

# Bixi Bikes Montreal Project

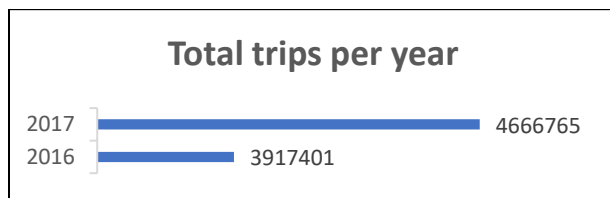
## Introduction

Bixi Bikes in Montreal is a nonprofit organization managing bike rental services since 2014 in Montreal, Canada. The organization provides open data. The cleaned dataset of all the trips from the years 2016 and 2017 has been used for the study. The purpose of the study is to gain a high-level understanding of the overall rental and usage of bikes in Montreal. Based on the insights found from the study; we can get a clear view of business growth strategies.

The database contains the details of the start and end dates of the trips, the trip timings, the bike stations and their locations, membership status, etc. It contains more than 8.5 million trips and 540 stations throughout the city and its suburbs. The data was analyzed in MySQL. The exported query results were used to create visuals in Microsoft Excel.

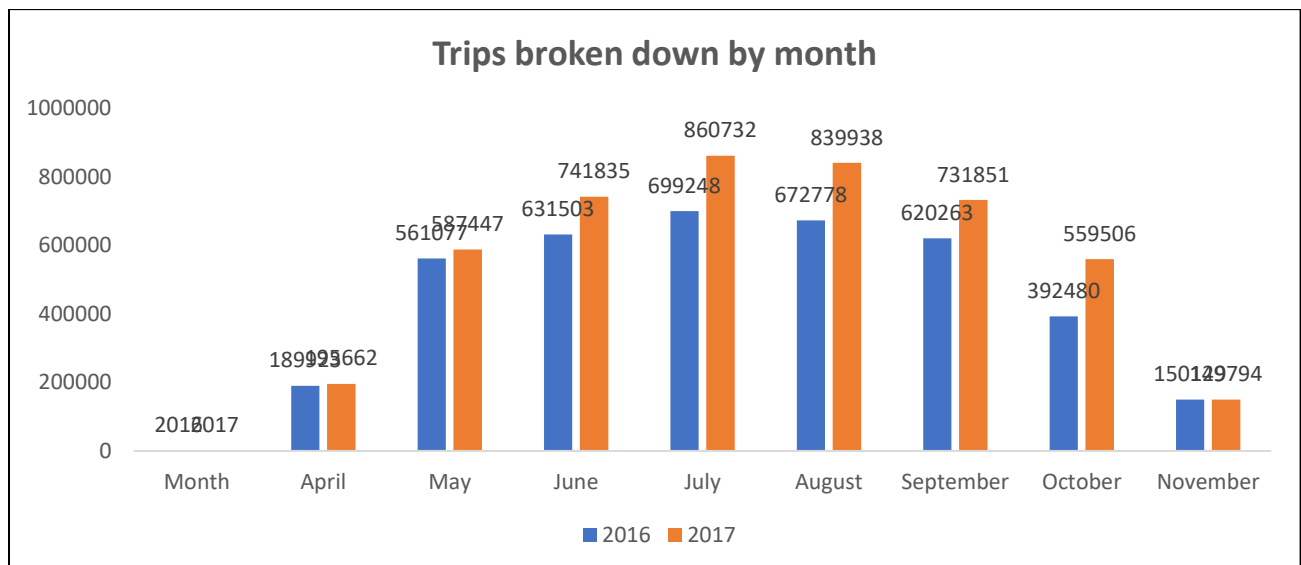
---

## Overview of volume of bikes usage



There were more than 3.9 million trips taken in 2016. Total trips taken in 2017 increased drastically to 4.6 million. It's 19% Y-O-Y growth in the total trips.

## Trips broken down by month

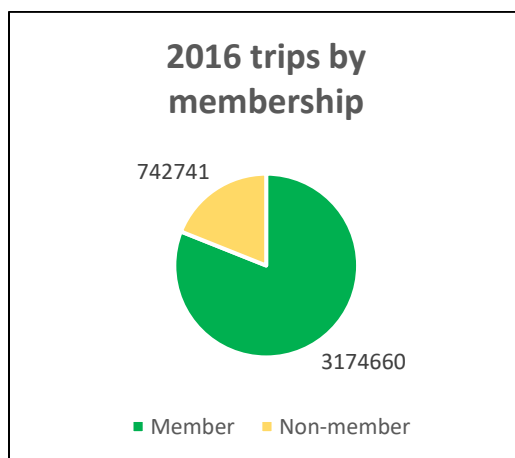


As seen in the above figure, there are hardly any rides before April and in December. Montreal being a city with a harsh winter and heavy snowfalls, there were no rentals from December to March in both the years. Consequently, bike rentals increased with the onset of summer. Most bikes were rented from May to September. The highest rentals were observed in July with 699,248 and 860,732 in 2016 and 2017 respectively. The total number of trips started reducing as fall/autumn started approached and stopped in December.

