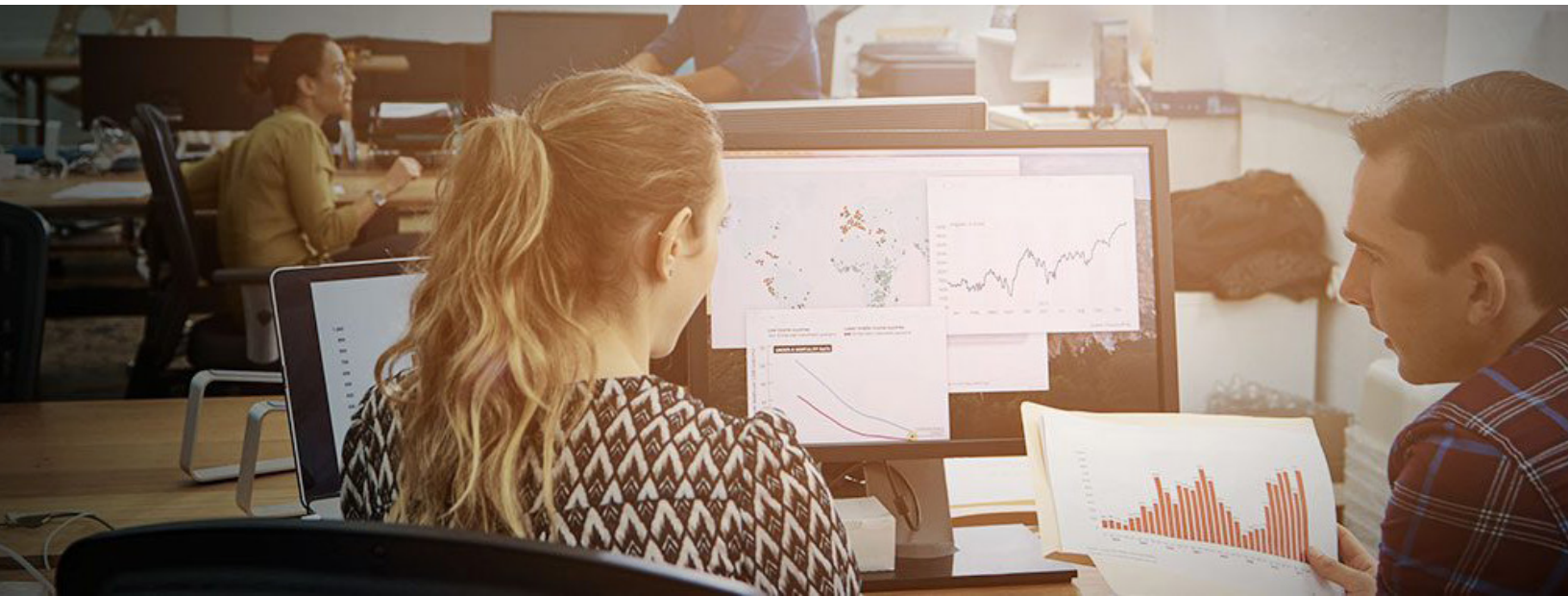# Vanguard Software CORPORATION

Portfolio Review to Full S&OP with Cloud-Based Advanced Analytics

You don't need to be a quantitative expert to get substantial returns from advanced-analytic software. On the contrary, best-in-class applications are designed to make the data and algorithmic technology accessible to non-technical business users. The end goal is to help you make optimal decisions by letting the software do what it does best so that you and your teams can see clear choices.

There are several reasons to review the product portfolio on a regular basis. It brings roles and teams together on product performance, KPIs, and overall portfolio strategy. It improves cross-functional coordination and shared risk management. It helps optimize the product portfolio, either for cost savings, profit margins, total return, long-range market strategy, or all of the above.

For certain companies, such as those with very large SKU volumes or complex product mixes, the Portfolio Review should be a fundamental component of the monthly (or quarterly) S&OP process, just as important as the Demand Review and the Supply Review.

But it's not necessarily easy. In many organizations, different departments operate as silos, limiting collaboration on fundamental decisions about what to make and sell, and when, where, and how.

Executive Summary:
- A regular product portfolio review is an essential component of not only sales and operations planning, but of long-range revenue and profitability planning.

Vanguard's Solution:
- Non-technical business users can apply advanced analytics, including Monte Carlo simulations, to find the best-possible outcome among competing courses of action.

Impact on Client's Business:
- Higher and more reliable revenues, thicker margins and increased profitability.

These include decisions about the product pipeline, R&D resource allocations, new product introductions (NPIs), phase outs, pricing changes, margin and profitability targets, life-cycle management, and overall portfolio strategy. These matters are fundamentally important and worthy of purposeful deliberation.

Software matters too

Getting department heads together on a regular basis to discuss challenges and choices around the product portfolio is a great start to fleshing out your S&OP or IBP process. But it's quite a bit more to leverage the Portfolio Review process with enterprise-grade forecasting and planning technology. Specifically, we're talking about a collaborative and transparent cloud environment that combines advanced-analytic forecasting, process automation, and reporting. In this workspace, diverse sets of internal business users (and even third-party partners) can share and compare forecasts, budgets and plans. More importantly, they're doing so with statistically derived baseline forecasts. These forecasts are far more accurate than the manually entered forecasts featured in most Business Intelligence (BI) and Corporate Performance Management (CPM) systems.

Big advantages

Advanced-analytic capabilities markedly improve the quality of the numbers that you bring to the table each month or quarter. That, if nothing else, is a direct improvement to the effectiveness of your regular Portfolio Review meetings, your S&OP or IBP process, and your strategic planning. Meanwhile, advanced automation speeds your time to action by eliminating the labor hours and human error inherent in spreadsheet-based forecasting processes.

