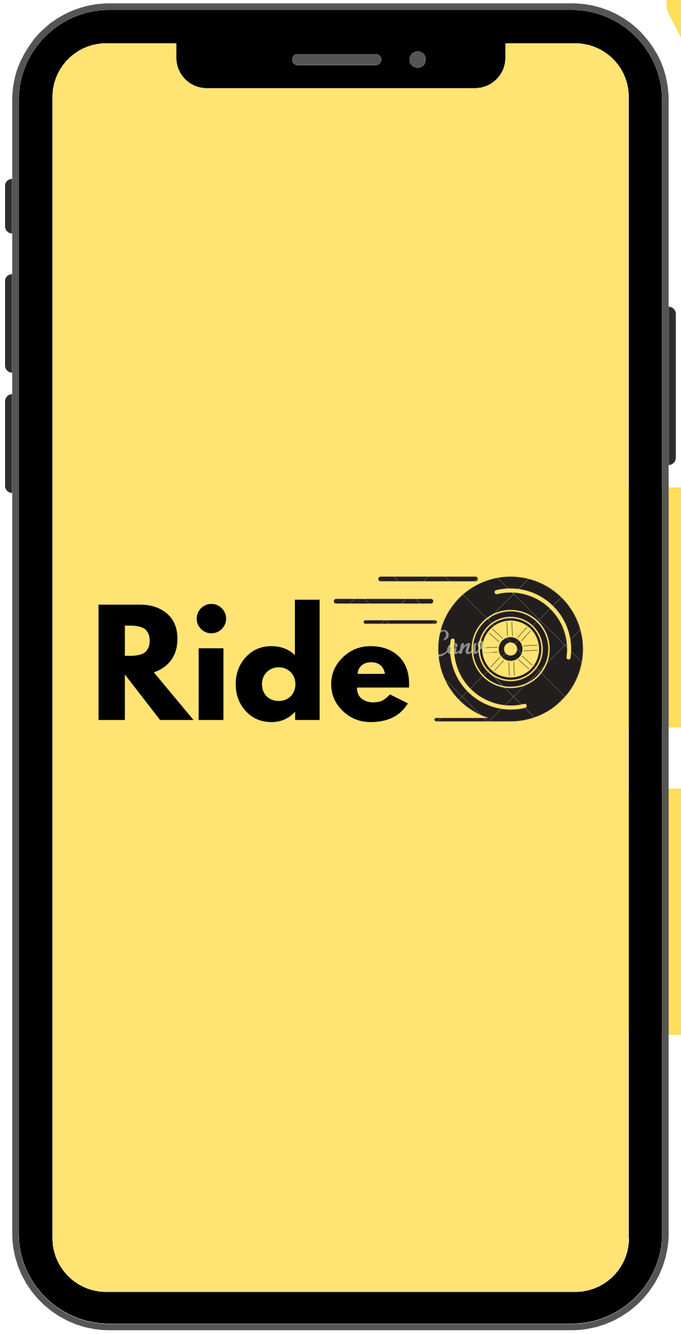
RideO app

From Static Rates to Dynamic Profits

Designing a profitable dynamic pricing system with real time data



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Introduction

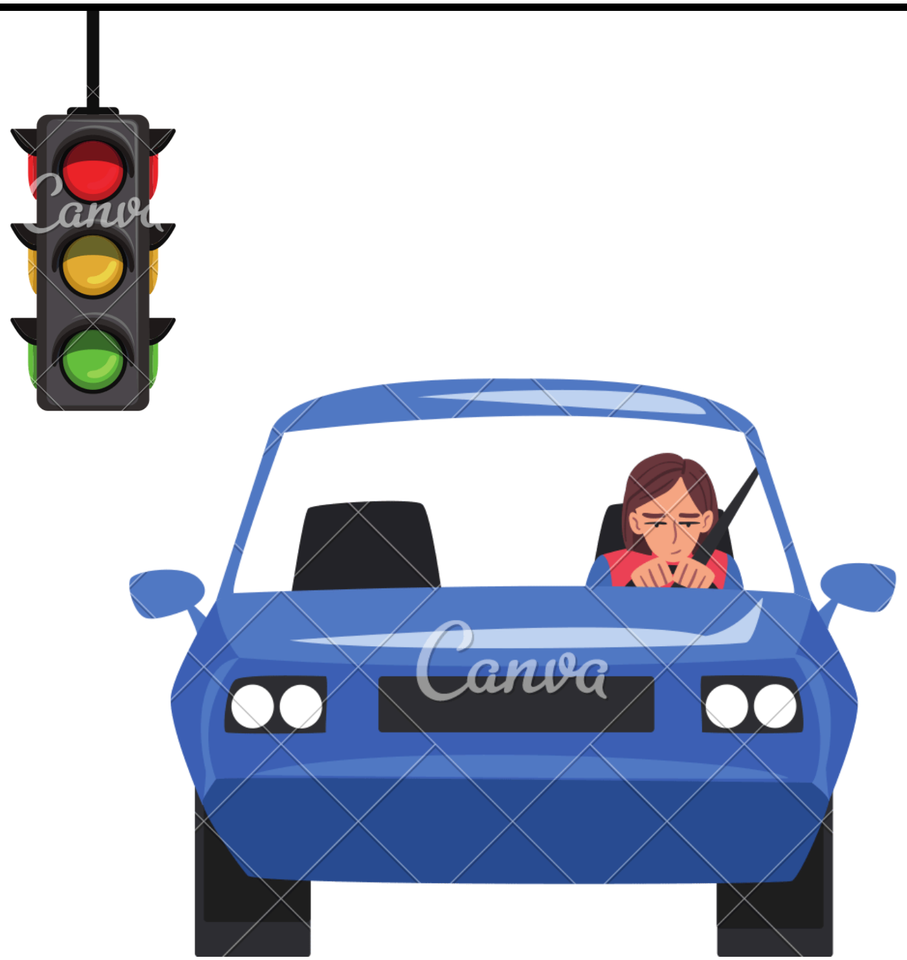
A lot of cab services still use a fixed fare structure. the price stays the same, whether it’s rush hour, raining, or midnight.

- But the world outside is constantly changing.
- Supply and demand don’t stay still.
- And neither should pricing.

Maya Stuck in Traffic Again

This is Maya

- one of RideO's top drivers.
- Yesterday, she accepted three rides in traffic.
- The price per ride? Flat as always.
- The earnings? Not even enough to cover fuel and time.



Missed Opportunity

Today, it’s raining again.

- Maya sees another low paying request from a busy area.
- She knows it’ll be slow moving.
- She declines “it’s not worth the cost.”

Ravi’s Ride Keeps Getting Canceled

here’s Ravi.
He’s late for an important meeting and books a cab.

- His request gets canceled... again.

Why? Drivers like Maya are avoiding low priced, high-effort trips.

Mr. Das: The RideO Boss Under Pressure

Meanwhile, Mr. Das, the owner of RideO, is facing losses.

- Drivers are quitting.
- Customers like Ravi are switching to competitors.

Revenue is dipping and he can’t understand why.

The Real Problem

Static Pricing in a Dynamic World

The truth?

- RideO uses static pricing.

One fixed fare,

- But the world outside is anything but static.

Jane saw what Mr. Das couldn’t

This is Jane
A data scientist at RideO.
While others were frustrated, Jane looked at the data and saw the pattern.

