

Tesla's Recall Dilemma: A Data-Driven Story of OTA Innovation, Risk, and Reliability

A data-driven exploration of Tesla's recall patterns, resolution methods, and strategic opportunities.

Final Presentation

BAN-240NAA-Business Analytics
Consulting Capstone Project

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Navigation

Fillmore Heritage Garage - Lot #206
1210 Fillmore St
San Francisco, CA 94116

233 Elsworth St
San Francisco, CA 94116

11:23 am 0 min 0.0 mi
Fillmore Heritage Garage - Lot #206

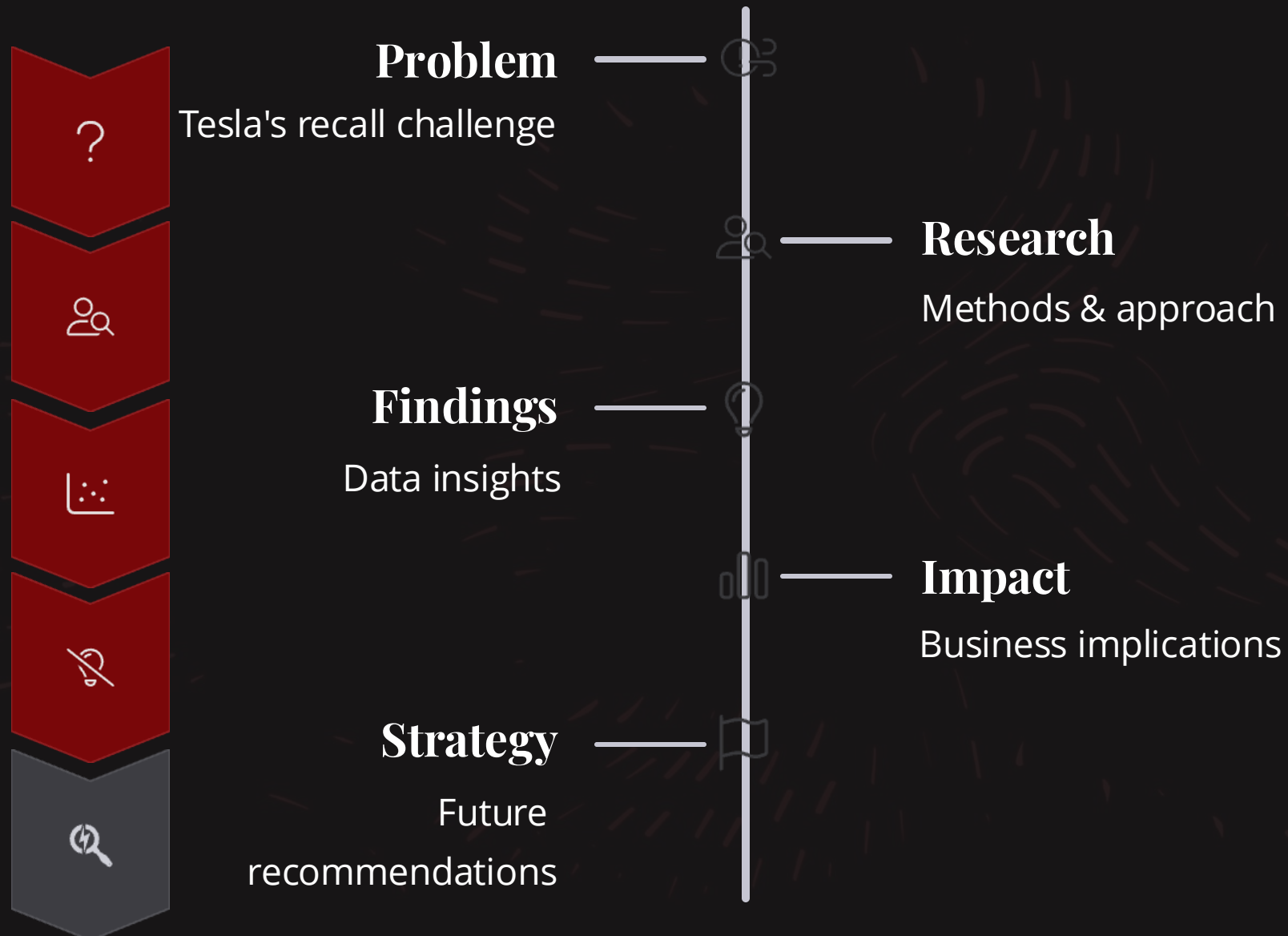
End Trip

Take me to the Fillmore Heritage garage!

