

Cyclistic Case Study: Analyzing Rider Behavior to Drive Membership Growth

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Problem Statement

Cyclistic, a bike-share program in Chicago, wants to convert casual riders into annual members. The business task is to analyse how casual riders and annual riders use Cyclistic bikes differently. The goal is to identify usage patterns, which in turn can help in forming the marketing strategy to convert casual riders into annual riders.

Stakeholders

- Lily Moreno – Marketing Director
- Cyclistic Marketing Analytics Team
- Cyclistic Executive Team

Data Overview

The analysis utilized 12 months of historical bike trip data from the Cyclistic bike-share program for the year 2021. This dataset, made publicly available by *Motivate International Inc.*, includes detailed information on ride duration, user type, time of travel, and station locations, enabling comprehensive insights into rider behavior.

Data Cleaning And Manipulation

All data cleaning and manipulation were performed using **Power Query within Microsoft Excel**, ensuring an efficient and scalable process for handling a large dataset.

The raw data for 2021 was downloaded as separate monthly CSV files from the Cyclistic website. These files were then consolidated into a single folder, and subsequently combined into one master query in Excel using **Power Query's 'From Folder' feature**. This method allowed for automated concatenation of all monthly data.

Key data preparation and cleaning steps included:

- **Header Consistency Check:** Before combining the data, a preliminary Power Query was used to ensure all 12 monthly files had consistent headers, preventing data misalignment during the consolidation process. (This was done by combining files for header check only, and expanding the 'FileHeaders' column to quickly identify any discrepancies.)
- **Calculating `ride_length_minutes`:**
 - ◆ Ensured `started_at` and `ended_at` columns were correctly set to the **Date/Time** data type.

- ◆ A new column, **ride_length**, was created by subtracting **started_at** from **ended_at**. This column initially had a 'Duration' data type.
- ◆ To enable proper numerical aggregation in Excel, the **ride_length** column was then converted to **total minutes** by creating a new column, **ride_length_minutes**, from the 'Duration' type. This new column was set to the **Decimal Number** data type.
- ◆ The original **ride_length** (Duration) column was then removed to avoid confusion.

→ Calculating **day_of_week**:

- ◆ A new column, **day_of_week**, was extracted from the **started_at** column to represent the day the ride began.
- ◆ The values were adjusted by adding 1, ensuring that the days of the week were represented numerically from **1 (Sunday) to 7 (Saturday)**.
- ◆ The original 'Day of Week' column (the separate one remained before adjustment) was removed.

→ Data Quality Assurance:

- ◆ Rows with **duplicate ride_id** values were removed to ensure each ride was uniquely represented.
- ◆ Rows containing **negative or zero ride_length_minutes** were filtered out, as these represent invalid ride durations.
- ◆ Rows with **null (empty) values** in critical columns such as **start_lat** and **end_lat** were removed to ensure data completeness for geographical analysis.

The resulting dataset was clean, well-structured, and optimized for deeper analysis using Excel's Data Model.

Summary Of The Analysis

Our analysis of the 2021 Cyclistic bike trip data revealed distinct usage patterns between casual riders and annual members, providing key insights for marketing and conversion strategies.

→ Overall Rider Behavior: Initially, an aggregate view of all rides showed significant differences in both volume and duration:

- ◆ Annual members constituted the majority of rides, with a total of **641,052 rides**.
- ◆ Casual riders, while fewer in number, still accounted for **407,523 rides**.
- ◆ A striking difference was observed in ride duration: Casual riders had a significantly longer average ride length of **38.50 minutes**.

- ◆ In contrast, annual members' average ride length was considerably shorter, at **14.50 minutes**.

→ **Daily Usage Patterns:** Further analysis by **day_of_week** highlighted behavioral variations throughout the week, as illustrated in the following visualizations:

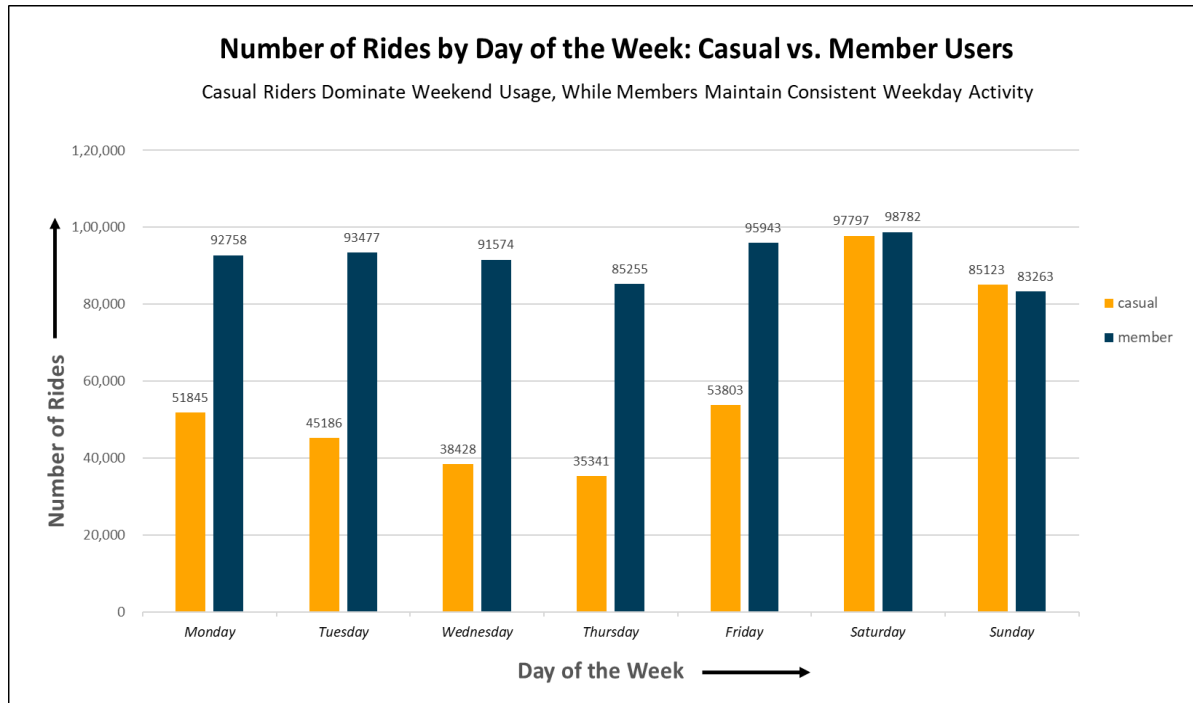


Figure 1: Cyclistic Rider Volume by Day, Highlighting Weekend Peaks for Casual Riders.

- ◆ **Key Finding (Ride Volume):** Members consistently rode more frequently on weekdays, indicating a strong likelihood of using bikes for commuting or regular errands. While their ride counts fluctuated slightly, they maintained a more stable daily usage.
- ◆ Conversely, casual riders showed a pronounced peak in ride volume during weekends (specifically Sunday and Saturday), with significantly lower usage on weekdays. This suggests their usage is more leisure-oriented.

