**XYZ Logistics Performance Report**

**Overview**

XYZ Logistics, a mid-sized last-mile delivery company, operates in four metropolitan zones: North, South, East, and West. Due to an increase in demand, XYZ is facing challenges related to increased fuel costs and delivery delays. The management has requested an analysis to identify areas for improvement and ensure efficient operations. This report outlines the key insights from analyzing delivery metrics, fuel usage, customer feedback, and performance trends.

**1. Delivery Performance**

**On-Time Delivery Rate by Zone:** Analysis shows that the West zone performs best with 15 on-time deliveries, while the North lags behind with only 8 on-time deliveries.

**Delayed Deliveries:** The East and North zones show the highest number of delayed deliveries at 16 and 14 respectively, indicating potential operational bottlenecks.

**Average Delivery Time Across Zones:** The South zone has the longest average delivery time (111 mins), whereas the East has the shortest (92 mins). Peak hour traffic is a significant contributing factor, with average delivery times increasing from 102 mins (non-peak) to 104 mins (peak).

**2. Operational Efficiency**

**Average Delivery Time:** Delivery times varied significantly across zones. South Zone deliveries have the highest average delivery time of 111 minutes, while East Zone deliveries average at 92 minutes, suggesting greater efficiency in the East. To ensure uniformity across zones, further investigation into route planning, road conditions, and driver scheduling is recommended.

**Impact of Peak Hours:** Deliveries conducted during peak hours averaged 104 minutes, which is slightly higher compared to the non-peak average of 102 minutes. Peak-hour deliveries are also more costly ($18.32 vs $17.71 per delivery). This suggests that the company could benefit from encouraging non-peak scheduling for deliveries to save costs and improve efficiency.

**3. Cost and Fuel Analysis**

**Fuel Consumption by Zone:** The highest average fuel consumption per delivery was observed in the South Zone (3.64 liters per delivery), indicating potentially inefficient routing or longer delivery distances. The East Zone had the lowest average fuel consumption (3.37 liters per delivery), which aligns with its relatively lower delivery times.

**Average Delivery Cost:** Costs also varied between zones, with the South Zone having the highest average delivery cost of $18.43, while East Zone deliveries cost $17.50 on average. These differences could be addressed by investigating distance, traffic, or other logistical factors affecting each zone.

**4. Customer Feedback**

**Customer Ratings:** The West Zone received the highest average customer rating of 4 out of 5, whereas other zones received a lower rating of 3. This suggests that customers in the West are more satisfied with the delivery service, potentially due to better timeliness or customer interactions. Efforts should be focused on improving delivery experience in the East, South, and North Zones to match the performance of the West.

**Correlation Between Delays and Ratings:** A weak correlation (correlation coefficient of 0.116) between delayed deliveries and customer ratings was observed, suggesting that delayed deliveries could impact customer satisfaction but are not the only influencing factor.

**5. Trends and Patterns**

**Delays and Costs by Day of the Week:** The analysis indicates that deliveries on Saturdays experience higher costs ($19.50 on average) and more delays compared to other days. Strategic adjustments to delivery schedules or increased workforce allocation over the weekends could reduce costs and improve on-time performance.

**Fuel Usage During Peak Hours:** Interestingly, fuel usage is slightly lower during peak hours compared to non-peak hours in some zones. This anomaly might be due to shorter distances covered during peak hours or optimized routes. Further analysis is required to validate these findings.

**Recommendations & Strategic Action Plan**

**1. Root Cause Analysis of Delays**

**North and East Zones:** Delays are mainly due to peak-hour traffic and operational inefficiencies. Implement dynamic routing tools to adapt to real-time traffic conditions.

**2. Optimization Strategies for Each Zone**

**North Zone:** Reduce delays with better routing and scheduling using route optimization software for real-time traffic updates.

**South Zone:** Reduce fuel consumption by optimizing routes and using smaller, fuel-efficient vehicles.

**3. Operational Efficiency Recommendations**

**Routing and Scheduling:** Use machine learning to predict optimal routes and peak demand, enhancing delivery efficiency.

**Peak-Hour Strategy:** Avoid peak hours using split-shift systems or incentivize non-peak delivery windows.

**4. Data-Driven Insights Visualization**

**Dashboard:** Incorporate bar graphs, heatmaps, and line charts to visualize delivery rates, delays, and fuel consumption for easy interpretation.

**5. Continuous Monitoring and Feedback**

**Customer Feedback:** Gather real-time customer feedback to improve processes.

**Weekly Review:** Hold weekly review meetings to assess delivery metrics and resolve issues.

**Conclusion**

Targeted improvements in routing, fuel efficiency, and customer experience can significantly boost performance. Utilizing data dashboards and machine learning tools will enhance efficiency and satisfaction.