

APICS INSIGHTS AND INNOVATIONS

APICS S&OP PERFORMANCE

ADVANCING SALES AND OPERATIONS PLANNING

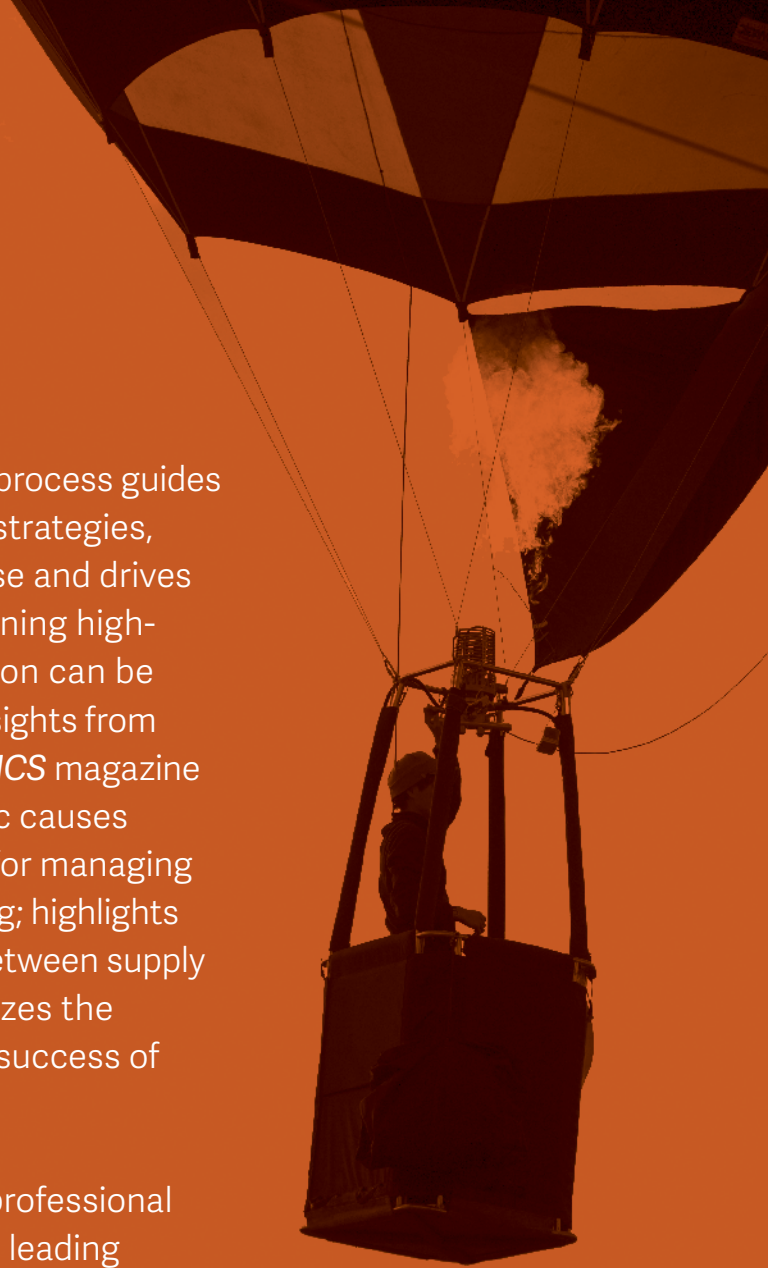


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ABOUT THIS REPORT

An effective sales and operations planning (S&OP) process guides business decisions, provides key problem solving strategies, gives executives greater control over the enterprise and drives overall business success. Establishing and sustaining high-functioning S&OP processes within an organization can be extremely difficult, however. This report collects insights from APICS research, APICS Body of Knowledge, and *APICS* magazine as a resource for optimizing S&OP. It outlines basic causes for S&OP underperformance; provides strategies for managing complexity, demand variability and sales forecasting; highlights common S&OP pitfalls; explores the relationship between supply chain agility and the S&OP process; and emphasizes the impact of team culture and human energy on the success of an S&OP initiative.

This report was developed by APICS, the premier professional association for supply chain management and the leading provider of research, education and certification programs that elevate supply chain excellence, innovation and resilience. The APICS Certified in Production and Inventory Management (CPIM), APICS Certified Supply Chain Professional (CSCP), APICS Certified in Logistics, Transportation and Distribution (CLTD) and APICS Supply Chain Operations Reference Professional (SCOR-P) designations set the industry standard. With over 45,000 members and approximately 300 channel partners, APICS is transforming the way people do business, drive growth and reach global customers. For more information, visit apics.org.



APICS S&OP PERFORMANCE

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APICS POINT OF VIEW

ADVANCING SALES AND OPERATIONS PLANNING



EXECUTIVE SUMMARY

Few organizations find S&OP an easy process. Usually it takes time and practice, often over many months or years, to create a continuous high-performance sales and operations planning (S&OP) practice. Before positive results occur, an organization must develop ways to meet the demands that S&OP requires. This involves improving communication and soft skills, integrating relevant departments and processes, and gathering and analyzing information. During this period of improvement, an organization still has a comparatively underperforming S&OP process. And the rate of improvement may be slower than participants expect.

An underperforming S&OP team may not have a clear idea of the causes of S&OP underperformance. Despite decades of practice, no S&OP roadmap yet exists that instantly raises S&OP practice to high performance in all organizations. Yet the need for S&OP improvement is real. APICS research revealed underperformance triggered by lack of team consensus, financial alignment, and information analysis. Many other S&OP challenges exist, but these typical areas present challenges to many organizations. Many causes exist for S&OP underperformance.

This report explores the following three causes:

1. team consensus
2. financial alignment
3. information analysis

Defining the S&OP Process

How do you define S&OP at your organization? The *APICS Dictionary, 15th edition*, defines sales and operations planning (S&OP):

A process to develop tactical plans that provide management the ability to strategically direct its businesses to achieve competitive advantage on a continuous basis by integrating customer-focused marketing plans for new and existing products with the management of the supply chain. The process brings together all the plans for the business (sales, marketing, development, manufacturing, sourcing, and financial) into one integrated set of plans.

S&OP is performed at least once a month and is reviewed by management at an aggregate (product family) level. The process must reconcile all supply, demand, and new product plans at both the detail and aggregate levels and tie to the business plan. It is the definitive statement of the company's plans for the near to intermediate term, covering a horizon sufficient to plan for resources and to support the annual business planning process.