Navigation to the Fillmore Heritage garage

69

Our Journey Through the Data



The Scale of the Problem

5.1M

Vehicles Recalled

In 2024 alone

2,450%

Increase

From 2015 to 2024

#1

Industry Position

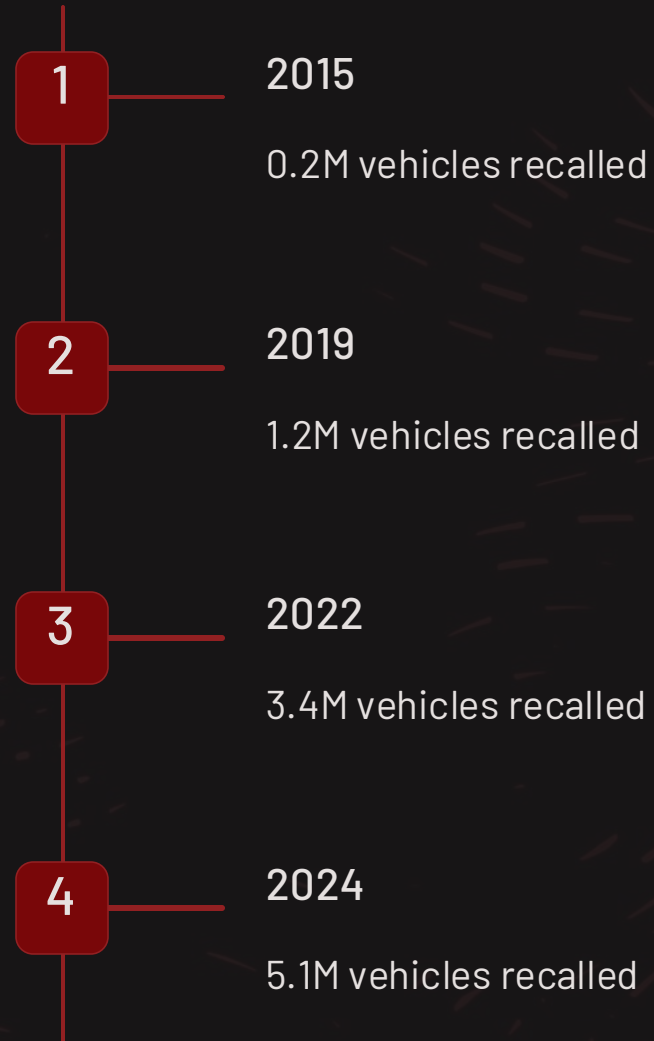
Leader in total recalls

16 Recall Campaigns

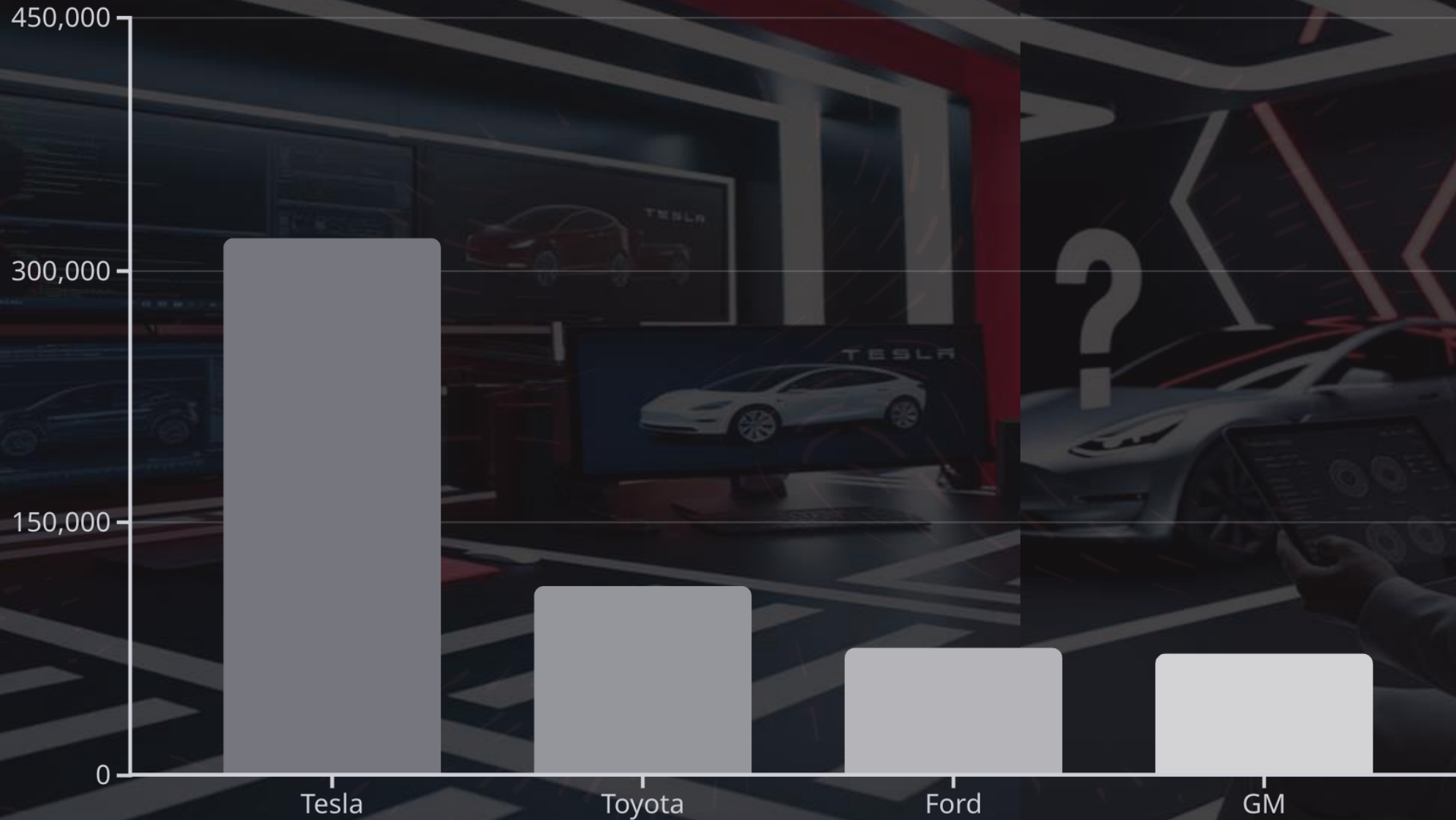
Affecting multiple vehicle lines



Recalls Growing Dramatically



The Tesla Difference



Tesla averages 318,750 vehicles per recall - 37% higher recall-to-production ratio than industry average.



Key Questions Driving Our Research



Root Causes

What's driving Tesla's high recall rate?



OTA Potential

Can over-the-air updates solve this crisis?



Industry Comparison

How does Tesla compare to competitors?



Business Impact

What's the cost to Tesla?

