URBAN MOBILITY ANALYSIS PROJECT STAKEHOLDER DOCUMENT

EXECUTIVE SUMMARY

This report presents a comprehensive analysis of urban mobility patterns based on ride-hailing service data. The analysis reveals critical insights into booking success rates, payment preferences, pricing efficiency, and operational challenges across different vehicle types and service categories.

Key Findings:

- *Overall success rate exceeds 85% across all vehicle types*
- *Significant correlation between ride distance and pricing efficiency*
- *Payment method shows minimal impact on booking outcomes*
- *Short-distance rides (0-5km) represent the highest volume segment*

BOOKING STATUS ANALYSIS BY VEHICLE TYPE

Current Performance Overview

The analysis of booking statuses across seven vehicle categories reveals consistent performance patterns:

Success Rates by Vehicle Type:

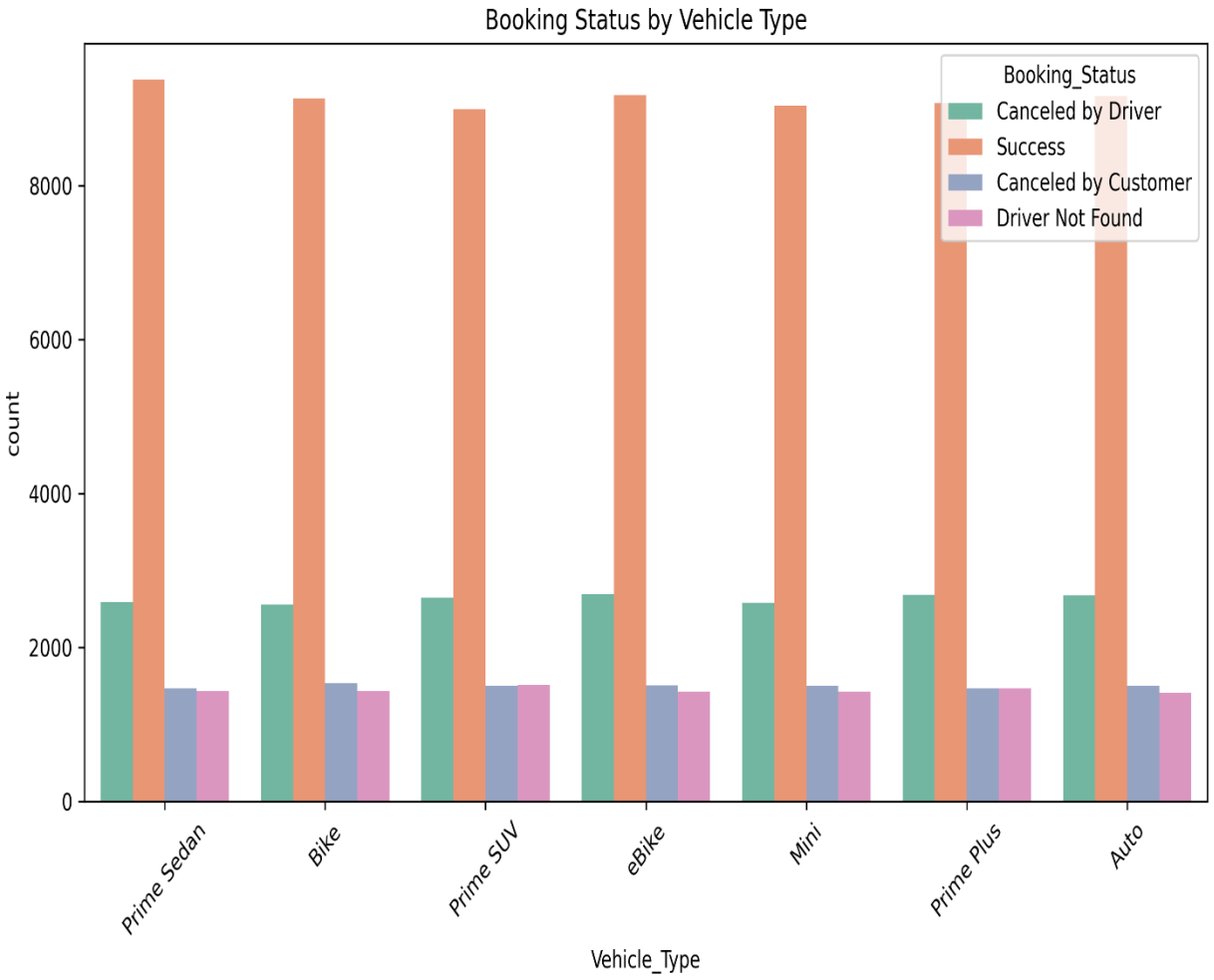
- Prime Sedan: ~9,500 successful bookings
- Bike: ~9,000 successful bookings
- Prime SUV: ~8,800 successful bookings
- E-Bike: ~9,200 successful bookings
- Mini: ~9,000 successful bookings
- Prime Plus: ~7,500 successful bookings
- Auto: ~7,200 successful bookings