Executed properly, the S&OP process links the strategic plans for the business with its execution and reviews performance measurements for continuous improvement.

What makes S&OP processes effective? According to the *APICS Operations Management Body of Knowledge (OMBOK) Framework, third edition*:

"The S&OP process develops tactical plans that assist management in strategically directing the business to achieve continuous competitive advantage. It integrates customer-focused marketing plans for new and existing products with the management of the supply chain. The process integrates all business plans into a single set that meets all needs of the functions of the business." To facilitate high-performing S&OP, develop a plan that "identifies key resources to achieve the firm's strategic objectives and goals, and is the basis of all subsequent material and labor resource decisions and for the master production schedule."

Building S&OP Team Consensus

S&OP demands both hard and soft skills. Hard skills include creating consistent metrics, calculations, and measurements. Soft skills include leadership, relationship building, influencing, facilitation, and consultative skills that synchronize S&OP tasks across functions. The rhythm of S&OP, its routine and formal meetings and procedures, always relies on an optimal integration of hard and soft skills, and the formal and informal engagement of people and perspectives. This helps bridge differences in responsibilities and ensures effective communication among all participants. Using effective communication and engagement with all participants is how S&OP solves the what, when, where, who, and why needed to balance supply and demand.

Causes of Disagreement in S&OP Practices

In the complex process of S&OP practice, differing opinions are normal and should be expected. Even more important is to discover why different opinions exist and whether or not a differing opinion is valid. Each S&OP participant brings his or her own collection of perspectives and perceptions. A skilled S&OP facilitator helps discover why opinions differ while keeping the S&OP process on track.

S&OP Silos

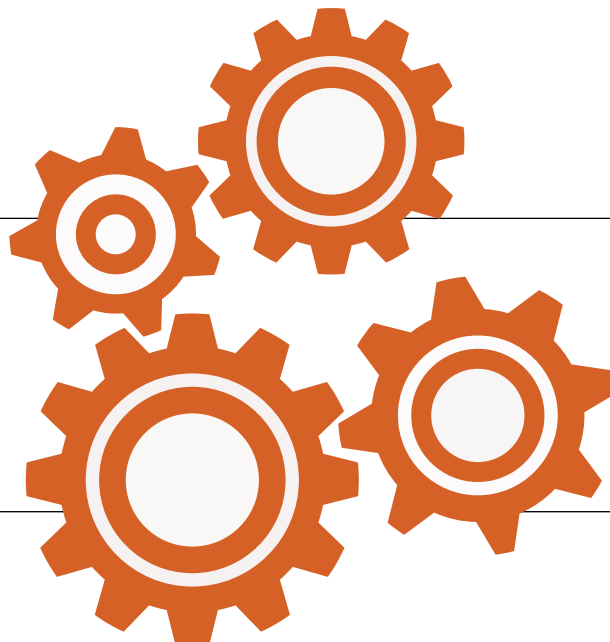
Potential silo conflicts outside of the S&OP process that hinder S&OP performance:

conflicts of interest, such as one department lowering its costs by offloading expenses onto another department

failure to share information, or filtering information and creating silo-reinforcing information asymmetry

failure to consider the full consequences of decisions in terms of risk, service, and quality to the organization as a whole

personal or team career advancement desires, or competitive positioning for high profile projects or leadership assignments that harm S&OP team functionality



Differing Time Horizons and Perspectives

S&OP practice may not be aware of differing time horizons or planning horizons represented by departments. Different departments, such as finance, research and development (R&D), production, marketing, and senior management, may have different planning horizons that make S&OP planning difficult to reconcile.

Forecast Trust

Forecast trust is the balance between probability and accuracy in forecasting. People vary forecasts based on the estimates of probability they expect people require. For example, ask a sales director for next year's sales estimate, and he or she may say \$500 million. However, ask how probable or how certain the sales director is of the forecast, and the response may only be 75 percent. Follow up by asking what the sales estimate would be at 90 percent probability. The sales estimate likely will fall. This may trigger disagreement or distrust among S&OP participants who expect firm forecasts no matter how probable the forecast must be.

Human nature tends to demand that the more certain a forecast needs to be, the more conservative and variable the forecast becomes. This creates concerns over forecast sandbagging among S&OP participants who do not feel the pressure of defending a high probability-forecast. Team awareness and agreement on expected levels of probability help create forecasting trust. Incentives for under forecasting may also hinder forecast probability and accuracy. This may occur when the organization routinely rewards the surpassing of forecast values.

To develop S&OP, knowing the reasons behind divergent points of view is important. This takes discovery. Simply coping with differences or disagreement may not reveal the reasons behind them. Overcoming opposing viewpoints or disagreements in shared understanding often means engagement. Having a say, knowing why different opinions and perspectives exist, combined with a trusted S&OP process and leadership commitment lead to effective S&OP. Because S&OP is a continuous process and reliant on new information, it improves from actual practice even at the risk of temporarily unfavorable outcomes.

TIP: Identify optimal planning horizons by department and consider each department's planning needs. In general, the more mature the S&OP practice, the longer the planning horizon.

Good, Better, Best

Knowing the perspectives and needs of your S&OP professionals and optimizing that knowledge across the team, can lead to high-performance S&OP. A high-performance team not only serves the process of balancing supply and demand, but also the many other goals and objectives of the S&OP process. Current and valuable information remains vital to the S&OP process. Shared analysis, decisions, and compromises must still increase market responsiveness for high-performance S&OP. Reducing risk, optimizing inventory, and focusing on customer service remain essential to high-performance S&OP. No one individual has the entire picture or the full breadth and depth of S&OP.

Individuals who participate in S&OP, as well as the designated S&OP champion, should be asking the following questions:

1. What information do I need to know?
2. What information should everyone else know about my department or area of responsibility?
3. What information do I need to share with others about my department?
4. What information should S&OP track to develop success in my area?
5. Where do I anticipate challenges in the future?
6. What are the unpredictable outcomes?

Asking these questions leads to sharing valuable information, which builds visibility and transparency, and leads to higher performing S&OP processes.

Ad hoc and manual data collection, typical for many kinds of S&OP data, should give way to more regular and established data collection. This data should not be isolated facts and figures, but should be reported in context-aware methods such as heat maps, internal baseline comparisons, and qualitative and quantitative reporting that fuel S&OP evaluation and decision making. S&OP processes consume business intelligence, trend and expectation analysis, and root cause exploration, as well as establish shared understanding and consensus building.

