



# **Inventory Optimization:**

## **The Science behind Growing Profit, ROA, and Customer Service Levels**

by GAINSystems, Inc.

W h i t e   P a p e r

## Introduction

The Boston Consulting Group (BCG), an internationally recognized leader in business strategy and operational policy consulting, recently published an analysis of the growth in U.S. market volatility, for 5 major industries, over the past 50 years. (Harvard Business Review, July 2011). In all industries the study shows that market volatility has increased and continues to do so. The study's authors, both managing partners at BCG, imply that the forecasting and planning tools which "market leader" companies are currently using will not be able to keep up with this growing market volatility. They suggest that new tools are needed, tools that provide a higher degree of accuracy and the ability to sense market behavior before that changing behavior has the ability to negatively impact a company's revenue.

Think of such tools as having the ability to sense heat before it gets to the point of combustion. Being able to dynamically sense demand or supply change before that change "combusts" into a major problem that consumes resources, cash, market share, and, if prolonged, company viability.

## GAINS Inventory Optimization Addresses Need

GAINS monitors and evaluates, in real time, every supply and demand signal for every SKU, for every supplier, every customer, at every location in the enterprise. GAINS is monitoring and evaluating them for any meaningful change or change trend that would suggest a need to revise inventory policies and/or replenishment plans in order to ensure that all targeted customer service levels, for each line in the order, are met with the greatest possible contribution to corporate profit.

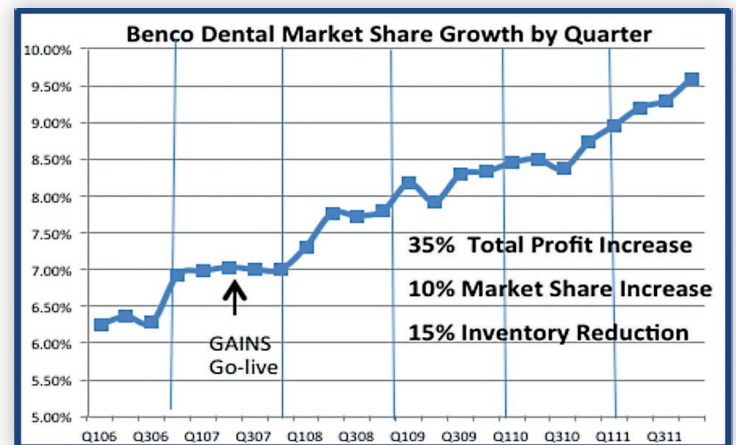
The Science that underlies GAINS Inventory Optimization is based on a suite of statistical rules and algorithms, management science techniques, and years of industrial engineering observations that have been turned into genetic algorithms. Some 300 man years of testing and validation have gone into GAINS. The result is a robust calculator that utilizes iterative and statistically exhaustive analysis to evaluate the demand and supply position for every SKU at every location in the business.

In making this analysis, GAINS considers, on an SKU by location basis, all operational constraints, dependencies, costs, and the comprehensive error across the enterprise. The result of GAINS real time analysis is optimized inventory policies and replenishment plans that ensure targeted

customer service levels are achieved for every item at every location with the highest possible contribution to profit and return on assets.

An interesting note; 95%+ of the data required by GAINS to Profit Optimize your inventory policies and plans is already in your ERP data bases and readily available. By utilizing GAINS optimized implementation templates, GAINS can be implemented with minimal IT resources.

Benco Dental is one of many companies who deployed GAINS Inventory Optimization during the recent recession to produce the growth in revenue, profit, and market share shown below.



## Key Functions of GAINS Inventory Optimization

### GAINS Provides Unbiased and Robust Detailed Forecasts

GAINS dynamically determines forecasts based on a library of automatically selected models that account for myriad demand patterns (seasonal, sporadic, trend, etc.). This goes well-beyond 'best-fit' and ensures lead-time matching as well as statistical viability for later-stage processes such as inventory policy and replenishment parameters. GAINS filters models that exhibit bias so that aggregate error tends towards zero. It also includes leading indicators that can be quantified (e.g., macroeconomic or industry factors) so that these are already embedded in the baseline forecasts that form the starting point for replenishment plans and strategic/tactical operational plans.

### Robust and Scalable Synchronization

Determining Volume from the Bottom (or Middle) Up avoids execution error from simplistic top-down allocation assumptions. Often this move from 'Volume' to 'Mix' is an afterthought in the planning analysis process. In reality, it is absolutely essential to driving actionable information to achieve the key organization cost/profit and service goals.

