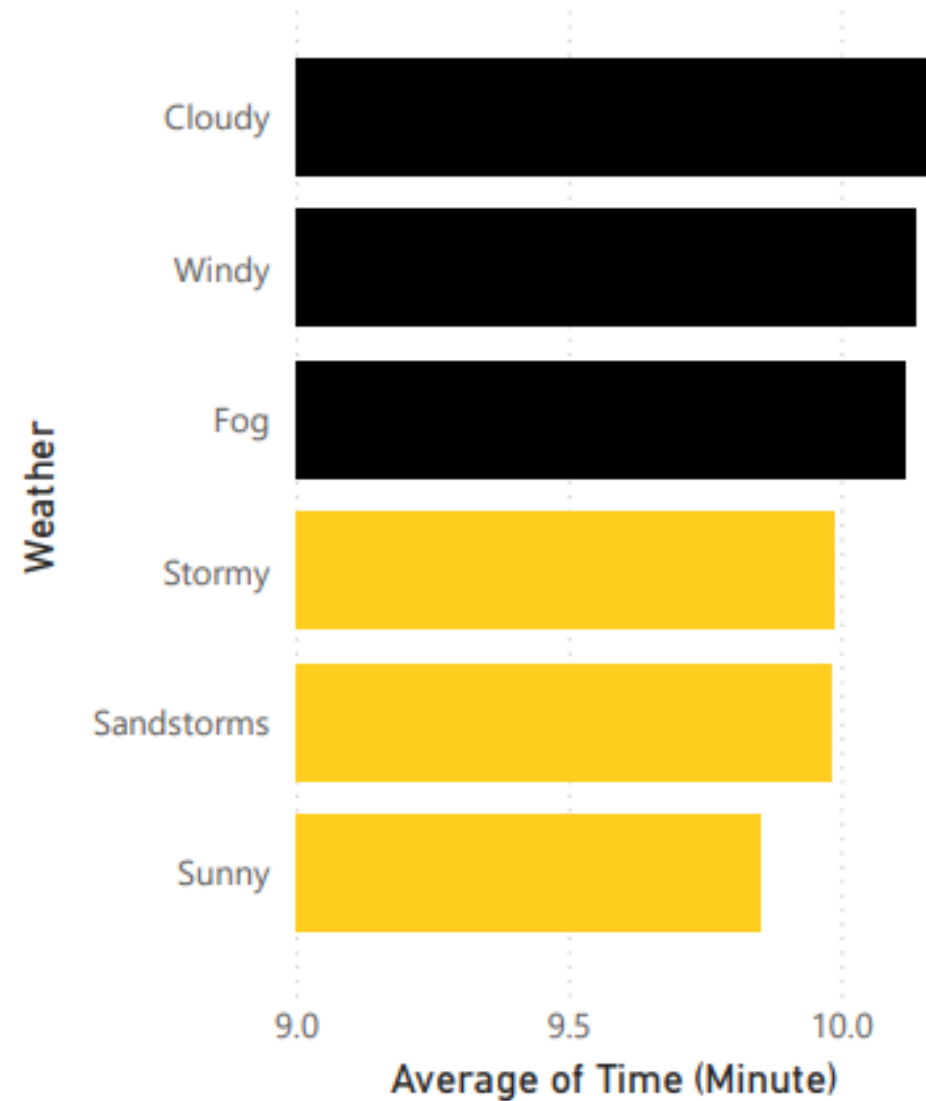
Buffet

Drinks

Meal

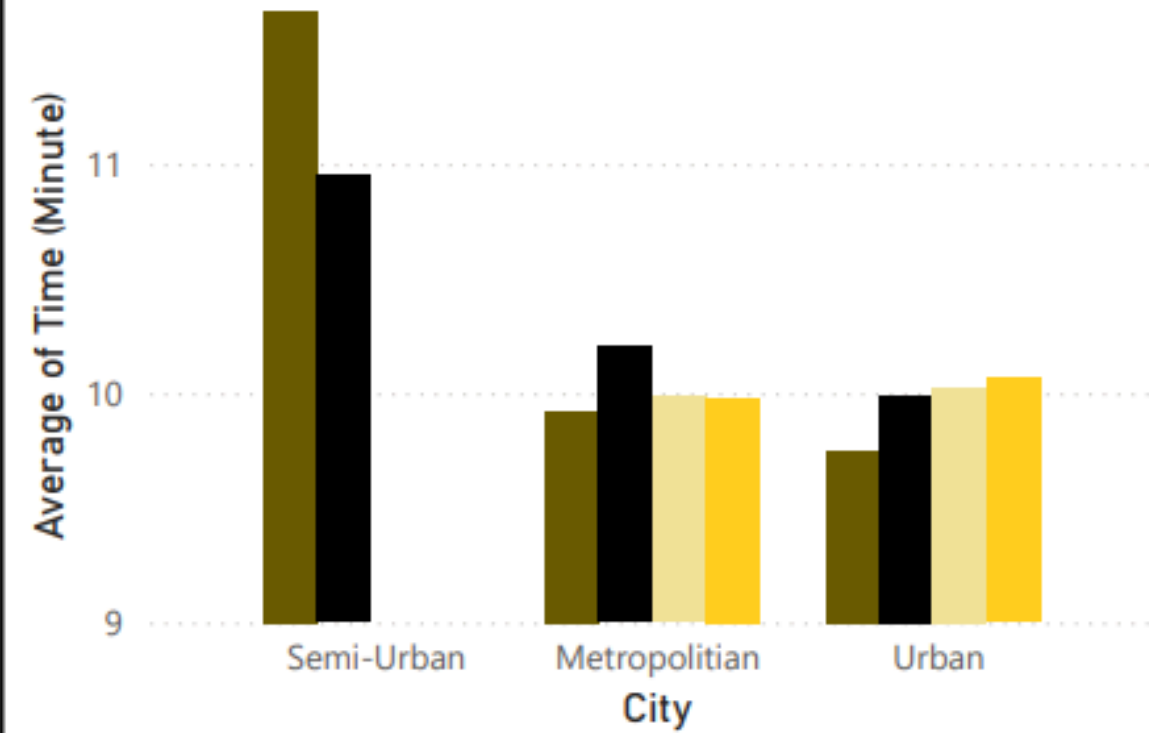
Snack

Average Delivery Time by Weather Condition

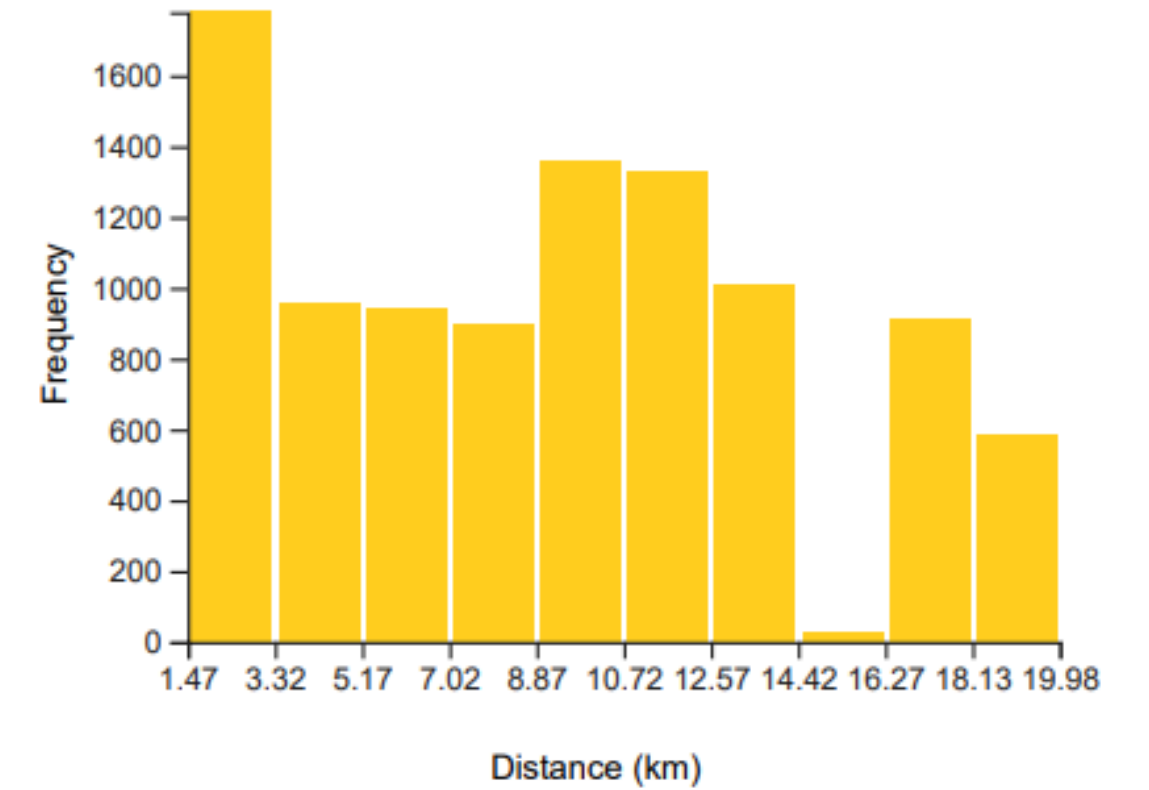


Average Delivery Time by City and Traffic Density

Traffic_density ● High ● Jam ● Low ● Medium

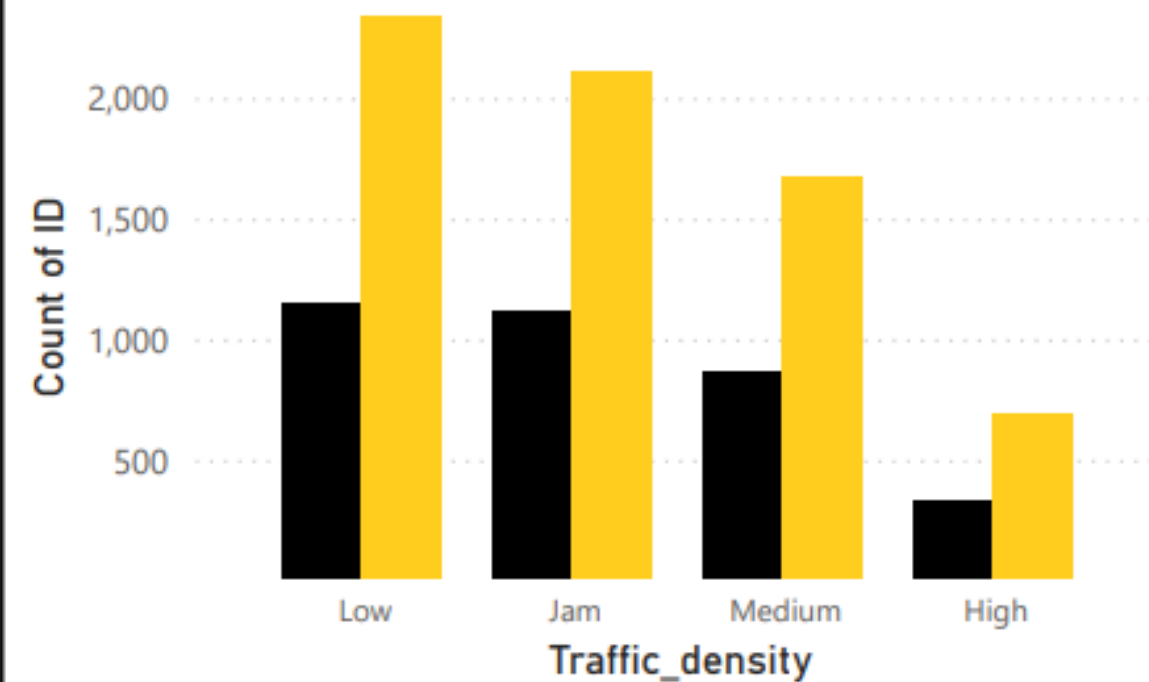


Total Order by Distance (km)



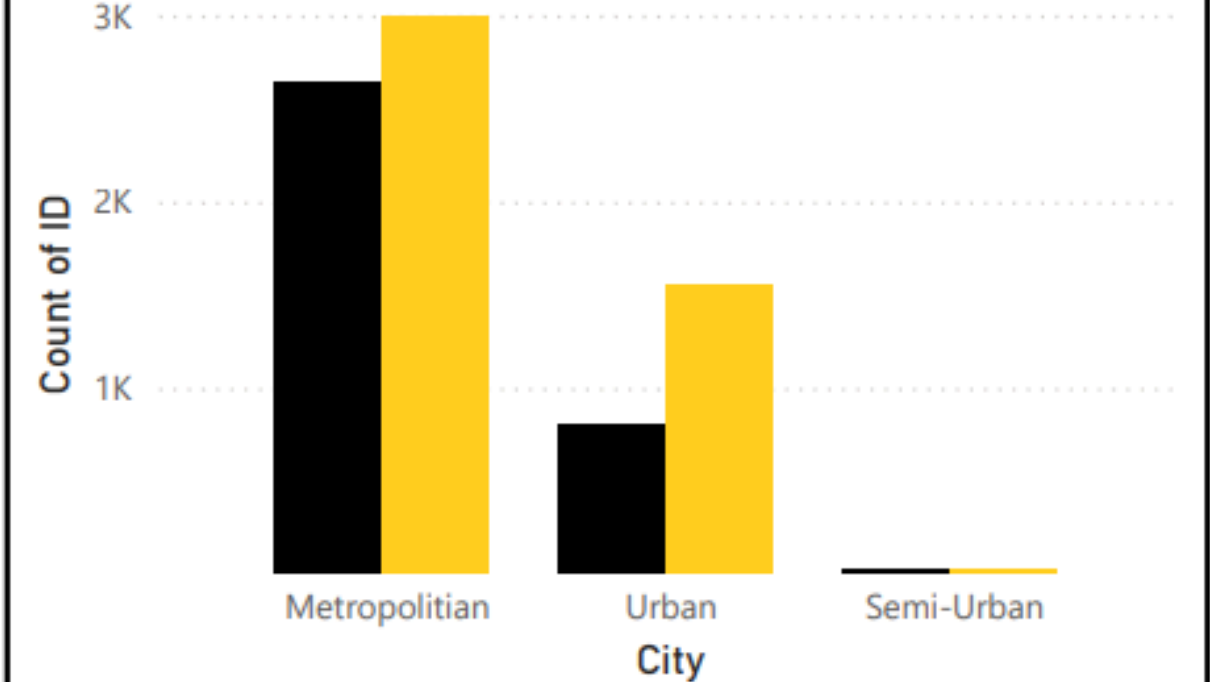
Delivery Status by Road Traffic Density

Delivery Status ● Late ● On time



Delivery Status by City

Delivery Status ● Late ● On time



CORRELATION ANALYSIS BETWEEN PERSONAL FACTORS AND ENVIROMENTAL FACTORS

1/3/2022



12/3/2022



Average Times (Minute)

