



BIXI Project EDA-Part 1 Business Report

By Lucia Zhang

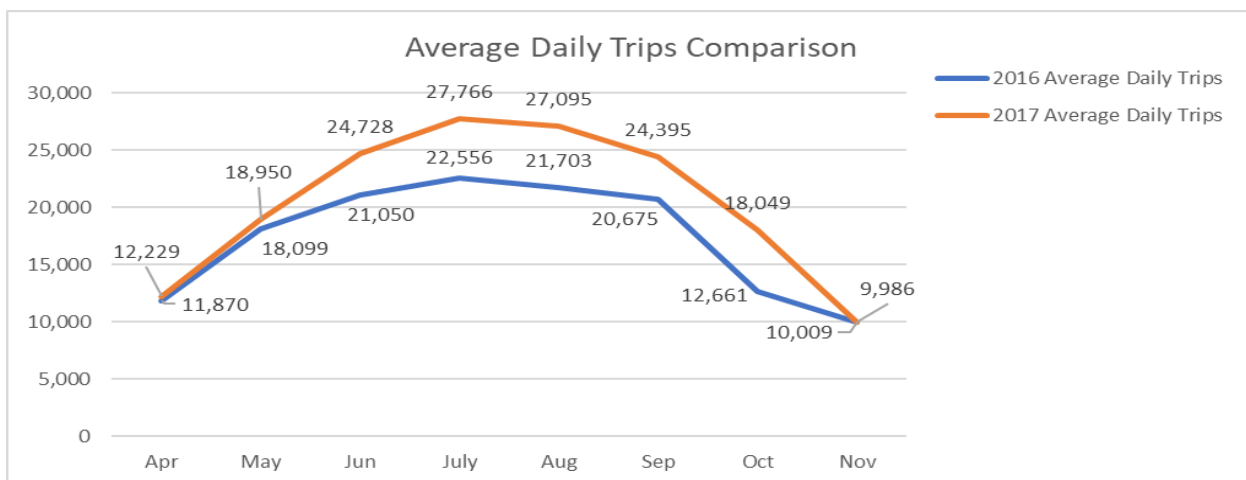
Project Summary

As a rapidly growing bike-sharing service, BIXI was founded by the city of Montreal in 2014, aiming to provide locals and tourists with a quick and convenient transportation alternative while promoting green environment concepts. To remain successful, BIXI needs to optimize revenues. Constantly searching and analyzing customer behavior patterns, trends, controllable and uncontrollable factors, pricing, and the operation system is crucial to make data driven decisions and continuously optimize routes and station locations.

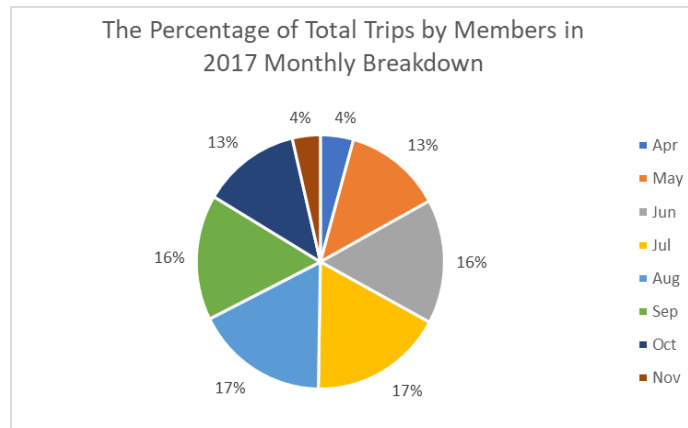
- The first step: EDA data analysis to find patterns and insights learning about how people use Bixi bikes, and what affects usage, station popularity, and business growth ;
- Findings are followed by insights and recommendations
- The purpose and goal is to gain a high-level understanding, find a dynamic model and optimized solutions in pricing, marketing, logistics/operations to maximize overall business growth.