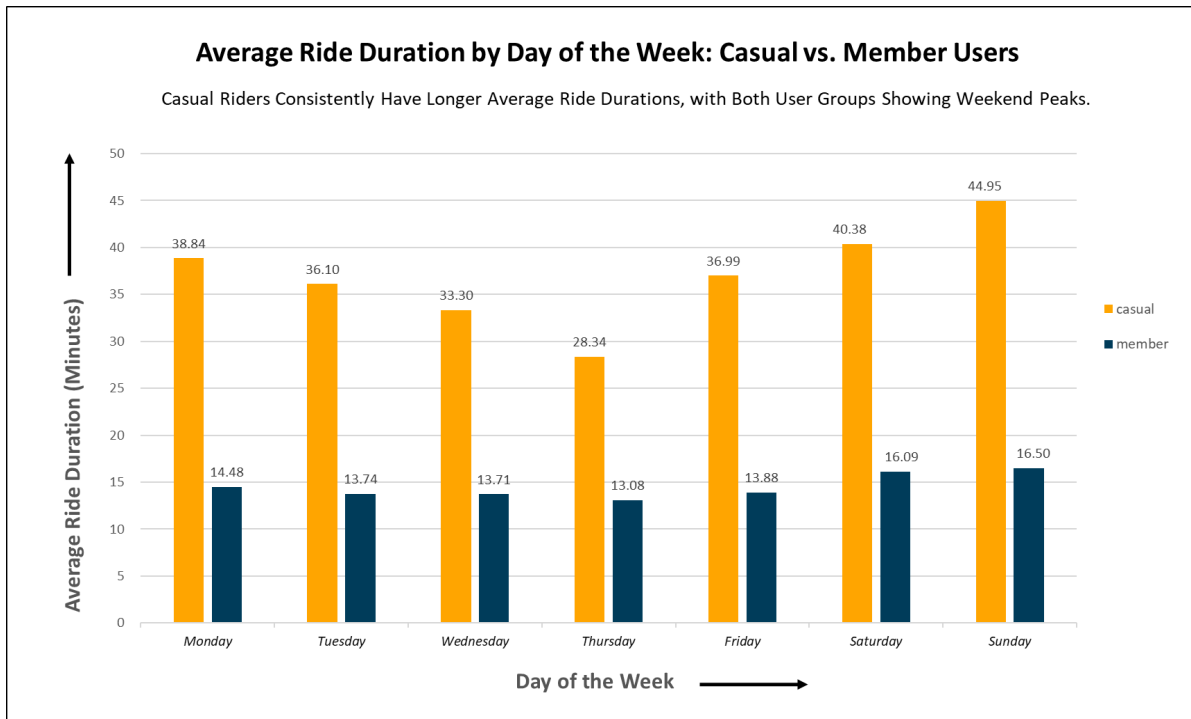


Figure 2: Average Ride Duration by Day of Week, with Longer Rides Among Casual Users

- ◆ **Key Finding (Ride Duration):** Casual riders maintained a substantially longer average ride length than annual members across all days of the week. This pattern was consistent, reinforcing that casual rides are typically for longer, possibly recreational, purposes.
 - ◆ Both casual and annual riders exhibited longer average ride durations on Fridays, Saturdays, and Sundays, aligning with increased leisure time on weekends.
 - ◆ Notably, both rider types recorded their lowest average ride times on Thursdays.
- **Bike Type Preference:** Further analysis of `rideable_type` reveals distinct usage patterns among bike categories for both casual and member riders, as shown in the chart below:

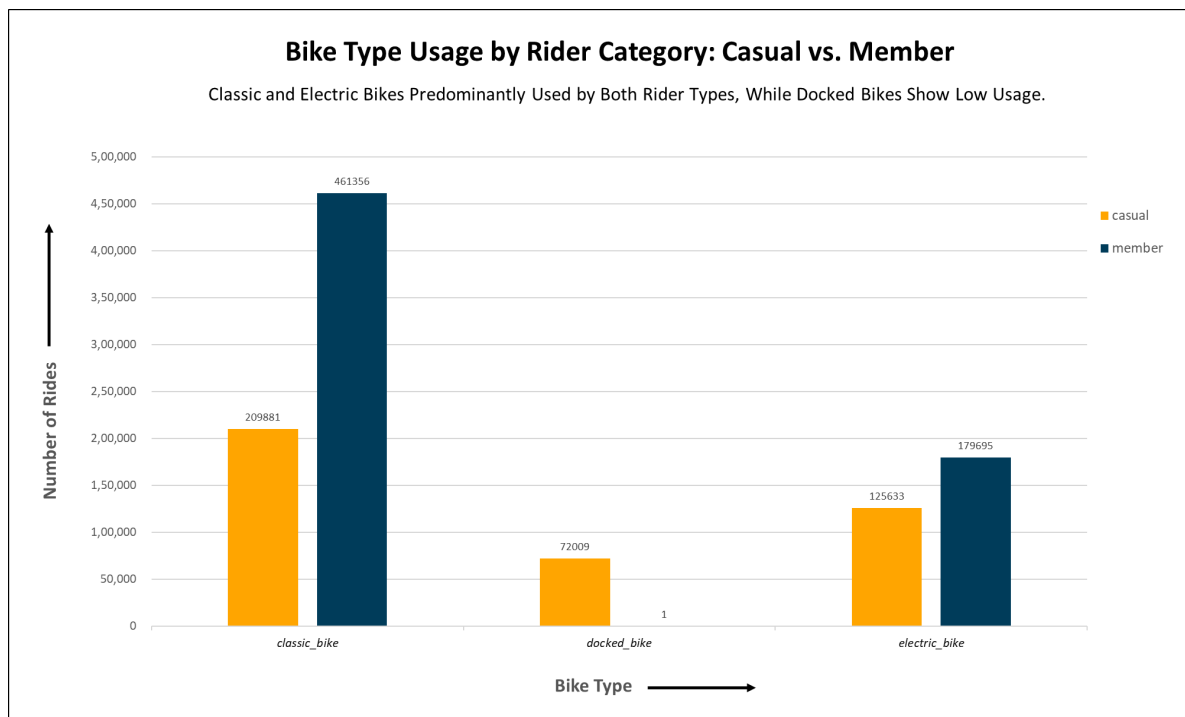


Figure 3: Bike Type Preferences Among Rider Groups, Showing Low Usage of Docked Bikes

