Inventory, Service and Working Capital Assessment

Reference-anchored prompt

Using the ten supplied inventory workbooks, reconcile SKU, distribution-center, demand, inventory and purchasing records before analysis. Apply ABC inventory segmentation, forecast bias and weighted absolute percentage error, continuous-review (Q,R) control, periodic-review order-up-to control, Economic Order Quantity, risk pooling, Sales and Operations Planning, and IAS 2 net realisable value principles. Explain why excess inventory and shortages coexist; quantify service and contribution exposure, inventory requirements, purchasing commitments and recoverability. Distinguish observed facts, diagnostic benchmarks and conditional scenarios. Preserve legitimate service stock and lifecycle commitments; do not infer an optimized inventory target, realizable cash savings or lost sales where the required evidence is absent. Recommend specific cross-functional actions in compressed executive tables.

1. Executive verdict and evidence readiness

The business has an inventory mix and replenishment problem. A blanket reduction would worsen service; blanket buying would deepen excess. Opposing demand shifts, large purchase lots, supplier disruption and regional demand changes explain the pattern better than the portfolio total.

The evidence is sufficient for diagnosis and prioritization, but not for an optimized inventory budget. Seven SKU-level tables each contain 120 unique SKUs; the purchasing file contains 96 PO lines, and supplier performance covers 18 suppliers. Inventory availability, September demand, fulfillment and network totals reconcile. PO commitments reconcile to open quantities multiplied by PO cost. Management observations support the exceptions identified below. [S1-S10]

Portfolio measure	Computed result
On-hand inventory	38,203 units; **$8.845m** at ledger cost
Available / committed inventory	33,612 / 4,591 units
Open purchasing commitments	33,506 units; **$7.857m** at PO cost
Stock plus open purchasing exposure	**$16.702m**; excludes unreported freight and other costs
September requested / fulfilled / backordered	29,475 / 27,940 / 1,535 units
September unit fill rate	**94.79%**
Backordered revenue / contribution exposure	**$553,669 / $169,338** at current unit economics
Annual carrying burden on current stock	**$1.828m**, using supplied SKU-specific rates
April-to-September demand change	**-2.80%**

Backorders are unfulfilled demand, not demonstrated lost sales. Contribution equals selling price less unit cost and variable freight/handling; it excludes fixed costs and unreported expedite charges. Carrying burden is an economic estimate, not necessarily avoidable cash expense.

Material limits: the inventory/PO extract has no explicit common as-of date; dated notes extend through September 26. Results describe the supplied snapshot, not verified October 13 balances. In 37 records, the named highest-demand DC differs from the primary DC despite a lower reported demand quantity; specific destination rankings require correction. Only one inventory row per SKU is supplied, so DC-level stock availability cannot be reconstructed. Daily demand, receipt histories, age-bucket quantities, cancellation terms and the definition of target service level are missing. These gaps limit optimization and execution sizing, rather than the supported diagnosis.

2. Why money and shortages coexist

Aggregate forecast accuracy conceals damaging errors in opposite directions. September net overforecast was only 0.98%, but SKU-level weighted absolute error increased from 3.92% in July to 7.06% in September. Forecasts remain too high on declining products and too low on growth products. [S3, S6-S10]

Exception group	SKUs	September forecast bias	Unit fill rate	Backorders
Commercial promotion / account win	6	-21.65%	71.95%	460
Demand acceleration	2	-21.70%	88.00%	130
Regional mix shift	3	-5.85%	79.01%	208
Supplier constraint	3	+1.98%	84.15%	104
Demand softening	6	+42.36%	97.60%	22
Planned phase-out	3	+42.59%	98.56%	10
Program reduction	2	+42.71%	97.04%	14

Bias is (forecast minus actual) / actual; negative means underforecast. Weighted absolute percentage error is the sum of absolute SKU errors divided by total actual demand.

The first four groups represent **14 SKUs, 902 backorders (58.76% of all backorders), and $125,826 of contribution exposure**. Conversely, demand-softening, phase-out and program-reduction demand has fallen about 48% since April, while stock and purchasing remain substantial.

