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## MEMO

**To:** AXA Deutschland Leadership Team  
**From:** Data Science Analysis Team  
**Date:** ....../....../....  
**Re:** Citi Bike Insurance Market Opportunity — Data Analysis Findings

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### Executive Summary

This memo presents findings from our analysis of **121+ million Citi Bike trips** (NYC) and **2.7+ million trips** (Jersey City) integrated with NYPD crash proximity data.

#### Key Finding:

The Citi Bike system represents a large, fast-growing market (46.8M annual trips, +123% since 2019) with identifiable risk patterns that can inform insurance product design and targeted distribution strategies.

#### Important Limitation:

This analysis uses crash proximity data as a risk proxy. We do not have actual insurance claims data, so financial projections (premiums, loss ratios, profitability) would require actuarial assumptions beyond this dataset. This memo focuses on what the data does tell us.

### Data Sources & Methodology

#### Data We Have (Validated Findings)

Data Source	Volume	What It Tells Us
NYC Citi Bike Trips	121+ million	Market size, growth, temporal patterns
JC Citi Bike Trips	2.7+ million	Secondary market, portability test
NYPD Crash Data	500m proximity	Risk proxy (crashes near stations)
Station Locations	2,100+ stations	Geographic targeting opportunities

#### Data We Do NOT Have

Missing Data	Impact on Analysis
Insurance claims history	Cannot calculate actual loss ratios
Premium pricing tests	Cannot validate willingness-to-pay

Attach rate data	Cannot predict adoption rates
Citi Bike-specific crashes	NYPD data is all cyclists, not just Citi Bike

## Finding 1: Market Size & Growth

Market	2019	2025	Growth
New York City	20,551,697	45,761,685	+123%
Jersey City	404,895	994,941	+146%
<b>Combined</b>	<b>20,956,592</b>	<b>46,756,626</b>	<b>+123%</b>

### Insight:

The market has more than doubled since 2019, demonstrating strong secular growth beyond COVID recovery. Each trip represents a potential insurance transaction.

## COVID-19 Impact & Recovery

Metric	NYC	Jersey City	Implication
2020 Decline	-4.9%	-20.2%	JC more commuter-dependent
Recovery Year	2022	2023	Both fully recovered
2025 vs 2019	+123%	+146%	JC growing faster

## Finding 2: Temporal Patterns

Time Window	NYC Share	JC Share	Implication
Peak Season (Jun-Oct)	54.4%	54.0%	Focus campaigns here
Peak Month (September)	11.6%	10.9%	Maximum activation
Weekdays (Mon-Fri)	73%	72%	Commuter products
Tue-Wed Peak	30.1%	29.7%	Midweek focus

### Insight:

Both markets show nearly identical temporal patterns. This means a single marketing calendar and product structure could serve both markets efficiently.

## Finding 3: Risk Analysis (NYC Only)

We used Empirical Bayes (EB) smoothing to estimate station-level risk based on NYPD crash proximity data.

**Important Caveat:**

NYPD crash data includes all cyclists, not just Citi Bike riders. This is a proxy for risk, not a direct measurement of Citi Bike incidents.

**Risk Trends Over Time**

Year	Trips	EB Expected Crashes	Rate per 100K
2019	20.6M	167,514	815
2020	19.6M	59,056	302
2025	45.8M	122,838	268

**Key Finding:**

Per-trip crash proximity risk has declined 67% since 2019 (815 → 268 per 100K). This suggests improving safety conditions.

**Station Classification (Four-Zone Model)**

Zone	Definition	Count	Action
Prevention Hotspots	High risk + High volume	2,676	Safety focus
Product Hotspots	High volume + Lower risk	5,552	Sales focus
Acquisition Targets	Lower volume + Low risk	5,551	Growth
Monitor	Lower risk + Lower volume	2,675	Passive

**Finding 4: Jersey City (Exposure-Only)****Portability Insight:**

Jersey City demonstrates that the framework produces actionable outputs without crash data. This is critical for expansion to markets where such data is unavailable.

Station	Trips	% of JC	Type
Grove St PATH	191,696	19.3%	Transit
Hoboken Terminal - River	121,830	12.2%	Transit
Hoboken Terminal - Hudson	107,005	10.8%	Transit
Newport PATH	89,432	9.0%	Transit
<b>Top 5 Total</b>	<b>662,484</b>	<b>67%</b>	—

**Extreme concentration:** Just 5 stations account for 67% of all Jersey City trips.

## Measurable KPIs (From Available Data)

These KPIs can be tracked using the data we have:

### Market & Exposure KPIs

KPI	Current Value	Data Source
NYC Annual Trips	45.8M	Citi Bike trip data
JC Annual Trips	995K	Citi Bike trip data
Combined Addressable Market	46.8M trips	Citi Bike trip data
YoY Market Growth	+8-10%	Historical trends
Peak Season Share (Jun-Oct)	54%	Timestamp analysis
Weekday Commuter Share	73%	Timestamp analysis

### Risk Proxy KPIs (NYC Only)

KPI	Current Value	Data Source
Crash Proximity Rate (per 100K)	268	NYPD + EB model
Prevention Hotspot Stations	2,676	Four-zone classification
Product Hotspot Stations	5,552	Four-zone classification
Credible Station-Periods	16,454	≥5,000 trip threshold
Top Risk Cluster	Times Square	Geographic analysis

## KPIs Requiring Additional Data

**Note:**

The following KPIs are essential for financial planning but cannot be calculated from our current data. They would require actuarial assumptions, market testing, or partnership data.

KPI	Why We Can't Calculate	How to Obtain
Attach Rate	No purchase behavior data	Market test / pilot
Premium Willingness	No pricing test data	Conjoint analysis
Loss Ratio	No claims history	Actuarial model + pilot
Claim Frequency	NYPD ≠ actual claims	Partnership with Lyft
GWP Projections	Depends on above unknowns	Financial modeling post-pilot

## Recommendations

### 1. Market Entry is Justified Based On:

- **Large market:** 46.8M annual trips (and growing 8-10% annually)
- **Concentrated distribution:** 67% of JC volume at 5 stations
- **Predictable patterns:** 54% in peak season, 73% weekdays
- **Improving safety:** Per-trip risk proxy down 67% since 2019

### 2. Recommended Next Steps

Phase	Action	Purpose
1	Partner with Lyft	Access to actual incident data, app integration
2	Conduct pricing research	Determine willingness-to-pay
3	Run small pilot (100 stations)	Measure actual attach rates, claim frequency
4	Build actuarial model	Use pilot data to project loss ratios
5	Scale based on results	Expand if pilot KPIs are positive

### 3. Use This Analysis For:

- **WHERE to focus:** Product hotspots (5,552 NYC stations), PATH hubs (5 JC stations)
- **WHEN to activate:** June-October peak season, Tuesday-Wednesday commute days
- **WHAT to prevent:** Times Square / Port Authority corridor (top risk cluster)
- **Framework validation:** JC proves approach works without crash data

## Conclusion

### Summary:

Our analysis of 121M+ trips reveals a large, growing, and targetable market. We have identified 2,676 prevention priority stations, 5,552 product distribution hotspots, clear temporal windows, and a portable framework validated in Jersey City. However: Financial projections (GWP, loss ratios, profitability) require data we do not have. We recommend a phased pilot approach to gather actual claims and pricing data before committing to financial targets.

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For questions, contact the Data Science Analysis Team  
Full technical methodology available in appendix