10.04

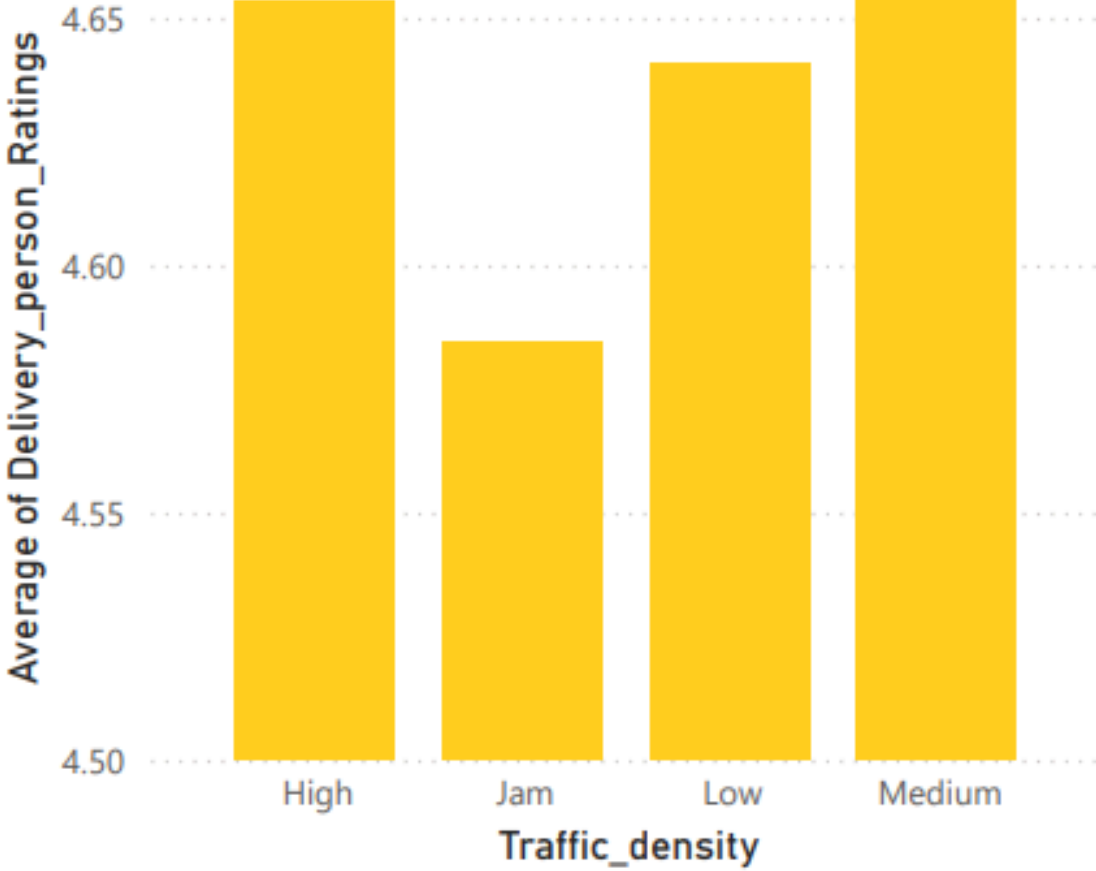
Average Ratings

4.63

Average Age

29.56

Average Ratings by Traffic Density



Type_of_order



Buffet

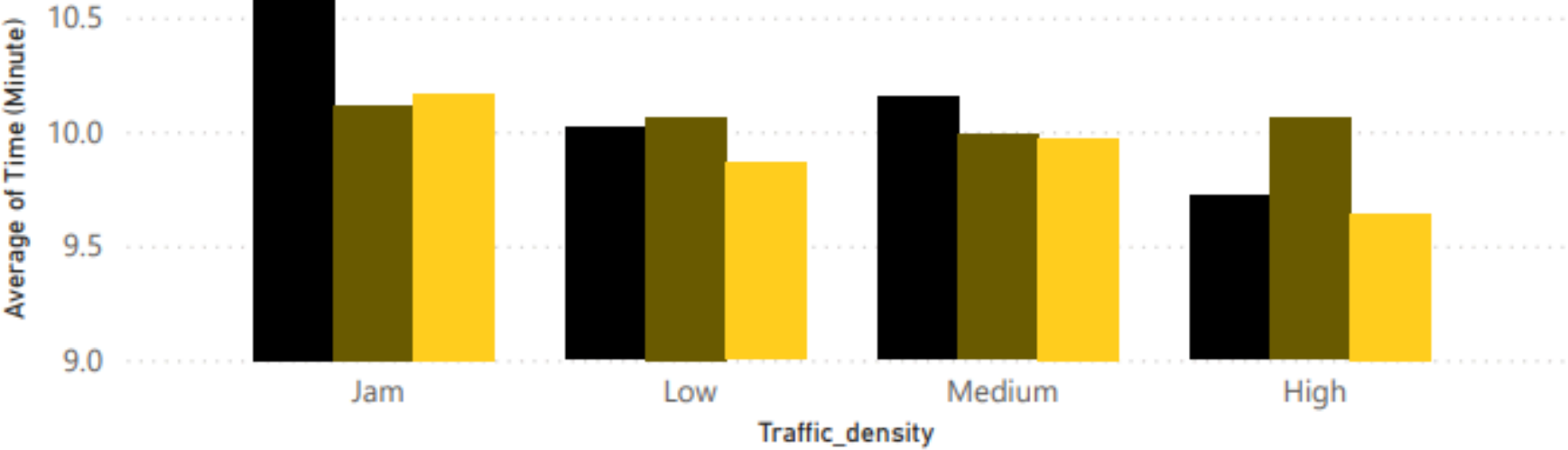
Drinks

Meal

Snack

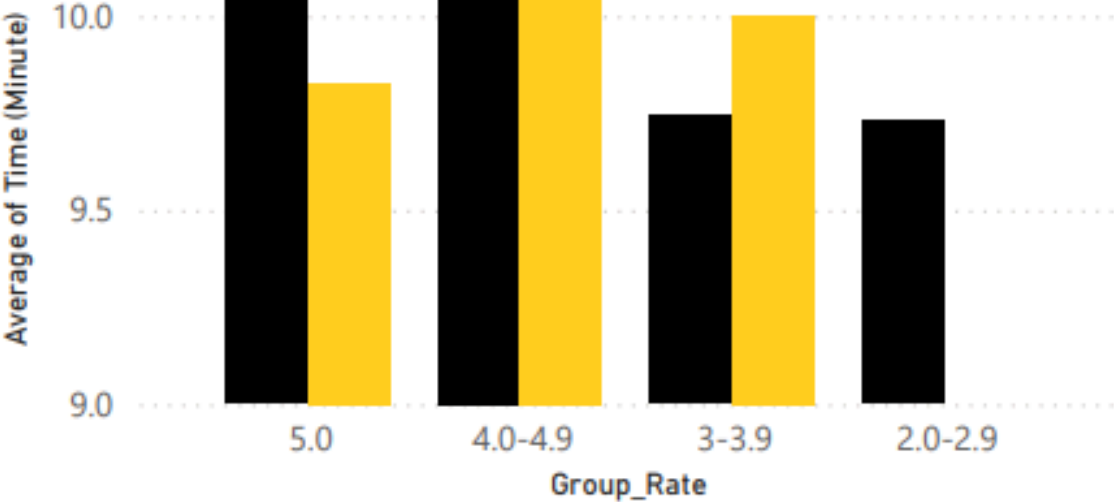
Average Delivery Time by Traffic Density and Type of vehicle

Type_of_vehicle ● electric_scooter ● motorcycle ● scooter



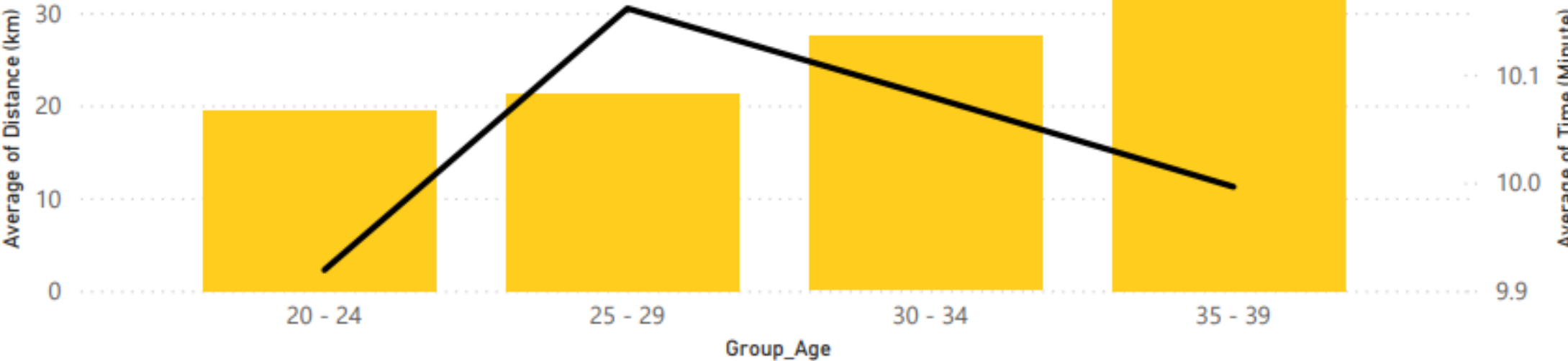
Average Delivery Time by Group Rate in Festival

Festival ● No ● Yes



Average Delivery Time and Distance of Group Age

● Average of Distance (km) ● Average of Time (Minute)





The dashboards presented here were created as part of my work **analyzing factors** affecting delivery performance.

They are intended to support data-driven decision making, provide operational insights, and highlight areas for improvement.

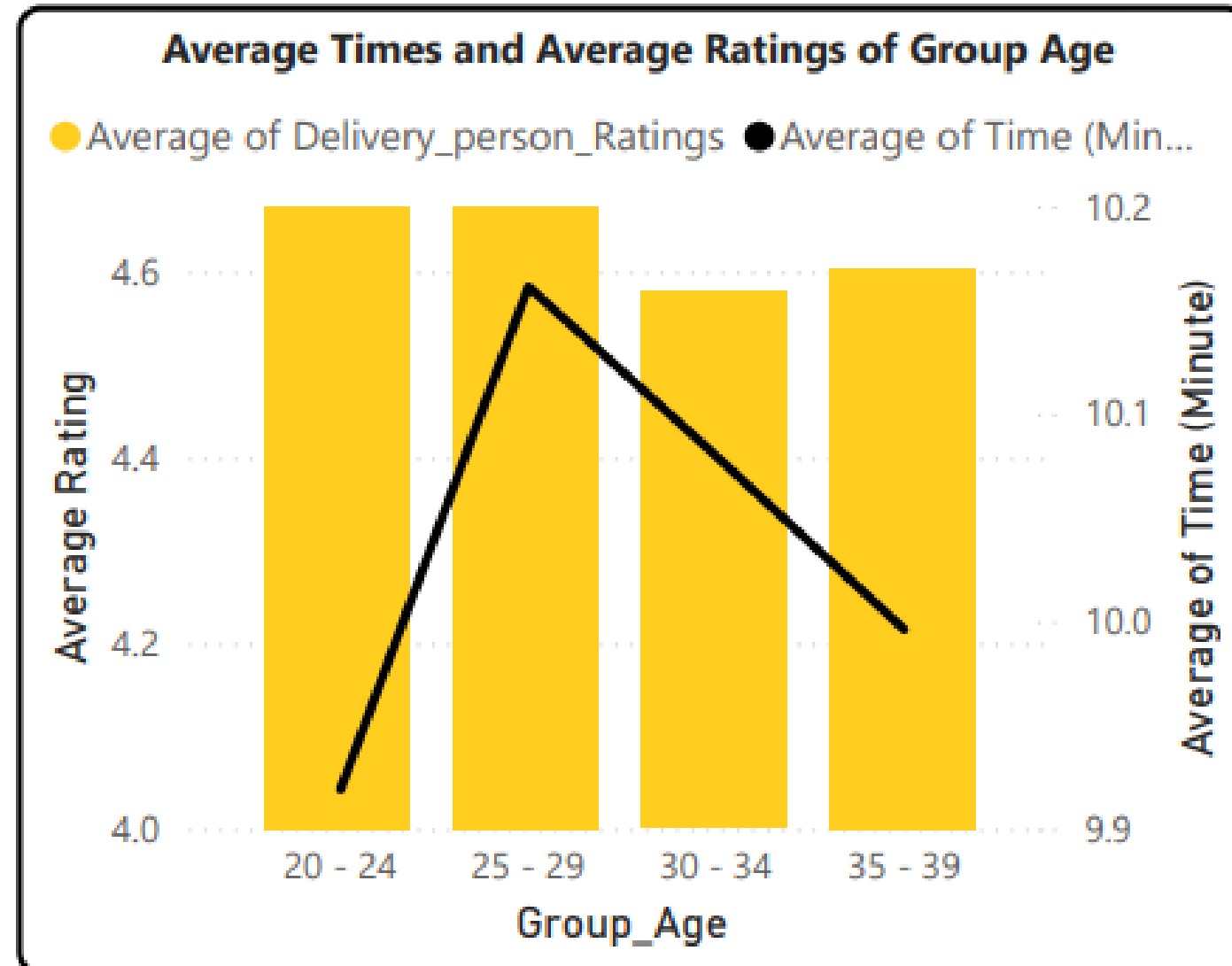
Based on these dashboards, I will now provide a **deeper analysis** and **interpretation** of the findings.

