Inventory Optimization Case Study: RawMat Industries

Executive Summary

This concept study demonstrates our inventory optimization approach for a hypothetical mid-sized manufacturing company producing multiple distinct product lines. The scenario involves a manufacturer facing challenges with six key raw materials subject to price fluctuations, budget constraints, warehouse capacity limitations, and specific inventory requirements.

Through our proposed solution, a company in this situation could potentially achieve [1]:

- **15-20%** reduction in raw material acquisition costs
- **20-25%** decrease in inventory holding costs
- **10-15%** improvement in production efficiency
- **20-25%** warehouse space optimization
- Maintenance of **99%+** service levels

Common Challenges in Manufacturing Inventory

- Cost management: Balancing acquisition vs. Holding costs
- Price Volatility: Timing purchases to avoid market fluctuations
- Budget Constraints: Adhering to fixed procurement cycles
- Storage Limitations: Optimizing warehouse space
- Production Continuity: Avoiding stockouts and overstocking

Typical Constraints

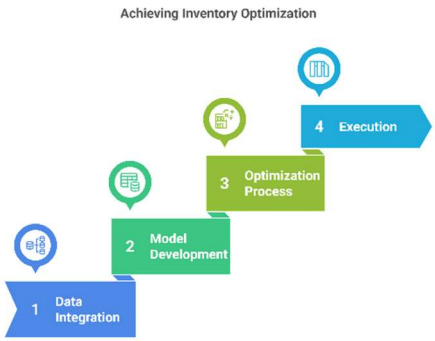
- Budget: Fixed annual + quarterly allocations
- Warehouse Capacity: Limited space
- Minimum Inventory: Safety stock requirements
- Price Volatility: Market and seasonal shifts
- Product Demand: Irregular SKU-level demand

CLEARMIND-ANALYTICS
Clarity And Impact

Supply Chain Solution: inventory optimization

Solution Approach

Our solution uses advanced mathematical optimization to help manufacturers determine the optimal raw material acquisition strategy, reduce inventory costs, balance storage constraints, and maintain production continuity — all within budget.



1- Data integration and preparation

- Collection and validation of historical price data
- Analysis of product-material requirements matrix
- Incorporation of demand forecasts and production schedules
- Assessment of storage constraints and holding costs

2- Mathematical Model

- Goal: Minimize total cost (acquisition + holding – salvage)
- Decisions: Monthly purchase quantities per materials
- Constraints: Budget, space, and stock level constraints

3- Optimization Process

- Monthly rolling horizon
- Demand scenario testing
- Sensitivity analysis for price changes

4- Implementation and execution

- Rolling monthly horizon with quarterly review
- Scenario analysis for demand variation
- Sensitivity testing for price volatility

Strategic Benefits Grid

Component	What We Deliver
Data Integration	Accurate inputs for optimized decisions
Modeling & Optimization	Smart algorithms that reduce cost and risk
Scenario Planning	Flexible, resilient planning in uncertain environments
Execution & Monitoring	Fast deployment, continuous improvement, measurable

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Sample Optimization Output (see demo)

Price Forecast: Raw Material 4

Purchase Plan: Raw Material 4

Combined View: Raw Material 4

Month	Price Forecast	Optimal Purchase Quantity	Ending Inventory	Budget Utilized
Jan	$4.25/unit	12,500 units	14,200 units	$53,125
Feb	$4.40/unit	8,000 units	13,700 units	$35,200
Mar	$4.15/unit	15,000 units	17,200 units	$62,250
Apr	$3.90/unit	18,500 units	20,100 units	$72,150
May	$3.85/unit	19,000 units	21,500 units	$73,150
Jun	$4.10/unit	10,000 units	16,200 units	$41,000
Jul	$4.30/unit	7,500 units	12,100 units	$32,250
Aug	$4.45/unit	6,000 units	10,500 units	$26,700
Sep	$4.50/unit	5,500 units	9,200 units	$24,750
Oct	$4.35/unit	11,000 units	11,800 units	$47,850
Nov	$4.20/unit	14,000 units	14,500 units	$58,800
Dec	$4.30/unit	9,000 units	12,000 units	$38,700

This table on the left shows a simplified example of what optimization results might look like for one raw material across a 12-month planning horizon