Insights & Recommendations – Last Mile Delivery Optimization Strategy

Executive Summary

This project analyzes last-mile delivery data to uncover key operational bottlenecks. Semi-urban zones show significantly higher delivery durations—over 200 minutes on average—compared to metro and urban regions, indicating a need for better route or hub planning. Delays are further amplified under poor weather and heavy traffic, with combined conditions pushing delivery times to their peak. Additionally, mid-morning and afternoon periods show increased agent idle time, suggesting gaps in scheduling coordination. These insights highlight actionable opportunities to enhance delivery efficiency through data-driven planning and localized operational improvements.

Key Insights

1 Semi-Urban Areas Are Causing Major Delivery Delays

- Average delivery time here is **200+ minutes**, much higher than Urban (110 mins) or Metro areas (130 mins).
- Highlights the need for route or hub optimization in these regions.

2 Traffic Jams with Bad Weather Lead to Longest Delays

- Under **cloudy or stormy** weather with **jammed traffic**, delivery times go up to **180 mins**.
- Even in better traffic, poor weather still slows deliveries noticeably.

3 Idle Time Peaks Mid-Morning and Afternoon

- Idle time before pickup hits **10.5+ mins** around **10 AM** and **2 PM**.
- Points to inefficiencies in pickup scheduling or driver availability.

Recommendations

Insight 1: Severe Delays in Semi-Urban Zones

Problem: Average delivery time exceeds 200 minutes in semi-urban areas, compared to 110 minutes in urban and 130 minutes in metro regions.
Impact: Causes serious inefficiencies in fulfillment speed, leading to lower customer satisfaction and higher operational costs.
Recommendation:

- Conduct a detailed route efficiency and hub placement analysis.
- Deploy micro-fulfillment hubs or localized dark stores in delay-heavy areas.
- Use clustering algorithms (e.g., K-Means) to redesign delivery zones more effectively.

Insight 2: Traffic and Bad Weather Drive Longest Delays

Problem: Delivery times rise to 180 minutes during heavy traffic and adverse weather. Even with moderate traffic, poor weather noticeably slows deliveries.
Impact: Limits delivery reliability and affects customer trust in service-level agreements (SLAs).
Recommendation:

- Integrate real-time weather and traffic data into the routing system.
- Design dynamic fallback routes within delivery SOPs.
- Build risk-adjusted buffer times into SLAs and ETA models.

Insight 3: Idle Time Peaks During Mid-Morning and Afternoon

Problem: Idle time before pickup exceeds 10.5 minutes around 10:00 AM and 2:00 PM.
Impact: Reduces fleet productivity and increases cost per delivery due to suboptimal dispatching.
Recommendation:

- Implement real-time driver assignment based on demand surges.
- Analyze order flow trends to optimize dispatch windows.
- Introduce staggered pickup slots to reduce clustering of dispatch tasks.