

TECH & AI CASE STUDY - WHOLESALE DISTRIBUTION - 2026

Inventory Optimization That Freed \$3.4M in Working Capital

Based on a delivery engagement with Bexley Industrial Supply

\$3.4M

WORKING CAPITAL RELEASED

96.2% to 98.1%

FILL RATE (A-CLASS)

-37%

A-CLASS STOCKOUTS

4.2 to 5.6

INVENTORY TURNS

A fillable practice edition: the full story, 8 actions,
6 reflections and a 90-day plan - work it with your team.

Free - no email required
emersontechnology.com

MAKE THIS PRACTICE BOOK YOURS

Work it, do not just read it

This practice book turns the Bexley Industrial Supply case study into a working session for your team. Read the full story first - what happened, what was built and what it changed. Then tick the 8 actions you can commit to, write short answers to the 6 reflections, and finish with a 90-day plan. Every field in this PDF is fillable: open it in Adobe Acrobat Reader, Chrome, Edge or macOS Preview, type directly into the boxes and save.

YOUR NAME	ROLE
COMPANY	TEAM / DEPARTMENT
DATE	EMAIL (OPTIONAL)

MY GOAL FOR THIS PRACTICE SESSION

- 01 The story** - What happened at Bexley Industrial Supply - before, during and after the project.
- 02 The results** - The numbers that changed, plus industry benchmarks from public research.
- 03 The 8-action checklist** - Tick boxes as your organization completes each step. Owner and date fields included.
- 04 The 6 reflections** - Fillable questions that pressure-test your own roadmap.
- 05 My 90-day plan** - Three fillable phase cards that turn this case study into your roadmap.

RUN IT AS A 90-MINUTE TEAM SESSION

25 min READ Read the story together. Ask everyone to note the one number that surprised them most.	40 min PRACTICE Work the 8-action checklist and the 6 reflections. Assign an owner and a date to every action you commit to.	25 min COMMIT Fill in the 90-day plan. One goal per phase, one number that tells you it worked. Book a review date before you leave the room.
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THE STORY

What happened, and why it worked

01 The Company

Bexley Industrial Supply is a wholesale distributor of industrial fasteners, tools, safety equipment and maintenance supplies, moving 48,000 SKUs through three regional distribution centers into 120 branches that serve contractors, manufacturers and facilities teams. The economics of the business are classic wholesale: thin gross margins, large order values, customers who punish a stockout by calling a competitor, and a working-capital base dominated by inventory sitting on shelves and warehouse pallets. At the start of this program, \$28M of the company's cash was tied up in inventory across the network.

Bexley had grown through acquisitions of smaller distributors, which is how a company ends up with 120 branches running 120 slightly different versions of the same job. The branch network was the company's competitive asset — local stock, local relationships, same-day availability — and, as it turned out, also the place where its biggest untapped financial win was hiding.

02 Where Things Stood

Inventory was managed branch by branch with flat safety-stock rules: essentially the same policy applied to a fast-moving fastener and a slow-moving specialty tool, with no visibility of what the distribution centers held or what other branches needed. The result was chronic imbalance. Branches starved for A-class fast movers while slow-moving stock occupied shelf space nobody wanted, and the distribution centers absorbed the surplus of both. Stockouts on A-class items ran at 11% of order lines — a figure that translated directly into lost orders and irritated contractors.

The workarounds were costing real money. When a branch ran short, sales routinely rescued the order by driving vans between branches — genuinely good service, delivered at invisible cost in fuel, driver hours and double handling. Expedited freight from suppliers added \$410K a year as branches paid to compensate for positioning they had gotten wrong weeks earlier. Meanwhile, finance and sales were locked in a permanent standoff: finance wanted inventory down to free working capital, sales wanted availability up to win orders, and each side arrived at leadership meetings with a spreadsheet proving its point. Supply-chain practitioners using ASCM guidance commonly estimate annual carrying costs at 15-30% of inventory value — at Bexley's scale, the difference between a good and bad inventory position was measured in millions every year.

03 The Challenge

The challenge was structural: 123 locations were each optimizing themselves in isolation, and no process anywhere could see the network as one system. A branch that over-ordered to protect its own service was doing exactly what its incentives told it to do; the cost simply appeared somewhere else, in the DC, in the expedite budget or in the other branch's stockout. Flat safety-stock rules made it worse because they ignored the two variables that actually matter — how fast an item moves and how erratic its demand is — so the same policy silently overstocked stable items and understocked volatile ones.

