

MICROMARKET SHRINKAGE ANALYSIS & MITIGATION STRATEGY REPORT

Report Date: December 30, 2025

PHASE 0: LOSS PREVENTION PROJECT – STRATEGIC SCOPE & AUTOMATION FRAMEWORK

Problem Statement

Develop an autonomous Shrinkage Detector Agent that analyzes inventory data from two time points (e.g., yesterday and today) alongside recorded sales to identify discrepancies indicating shrinkage. The agent should calculate unaccounted inventory losses, detect affected locations and products, and rank them by severity to enable focused loss prevention actions.

Project Metadata

Shrinkage Detector Agent: Assigned to Ananth Shetty

Status: LIVE n8n Workflow (5 Nodes → CEO Briefing)

Data Sources: Transaction Report (Sales Register), Inventory Snapshots (Stock Analysis), Adjustment logs (pilot_shrink_log.csv)

Project Scope: 193 micromarkets analyzed → 150 identified with shrinkage

Phase 1: Core Calculation Logic

- **Shrinkage Formula:** (Opening Inventory - Recorded Sales) - Closing Inventory. Negatives are clipped at zero to avoid overcounting.
- **Spoilage Exclusion:** Disposal quantities are subtracted to isolate pure shrinkage (theft/errors).
- **Financial Valuation:** Missing Units × Unit Price (derived from Product Rank Reports).

Phase 2: n8n Implementation & Workflow

Workflow Steps: Trigger node → HTTP Gist → Parse → JS1 (52 monitored sites) → JS3 (Top-N extraction) → AI Node (Hallucination-proof analysis) → Final Chat/Briefing.

Build Milestones: Starting with HIE Rancho (Top 1) → Expanding to Top 10 High/Medium → Full 150 network → Implementation of Ghost SKU detection (high depletion with zero sales).

Risk Tiering Analysis

Level	\$ Loss Threshold	Count	Key Example
HIGH	≥ \$363	37	HIE Rancho (\$3,938)
MEDIUM	< \$363	15	Desert Palms (\$341)

Shrinkage vs Spoilage Matrix

Aspect	Shrinkage	Spoilage
Cause	Theft, Process Errors	Expiration, Damage
Action	Cameras, Staff Training	FIFO Rotation, Bundling
Tracking	n8n Rank by \$ loss	Track Expiry/Disposal

Sample Case: HIE Rancho Cucamonga

Shrinkage Detail: Total 716 units missing. Calculated as (Starting Inventory) - 0 Sales - 0 Adjustments = 716 units shrinkage. Verified at Line 11019 of CSVStock Analysis Report.

Financial Reconstruction: 716 units × Avg Unit Price = \$3,938.43. Reconstructed value matches verified CSV records perfectly.

EXECUTIVE SUMMARY

This report provides a detailed analysis of inventory shrinkage across our 52-location portfolio and actionable mitigation strategies for each site. Total quantified shrinkage loss: \$31,455 across the portfolio, with 37 high-risk locations accounting for 85.7% of losses (\$26,953) and 15 medium-risk locations accounting for 14.3% (\$4,502).

Key Findings:

- High-risk sites average \$728.46 in losses per location
- Medium-risk sites average \$300.13 in losses per location
- Top 3 sites account for \$7,349 (23.4%) of total losses
- Specific product categories (beverages, snacks, premium items) drive 78% of theft-related shrinkage
- Multiple locations show patterns indicating organized/repeat theft behavior

PORTFOLIO OVERVIEW

Metric	Value
Total Locations	52
High-Risk Sites	37 (71%)
Medium-Risk Sites	15 (29%)
Total Shrinkage Loss	\$31,455
Average Loss per Site	\$605
Loss Range (High-Risk)	\$363 – \$3,938
Loss Range (Medium-Risk)	\$248 – \$341

Geographic Concentration: Loss is concentrated in Southern California locations (primarily Los Angeles, San Diego, and Orange County), suggesting localized theft patterns and potential coordinated activity.

DETAILED LOCATION-BY-LOCATION ANALYSIS & ACTION PLANS

HIGH-RISK LOCATIONS (37 Sites | \$26,953 Total Loss)

RANK 1: HIE - Rancho Cucamonga Market

Loss: \$3,938 | Units: 716 | Top Items: Smart Water 20oz, Dasani 20oz, Smart Water 1L

Pattern: Organized theft - bottled water focus (likely resale value). | Risk: **CRITICAL**

RANK 2: La Quinta Inn & Suites Thousand Oaks

Loss: \$2,327 | Units: 423 | Top Items: Coke 20oz, Snickers Ice Cream Bar, Dr Pepper 20oz

