

From Reactive to Proactive

How Artificial Intelligence Is Reshaping Carrier Performance in Large-Scale Freight Networks through Predictive Reliability Index (PRI) model

DEBANSHU SHARMA

Chartered Member, CILT • Project Management Professional • Six Sigma Black Belt

Supply Chain and Transportation Leader, Stephen M Ross School of Business MBA (University of Michigan, Ann Arbor)



What we will cover

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|----|---|-------------------------------------|--|
| 01 |  | The pressure on the network | Volume, mix, speed and capacity. |
| 02 |  | Where the failure happens | The pickup window, its root causes and what it sets off. |
| 03 |  | What it costs | The cost drivers, and how much goes unrecovered. |
| 04 |  | Predictive Reliability Index | What goes in, and what comes out. |
| 05 |  | Results | Where risk concentrates, and what intervention moves. |
| 06 |  | The response ladder | Pre-agreed actions, owners and lead times. |

Four pressures, one failure point, one score, and a decision made before the truck is due.

Delivery demand is outgrowing transport capacity



Volume and speed are climbing while fleet capacity remains flat. The origin pickup is where network strain turns into failure.



System Pressure

E-commerce volume spikes and shorter delivery windows push legacy carrier networks past limits.



Strategic Imperative

Predict execution risks and intervene **before** the truck is due — not after the pickup is missed.

Volume Acceleration & Retail Mix Shift



VOLUME SURGE

+49%

Global E-Commerce Expansion, 2021–2026

2021 Volume

\$4.9T

2026 Target

\$7.3T



RETAIL SHIFT

21.1%

Online Share of Global Retail, 2026 (Snapshot)

Store Retail

78.9%

E-Commerce

21.1%

Speed Expectations vs. Driver Capacity

80% Same-Day Grocery Baseline

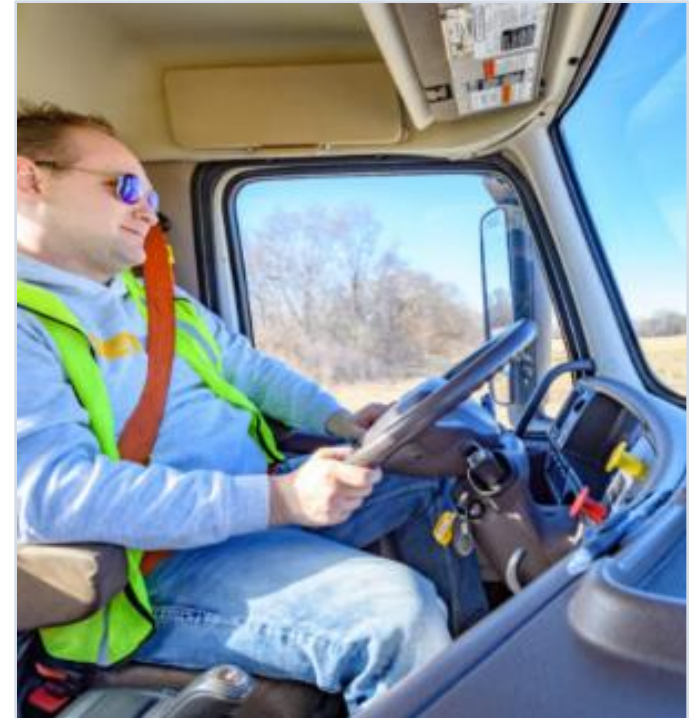
SPEED PRESSURE

Up from 55%. Rapid fulfillment eliminates safety buffers — buffer time to detect and correct missed pickups has collapsed.

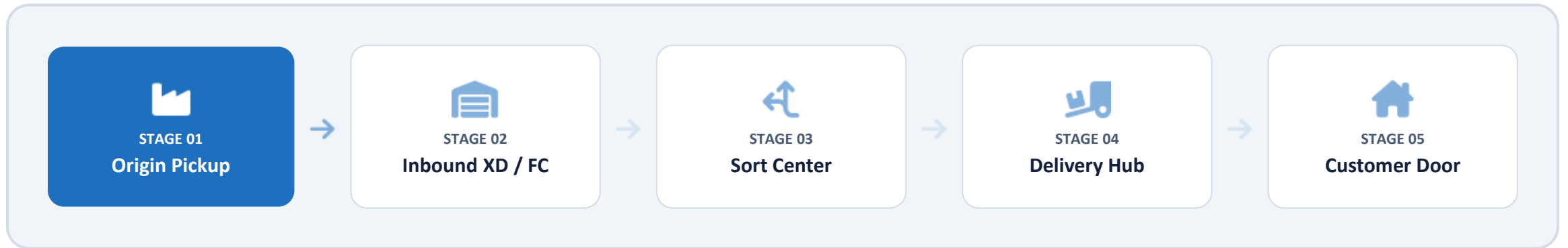
~90% Annual Driver Turnover

FLEET BOTTLENECK

Carriers replace 9 in 10 drivers annually. Fleet capacity remains constrained in a rapidly expanding network system.



The Failure Point: Origin Pickup Window



If the pickup fails at Stage 01, every downstream node experiences late arrivals, idle labor, and missed customer SLAs.

Six Drivers of Missed Pickup Windows

Driver No-Show

Unannounced absence or prior dispatch delay.

