

Team #4 Executive Brief

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Topic: Public Citi Bike Program Analysis for NYC DOT

Team Looker Studio Dashboard:

<https://lookerstudio.google.com/reporting/e440aa05-d8a4-42df-88c1-8af01e1f9905>

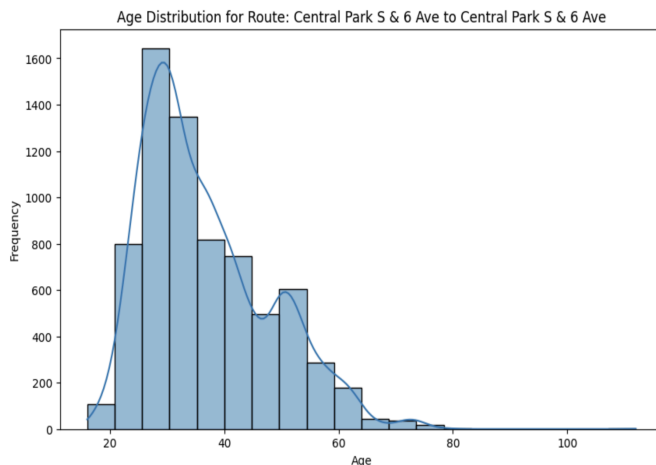
Introduction

The New York City Citi Bike program serves as one of the largest micromobility systems in the world. It provides the residents as well as visitors of New York City an accessible and sustainable mode of transportation. Our project uses AI assisted EDA and Looker Studio visualizations to discover behavioral and operational trends that can help NYC's Department of Transportation improve accessibility, efficiency and user experience. We do so by uncovering differences in rider demographics, popular stations, trip patterns and more.

Analysis & Insights

	station_name	net_change_in_bikes
0	W 33 St & 7 Ave	27421
1	DeKalb Ave & Hudson Ave	19419
2	E 17 St & Broadway	15885
3	W 51 St & 6 Ave	15211
4	12 Ave & W 40 St	12788
5	Pearl St & Hanover Square	11406
6	W 41 St & 8 Ave	10263
7	W Broadway & Spring St	10088
8	W 20 St & 11 Ave	9138
9	W 14 St & The High Line	8664

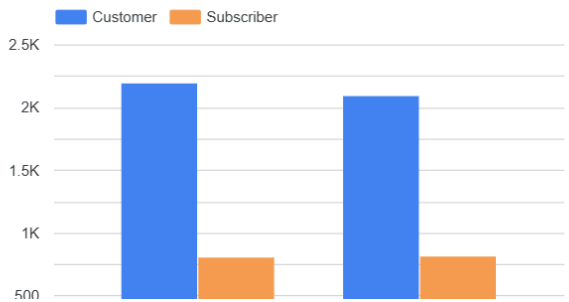
New York City's Citi Bike program has grown into one of the largest micromobility systems in the world, offering millions of residents and visitors a sustainable way to travel. Between 2013 and 2016, Citi Bike ridership rose sharply from about 5 million to over 10 million trips annually — a 60% increase in just one year — with an average trip duration of roughly 15.5 minutes. This growth underscores the system's importance but also highlights operational challenges related to station imbalance and resource distribution.



Analysis revealed that station activity is uneven across the city. Locations like W 33 St & 7 Ave showed a net imbalance exceeding 27,000 trips, indicating more bikes end there than begin. Similarly, high-traffic routes such as Central Park S & 6 Ave (Station 2006) are frequently used by riders aged 20-40 for 25-45 minute trips, though a notable share of users aged 40-60 take longer rides of 45-75 minutes. These findings suggest

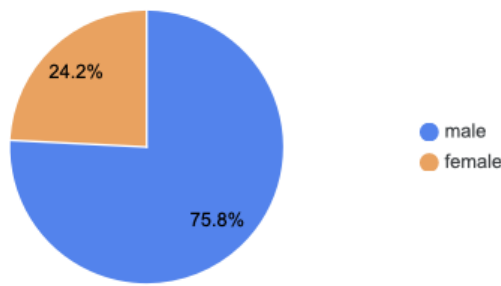
differing user motivations and varying spatial demand patterns.

Average Trip Duration by User Type (Peak vs Off-Peak)



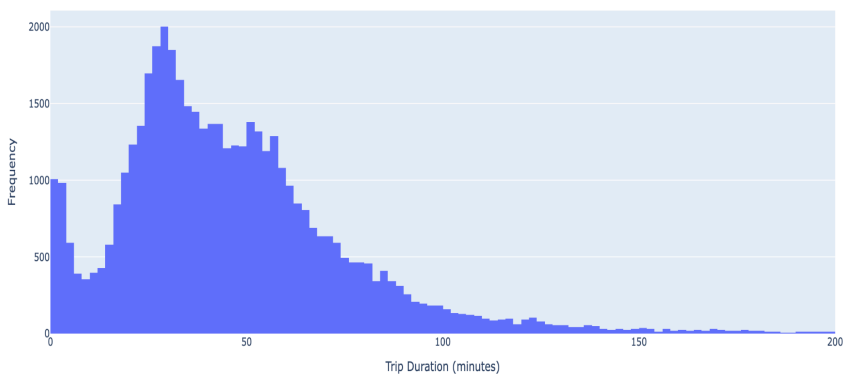
Trip behavior also varies by user type. Subscribers tend to take shorter rides (averaging about 13 minutes) for daily commuting, while casual customers take longer rides (around 35 minutes) for leisure or tourism. This points to distinct usage patterns that can guide targeted marketing and service design.