- Using RideO’s ride history and real-time availability, she created a dynamic pricing model

The Solution Dynamic Pricing

Enter: Smart, Adaptive Pricing

Imagine a system that adjusts prices in real time

- Higher fares during rush hour.
- Discounts when demand is low.

Fair pay for drivers. Shorter wait times for riders.

Everyone Wins

The Results

- Maya now earns what her time is worth.
- Ravi finds a ride in minutes.
- Mr. Das sees growth, not churn.

Dynamic pricing doesn't just change numbers
it changes lives.

What is dynamic price

It’s a pricing strategy where a business sets variable and flexible prices of its products and services depending on the multiple factors like demand, supply chain, competition, location, time frame, and other market conditions.

The Data

1000
Observations

11
Features

NO. OF RIDERS
NO. OF DRIVERS
LOCATION CATEGORY
CUSTOMER LOYALTY STATUS
NO. OF PAST RIDES
AVERAGE RATINGS
TIME OF BOOKING
VEHICLE TYPE
EXPECTED RIDE DURATION
ADJUSTED COST OF RIDE
PROFIT PERCENTAGE

4
Categorical

7
Numerical

Pre-Processing

Checking Duplicates

No Duplicates identified

Missing values

No missing values identified

Outliers

No significant outliers were detected

Splitting dataset

80% as the training data
20% as the test data

Implementing dynamic pricing

Define the percentiles that represent high (0.75) and low (0.25) supply levels and calculate the relevant values.

Calculate the supply multiplier by dividing the calculated percentile value by the number of drivers.

Define the percentiles that represent high (0.75) and low (0.25) demand levels and calculate the relevant values.

Calculate the demand multiplier by dividing the number of riders by calculated percentile value .

ADJUSTED RIDE COST =
(**Historical cost**) x
max(**demand_multiplier**,Lower Demand Threshold) x
max(**supply_multiplier**,Higher Supply Threshold)

Why predict adjusted cost ride?

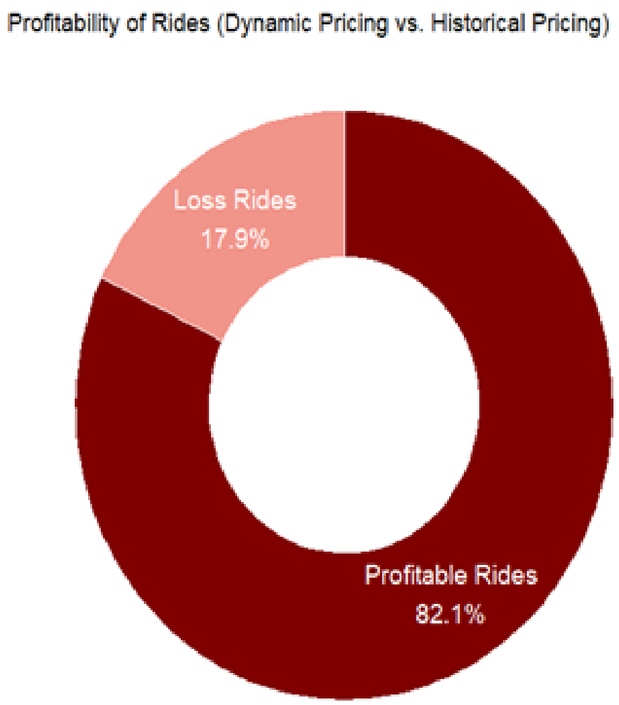
Ravi wants to book a new ride again

ADJUSTED RIDE COST =
(**Historical cost**) x
max(**demand_multiplier**,Lower Demand Threshold) x
max(**supply_multiplier**,Higher Supply Threshold)

Historical cost

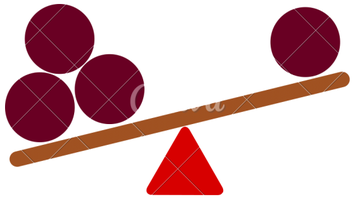
Why, dynamic pricing?

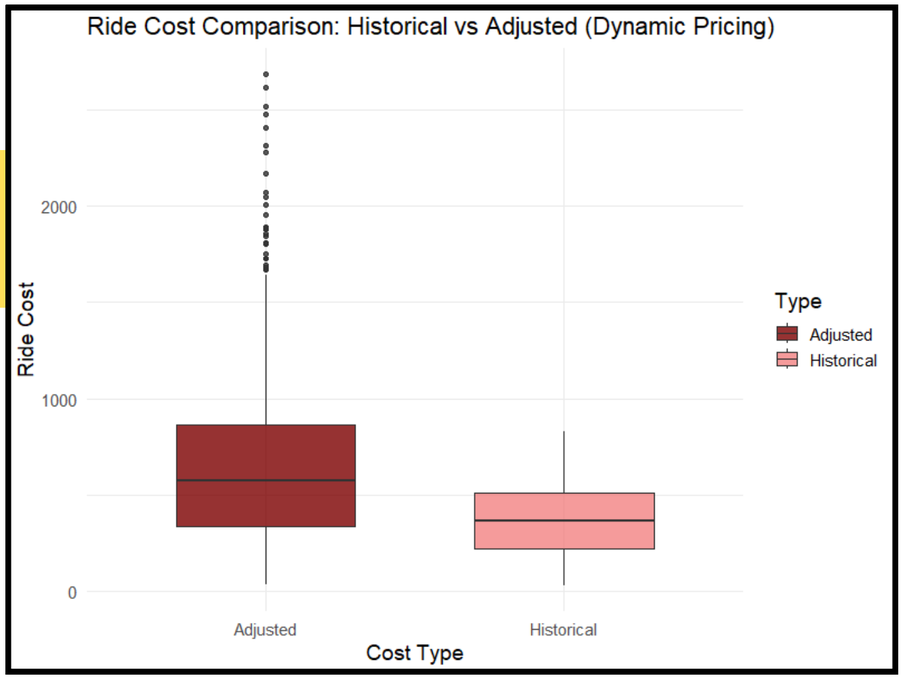
Overall Profitability

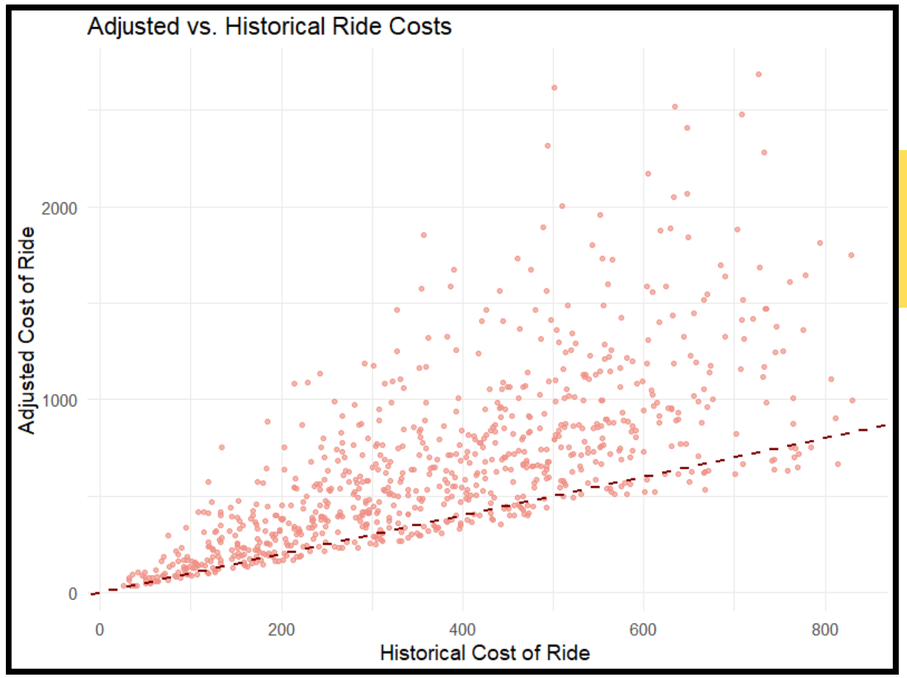


- Significantly improves profitability: 82.1% of rides now profitable
- Minimizes losses: Only 17.9% of rides unprofitable
- Enhances revenue generation
- Supports competitive pricing and customer retention
- Highly beneficial business decision