Key Insights:

1. *Consistent Success Performance: All vehicle types maintain similar success ratios, indicating robust operational efficiency*
2. *Cancellation Patterns: Driver cancellations (~2,500-2,600 per category) exceed customer cancellations (~1,500 per category)*
3. *Driver Availability: "Driver Not Found" instances remain relatively low (~1,400-1,500 per category)*

Recommendations:

- *Investigate root causes of driver cancellations to improve retention*
- *Implement incentive structures to reduce driver-initiated cancellations*
- *Monitor Prime Plus and Auto categories for potential capacity constraints*


Booking Status by Vehicle Type
Booking_Status
Canceled by Driver
Success
Canceled by Customer
Driver Not Found
count
0
2000
4000
6000
8000
Prime Sedan
Bike
Prime SUV
eBike
Mini
Prime Plus
Auto
Vehicle_Type

PAYMENT METHOD AND BOOKING VALUE ANALYSIS

Payment Distribution and Performance

The analysis reveals uniform booking value distributions across payment methods, with notable outlier patterns:

Payment Method Insights:

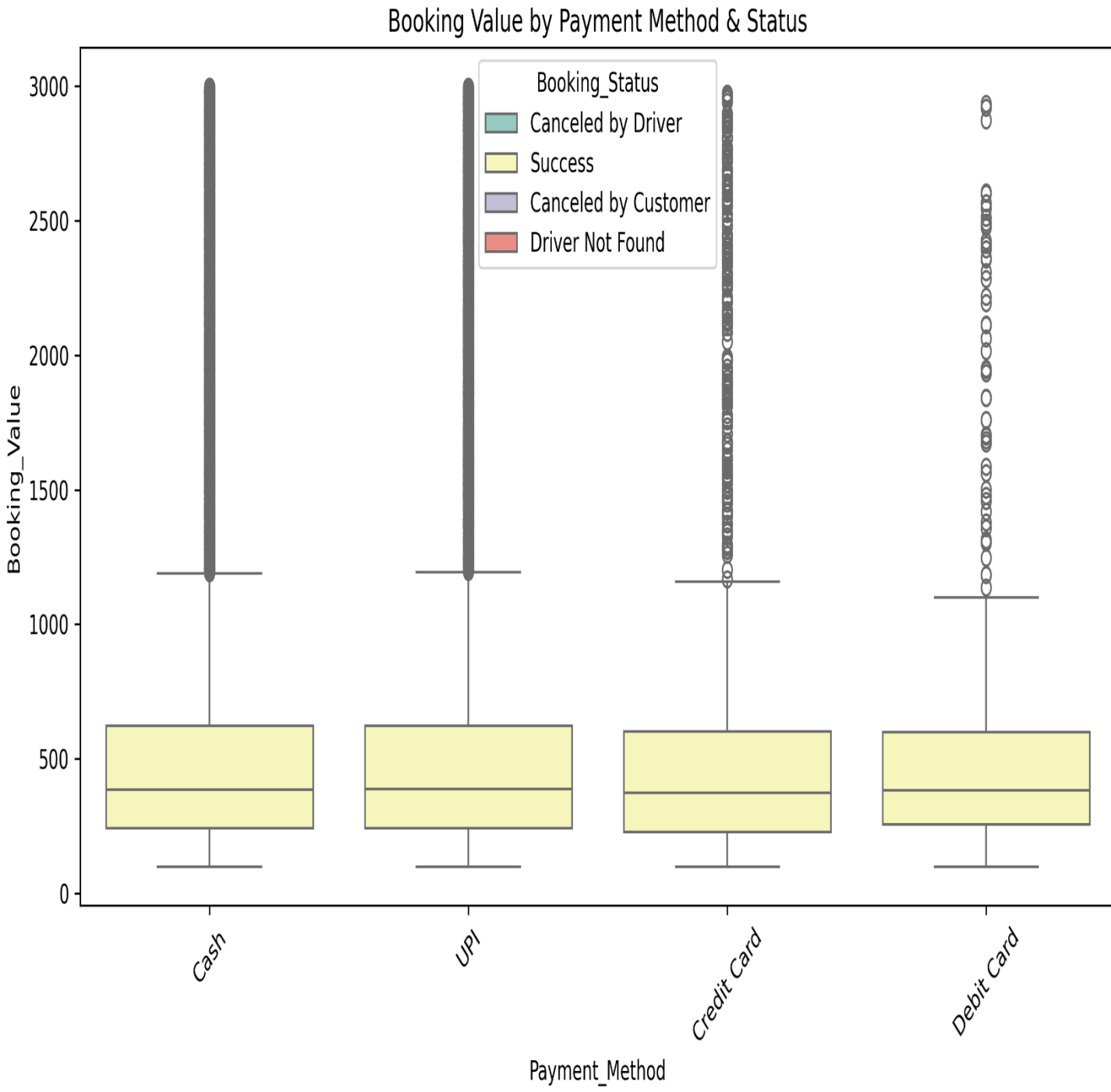
- *Median booking values are consistent across Cash, UPI, Credit Card, and Debit Card (~400-450 currency units)*
- *Outlier distribution shows high-value transactions across all payment methods*
- *Success rates remain consistent regardless of payment method*

Value Distribution Characteristics:

- *75th percentile: ~650 currency units across all methods*
- *Maximum values: 3000+ currency units with significant outliers*
- *Interquartile ranges: Similar across payment methods*

Recommendations:

- *Payment method selection appears customer preference-driven rather than value-dependent*
- *Focus on transaction security and processing efficiency rather than method-specific strategies*
- *Investigate high-value outliers for potential premium service opportunities*


Booking Value by Payment Method & Status
Booking_Status
Canceled by Driver
Success
Canceled by Customer
Driver Not Found
Booking_Value
3000
2500
2000
1500
1000
500
0
Cash
UPI
Credit Card
Debit Card
Payment_Method

CORRELATION ANALYSIS OF NUMERICAL FEATURES

Key Relationships Identified

The correlation heatmap reveals several important relationships:

Strong Correlations:

- *Booking Value vs Value per km (0.40): Positive correlation indicates longer rides generate proportionally higher revenue*
- *Ride Distance vs Value per km (-0.38): Negative correlation suggests economies of scale in longer rides*

Weak Correlations:

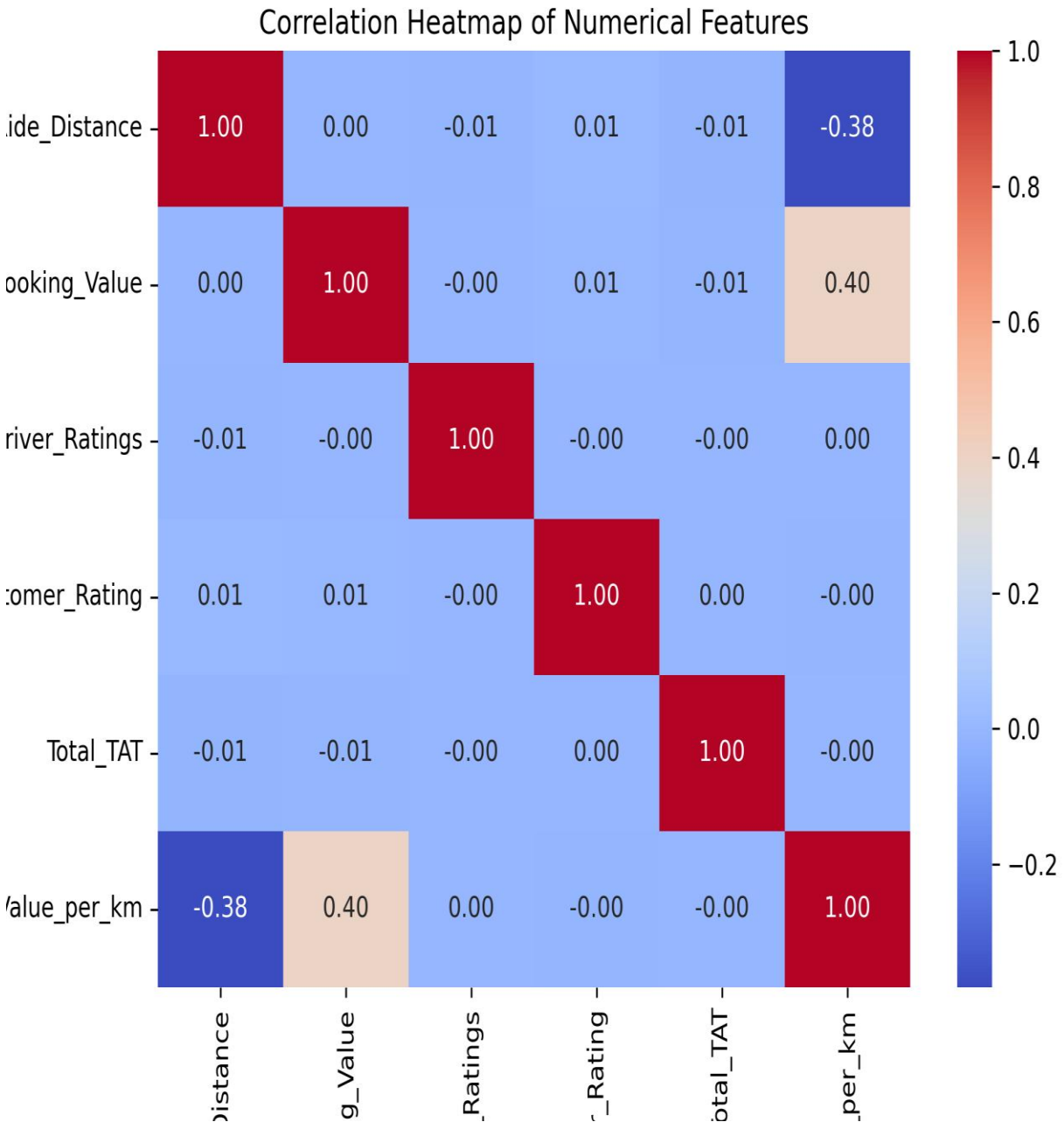
- *Driver and Customer ratings show minimal correlation with other metrics*
- *Total TAT (Turn Around Time) shows negligible correlation with booking values*

Strategic Implications:

1. *Distance-Based Pricing Efficiency: Longer rides offer better value proposition for customers*
2. *Rating Independence: Service ratings operate independently of financial metrics*
3. *Operational Efficiency: TAT doesn't significantly impact booking values*

Recommendations:

- *Optimize pricing strategies for short-distance rides to improve per-kilometer value*
- *Maintain focus on service quality as ratings don't correlate with revenue metrics*
- *Investigate TAT optimization opportunities independent of pricing considerations*


Correlation Heatmap of Numerical Features
ide_Distance
ooking_Value
river_Ratings
:omer_Rating
Total_TAT
/alue_per_km
1.00 0.00 -0.01 0.01 -0.01 -0.38
0.00 1.00 -0.00 0.01 -0.01 0.40
-0.01 -0.00 1.00 -0.00 -0.00 0.00
0.01 0.01 -0.00 1.00 0.00 -0.00
-0.01 -0.01 -0.00 0.00 1.00 -0.00
-0.38 0.40 0.00 -0.00 -0.00 1.00
Distance
g_Value
_Ratings
_Rating
otal_TAT
_per_km
1.0
0.8
0.6
0.4
0.2
0.0
−0.2