02

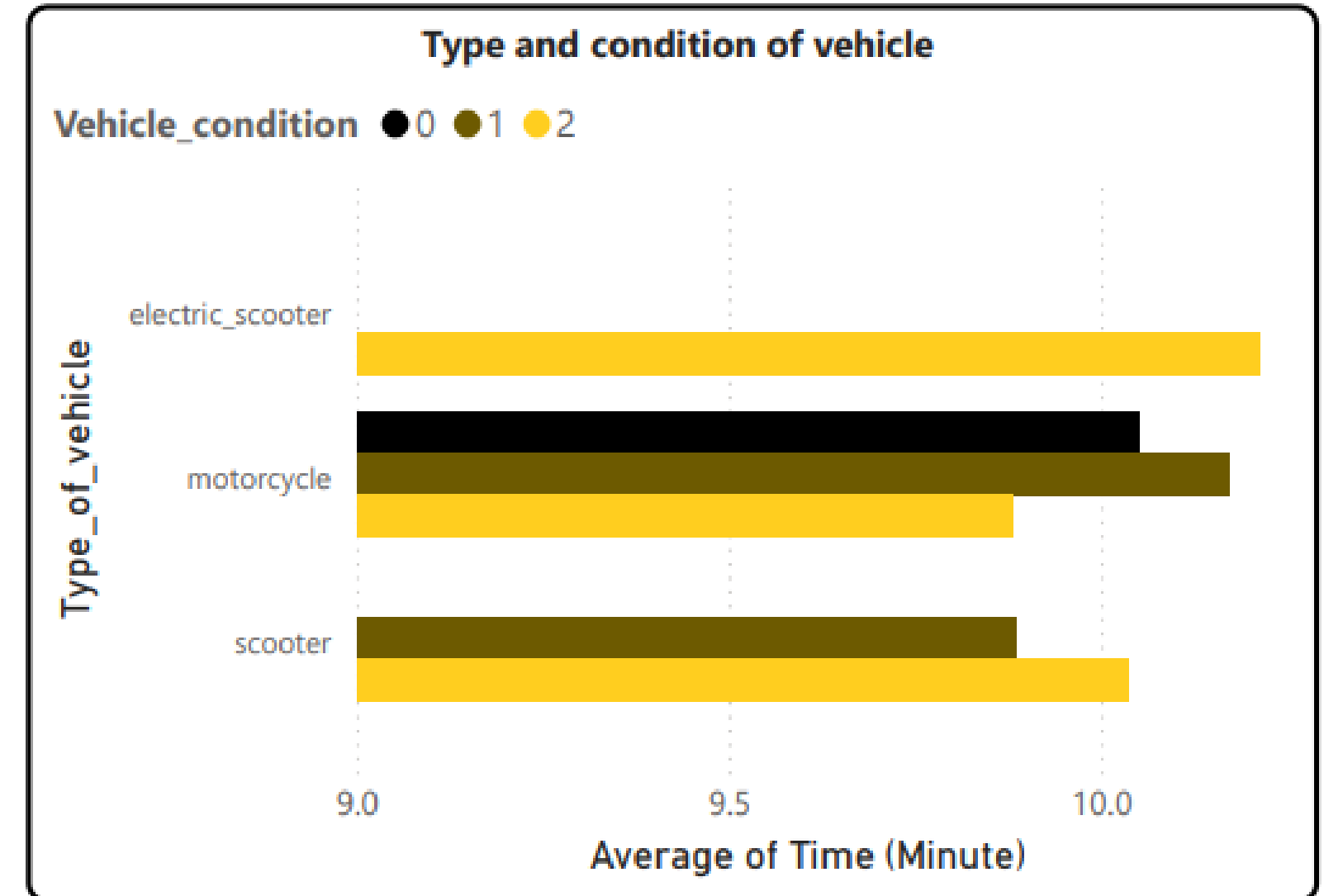
IDENTIFY THE FACTORS AFFECTING DRIVER DELIVERY PERFORMANCE



ANALYSIS PERSONAL FACTORS AFFECTING DELIVERY PERFORMANCE

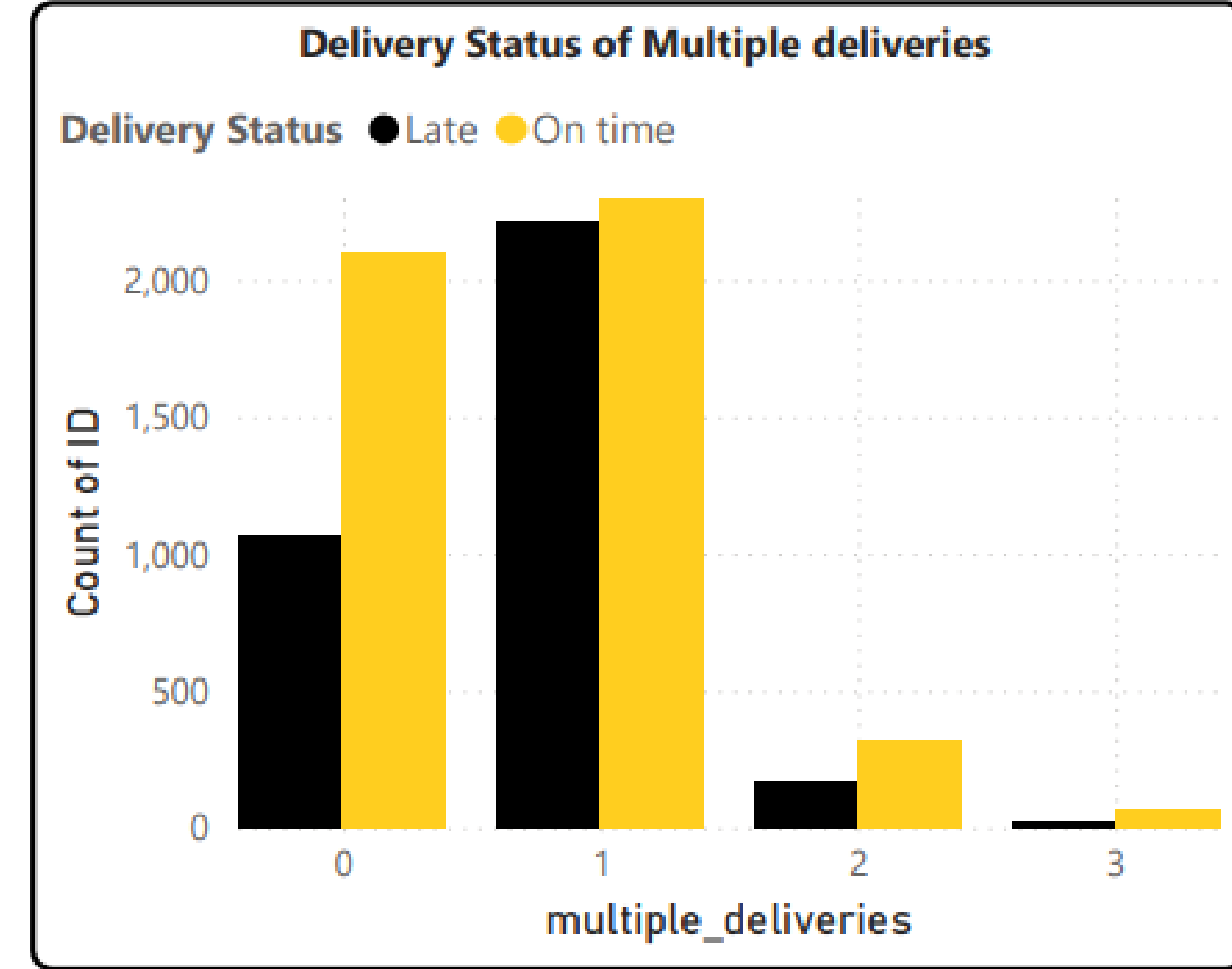
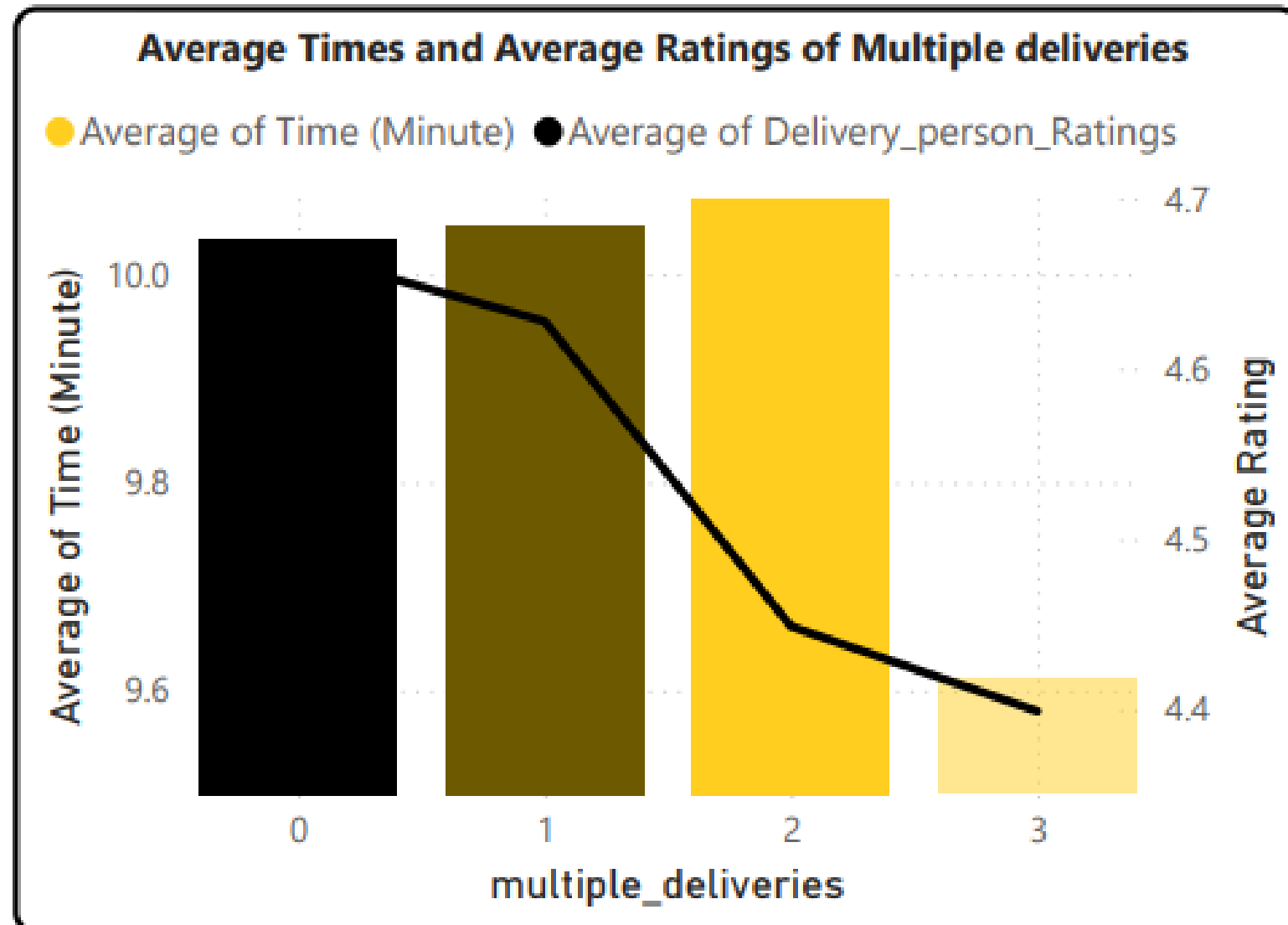


- The **20–24 age** group demonstrates **the best overall performance**, combining high customer ratings (~4.65) with efficient delivery times (~9.9 minutes)
 - In contrast, the **25–29 age** group has the same high ratings (~4.65) but shows the **slowest delivery times** (~10.1 minutes)
- => This suggests that the younger age group (20–24) strikes an effective balance between speed and service quality



