**Executive Summary: NYC Taxi Data Analysis**

**Overview**

This project analyzes ride data from the New York City Taxi and Limousine Commission (TLC) to uncover patterns in ridership and revenue. Using Python for exploratory data analysis (EDA) and visualizations, we examined key metrics such as trip distance, duration, and fare amounts. The purpose of this analysis is to support data-driven decision-making for optimizing taxi operations and improving service delivery.

**Problem**

The NYC TLC needs a better understanding of taxi usage trends to inform operational decisions and policy planning. Specifically, they are interested in learning which factors influence trip revenue and how those factors vary over time and by location.

**Solution**

EDA was conducted on trip-level data, calculating and visualizing the relationships between trip distance, trip duration, and total fare. Correlation analysis and scatter plots revealed which variables most strongly influence revenue. In addition, a Tableau dashboard was created to visualize monthly taxi activity across the city in an accessible, user-friendly format for stakeholders.

**Key Insights**

**Trip distance** has a strong positive correlation with **total revenue** (0.77), suggesting longer trips are more profitable.

**Trip duration** has a weak correlation with total revenue (0.13), indicating that time alone is not a major revenue driver.

Visualizations revealed a clustering of short trips with lower fares, and a gradual increase in fare with distance.

Seasonal patterns suggest that certain months show spikes in activity, which can help with resource planning.

**Next Steps**

Enhance the analysis by incorporating external datasets (e.g., weather, events) to explore what drives seasonal variation.

Perform segmentation to understand differences in behavior by time of day, location, or customer type.

Implement predictive modeling to forecast demand or identify underperforming zones.

**Impact**

These findings enable the NYC TLC to identify high-revenue routes, optimize vehicle deployment, and improve rider experience. The analysis also sets a foundation for more advanced modeling and decision-support systems. By aligning insights with operational strategy, the TLC can increase efficiency and equity in public transportation services.