Supplier delays and placement compound planning errors. SUP-03 reports 78.6% fill, 71.4% on-time delivery and an actual average lead time 24 days above contract; SUP-14 reports 83.2%, 76.8% and an 18-day gap. The three specifically constrained SKUs carry $498,649 of delayed POs, with promised dates pushed back 18-32 days. These are average lead-time overruns, not statistical lead-time variance. [S5, S9]

For regional-mix SKUs, 70.94% of demand is outside the primary stocking DC. Yet available coverage is only 2.13, 2.64 and 5.69 days for SKU-039, SKU-074 and SKU-112. Transfers may help placement, but the data do not establish adequate spare network stock. Across the portfolio, cross-DC shipments supplied 36.95% of fulfilled units; 37 transfer requests remain open. [S2]

3. Where capital is trapped

Fifteen SKUs exposed to declining demand, phase-out, reduced customer programs or changed MOQs hold $3.173m of stock and $1.846m of open POs. Those balances are review exposure, not entirely removable inventory. [S1, S4-S8]

A conservative screening quantity is max[available units - September daily demand x (planning lead time + review cycle) - existing safety stock, 0]. Daily demand is September requested units / 30. This deliberately retains a full lead-plus-review allowance even for continuous-review items; it is a generous diagnostic screen, not an optimized holding policy.

Capital-trap group	On-hand value	Open PO value	Stock above conservative screen
Demand softening	$1.062m	$0.405m	$0.286m
Planned phase-out	$0.860m	$0.262m	$0.438m
Program reduction	$0.476m	$0.478m	$0.131m
Supplier pack / MOQ change	$0.775m	$0.700m	$0.179m
Other screened stock	—	—	$0.001m
Screened stock total, 12 SKUs	—	—	**$1.036m**

The screened stock represents **11.71% of total inventory book value** and approximately **$222,912 annual carrying burden**. Conditional disposition using supplied recovery percentages, less supplied disposition-cost percentages, yields approximately **$608,276 net proceeds** and **$427,460 below-book-value exposure**. This assumes recovery percentages are gross proceeds and disposition costs are additional; confirm before approval. It is not a sales offer, booked impairment or guaranteed cash release. Markdown, recovery and write-down estimates must not be added together as independent losses.

Additional traps require different remedies:

Issue	Quantified evidence	Executive implication
MOQ-driven accumulation	MOQ is 600 units on each of SKU-022/055/088/109; equivalent to 63/212/72/200 demand days	Negotiate smaller releases, scheduled deliveries or supplier-held stock; do not merely lower reorder points
Phase-out pipeline	$860,136 stock plus $262,182 POs; all three phase-out dates are December 30	Review every receipt against remaining demand and replacement-product plans
Weak promotional economics	SKU-058/104: 8.82% contribution margin; $20,772 September contribution versus $9,340 monthly carrying burden	Reassess price, purchasing and promotion economics before chasing unit volume
Aging signal	Nine SKUs with oldest stock at least 180 days hold $1.849m	Obtain lot-level aging; this is the value of flagged SKUs, not proof that every unit is aged

A conditional phase-out scenario illustrates the risk: if the available-plus-open position enters Q4 unchanged, all open units arrive, and Q4 demand equals the supplied forecast, residual stock is **1,962 units / $490,231 at ledger cost**. At September demand sustained for three months, residual value increases to **$642,716**. These are alternative scenarios, not additions to the $1.036m screen. Snapshot timing and receipt feasibility require confirmation.

4. How much inventory is actually needed

The evidence supports SKU-specific protection levels, but cannot substantiate one optimal dollar target. Inventory position, reorder triggers and average physical inventory are different measures. Lead-time demand mainly determines the protection position; order size and safety stock determine average on-hand requirements. [S1, S4-S6, S9]

For diagnosis, retain supplied safety stock and use September requested demand: continuous-review trigger = daily demand x lead time + safety stock; periodic-review target = daily demand x (lead time + review cycle) + safety stock. The examples below compare periodic-review targets with available stock plus all open POs. They assume open receipts are usable and do not separately subtract backlog because overlap with committed units is unknown.

Periodic-review SKU	Available coverage	Lead + review	Current available + open units	Diagnostic protection target
SKU-116	0.37 days	73 days	353	1,008 units
SKU-101	0.79 days	32 days	259	420 units
SKU-065	4.60 days	96 days	363	1,914 units

These gaps are review triggers, not immediate purchase authorizations. Time-phase confirmed receipts against demand before ordering; delayed supply cannot protect service merely because it is included in inventory position.

The supplied safety-stock settings total **18,580 units / $4.268m**, but their statistical adequacy cannot be validated. SKU-013/049/083 have 120-day planning lead times and 99% stated service targets: elevated coverage is legitimate policy context, not evidence of excess by itself. Their 60.6/85.7/60.5 on-hand days also do not prove sufficient protection.

Before approving an inventory budget, establish daily forecast-error and lead-time distributions, cycle-service versus unit-fill objectives, actual replenishment lots, order costs, receipt dates and DC demand/stock positions. Use these to calibrate safety stock and order-up-to levels. EOQ cannot be computed defensibly without ordering costs. Neither a universal days-of-stock target nor a uniform percentage reduction is justified.