Cost Comparison





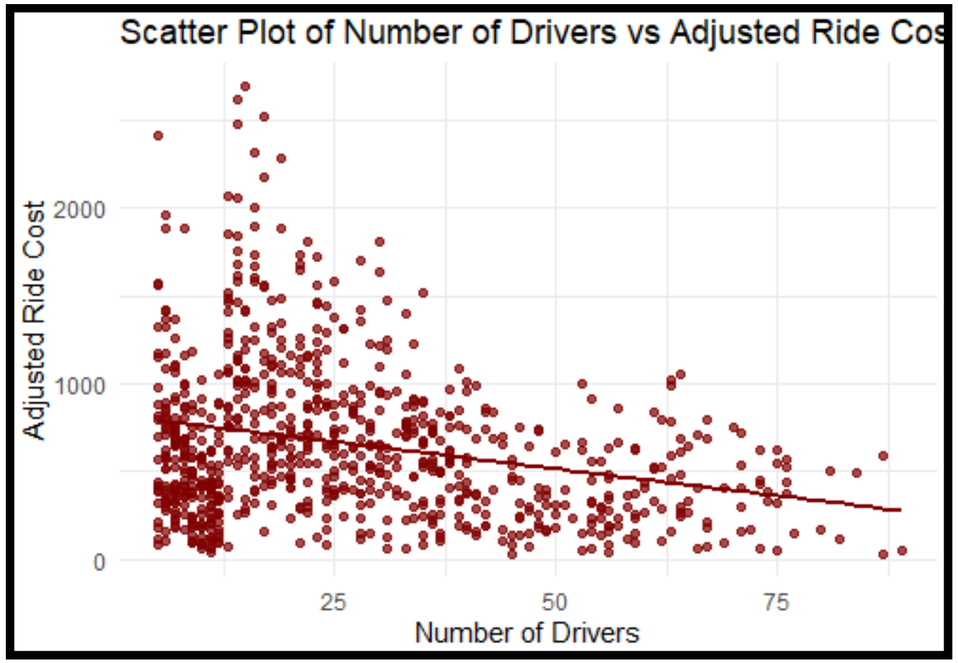


Significant increase in the median ride cost under dynamic pricing compared to the historical cost structure.

Dynamic pricing typically results in higher prices since most data points are above the dashed y=x line, which represents equal adjusted and historical costs.