S&OP Team and Skills

Beyond balancing supply and demand, other primary objectives of S&OP practices cover a broad area:

- maximizing revenue
- minimizing risk
- improving customer service
- responding quickly to market changes
- reducing inventory

This range of primary objectives suggests that an expansive variety of skills and experience should exist on a S&OP team.

Implementing S&OP relies on people's soft skills such as communication and addressing expectations. Team and organizational behavior usually matter more than tools and systems. Recognize you will likely exceed the comfort zones of many participants in order to implement S&OP. You may encounter objections or comments that fail to focus on productive S&OP. At first, this may seem like a unintuitive approach toward building an enduring process. It is up to the S&OP leader to see through these challenges, stay focused, and keep the process on track in order to achieve high-performance S&OP over time.

Building S&OP Consensus Tips

Follow these S&OP suggestions for all levels of performance and maturity:

Make use of organizational culture.

Play up to its strengths. For example, if your organizational culture prefers written communication over face-to-face discussion, include plenty of written communication processes, email, memos, and reports.

Increase visibility of the S&OP process among participants.

S&OP should be accessible. Acknowledge where and why S&OP is difficult. Make sources and limitations of data accessible to all participants. Avoid dwelling on details that are irrelevant or inaccessible to the team as a whole. Stay focused on the most useful information available.

Accept differences of opinion as a normal part of S&OP.

Use those differences as an opportunity to find out why disagreement exists. S&OP relies on less-than-perfect forecasting and divergent points of view are certain to exist. Obtaining the best balance of supply and demand requires all participants to contribute their best ideas. As differences occur, explore the reasons behind them. S&OP team perspective and practice tends to improve as the team becomes aware of where opinions and experiences diverge.

When perfect unanimity is not possible, develop consensus instead.

Consensus occurs when all team players have a say and a majority reaches agreement on a reasonable plan. Make a decision based on this agreement and continue the process. A healthy S&OP practice accounts for minority views with a commitment to learn from them and continually improve the process.

Building S&OP and Finance Alignment

Risk and reward, organizational strategy, and financial alignment must be evaluated when it comes to making decisions. Every S&OP decision comes with risk. Yet enduring risk is necessary to earn reward. You must expect sufficient reward for the amount of risk you take when making a decision. Business unit strategy helps define priorities and rewards worth the risk of obtaining them. How the organization views risk and reward becomes part of the organization's culture. Leadership should ensure S&OP processes tie to a shared business unit strategy.

S&OP decisions have obvious costs in terms of currency (dollars, euro, yen, and other currency) or units. Yet S&OP decisions come with other costs:

Opportunity cost: This is the cost of losing the opportunity to carry out the next best alternative. What else could we have done but will now no longer be able to do? How is our balance of short-term versus long-term cost? Opportunity cost and risk present both real and perceived cost and value to the individual and the organization.

Risk: This is the cost of uncertainty. Is the current risk worth facing? Will the reward be worth the risk? What if we fail? Do we have a backup plan? People differ in their levels of comfort to risk. Your answers to these questions must take into account the perspectives of your team, organization, and supply chain.

Opportunity cost and risk management help shape our perceptions of price and value. Where perceptions are unique, teamwork may help create an insightful shared perspective.

Risk and reward are powerful influencers. The sense of risk and reward comes from professional experience, expectations from teams and leadership, and methods used to fulfill responsibilities. These are shaped over the course of a career. Basic explanations of theory, ideas, or plans alone usually do not alter our view of risk and reward. Budget items, plans, and priorities might seem unnecessarily risky to some, but may be essential to others. Imbalanced risk and reward decisions strain S&OP processes. Soft communications skills help reveal individual and organizational perceptions of acceptable risk and reward. Effective soft communications skills align the most productive elements of organizational culture with the challenges of exchanging complex information and ideas in S&OP. This alignment helps build an accurate, shared vision of risk and reward.

Leadership should make clear consistent cost determinations. This must be harmonized across the S&OP team. The value of something and the reason it is valuable should be transparent. The low- and high-cost priorities and the reasons for those priorities should be clear. Finance senior management may be particularly helpful in this area. Leadership alters risk and reward perspective by clarifying committed strategy, unchanging priorities, critical accomplishments the organization must deliver, competitive present pressures or future pressures, as well as performance expected from management. A common view of strategy, and risk and reward, creates a foundation for financial and forecasting alignment.

Aligning Finance and Budgets with S&OP

Finance enables both supply and demand. At most organizations, the financial department remains responsible for forecasting expenses and revenue, and setting budgets no matter the state of S&OP practice. Today's financial models and practices are usually based on decades of practice, adherence to strict accounting requirements, and well-defined senior management expectations. But this often is not true in early S&OP practice. Nonetheless, S&OP and the financial department's established budgets and forecasts of revenue should align. Where alignment is not successful, S&OP appears to become its own silo, with reduced finance departmental support. Integrating high-level financial department plans and budgets seems daunting. However, it is possible to start by simply determining gross profit:

- 1.** Determine average selling price per unit in each product family using historical data.
- 2.** Calculate revenue for each product family by multiplying units in each family by the average revenue per unit. In make-to-stock product families the planned revenue is equal to the demand plan. In make-to-order product families, the revenue plan is equal to the production plan.
- 3.** Calculate production and inventory cost by determining average standard expense for each unit in a product family. Multiply standard expense by the number of units in the revenue plan to determine the cost of units shipped.
- 4.** Subtract cost from revenue to determine gross profit per product family.

These calculations provide a forward-looking perspective by product family. Combining all product families together helps align S&OP with financial forecast expectations. In addition, because S&OP in many organizations occurs before finance closes the books each month, comparing S&OP plans to actual monthly closing results can help refine revenue and expense estimates for future months. Depending on complexity, comparing S&OP plans to actual monthly results may occur in a separate review or pre-S&OP meeting.

These results are an indicator; they are not exact. Most organizations find that as they improve and adjust their S&OP process, the financial forecast improves. This is especially valuable because changes to the demand and production plans can affect the financial plans. In high-performance S&OP processes, it does not take the financial professionals very long to appreciate the forecasting linkage. Because it is often considered a high-risk conversion in publicly held companies, the transition from two disconnected financial plans to one S&OP-driven plan takes a few months of testing, tweaking, and building confidence in the process.

While conducting S&OP practice based in units rather than currency is typically the preference, a high-performing S&OP team may need to become skilled in the language of both. While converting units to currency is reasonably objective, converting currency to units is much less so. However, sometimes it is necessary. The reason is that some S&OP financial or demand participants may prefer currency, or their supporting data may exist only in currency terms. It may take practice to successfully translate currency to units to account for all the variables.