The political challenge was as real as the mathematical one. Branch managers owned service levels and knew their customers intimately; every previous corporate attempt to "rationalize inventory" had read, to them, as a plan to strip their shelves and leave them exposed. Any solution had to prove, on Bexley's own data and in their own branches, that service would improve — not merely survive. Gartner's research on multi-echelon inventory optimization reports typical safety-stock reductions of 10-25% at equal or better service levels, which made the destination credible; the program's job was to make it believable in a branch manager's office, one simulated number at a time.

04 Discovery and Diagnosis

Emerson Technology began with a six-week network diagnostic. The team reconstructed 24 months of order history at SKU-location level, cleaned the item master, and classified every SKU by velocity and value in an ABC-XYZ segmentation — the standard lens that reveals where flat rules fail hardest. The segmentation quantified the imbalance precisely: fast-moving A-class items were understocked in a majority of branches while the same items sat in surplus at the distribution centers, and the long tail was overstocked almost everywhere, with some items showing no movement in over a year.

The demand analysis then examined how each segment behaved. Gradient-boosted forecasts would later capture seasonality and order-size effects, but the diagnostic already showed the pattern: A-class fastener demand was high-volume and comparatively predictable, safety-item demand spiked with local project cycles, and long-tail specialty demand was erratic in ways no single-echelon rule could handle. A simulation of the existing policy against its own 24-month history reproduced the observed 11% A-class stockout rate and the expedite spend almost exactly — which was the moment the model earned credibility, because it had recreated reality before being asked to change it. The diagnosis ended with a clear thesis: pool variability upstream at the DCs, position safety stock deliberately across two echelons, and manage the exception queue weekly — the network, not the branch, is the unit of optimization.

05 The Solution

Emerson Technology built a multi-echelon inventory optimization capability in Python that treats the network as one system rather than 123 independent stockpiles. The design has three layers.

Forecasting at SKU-location level

Demand is forecast for every SKU in every location using gradient-boosted models that capture seasonality, local project patterns and order-size effects. Forecast quality was deliberately invested in before optimization began, because a repositioning model fed by naive averages would have simply redistributed error around the network. The forecasts feed the optimizer weekly, so policy responds to demand shifts within days of them appearing rather than at the next quarterly review.

Safety stock positioned across two echelons

The core of the system is a two-echelon optimizer that simulates service levels and cost trade-offs across the network: the distribution centers pool variability so branches can carry less, while each branch's stocking policy reflects its own demand profile and replenishment lead time. Reorder points and order quantities are generated as ERP-ready outputs on a fixed weekly cadence in Airflow — the parameters flow straight into the ERP rather than into a spreadsheet, because optimization that ends in a spreadsheet decays within weeks. Before any parameter went live, the team backtested the proposed policies against the full 24 months of history, showing projected service impacts per branch — and it was those simulations, showing each branch manager its own availability numbers improving, that converted the loudest skeptics into sponsors.

A weekly operating rhythm for humans

The optimizer does the arithmetic; people govern the exceptions. Procurement works through a Power BI planner view with an exception queue of flagged items — new SKUs, demand breaks, supplier disruptions — and each item is approved, overridden or deferred, with every decision fed back to retrain the model. Buyers review a few hundred exceptions a week instead of pretending to review 48,000 SKUs. Service and capital are reported together on one monthly page — fill rate next to inventory value — because optimizing either metric alone produces exactly the imbalance the program set out to escape.

06 The First 90 Days

Weeks one and two covered data foundation work: reconstructing the 24-month order history at SKU-location grain, cleaning the item master, and completing the ABC-XYZ segmentation. Weeks three through six built the forecasting layer and ran the diagnostic simulation that reproduced current performance — the credibility milestone. Weeks seven through ten ran a pilot across twelve branches in one region, chosen because its branch managers were the most vocal doubters. The pilot compared simulated policies against actual outcomes week by week: pilot branches saw availability on A-class items improve within the first replenishment cycles while their total inventory value held flat or fell, and the weekly exception reviews kept buyers in control of every change reaching the ERP.

