Inventory Operations Enhancement

- From Problem Diagnosis to Scalable Execution

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Agenda

- Executive Summary
- Problem Statement and Strategic Context
- How Data Analysis Informed the Business Analysis
- Current-State Insights & Data-Indicated Root Causes
- Solution Strategy
- KPI & Value Alignment – How Success Is Measured
- Why This Is a Realistic SMB Project

Executive Summary

- Objective: Eliminate execution gaps between physical inventory movement and system records.
- Process-Focused enhancement: Inbound, Putaway, Cycle Counting, Replenishment, and Order Picking.
- Approach: Targeted IMS enhancements, not system replacement.
- Outcome: Improved inventory accuracy and fulfillment reliability without system replacement.

Problem Statement & Strategic Context

- Execution Gaps: Delayed updates cause ATP overselling and unreliable availability
- Hidden Risk: SKU-level imbalances masked by stable aggregate KPIs
- Operational Drag: Frequent pick disruptions and reactive replenishment firefighting
- Strategic Need: System-directed workflows with clear exception thresholds.

How Data Analysis Informed the Business Analysis

Data Analysis provided Diagnostic Evidence for:

- Inventory accuracy risk through ATP overselling and delayed adjustments
- Demand volatility using ABC–XYZ to expose high-risk SKUs
- Uneven inventory distribution via coverage vs demand analysis
- Warehouse workload imbalance across fulfillment centers
- Supplier reliability as inbound risk context, not a system failure

Executive Inventory Snapshot (Category Context)

Where Inventory Value and Turnover Are Misaligned

Category-Level Inventory Performance Summary

Category	Inventory Turnover	Total Inventory Value	% SKUs Below ROP	% SKUs Oversold
Dairy	11.9	$82.9K	35.42%	
Frozen	11.5	$111.7K	25.58%	
Fresh Produce	11.5	$67.7K	24.55%	4.55%
Bakery	9.3	$76.0K	23.19%	5.80%
Beverages	3.0	$249.7K	22.50%	15.83%
Meat	10.1	$171.7K	14.94%	
Seafood	15.1	$115.3K	13.64%	
Pantry	2.6	$261.6K	9.49%	0.73%
Personal Care	4.0	$263.5K	7.14%	
Household	3.0	$179.4K	2.91%	

Expiry Risk Distribution Across Categories

Category	<=30 days	<=7 days	<=90 days	>90 days
Personal Care				$263,468.8
Beverages	$7,528.2	$2,074.5	$17,997.0	$219,141.8
Pantry	$1,186.0	$658.6	$23,218.7	$220,398.0
Household				$179,378.7
Frozen	$6,886.9	$1,596.8	$29,851.2	$69,195.7
Bakery				$26,828.1
Meat	$1,404.4	$18,170.2		
Fresh Produce				$14,436.3
Seafood		$3,659.6		
Dairy	$1,030.7	$620.0		

Key Observations

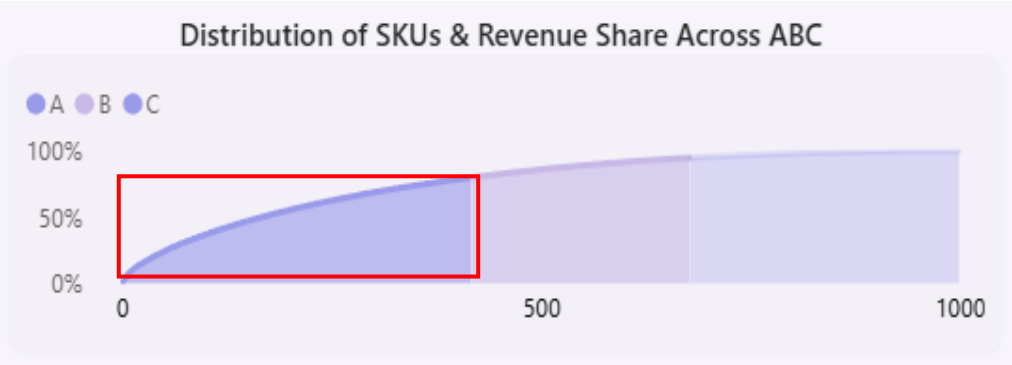
- Over 60% of inventory value is tied to long-expiry stock
- Slow-moving categories hold disproportionate inventory value and exhibit very low turnover, inflating Days of Inventory
- Perishables operate under tighter buffers.