To achieve this, the plan must start from the bottom-up and always remain in synch even when hundreds of thousands of detailed forecasts are affected by even a single change at an aggregate level (e.g., product family). In order to scale, other approaches over-simplify this process (e.g., if applying a % change, how do you raise a 5-unit forecast by 7%) by starting at the top and resolving the detail only later (e.g., Excel or other stand-alone planning facilitation tools).

## Comprehensive Management of Enterprise Planning Error

GAINS ensures that demand planning error is manageable by fitting the error pattern to the appropriate inventory model/distribution. It considers all error sources including the variability in supply and user variance from plan. Only through this comprehensive approach can precise Service Level attainment be achieved (most alternative approaches overshoot for most items and undershoot for some leading to excess costs). The goal is to attain exactly the cost-minimizing or profit-maximizing Service Level, not more or less.

## Total Cost/Profit Optimization

GAINS profit optimizes utilizing over 20 cost and margin-related factors as applicable (e.g., costs such as carrying, expediting, opportunity, lost sale). This is applied in Multi-echelon Inventory Optimization which establishes Service Levels that minimize costs (maximize profit) within practical operation constraints such as overall Service Goals. It also optimizes Postponement Strategies where stocking policy (e.g., levels at which to stock) is determined across a BOM, RBOM, &/or distribution network.

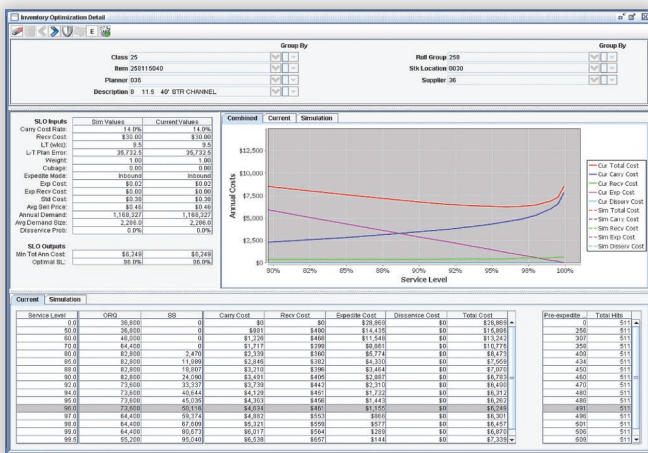


Figure 2: Inventory Optimization Simulation

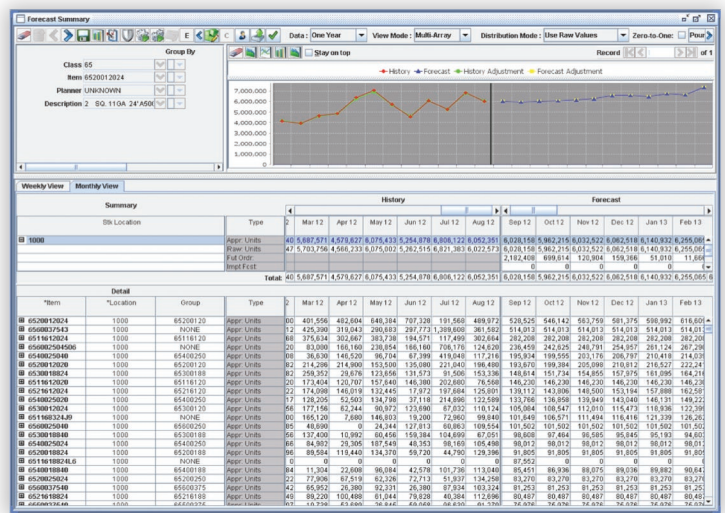
## Focus on Value-Added Activities

GAINS applies the impact of manual adjustments to the model. Other approaches look strictly at the simulated error (albeit ignoring many error sources) although manual intervention can significantly change results. Also, GAINS measures process value-add (versus 'Baseline') to encourage value-added

plan engagement and discourage low (or negative) yield adjustments that are common. Lastly, our root cause analysis of performance lapses transforms subjective & unproductive discussions into objective, data-driven collaborations.

## Best of Breed Built on Scientific Foundation

As mentioned, this paper focuses on the science of GAINS Inventory Optimization, those elements that GAINS uniquely provides. That said, GAINS matches the best-in-class abilities to provide workbenches with embedded reports to manage in any unit-of-measure, at the aggregate level, to connect and synch multiple plans across multiple functions in the enterprise (e.g., Strategic / Financial / Marketing) with the Detailed Plans (including replenishment). See the figure below for a sample of the multi-level, multi-unit-of-measure review abilities.



## Workflow and KPIs

GAINS also coordinates cross-department workflow and provides KPIs. These drive executive discussion to the key areas where Return-on-Time-Invested is maximized:



Figure 4: KPI Dashboard



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