Weeks eleven and twelve extended parameter rollout across the remaining regions in waves, with each branch manager receiving a one-page preview of their own simulated numbers before cutover — what would improve, what would move, what would not change. The previews were honest about trade-offs: some slow movers would be consolidated upstream, and branches would rely on faster inter-DC replenishment instead of local pallets. Two feedback channels made the rollout stick: a daily issue log during the first month of each wave, and the weekly exception review where buyers could defer any parameter they did not yet trust. By the end of the quarter the optimizer was live network-wide, and the rescue-trip count — tracked quietly by the operations team — had already started to fall.

07 The Results

Within three quarters, the network released \$3.4M of working capital from inventory while fill rate on A-class items rose from 96.2% to 98.1% — the combination finance and sales had each insisted was impossible without hurting the other. Stockouts on those A-class items fell 37%, expediting fees dropped 41%, and inter-branch rescue trips fell by half as positioning improved. Inventory turns moved from 4.2 to 5.6 without a single service-level trade-off. Branch managers, initially the loudest skeptics, became the program's reference cases after their own availability improved.

METRIC	BEFORE	AFTER
Working capital released	-	\$3.4M
Fill rate (A-class)	96.2%	98.1%
A-class stockouts	11% of order lines	-37%
Inventory turns	4.2	5.6

The changes compounded operationally. The van-rescue culture did not disappear — branches still help each other — but it became a rare tool instead of a daily habit, and its cost is now visible in the operations review. The finance-versus-sales argument ended because both sides read the same monthly page: McKinsey's research that AI-enabled supply-chain management has helped early adopters reduce inventory by up to 35% while improving service levels now reads less like a benchmark and more like a roadmap Bexley is partway along.

08 What Your Business Should Do

The mechanics behind Bexley's \$3.4M are available to any multi-location distributor, and the order of operations matters. Model the network as one system before you touch a single reorder point: branch-by-branch rules cannot see pooling effects between echelons, and that blindness is where most distributors over-stock everywhere because no model ever said where the stock should live. Segment SKUs by velocity and value with an ABC-XYZ classification, because fast-moving A-class items, erratic long-tail products and seasonal goods each need fundamentally different stocking policies. Then position safety stock at the right echelon — pool variability upstream at the DCs and keep branches lean on fast replenishment — rather than letting each location protect itself in isolation.

Prove the policy before you deploy it. Backtest against 24 months of your own history and simulate any new rule against real demand and service outcomes before go-live; proof on your own data is what converts skeptical operators into sponsors. Push the resulting parameters straight into the ERP on a fixed weekly cadence — optimization that ends in a spreadsheet decays within weeks — and run a weekly exception review so buyers approve, override or defer flagged items rather than reviewing all 48,000 SKUs. Measure service and capital together on one monthly page, because tracking fill rate and inventory value in separate reports simply re-creates the finance-versus-sales standoff under a new name. And win over your branch managers early: show each one their own simulated availability numbers before cutover, because frontline buy-in, not raw model accuracy, determines whether new parameters stick.

Then interrogate your own network with the questions this program answered: how much of your working capital sits in stock nobody has ordered this quarter; do you know your true carrying cost per SKU including space, insurance and obsolescence; which branches are starving for fast movers while your DCs hold the same items in surplus; when finance and sales argue about inventory, whose spreadsheet wins and what does that argument cost you annually. With carrying costs commonly estimated at 15-30% of inventory value per year, the prize is larger than most operators assume — and Gartner's finding that multi-echelon optimization typically cuts safety stock 10-25% at equal or better service means you do not have to choose between cash and availability. Work through the eight actions above with your supply-chain and finance teams together, and revisit the reflection questions in this practice book each quarter to keep the network honest.

REAL-WORLD PROOF & BENCHMARKS

McKinsey research reports that AI-enabled supply-chain management has helped early adopters reduce inventory levels by up to 35% while improving service levels. - McKinsey & Company

Supply-chain practitioners commonly estimate annual inventory carrying costs at 15-30% of inventory value per year, covering capital, storage, insurance and obsolescence. - ASCM (APICS) guidance

Industry analyses of multi-echelon inventory optimization report typical safety-stock reductions of 10-25% at equal or better service levels versus single-echelon policies. - Gartner research

THE PRACTICE PAGES

The 8-action checklist

Work through the list with your team. Tick each box as your organization completes the step, and fill in an owner and a target date so every action has a name and a deadline.

