



Forecast Accuracy Myopia & the Need to Heed Inventory Optimization

**Empirical Approaches to Prioritizing
Enterprise Process Improvements**

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AT THE GARTNER SUPPLY CHAIN EXECUTIVE SUMMIT

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Theater Topic Inspiration

- Thorough Assessment of Received RFI/RFP Constructs and Observations of Engaged Organization Priorities
- Realizations Following Significant Number of Empirical Study Results Quantifying Demand Planning and Inventory Optimization
- Burgeoning Marketplace Awareness of Forecast Accuracy Myopia (such as the following Paul Lord blog)

The screenshot shows a Gartner blog post. At the top, the Gartner logo is on the left, and navigation links for 'WHY GARTNER', 'ANALYSTS', 'RESEARCH', 'EVENTS', 'CONSULTING', and 'ABOUT' are in the center. A search bar is on the right. Below the navigation is a blue header for 'Gartner Blog Network'. The author's name 'Paul Lord' is displayed in orange, with the text 'A member of the Gartner Blog Network' below it. A 'Become a Client' sidebar is on the right. The main content area features a 'Back to GBN Home' link, social media sharing buttons (Like, Tweet, Share, G+, 1), and the article title 'Demand forecast error NEVER WAS the biggest driver of inventory' in blue. The author 'Paul Lord' and date 'December 7, 2015 | 11 Comments' are listed below the title. The first paragraph is highlighted with a red box: 'Some have recently expressed surprise to learn that demand forecast error (DFE) might not be the significant driver of inventory they previously thought. After all, DFE is cited as the primary root cause for nearly every supply chain challenge, including inventory, in most of Gartner's research surveys. Other commonly-cited causes are product complexity and risk.' The second paragraph is not highlighted. The third paragraph is highlighted with a red box: 'Positioning and managing inventory in the supply chain is a complex topic beyond what can be determined with average benchmark comparisons or correlations against DFE. While statistically undeniable, single-variable correlations have contributed to an oversimplified understanding of

Did You Know?



60%

Proportion of Supply Chain Planning Improvement Initiatives & Related Requirements Observed focus Exclusively (or Predominantly) on Demand Planning



25%

Percentage of Detailed Operational Improvements in Planning Achievable via Demand Planning Process Improvements (as distinct from high-level SI&OP benefits)



20%

Estimate of Organizations Using at least Basic Statistical & Cost Methods to Determine Inventory Policy (versus Traditional, Single-echelon Safety Stock or Rules-driven approaches)



7%

Proportion of Organizations Applying Advanced Demand Planning Algorithmically-Integrated via a Holistic-Model with Inventory Optimization

Source: GAINSystems Surveys

Presentation Objectives

Key Presentation Objectives

- Describe an objective means to derive prioritization of solution needs
- Provide a quantitative (non-subjective) method to weight importance of certain factors
- **Not** to diminish the value of SI&OP but to emphasize other proven-key areas

Introduce a Means of Measuring Incremental Impacts of Key Process Improvements in a Quantitatively-rigorous Fashion: Across a statistically-significantly sample of items and time horizon

Determine Key Measures of Performance

- Inventory (Turns)
- 'First-pass' Fill Rate (prior to Expediting or Substitution)
- Activity Cost (frequency/cost of replenishment)

Process/Algorithmic Improvements to ***Measure Independent Value-add of***

- ***Sophisticated/'Advanced' Forecast Modeling:*** *automatic selection from 40 models*
- ***Comprehensive Inventory Policy Optimization*** considering planning error (demand & supply), *stocking and stockout costs*, & profitability *across echelons*

Simulation Scenarios

The following scenarios were analyzed and evaluated based on inventory reduction and service level improvement

| Scenario | Forecasting Method | Inventory Parameters | Service Level Target |
|--|------------------------------|----------------------|-------------------------|
| Baseline | Traditional (Moving Average) | Traditional | N/A: Result (not Input) |
| Adv Fcst w/Trad'l Inv Params | Advanced | Traditional | N/A: Result (not Input) |
| Adv Fcst w Opt Inv Params (SL Neutral) | Advanced | Optimal | Neutral |
| Adv Fcst w/Opt Inv Params (SL Improve) | Advanced | Optimal | Improvement |

