

# **Divvy Bikeshare Analysis: Member and Casual Rider Behaviour**

## **A Google Capstone Project Report**

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## **1. Executive Summary**

This report presents a comprehensive analysis of Divvy Bikeshare trip data, focusing on the distinct usage patterns between its annual members and casual riders from January 2024 to December 2024. The primary objective was to leverage data-driven insights to inform strategic operational and marketing decisions for the Organization.

Key findings reveal that members constitute the majority of ridership, demonstrating consistent year-round usage, often for commuting purposes. In contrast, casual riders exhibit highly seasonal behavior, with significant peaks during warmer months, and tend to take longer, more leisure-oriented trips, predominantly on weekends. This disparity highlights opportunities for targeted marketing and operational adjustments.

Based on these insights, key recommendations include implementing targeted seasonal marketing campaigns to convert casual riders, dynamically adjusting bike distribution based on peak demand for each user type, and exploring diversified pricing strategies to enhance profitability and user satisfaction.

## **2.0 Introduction**

### **2.1. Project Background**

In 2016, Cyclistic launched a successful bikeshare offering. Since then, the program has grown to a fleet of 5,824 bicycles that are geotracked and locked into a network of 692 stations across Chicago. The bikes can be unlocked from one station and returned to any other station in the system anytime. Until now, Cyclistic's marketing strategy relied on building general awareness and appealing to broad consumer segments. One approach that helped make these things possible was the flexibility of its pricing plans: single-ride passes, full-day passes, and annual memberships. Customers who purchase single-ride or full-day passes are referred to as casual riders. Customers who purchase annual memberships are Cyclistic members.

Therefore, this analysis delved into the rich dataset generated by Divvy trips to gain a deeper understanding of its diverse user base. By differentiating between the usage

habits of annual members and casual riders, Divvy can better tailor its services, enhance user experience, and optimize its operational efficiency.

## **2.2. Business Question**

The central business question guiding this analysis is: How do members and casual riders use Divvy bikes differently, and what are the implications for business strategy?

## **2.3. Project Objectives**

To answer the business question, the project established the following objectives:

- To identify the total ridership contribution and numbers of members versus casual users.
- To analyze total number of users by rideable type.
- To compare highest number of cycling trips per month
- To assess differences in average ride length and trip duration.
- To determine User types by day of the week
- To determine the longest average length per week.
- To provide data-driven recommendations.

## **3. Methodology**

This project followed a structured analytical approach to investigate the distinct usage patterns between Divvy Bikeshare members and casual riders. The methodology encompassed data acquisition, rigorous cleaning and transformation, in-depth exploratory data analysis, and the synthesis of findings into actionable insights.

### **3.1. Data Acquisition**

The primary data source for this analysis was the publicly available Divvy Bikeshare trip data, specifically a collection of twelve-monthly CSV files covering the period from January 2024 to December 2024. These files contain detailed records of individual bike trips, including user type, trip duration, and bike type.

### **3.2. Data Cleaning and Transformation (ETL Process)**

Leveraging Microsoft Excel's Power Query Editor, a robust Extract, Transform, Load (ETL) process was implemented to prepare the raw data for analysis. This involved several critical steps:

- **File Combination:** All twelve-monthly CSV files were combined into a single, cohesive dataset. This was facilitated by the consistent number of columns and identical headings across all individual files.
- **Initial Data Inspection:** A preliminary review was conducted to identify data types, potential inconsistencies, and missing values.
- **Column Management:** Irrelevant or redundant columns were identified and removed to streamline the dataset.
- **Feature Engineering:** A new calculated column, ride length, was created to represent the duration of each trip.
- **Data Quality Assurance:** During the calculation of ride length, instances of negative values were identified. These anomalies, likely resulting from data entry errors or system glitches, were systematically removed from the dataset to ensure data integrity. For consistency in ride length values, the absolute value (ABS) was applied to ensure all durations were positive, reflecting actual trip lengths.
- **Data Type Standardization:** All columns were converted to appropriate data types (e.g., dates to date format, numerical values to numeric types) to facilitate accurate calculations and analysis.
- **Table Preparation:** The final cleaned and transformed table was prepared to align precisely with the project's analytical objectives.