Weather & Traffic

Corridor bottlenecks and severe storm delays.

Gate Check-In Error

Kiosk errors or missing access credentials.

Equipment Failure

Mechanical breakdown or trailer maintenance.

Yard Congestion

Facility gridlock delaying dock positioning.

Window Mismatch

Unaligned shipper and carrier scheduling.



Key Insight: 100% of these root cause signals are visible before the departure window opens!

The Hidden Financial Toll of Missed Pickups

39.3%

Excessive Driver Detention

Of stops experience over 2 hours of unpaid wait time.

< 50%

Detention Fee Recovery

Of billable detention fees are collected; the rest is written off.

Freight Network Cost Friction Analysis

Driver Detention Rate

39.3%

Fee Recovery Rate

48.0%

Network Loss Waste

2–5% Sector

Total Sector Impact: \$937 Billion freight sector loses billions annually due to reactive pickup management.

The three bars are independent measures, not shares of one total: network loss waste runs 2–5% of total sector cost.

Predictive Reliability Index (PRI) System Architecture

01. INPUTS

Data Ingestion

Synthesizes telematics, weather forecasts, and carrier history.

02. MODEL

Predictive AI Engine

Evaluates multi-variable risk factors pre-dispatch.

03. SCORE

0–100 PRI Score

Outputs instant risk rating for every scheduled tender.

04. ACTION

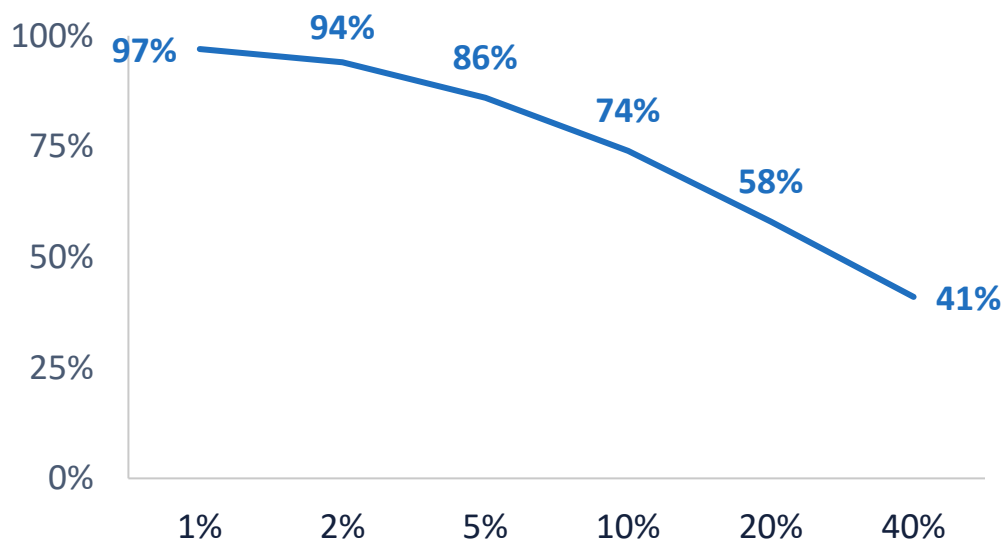
Automated Protocol

Triggers carrier reassignments or standby backups automatically.



Precision is a curve, not a single number

Precision by share of tenders flagged, highest risk first



Share of tenders flagged

Precision falls as coverage rises. Where the threshold sits is a business decision: how many false alarms a dispatch desk will absorb to catch one more missed pickup.



Where the PRI operates

Flagging the top 1-2% of tenders holds precision near 95%. Almost every alert a planner sees is real.



Why we do not flag more

Widen to 20% of tenders and precision falls to roughly 55%. Half the alerts are wrong and the desk stops acting.

Performance Across 150,000+ Shipments



1.35%

Risk Concentration

Small fraction of tenders drive majority of delays.



3.5×

Predictive Accuracy

Missed pickups clustered on flagged loads.



35%

Fewer Origin Pickup Failures

Net reduction after the model went live.



+15%

On-Time Pickup Gain

Direct improvement in overall network SLA.

The Proactive Response Ladder

LOW (0–39)	No Action. Score refreshes dynamically at each tender event.	AUTOMATED
GUARDED (40–59)	Automated alert: Confirm driver, tractor ID, and dispatch time slot.	12H LEAD TIME
HIGH (60–79)	Confirmation call required. Reserve backup carrier on standby.	24H LEAD TIME
CRITICAL (80–100)	Reassign tender immediately to proven second-line backup carrier.	24-48H LEAD TIME

Investment followed proof, not the business case

Stakeholders would not fund the build up front: implementation took time and reactive defect work kept winning priority. The pilot results below are what changed minds.

Prevention loses the budget queue

Reactive defect work carries a visible failure.
Preventive work has to earn its place first.

Proof moved money, not forecasts

150,000 shipments ran before funding was approved. Results changed minds; the business case had not.

The threshold is a business call

How many false alarms a dispatch desk will absorb sets coverage, not the model.

"Predict execution risk — don't just report it."

By acting before departure windows open, freight networks protect SLAs, eliminate detention costs, and build resilient carrier partnerships.

DISCUSSION & Q&A

DEBANSHU@UMICH.EDU