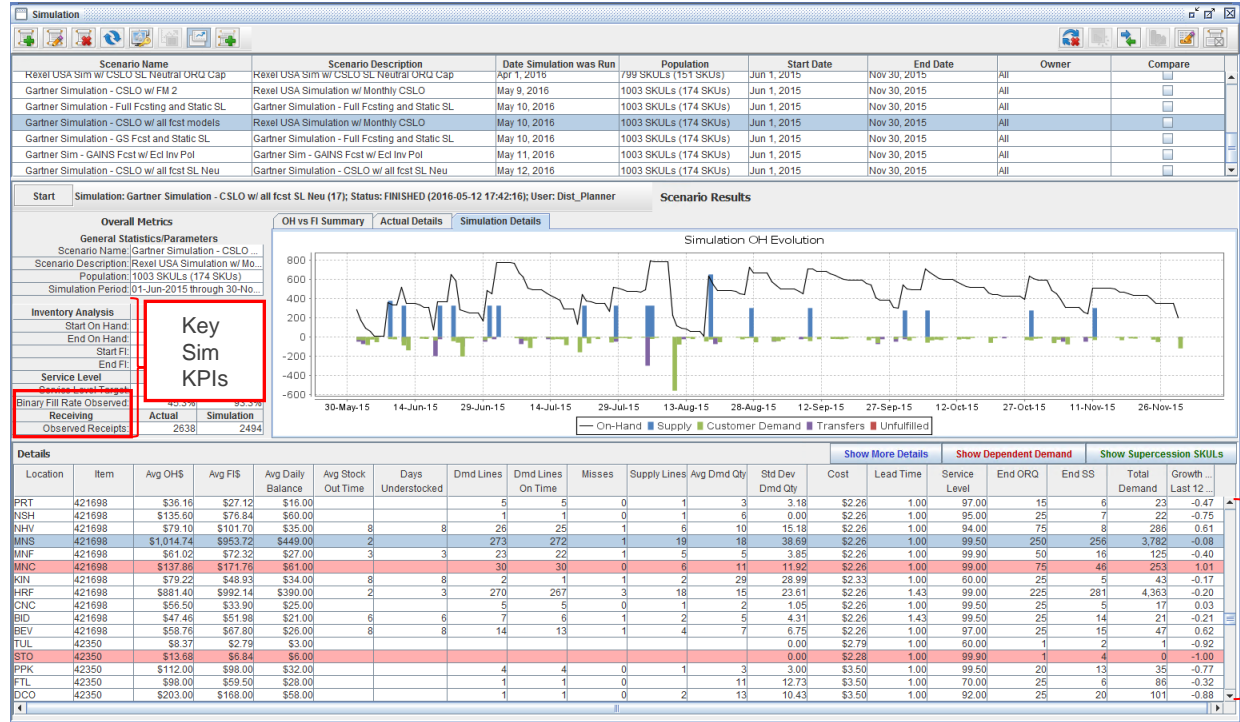
Empirical 'Black-Box' Simulation Process Overview

Process

- Demand from periods prior to the simulation date is used for forecasting each day iterated
- The records demand fulfillment and activities occurring during the specified interval without intervention or expediting
- Includes distribution 'parents' and BOM materials for multi-echelon measurement

Test Sample and Parameters (results are typical of dozens tested)