Data-Indicated Root Causes

- MOQ (Minimum Order Quantity)-driven procurement
- Uniform replenishment logic applied across categories with vastly different shelf lives and demand velocity.

Demand Volatility, Revenue Concentration, & SKU Risk (ABC–XYZ)

Revenue Concentration Meets Volatility



Distribution of Total Revenue Across ABC/ XYZ

ABC	X	Y	Z
A	$250.01K	$3,494.29K	$795.09K
B	$219.00K	$434.32K	$197.11K
C		$230.58K	$54.43K

Distribution of Total Orders Across ABC/ XYZ

ABC	X	Y	Z
A	2.37K	45.80K	11.59K
B	8.32K	17.50K	6.66K
C		25.99K	4.56K

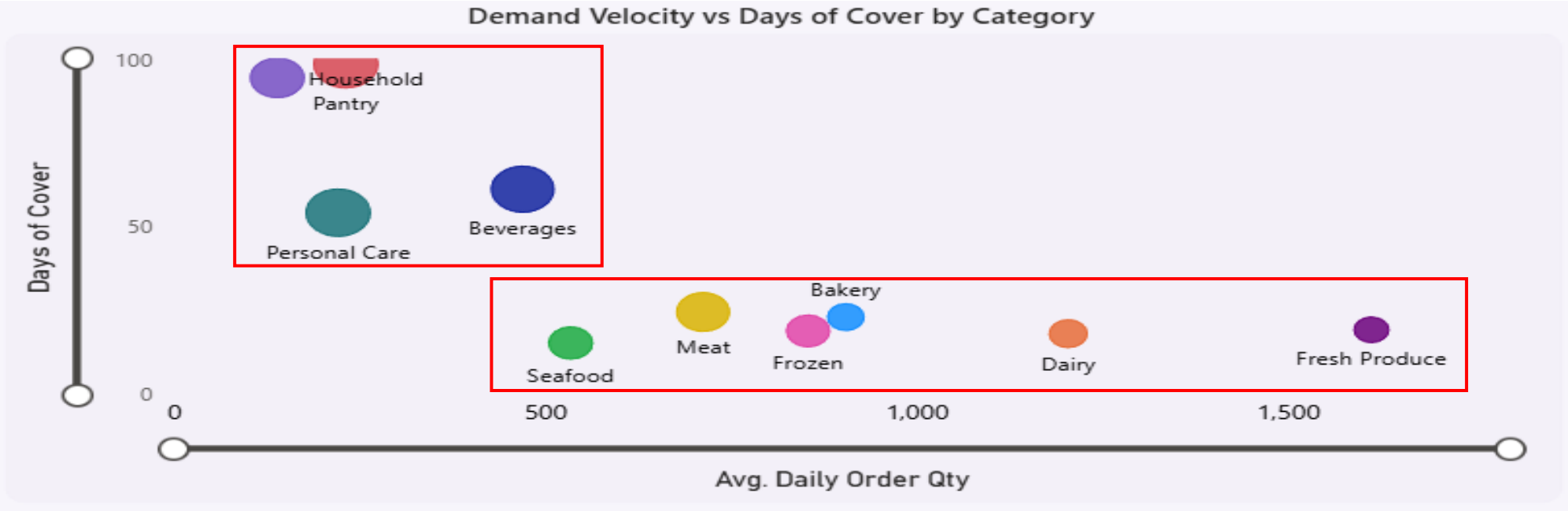
Key Observations

- Revenue concentrated across a large A-class SKU base
- A/Y and A/Z SKUs dominate both revenue and workload
- High volatility + high value creates execution risk (stockouts and overselling)
- C/X empty → low-value products rarely have stable demand, typical for e-grocery.

Data-Indicated Root Causes

- ABC–XYZ classification not operationalized
- No differentiated safeguards for high-risk SKUs.

Inventory Distribution, Velocity, & Replenishment Risk - 1



Key Observations

- Fast-moving categories have lower coverage.
- Slow movers carry excess stock.
- Coverage is not proportional to demand velocity.
- Stockouts and Overstocking Coexist

Data-Indicated Root Causes

- Purchase quantities driven by supplier constraints.
- Poor backstock-to-pick-zone translation.