### **3.3. Exploratory Data Analysis (EDA)**

With the cleaned dataset, comprehensive exploratory data analysis was performed primarily using Microsoft Excel's Pivot Tables and Charting capabilities. This phase aimed to uncover patterns, trends, and relationships within the data, specifically focusing on the differences between member and casual rider behavior:

- Overall Ridership Volume: Pivot tables were used to aggregate the total number of rides, broken down by user type (member vs. casual), to understand their overall contribution to the service.
- Rideable Type Preference: The distribution of classic bike, electric bike, and electric scooter usage was analyzed for members and casual riders to identify preferences.
- Seasonal Usage Patterns: Monthly ride counts for both user types were analyzed to identify seasonal trends, peak periods, and off-peak periods. Line charts were generated to visualize these monthly variations.
- Daily Usage Patterns: Ridership was analyzed by day of the week for both user types to identify differences in weekday vs. weekend usage, suggesting commuting vs. leisure patterns. Column charts were utilized for visualization.
- Average Ride Length Comparison: The average ride length was calculated and compared across user types, both overall and by month/day of the week, to understand typical trip durations.
- Visualization: Various charts (pie charts, line charts, column charts) were created from pivot table summaries to visually represent the data and make insights easily digestible.

### **3.4. Tools and Technologies**

The following tools were instrumental in executing this project:

- Microsoft Excel: Utilized for all data cleaning, transformation (via Power Query), data aggregation (Pivot Tables), and data visualization (Charts).
- Microsoft Word: Employed for compiling the comprehensive project report, documenting findings, methodology, and recommendations.
- Google Drive: Used for securely storing and sharing the large Excel workbook, ensuring accessibility for external stakeholders like recruiters, while adhering to GitHub's file size limitations.
- GitHub: Served as the central repository for project files, including the README.md (project overview), the comprehensive report, presentation, and embedded chart images, facilitating version control and project showcase.

## **4. Key Findings and Analysis**

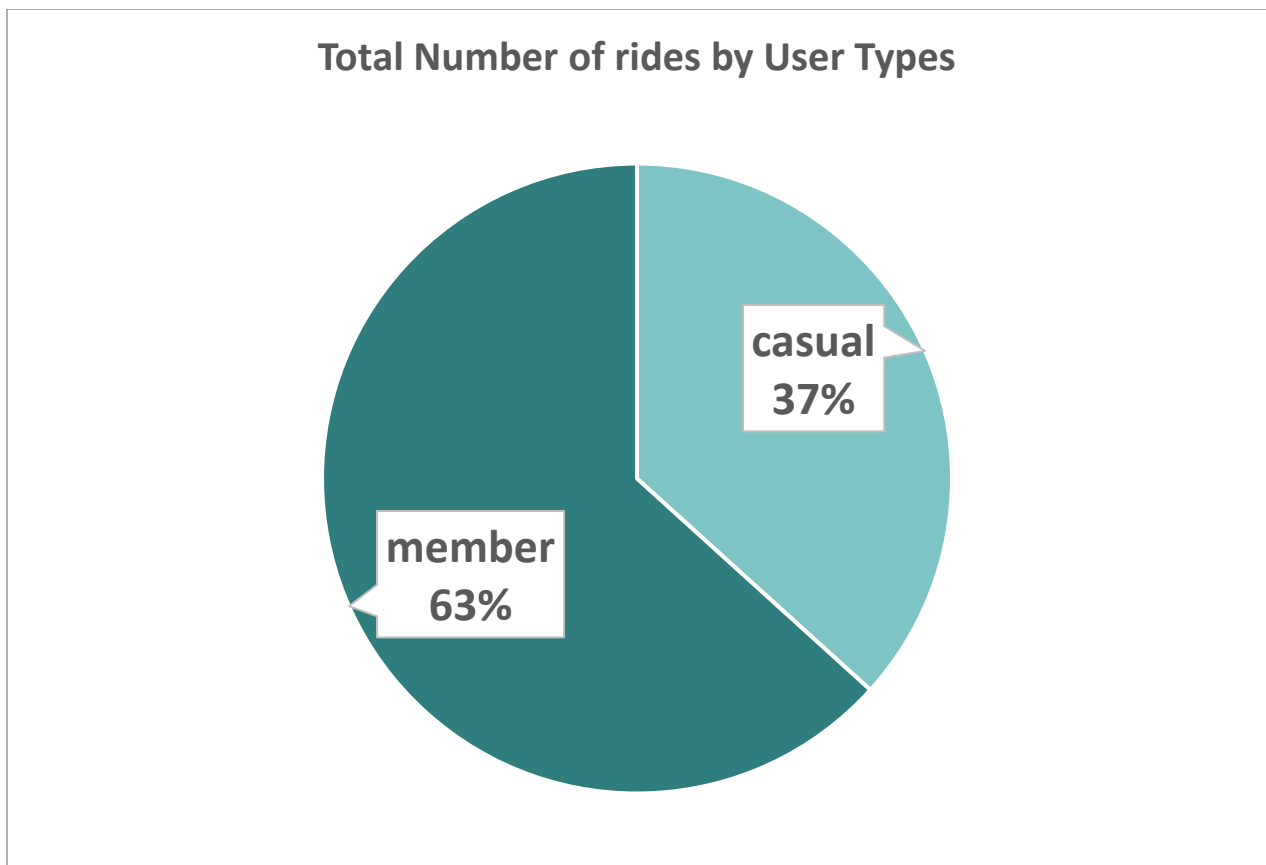
This section details the key insights derived from the exploratory data analysis, highlighting the distinct usage patterns between Divvy Bikeshare members and casual riders.