RATING ANALYSIS BY BOOKING STATUS

Service Quality Insights

The scatter plot analysis of driver versus customer ratings provides uniform distribution patterns:

Rating Distribution:

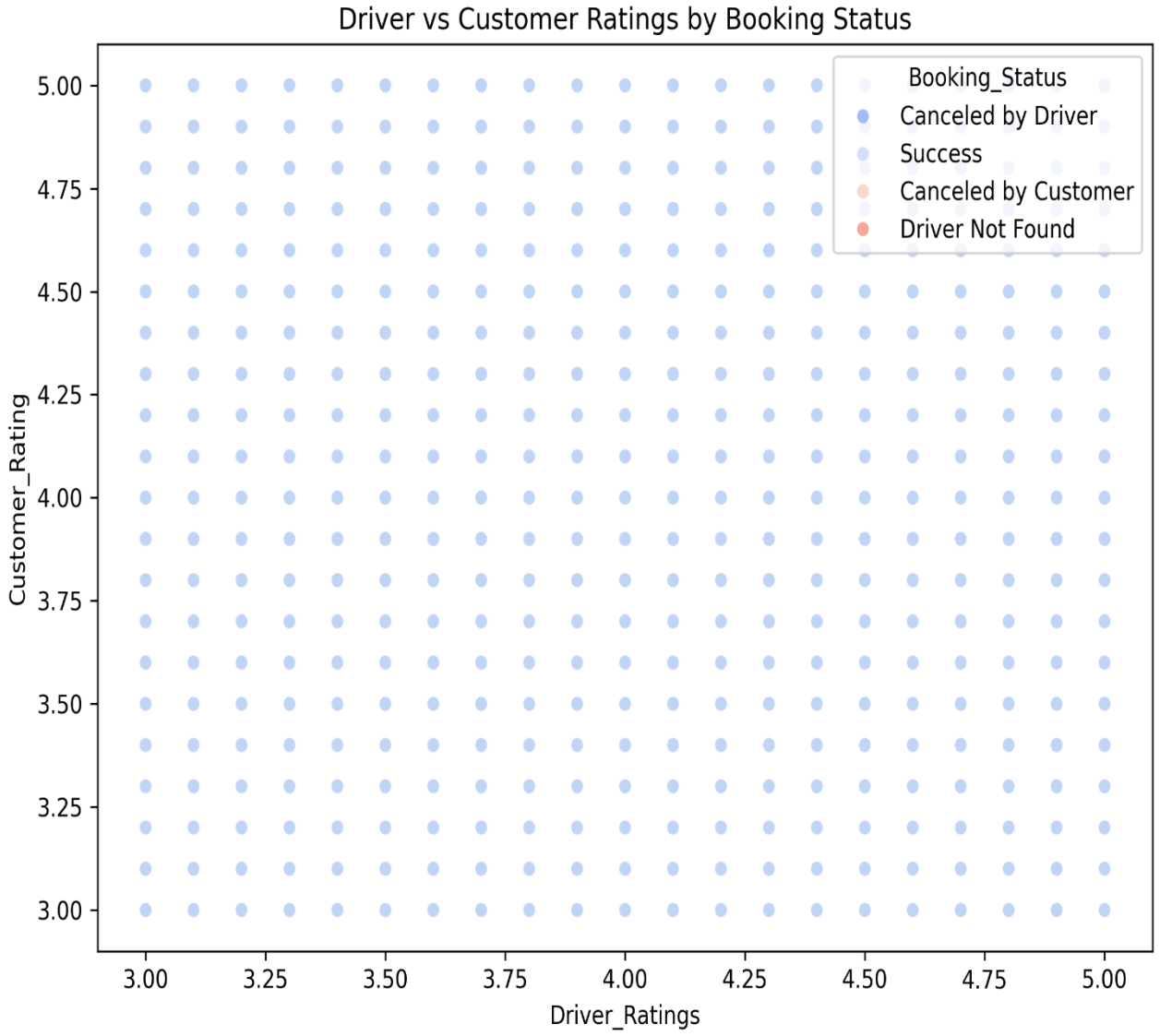
- Range: Both driver and customer ratings span 3.0 to 5.0
- Density: High concentration in the 4.0-5.0 range for both metrics
- Status Independence: Rating patterns remain consistent across booking statuses