☐
1. Model the network as one system

Branch-by-branch rules cannot see pooling effects between echelons. Treat your DCs and branches as one connected system before you touch a single reorder point anywhere.

OWNER

TARGET DATE

STATUS

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☐
2. Segment SKUs by velocity and value

ABC-XYZ classification reveals where flat rules fail hardest. Fast-moving A-class items, erratic long-tail products and seasonal goods each need fundamentally different stocking policies in daily practice.

OWNER

TARGET DATE

STATUS

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☐
3. Backtest against 24 months of history

Simulate any new policy against real demand and service history before any go-live. Proof on your own data is what converts skeptical operators into sponsors.

OWNER

TARGET DATE

STATUS

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☐
4. Position safety stock at the right echelon

Pool variability upstream at DCs and keep branches lean on fast replenishment. Most distributors over-stock everywhere because no model ever said where stock should live.

OWNER

TARGET DATE

STATUS

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☐
5. Push parameters straight into the ERP

Optimization that ends in a spreadsheet decays within weeks. Generate reorder points and order quantities as ERP-ready outputs on a fixed weekly cadence, exceptions only for humans.

OWNER

TARGET DATE

STATUS

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☐

6. Run a weekly exception review

Buyers should approve, override or defer flagged items — not review all 48,000 SKUs. Exception queues make optimization governance fast enough to actually happen weekly.

OWNER

TARGET DATE

STATUS

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☐

7. Measure service and capital together

Track fill rate and inventory value on the same page every month. Optimizing either metric alone produces exactly the imbalance you are trying to escape.

OWNER

TARGET DATE

STATUS

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☐

8. Win over branch managers early

Show each branch manager their own simulated availability numbers before cutover. Frontline buy-in, not raw model accuracy, is what determines whether the new parameters actually stick.

OWNER

TARGET DATE

STATUS

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AFTER THE CHECKLIST: OUR TOP 3 PRIORITIES

From the eight actions above, write down the three you will start first - and the single number you expect each one to move. Three priorities with owners beat eight without any.

PRIORITY 1 NUMBER IT SHOULD MOVE	PRIORITY 2 NUMBER IT SHOULD MOVE	PRIORITY 3 NUMBER IT SHOULD MOVE
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THE PRACTICE PAGES

Reflections for your team

Use these questions in your next planning session and type short answers into the boxes. The gaps you find are usually the fastest wins.

Q1. How much of your working capital is tied up in stock nobody has ordered this quarter?

Q2. Do you know your true carrying cost per SKU, including space, insurance and obsolescence?

Q3. Which branches are starving for fast movers while your DCs hold the same items in surplus?

Q4. What does an expedited order actually cost you once fees, freight and discounts are counted?

Q5. When finance and sales argue about inventory, whose spreadsheet wins — and what does it cost you?

Q6. Could you simulate a policy change against your own history before committing to it?

THE PRACTICE PAGES

My 90-day plan

Finish the session by committing to a plan. Three phases, one goal each, one number that tells you it worked. Bring this page to your next leadership review - or to a free consultation with Emerson Technology, and we will pressure-test it with you.

Days 1-30 Focus: audit and alignment

PRIMARY GOAL

KEY ACTIONS

HOW WE MEASURE SUCCESS

OWNER

Days 31-60 Focus: build and prove

PRIMARY GOAL

KEY ACTIONS

HOW WE MEASURE SUCCESS

OWNER

Days 61-90 Focus: scale and measure

PRIMARY GOAL

KEY ACTIONS

HOW WE MEASURE SUCCESS

OWNER

Tip: save a copy per team so each group keeps its own answers. Revisit the reflections every quarter - the questions stay the same even as the numbers move.

BOOK THE REVIEW BEFORE YOU CLOSE THE BOOK

Plans without a review date drift. Before you close this practice book, agree on when you will come back to these pages, who will run that session, and when you will check the numbers again. If you want an outside pair of eyes, bring this page to a free consultation with Emerson Technology and we will pressure-test the plan with you.

REVIEW DATE	REVIEWED BY	NEXT CHECK-IN
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Ready for a transformation like Bexley Industrial Supply's?

Emerson Technology designs and builds the data, AI, cloud and automation systems behind results like these. On a free consultation call we will map this exact playbook to your business - your data, your constraints, your numbers.

Book a free consultation

support@emersontechnology.com

or start online: emersontechnology.com/contact