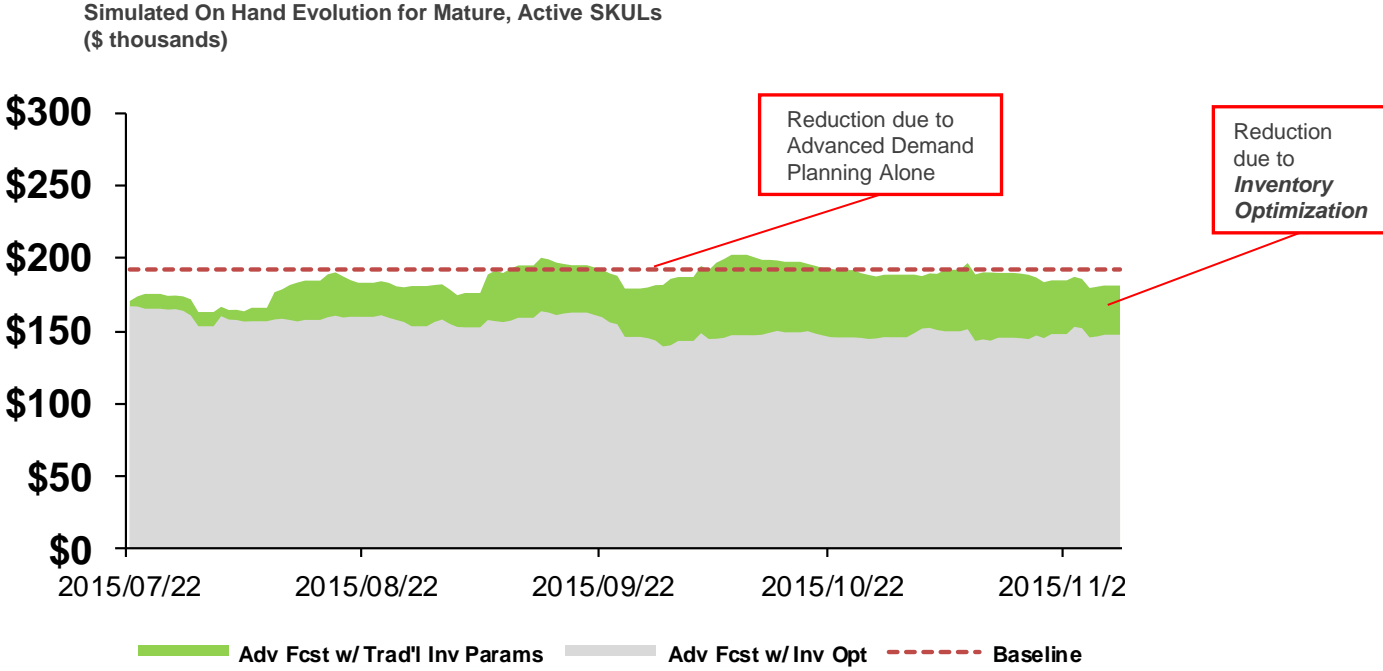
- Statistically-significant sample size (1,000 after eliminating new/unprecedented items) selected randomly but matched 'demographically' for Inventory Turns and Service Level to the Population
- Extended (6-month) horizon to cover multiple replenishment cycles (lead times) and peak season