Our Research Approach

Data Collection

NHTSA, Transport Canada,
Consumer Reports

Visualization

Charts, heatmaps, matrices



Analysis Tools

Python, Tableau, NLP

Methodology

EDA, regression analysis

Resolution Methods: OTA vs Physical

OTA Updates

37% of recalls

- 12% annual growth rate
- 3 days average resolution
- \$12 per vehicle cost

Physical Repairs

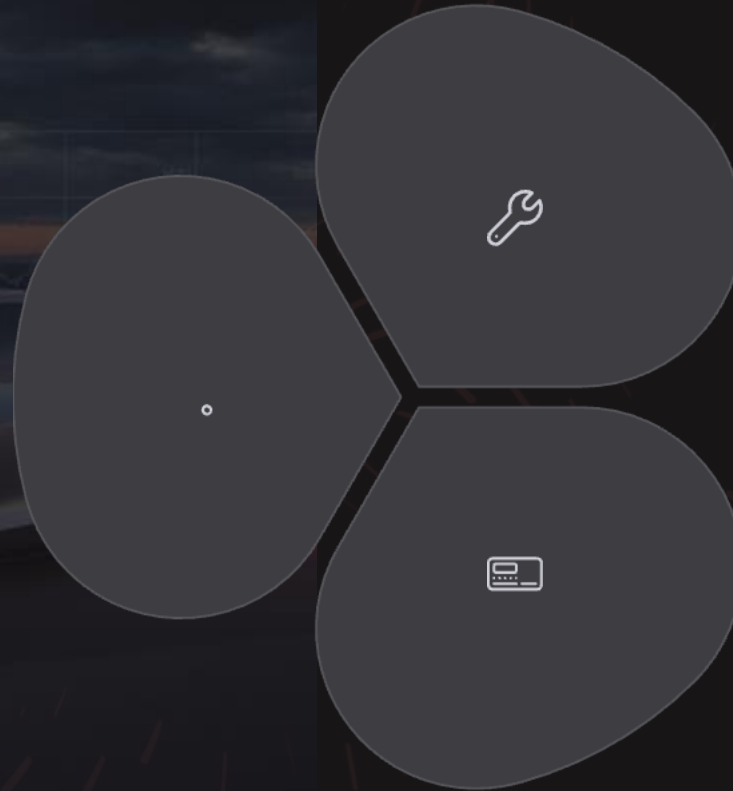
63% of recalls

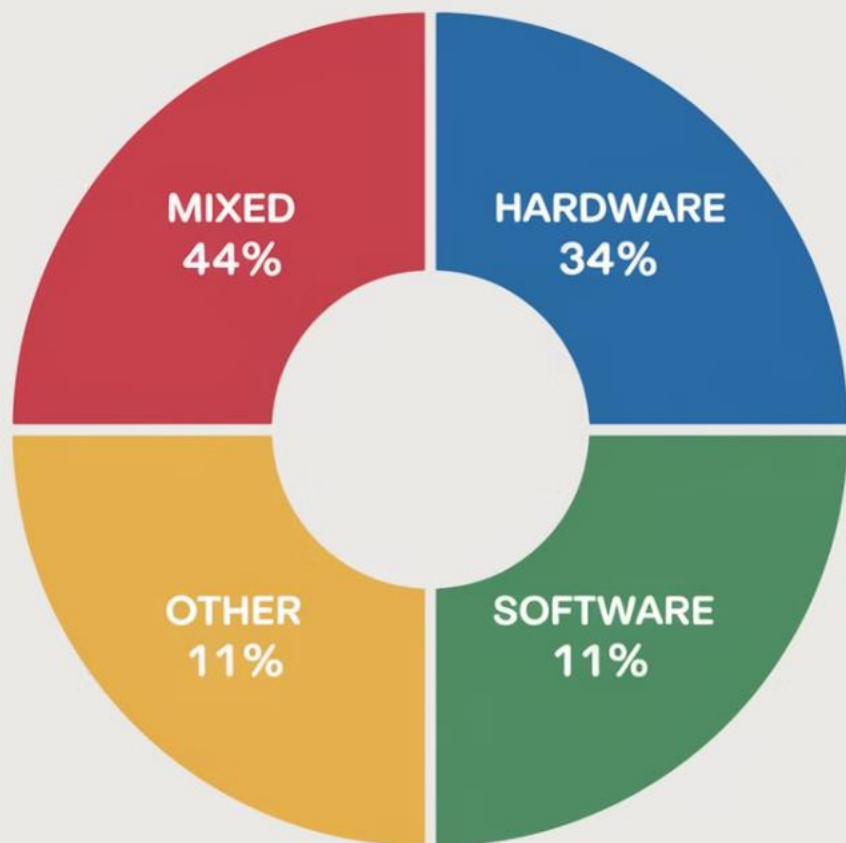
- 14-28 days resolution time
- \$450 per vehicle cost
- 76% completion within 30 days