Inventory Distribution, Velocity, & Replenishment Risk - 2

FIFO vs FEFO Value Comparison by Category

Category	FEFO	FIFO
Bakery	$25.7K	$50.3K
Beverages	$82.3K	$167.4K
Dairy	$48.9K	$34.0K
Fresh Produce	$26.6K	$41.1K
Frozen	$36.8K	$74.9K
Household	$65.6K	$113.8K
Meat	$104.4K	$67.3K
Pantry	$101.8K	$159.8K
Personal Care	$83.0K	$180.4K
Seafood	$62.6K	$52.7K

Key Observations

- Short shelf-life categories show FEFO leakage.
- Expiry risk is execution-driven, not demand-driven.

Data-Indicated Root Cause

- FEFO not enforced operationally

Warehouse Throughput & Network Imbalance

Throughput Is Uneven Across FCs

Distribution of Monthly Revenue Across Warehouses

Warehouse	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov
Scarborough	$154.55K	$272.62K	$130.14K	$167.52K	$280.96K	$229.37K	$121.11K	$151.19K	$135.57K
Mississauga	$145.64K	$286.08K	$230.68K	$149.86K	$215.65K	$170.05K	$62.33K	$203.80K	$178.88K
Vaughan	$101.57K	$199.86K	$206.51K	$232.18K	$138.28K	$111.96K	$86.85K	$162.21K	$87.50K
Brampton	$110.55K	$70.28K	$242.64K	$233.21K	$154.80K	$159.13K	$61.99K	$195.17K	$175.33K
Richmond Hill	$111.99K	$127.96K	$131.48K	$159.54K	$231.29K	$159.29K	$45.35K	$145.58K	$65.25K

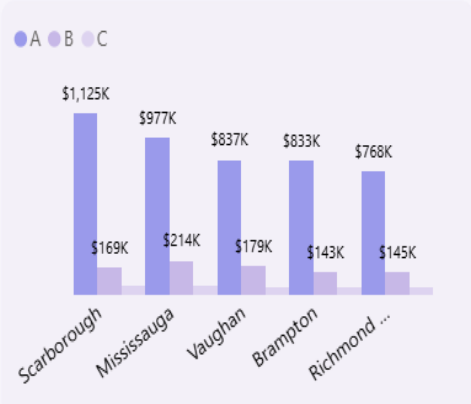
Distribution of Total Orders Across Warehouses & Categories

Warehouse	Bakery	Beverages	Dairy	Fresh Produce	Frozen	Household	Meat	Pantry	Personal Care	Seafood
Scarborough	1.88K	3.70K	2.19K	3.98K	2.86K	1.78K	2.19K	3.54K	3.56K	2.17K
Mississauga	2.12K	3.14K	2.66K	2.74K	2.32K	2.55K	2.58K	2.99K	4.22K	1.60K
Vaughan	1.57K	3.47K	2.30K	2.06K	2.11K	2.81K	2.52K	3.30K	2.61K	1.49K
Richmond Hill	1.70K	2.49K	2.22K	1.93K	2.26K	1.85K	2.83K	2.98K	2.75K	1.39K
Brampton	1.38K	2.18K	2.26K	2.34K	2.13K	2.20K	1.35K	2.67K	1.89K	3.00K

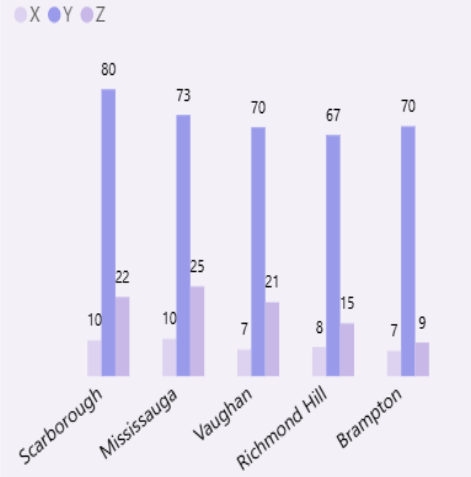
Distribution of Avg. Daily Orders Across Warehouses & Categories

Warehouse	Bakery	Beverages	Dairy	Fresh Produce	Frozen	Household	Meat	Pantry	Personal Care	Seafood
Scarborough	8	15	9	16	12	7	9	14	14	9
Mississauga	9	13	11	11	9	10	10	12	17	6
Vaughan	6	14	9	8	8	11	10	13	11	6
Richmond Hill	7	10	9	8	9	7	11	12	11	6
Brampton	6	9	9	9	9	9	5	11	8	12

ABC Distribution of Total Revenue



Avg. Daily Orders Demand Distribution



Key Observations

- Three FCs contribute over 70% of revenue and order volume, while others remain underutilized.
- Category mix varies significantly by FC, creating uneven operational load.