- **Motorcycle** has the **fastest** delivery times, especially when they are in good condition
 - On the other hand, **electric scooter** tends to have the **longest** delivery times, even though the vehicle condition is very good
- => Using **motorcycle** is the **optimal choice** for faster deliveries

ANALYSIS PERSONAL FACTORS AFFECTING DELIVERY PERFORMANCE

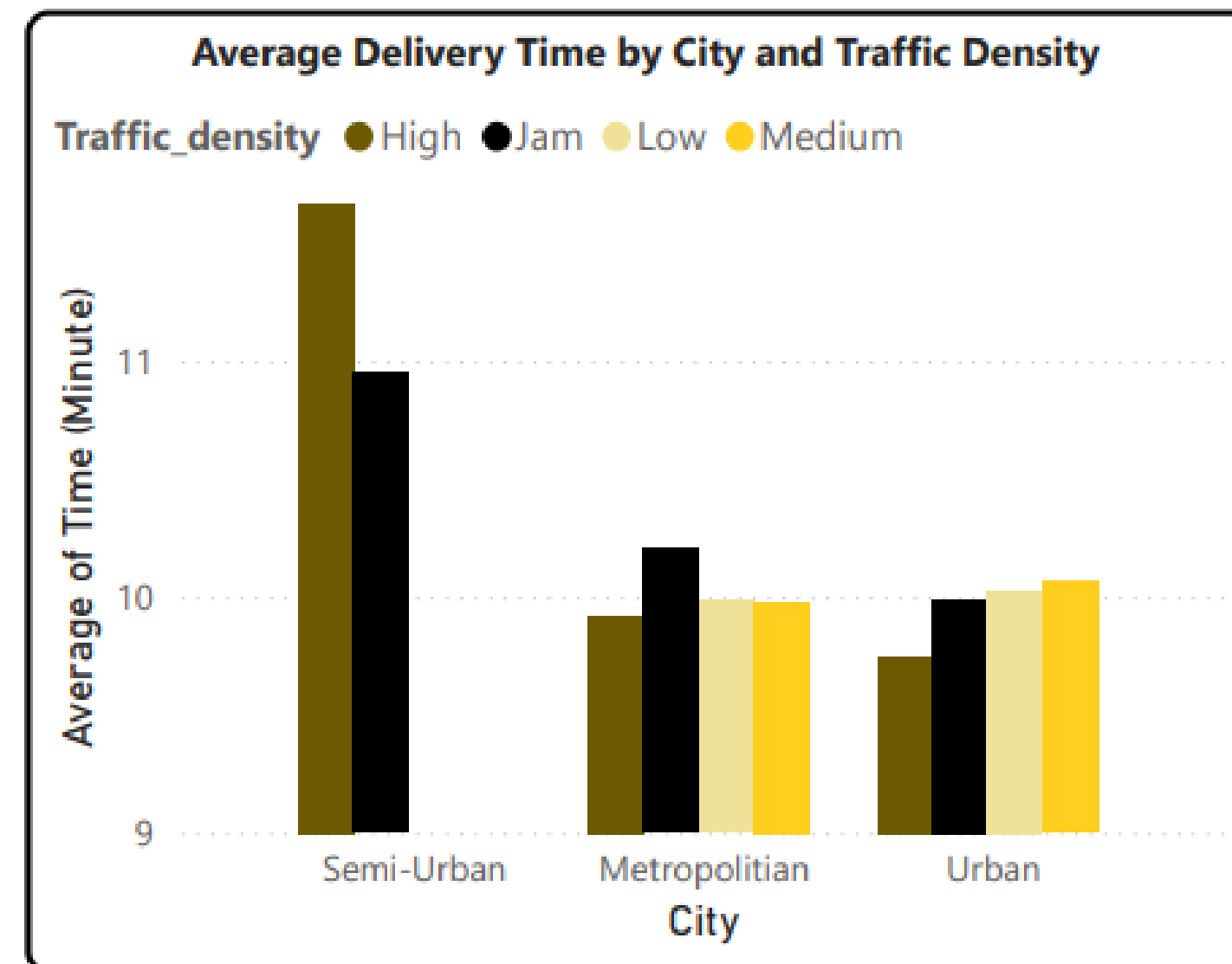
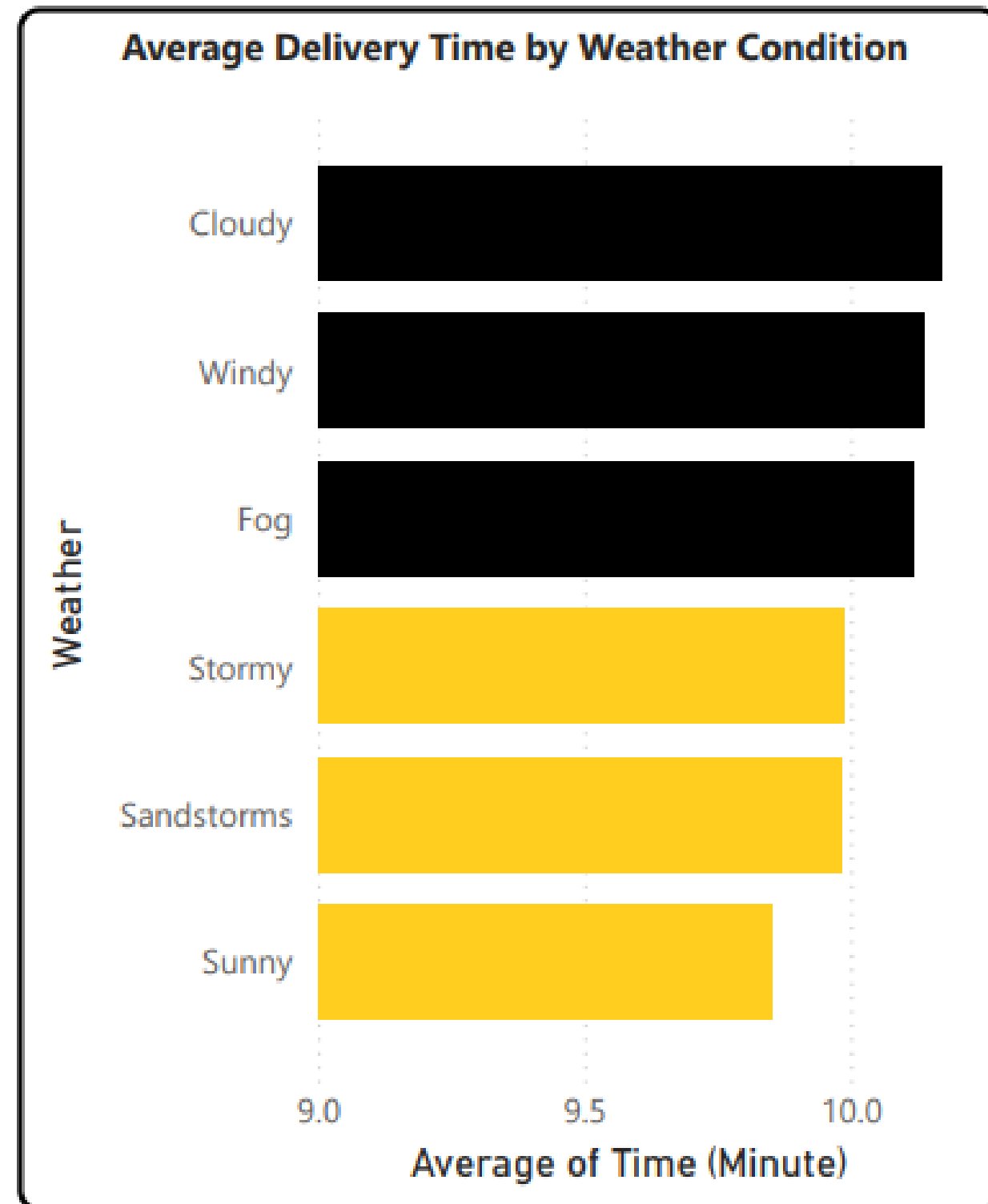


When the driver deliveries more than 1

- Average **delivery time increases** from 9.9 to 10.2 minutes
- Average **ratings drop significantly** from 4.65 to 4.38
- The late delivery rate rises noticeably at 2 orders

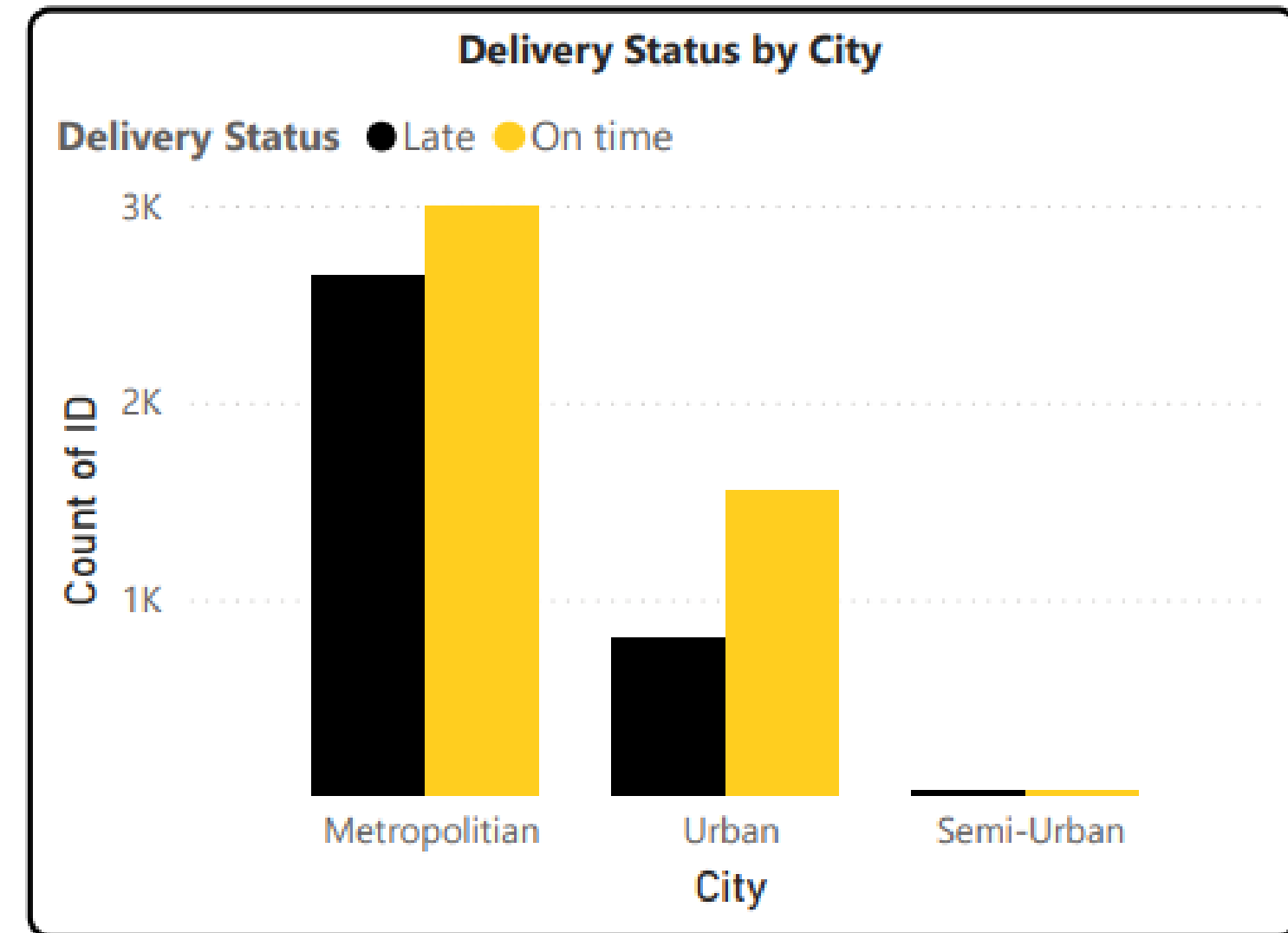
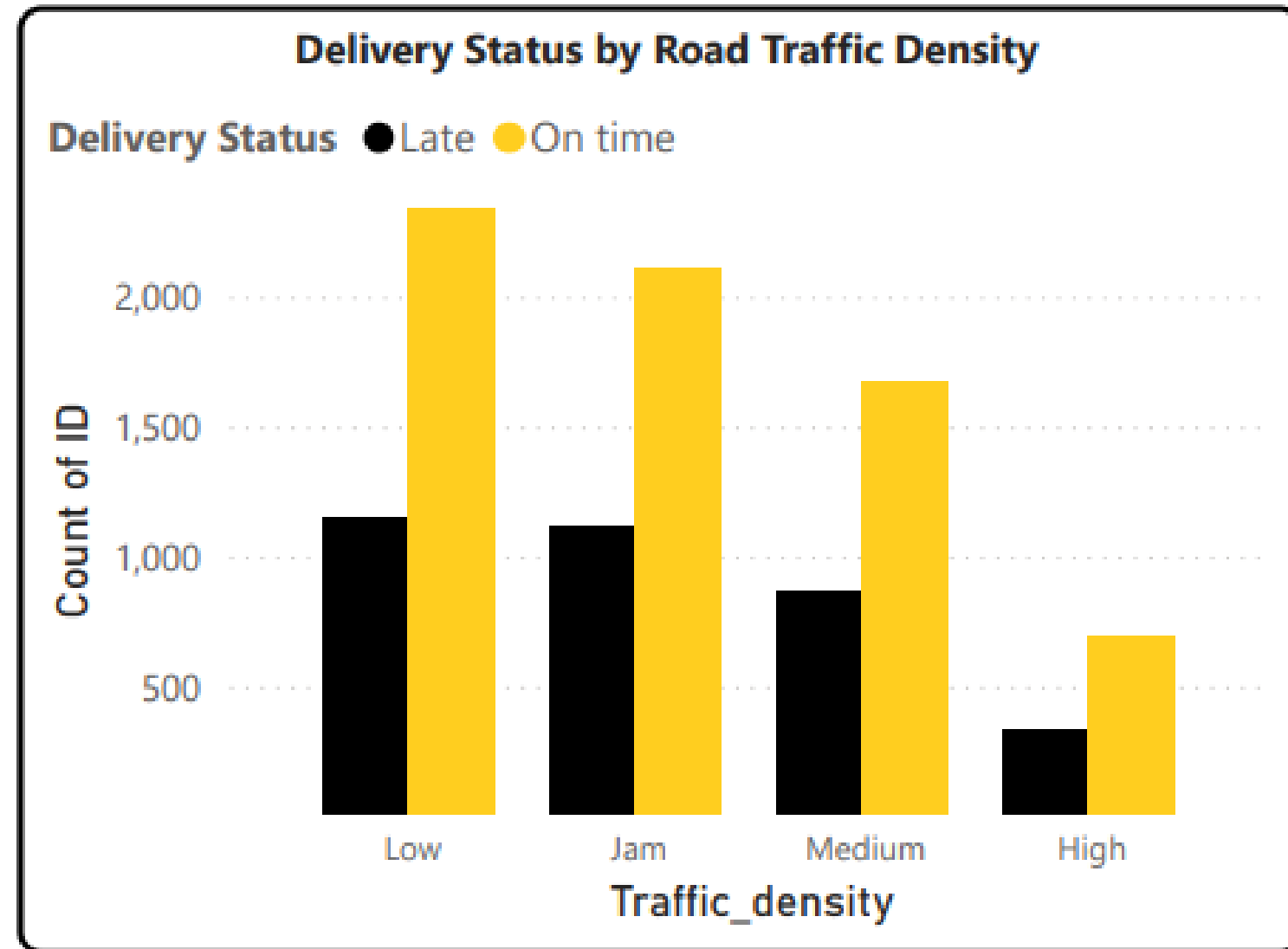
=> Limiting simultaneous deliveries to **no more than 1** helps maintain service quality and timeliness