At the end of the day, we humans must still decide what our organizations want to achieve. But the right software can tell us how best to go about doing it. There are three essential improvements to expect with any serious investment in supply-demand planning, financial planning, or S&OP and IBP:

- Baseline Accuracy
- Collaboration
- Decision making

Baseline Accuracy

Among all possible IT investments, increased forecast accuracy is the single biggest (and surest) driver of direct savings, revenue, and total return on investment. That's because improved demand forecasts set the stage for improved planning across all parts of the organization. Forecasts are indeed the starting point for policies and decisions around pipeline planning, new-product introductions, market adoption, product lifecycle, resource allocation, and more. With statistically driven forecasting, these policies and decisions are no longer guesses, gut feels, or simple consensus averages. They're based on real trends and patterns identified in individual SKUs, whole product lines, customers, sales reps, campaigns, or even larger rolled-up data sets.

Collaboration

If step one is achieving the most accurate possible baseline forecasts, step two is the ability to improve on them using the knowledge and insight of your workforce. Such insights might include the foray of a brand new competitor, an upcoming product campaign, a planned change in pricing, or anything consequential that is not in the historical data. This is why data-mature organizations invest in collaborative systems with intuitive workflows and time-stamped audit-trails – so that forecasts are based on more than just history. Yes, we start with a statistical baseline value, but then we refine it with additional information, such as workforce knowledge of goings-on in organization,

the customer base, and the competitive field. All of this intel can come together in the monthly Demand Review, which then informs other review processes that determine financial planning and budgeting decisions.

Decision making (with advanced, prescriptive analytics)

This is where we get into the power of advanced analytics and automation. These capability sets are the real key to optimizing policies, plans, and decisions around the product portfolio – with the least-possible effort.

Let's take it from the top. We've noted that statistically-derived assumptions and forecasts are an absolute must. If we don't get the starting points right, everything that follows is flawed, including predictions about new product sales, mature-stage demand, componentry lifespans, or where current investments in R&D will get us tomorrow – all things critical to planning and strategy. That's not to say that an attractive UI or an easy integration with Microsoft Office aren't valuable features. They are. But they're not going to reduce safety stock, increase service levels, or provide any of the hard financial returns possible through increased forecast accuracy. Let's be clear. Without an advanced statistical forecast engine, you're paying for attractive features, not investing in a sustainable net return.

We've also noted the importance of a smartly designed workflow with adjustment-and-override tools that help business users improve baseline forecasts. The input of the workforce, and the means to easily track and record that input, is a tremendous value in terms of transparency, accountability and accuracy in forecasting and planning. It works especially well with a built-in approval process and automated, system-wide updating.

Advanced analytics

This is where we get back to the most powerful competitive differentiator: advanced analytic modeling and simulation matched with advanced automation. This combo is a game changer.

Advanced analytic software not only helps us see the future, it helps us understand whole ranges of possibilities, and probabilities. We can run exhaustive simulations, predict multiple outcomes, and execute best-possible courses of action. We've seen tremendous value in advanced analytics within our own client base.

Many rely on our optimization models to set best-possible policies, plans, and targets for sales, inventory levels, and financial planning. Others use them to tackle tough resource allocation problems, such as choosing the right product mix to maximize profit, given limited raw materials and resources.

Among the heavyweights on our modeling and simulation arsenal is Monte Carlo simulation. Several large pharmaceutical clients use a number of our Monte Carlo simulation tools to predict the performance of their drug development portfolios, assessing the probabilities of sometimes hundreds of thousands of potential outcomes. Our Monte Carlo tools let them see long-range revenue potential, decide where in the portfolio to invest, or how best to balance cash and resource needs with investment.

Somewhat relatedly, aerospace customers run our Monte Carlo simulations to predict costs related to multi-year support and maintenance contracts. They set plans and policies by assessing the probabilities of myriad outcomes, such as the likelihood that internal costs will fall in a specified range, or that a specific contract will lose money.

In cases of competing courses of action, these and other clients use our software to what-if test unlimited scenarios,

also called scenario planning. In seconds, they can see and assess how different decisions or circumstances will affect outcomes.

In addition to Monte Carlo simulation, advanced analytics can include a multiple of techniques to new-product forecasting, or combine various methods such as Comparable Forecasting, Spread Curve, Supersession, or adoption modeling (more on these methods in another piece).

Advanced automation

Lastly, because our system is cloud-based and fully automated, managers are always working with the latest data. Vanguard Software can synch live with any transactional database. And any changes or updates made within the system are live across the entire system in seconds.

For many client organizations, this is an absolute first. In fact, more than a few had been so indoctrinated in their laborious monthly forecast processes that they had a tough time understanding the full value of automated rolling forecasts, evergreen planning, or the ability to look out two or three years ahead in a matter of seconds.

Root Mean Squared Error (RMSE)

➢ This measure of forecast error is important because a reduction in RMSE has been shown to provide an opportunity to reduce safety stock by a proportional amount

$$RMSE = \sqrt{\frac{\sum(A - F)^2}{n}}$$

A = Actual
F = Forecast
n = number of points

➢ Recall the simple equation for sizing safety stock (SS) (constant lead time)

$$SS = z\sigma\sqrt{L}$$

z = statistical constant associated with a service level
σ = standard deviation of historical data
L = Lead time

RMSE can be substituted for σ above to act as a good heuristic for variance, thus reducing RMSE will reduce required SS proportionally

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