We can expect a similar trend if we look at the average trips per day for both the years as shown below. Average rides per day were 11,870 in 2016 and 12,229 in 2017. The daily average increased and reached maximum in July with more than 22,000 in 2016 and 27,000 in 2017. It shows a bell-curved pattern. The daily trips started decreasing since August with the lowest trips of around 10,000 in November.

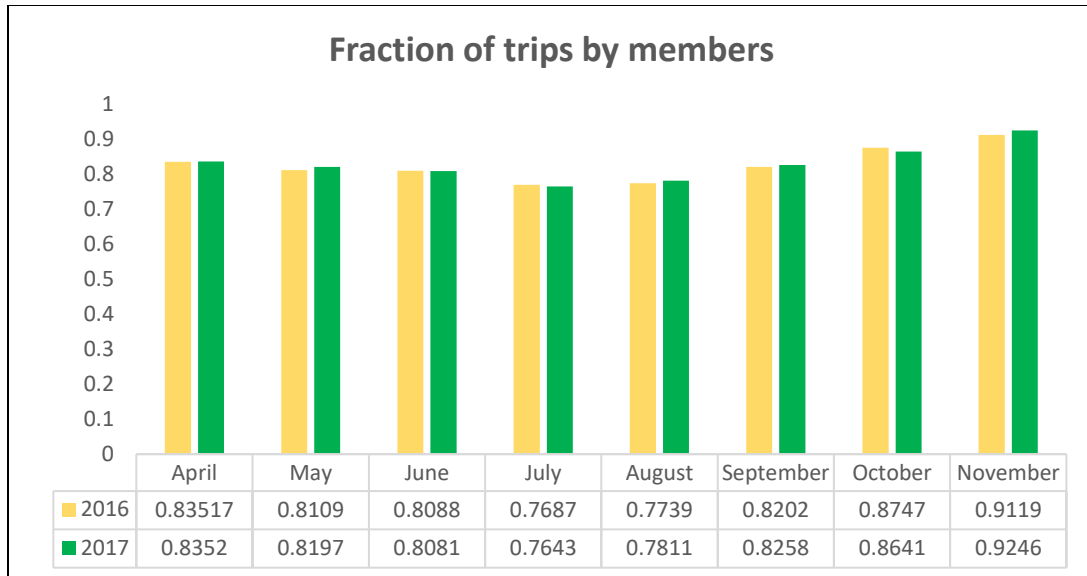
	April	May	June	July	August	September	October	November
2016	11,870	18,099	21,050	22,556	21,703	20,675	12,661	10,009
2017	12,229	18,950	24,728	27,766	27,095	24,395	18,049	9,986

### Trips according to membership status



Bixi bikes can be rented either by subscribing for membership or with a one-time purchase. Total rentals purchased by non-members were significantly higher than those taken by members in both years. The Bixi members contribute to 81% of trips per year. The rest of the 19% of trips are purchased by non-members.

