**Investigating Citi Bike Usage/Performance Metrics by Time of Year (2020-2021)**

**Introduction:**

This report looks to discover areas of under-performance in CIti Bike's central hub, New York City. As the home of our headquarters and the city where the company was founded, it is of great importance that our resources are utilized with the utmost efficiency. The two sets of data examined here include ride data for July of 2020 and January of 2021, as these represent two differing outdoor weather profiles and very important times of year for the comapany, economically. This report also serves as a point of reference to be followed when reading through the components found within "The Story".

**General Performance Metrics:**

When reviewing the drastic difference between the total rides during July 2020 and January 2021 the obvious variable that comes to mind is the weather. The winter months are expected to have a large drop off in users due to the chilly temperatures and common snowfall NYC faces annually. But, such a drastic drop off (From 400,000 to 10,000) raises some concern over whether or not the company is utilizing its resources in an optimally efficient manner. To venture a bit deeper into our data sources , the peak hours of use during these times were plotted. As Citi Bike's primary function amongst users is to shorten time of work commutes, one would think that the hours just before 9am and after 5pm would peak to create a bimodal pattern. Surprisinglyt though, this was not the case.

While July showed a more precise peak at the hours of 7pm to 9pm January yielded a broader usage peak from 1pm to 4pm. From this, one could hypothesize that users are primarily using bikes during summer months to return home from work or use them as a means of recreation/exercise in the evening. Overall, both times of year present a similar pattern of usage thorughout the day. A way to possibly boost usage during morning hours for both times of year would be to consider moving some underperforming stations to areas nearby NYC's largest school systems or largest employers. This could possibly provide a way for students or employees in population dense areas of the city to commute to and from school/work and avoid taking subways and buses. This could easily be advertised as a way to not only promote one's health by biking to school or work, but also sociallly distance oneself while Covid-19 is so prevalent in our society and as in-person work/learning resumes.

**Trip Duration vs. Age Review:**

To supplement the investigation above, the next factor to look into was the ages of our users and how long they tend to use our product. Interestingly, the ages that showed the greatest spikes in ride duration were ages within the span of 40 to 60 years old. While the longest rides tended to be our 18 year old users, users aged 25-35 were easily had the least usage. This could be due to a number of life factors such as balancing work and possibly looking to grow or start a family. Promotions targeting these less profitable age groups could be of interest in the upcoming spring and summer months as base user rates start to rise. A poll of users on how/why they use our product may also yield insight into how best to generate promotions and which age groups to cater advertising towards.

**Mapping Underperforming Stations:**

By mapping out the worst performing stations for both times of year (for both the start and end of trips), we can potentially look to re-allocate resources to gain greater user frequency for these failing stations. For both start and endpoints for trips in July, the Christ Hospital station was one of the worst performing stations in the city. It also lies very close to another low performing station at Oakland Avenue. I propose that the station at Christ Hospital be moved further south, just on the edge of Liberty State Park. This could allow for a greater number of users during the summer months to utilize the product within and around the park, providing the product functionality to individuals or families who wish to visit/explore the park but may not own a bicycle.

By reviewing the maps for worst performing start and endpoints during January 2021, it also becomes apparent that the Riverview Park station is one of the company's least utilized stations year-round. To increase users for this station, it may be beneficial to move it about 10 blocks West closer to the Steven's Institute of Technology. This could better serve both the students and the staff for this school and could make the station a popular form of transportation if we possibly allocate the station's resources so that they are possibly split between being right on campus and at a location where students and staff tend to live near campus.

**Conclusions:**

By looking at the general performance of our stations we have seen that while colder months may always have lower usage rates than warmer months, there is certainly room for improvement during earlier hours of the say for year-round outcomes. Looking to cater towards students and employees commuting to class and work could be a great way to boost these results by catering towards the importance of social-distancing and accounting for healthy living while busy with life’s challenges (work, pandemic, etc.) When looking deeper into our user's age vs. usage rate, we can identify that young adults transitioning into mid-life should be of particular focus when preparing promotions for the upcoming warmer weather months of 2021. And finally, we have seen there are standout stations that have greatly under-performed that should now be moved and re-purposed to help engage these groups we wish to target. These actions should be monitored for the rest of the fiscal year to see if we were successful in our attempts to target areas and users that will most-likely use our products year-round and most frequently.