Advanced S&OP performance and maturity call for the ability to align S&OP directly with organizational financial and budget processes. Set this expectation with all participants. Financial alignment takes time and effort. There is a steep learning curve in integrating S&OP with finance because both domains require skill and expertise to master unique intricacies. Over time, it may be necessary for the S&OP team to have a formal finance resource and data systems resource to develop greater integration.

Integrating Big Data

Turning supply and demand data into S&OP information is necessary to build accurate S&OP team information analysis. This is an important task for both people and processes. Improvements to S&OP often derive from new tools and technologies, including increasingly powerful S&OP systems and platforms. Reliance on spreadsheets and outdated human scale S&OP tools are giving way to big data tools.

Human scale refers to the primary source of data creation and selection in terms of the volume and speed of data flow that is comfortable to the human mind. Data and information is no longer a human scale in volume and speed.

Big data refers to the technologies that gather and filter data from every source and enable businesspeople to know more about their businesses and make better decisions with that knowledge. Rapid information growth is altering supply chain, market, and customer behavior. Big data is one of the drivers of increasing complexity in supply and demand. Even with the best information systems, human analytical skill remains paramount. Organizations face excessive trivial data that masks helpful information in the effort to anticipate supply and demand, or make correct decisions. Skilled analysis combined with information systems reveal relevant, useful information.

Consider the following scenarios:

- **Causes of demand volatility are vast**, and each cause may come and go without warning, challenging forecast accuracy and predictability. As demand becomes increasingly volatile, big data sources assist forecasting and ordering decisions, as well as automated reporting by analyzing a broad array of current and relevant data.
- **Customers are increasingly discriminating**. There is less information asymmetry between suppliers and customers. Consumers have greater access to information and as a result, are more informed and more demanding.
- **Supply is increasingly complex and extended**. This reflects globalization and the search for low cost manufacturing that is often characterized by significantly longer product lead times.
- **Desires grow for eventual earth-to-earth tracking across all points of supply and demand**, not only for legal or regulatory requirements, but for refining customer understanding, enhancing visibility, responsiveness, and ensuring product quality.

S&OP success must account for these trends in part by discovering and creating metadata, or data about data. Metadata is insight into relationships, trends, and dependencies from one or more datasets. Metadata adds value to the S&OP process by improving planning, decision making, and business intelligence. There will be an increased demand for using human skill to evaluate big data analysis and the strategic view of S&OP requirements. This means the ability to find critical value and relevance in the increasing volume of data.

S&OP Planning and Forecasting

APICS S&OP research revealed a trend in increasing S&OP process sophistication and planning horizons. Many variables impact S&OP planning horizons, such as industry practices and S&OP maturity within the organization. However, S&OP planning horizon tend to increase when S&OP sophistication is improved. The following S&OP processes become more utilized based on how far ahead S&OP planning horizons become:

- pre-S&OP for the executive team
- S&OP executive review
- inventory target review
- product rationalization

These processes become more frequent as planning ahead timelines increase. Simple tools and spreadsheets give way to powerful S&OP systems, tools, and platforms designed for developing longer-range planning and forecasting. They analyze complex production and supply chains, report detailed analysis of what-if scenarios, gather data from numerous sources, and alert participants of new information in ways impossible to achieve manually.

APICS survey research revealed that the most common key performance indicator (KPI) used to measure S&OP performance is forecast bias or error. Despite efforts to reduce forecast bias, research showed that low confidence in forecasting or forecast ability remains an enduring S&OP difficulty. Improving forecasting ability increases both forecast confidence and S&OP performance, and when combined, these advance S&OP maturity.

Improve S&OP Forecasting

Take the following steps to improve S&OP forecasting at your organization:

1. Consider adding weight to forecasts from those closest to the data, its history, and those individuals who regularly forecast the data in question.
2. Avoid unnecessary forecasting. Forecast only what the S&OP process needs for its success. Excessive information or forecasts risk information overload, confusion, or inefficient processes.
3. Avoid overwhelming S&OP forecasts with a high number of variables. Consider the Pareto Principle—20 percent of variables tend to explain 80 percent of the outcomes.
4. Present forecasts with an estimate of their certainty. Just as surveys tend to include a 'margin of error' statement, forecasts can benefit from an estimate of certainty or probability. To help estimate the strength of forecast certainty, consider the following questions:
 - How have similar forecasts in the past performed in either over or under forecasting?
 - How current and relevant are the data that helped create the forecast?
 - Historically, how much variation occurs due to market trends, seasonality, and economic factors? How much adjustment does the forecast make for these?
 - Do similar forecasts from other departments significantly disagree with this forecast?

Data Management Tips

1. Data processes should assist with what-if planning, particularly for data with historically high variability. Create an accepted S&OP decision along with guidance for what-if high- and low-outcome scenarios based on statistically probable ranges.
2. Data processes should support S&OP practice by comparing planning to actual results. Most data systems routinely compare forecast to actual results to help refine forecasting. Automated reports that compare a wide range of S&OP-approved decisions to actual results are less common, unless you use S&OP modules, systems, or software. Comparing monthly S&OP decisions against multi-year strategic requirements of the organization, or multi-year trends, may also be useful. Mid-course corrections and discovery of new factors may improve S&OP practice.
3. Data gathering and evaluation should include searching for, and carefully considering, meaningful correlations. Correlations describe relationships between variables or data. If one variable rises, does the other fall by a similar amount? Does it rise? Does it remain unaffected? Information systems can measure how strong a correlation tends to be over time. Complex processes often have hidden correlations. For example, variations in weather or demographics may reveal correlations tied to consumer demand. Correlations may help uncover motivations, perspectives, or behaviors not previously noticed.

S&OP Performance Checklist

To advance S&OP from mere coping to improving performance, consider the following questions:



Can you involve more people for better support or data?

APICS survey results showed that most supply chain and operations management professionals, even those not formally involved in S&OP practice, still understand its importance. These practitioners may have access to information, insight, or analysis. Spread the S&OP information gathering and sourcing where data are difficult to find or develop. Consensus may advance as previously opinion-based perspectives become fact-based.



Can you better align departmental and S&OP planning horizons?

Are S&OP planning horizons too short, too long, or out of sync with other department planning horizons? Would defining and working toward an optimal planning horizon in alignment with other planning processes advance S&OP success?