ANALYSIS ENVIROMENTAL FACTORS AFFECTING DELIVERY PERFORMANCE



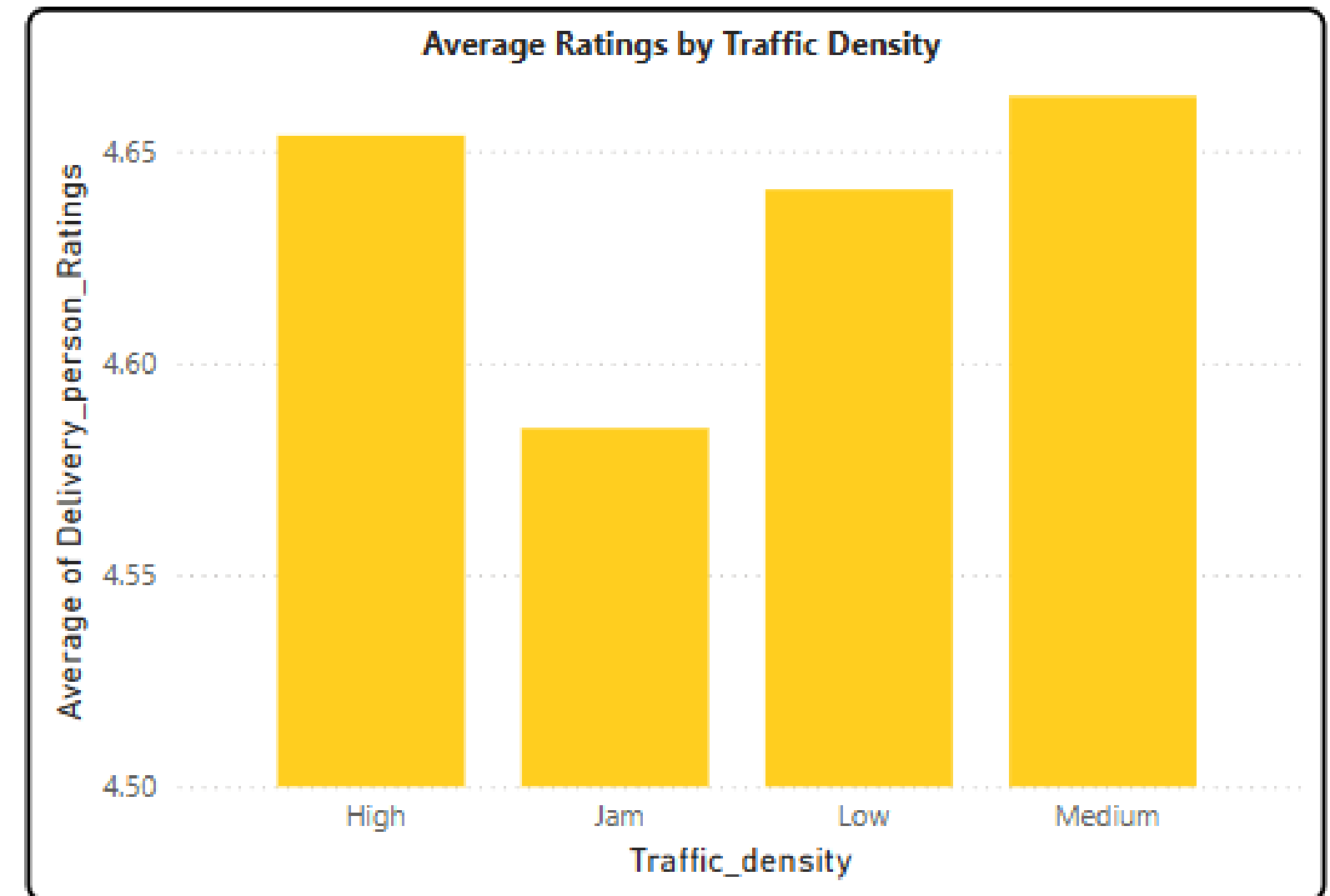
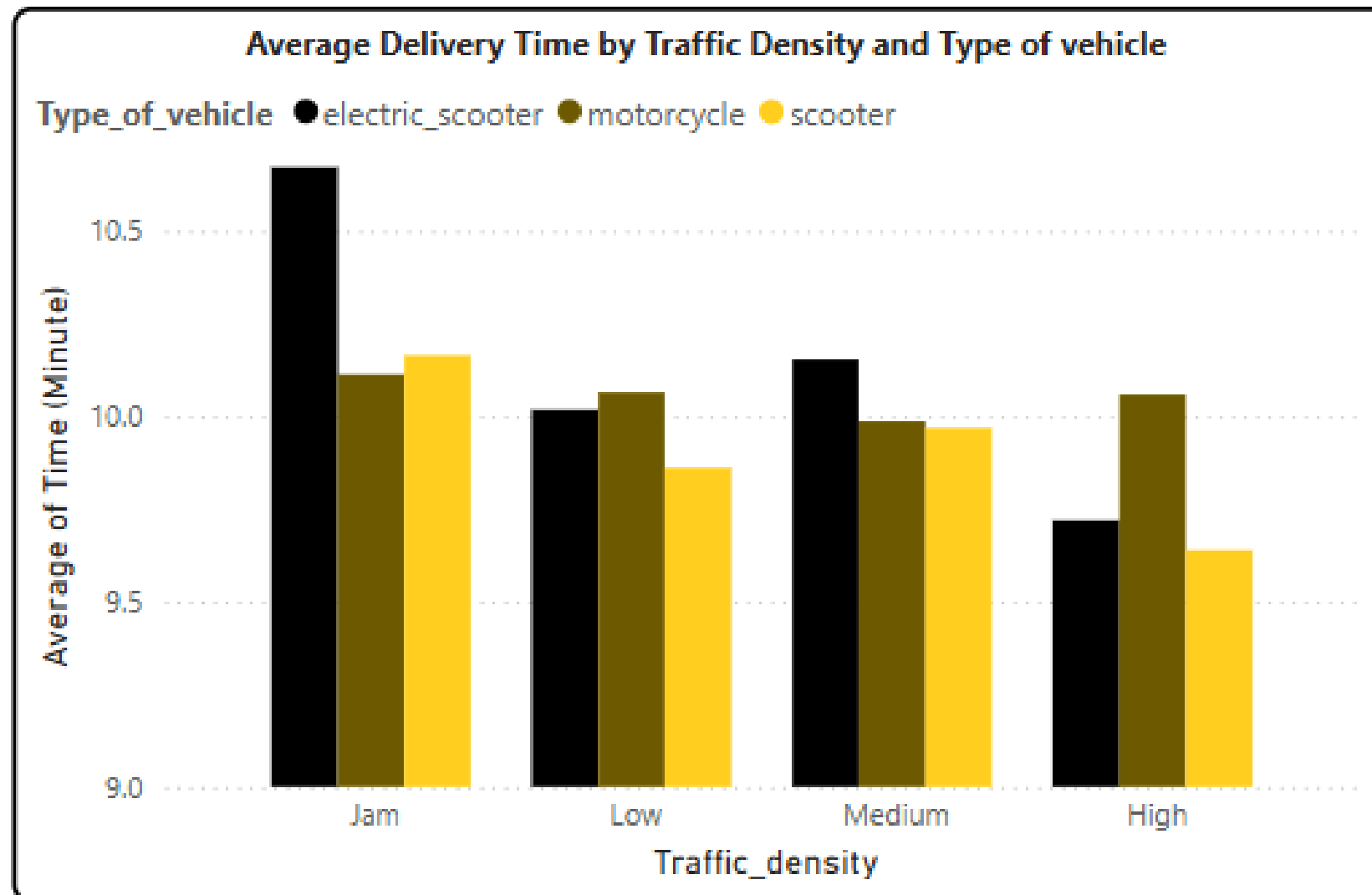
- **Bad weather** (cloudy, foggy, windy) and **high traffic** in Semi-Urban areas significantly **increase delivery time** (~10–11.5 mins)
- Sunny weather and Urban/Metropolitan areas with low traffic density achieve the best performance (~9.3 mins, high on-time rate)