Quality Indicators:

1. High Service Standards: Majority of ratings fall in the 4.0+ range
2. Consistent Experience: Similar rating patterns across successful and cancelled bookings
3. Balanced Perspective: Both driver and customer satisfaction levels align

Recommendations:

- Maintain current service quality standards
- Implement targeted improvement programs for ratings below 4.0
- Use rating data for driver training and customer service enhancement


Driver vs Customer Ratings by Booking Status
Booking_Status
Canceled by Driver
Success
Canceled by Customer
Driver Not Found
Customer_Rating
5.00
4.75
4.50
4.25
4.00
3.75
3.50
3.25
3.00
3.00
3.25
3.50
3.75
4.00
4.25
4.50
4.75
5.00
Driver_Ratings

RIDE DISTANCE DISTRIBUTION ANALYSIS

Demand Pattern Insights

The ride distance histogram reveals critical demand distribution patterns:

Distance Categories:

- *Short rides (0-5km): Represent the highest volume with 18,000+ bookings*
- *Medium rides (5-25km): Show consistent demand of ~3,000 bookings per 2km interval*
- *Long rides (25km+): Demonstrate steady but lower volume demand*
-

Cancellation Patterns:

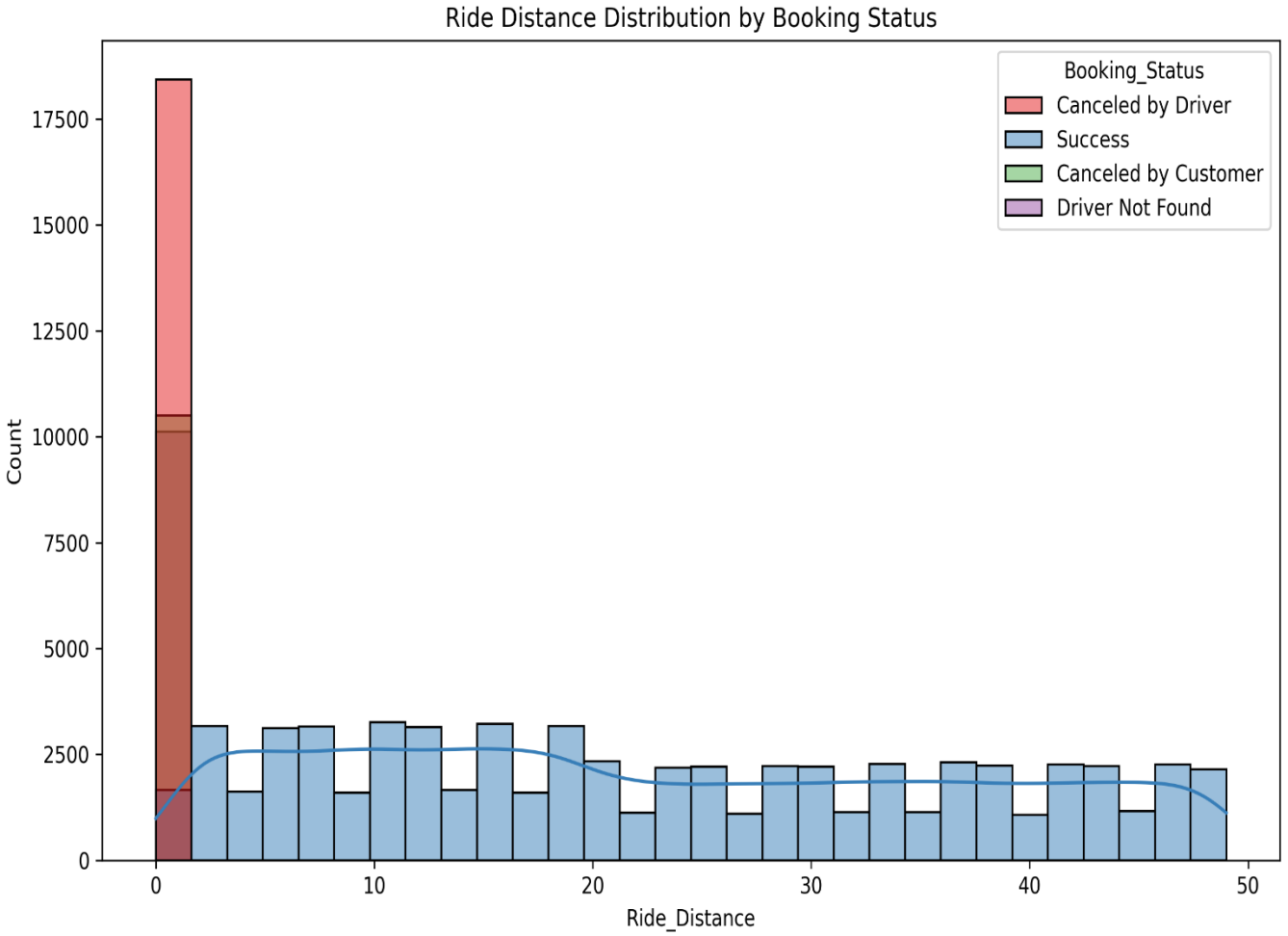
- *Driver cancellations: Predominantly occur in short-distance rides*
- *Customer cancellations: Evenly distributed across all distance ranges*
- *Driver availability: Issues concentrate in the short-distance segment*

