Part 2 ‐ Experiment and metrics design

The neighboring cities of Gotham and Metropolis have complementary circadian rhythms: on weekdays, Ultimate Gotham is most active at night, and Ultimate Metropolis is most active during the day. On weekends, there is reasonable activity in both cities.

However, a toll bridge, with a two way toll, between the two cities causes driver partners to tend to be exclusive to each city. The Ultimate managers of city operations for the two cities have proposed an experiment to encourage driver partners to be available in both cities, by reimbursing all toll costs.   
1) What would you choose as the key measure of success of this experiment in encouraging driver partners to serve both cities, and why would you choose this metric?

The key measure of success would be the average number of drivers transiting through the bridge. Compare the average number of drivers before and after the experiment. If the average number of drivers after the experiment are more that means the toll cost reimbursement worked

2) Describe a practical experiment you would design to compare the effectiveness of the proposed change in relation to the key measure of success. Please provide details on:  
a) how you will implement the experiment

Before we start the experiment, driver partners need to be informed of the experiment 2-3 weeks in advance so that we have driver patterns data to analyze. The experimentation period should be monitored for 2-3 weeks.

Record the average number of drivers before the experiment begins for a week. After the implementation of the experiment, record the average number of drivers transiting through the bridge.

b) what statistical test(s) you will conduct to verify the significance of the observation

Using Null Hypotheses, we can test the experiment

H0: The number of drivers before and after reimbursement are the same

H1: The number of drivers before and after reimbursement are not the same

c) how you would interpret the results and provide recommendations to the city operations team along with any caveats.

Use correlation tests to verify the significance of the observation. If p-value < 0.05, reject the Null Hypotheses (H0). That means there is a difference in the number of drivers and the reimbursement experiment was successful.

With an increase in the number of drivers' and reimbursement of toll, the city needs to find out if they are still in profit. Another experiment needs to be performed if an increase in the number of drivers relates to an increase in the sales tax data.

*Note: The two cities of Gotham and Metropolis are not in the provided dataset; however, you do not need this information to answer Part 2.*