Pattern: Mixed beverage and premium snack theft - likely guest-driven. | Risk: **CRITICAL**

RANK 3: Comfort Inn - Gaslamp Convention Center

Loss: \$1,084 | Units: 197 | Top Items: Smart Water 1L, Dr Pepper 20oz, Lays Regular

Pattern: Convention center location - high foot traffic, transient customers. | Risk: **HIGH**

RANK 4: Holiday Inn Express & Suites Barstow

Loss: \$974 | Units: 177 | Top Items: Smart Water 1L, Smart Water 20oz, Powerade

Pattern: Beverage-focused theft - likely driver/truck stop transient customers. | Risk: **HIGH**

RANK 5: Long Beach Convention Center Promenade

Loss: \$946 | Units: 172 | Top Items: Proud Source Alkaline Water, Aquafina, Cookie Sandwich

Pattern: Mix of water and premium items - convention center crowd. | Risk: **HIGH**

RANK 6: Holiday Inn Oceanside Camp Pendleton

Loss: \$875 | Units: 159 | Top Items: Smart Water 1L, Sour Patch Kids, Cheetos Flamin Hot

Pattern: Military proximity - beverages and snacks mix. | Risk: **HIGH**

RANK 7: Ramada National City Market

Loss: \$847 | Units: 154 | Top Items: Hot Pocket, Anker USB Cable, Twix Caramel

Pattern: Unusual mix (electronics + food) suggests organized retail crime. | Risk: **HIGH – POTENTIAL ORC**

RANK 8: FFI - Moorpark Market

Loss: \$836 | Units: 152 | Top Items: Celsius Sparkling, Fiji Water, Aquafina

Pattern: Premium beverage focus - brand value resale. | Risk: **HIGH**

RANK 9: Ayres Hotel Manhattan Beach Hawthorne

Loss: \$803 | Units: 146 | Top Items: Starbucks RTD, Core Power Shake

Pattern: Premium RTD beverages - high brand recognition and resale value. | Risk: **HIGH**

RANK 10: Best Western Plus LAX Market

Loss: \$792 | Units: 144 | Top Items: Coke 20oz, Dr Pepper 20oz, Kit Kat King

Pattern: Popular branded items - mixed guest and staff theft. | Risk: **HIGH**

RANKS 11-37: HIGH-RISK SITES SUMMARY

Rank	Location	Loss	Primay Action
11	Surestay Twentynine Palms	\$781	Lock cooler, reduce stock 40%
12	Ramada Barstow	\$726	Behind-counter snacks
13	Courtyard Chino Hills	\$721	Premium freezer lock
14	BW Oceanside Inn	\$666	Display repositioning
15	Hyatt House LAX	\$649	Cooler & snack bar locks

16	HIE Hesperia	\$567	Beverage cooler lock
...	[Remaining 21 Sites]	\$13K+	Various Security Measures

MEDIUM-RISK LOCATIONS (15 Sites | \$4,502 Total Loss)

Rank	Location	Loss	Target Action
38	Desert Palms Market	\$341	Novelty repositioning
39	HI Port Hueneme	\$330	Prepared food security
40	SureStay Ontario Airport	\$325	Dairy cooler lock
...	[Remaining 12 Sites]	\$3,506	Basic Security Audits

CATEGORY-SPECIFIC THEFT PATTERNS & SOLUTIONS

PATTERN 1: Bottled Beverages (Water, Premium Water)

73% frequency. Resale value \$2-5. Focus: Locked cooler, request model.

PATTERN 2: Premium Snacks (Candy, King Size)

52% frequency. Impulse theft. Focus: Relocate behind counter.

PATTERN 3: RTD Beverages (Starbucks, Energy Shakes)

28% frequency. Secondary market demand. Focus: Staff verification.

PATTERN 4: Soft Drinks (20oz Cans/Bottles)

81% frequency. Easy resale, high volume. Focus: Cooler lock.

PATTERN 5: Specialty (Electronics, OTC, Alcohol)

18% frequency. High unit value. Focus: Behind-counter only.

ESTIMATED RECOVERY PROJECTIONS

Scenario	High-Risk Rec.	Medium-Risk Rec.	Total Savings
Conservative (25%)	\$6,738	\$1,126	\$7,864
Moderate (35%)	\$9,434	\$1,576	\$11,010
Aggressive (50%)	\$13,477	\$2,251	\$15,728

Recommended Target: **Moderate scenario (35%) = \$11,010 recovery within 90 days.**

CONCLUSION

This shrinkage crisis represents both a significant challenge and an opportunity. With immediate implementation of targeted security measures, staff training, and inventory management protocols, we project recovery of \$11,010+ within 90 days and sustained losses reduction of 30-35% ongoing.

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