

# Case Study: How a Bike-Share Navigates Speedy Success

## 1. Introduction & Ask

### **Business Problem:**

A fictional bike-share company wants to increase ridership and improve operational efficiency. They need insights on who rides their bikes, when, and where, to make strategic decisions on bike allocation, marketing, and station placement.

### **Objectives:**

- Identify peak usage times and stations.
- Understand user behavior differences between members and casual riders.
- Recommend strategies to attract more riders.

### **Key Questions:**

1. What are the most popular stations and routes?
  2. What times/days see the most activity?
  3. How do casual riders differ from members?
  4. Which areas/stations need more bikes?
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## 2. Data Preparation

### **Datasets (mocked for analysis):**

- **Trips:** Trip ID, start/end times, start/end stations, user type (member/casual), trip duration.
- **Stations:** Station ID, location, capacity.

- **Weather:** Date, temperature, precipitation (optional).

### **Preparation Steps:**

- Checked for missing or duplicate entries.
  - Converted start/end times to datetime format.
  - Created new columns:
    - Trip duration in minutes
    - Day of week
    - Hour of day
  - Aggregated data by station, user type, and day.
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## **3. Data Processing**

### **Example transformations:**

Trip ID	Start Time	End Time	Start Station	End Station	User Type	Duration (min)	Day	Hour
101	2025-12-01 08:05	2025-12-01 08:25	Station A	Station B	Member	20	Monday	8
102	2025-12-01 12:30	2025-12-01 12:55	Station C	Station D	Casual	25	Monday	12

- Calculated **total trips per day**, **average trip duration per user type**, and **trips per station**.
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## 4. Analysis & Insights

### 1. Ridership Trends

- **Peak days:** Weekends (Saturday, Sunday).
- **Peak hours:** Morning (7–9 AM) and evening (5–7 PM) for members; casual riders mostly mid-day.

### 2. Popular Stations

- **Top 3 start stations:** Station A, Station C, Station F
- **Top 3 end stations:** Station B, Station D, Station G

### 3. User Behavior

Metric	Member	Casual
Avg trips/day	15,000	8,000
Avg trip duration	22 min	30 min
Peak riding hours	7–9 AM, 5–7 PM	12–3 PM
Preferred stations	Commute hubs	Tourist areas

### 4. Geographic Insights

- Downtown stations have the highest traffic.
- Residential areas show lower ridership during weekdays.

#### Visualizations (mocked for portfolio):

1. **Line chart:** Trips per day over a month.
2. **Heatmap:** Trips by day of week & hour.
3. **Bar chart:** Top 10 stations by total trips.

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4. **Map:** Station usage hotspots.

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## 5. Recommendations (Share & Act)

### Operational Recommendations:

- Reallocate bikes to high-demand stations during peak hours.
- Adjust maintenance schedules for low-demand periods to maximize availability.

### Marketing Recommendations:

- Target casual riders with weekend promotions and day passes.
- Offer commuter memberships for weekday peak users.

### Strategic Recommendations:

- Consider adding new stations in high-growth residential areas.
- Launch loyalty programs to increase repeat usage.

### Expected Impact:

- Improved bike availability.
- Increased total ridership by targeting the right users at the right time.
- Data-driven station expansion to maximize ROI.

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## 6. Summary

This analysis demonstrates how a data-driven approach can guide bike-share companies in attracting more riders, optimizing operations, and expanding strategically. The insights balance operational efficiency with marketing opportunities, providing actionable steps to grow the business.