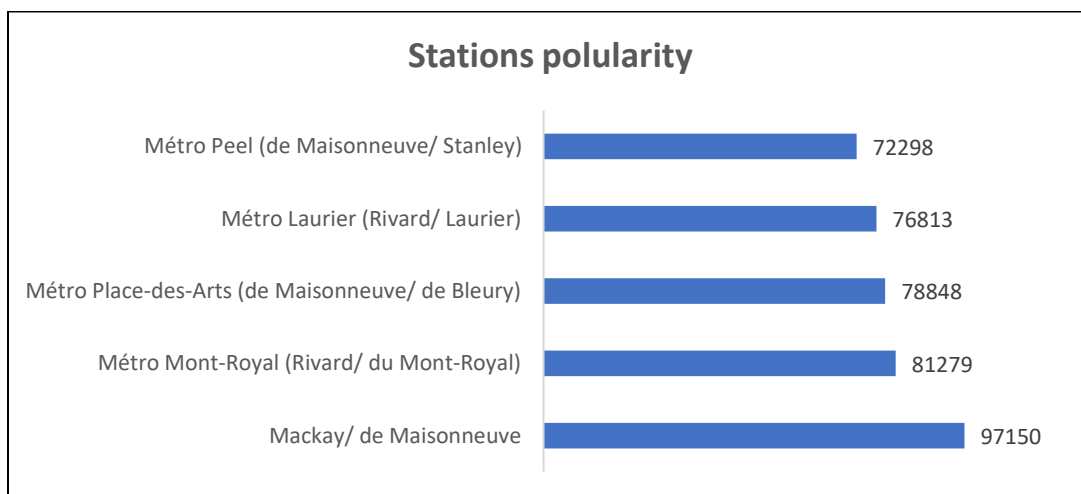
If we look at the members' trips per month, we can see that the members' trips were about 0.83 in April. The fraction of trips by members started decreasing after that. It starts increasing only after September. It means non-members tend to rent bikes more in the peak summer season. Once the weather conditions start getting scarce, only members rent bikes.



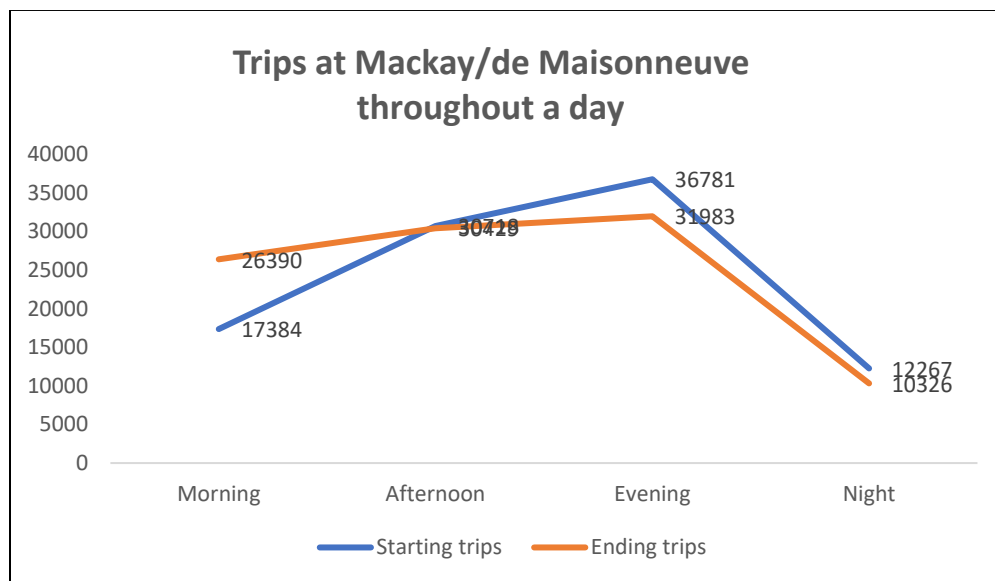
If Bixi wants to expand its membership program, promotions can be offered to non-members starting in March. First promotions can be advertised when the peak rental season is about to start. Maximum bikes were borrowed in the months of June, July, August and September. So, a second series of special promotions can be offered around June to encourage potential customers to bike rentals.

## Station popularity

We also found out the most popular stations where bike rental trips started. It was observed that maximum trips started from station Mackay/de Maisonneuve. A few of the most frequented stations are shown in the table below. As shown in the table, four out of the five starting stations are near metro stations. Thus, we can estimate that people prefer to use mixed transportation for better connectivity. Bixi can consider new stops near metro stations for future developments.



Since the station Mackay/de Maisonneuve has the highest number of starting trips, the rental pattern of that station throughout the day was observed.



We can observe that demand for bikes was higher in the evenings (5-9 PM) followed by the afternoons (12-4 PM). We can thus deduce, that people like to use bikes in their leisure time. Demand was seen to be the lowest at night times (10 PM onwards). More trips are ending in the morning (7-11 AM) than the starting trips. The location is in the core downtown. It means that a lot of people are starting their rides from different places like their homes, and use their bikes to ride downtown for their work, school, commercial complexes, etc.