EDA Findings

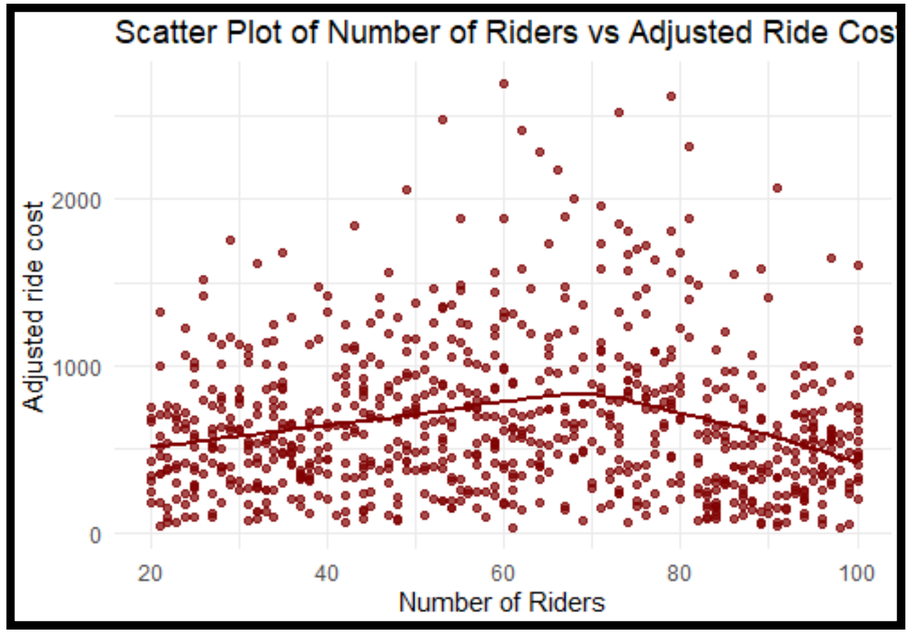
Number of Drivers



Aligns with basic economic principles of supply

higher supply of drivers → Lower prices

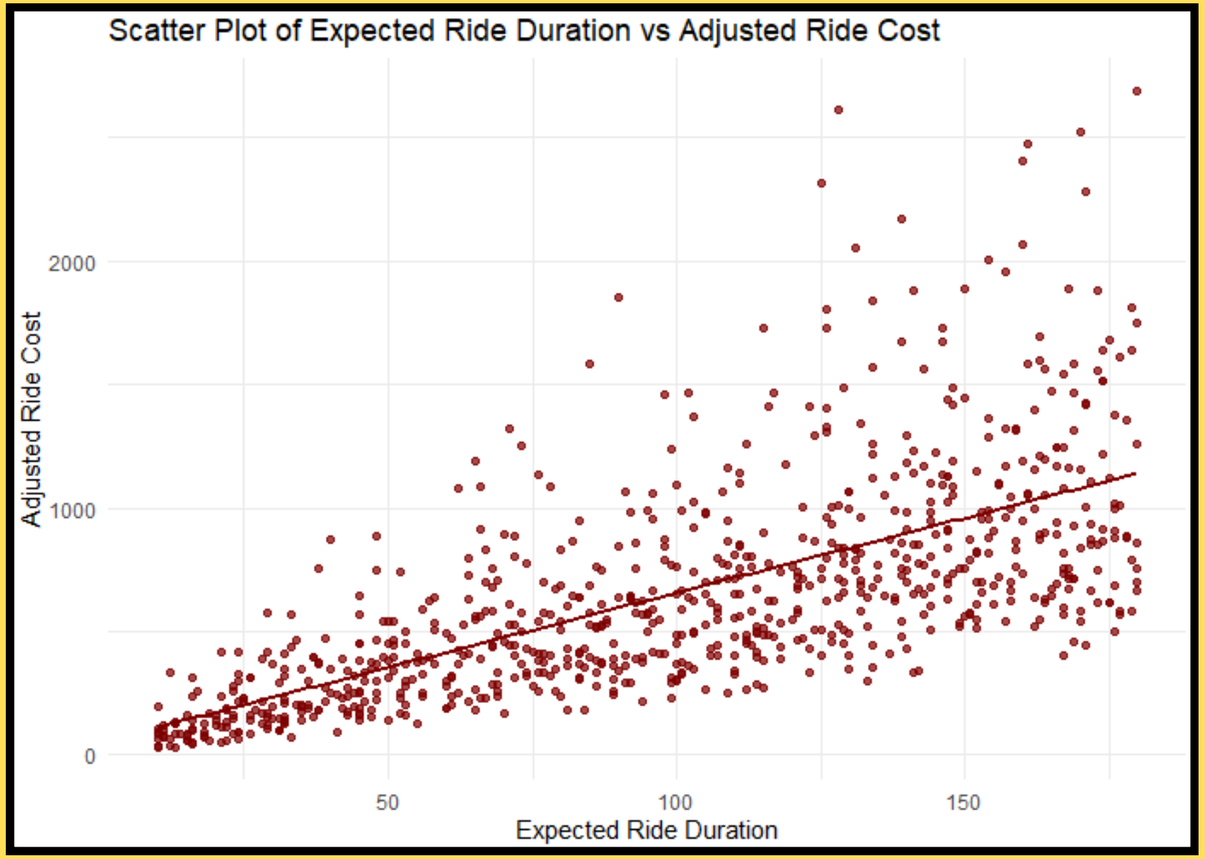
Number of Riders



Aligns with basic economic principles of demand

higher number of riders → Higher prices

Source: [Balancing Supply and Demand: Insights from Uber's Surge Pricing – DigitalProductAnalytics.com]

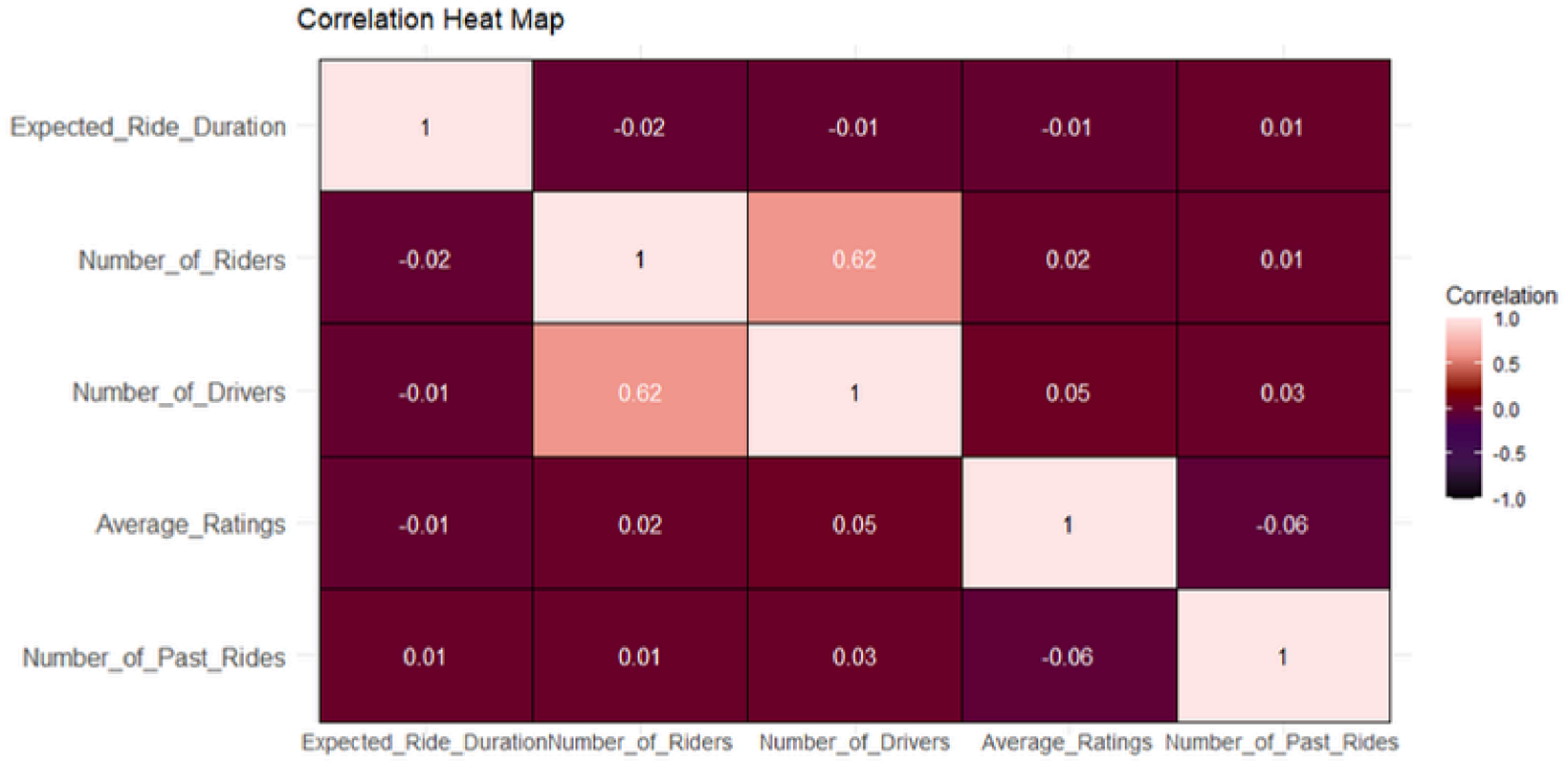


Expected Ride Duration

Longer trips with more distance and estimated time typically cost more than shorter ones

