Bike-Share Case Study

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Basic Setting

Cyclistic (fictional name), launched in 2016, is a bike-sharing company based in Chicago, USA. The company features more than 5,824 bicycles and 692 docking stations. Moreover, the company provides different types of bicycles such as reclining bikes, hand tricycles, and cargo bikes to better satisfy the needs of customers. Customers may pick up any available bikes at a docking station, ride to their destinations, and drop off the bike at another docking station closest to them. Cyclistic has three pricing plans: single_ride passes, full_day passes, and annual memberships. The director of marketing believes that the future success of the company largely depends on maximizing the number of annual memberships. Therefore, it is important to understand how casual riders and annual members use the service from Cyclistic differently based on data collected. This case study will focus on the most recent data made available by the company, namely the fourth quarter of 2019 and the first quarter of 2020.

The case study will mainly focus on two questions:

1. How do annual members and casual riders use Cyclistic bikes differently?
2. Why would casual riders buy Cyclistic annual memberships?

Data

The data used in this case study can be found here: https://divvy-tripdata.s3.amazonaws.com/index.html (specifically Divvy_Trips_2019_Q4.zip and Divvy_trips_2020_Q1.zip were used).

The data has been made available by Motivate International Inc. under this license: https://ride.divvybikes.com/data-license-agreement

Analysis

2020 Quarter 1

The case study focuses on data collected in the fourth quarter of 2019 (19q4) and the first quarter of 2020 (20q1). The total rides made by casual riders (riders

who did not possess an annual pass) recorded in 19q4 were 106194 and 48480 in 20q1. Annual members on the other hand, rode a total of 597860 rides in 19q4 and 378407 rides in 20q1. Based on the above results, the percentage changes were a decrease of 54% for casual riders and a decrease of 37% for annual members in the two quarters.

In the first quarter of 2020, the minimum ride time (defined by the time from first picking up the bike at a docking station and returning it later at another station) for both members and casual riders was close to zero second. This could probably been due to an error in the system or a customer picked up the bike and immediately changed his mind and returned it. The max ride time on the other hand was more than 108 days for a casual rider and a little over 65 days for a customer with an annual pass. Without knowing the specifics, it would be hard to determine if these two bikes were used for months-long rides or if the customers simply kept them after picking them up at the first docking station.

	Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
Casual Rider	14886	4855	5264	5933	4895	5167	7480
Members	35964	61923	69697	63978	61245	55496	30104

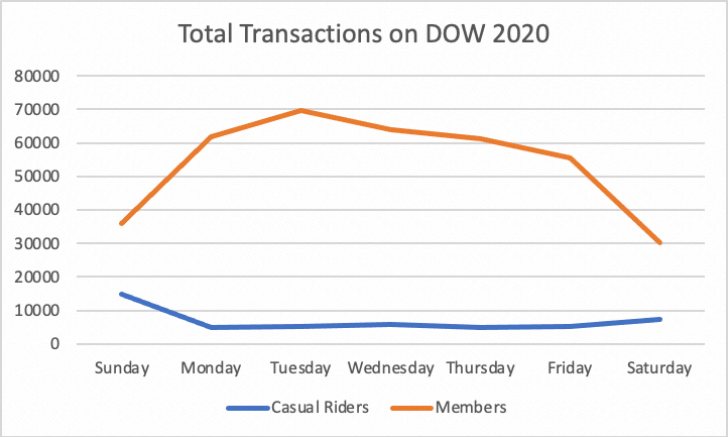
Table 1: Total rides recorded for both customer types based on different day of the week

	Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
Casual Rider	95	73	84	74	125	118	100
Members	15	13	11	11	11	12	15

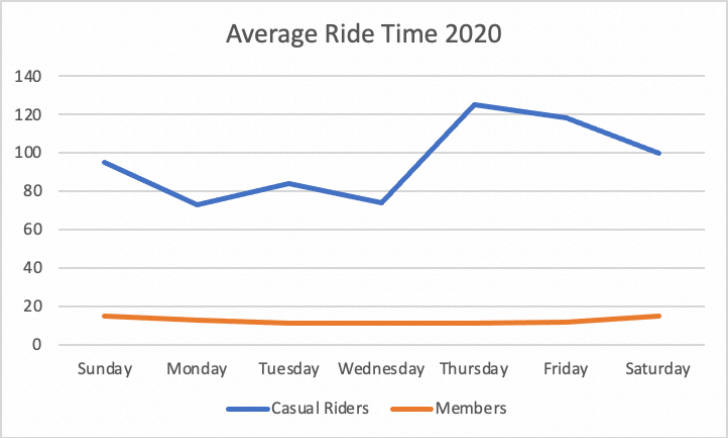
Table 2: Average ride time in minutes for both customer types based on different day of the week

The average ride times for causal riders and members were found to be around 95 and 12 minutes respectively. The median ride times were around 21 minutes for casual riders and 8 minutes for members. These results showed that casual riders in general used the bikes for a longer time than members. Since median ride times were shorter than the average ride times for both types of customer, it can be said that the distributions of customer ride times were approximately right tailed. This means that although there were riders who enjoyed a longer ride, more riders used the bikes for around the median ride times in both customer types.

When examining the total rides based on different day of the week (Table 1), it was found that for members, the busiest days were Tuesday and Wednesday with 69697 and 63978 rides recorded. Looking in further at table 2, the average ride times in these two days were found to be around 11 minutes. On the other hand, the least busy days were Sunday and Saturday with 35964 and 30104 rides and an average ride time of around 15 minutes. For causal riders, the busiest days were Sunday and Saturday with 14886 and 7480 rides, and an average ride time of over 95 minutes in both days. Thursday (average ride time of 125 minutes) and Monday (average ride time of 73 minutes) were their least busy days with only 4895 and 4855 rides recorded.