Data-Indicated Root Causes

- Inventory allocation does not align with geographic demand.
- Inbound scheduling and replenishment rules are FC-agnostic.
- No systematic inventory or workload balancing mechanism across warehouses.

Supplier Reliability as Inbound Risk Exposure - 1

Supplier Performance Matrix

Supplier	OTD %	Avg. Lead Time	Inv Turnover	Inventory Value
Pure Sip	79.2%	3.9	4.2	$116,204.0
Sunrise Bakes	75.9%	2.9	9.6	$45,130.5
The Golden Crust	74.5%	2.0	9.3	$30,869.2
Chill Zone Foods	74.3%	4.8	12.7	$71,543.3
Bountiful Baskets	73.0%	5.0	13.5	$29,580.7
Finest Catch	72.2%	2.0	9.4	$109,832.5
Deccan Elixir	70.0%	2.9	2.0	$133,466.5
Swachh Care	69.1%	2.0	3.8	$263,468.8
Home Harmony	68.2%	4.9	2.8	$179,378.7
Harvest Haven	66.7%	4.1	10.1	$38,074.2
Arctic Eats	63.2%	5.1	10.0	$40,162.3
Edible Emporium	63.0%	3.9	2.2	$90,445.0
Prakriti Dairy	60.3%	6.0	10.2	$32,249.7
Marine & Meadow	58.3%	5.0	14.0	$177,163.5
Grain & Gravy	52.5%	10.3	2.7	$171,156.1
Buttercup Creamery	46.8%	12.6	13.3	$50,663.8

