

CYCLISTIC BIKE-SHARE CASE STUDY: UNDERSTANDING USER BEHAVIOR

As part of my Google Data Analytics Certification, I conducted an in-depth analysis of Cyclistic's bike-share data to understand how casual riders and annual members use bikes differently.

Using BigQuery for SQL-based analysis, I explored ride duration trends, peak usage times, and station popularity.

My findings showed that casual riders take longer rides, prefer weekends, and use bikes near tourist areas, while members ride frequently for shorter durations, likely for commuting.

Based on these insights, I developed three key business recommendations: launching a Weekend Warrior membership plan, targeted promotions at high-traffic stations, and incentives for long rides.

This case study demonstrates my ability to analyze large datasets, extract meaningful insights, and translate findings into business strategies.

1. ASK – A clear statement of the business task

The primary goal is to analyze how **annual members** and **casual riders** use Cyclistic bikes differently to support the company's objective of converting casual riders into annual members. By examining historical trip data, we aim to identify key patterns in ride duration, time of usage, and popular locations for each group. These insights will drive data-informed marketing strategies, helping Cyclistic design targeted campaigns to increase annual memberships, which are more profitable and critical for the company's long-term growth. This analysis will also guide the use of digital media to effectively influence casual riders to become loyal members.

2. PREPARE - A Description Of All Data Sources Used

Data Source: Cyclistic Trip Data (2024)

Description:

- 12 CSV files, each representing monthly trip data for Cyclistic's bike-sharing service in 2024.
- Includes details about trip duration, bike type, start and end stations, geographic coordinates, and user type

Location:

- Initially stored in Google Cloud Storage.
- Imported into BigQuery for analysis.

Fields:

- *ride_id*: Unique identifier for each trip.
- *rideable_type*: Type of bike used (e.g., docked, electric).
- *started_at* and *ended_at*: Start and end timestamps of trips.

- *start_station_name, start_station_id, end_station_name, end_station_id*: Station names and id's where trips began and ended.
- *start_lat, start_lng, end_lat, end_lng*: Geographic coordinates of the stations.
- *member_casual*: User type (member or casual).

3. PROCESS - Documentation Of Any Cleaning Or Manipulation Of Data

Source Data

- **Data Location**: Google BigQuery.
- **Source Files**: 12 monthly CSV files for Cyclic trip data (2024).

Cleaning and Manipulation Steps

1. File Combination:

- All 12 CSV files were uploaded to Google Cloud Storage and imported into BigQuery as a single table.

2. Column Standardization:

- Unified column names across all files.
- Added two new columns:
 - *ride_length* (formatted as HH:MM:SS).
 - *day_of_week* (numeric, 1 = Sunday, 7 = Saturday).

3. Duplicate Removal:

- Removed duplicate rows using the DISTINCT keyword.

4. Missing Data:

- Replaced missing station names (*start_station_name, end_station_name*) with "Unknown."
- Checked for null values in other critical fields (e.g., *started_at, ended_at*).

5. Outlier Removal:

- Filtered out rides with:
 - Negative or zero durations.
 - Unrealistic durations exceeding 24 hours.

6. Validation:

- Verified timestamps and trip durations align.
- Randomly sampled rows for manual inspection.

Resulting Data

Table Name: ``cyclistic-case-study-450611.cyclistic_data_2024.enhanced_table``

Columns:

- Key Columns: *ride_id*, *started_at*, *ended_at*, *user_type*.
- Derived Columns: *ride_length* (HH:MM:SS), *day_of_week*.

4. ANALYZE

Cyclistic Bike-Share Case Study - Data Analysis Summary

Objective

The goal of this analysis is to identify patterns in Cyclistic's bike usage for casual riders vs. annual members. These insights will help convert casual riders into annual members through data-driven marketing strategies.

Key Insights from Data Analysis

1. Monthly Ride Trends

Findings:

- Members consistently have more rides per month than casual users.
- Casual riders' trips are significantly longer (20-25 minutes) compared to members' average trip duration (12-13 minutes).
- Casual ridership increases in warmer months (potentially due to tourism and leisure use).