Efficiency Gains

OTA advantages

- 89% faster resolution
- 97% cost reduction
- 4.8/5 vs 3.6/5 satisfaction





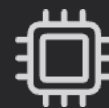
Root Causes of Recalls



Mixed Causes

44% of recalls

+24% CAGR



Hardware Issues

34% of recalls

-4% CAGR



Software Problems

11% of recalls

+3% CAGR



Other Factors

11% of recalls

Stable year-over-year



Component Vulnerabilities



Electrical Systems

24% of all recalls



ADAS Components

21% of recalls, +154% during FSD Beta



Airbag Systems

15% of recalls, only 10% OTA-fixable



Display/UI Issues

90% OTA-fixable, lowest service cost

Financial Implications



\$2.2B Total Recall Costs

Estimated impact on Tesla's bottom line



63% Cost Reduction

Potential savings with full OTA capability

4.2% Stock Impact

Average market reaction to major recalls



\$980M Legal Liability

Projected exposure from safety concerns



What We Couldn't See

1

Incomplete OTA Data

Some updates weren't logged as official recalls

2

Time-Bound Scope

Limited to 2015-2024



Subjective Classification

Hardware/software distinction involved human judgment



Limited QA Access

Tesla's internal defect tracking inaccessible

Every research journey has blind spots — these are ours



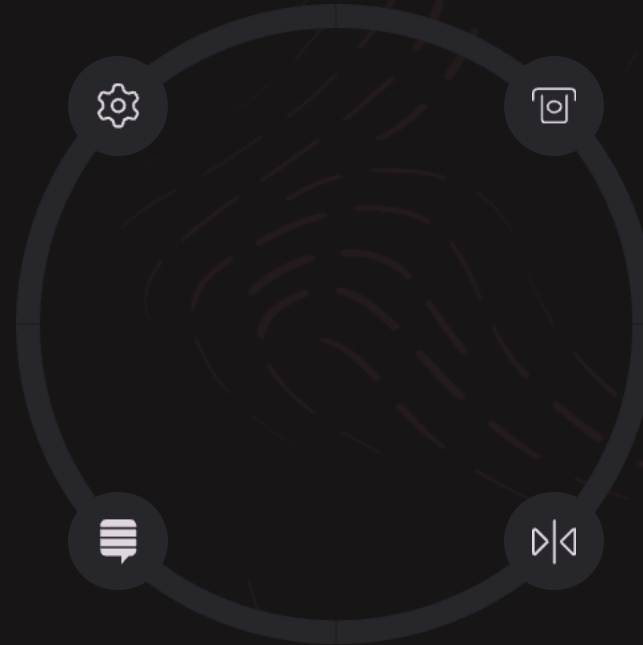
Additional Research Constraints

Rapid Tech Evolution

Tesla's architecture changed mid-analysis

EV vs Legacy OEM Differences

Not always directly comparable



Modeled Costs

Estimated, not actual repair expenses

Ideal Implementation Assumptions

Strategy assumes full feasibility



Customer & Business Impact



OTA Fix Cost

\$12 per vehicle

97% completion rate



Physical Fix Cost

\$450 per vehicle

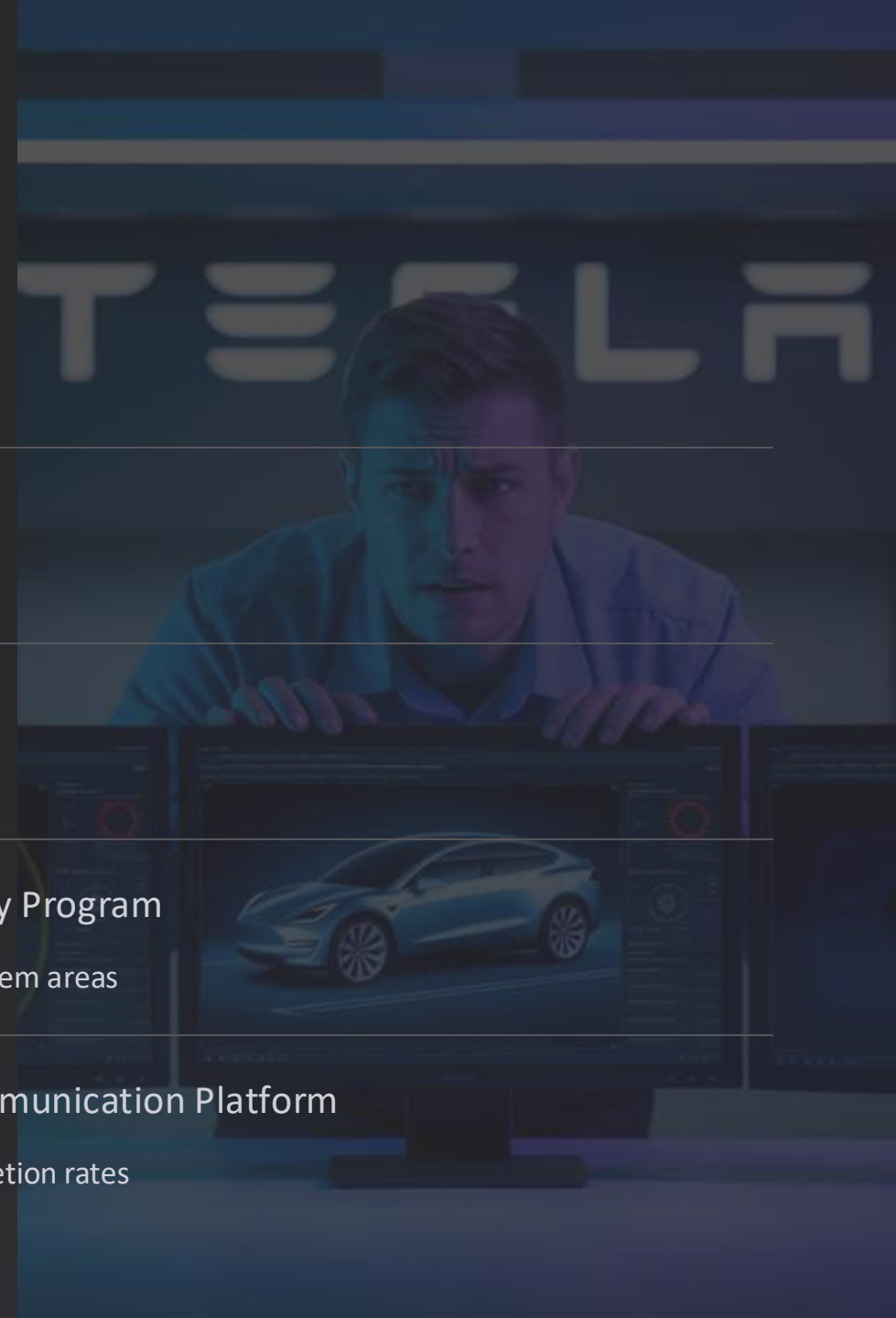
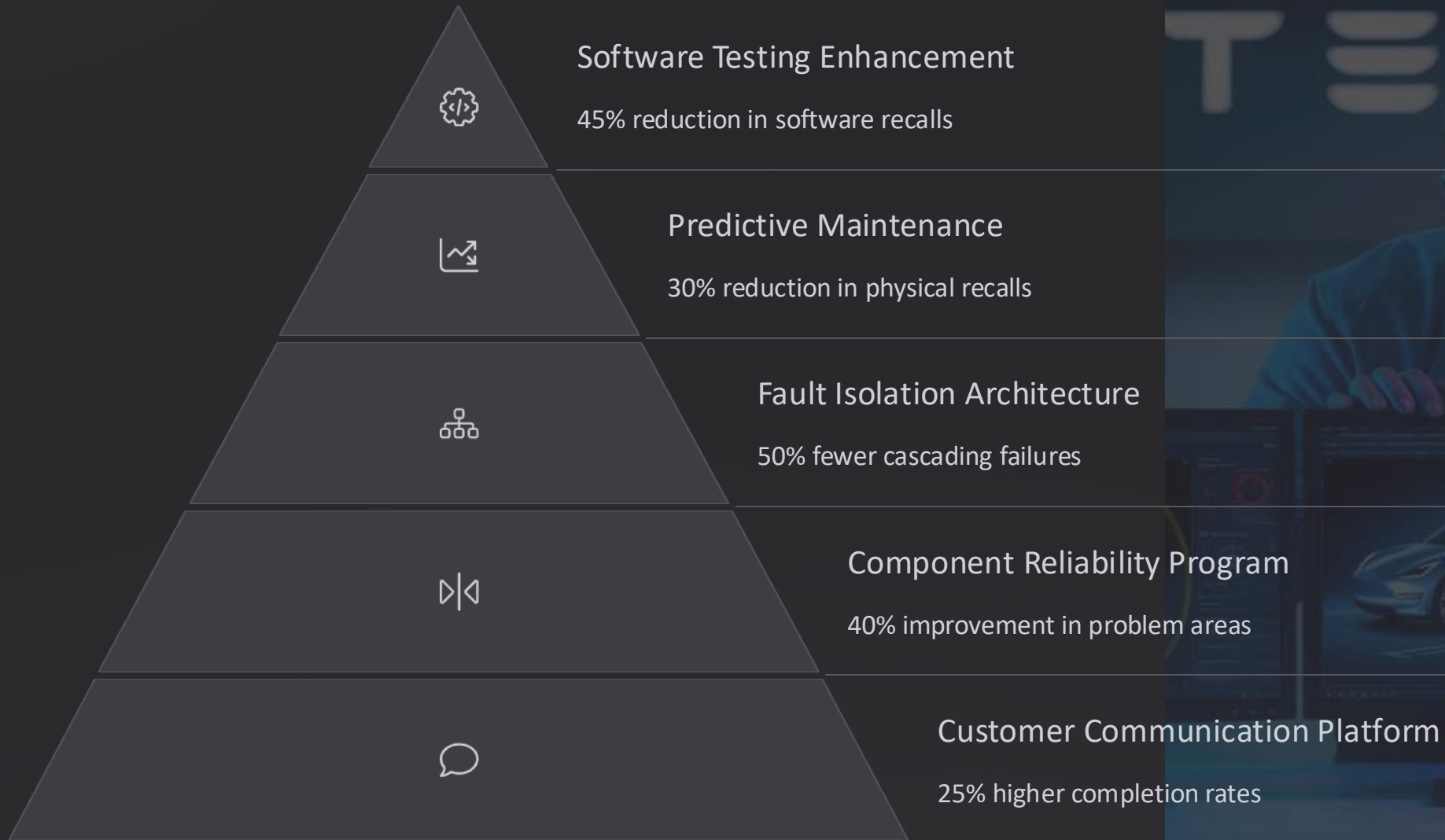
76% completion rate