Graph 1: Total rides recorded on different day of the week



Graph 2: Average ride time on different day of the week

2019 Quarter 4

In q4 of 2019, the average and median ride times for casual riders were 61 and 21 minutes respectively. For members, they were 12 and 8 minutes respectively. Based on the results, causal riders in general used the bikes for longer. The maximum ride times for a causal rider was around 99 days and 59 days for a member. Once again it is unclear if these customers had used the bikes continuously for a months long ride journey or simply had kept the bikes and returned them much later. The distributions for customer ride times are assumed to be right tailed based on the fact that both the median values are smaller than the averages for both customer types.

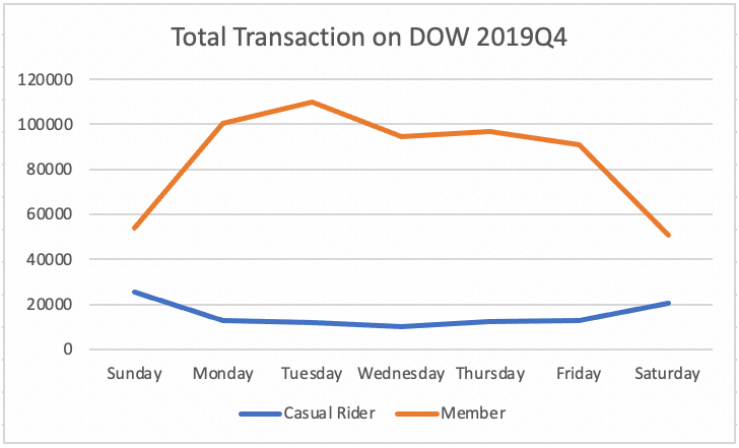
	Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
Casual Rider	25333	12790	12041	10227	12206	12903	20694
Member	54091	100423	109778	94612	96966	91060	50930

Table 3: Total rides recorded for both customer types based on different day of the week

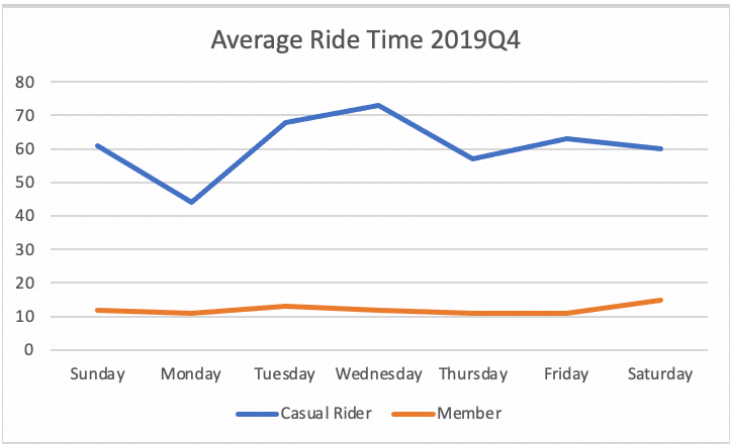
	Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
Casual Rider	61	44	68	73	57	63	60
Member	12	11	13	12	11	11	15

Table 4: Average ride time in minutes for both types of customer based on different day of the week

Examining tables 3 and 4, for members, the most busy days were Tuesday (average ride time of 13 minutes) and Monday (average ride time of 11 minutes) with 109778 and 100423 rides recorded. The least busy days were Sunday (average ride time of 12 minutes) and Saturday (average ride time of 15 minutes) with 54091 and 50930 rides. For casual riders, the most busy days were Sunday (61 minute average ride time) with 20694 rides and Saturday (60 minutes) with 20694 rides. The least busy days were Tuesday (68 minutes average ride time) and Wednesday (73 minutes average ride time) with 12041 and 10227 rides respectively.



Graph 3: Total rides recorded on different day of the week



Graph 4: Average ride time for different day of the week

Summary Observation and Recommendations

The first major finding from the data was that there were more annual members than casual riders in both quarters examined. Going from the fourth quarter of 2019 to the first quarter of 2020, the number of casual riders showed a larger decrease of 54% when compared to the 37% decrease of annual members.

The second major finding was that annual members used the rental bikes the most during weekdays and least during the weekend. On average, the ride durations for members were usually under the 20-minute mark and did not

fluctuate greatly (please see graph 2 and 4). This may suggest that annual members were using the service more for commuting to work and short rides. On the other hand, casual riders were most active during the weekend and less so during the weekdays. On average, causal riders would ride the bikes for over an hour, which is much longer than members. This may suggest that causal riders were using the service more for leisure.

From the data it can be observed that casual riders had the characteristics of using the bikes for longer trip durations and enjoyed the service more during the weekend. To help convince this type of customers to purchase an annual pass, the following suggestions are made.

1) Create an "upsell" and convince casual riders that an annual pass is a much better deal than single-ride and full-day passes.
2) Provide more pricing options such as quarter-year and half-year passes so that riders could have more freedom.
3) Create a "free trial" for more riders to experience the service so that ultimately more positive word-of-mouth messages can travel along. This seems especially important since there was a decrease in both types of customer.
4) Announce a calculated price increase especially for renting the bike during the weekend. This may drive more "on-the-fence" causal riders to want to secure the lower price of an annual pass.

Other Considerations

1) Create user-ids and collect data on riders. It would be informative to see how often a rider would use the service. Also, it would be beneficial for the company to see if a casual rider would eventually become a member.
2) Collect data on the type of bikes riders prefer from different stations so that more preferred bike types can be properly allocated.

* All the SQL codes will be included in a separate file.