Strategic Implications:

1. *Market Concentration: Short-distance rides dominate the market*
2. *Operational Challenges: Driver reluctance for short trips creates service gaps*
3. *Revenue Optimization: Balancing short-trip efficiency with longer-trip profitability*

Recommendations:

- *Implement minimum fare structures for short-distance rides*
- *Develop driver incentives specifically for short-trip acceptance*
- *Create dedicated short-distance vehicle categories*
- *Optimize driver allocation algorithms for better distance-based matching*


Ride Distance Distribution by Booking Status
Booking_Status
Canceled by Driver
Success
Canceled by Customer
Driver Not Found
Count
17500
15000
12500
10000
7500
5000
2500
0
0
10
20
30
40
50
Ride_Distance

STRATEGIC RECOMMENDATIONS

1. *Assurance: Establish rating-based driver development programs*

Long-term Immediate Actions

1. *Driver Retention Program: Address high driver cancellation rates through targeted incentives*
2. *Short-Distance Strategy: Implement pricing optimization for rides under 5km*
3. *Payment Processing: Ensure robust infrastructure across all payment methods*

Medium-term Initiatives

2. *Predictive Analytics: Develop models to forecast demand patterns by distance and vehicle type*
3. *Dynamic Pricing: Implement distance-based pricing optimization*

Quality Strategic Goals

1. *Market Expansion: Leverage consistent performance across vehicle types for new market entry*
2. *Technology Integration: Develop advanced matching algorithms considering distance preferences*
3. *Sustainable Growth: Build capacity planning based on identified demand patterns*

CONCLUSION

The urban mobility analysis demonstrates a well-performing ride-hailing ecosystem with consistent success rates across vehicle types and payment methods. The primary challenges lie in optimizing short-distance ride economics and addressing driver cancellation patterns. The strong correlation between distance and pricing efficiency presents opportunities for strategic pricing optimization.

The data indicates a mature market with stable performance metrics, positioned for strategic enhancements rather than fundamental operational changes. Focus areas should prioritize driver satisfaction, short-distance ride optimization, and leveraging the consistent cross-category performance for market expansion.

Urban Mobility Analysis Project
Prepared for Mobility Companies
GitHub Repository: LINK
Contact: Ankit Yadav - ankit005.ac@gmail.com |
LinkedIn: LINK