Do S&OP participants know the reason behind each participant's perspective?

Do S&OP participants know how S&OP decisions directly impact each person's responsibilities, commitments, and management evaluation of his or her position? Could practitioners provide examples on both an informal and formal level?



Are S&OP data and tools continually improving?

Are they keeping up with growing complexity? Do they help ensure shared understanding? Do these tools build trust in the level of precision and integration of all relevant data? Has the team recently evaluated current S&OP software, tools, or platforms?



Does the S&OP process get to the root cause of challenges?

Is there leadership and formal responsibility to address process bottlenecks, areas of improvement in communication, forecasting bias, or conflicts of interest?



Does the S&OP process have the right challenges for its team and resources?

While the primary objective of S&OP is to balance supply and demand, it may face many other demands, such as maximizing revenue, minimizing risk, improving customer service, lower inventory, or driving change in general. Where additional goals seek priority above balancing supply and demand, S&OP begins to face unproductive scope creep in its efforts.

As you work to improve your S&OP practice, use the S&OP Performance Scorecard.

S&OP Performance Scorecard

Use this scorecard to assess S&OP processes and maturity at your organization. S&OP practice relies on strong foundational practice and capability. How does your current performance measure up to successful S&OP practices? **Score the following statements with your level of agreement on a scale of one to five. One is no agreement. Five is perfect agreement.**

- S&OP team soft skills, such as communication and addressing expectations, are well-developed. Team and organizational behavior usually matter more than tools and systems. Sometimes we exceed individuals’ comfort zones in order to implement S&OP, but everyone recognizes we are improving an already well-functioning practice.
- We make sure the “and” in sales and operations planning is well represented in all of our S&OP processes, even when we face challenges. If we experience challenges, we consistently gather insight from both sales and operations planning perspectives to help find the cause of our challenges. While we work out challenges, we stay on top of market issues, and do not let ourselves get overwhelmed.
- Our S&OP team benefits from a well-respected S&OP champion who maintains and advances our S&OP process by anticipating and addressing concerns, and demonstrating the value of improving S&OP implementation.
- Our S&OP data and reports rely on fair and reliable measurements and audits. They are consistent, meaningful, timely, and available to all participants. They help ensure clear goals, strategy, governance, forecasting, and make connections between planning and execution. Our processes and goals are realistic and achievable given our current S&OP practice and organizational culture.

Score: _____

Score: _____

Score: _____

Score: _____

Our S&OP began as a supply-chain-driven process, but is evolving into a business-level process or integrated business process, which incorporates more areas such as margins, product reliability, and speed to market.

Score: _____

Total score: _____

Add the numbers you circled.

- A score of 10 or less suggests room for advancement toward high-performance, high-maturity S&OP practice.
- A score between 10 and 20 suggests there may be specific areas to target or prioritize to improve S&OP performance and maturity.
- A score of 20 or higher suggests mature, high-performance S&OP practice.

From an operations management perspective, underperforming S&OP is a serious issue. It can fail to serve or be harmful to aggregate planning and master planning. Underperforming S&OP may effectively remain in its own silo, disconnected from improving production planning. Underperforming S&OP may complicate tasks such as maintaining level production that matches actual demand.





PERSPECTIVES FROM *APICS* MAGAZINE

APICS magazine is an award-winning publication featuring innovative ideas and real-world strategies for inventory, materials, production and supply chain management; planning and scheduling; purchasing; logistics; warehousing; transportation and logistics; and more. Visit apics.org/magazine to view current and archived issues and to learn more about the magazine.

THE BEAUTY OF “SIMPLE”

A strategy for making S&OP less complex

By Bradley McCollum



I have always been fascinated by technology. One thing I've come to appreciate over the years is that successful technology applications have at least one thing in common: They take something complex and make it very simple.

A successfully designed sales and operations planning (S&OP) process must do the same thing while keeping that simplified design as relevant as possible. That sounds easy enough, but—just as with technology—it can be quite difficult.

Why it's Challenging

Within the design phase, maintaining a focus on simplicity is probably the most challenging change. I say “change” because, in most cases, that's what it's going to be for your supply side team members. These resources typically operate in the detail every day. On the surface, everyone can understand the need for simplicity. But when it comes time to design the model, people often hit the brakes.

How can we represent something at that level and have it be of any value? Consider the simplifying assumption, a model that links those important details of the bottom-up perspective your team is accustomed to with the ease and clarity that can come only from a top-down perspective. An example of one of these assumptions is the split between market-facing families (demand) and capacity groupings (supply). As we know, demand drivers typically have very little to do with how we actually supply our products—and, as a result, we are left to translate the connections between two different languages.

For instance, in my business—consumer packaged goods—we often have similar items that are both manufactured internally and procured from outside vendors. These supply paths have very different lead times, constraints, costs, and so on. It is of course necessary to understand and model what requirements are going to the plants versus those of vendors. From a demand perspective, however, where and how these items are made is irrelevant. I have a single market-facing family on the demand side, with multiple and very different supply groupings on the supply side. Instead of requiring more detail to solve this issue, the simple answer is to build a simplifying assumption.

This may sound confusing at first—and it's partly because of the word “assumption.” It sounds like something casual or even haphazard; however, simplifying assumptions must be based on and supported by an analysis of history and then tested and monitored over time. In my situation, we had to understand what portion of demand was provided by each supply group. Once we laid out the historical data showing the percentages supplied each month, we could see that, typically, 70 percent of the demand—no matter what the volume in total—was for items produced internally. The remaining 30 percent was for items sourced externally.

Simplifying assumptions must be based on and supported by an analysis of history and then tested and monitored over time.

This dynamic was relatively consistent; so, instead of requiring greater detail (perhaps by rolling up a more detailed forecast over a long horizon), we use this as our ongoing assumption to translate projected demand into supply-specific capacity requirements.

Applying Run Charts

While history suggests we have a model we can count on going forward, we all know things change. Thus, it's critical that these assumptions be monitored and maintained over time. Run charts are the best tool for this because they make it possible to monitor assumptions easily each month and their variations over time. Understanding those normal discrepancies (model error) and taking note of bias or abnormal error as it occurs also are important.