Source: https://www.uber.com/en-GB/blog/uber-dynamic-pricing/

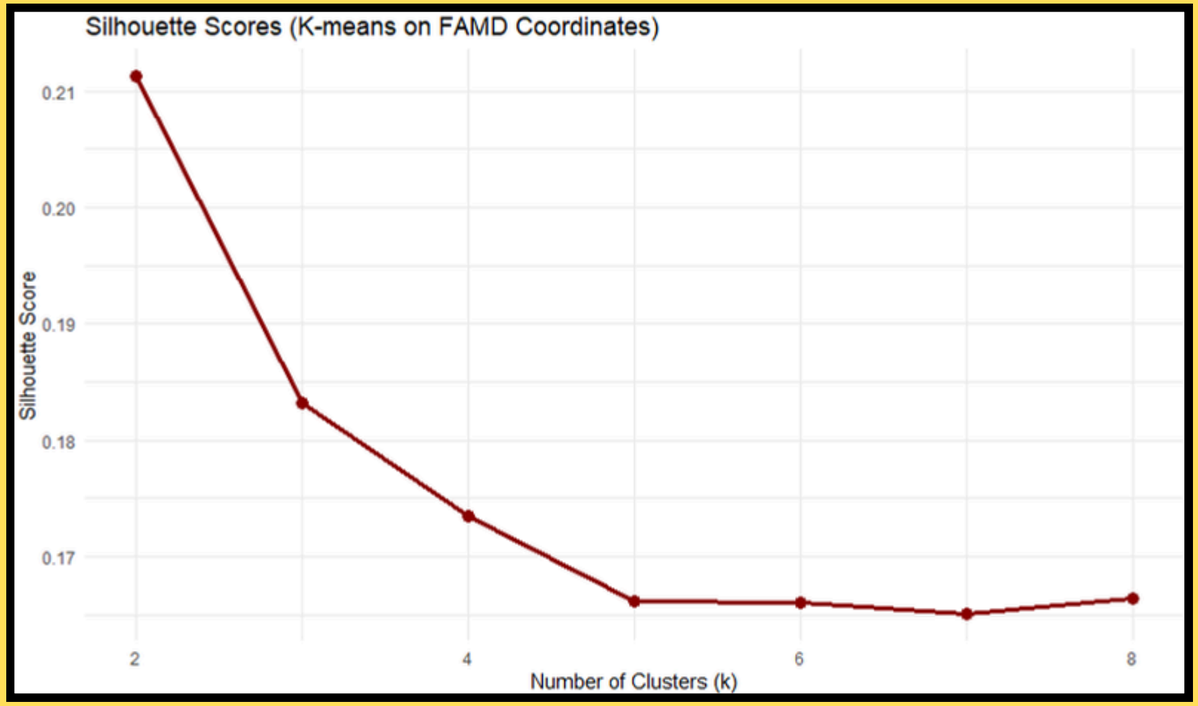
Multicollinearity

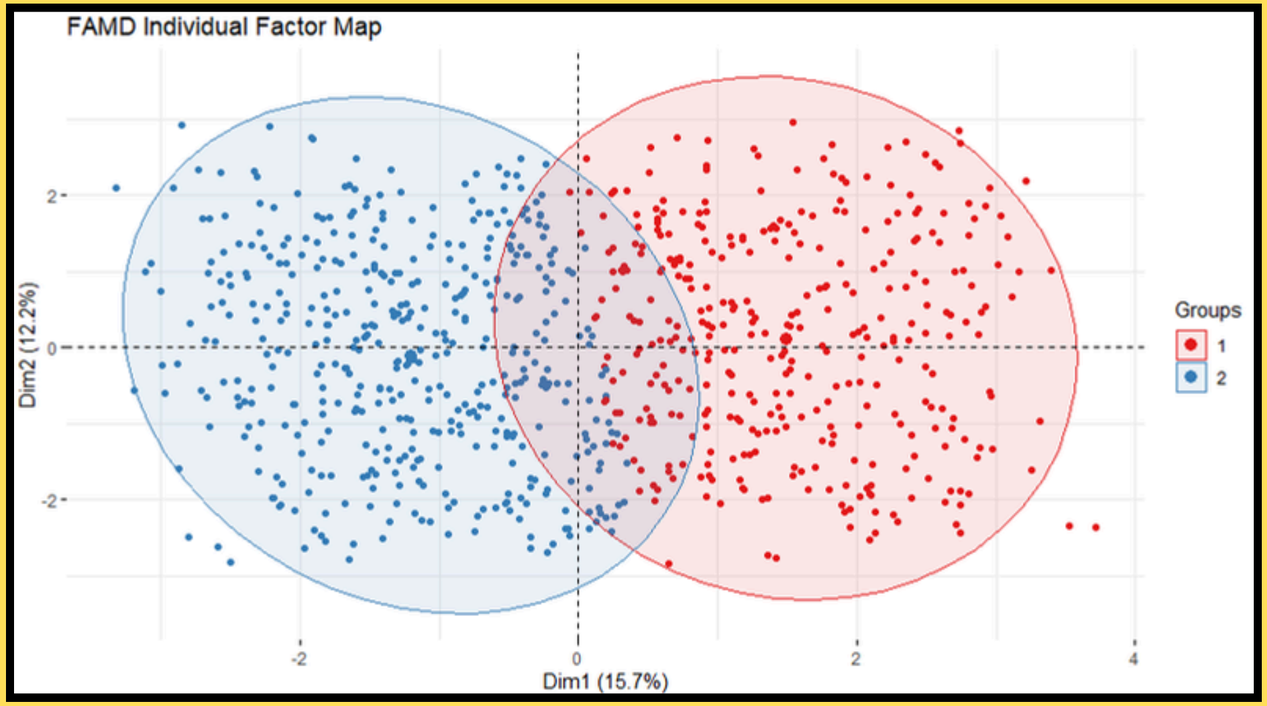


Correlation heat map visualizes pairwise linear relationships between numerical variables.

A moderate positive correlation exists between the Number of Riders and the Number of Drivers.

Cluster Analysis





Silhouette Score plot shows consistently low average silhouette scores across different numbers of hypothesized clusters

Highest silhouette score of 0.211 when there are 2 clusters

No clear clustering

ADVANCED ANALYSIS

Multiple Linear Regression

	RMSE	R^2
TRAINING	290.88	0.5669
TEST	296.27	0.5756

- Number of Drivers
- Number of Riders
- Vechicle Type
- Expected Ride Duration

Best Subset Selection

Shrinkage Methods

Model	Training		Testing	
	RMSE	R^2	RMSE	R^2
RIDGE	291.40	0.5654	298.76	0.5684
LASSO	290.94	0.5668	297.44	0.5722
ELASTIC NET	290.88	0.5669	297.64	0.5717

Tree Based Methods

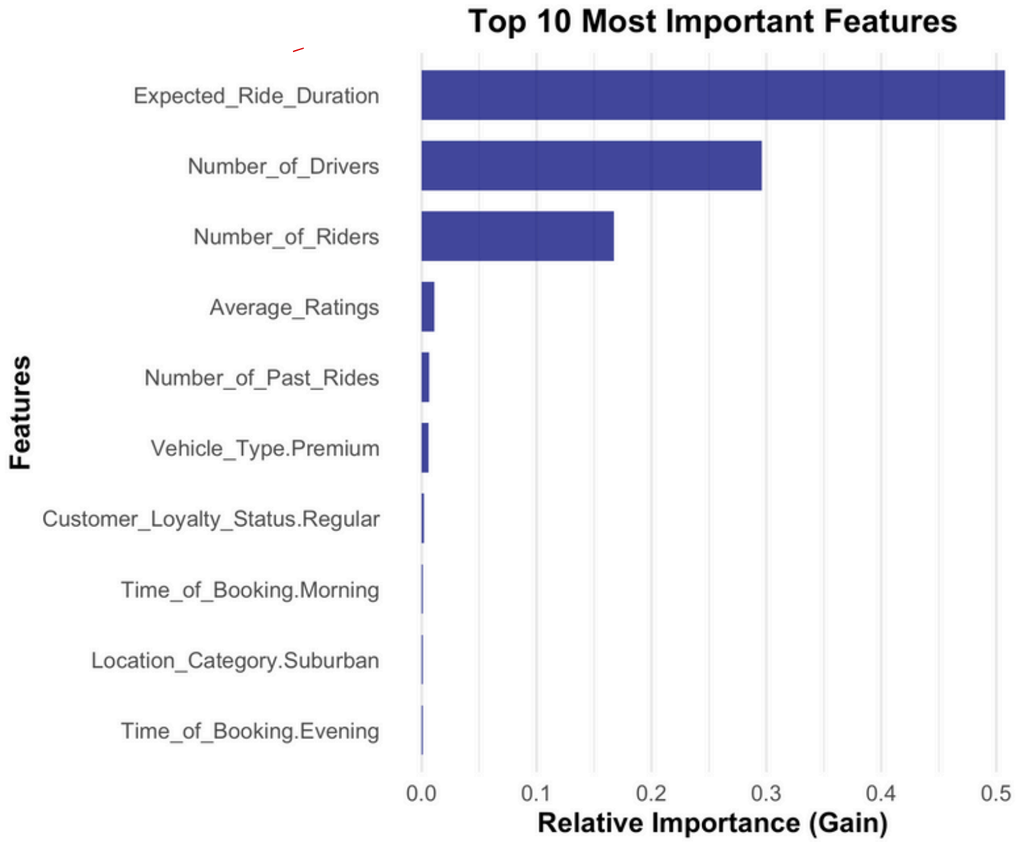
Model	Training		Testing	
	RMSE	R^2	RMSE	R^2
Random Forest	116.72	0.9435	180.20	0.8312
XG Boost	99.0859	0.9497	156.87	0.8810