#### 4.1. Who takes the most frequent trips?

**Insight:** Members constitute the majority of Divvy Bikeshare ridership, significantly outnumbering casual users and forming the core user base.

**Analysis:** Over the analyzed period, Divvy recorded a total of 5,860,568 rides. Of these, Members accounted for 3,708,910 rides (approximately 63%), while Casual riders contributed 2,151,658 rides (approximately 37%). This clear disparity underscores the critical role of the membership program in the overall utilization of the bike-sharing service.

Figure 1: Overall User Type Distribution



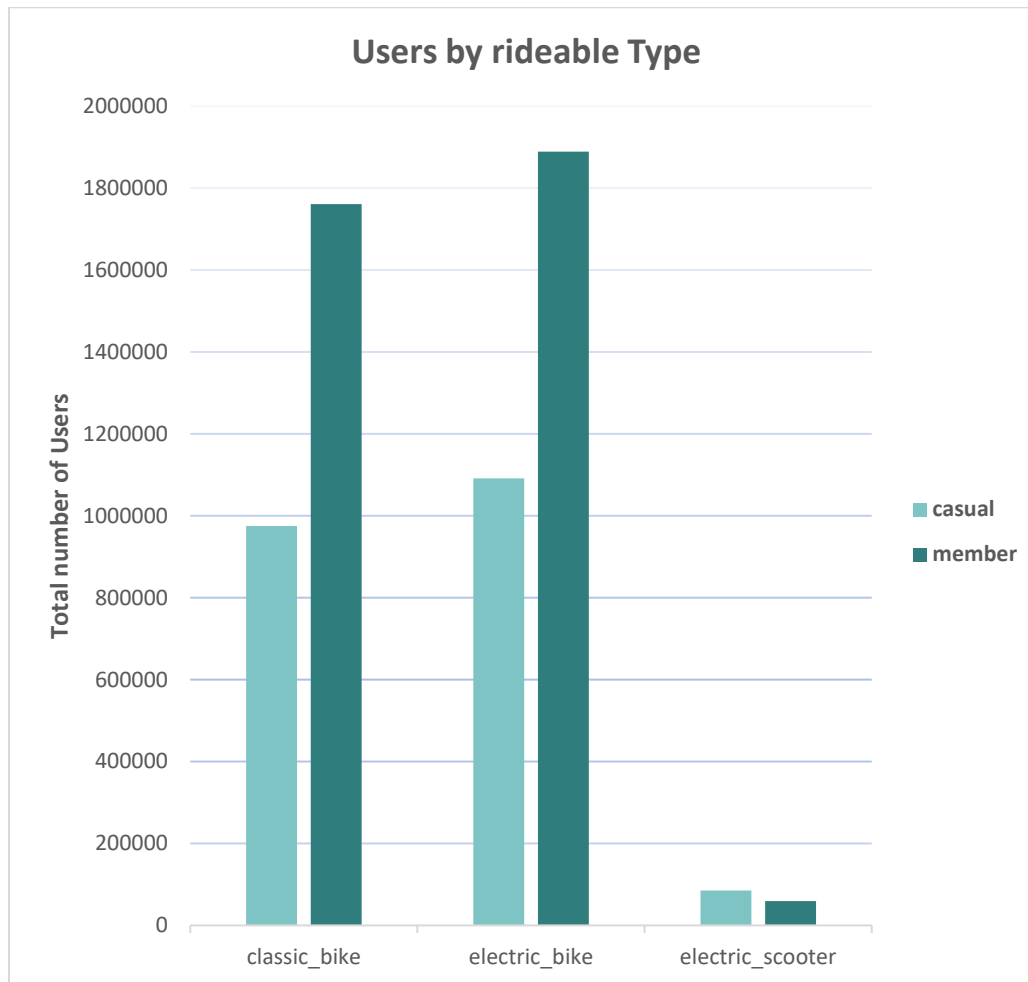
## **4.2. Which rideable type is the most preferred?**

Insight: Both user types predominantly utilize classic and electric bikes, but casual riders show a slightly higher proportional usage of electric scooters compared to members.

Analysis: The data indicates that electric bikes (casual: 1,091,477; member: 1,980,895) and classic bikes (casual: 574,966; member: 1,768,670) are the most frequently used rideable types by both members and casual riders. However, a closer look reveals that casual riders accounted for 85,215 electric scooter rides, compared to 59,122 for members. This suggests a potential demand or preference for electric scooters among the casual user segment.