5. Decisions and execution priorities

Protect profitable shortage items while stopping the replenishment of demonstrable excess. SKU-116, SKU-008, SKU-101 and SKU-043 alone represent **$88,381**, or **52.19%**, of September backordered contribution exposure. Prioritize customer-critical demand alongside that economic ranking. [S3-S10]

Priority	Action and owner	Approval or completion condition
Immediate service protection	Planning/Sales: refresh the eight growth-product forecasts; Procurement: confirm receipts and qualified alternatives for constrained supply	Expedite only where incremental cost is justified by protected contribution or documented account risk
Immediate capital control	Procurement/Finance: review $1.146m of POs on softening, phase-out and reduced-program SKUs; review $0.700m on MOQ-exception SKUs separately	Confirm contract rights, cancellation charges, customer commitments and remaining demand before changing POs
Placement repair	Distribution: validate destination rankings and donor stock for SKU-039/074/112; resolve transfer queues	Donor service remains protected; transfer arrival beats the shortage need date
Parameter repair	Planning: prioritize changed-demand and supplier-risk SKUs; 74 parameters have not been reviewed for over 90 days	Approved demand, lead time, lot size and defined service objective drive each reset
Excess realization	Finance/Commercial: validate the 12 screened SKUs, then choose sell-through, return, redeployment or disposition	Compare net proceeds, carrying burden and remaining contribution; book valuation adjustments under applicable accounting rules
Operating governance	Supply Chain/Finance/Sales: establish monthly S&OP with weekly exceptions	Track fill, backlog contribution, directional forecast bias, overdue receipts, excess, MOQ coverage and action ownership together

6. Cross-framework verdict

The models converge on differentiated inventory control and coordinated commercial, purchasing and distribution decisions. They support a strong diagnosis, but not an exact optimization result.

Recognized framework or model	Contribution and limit
ABC inventory segmentation	Prioritizes economic/service importance; supplied A/B/C service classes are not a recalculated ABC value ranking
Forecast bias and weighted absolute percentage error	Exposes offsetting underforecast and overforecast hidden by aggregate totals
Continuous-review (Q,R) model	Separates the reorder trigger from physical stock; requires calibrated uncertainty and order quantity
Periodic-review order-up-to model	Protects demand over lead time plus review interval; receipt timing remains essential

Recognized framework or model	Contribution and limit
Economic Order Quantity	Explains purchase-lot/carrying tradeoffs; missing order costs prevent an optimal lot calculation
Risk pooling and multi-echelon inventory control	Tests placement and shared protection; no defensible pooling savings without DC variability, correlations and transfer economics
Sales and Operations Planning	Reconciles commercial changes, supply constraints and capital decisions through one approved plan
IAS 2: lower of cost and net realisable value	Separates stock value from realizable recovery; accounting applicability and realizable selling costs must be confirmed

Authoritative references: MIT OpenCourseWare, *Inventory Management* and *Introduction to Stochastic Inventory Models and Supply Contracts*, support replenishment and risk-pooling models; MIT's *Inventory* lectures cover EOQ and inventory position. ASCM supports segmentation, forecast bias and S&OP. The IFRS Foundation specifies IAS 2 valuation principles.

Source register

S1. 505 - Inventory Position Ledger (Inventory Positions)(4).xlsx — Inventory Position Ledger, 120 SKU rows.

S2. 505 - Network Allocation Report (Network Allocation)(4).xlsx — Network Allocation, 120 SKU rows.

S3. 505 - Sales & Demand History (Historical Demand)(4).xlsx — Sales & Demand History, 120 SKU rows.

S4. 505 - Product Economics & Valuation (Product Economics)(4).xlsx — Product Economics, 120 SKU rows.

S5. 505 - Open Purchase Orders (Purchasing)(4).xlsx — Open Purchase Orders, 96 PO rows.

S6. 505 - Replenishment Parameters (Replenishment)(4).xlsx — Replenishment Parameters, 120 SKU rows.

S7. 505 - Product Lifecycle & Commercial Events (Product Lifecycle)(4).xlsx — Lifecycle & Commercial Events, 120 SKU rows.

S8. 505 - Forecast vs. Actual Demand (Forecast Performance)(4).xlsx — Forecast vs Actual, 120 SKU rows.

S9. 505 - Supplier Performance (Supplier Performance)(4).xlsx — Supplier Performance, 18 supplier rows.

S10. 505 - Management Operating Notes (Operating Context)(4).xlsx — Management Operating Notes, 44 dated notes.