Model Comparision

	Training		Testing	
	RMSE	**R^2**	**RMSE**	**R^2**
MLR	290.88	0.5669	296.27	0.5756
RIDGE	291.40	0.5654	298.76	0.5684
Lasso	290.94	0.5668	297.44	0.5722
ELASTIC NET	290.88	0.5669	297.64	0.5717
Random Forest	116.72	0.9435	180.20	0.8312
XGBoost	99.0859	0.9497	156.87	0.8810

Findings of Our Best Model

Variable Importance of Best Model



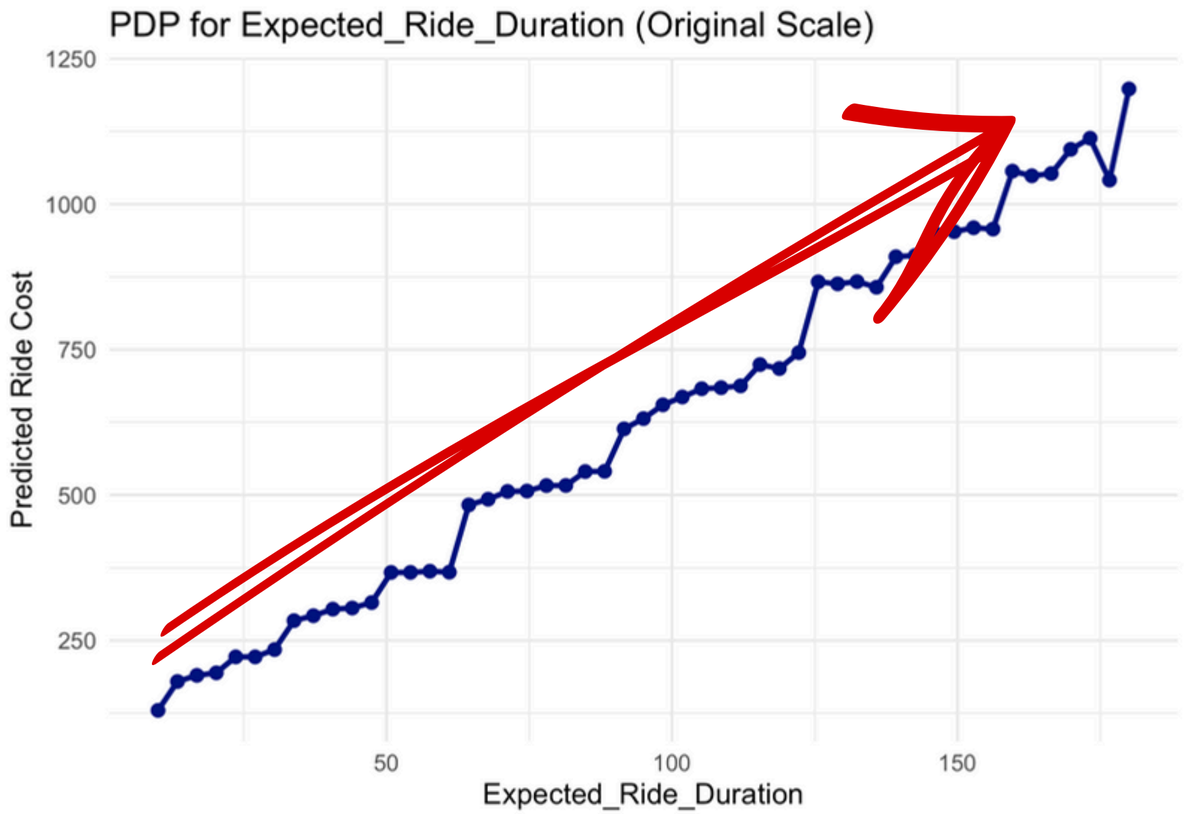
IMPORTANT VARIABLES TO THE MODEL

- Expected Ride Duration
- No. of Drivers
- No. of Riders

Dynamic pricing automatically rising when there are more riders in a given area than available drivers. This encourages more drivers to serve the busy area over time and shifts rider demand, to maintain reliability and restore balance.