Figure 1: Total Rides by Rideable Type and User Type



#### 4.3. Which months have the highest number of cycling trips?

Insight: Both user types exhibit seasonality, but casual riders' usage is far more dependent on favourable weather conditions, showing extreme peaks during warmer months, while members maintain more consistent year-round activity.

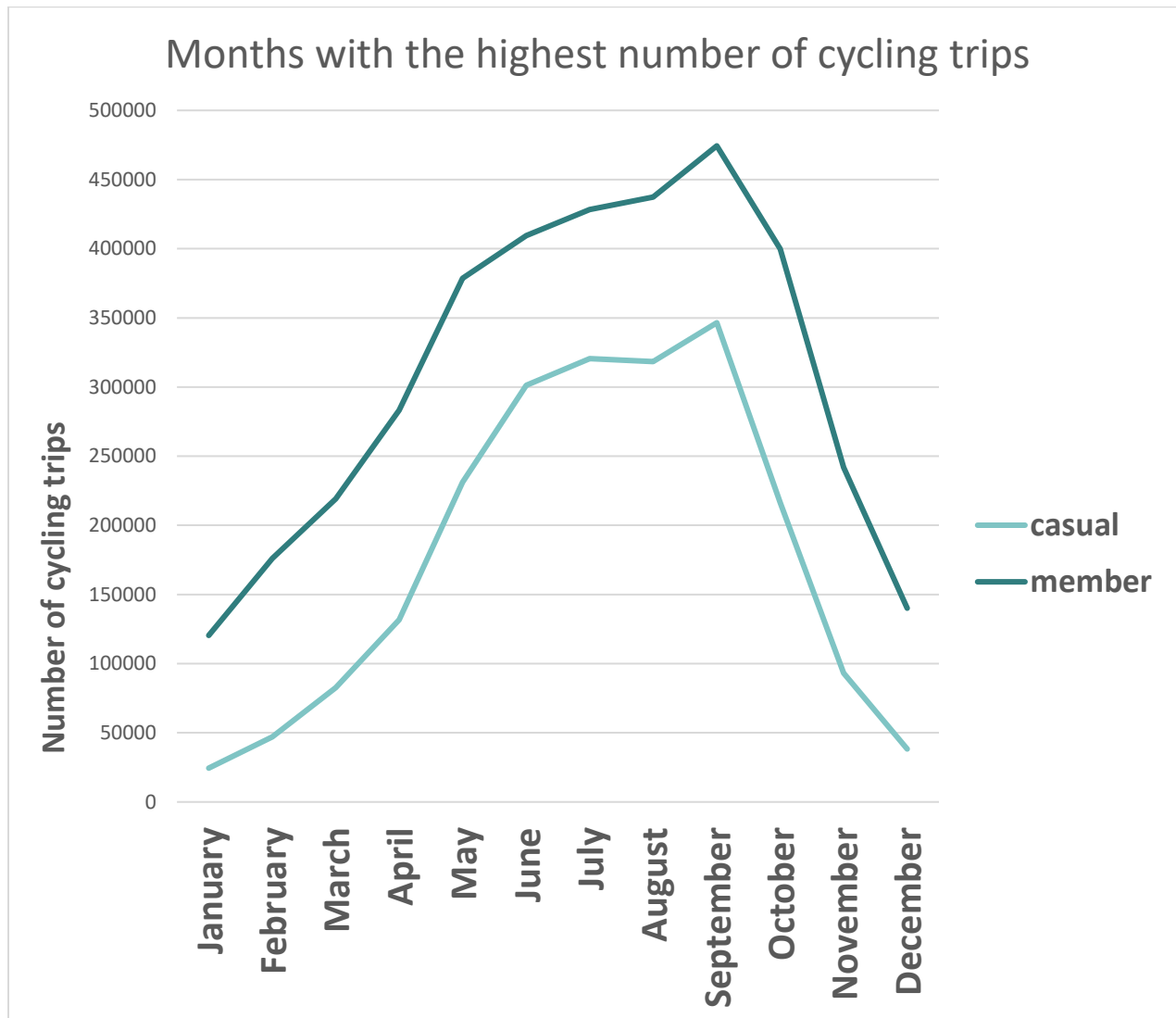
Analysis:

- Casual Riders: Their usage demonstrates a very strong seasonal pattern, starting with low activity in winter months (e.g., January: 24,460 rides; February: 47,163 rides) and surging dramatically as temperatures rise. Peak

usage for casual riders occurs during July (320,581 rides) and August (318,398 rides), before gradually declining into autumn and winter. This pattern strongly suggests recreational or tourist-driven use.