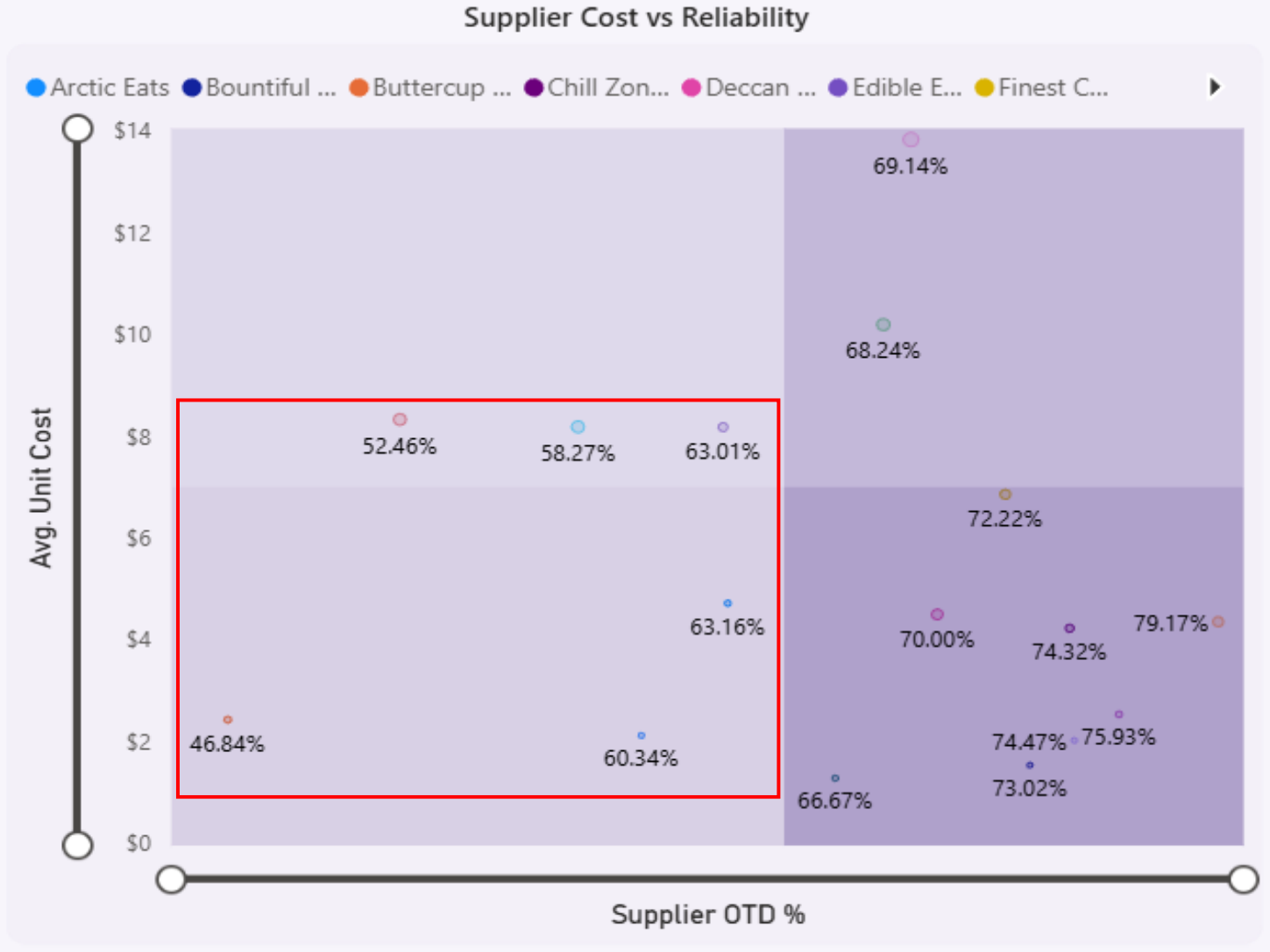
Key Observations

- Overall supplier OTD averages 66.7%, well below grocery benchmarks.

Data-Indicated Root Causes

- Limited feedback loop from operations to procurement.

Supplier Reliability as Inbound Risk Exposure - 2



Key Observation

- Several higher-cost suppliers deliver unreliably.

Data-Indicated Root Cause

- Supplier evaluation lacks multi-dimensional scoring.

Solution Approach (What Changed and Why)

Core Design Principles:

1. System-Directed (Execution), Not System-Replaced
2. Automated inventory updates at control points
3. Exception-Based Human Intervention
4. Single Version of Inventory Truth
5. Realistic Integration

KPI & Value Alignment – How Success Is Measured

Execution-Focused KPI Framework:

- KPIs are designed to measure execution discipline, not just inventory levels.
- Focus is on accuracy, availability, and operational stability.
- Supplier KPIs are monitored as risk context, not as controllable outcomes or improvement targets.

Inventory Accuracy & Availability	Replenishment & Stock Control	Risk & Loss Exposure	External Risk Context
Total Inventory Value Inventory Turnover (Annual) % SKUs Oversold (ATP < 0) Total ATP Quantity Days of Inventory & Days of Cover Median Sellable Coverage	% SKUs Below Reorder (ROP) % SKUs Below Safety Stock	Value Expiring < 30 Days Avg Unit Cost (contextual impact on inventory value risk)	On-Time Delivery % Avg Lead Time Supplier Concentration

Estimated Benefits & Expected Outcomes

- 6-Month Post-Implementation Outlook

1. Inventory Efficiency Improvements
   - Inventory Turnover: 6.5x → ~8.0x
   - Days of Inventory: 56 → ≤50 days
   - Median Sellable Coverage: 33 → ~30 days

2. Inventory Accuracy & Fulfillment Stability
   - % SKUs Oversold (ATP < 0): 2.9% → <1%
   - Fewer pick-time shortages and order disruptions

3. Replenishment Risk Reduction
   - % SKUs Below ROP: 17.3% → <10%
   - Earlier replenishment signals and fewer emergency interventions

4. Operational Impact
   - Reduced supervisor firefighting
   - More predictable warehouse flow under demand volatility

Why This Is a Realistic SMB Project

This initiative deliberately avoids overengineering:

- Supplier performance issues are observed and mitigated, not solved through sourcing changes
- Automation is rule-based, not AI-driven
- Integrations are lightweight, not real-time enterprise orchestration
- Improvements focus on execution discipline
- No organizational restructuring.

This makes the solution realistic, defensible, and achievable within MapleDash's operational context.