Source: Uber
https://www.uber.com/us/en/marketplace/pricing/surge-pricing/

Partial dependencies of Expected Ride Duration



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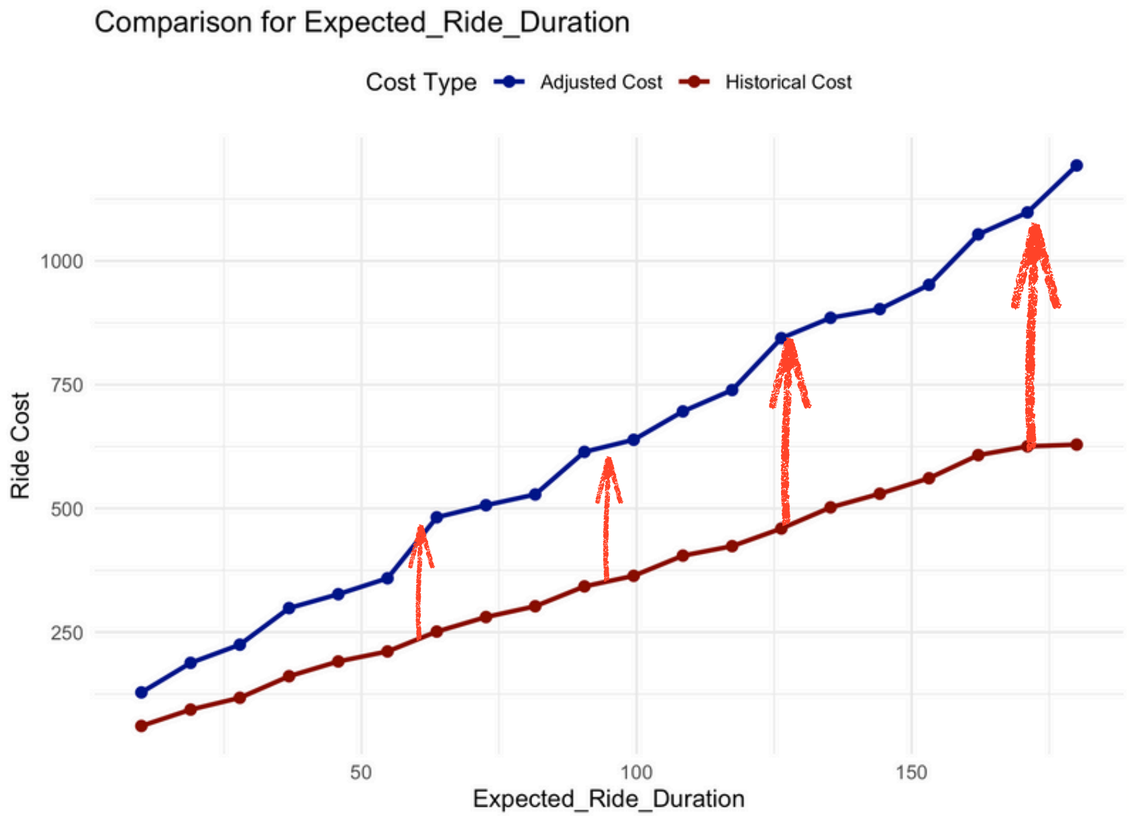
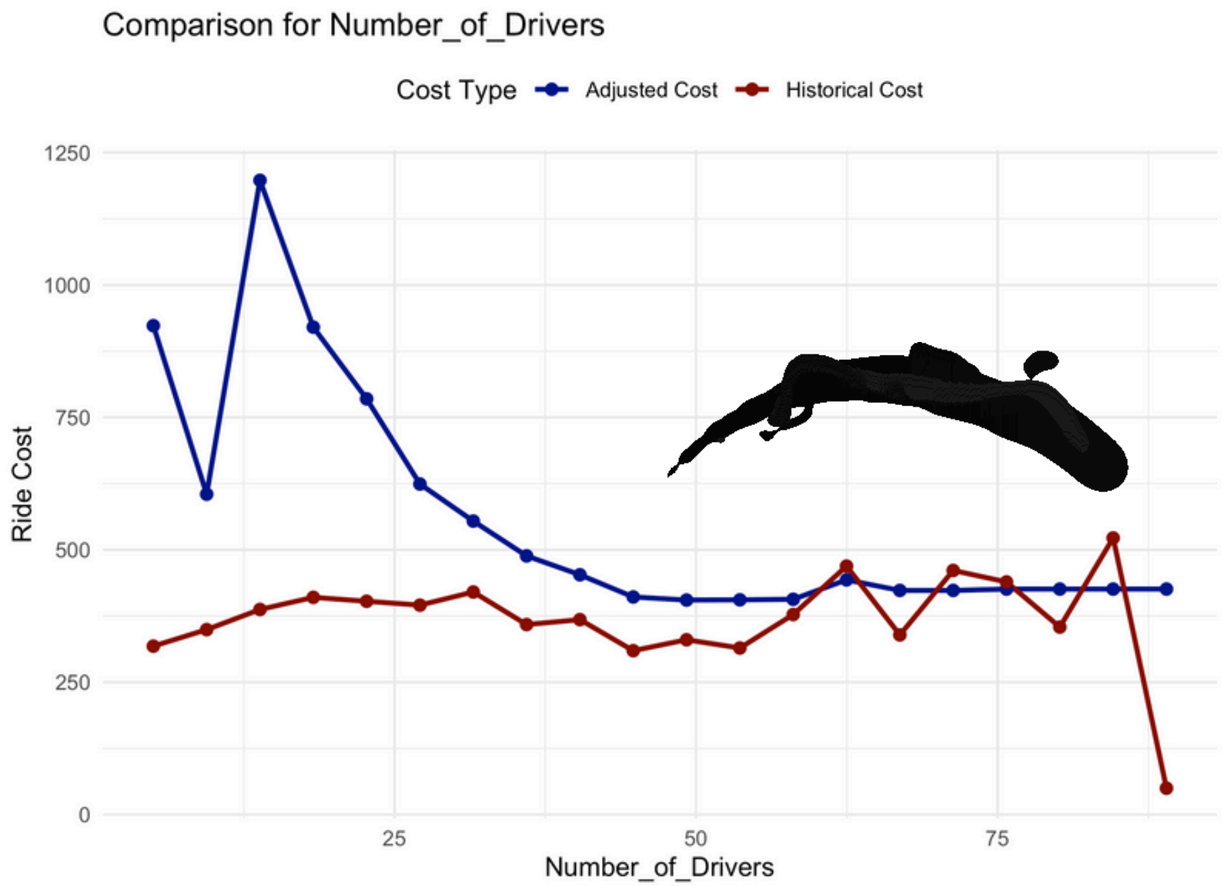
Partial dependencies of Expected Ride Duration



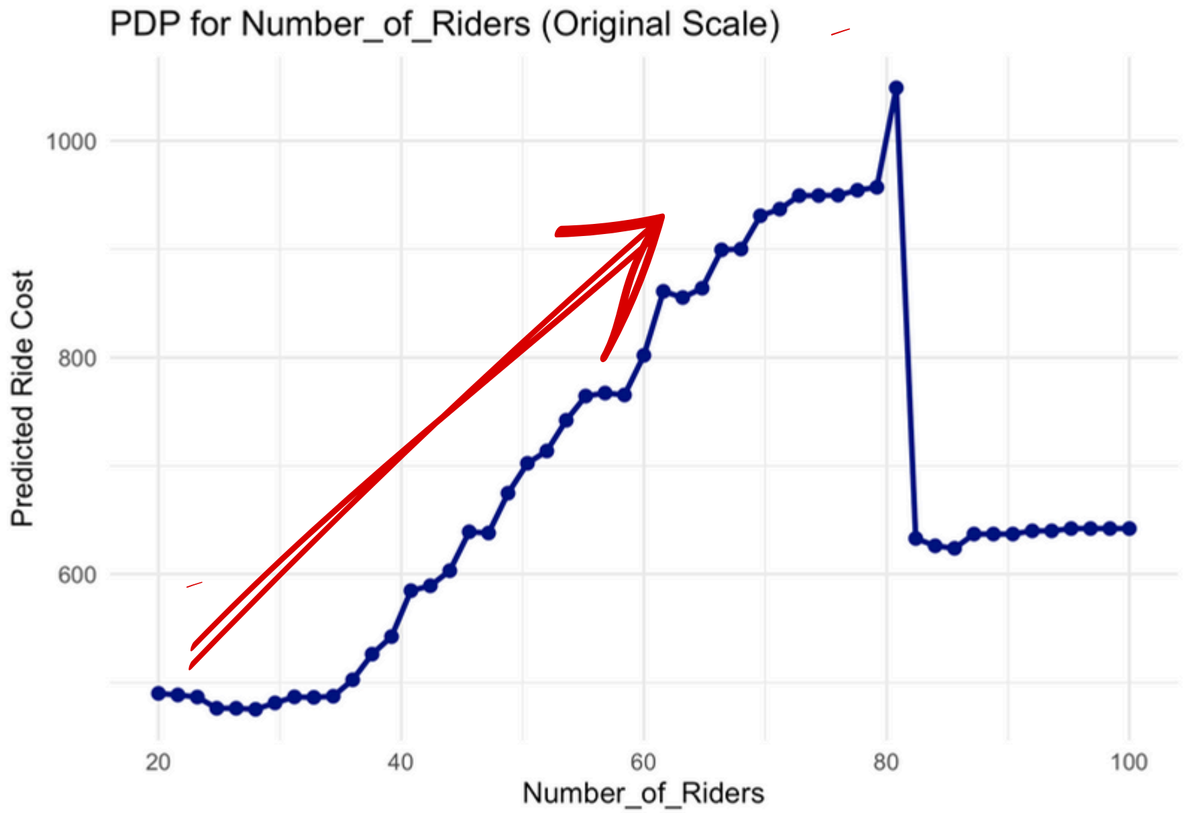
- For shorter rides, both costs are closer.
- As the ride duration increases, the gap widens significantly.
- Customers who take longer rides will pay **much more** compared to the historical pricing.