Customer Satisfaction

4.8/5 OTA vs 3.6/5 physical

Strategic Recommendations



Implementation Timeline



Phase 1: Q2-Q4 2025

- 15 FTE resources
- Software testing focus
- Predictive maintenance pilot



Phase 2: Q1-Q3 2026

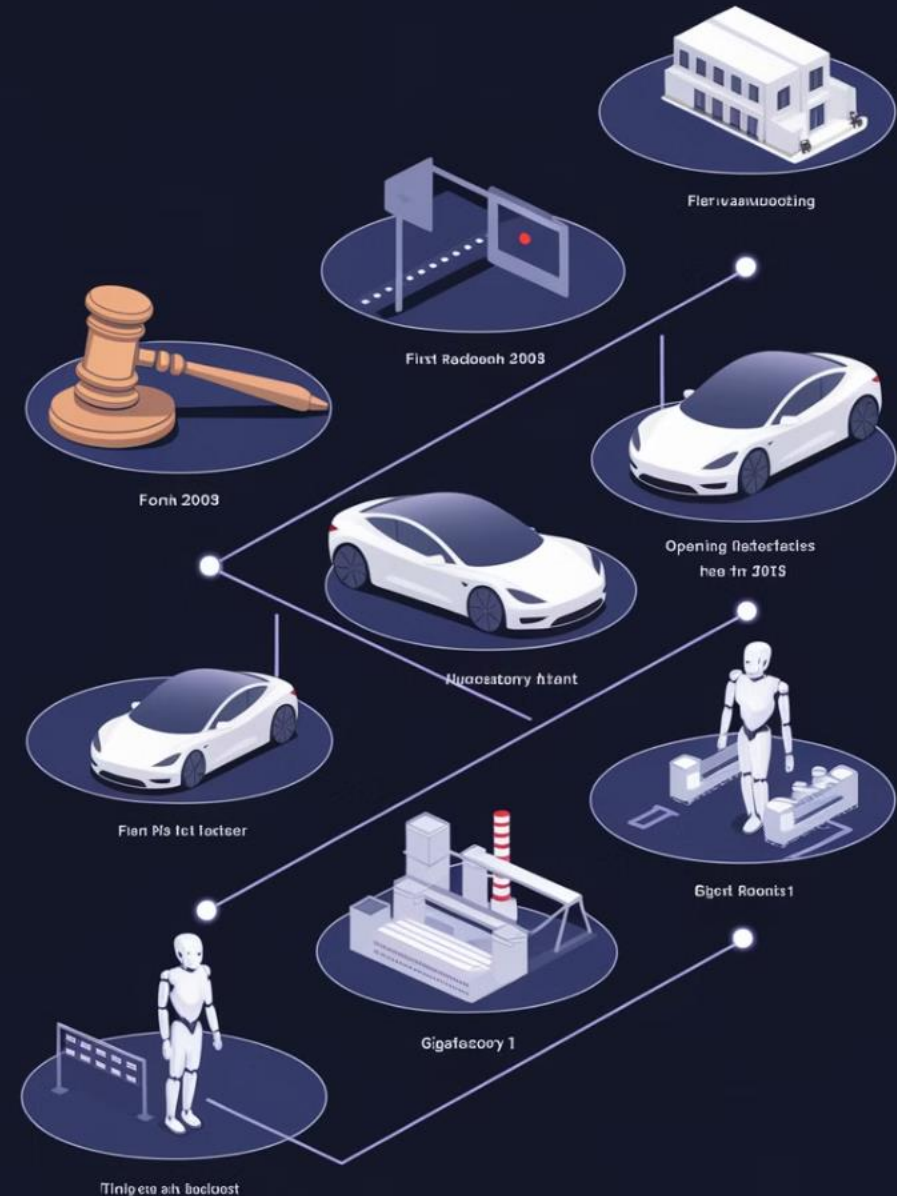
- 18 FTE resources
- Component reliability program
- Fault isolation architecture



Phase 3: Q4 2026

- 12 FTE resources
- Regulatory framework
- Full platform integration

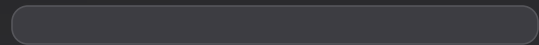
Total investment: \$42-48M with projected 3.2x ROI





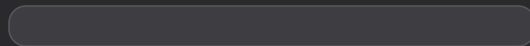
Conclusion: Transforming the Recall Paradigm

A Future of Quality and Innovation



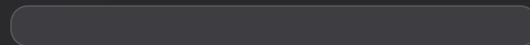
Already Achieved

\$243M in service costs saved via
OTA



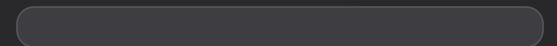
Short-Term Impact

45% reduction in software-
related recalls by 2025



Long-Term Transformation

65% of all recalls resolved via
OTA by 2027



Industry Leadership

Setting new standards for
automotive quality management
management

Turning Challenge Into Opportunity



THANK YOU