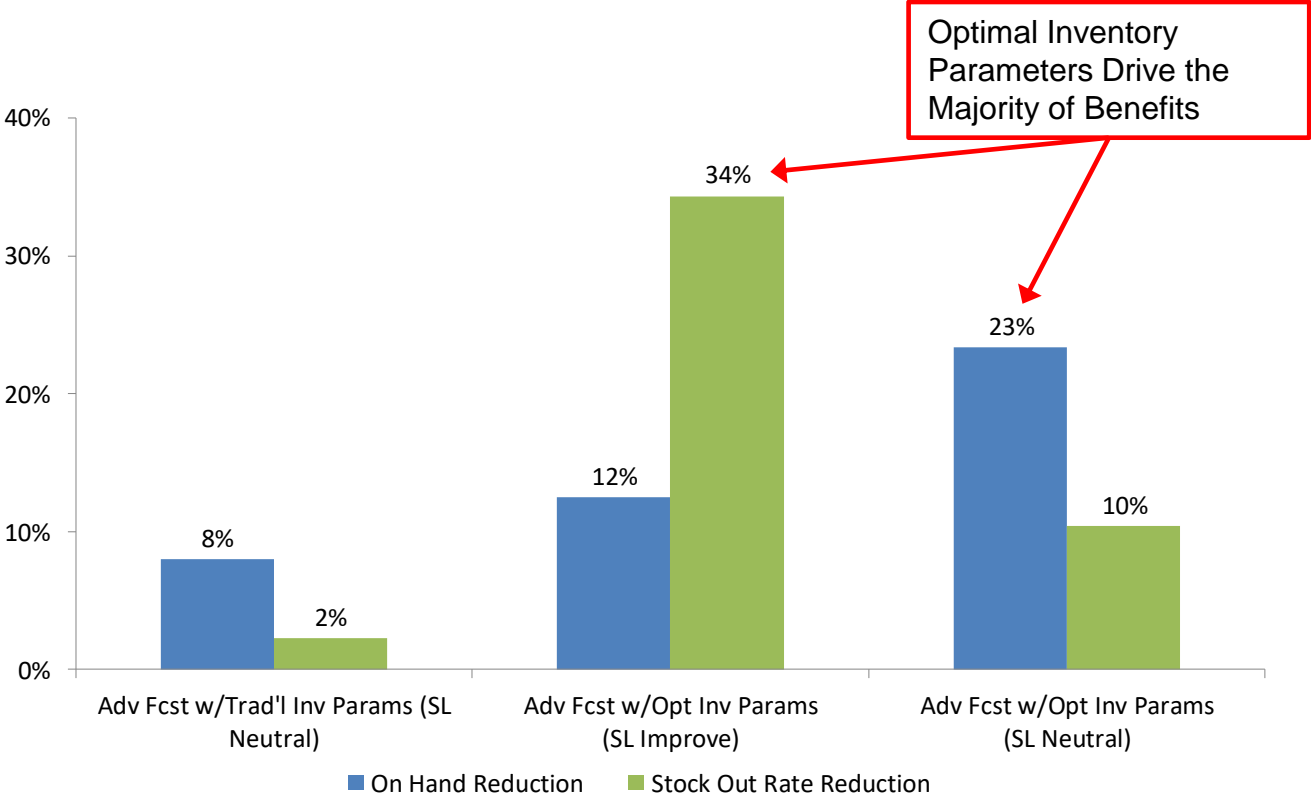
Displays Item-level Results for Selected Scenario

Simulation Results: On Hand Evolution

For a service level neutral scenario, the following shows the opportunity for inventory reduction due to inventory optimization



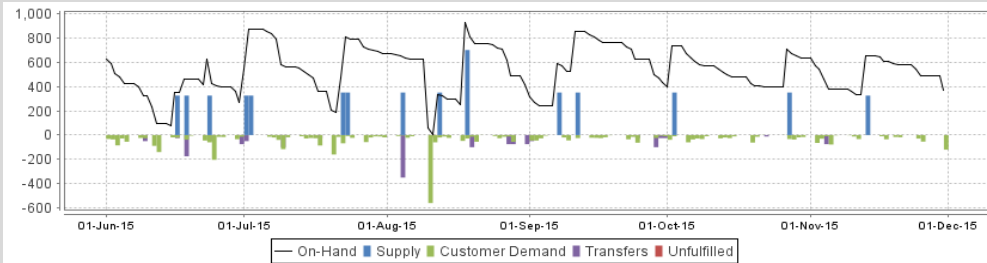
GAINS Empirical Simulation Summary



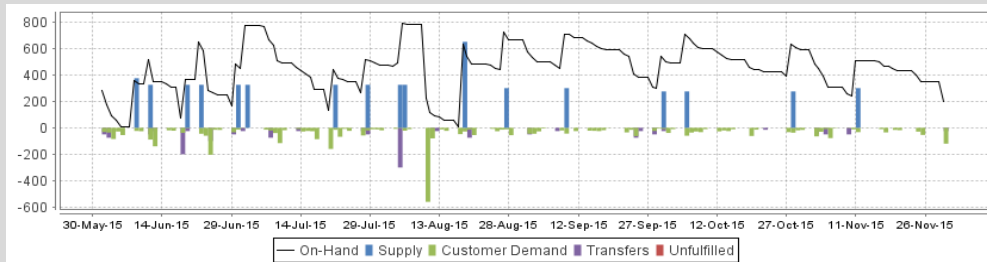
Inventory Reduction Example

Traditional inventory parameters fail to recognize that inventory coverage above-and-beyond a 100% observed Service Level provides no incremental benefit