- ◆ **Key Finding (Bike Type):** Both member and casual riders predominantly used classic and electric bikes, indicating a strong preference for flexible, widely available bike types.
- ◆ Classic bikes had the highest overall usage, suggesting they are the default or most accessible option for both groups.
- ◆ In contrast, docked bikes were used significantly less by both segments, pointing to either limited availability or lower convenience, especially for casual riders who may favor spontaneity and ease of use.

These findings provide a clear picture of how casual and annual riders differ, forming the basis for strategic recommendations to encourage membership conversion.

Top Three Recommendations

Based on our detailed analysis of Cyclistic's 2021 ride data, we propose the following actionable recommendations to drive casual rider conversion and optimize overall ridership:

1. Implement a Comprehensive Ride-Time Based Loyalty Program for All Riders

- ➔ **Recommendation:** Develop a unified loyalty program where both casual and annual riders earn points based on their accumulated ride time, redeemable for various benefits, including membership conversion incentives and enhanced member perks.
- ➔ **Rationale:** Our analysis shows distinct ride duration patterns: casual riders consistently take significantly longer average rides, while annual members ride more frequently but for shorter durations. A single point system can leverage both behaviors.

→ **Proposed Action:**

◆ **For Casual Riders:** Points earned from their longer rides can be directly applied as discounts towards an annual membership (e.g., "Earn Your Membership Discount"). This directly converts their existing behavior into a tangible incentive.

◆ **For Annual Members:** Points can unlock tiered benefits such as premium membership status (e.g., Platinum), exclusive offers, coupons, priority bike access, reduced wait times, access to better bike performance, or the ability to add family members to their plan. This incentivizes them to ride more frequently and for potentially longer durations, increasing their lifetime value.

→ **Expected Benefit:** This dual-purpose program directly addresses the primary goal of converting casual riders while simultaneously enhancing the value proposition for existing members, encouraging increased engagement and loyalty. It creates a continuous value ladder for all Cyclistic users.

2. Drive Weekday Engagement Among Casual Riders Through Targeted Incentives

→ **Recommendation:** Introduce specific discounts and promotional campaigns designed to encourage casual riders to utilize Cyclistic bikes during weekdays.

→ **Rationale:** Our data clearly shows a substantial disparity in casual rider activity, with significantly lower ride counts on weekdays compared to pronounced peaks on weekends. This indicates an underutilized weekday capacity for casual users.

→ **Proposed Action:** Offer attractive weekday-only pricing (e.g., a 'Weekday Commuter Pass' or 'Lunchtime Ride Special' with reduced per-minute rates), or limited-time coupons valid only on weekdays. Marketing efforts should highlight the convenience and benefits of using Cyclistic for weekday commutes, errands, or lunchtime rides, thereby shifting their usage patterns.

→ **Expected Benefit:** Increases overall weekday ridership, optimizes fleet distribution and utilization during less busy periods, and exposes casual riders to the benefits of using Cyclistic bikes for practical, everyday purposes, which aligns more with member behavior.

3. Enhance Utilization of Docked Bikes Across Both Rider Segments

→ **Recommendation:** Implement targeted pricing strategies and awareness campaigns to incentivize both casual and annual members to use docked bikes more frequently.

→ **Rationale:** Our analysis of bike type preference indicated a strong predominant usage of classic and electric bikes by both casual and annual riders, with docked bikes showing significantly lower utilization. This suggests an opportunity to optimize the usage of existing assets.

- **Proposed Action:** Offer attractive reduced rates or store credits for choosing docked bikes for rides. Campaigns could emphasize benefits specific to docked bikes, such as guaranteed return points and reliability for certain routes.
- **Expected Benefit:** Improves the return on investment for the docked bike fleet, potentially reducing maintenance pressure on other bike types, and diversifies usage across Cyclistic's entire inventory.

Concluding Remarks

Our comprehensive analysis provides actionable insights into Cyclistic's rider behavior, laying a clear strategic foundation to drive casual rider conversion and optimize overall fleet utilization for sustained growth. We are confident these recommendations will directly contribute to achieving Cyclistic's business objectives.