ANALYSIS ENVIROMENTAL FACTORS AFFECTING DELIVERY PERFORMANCE



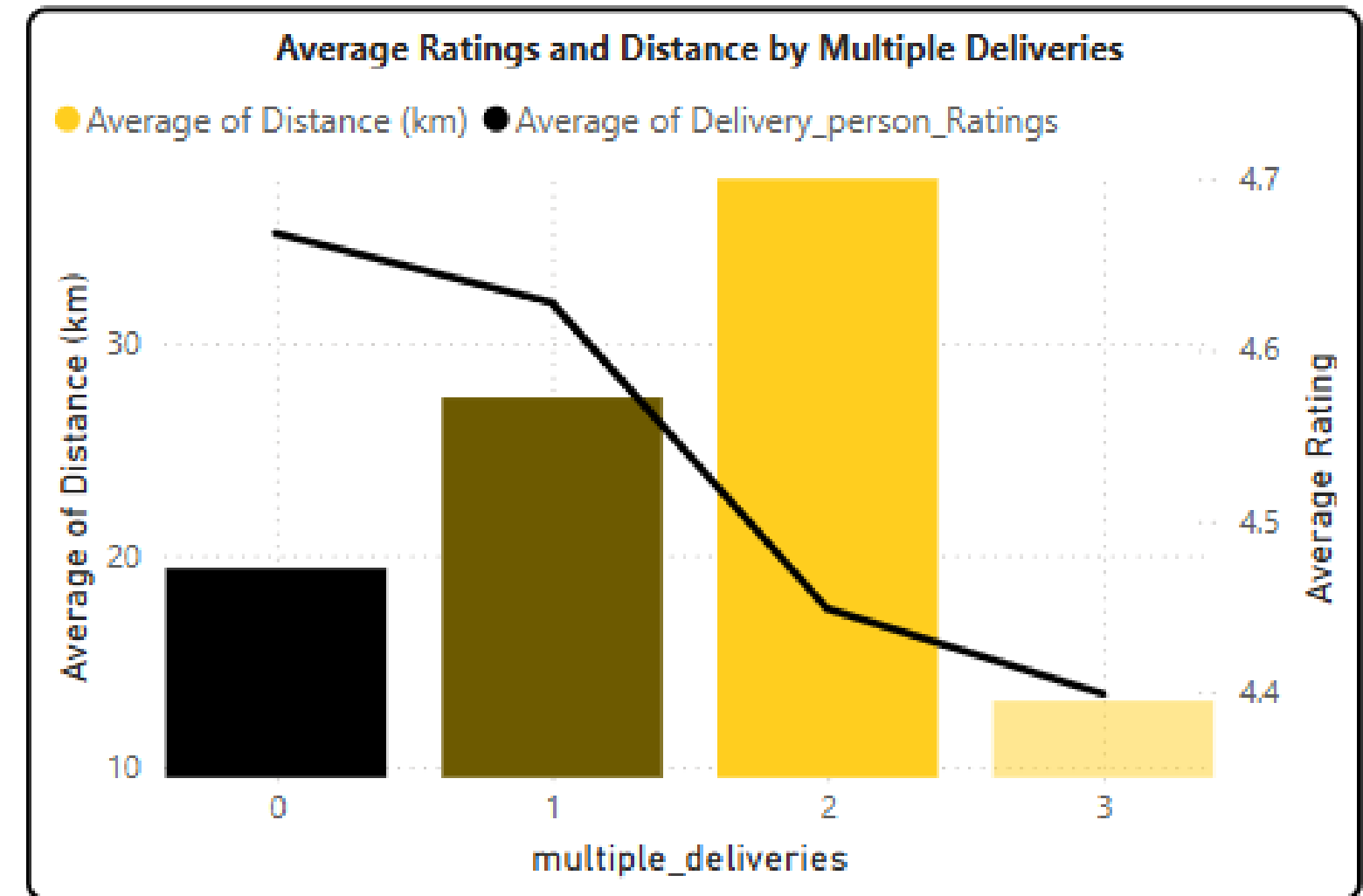
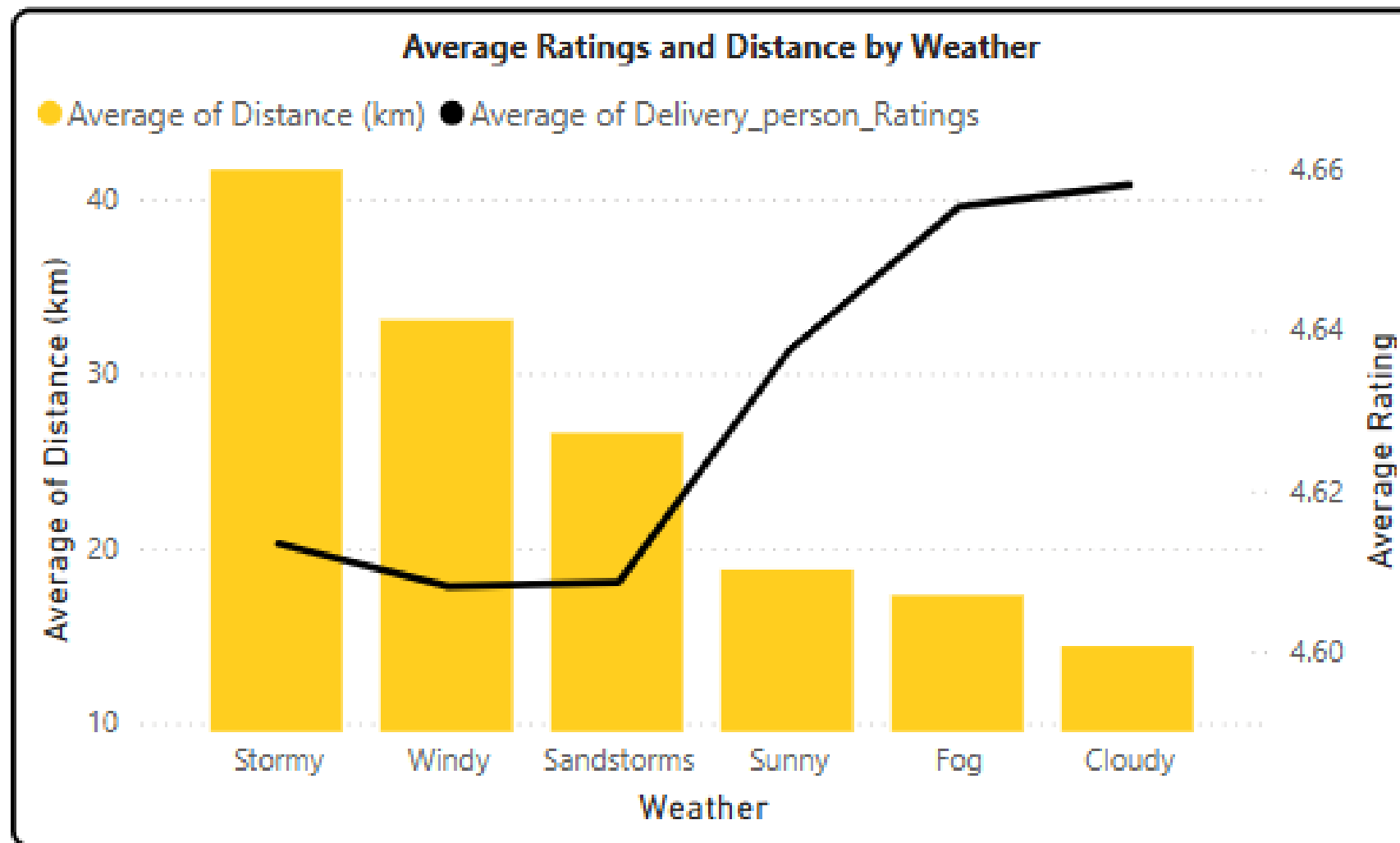
- **Low traffic** density and **Metropolitan** areas have the **highest** on-time delivery rates.
 - **High traffic** and **Semi-Urban** areas show a spike in **late** deliveries.
- => Focus deliveries in Low-traffic zones and use smart routing to reduce delays in congested areas..

CORRELATION ANALYSIS BETWEEN PERSONAL AND ENVIROMENTAL



- Traffic density significantly impacts delivery time and service quality. In traffic jams, all vehicle types experience delays, but **electric scooters are most affected**, while scooters maintain more stable performance.
 - Customer ratings also **drop sharply for late deliveries in high-traffic** conditions, whereas on-time deliveries receive consistently higher ratings
- => Prioritize **using scooters** in high-traffic areas.
- => Implement traffic-aware order assignment to reduce delays and improve customer satisfaction.

CORRELATION ANALYSIS BETWEEN PERSONAL AND ENVIROMENTAL



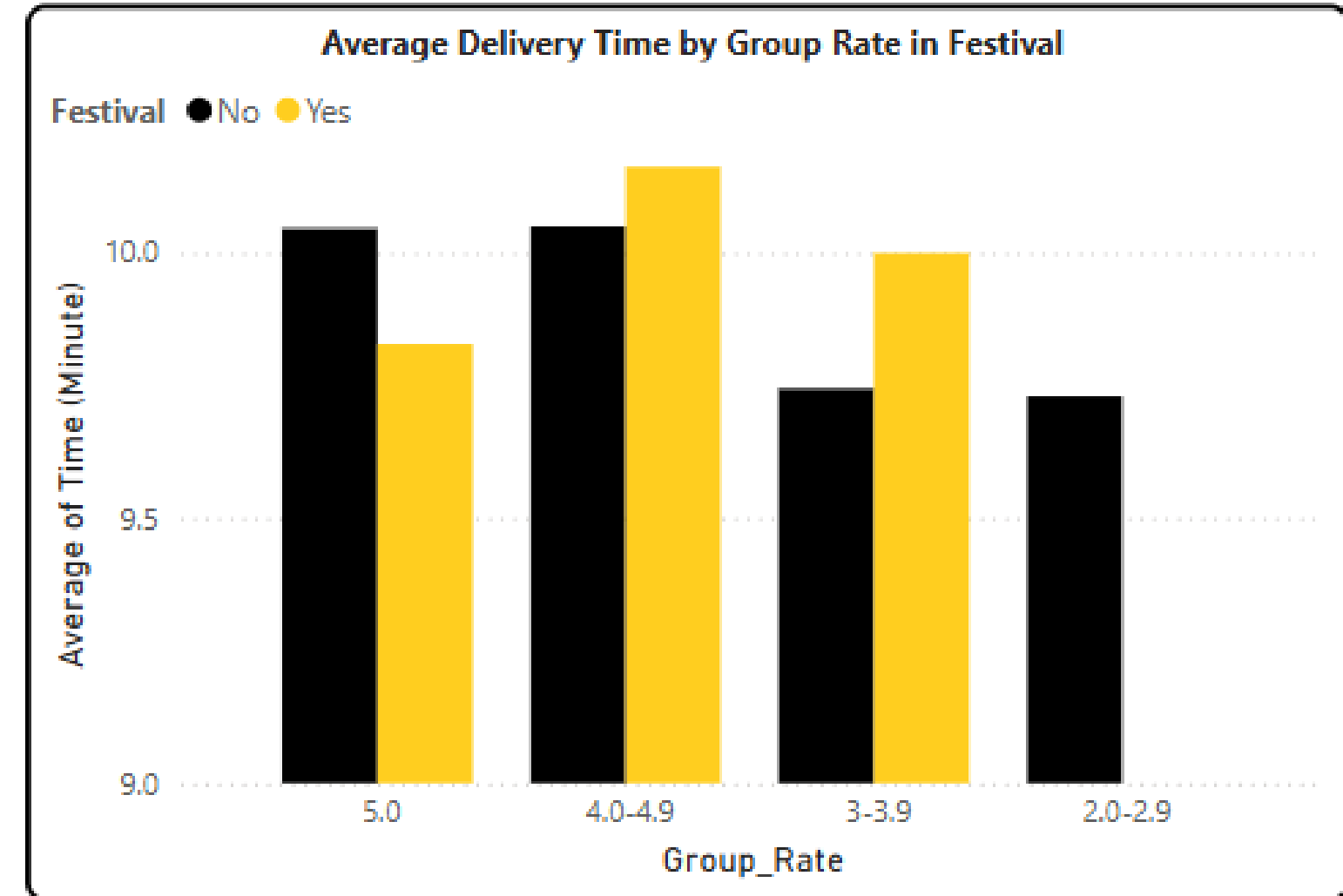
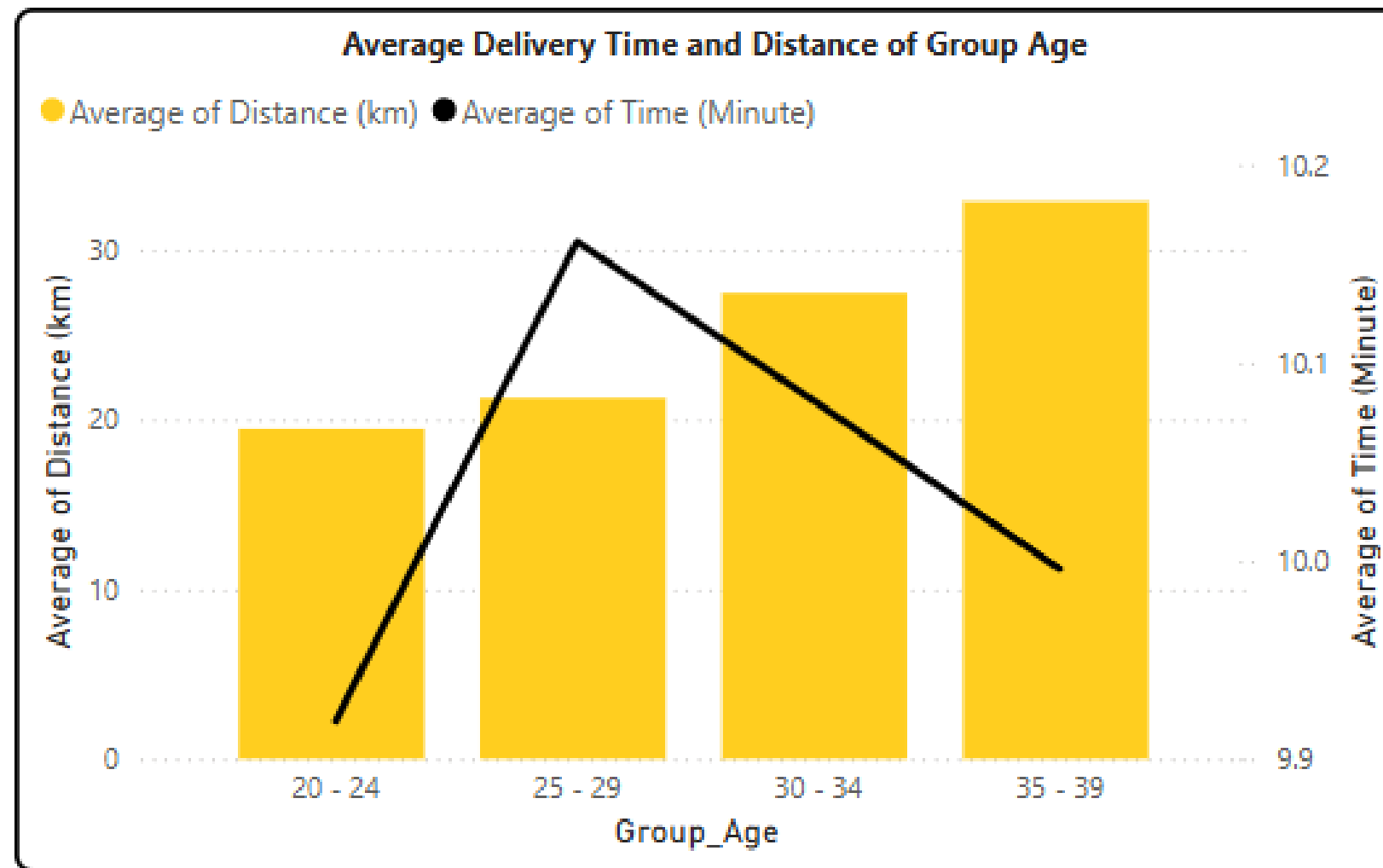
- Deliveries during **stormy** and **windy** weather cover **longer distances** but receive **lower ratings**, indicating reduced performance in harsh conditions
- As the number of simultaneous **deliveries increases** (especially 3), **customer ratings drop sharply** despite higher delivery distances

=> **Poor weather** and **multiple deliveries** load **negatively affect service quality**

=> Limit orders (max 2 at same time)

=> Use smart, traffic- and weather-aware order assignment systems to improve efficiency and customer satisfaction.