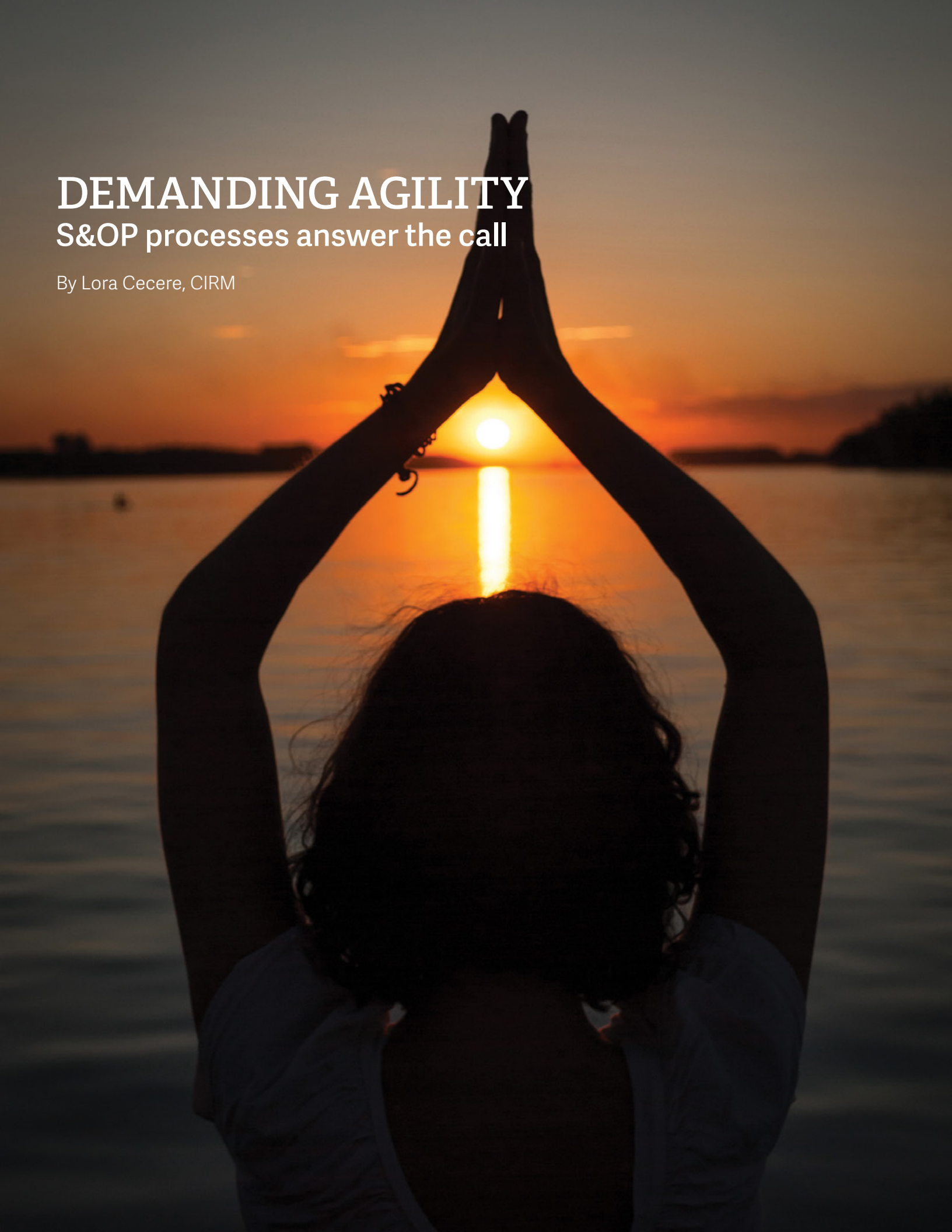
While the previous example is rather basic, it clearly illustrates why using assumption models is the key to successful S&OP. They enable your team to cross what often is a challenging hump in the S&OP design process and remain data-driven. Most importantly, they keep things simple. As Leonardo da Vinci said, "Simplicity is the ultimate sophistication."

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DEMANDING AGILITY

S&OP processes answer the call

By Lora Cecere, CIRM



Growth and strength in supply chain processes often are achieved by maintaining control—control over manufacturing operations, sourcing partners, and ordering processes. However, in even the most well-planned supply chain, control is no longer sufficient. After all, whatever you try to control today has a very good chance of being less important tomorrow. Agility is the new pivot point for power and growth.

In spring 2012, my company surveyed 117 business leaders to understand agility. We found that there is a significant disconnect between an organization's understanding of the importance of agility and actually achieving agile performance. The good news is that almost all respondents realized that agility is about much more than speed. After all, nothing can be gained by doing the wrong things faster. While 89 percent said that agility is important to their company, only 27 percent rate their organization as "agile." The issue here is that a singular focus on control has failed to give our supply chains flexibility, balance, and agility. Many companies are aiming to make their supply chains less brittle with sales and operations planning (S&OP).

Companies considering S&OP solutions share several commonalities. At the corporate level, senior management wants to mitigate volatility and optimize revenue and margins in order to power growth. At the operations level, the goals are to increase demand predictability, align internal and external communication and numbers, and optimize inventory to increase fulfillment.

Nothing can be gained by doing the wrong things faster.

Today's manufacturing environment is very different from that of 10 years ago, when the goal of operations control was paramount. Now, instead of the fixation on the pursuit of the perfect forecast or the flawless supply plan, companies need to adapt to deal with changes in demand and the impact on supply. The organization must be agile in order to capitalize on unexpected high demand or successfully ride out shrinking demand or sourcing shortages.

My company's quantitative research assessed the importance of supply chain agility and the tactics used to improve agility and understand the role of S&OP in driving agility in organizations. The research included 117 supply chain business leaders and spanned 50 companies (nearly half with more than 5,000 employees) in 13 industry groups (primarily food and beverage, make-to-order discrete, consumer packaged goods, and high tech and electronics).

The main survey hypothesis was this: The greater the complexity of the supply chain, the more important it is to have a mature S&OP process in order to realize agility. While most companies reported having an S&OP process, 51 percent had more than one process. In fact, on average, a company today has four S&OP processes to manage. This proliferation of processes causes even more complexity.

While many have implemented global centers of excellence to improve process reliability, there are issues. This is mainly because businesses still begin with the old “people, process, and technology” paradigm. What they really must start with is strategy. S&OP needs to be defined to deliver the supply chain strategy. Unfortunately, only 15 percent of respondents have a clear plan for how to make trade-offs on source, make, deliver, sell.

Governance is an important part of the process, as well. When we asked survey respondents, “How balanced is your S&OP process?” only 20 percent reported having balance. Interestingly, 41 percent reported a “big OP” and a “little S” (meaning the company is tightly controlled by manufacturing), and 39 percent have a “big S” and a “little OP” (tightly controlled by sales, meaning, more bias and error).