Adv Fcst w/Trad'l Inv Params



Adv Fcst w/Opt Inv Params



Incremental Benefits

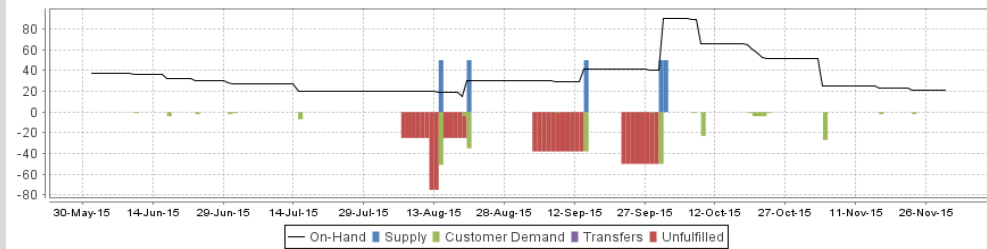


| | |
|-----|------------------|
| 29% | Less Inventory |
| 50% | Fewer Stock Outs |

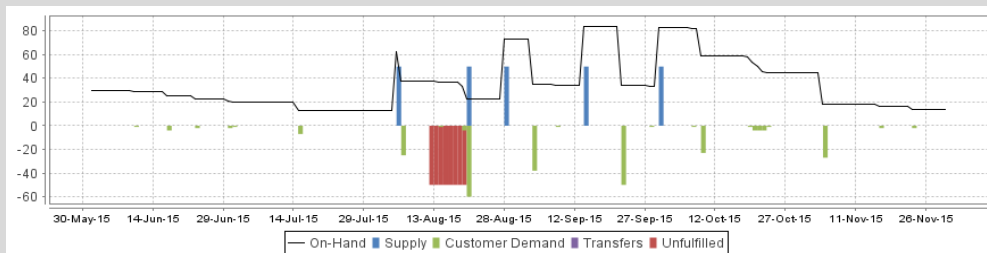
Service Level Improvement Example

An optimal inventory policy approach is required to achieve a high Service Level in a lumpy demand pattern environment while maintaining efficient inventory levels

Adv Fcst w/Trad'l Inv Params



Adv Fcst w/Opt Inv Params

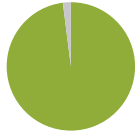


Incremental
Benefits

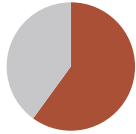


| | |
|-----|---------------------|
| 75% | Fewer Stock Outs |
|-----|---------------------|

You Probably Already Knew...



98% Proportion of Organizations that would Benefit from Empirically-driven Prioritization of Operational Improvements



60% Reduction in Elapsed Time versus Subjectively Debating Supply Chain Improvement Priorities when Shifting to an Empirical Methodology



40% Proportion of audience likely leaving with more questions than were answered...

We'd thoroughly enjoy continuing these discussions and how these concepts could apply in your organization at Booth 718

Source: Unabashed Speculation

The GAINS Solution Overview: Single & Multi-Echelon Planning

1. **Auto-selects the optimal forecast model** over lead time given historical patterns
2. Synchronizes top-down/bottom-up changes in various units-of-measure (supporting SI&OP)
3. Automatically applies **Leading Indicator Analysis** to predict changes not yet reflected in history

Demand Planning/Forecasting

Starting
Point

1. Coordinate & **Collaborate with Suppliers**
2. **Optimize planning with Production** (for in-production parts)
3. Enables robust **scenario simulation**
4. **GAINS Mobile** allows for broad-based & accessible collaboration (iPad)
5. **KPI Dashboard** for graphical performance management 'drill-down'

Sales & Operations Planning (S&OP)



Inventory/ Stocking/ Source Policy Optimization

1. Determines the **optimal Service Level** and stock **policy** for each SKUL
2. Automatically & dynamically **determines the Order Quantity & Buffer/Service Stock minimizing total costs**
3. Determines the **optimal source** for each SKUL

Replenishment Optimization

1. Provides **automated** &/or exception-based, **profit-prioritized purchase recommendations**
2. Recommends **optimal** and feasible transfers and **re-distribution** across the network
3. Automatic order-minimum-adherence, price break, substitute, & alternate suppliers decisions