CORRELATION ANALYSIS BETWEEN PERSONAL AND ENVIROMENTAL



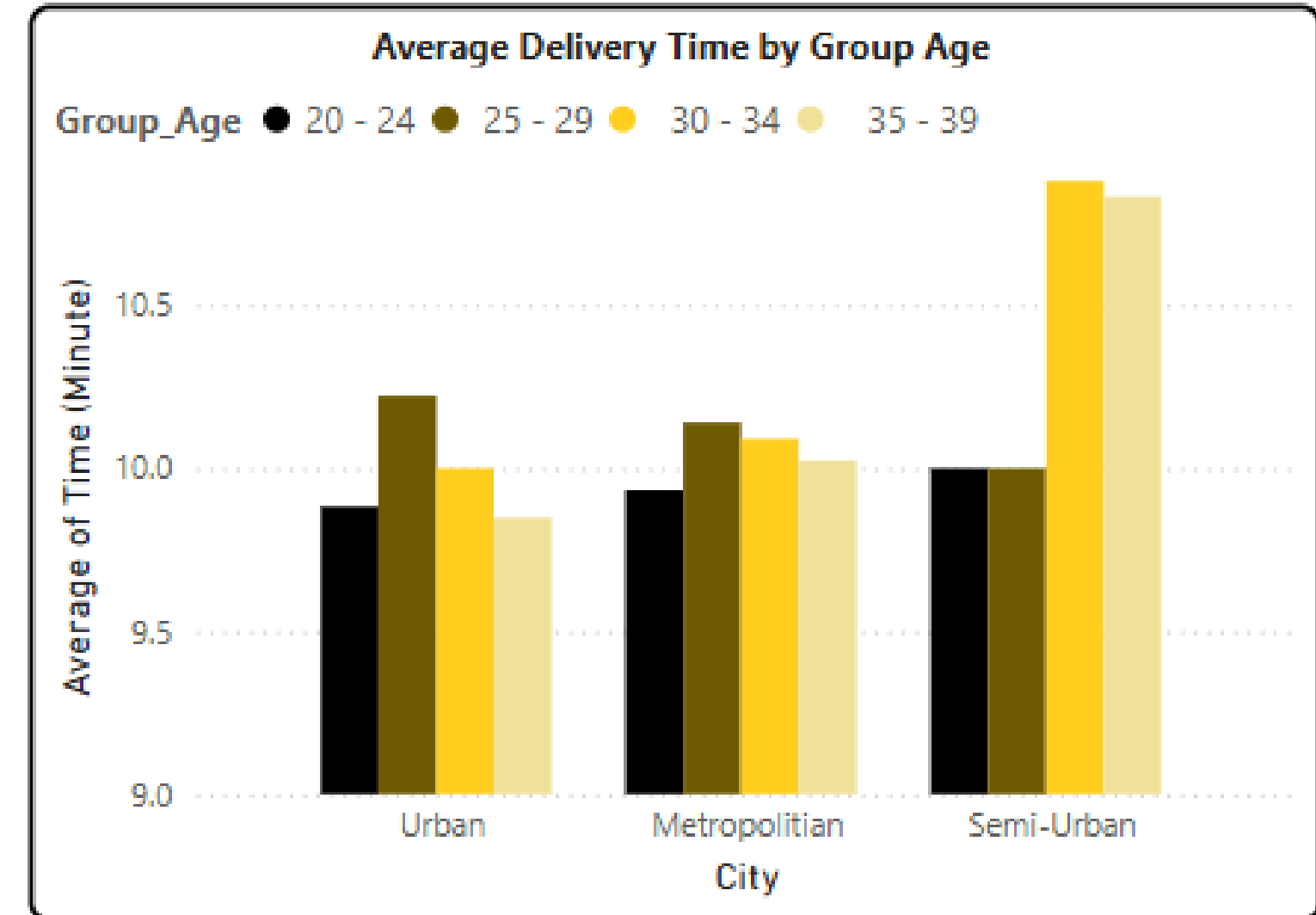
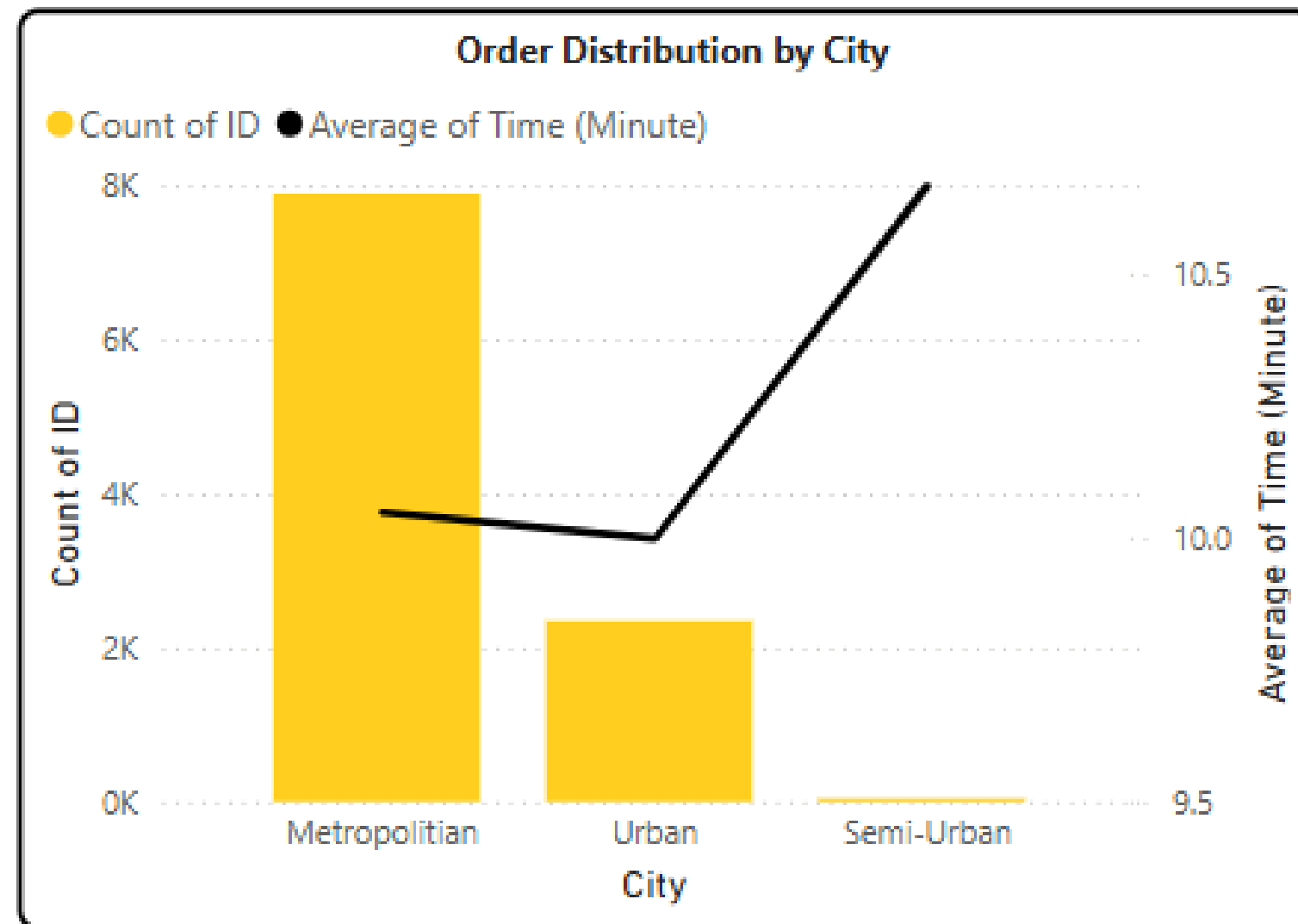
- Drivers **aged 30–39** handle **longer** distances but deliver **faster than younger groups**, indicating that experience improves performance.
 - During festivals, high-rated drivers (5.0) maintain or improve delivery time, while mid-rated drivers (4.0–4.9) face significant delays.
- => Assign long or complex deliveries to experienced drivers (30–39 years old).
- => During festivals, prioritize high-rated drivers and consider **training mid-rated drivers to ensure efficiency**.

03

HOW TO OPTIMIZE DELIVERY PERFORMANCE

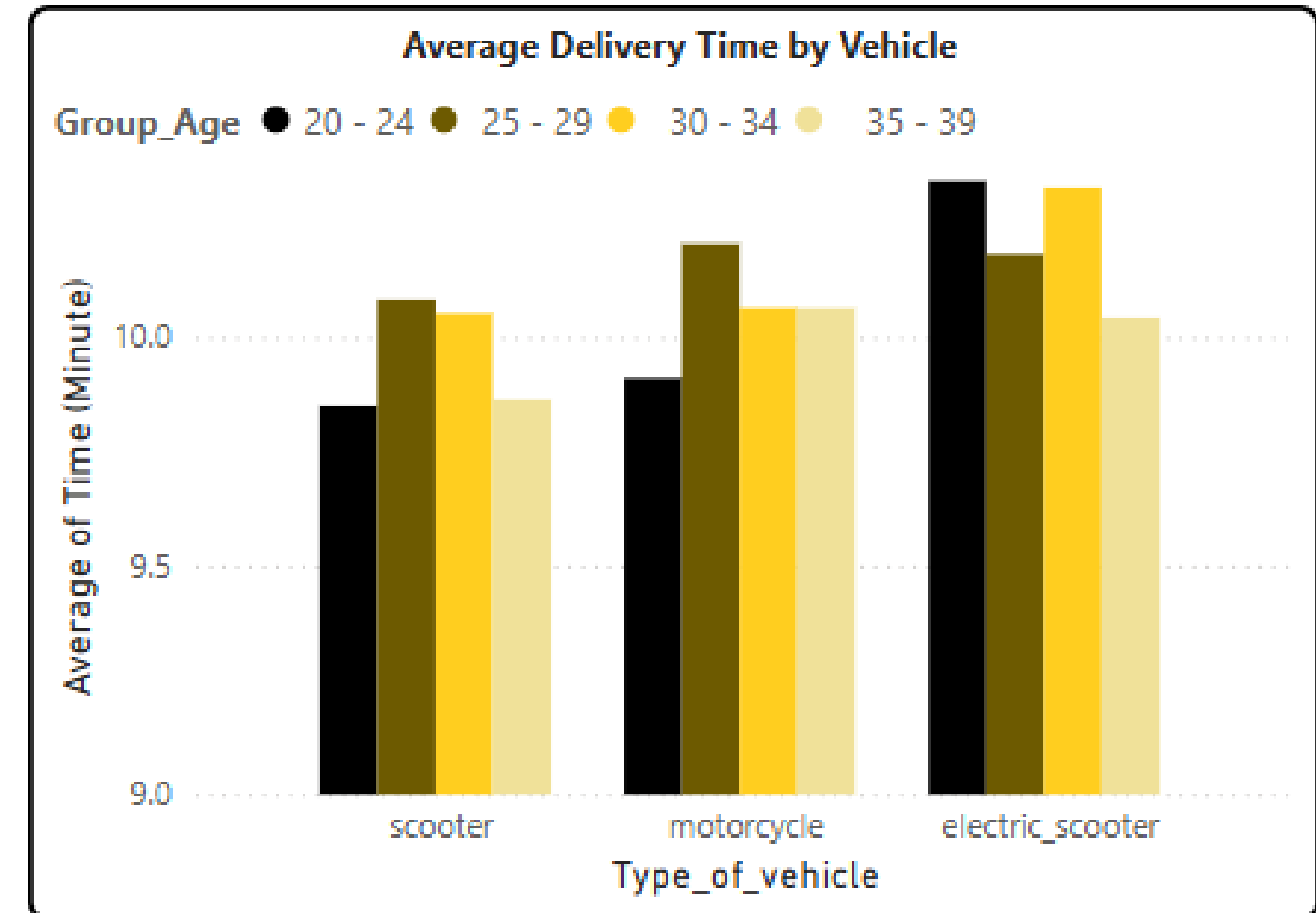
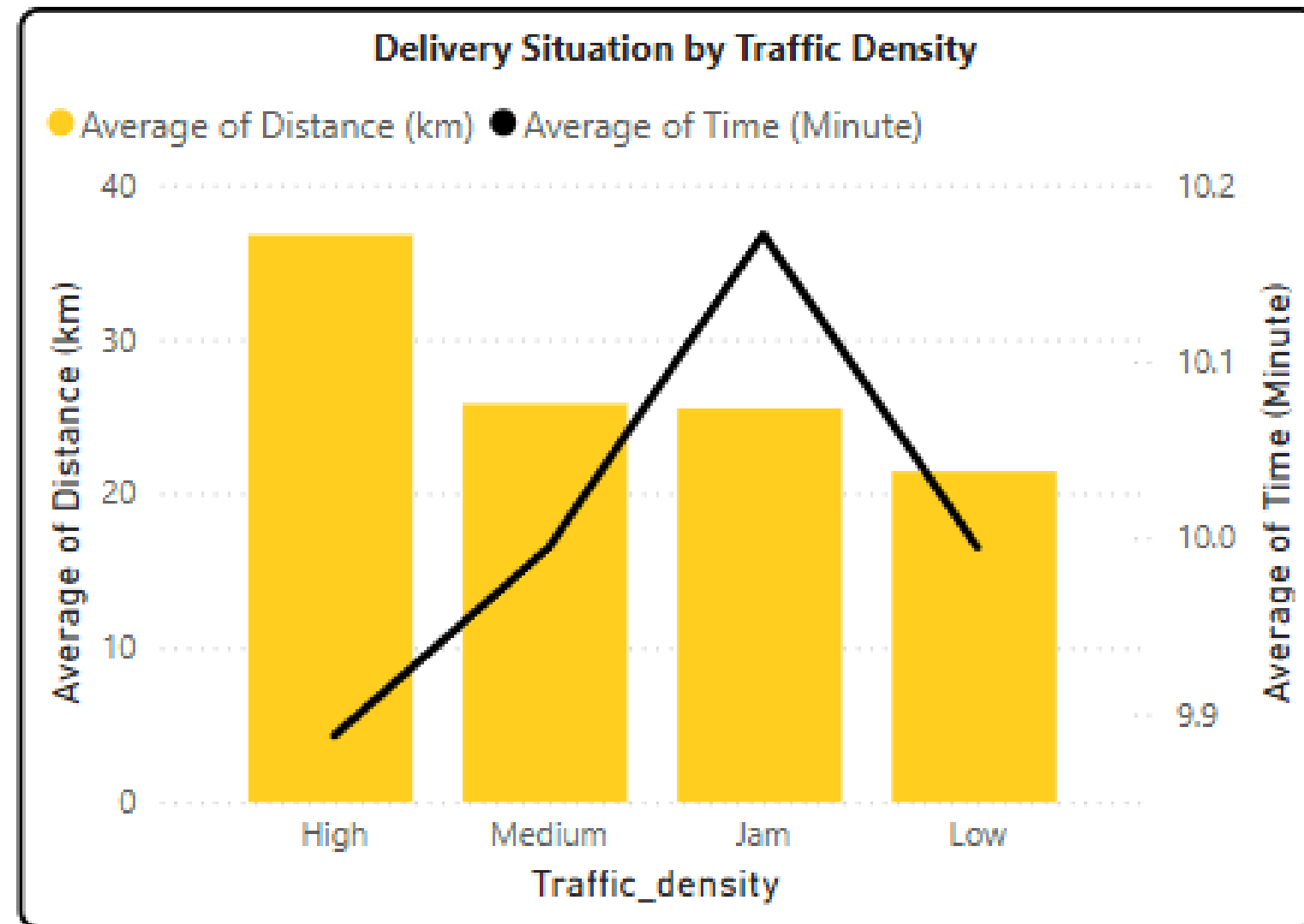