Agility Defined

What is agility, how does it influence a company’s power and growth, and how do we achieve it? In a nutshell, agility counteracts market volatility by closing the gap between aspiration and current performance. Organizations can achieve it by better understanding how S&OP affects the ability to adapt to change.

The most mature definition of agility, based on survey responses, was “the ability to recalibrate plans in the face of market, demand, and supply volatility and deliver the same or comparable cost, quality, and customer service.” This was the definition chosen by nearly half of the survey respondents. Those companies most mature in planning also were the most mature in their definition of agility.

In addition, it’s telling that, while almost 90 percent of respondents said that agility is important, only 27 percent were happy with their own agility. This represents a 62 percent gap between where people are and where they would like to be. The challenge of course, is how to close that gap.

S&OP Processes Drive Agility

It is important to determine how well people perform scenario planning and what-if analysis. When we asked, “How well can you plan and build scenarios to plan for agility today?” the results were a bit surprising. Of all survey respondents, 33 percent said they can do it, but it is tough; 60 percent said they can plan, but it’s hard to do “what-if” scenarios; and 8 percent said their system easily lets them perform “what-if” scenarios.

S&OP first was defined in 1981, and supply chain management itself is 30 years old. So the question then becomes: Where are we today in terms of S&OP maturity?

The study aimed to determine whether an organization had a mature S&OP process by analyzing answers to the question “What is the goal of S&OP?” The results showed an interesting progression over time. For example, at first, S&OP meant a feasible plan for operations. Next, it meant matching supply with demand, and many organizations are still at this very volumetric step today. Advanced planning tools come into play here for constraint-based planning. Finally, as we move further down the continuum, the goal of S&OP shifted to mean maximizing opportunity and mitigating risk, thus enabling a reduction in the cost of sales and an increase in volume.

Respondents also were asked, “What is your largest challenge in building an agile sales and operations plan?” The most frequently cited challenge was support and understanding by the executive team. Second was clarity of supply chain strategy and supply chain excellence. Third was the need for technologies to support the process. The role of finance and the budget came in fourth, and the availability of skilled resources was last. Upper management’s understanding and buy-in clearly are challenges and may require specific training in order to foster a better understanding and appreciation for building agile S&OP.

As companies become more mature, the ability to be agile has grown in importance. To succeed, companies must go beyond “business as usual” with S&OP. Effective organizations put processes in place that enable them to benchmark themselves against peers and better understand their abilities, challenges, and efforts.

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Building Agility into the Construction Business

A construction company provides site solution products and services for the civil engineering industry. With more than 40 manufacturing facilities across North America, Mexico, and Australia, its product portfolio consists of bridges, drainage, retaining walls, sanitary sewer, storm water, erosion control, and soil stabilization solutions.

Recent global market volatility has taken a bite out of the construction industry's overall demand. Although construction and maintenance of national infrastructure systems will never be optional, the down economy not only tightens infrastructure budgets, but also makes expansion and upgrade project timing less predictable.

Core to the company's strategy is to keep manufacturing in sync with customer demand. Many projects are dictated by federal, state, and county governments. When money is freed up, these entities are ready to move at a moment, so the company must plan in advance to ensure its pipeline is in position to take the business.

Five years ago, company leaders recognized that tighter business management required tighter supply chain management. The firm planned for growth by shrinking the time between manufacture and delivery to its customers.

To meet its supply chain strategies, the company developed both its supply chain team and its sales and operations planning (S&OP) processes. S&OP became a stake in the ground—the linkage making supply equal demand and ensuring the company does the right things. The result is a more agile firm, able to adapt to the changing business environment.

In the end, key returns on investment included decreased working capital by 40 percent, increased customer service by 10 points, forecast visibility of 18 months, and "what-if" modeling across 40 sites.

HUMAN ENERGY ALIGNMENT

Exploring this powerful benefit of effective S&OP

By Bradley McCollum



Fast approaching is the fourth anniversary of Jarden Corporation's executive sales and operations planning (S&OP) implementation and my eighth anniversary with the organization. Looking back over those years, our business—like so many others—has had opportunities to capture and challenges to overcome. Without question, our S&OP processes have helped us navigate those waters.

The work we've done has had lasting impacts on a broad array of business processes. We forecast differently, we plan supply capacities differently, we make decisions around warehousing and transportation differently. Our investments in S&OP have brought significant, quantifiable returns. However, I would submit that the most valuable change has been to something far more qualitative, something most of us never even talked about when we started: our very culture. S&OP has brought about a significant shift and enabled us to leverage the power of aligned human energies.

The Culture Change

Prior to the S&OP implementation, our business had the usual functional silos: sales, marketing, finance, supply chain, and operations. Our process structure provided no opportunity or forum to discuss, understand, or certainly argue about the quality or bias of our key inputs. Therefore, each silo was left to make its own calls, based on its own perspectives. This translated into the familiar sand-bagging and hedging, typically leaving finance to make heads or tails out of what was really going on.

The result was a business that was difficult to predict and control—and thus very challenging to optimize. Today, however, our S&OP design not only provides for that forum, but also makes consensus a cross-functional priority and monthly requirement. What began as a somewhat uncomfortable process change as part of our S&OP design developed into a key cultural transformation.

I have identified three key aspects of the S&OP implementation and ongoing practice that facilitate this change:

- 1. Consensus around the data we use to make decisions:** A key step of S&OP design starts with deciding what data are going to be used each cycle. No longer is it acceptable for each business function to have its own data source. The cross-functional team must agree to the data inputs needed for each step, validate the data, and support the inputs.

What began as a somewhat uncomfortable process change as part of our S&OP design developed into a key cultural transformation.

- 2. Disagreeing without being disagreeable:** Every time I introduce new team members to our S&OP process, I explain to them it's not only acceptable for them to disagree and argue their perspectives in our meetings, but it's really their responsibility to do so as part of the team. For some people, this can be uncomfortable at first; but this mandate for disagreement within the process eliminates the unproductive passive aggression that often otherwise results. That situation can be divisive and serves no benefit to the task at hand.
- 3. Focusing on the error:** We know we will never be exactly right with our assumptions, so we stop arguing about what the correct number is and start understanding how wrong the numbers could be. This change in thinking completely refocuses the efforts spent rescrubbing numbers, enables a better understanding of error and risk drivers, and lets the team more quickly develop mitigations. Our responsibility as an S&OP team is to ensure that we're successful as a business, not to point fingers when we're not.