Partial dependencies of Number of Drivers



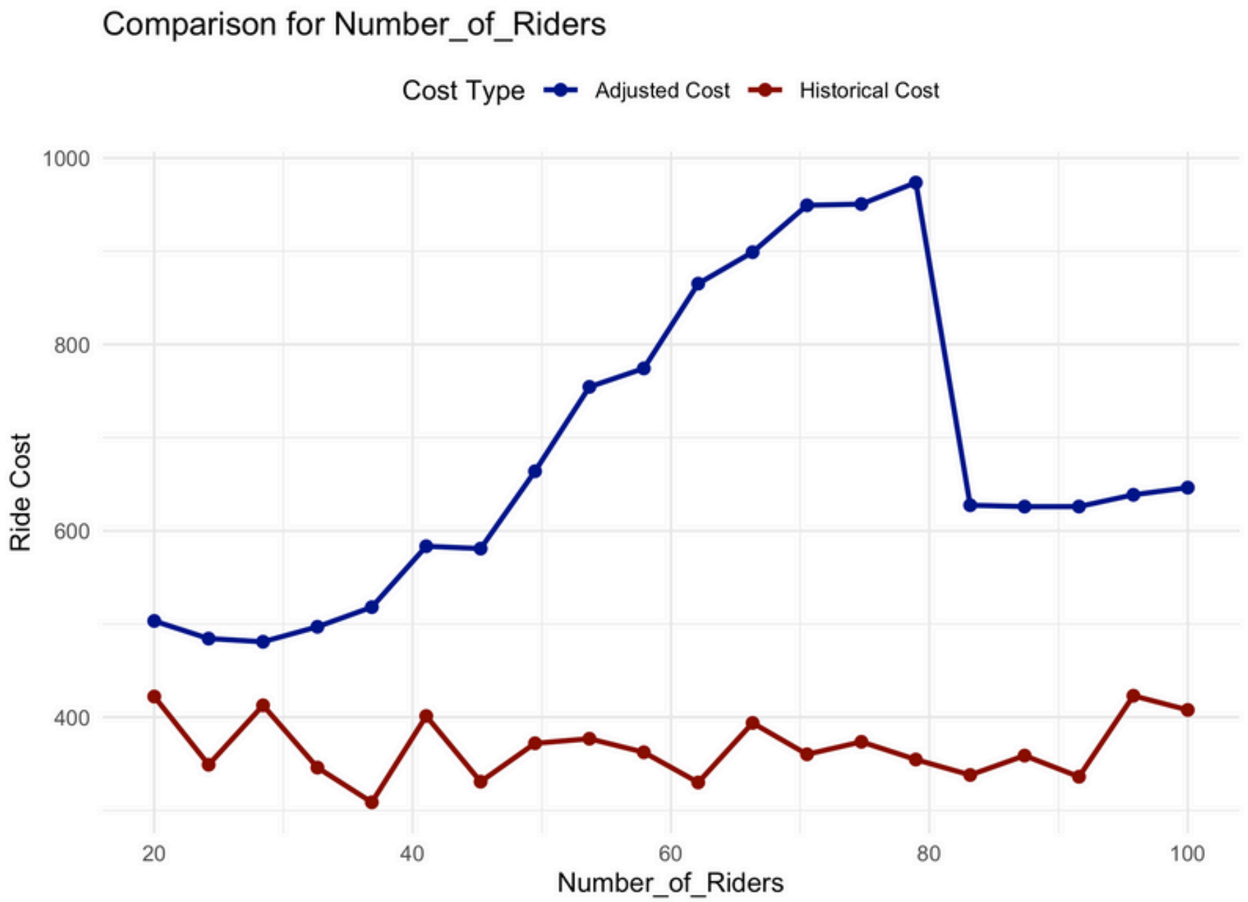
- From about 20 to 50 drivers, the ride cost decreases rapidly
- Beyond 50 drivers, the cost levels off and stay around Rs. 400
- If there is higher demand, customers like Ravi can benefit from our dynamic model.

Partial dependencies of Number of Riders



- Ride costs stay low when there are fewer than 35 riders.
- Costs increase with more riders, especially from 40 to 75
- There’s a big spike in cost around 78–79 riders.
- After that, the cost drops and becomes stable again, even as rider numbers go up.

Partial dependencies of Number of Riders



- This behavior helps us avoid losing customers to competitors due to overpricing.
- **More profit than in the past.**

Taxi Service

RideO offers fast and reliable taxi services around the clock. Whether it's a quick trip across town or your daily commute, we've got you covered with safe and comfortable rides.

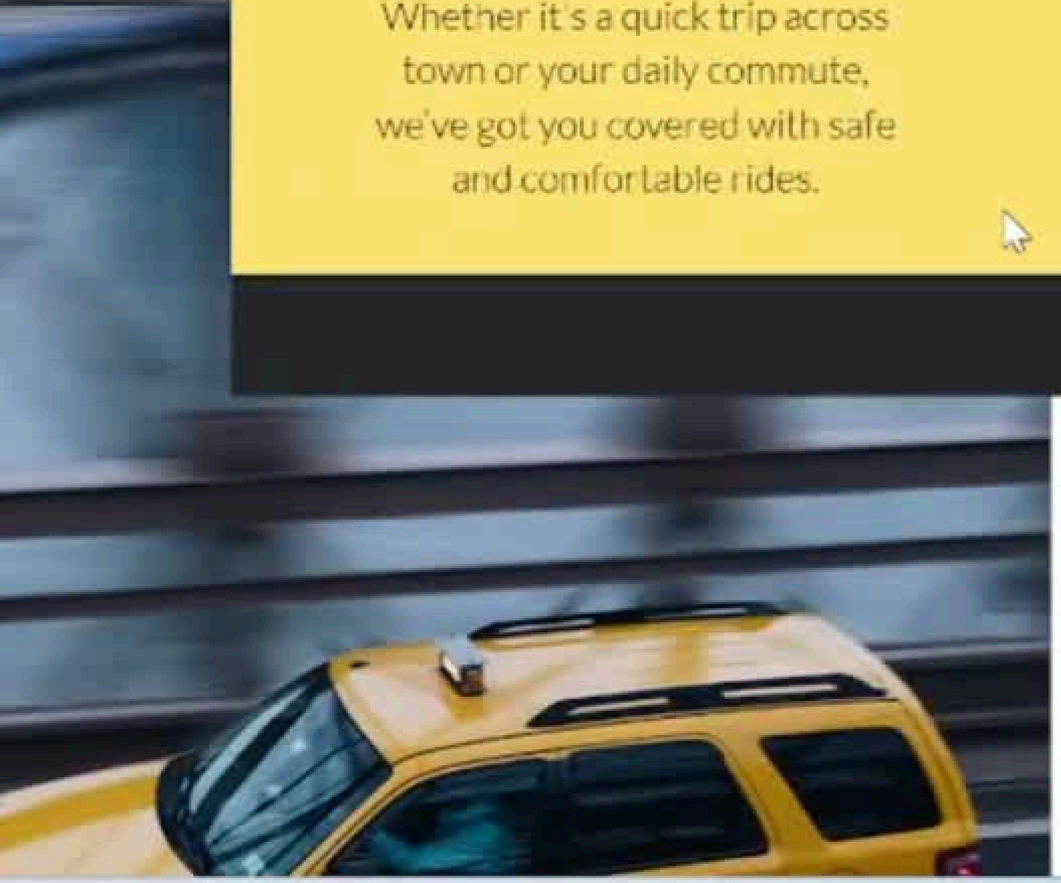
Airport Transfer

Catch your flight stress-free with RideO's airport service. We provide timely pickups and drop-offs, ensuring you arrive on schedule every time.

VIP Service

Experience premium travel with RideO's VIP service. Enjoy luxury vehicles, professional chauffeurs, and a ride tailored to your comfort and style.

See All



About RideO

Refferences

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RideO app

Thank You