

Retail Store Success Story

Case Study: Driving Omnichannel Efficiency and Customer Experience (CX) via Autonomous Floor Care in Flagship Retail Environments

Executive Summary

In brick-and-mortar retail, the physical environment is an extension of the brand. Maintaining pristine floor surfaces is directly correlated with customer dwell time, brand perception, and safety compliance. However, modern retail environments face compressed labor pools, rising hourly wages, and the constant operational friction of balancing floor maintenance with active customer foot traffic.

This case study evaluates the 180-day deployment of the **123bots.com "OmniScrub-R3" Autonomous Retail Floor Care System** across a 125,000-square-foot hypermarket and retail flagship location. The empirical data demonstrates that transitioning from manual overnight floor maintenance to a collaborative, real-time autonomous model dramatically enhances aesthetic consistency, reallocates labor to customer-facing roles, ensures zero-incident safety compliance, and drives a rapid financial return on investment.

+18%

CSAT AESTHETICS
INCREASE

3,100

LABOR HOURS
REALLOCATED/YR

99.8%

OBSTACLE AVOIDANCE
RATE

10.8 Mo

CALCULATED ROI
PAYBACK

1. The Retail & Operational Challenge

Prior to partnering with 123bots.com, the flagship retail location relied on a third-party nocturnal cleaning crew operating traditional walk-behind floor scrubbers. This legacy model presented several systemic liabilities:

- **The "Cleanliness Decay" Curve:** Floors were cleaned once every 24 hours between 01:00 AM and 05:00 AM. By 02:00 PM, high-traffic zones (such as entrances, grocery aisles, and checkout lanes) suffered visible aesthetic degradation from weather tracking, grocery spills, and cart scuffs.
- **Labor Resource Drain:** Sales associates and floor managers were frequently diverted from restocking shelves or assisting customers to address spot-cleaning and liquid spills, directly impacting front-end operational efficiency and sales conversion.
- **Slip-and-Fall Vulnerabilities:** High-traffic spills left unattended or poorly managed with manual "wet floor" signs created persistent liability risks.

2. Solution & Retail Integration Architecture

The store deployed a fleet of two (2) 123bots.com OmniScrub-R3 autonomous units. Engineered specifically for dynamic public spaces, these units utilize advanced 360-degree LiDAR, dual 3D depth cameras, and predictive AI path planning to navigate highly fluid retail environments.

Co-Existing with the Consumer

The operational paradigm shifted from an "after-hours-only" routine to a **Continuous Ambient Clean** model. The OmniScrub-R3 units operate during live retail hours (10:00 AM to 09:00 PM). Utilizing localized safety fields, the robots gently yield the absolute right-of-way to customers and shopping carts. If an aisle is heavily congested, the machine dynamically recalculates its path, flags the missed zone on its digital twin map, and returns when customer density decreases.

"The OmniScrub-R3 doesn't just clean our floors; it has become a positive brand statement. Customers are fascinated by its polite navigation, and our staff treats it like an essential member of the team." — Regional Store Director

3. Quantitative Performance & Experience Analysis

Aesthetics and Labor Breakdown

Store performance was tracked using daily visual gloss-meter consistency audits and customer exit-surveys regarding store environment quality.

Performance Indicator	Manual Overnight Baseline	123bots.com OmniScrub Fleet	Measured Impact / Variance
Aisle Gloss Consistency	58% variance across day	±4% variance (Constant)	High visual shine maintained
Spill Response Window	18.2 Minutes (Average)	3.4 Minutes (App-triggered)	-81.3% reduction in risk
Water & Chemical Waste	42 Gallons / 10k sq. ft.	6.3 Gallons / 10k sq. ft.	-85% via Eco-Filter recycling
Customer Service Hours	Restricted by maintenance	+62 Hours / week added	Direct increase in upsell metrics

Labor Optimization: Up-skilling the Frontline

Rather than reducing store headcount, the facility leveraged automation to close a critical labor gap. The 3,100 hours annually spent pushing manual floor scrubbers were reallocated to high-value, revenue-generating tasks like dedicated omnichannel fulfillment (BOPIS) and tailored high-margin clienteling.

4. Mathematical Verification of Retail Efficiency

To evaluate the true economic output of the retail cleaning automation, the Retail Experience Optimization Index (*REOI*) is modeled as follows:

$$REOI = \mu \times (A \times G_c) + \Delta H_s / (\beta \times L_m + C_{slip})$$

Where A is total square footage of high-traffic retail space, G_c is the gloss uniformity coefficient, ΔH_s is reallocated employee hours directly shifted to customer service, L_m represents management intervention hours required per day, C_{slip} is the financial risk exposure of floor hazards, and μ and β are environmental scaling constants.

Under the manual baseline, midday gloss degradation and high human overhead heavily depressed the performance coefficient. Under automation, human intervention hours dropped to an oversight baseline of just $L_m = 0.4$ hours per day for rapid tank rinsing, driving a 386% net improvement in the overall *REOI* framework.

5. Financial Return on Investment (ROI)

The total capital expenditure (CapEx) for procurement, spatial mapping, custom store-branding wraps, and point-of-sale software integration for the two OmniScrub-R3 units totaled \$64,000. Operating expenses (OpEx) covering preventive maintenance telemetry, software subscriptions, and consumables are locked at \$350/month per unit.

Fiscal Period	CapEx / OpEx Cash Outlay	Labor Reallocation Value	Net Economic Value
Year 0 (Launch)	-\$64,000	\$0	-\$64,000
Year 1	-\$8,400	\$79,500	\$71,100
Year 2	-\$8,400	\$79,500	\$71,100

Labor value is calculated based on a fully burdened retail associate rate of \$22.50/hour across reallocated floor-care schedules, combined with the complete elimination of nocturnal third-party contractor premiums. The simple payback timeline was achieved in exactly **10.8 months**.

6. Conclusion and Strategic Recommendations

The deployment of the 123bots.com autonomous floor care system at this flagship location proves that retail automation goes far beyond simple cost-cutting. By transforming facility maintenance from an intrusive, erratic chore into an ambient, highly optimized utility, the store lowered baseline operational overhead while simultaneously elevating the customer-facing retail environment.

Based on these undeniable outcomes, it is recommended to scale the 123bots.com platform to all Tier-1 and Tier-2 retail storefronts within the national portfolio ahead of the Q4 holiday shopping surge.