To gain an overall view of the volume of usage of Bixi Bikes and what factors influence it, we explored and analyzed data from 2016 and 2017.

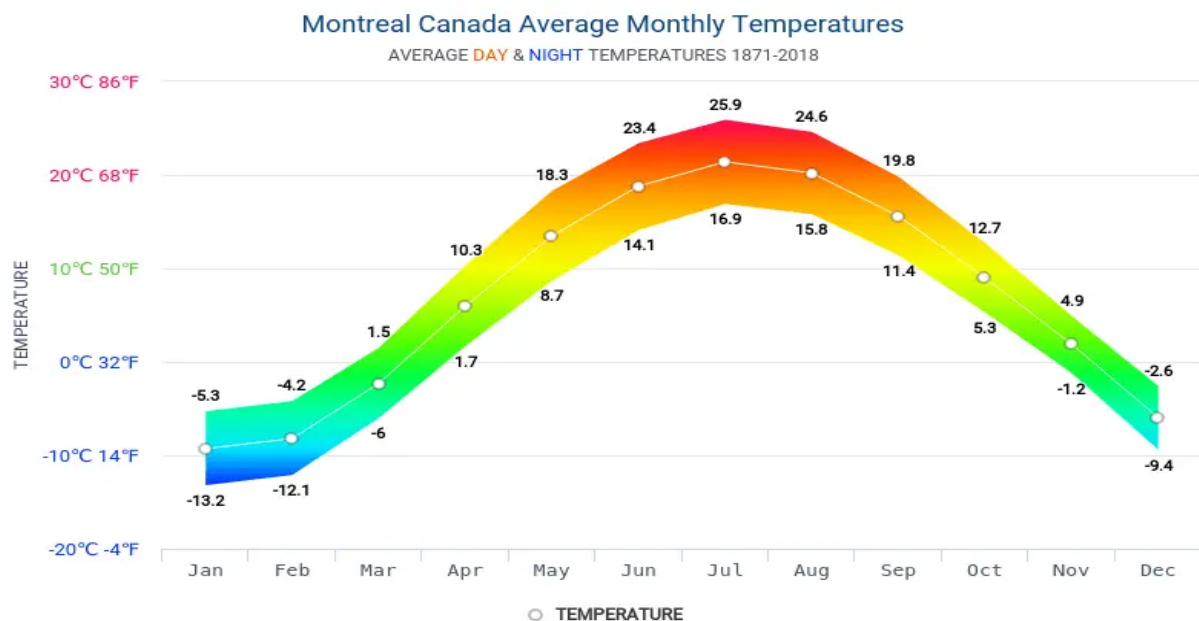
Findings - Part 1 : Membership, Rider Patterns and Seasonal Weather Factors



- As part of continued effort to improve business performance, in 2017 the total yearly trip counts hit 4,666,765, increased by 19.13%; the average daily trips during peak season in July and Aug were over 23% higher than 2016.
- In 2017 the members contributed 81.10% of total trips, the monthly breakdown as below:

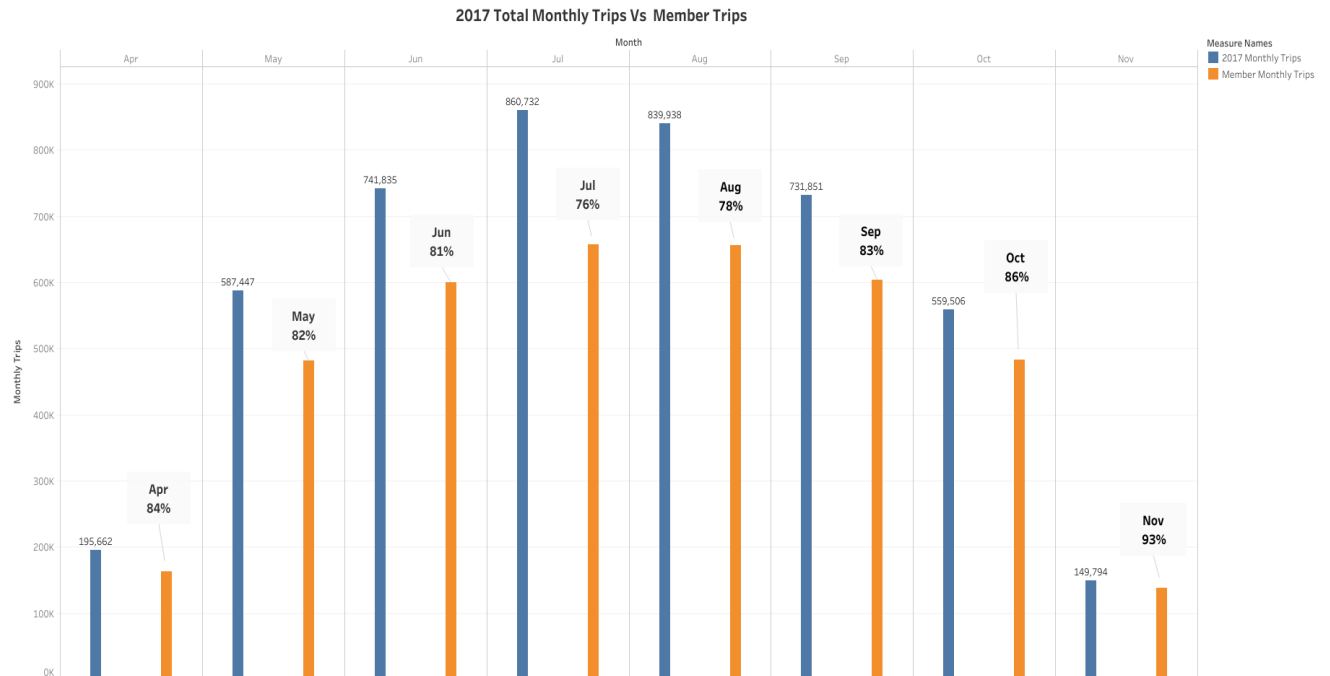


- Montreal is a city known for its high range of temperatures, it can easily get as hot as 30 °C in the summer and as low as -30 °C in the winter. The bikes from BIXI are taken off the streets in November and brought back in April. Due to extreme weather conditions, Jan, Feb and Dec 3 months see zero trips, Apr. is a starting month and Nov as an ending season.



hikersbay.com/climate/canada/montreal

- Based on data, there is a normal distribution pattern: Apr and Nov have extremely low numbers, each at the left and right tail, July and August sit at the peak of the curve.



Please click the link for full view: [Monthly Trips Vs Member Trips | Tableau Public](#)

Conclusion:

- It indicates that seasonal weather is the biggest uncontrollable factor in the biking business: warmer the better. The demand for Bixi bikes is at its peak in July and Aug.
- It's fair to conclude that membership is the major driving force to the increase of trip numbers.
- The ratio of trips by members slightly decreased from 84% in Apr to 76% by July, then slowly increased to 78% in Aug and all the way to 93% by Nov.
The pattern of trips by non-members: vice versa

Recommendations:

- If offering non-members a special promotion in an attempt to convert them to members, the company may consider advertising and a promotion campaign in early April as a good kicking start; once converted, these new members can contribute to business growth all the way till the end of season which is Nov.
- Bixi has been very creative with effective pricing packages to promote membership, such as seasonal/monthly membership, one-way passes and group rates. BIXI Corporate Program targets companies to promote an active lifestyle. While the member and non-member behavior patterns suggest family package, friend referrals, rewarding bonus, gift cards, etc. can be other attractive offerings: who can refuse the invitation to take a fun ride with family members and friends on a good sunny day?
- Membership status is intertwined and influences greatly how people use Bixi bikes. Considering members contributed 81% of yearly trips in 2017, Bixi can take advantage

of their solid member base, develop attractive family packages, bonus/referral programs on annual, 90-day, monthly, daily bases. The main purpose is to encourage and reward members to act as product ambassadors promoting the benefits of biking to their family members, friends and communities. When successfully tailored, this could be one of the most cost effective and efficient win-win solutions.

