# Cyclistic Bike-Share Case Study

## Data Analysis Report

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# Project Description

This case study analyzes Cyclistic's historical bike-share trip data to identify behavioral differences between casual riders and annual members. The objective of this project was to use data analytics to generate actionable business insights that support the company's goal of increasing annual memberships.

Using R and RStudio, I performed data cleaning, transformation, exploratory analysis, and visualization. The findings were translated into strategic recommendations aimed at improving conversion rates from casual riders to annual members.

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# 1. Ask Phase

## Business Task

Cyclistic's marketing team aims to increase the number of annual memberships. The primary business problem is converting casual riders into annual members.

## Key Business Question

How do annual members and casual riders use Cyclistic bikes differently?

## Stakeholders

- Director of Marketing (Moreno)

- Marketing Analytics Team

- Executive Leadership Team

## Business Objective

Identify usage patterns between casual riders and annual members and provide data-driven recommendations to support targeted marketing strategies.

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# 2.   Prepare Phase

## Data Source

The dataset consists of 12 months of Cyclistic trip data. Each monthly dataset includes ride-level details such as:

- ride_id

- rideable_type

- started_at

- ended_at

- start_station_name

- end_station_name

- member_casual

## Data Credibility (ROCCC)

- Reliable: Provided by Cyclistic

- Original: First-party company data

- Comprehensive: Covers 12 months of activity

- Current: Reflects recent user behavior

- Cited: Publicly available for analysis

## Limitations

- No demographic data (age, gender, income)

- No pricing details

- No marketing response data

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# 3.  Process Phase

In the Process phase, the 12 monthly Cyclistic trip datasets were imported into RStudio and combined into one dataset using `bind_rows()`.

The merged dataset contained **5,552,965 rows and 13 columns**, which was confirmed using:

- `dim()` to check dataset size

- `str()` to verify data structure

- `colnames()` to confirm column names

## Data Cleaning & Transformation Steps

- Converted date-time columns (`started_at` and `ended_at`) into proper date-time format.

- Created a new variable `ride_length` by calculating the difference between `ended_at` and `started_at`.

- Extracted new variables:

  - `day_of_week`

  - `month`

  - `hour`

- Removed invalid records, including:

  - Rides with negative duration

  - Rides with zero duration

  - Missing or incomplete entries

- Checked for duplicates and ensured consistent data types.

After cleaning and validation, the dataset was structured, consistent, and ready for the Analyze phase.

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# 4. Analyze Phase

Using R and ggplot2, exploratory data analysis was conducted to compare behavioral patterns between casual riders and annual members.

## Visualizations Created

- Total Rides by Day of Week

- Average Ride Duration by Day

- Total Rides by Month

- Rides by Hour of Day

# Key Findings

## 1. Weekly Usage Patterns

- Members ride more frequently on weekdays.

- Casual riders ride more frequently on weekends.

This indicates members primarily use bikes for commuting, while casual riders use bikes for leisure.

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## 2. Ride Duration

- Casual riders have longer average ride durations.

- Members take shorter but more frequent trips.

This supports the assumption that casual riders engage in recreational use.

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## 3. Seasonal Trends

- Ride activity increases during warmer months.

- Casual rider growth is more pronounced during summer.

This highlights a strong opportunity for seasonal marketing campaigns.

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## 4. Hourly Patterns

- Members peak during commuting hours (morning and evening).

- Casual riders peak during midday and weekends.

This further confirms different usage motivations.

# 5.  Share Phase

In the Share phase, findings were presented using structured data visualizations and a clear slide-based presentation format.

## Communication Strategy

- One key insight per slide

- Clear axis labels and titles

- Minimal text with strong visual emphasis

- Logical flow from business question to recommendations

## Accessibility Considerations

- High contrast visuals

- Readable fonts

- Clean layout

- Simple language for stakeholder clarity

# 6.  Act Phase

## Final Conclusion

The analysis confirms that casual riders primarily use Cyclistic bikes for leisure and recreational activities, while annual members use bikes for commuting and routine transportation.

These behavioral differences present a strategic opportunity to design targeted campaigns that convert casual riders into annual members.

# Top Three Strategic Recommendations

### 1. Target High-Engagement Casual Riders

Identify frequent casual users through ride history analysis and deliver personalized membership offers. Highlight cost savings, convenience, and exclusive benefits of annual plans. Since these riders already demonstrate high usage, they represent the strongest opportunity for conversion.

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### 2. Launch Pre-Season Marketing Campaigns

Implement targeted marketing campaigns during spring to convert casual riders before peak summer demand. Promoting annual memberships ahead of high-usage months increases the likelihood of long-term subscription commitments.

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### 3. Drive Conversion with Behavioral Incentives

Introduce weekend promotions and commuter-based incentives to encourage casual riders to transition to annual membership. Aligning promotional strategies with observed riding behavior increases engagement and improves conversion rates.

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# How the Business Can Apply These Insights

- Implement behavior-based customer segmentation

- Personalize marketing communication

- Optimize campaign timing around seasonal trends

- Track and measure conversion performance

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# Next Steps

- Conduct A/B testing on promotional offers

- Monitor casual-to-member conversion rates

- Collect demographic data for deeper segmentation

- Evaluate marketing ROI

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# Final Summary

This case study applied data cleaning, transformation, and exploratory analysis using R to uncover meaningful behavioral differences between casual riders and annual members. The findings were translated into actionable, data-driven recommendations designed to support Cyclistic's business objective of increasing annual memberships.

Through structured analysis and strategic insight development, this project demonstrates strong analytical thinking, technical execution, and business communication skills.