Insights:

- Encourage casual riders to buy annual memberships by promoting discounts on longer rides.
- Seasonal promotions (e.g., summer discounts) may help convert high-usage casual riders.

2. Ride Duration Distribution

Findings:

- Casual riders have a wider range of ride durations, with many trips exceeding 30 minutes.
- Members tend to have shorter and more consistent ride durations.

Actionable Insights:

- A time-based pricing strategy (e.g., free first 30 minutes for members) could encourage casual users to join.

- Offer membership perks like unlimited rides for trips under 30 minutes.

3. Ride Usage by Hour of the Day

Findings:

- Members' ride durations remain steady throughout the day (~12 minutes).
- Casual riders take longer trips late at night (averaging 25-27 minutes between 1-2 AM).

Actionable Insights:

- Target casual riders with late-night ride passes or promotions for evening memberships.
- Highlight the convenience of shorter trips for commuters to attract casual users.

4. Most Popular Start Stations

Findings:

- Casual riders favor stations near tourist hotspots (e.g., *Streeter Dr & Grand Ave*).
- Members prefer stations closer to business or residential areas.

Actionable Insights:

- Advertise memberships at casual hotspots (e.g., station-based promotions).
- Focus on commuter benefits at member-frequented stations.

Business Recommendations

- Offer "Weekend Warrior" memberships for casual users who ride mostly on weekends.
- Provide discounts for long trips (e.g., free extra minutes for members).
- Place digital ads at top casual rider stations to increase membership sign-ups.
- Emphasize convenience for commuters (shorter, cheaper, faster rides).

5. SHARE

Cyclistic_Case_Study_Presentation.ppt
 Monthly_ride_trends.png
 Ride_duration_comparisation.png
 Ride_duration_by_hour.png
 Top_5_stations.png

6. ACT

1. Introduce a “Weekend Warrior” Membership Plan

Insight:

- Casual riders take longer rides and primarily use bikes on weekends.
- Members take shorter, more frequent trips, indicating a commuter-based pattern.

Recommendation:

- Launch a Weekend Warrior membership plan tailored for high-usage casual riders who ride mainly on weekends
- Offer discounted weekend passes to encourage sign-ups.
- Provide incentives such as unlimited 45-minute weekend rides for a fixed price.

Expected Impact:

- Converts high-usage casual riders into members.
- Creates an entry-level membership tier that casual riders find attractive.

2. Target Casual Riders with Promotions at Popular Stations

Insight:

- Casual riders frequently start trips from tourist-heavy stations (e.g., *Streeter Dr & Grand Ave*).
- Members use stations closer to business and residential areas, showing commuter behavior.

Recommendation:

- Place digital ads and station-based promotions at popular casual rider stations.
- Use in-app pop-ups and QR codes at bike stations to advertise membership benefits.
- Highlight cost savings (e.g., “Save 30% per ride with a membership”).

Expected Impact:

- Increased membership sign-ups from frequent tourist and recreational users.
- Helps casual riders see the financial benefits of membership vs. per-ride payments.

3. Offer Incentives for Longer Rides & Commuters

Insight:

- Casual riders take longer rides (20-25 min) vs. members (12-13 min).
- Members have consistent usage throughout the day, likely for commuting.

Recommendation:

- Offer "First 30 Minutes Free" for New Members to encourage sign-ups.
- Introduce loyalty-based discounts for casual riders who frequently take long trips.
- Promote monthly commuter plans with lower rates for weekday riders.

Expected Impact:

- Encourages longer trip casual riders to subscribe.
- Captures daily commuters looking for affordable alternatives.

Next Steps for Implementation

- Update Cyclistic's marketing strategy to focus on high-usage casual riders.
- Launch a trial campaign for the Weekend Warrior Plan and measure conversions.
- Monitor engagement at casual-dominated stations and adjust promotional efforts accordingly.
- Expand analysis with additional data, such as user demographics or surveys, to refine strategies further.