- Montreal is famous for rich historical Architectures, Bixi may also consider working with the tourist industry and issuing bike ride cars and gift cards with print of Montreal's Top 10 Architectural Marvels, local sightseeings and touch of art. This could be a good catch to both local residents and tourists.

Findings -part 2 : Popular Stations and Traffic Patterns

- As per data, the 5 most popular starting stations are: Mackay / de Maisonneuve with total starting trips of 97,150 , followed by Métro Mont-Royal (Rivard / du Mont-Royal), Métro Place-des-Arts (de Maisonneuve / de Bleury), Métro Laurier (Rivard / Laurier), and No 5. Métro Peel (de Maisonneuve / Stanley) with the total starting trips: 72,298.
- Why Mackay / de Maisonneuve in the No. 1 seat? Research and findings indicate the answer is all the factors such as location, bicycle path, safety facilities, favorite policy, government efforts, convenience, availability, flexibility and easy access to the service and bikes, ect.

1. Inaugurated in 2008, the de Maisonneuve bicycle path is one of the most popular in the city and is open to cyclists year round. In the downtown core, it is called the Claire-Morissette path, named posthumously for the founder of Cyclo Nord-Sud, an organization that repurposes used bicycles and sends them to communities in need, both in Montreal and around the world.

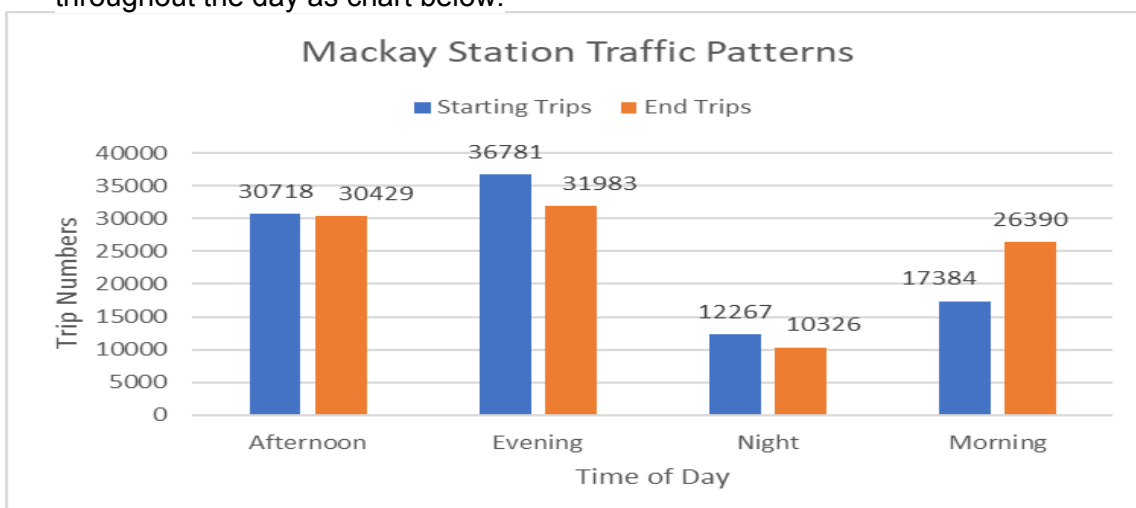
The city said there are about 1,000 cyclists and 2,000 pedestrians per hour at the busiest times on de Maisonneuve downtown. (Data source: Montreal Gazette.