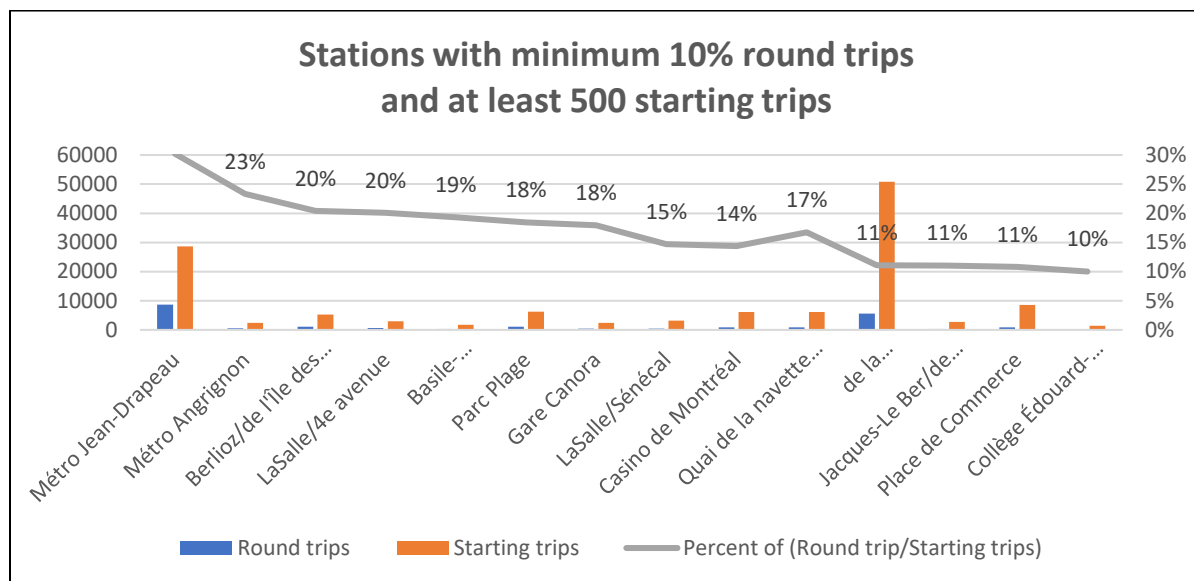
## Round trips

How many round trips were taken at different stations was checked. Round trips are the ones with the same starting and ending station. We saw that the total number of stations for starting trips is the same as that with round trips. This means that almost all stations were used for round trips. Most popular stations for round trips are as follows-

Station	Total round trips at the station
Métro Jean-Drapeau	8,658
de la Commune / Place Jacques-Cartier	5,622
de la Commune / St-Sulpice	4,123
de la Commune / Berri	2,591
de la Commune / McGill	2,182

The table illustrates that most of the round trips were near de la Commune. Maximum round trips were observed on station métro Jean-Drapeau. This information can help for developing new rental spots accordingly.

The research was narrowed down to filter out the stations with more than 10% round trips and a minimum of 500 starting trips to get more knowledge about the high-traffic stations. There are 14 such stations enlisted in the table below.



If we observe the statistics, the most popular station was Métro Jean-Drapeau. Métro Jean-Drapeau connects to different tourist spots such as Olympic village, biosphere, La Ronde. Therefore, the fraction of round trips to starting trips for the station is highest (30%). We can say that people use the bike station to visit scenic round trips where the Métro station Jean-Drapeau is easily accessible.

Maximum starting trips are from the station de la Commune/Place Jacques-Cartier. The station is in the old Montreal area where people can explore multiple tourist spots including the old port and Notre-Dame Basilica of Montreal.

If we locate these 14 stations, we can see that almost all stations are in downtown Montreal. As with any other city, it is more convenient to ride a bike in a downtown area than driving a car or using public transportation. Hence, we can conclude that there is a high demand for Bixi stations in downtown locations.

## **Conclusion and Recommendations**

The initial study of Bixi bikes in Montreal for the years 2016 and 2017 shows more than 8.5 million rides. The total number of rides in 2017 increased suddenly by 19% than the previous year. The majority of the bike trips were taken in the summer months from June to September. Demand for bikes is high in this period due to higher temperatures. More than 80% of trips are carried out by Bixi members. Thus, we suggest doing promotions at the start of the peak season and in the middle of the season to attract new customers.

Some of the popular bike stations are near metro stations. It can be inferred that people prefer hybrid transportation: public transit and bikes. Thus, connecting to more metro stations will be a good opportunity for business growth. A high number of trips have been observed in the evenings. Ensuring the availability of bikes in the evenings in the popular bike stations will be helpful for the users. A lot of round trips are started and ended in the Montreal downtown area. Metro Jean-Drapeau is the most populated station concerning round trips. It shows that if new stations are developed in future near famous tourist places, the demand for bike rentals will increase.