- **Member Riders:** While members also show increased activity during warmer months, peaking in August (437,406 rides), their baseline ridership remains significantly higher throughout the year, even during colder periods (e.g., January: 120,413 rides; February: 176,001 rides). This indicates a more consistent, potentially commuting-focused, year-round usage, less susceptible to minor weather fluctuations.
- **Overall Peak:** The combined total ridership reaches its highest points in August (755,804 rides) and July (739,784 rides), primarily driven by the substantial increase in casual rider activity during these months.

Figure 2: Number of Rides by Month and User Type



#### 4.4. Which month has the highest length of cycling trips?

##### 1. Casual Riders Consistently Take Longer Trips:

- Insight: Throughout the entire year, casual riders use Divvy bikes for a significantly longer average duration per trip compared to annual members.
- Evidence: The "Grand Total" average ride length is 15.02 hours for casual riders versus 10.88 hours for members. This difference is visible in every single month; the "casual" line on the chart is consistently above the "member" line.
- Implication: This highlights a fundamental difference in usage intent. Casual riders likely use bikes for leisure, longer recreational outings, or tourism, while members may use them more for efficient, shorter commutes or quick errands.

##### 2. Seasonal Fluctuation in Ride Length is More Pronounced for Casuals, but Both Peak in Warmer Months:

- Insight: Both casual and member average ride lengths increase during warmer months (roughly April to October) and decrease in colder months, indicating a seasonal influence on trip duration. Casual riders show a greater range in their average ride length throughout the year.
- Evidence:
  - For casuals, the average ride length goes from a low of ~10.2 hours in January to a high of ~16.3 hours in August.
  - For members, it goes from ~9.05 hours in January to ~13.7 hours in August.
  - The peak average ride lengths for both casuals and members occur around July-August-September, corresponding to summer and early fall.
- Implication: This reinforces the idea that weather and recreational opportunities heavily influence how long a bike is used, particularly for casual users.

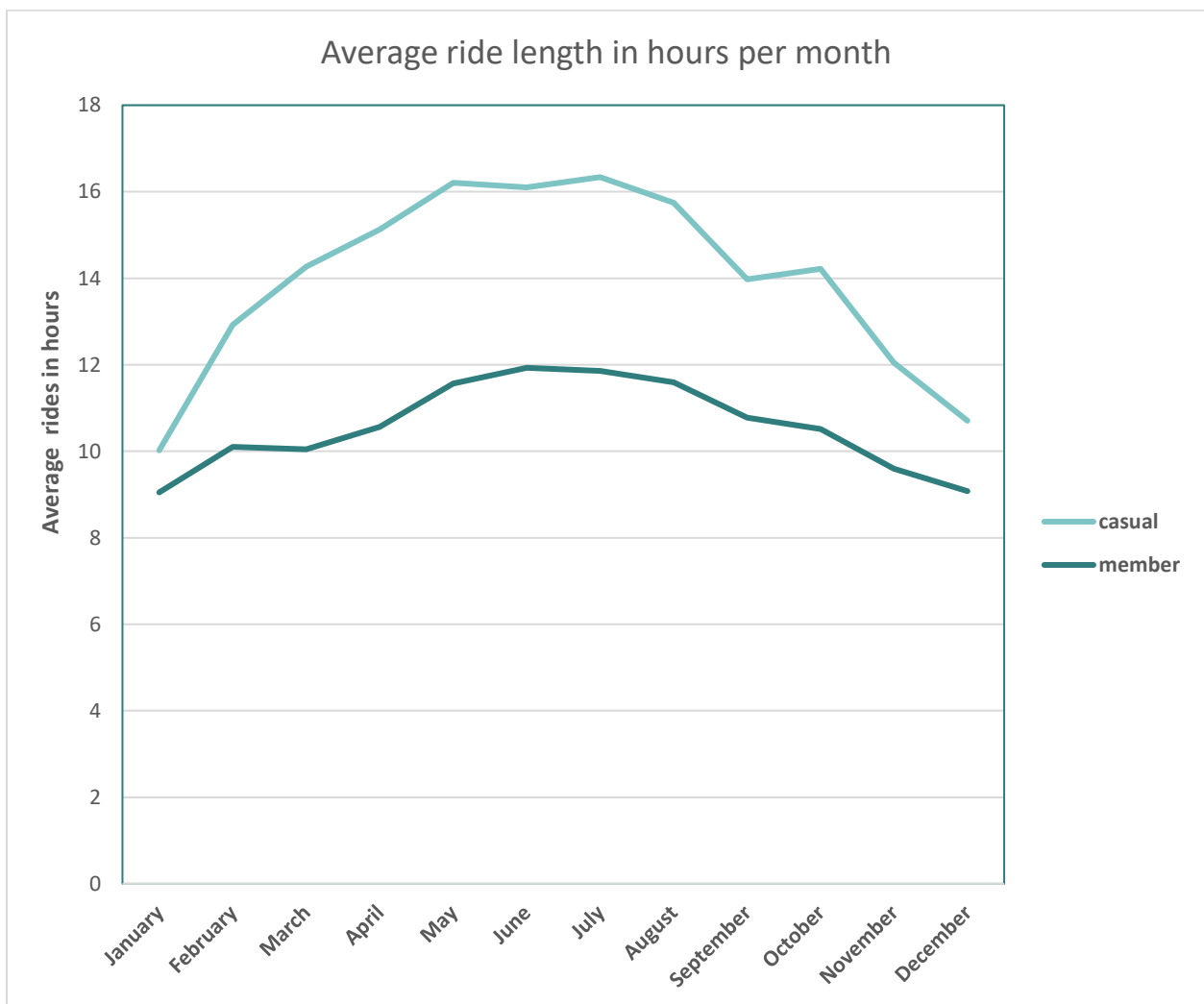
##### 3. The Gap in Average Ride Length Persists Year-Round:

- Insight: Even in colder months, when overall ridership might be lower (as seen in Figure 3 below) the trend of casual riders taking longer average trips than members still hold true.
- Evidence: In January, casuals average 10.2 hours while members average 9.05 hours. In December, casuals average 10.71 hours while members average 9.08 hours.

- Implication: This is not just a summer phenomenon; it is an inherent difference in how the two user groups interact with the bike-sharing service.

These insights are crucial for understanding customer behavior and can inform strategies related to pricing, bike availability, and marketing targeted at converting casual users to members.

Figure 2: Average ride length in hours per month



## 4.5. What are the most cycling popular days?

### 1. Members are Primarily Weekday Commuters/Routine Users:

- Insight: Annual members overwhelmingly use Divvy bikes during weekdays, suggesting their primary motivation is commuting or routine daily travel. Their usage significantly drops off on weekends.
- Evidence: Members' ride counts are consistently high from Monday to Friday (e.g., Tuesday: 570,686 rides, Wednesday: 610,271 rides), making these their peak days. Their usage sharply declines on Saturday (479,688 rides) and Sunday (417,256 rides). The "member" bars on the chart are much taller on weekdays than weekends.
- Implication: Divvy's core weekday operations and bike redistribution should prioritize routes and stations frequented by members during business hours.

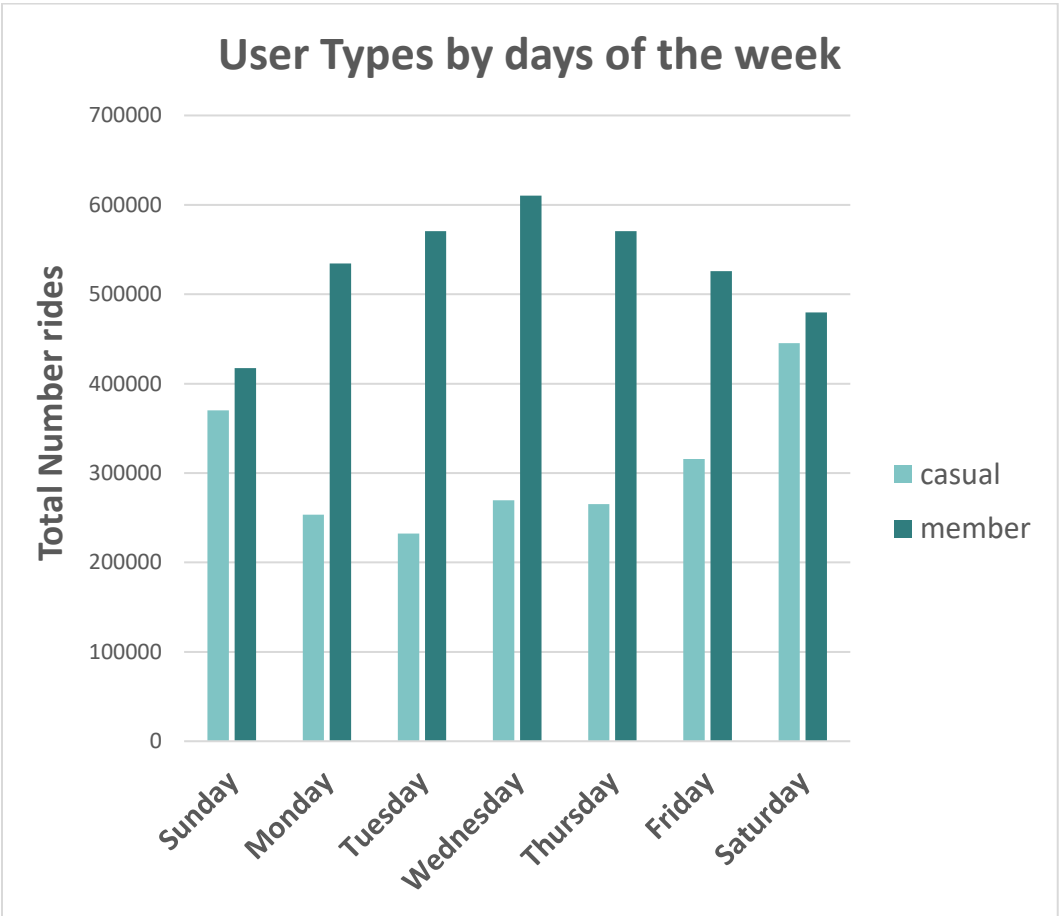
### 2. Casual Riders are Predominantly Weekend and Leisure Users:

- Insight: In stark contrast to members, casual riders show a strong preference for weekend usage, indicating their trips are more for leisure, recreation, or tourism. Their weekday usage is much lower and relatively flat.
- Evidence: Casual riders' peak days are Saturday (496,554 rides) and Sunday (464,152 rides). Their weekday usage is considerably lower (e.g., Monday: 196,160 rides, Tuesday: 183,966 rides) and doesn't show the sharp weekday peaks observed in members. The "casual" bars on the chart are highest on weekends.
- Implication: To maximize casual rider engagement and potential conversion, Divvy should focus marketing efforts and ensure bike availability at recreational spots, parks, and tourist attractions, especially on Saturdays and Sundays.

This highlights the dual nature of Divvy's service: a weekday utility for members and a weekend leisure activity for casuals. Operational strategies, including bike rebalancing, need to adapt dramatically between weekdays and weekends to meet these differing demands effectively.

These insights underscore the importance of segment-specific strategies for Divvy, particularly in how they manage bike availability and marketing efforts based on the day of the week.

Figure 3: Total Rides by Day of the Week and User Type

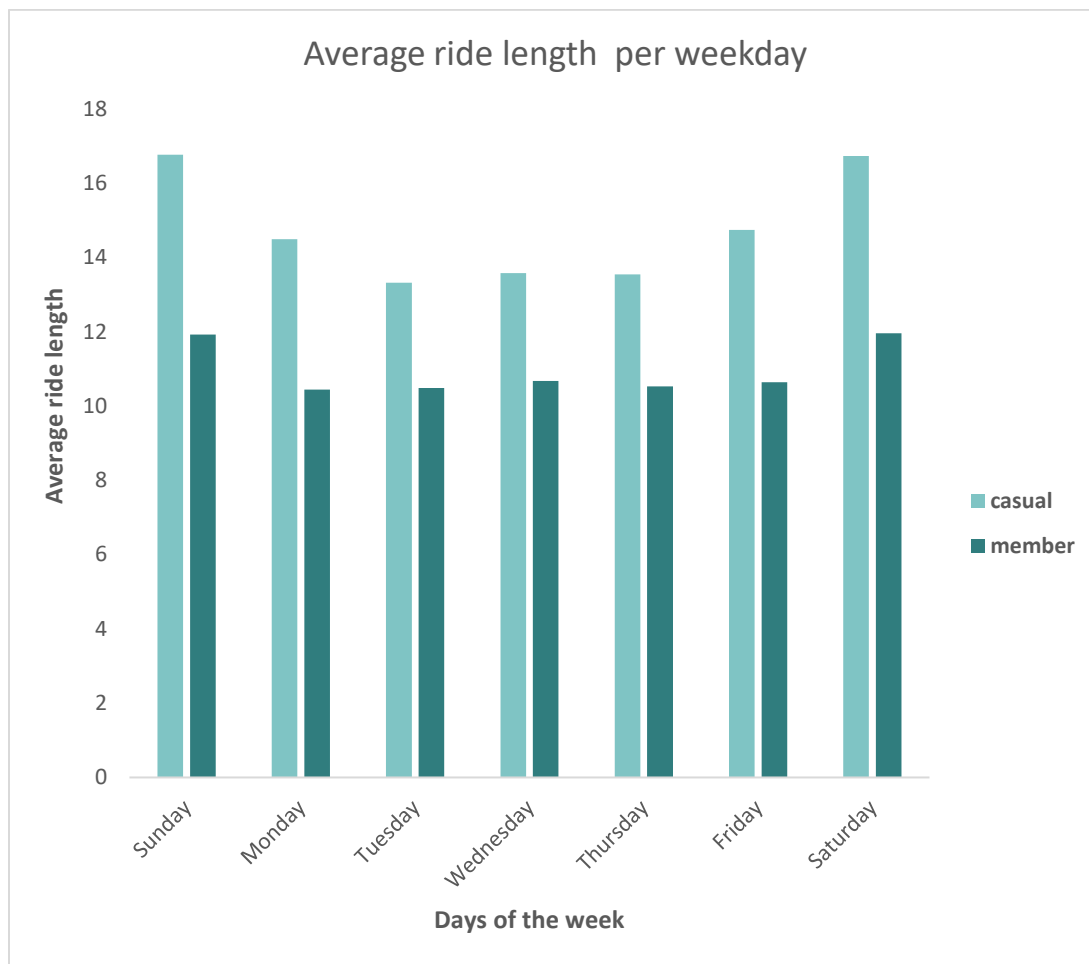


#### 4.6. What is the longest Average Length ride?

Insight: Casual riders consistently take significantly longer trips on average compared to member riders.

Analysis: The average ride length for casual riders (ranging approximately from 780 minutes (13 hours) to 1002 minutes (16.7 hours) across different days of the week and it was consistently higher than that for member riders (ranging approximately from 715 minutes (11.9 hours) to 717.6 minutes (11.96 Hours) This disparity suggests that casual users are more likely to use Divvy bikes for extended recreational trips, sightseeing, or exploring, while members tend to use them for shorter, more functional trips such as commuting or quick errands.

Figure 4: Average Ride Length:





## 5. Recommendations

Based on the distinct usage patterns identified between Divvy Bikeshare members and casual riders, the following actionable recommendations are proposed to optimize operations, enhance user experience, and drive business growth:

1. Strategic Marketing for Casual-to-Member Conversion:
  - Action: Implement targeted marketing campaigns (e.g., "Summer Pass," "First Month Free" with membership sign-up, benefits highlighting cost savings for frequent use) during peak casual rider seasons (late spring through summer).
  - Rationale: Capitalize on the high engagement of casual riders during favourable weather to convert them into loyal, year-round members, thereby increasing consistent revenue.
2. Dynamic Fleet Distribution and Rebalancing:
  - Action: Develop and implement a dynamic rebalancing strategy that prioritizes high bike availability in recreational areas and tourist hotspots during summer weekends, while ensuring sufficient commuter-focused bikes on weekdays.
  - Rationale: Address the significant seasonal and daily peaks in demand, particularly from casual riders, to maximize fleet utilization and customer satisfaction.
3. Tiered Pricing and Incentive Programs:
  - Action: Explore a tiered pricing model for casual riders based on ride duration (e.g., higher rates for extended leisure trips) or offer incentives for members to continue usage during off-peak seasons (e.g., discounted rides, loyalty points).
  - Rationale: Optimize revenue from longer casual trips and strengthen member retention during lower demand periods.
4. Evaluate Electric Scooter Strategy:
  - Action: Further investigate the demand and profitability of electric scooters, especially given their proportional popularity among casual riders. Conduct pilot programs or surveys to understand user needs and potential for expansion.
  - Rationale: Determine if expanding or promoting the scooter fleet could attract a new segment of users or meet specific short-distance travel needs, diversifying Divvy's offerings.

## **6. Conclusion**

This analysis of Divvy Bikeshare trip data successfully uncovered significant differences in how members and casual riders utilize the service. Members represent the stable, high-volume core, primarily using bikes for consistent, shorter trips, often during weekdays. Casual riders, conversely, are highly seasonal, taking longer, leisure-oriented rides, predominantly on weekends.

Understanding these distinct behaviours is paramount for Divvy Bikeshare. By implementing the recommended strategies for targeted marketing, dynamic fleet management, and flexible pricing, Divvy can effectively cater to the needs of both user segments, enhance operational efficiency, and ultimately foster sustainable growth in its ridership and revenue. This data-driven approach ensures that business decisions are informed by empirical evidence, leading to more impactful outcomes.

## **7. Limitations**

While this analysis provides valuable insights, it is important to acknowledge certain limitations:

1. Target casual riders with weekend promotions and incentives for longer rides (e.g., discounts for scenic routes).
2. Ensure bike availability in popular recreational areas on weekends to cater to casual riders.
3. Membership: Promote the benefits of membership (e.g., cost savings for frequent short trips) to casual riders who use the service regularly to motivate them to become members.

## **Appendix B: Raw Data File Structure**

The analysis was performed on 12 CSV files, each representing one month of Divvy trip data. All files shared a consistent schema, allowing for seamless combination using Power Query. The original files were downloaded from <https://divvy-tripdata.s3.amazonaws.com/index.html>