<https://montrealgazette.com/news/local-news/changes-in-the-works-to-make-de-maisonneuve-safer-for-pedestrians-cyclists>)

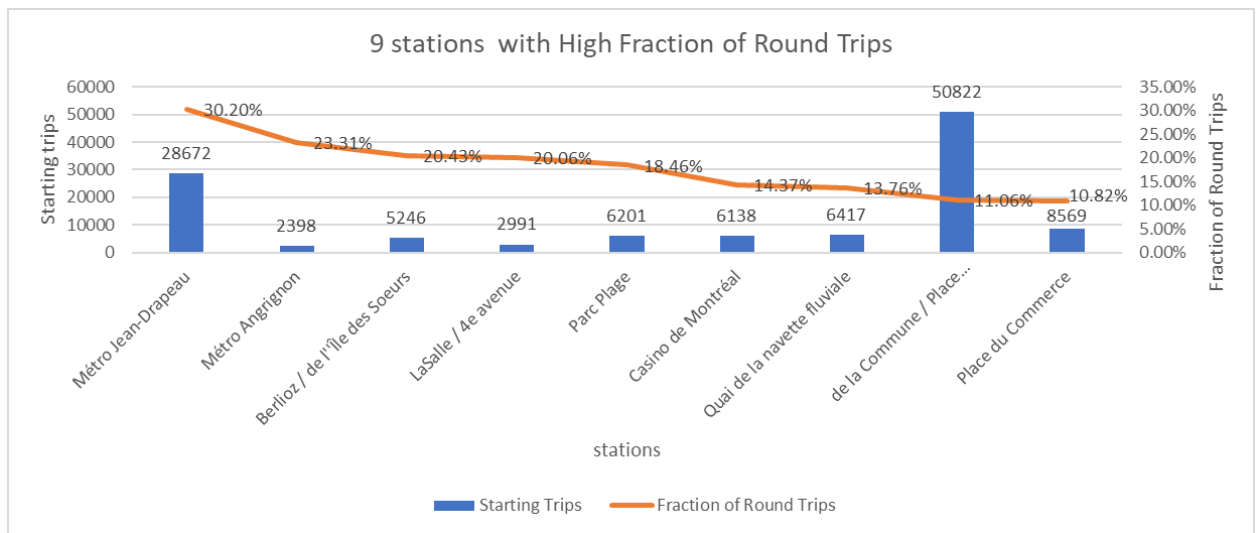
2. Bike share service is increasing in popularity as a mobility solution for Montrealers and residents of the metropolitan area, the network is denser in the city center, BIXI saw an increase in both ridership and the number of members. (Data source: Newswire

<https://www.newswire.ca/news-releases/another-record-breaking-season-for-bixi-with-9-million-trips-taken-in-2022-821288259.html>)

- The number of starts and ends distributed for the station Mackay / de Maisonneuve throughout the day as chart below:



- The interpretation to this pattern: bikers mostly commute in and out of the Downtown area which has a lot of offices, they commute to and from work using BIXI bikes, that's why the traffic starts build up in the morning, when residents and tourists enjoy the biking riding the trip number increases all the way till afternoon and hits the highest in evening, then dying down by the night time.
Will address this pattern with further details when analyzing the customer/riders tables later on.
- There are total 9 stations with at least 500 trips originating from them and having at least 10% of their trips as round trips:



We would expect to find stations with a high fraction of round trips where

- locals and tourists can enjoy diverse cultural and sports programming: Métro Jean-Drapeau,
- parks, beaches, resorts, sightseeing spots, the perfect place for family, couples and friends getaways: Parc Plage
- subway or bus stations where bikers can easily connect to next trips: Métro Angrignon
- Residential areas: Lasalle / 4e Avenue

Project references and links

- [Monthly Trips Vs Member Trips | Tableau Public](#)
- Changes in the works to make de Maisonneuve safer for pedestrians, cyclists:
<https://montrealgazette.com/news/local-news/changes-in-the-works-to-make-de-maisonneuve-safer-for-pedestrians-cyclists>

- Another record-breaking season for BIXI
<https://www.newswire.ca/news-releases/another-record-breaking-season-for-bixi-with-9-million-trips-taken-in-2022-821288259.html>