Trips by Gender



Gender disparities were also observed, with male riders accounting for the majority of trips. While data gaps (missing or unknown gender values) limit precision, the trend signals potential accessibility or perception barriers for female riders that the NYC DOT could address through outreach or safety-focused initiatives.

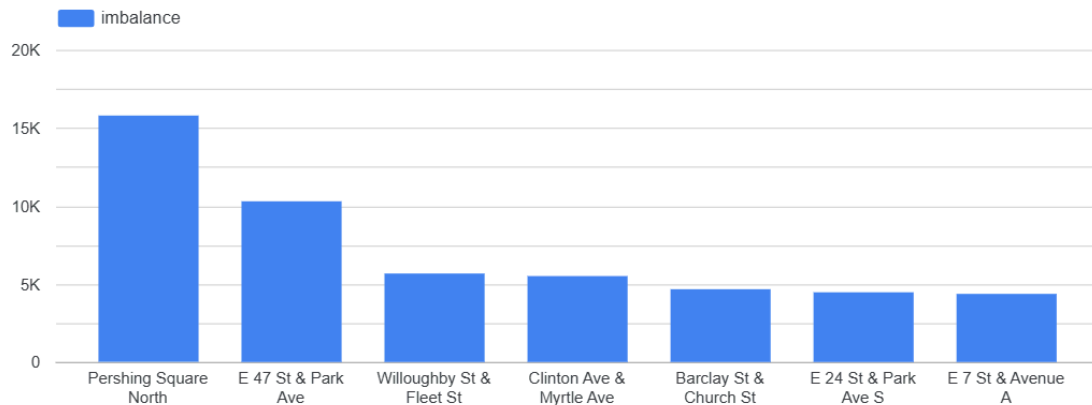
Trip Duration for Route 2006 to 2006 [excluded over 200 minutes]



Temporal and spatial trends indicate that demand peaks during commuting hours (7-9 AM and 5-7 PM) and is concentrated around business districts like Midtown Manhattan. Weekday ridership is consistently higher than weekends, reinforcing Citi Bike’s primary role as a commuting tool rather

than a leisure activity. Understanding these patterns can inform predictive rebalancing strategies and infrastructure planning to reduce shortages during peak periods.

Top 10 Station Pairs with Morning–Evening Imbalances



Overall, the data illustrates Citi Bike's dual identity as both a commuter service and a leisure amenity. Addressing data quality issues, balancing resource distribution, and tailoring engagement strategies to diverse rider segments are essential next steps for improving equity and system performance.

Suggestions & Actionable Recommendations

1. Predictive and Proactive Bike Rebalancing

Leverage historical and real-time data to forecast demand at key stations. Implement predictive rebalancing, especially along commuter corridors and high-traffic routes like W 33 St & 7 Ave and Central Park S & 6 Ave, to reduce shortages and ensure consistent availability.

2. Gender-Inclusive Outreach and Marketing

Develop targeted marketing campaigns and partnerships that make Citi Bike feel more accessible and safe for women and other underrepresented groups. Highlight safety initiatives, protected bike lanes, and community cycling programs to encourage broader participation.

3. Segmented User Strategies

Design differentiated offerings based on user type. For commuters (subscribers), ensure system reliability and seamless weekday access. For casual riders and tourists, introduce flexible passes or leisure packages that encourage weekend ridership and brand loyalty.

4. Infrastructure and Capacity Optimization

Expand docking capacity and protected lanes around high-demand stations and business districts. This can ease congestion, minimize idle time, and improve service quality during rush hours.

5. Data Quality Enhancement

Minimize missing and null entries in demographic and station data to improve analysis accuracy.

Establish standardized data collection practices that support future predictive modeling and performance tracking.

6. Subscriber Retention and Incentives

Encourage casual customers to transition into long-term subscribers through loyalty discounts, referral bonuses, or partnership promotions with local businesses. A stable subscriber base ensures steady usage and operational predictability.

Conclusion

Through AI-assisted EDA and visual analytics, our team identified clear behavioral, temporal, and demographic trends that shape Citi Bike's performance. Implementing data-driven strategies, focused on equitable access, predictive operations, and user-specific engagement, will allow NYC DOT to optimize resources, enhance rider satisfaction, and strengthen Citi Bike's role in sustainable urban transportation.