HOW TO OPTIMIZE DELIVERY PERFORMANCE



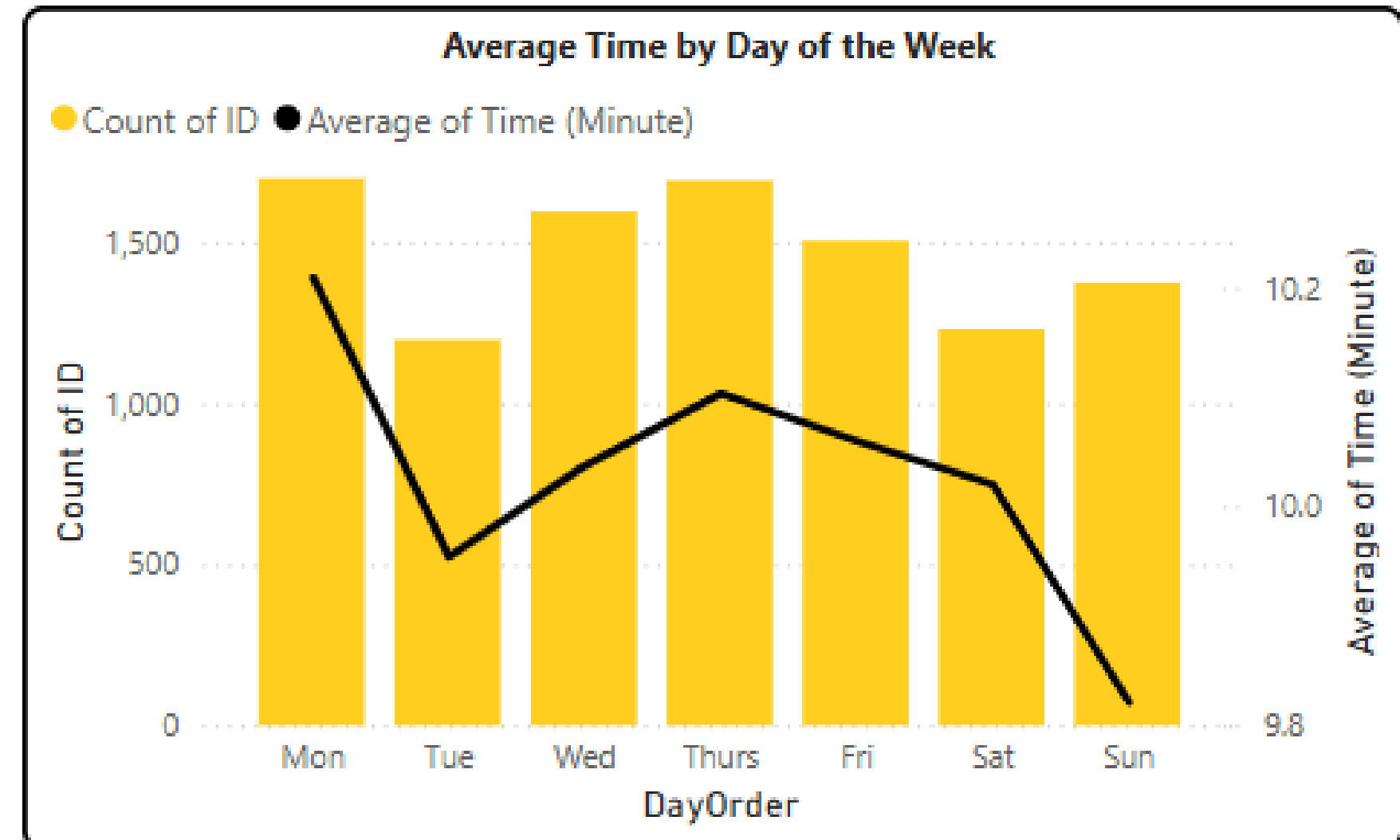
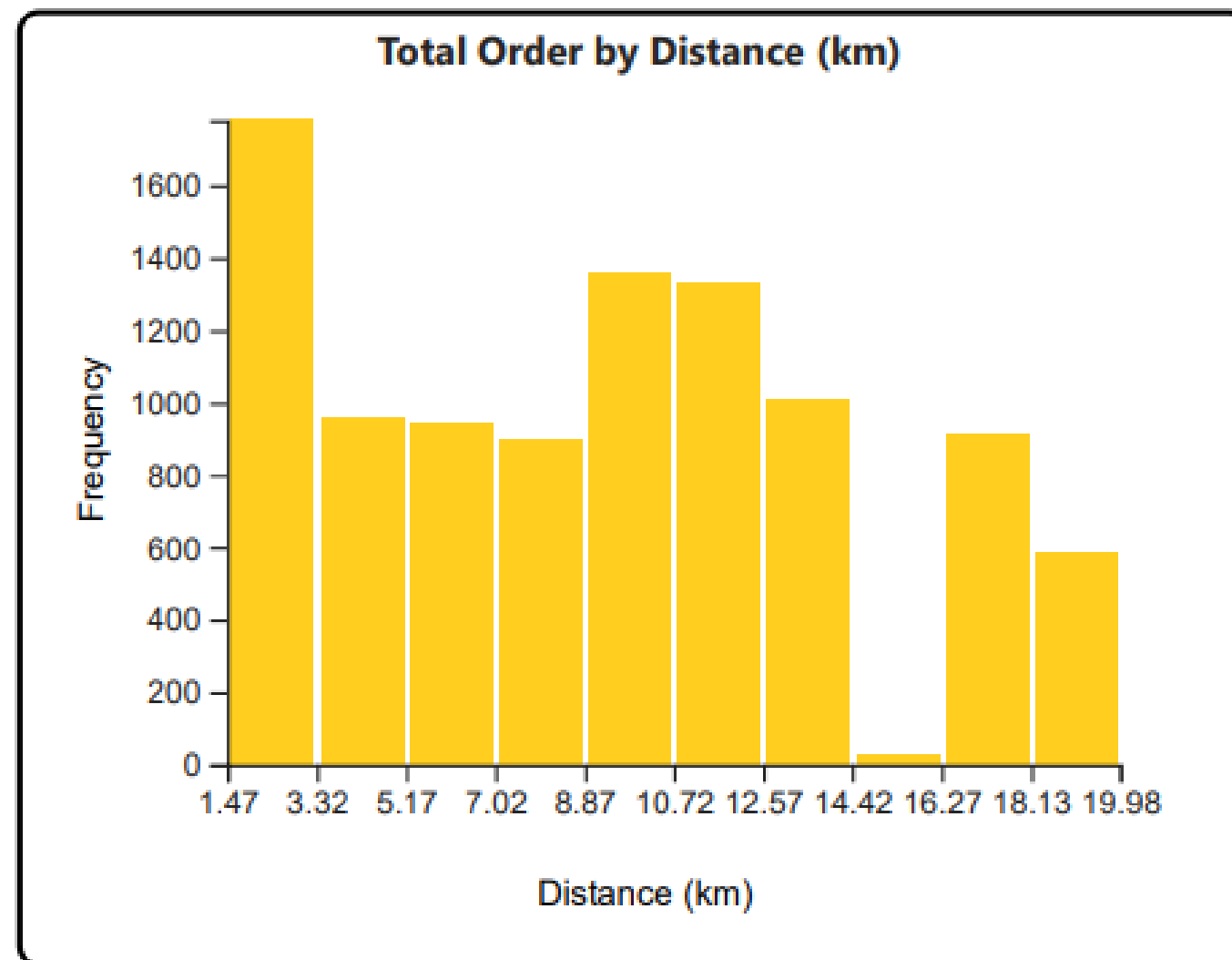
- There is a clear imbalance between order volume and delivery time across city types.
 - **Metropolitan** areas have **high demand** but manageable delivery time, while **Semi-Urban** zones have **fewer orders** but **longer** delivery time.
 - Additionally, older drivers (**age 35–39**) tend to **deliver slower**, especially in Semi-Urban areas.
- => **Allocate more drivers to Semi-Urban** areas to reduce delivery delays.
- => Prioritize **younger drivers** for deliveries in areas with **longer travel distances**.
- => Consider dynamic driver assignment based on performance and area type.

HOW TO OPTIMIZE DELIVERY PERFORMANCE



- **High traffic** areas involve **longer distances**, but time remains relatively stable, indicating some optimization.
 - However, **delivery time increases in jammed** conditions.
 - Among vehicle types, motorcycles outperform scooters and electric scooters, especially when combined with younger drivers.
- => Assign **motorcycles** in **traffic-heavy** or **long-distance** areas.
- => Use **bicycles or scooters** in congested zones for flexibility.
- => Improve **route planning** in jam-prone areas using traffic data.

HOW TO OPTIMIZE DELIVERY PERFORMANCE



- Most orders are **short-distance** (<10 km), suggesting opportunities for route optimization.
 - **Monday** experiences **peak demand** and **longer** delivery times, while **weekends** see **fewer orders** and **faster** delivery.
- => **Utilize batch deliveries** for **short-distance** orders to save time.
- => **Allocate more drivers** on **Mondays** to handle peak volume.
- => Use weekends for offloading less urgent tasks or driver rotations.

04

CONCLUSION & RECOMMENDATION



CONCLUSION

- Younger drivers (**aged 20–24**) tend to **deliver faster** and receive **higher** customer ratings, while older drivers (**aged 30–39**) perform better on **long-distance** or complex deliveries.
- Handling **multiple orders** simultaneously **increases** delivery time and **decreases** customer satisfaction.
- **Motorcycles** are the **most efficient vehicle** type, especially in high-traffic areas. Electric scooters and regular scooters perform less reliably under challenging conditions.
- **Traffic** congestion, adverse **weather**, and **festive** periods all contribute to delivery **delays** and **lower** ratings.
- Driver allocation is currently **suboptimal**, particularly in semi-urban zones and on peak days such as **Mondays**.



RECOMMENDATION

Short-Term	Mid-Term	Long-Term
Limit Simultaneous Deliveries: Cap at 2 orders per trip to ensure service quality, especially in bad weather or heavy traffic	Context-Based Vehicle Allocation: - Use motorcycles for long-distance or high-traffic areas. - Assign scooters to urban, narrow streets. - Avoid electric scooters in poor weather or congested routes.	Implement Smart Assignment Systems: - Develop or adopt real-time delivery routing systems using live traffic and weather data. Automate order assignment based on driver performance, location, vehicle type, and environmental factors.
Shift Scheduling Based on Demand: Increase driver presence on Mondays to meet peak order volume. - Use weekends for rest, training, or rotation due to lower demand	Flexible Driver Assignment: - Prioritize younger drivers for time-sensitive or long routes. - Assign high-rated, experienced drivers to complex or festive-time orders.	Delivery feedback tracking: Collect and analyze customer reviews and delivery experience data to improve training, evaluate driver performance, and optimize delivery operations.



THANK YOU