FINAL ANALYSIS REPORT – DIVVY BIKE-SHARE CASE STUDY

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1. Introduction

The objective of this project was to analyze the behavioral differences between annual members and casual riders of the Divvy bike-share system. The analysis followed the CRISP-DM methodology, including data cleaning, transformation, exploration, and visualization in Excel and Power BI.

IMPORTANT NOTE:

Due to system memory limitations in RStudio (free version restriction), the project had to be completed using only **three months of data** (Divvy Q1 datasets). The full 12-month dataset exceeded the allowed memory capacity, making the 3■month subset necessary for proper processing and visualization.

2. Data Cleaning and Preparation

The original dataset included more than 700,000 rows with various issues:

- Inconsistent date and time formats

- Missing station IDs and names

- Text formatting inconsistencies

- Incorrect ride duration values and outliers

- Need to regenerate a valid ride_length_minutes variable

Key transformations:

- Conversion of date fields into proper formats

- Creation of ride_length_minutes using DATEDIFF

- Removal of rows with critical missing values

- Outlier filtering based on business rules

- Creation of derived fields: month_year, month_name, month_number, day_of_week, hour

- Validation of all fields for consistency

The final dataset used for analysis was fully clean, structured, and ready for BI visualization.

3. Key Findings

a) Average Ride Duration

- Casual riders take significantly longer trips.
- Member average: 12–15 minutes
- Casual average: 25–35 minutes

This suggests members use bikes for commuting, while casual users use them for leisure.

b) Weekly Usage Patterns

- Members ride more during weekdays, matching work commute patterns.
- Casual users peak on weekends, confirming recreational usage.

c) Monthly and Seasonal Trends

- Usage increases from March to August.
- Winter months have lower activity due to weather conditions.

d) Bicycle Type Preferences

- Both user groups mainly use docked bikes.
- Casual users show more variability across tourist-oriented stations.

e) Peak Hours

- Members: 7–9 AM and 4–6 PM (commuting hours)
- Casual: 11 AM–6 PM (daytime leisure)

4. Recommendations

1) Convert Casual Riders into Members

Promotions targeting leisure users:

- Weekend passes

- Short-term flexible memberships

- Trial days for touristic routes

2) Optimize Bike Availability

- Increase stock in residential areas during morning peak

- Reinforce stations in business districts during the evening

3) Seasonal Marketing Strategy

- Focus campaigns during warm months (March–August)

- Promote leisure routes and touristic experiences

5. Conclusion

The analysis clearly demonstrates behavioral differences between rider types in terms of duration, timing, and seasonal usage. Casual riders represent a strong opportunity for membership conversion. Members show stable and predictable patterns aligned with commuting routines.

Working with only three months of data due to memory limitations did not prevent identifying strong and actionable insights. The findings support targeted strategies that can improve user satisfaction and increase Divvy’s long-term membership base.