S&OP can't and certainly won't by itself solve the challenges that businesses face every month, quarter, and year. When implemented correctly, however, it can support a cultural change that enables people to have control and achieve optimization. As a cross-functional S&OP team, you are able to make decisions knowing that each perspective has been explored, challenged, and understood as part of the solution. The result is a broader understanding of over-all business capabilities, opportunities, and risks—and decisions made with that understanding are more likely to be the right ones.

Proof that this cultural change has occurred will come in the form of a visible shift in focus from individual success within functions to success as an integrated business. And at the end of the day, that's why we all get paid.

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THE SEVEN DEADLY SINS OF SALES FORECASTING

By Fred Tolbert, CPIM, CSCP



Lust, pride, greed, gluttony, envy, anger, and sloth. Collectively, they are known as the seven deadly sins. If you are guilty of one or more of them, it is said that a guy with a pitchfork and pointed tail has a spot reserved for you surrounded by fire and brimstone. Sound bad? You bet.

Perhaps not as bad—but certainly something worth considering for any supply chain and operations management professional—are the sales forecasting seven deadly sins. These activities contribute to increased stockkeeping unit (SKU)-level sales forecast error, and the consequences are the supply chain equivalent to fire and brimstone: increased sales forecast error, excess inventory, and missed customer due dates.

Deadly sin #1: Using shipment history. Sales forecasting systems use sales history data to generate the statistical forecast for future periods. The key issue is the type of sales history used to run the statistical forecast—shipment history or demand history.

Let's say your customer placed an order for 1,000 units of Item 12345 for delivery in July. Item 12345 is on back-order, and you are unable to ship the product until September. Does your enterprise resources planning system post the sales history as July demand (when the customer wanted the product) or September demand (when you were able to deliver the product)?

If the answer is that your system posts the history as September history, your forecasting system will use 0 units in July and 1,000 units in September to drive the statistical forecast. Using shipment history will perpetuate your backorder situation. The appropriate procedure is to post the 1,000 units as July history for sales forecasting purposes.

Deadly sin #2: Relying on bad data. Congratulations if you avoid the first deadly sin and use customer demand data as the basis for generating the statistical forecast. However, the demand data can still be polluted with the effects of one-time or non-recurring orders that can lead to inaccurate statistical sales forecasts. Examples of the bad demand data that get posted to the demand history file include

- sales due to promotions that will not be repeated in the same period next year
- spikes in demand due to special, one-time customer orders
- pipeline fill orders by big-box retailers
- special orders due in advance of quarter-end price increases
- using customer-specific demand data that are too granular to be statistically significant
- unit of measure conversion issues, such as when items are sold as both individual units and three-packs.

It is necessary to periodically scrub the demand history file in order to eliminate the effect of the special orders. Some systems automatically filter demand history values that are outside of a statistical confidence interval. Others identify the exceptional demand and rely on the user to determine how to adjust the sales history and eliminate the bad data. The key is to include data scrubbing as part of your regular demand planning process.

Deadly sin #3: Excessive “gut feel” overrides. Many companies commit hours or days of effort each month to review and adjust the system’s statistical forecast. The sales forecast sometimes travels from the forecast planner to the sales team to the product management team, with each level making their adjustments to the sales forecast. Too often, planners base forecast adjustments on a feeling and not specific knowledge of customer activity. Raise a red flag if you feel compelled to override more than 10 to 20 percent of the system’s statistical forecasts.

Use the system’s statistical forecast as the starting point for making forecast adjustments. The rule of thumb should be to adjust the statistical forecast only if you know something about the future that is not reflected in the demand history. Otherwise, resist the urge to adjust the forecast just to make it look pretty.

Deadly sin #4: Poor event planning. Some companies do the opposite of the third deadly sin; instead, they don't make enough forecast overrides when special events are scheduled to occur. Poor event planning often is the source of missed customer due dates, product expedites, and excess inventory.

The typical special events that occur that do not have the benefit of being reflected in past sales history include new item introductions, promotions, item substitutions, and item replacements. It is imperative to develop an internal collaboration process that brings together all the individuals responsible for planning for the impact of special events. There also needs to be frequent review of how actual sales are performing versus the forecast to ensure that the right level of inventory is available to meet the special event needs.

Deadly sin #5: Senior management meddling. If your weekly or monthly demand planning meeting involves the company president, CFO, vice president of sales, or vice president of operations, it is almost certain the fifth deadly sin is going to occur. Senior executives have no business exerting their bias or influence on the SKU forecasts.

The sales forecast should be the company's best estimate of customer demand. It is inappropriate for executives to adjust the forecast as a means of manipulating inventory levels and fill rates. Inventory and service levels are best managed as part of the supply planning and inventory replenishment processes. Unfortunately, this sin is the easiest to recognize and the toughest to do anything about.

Deadly sin #6: Failing to measure sales forecast accuracy. It's crucial to measure forecast error and understand the root causes of high forecast errors. Some basics of sales forecast accuracy reporting include the following:

- Measure forecast accuracy at the SKU and product family levels.
- If your products have long lead times, account for the lead time lag in the sales forecast accuracy reporting.
- Measure which is more accurate—the system's statistical forecast or the planners' override forecast.
- Determine if forecasts are consistently too high or too low, indicating a bias in the statistical forecast or in forecast adjustment.
- Perform root cause analysis on items with high forecast errors to learn the real reasons for the forecast error.

Deadly sin #7: Safety stock based on forecast error. Safety stock inventory exists to cover periods when actual demand is greater than the forecast. It is a common system feature to compute SKU safety stock quantities based on forecast error and a desired customer service rate. Just plug in a 98 percent service rate, and let the system compute the safety stock quantity. Sounds too good to be true, right? Yes—until you look at the math of the traditional safety stock calculation.

The traditional safety stock calculation based on forecast error does not distinguish between periods when the forecast is too high and too low. But if we have forecasting processes that contribute to forecast error and the technique that uses forecast error results in excess inventory, why would we use it? Consider using new statistical modeling techniques that eliminate the bias of periods when the forecast error is the result of the forecast greater than actual. Or try an inventory planning strategy based on safety time rather than the fixed safety stock calculation that uses forecast error.

The seven deadly sins of sales forecasting contribute to increased forecast error, increased inventory, and lower customer service levels. Avoid them, and may find yourself in sales forecasting seventh heaven.

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SMOOTHING THE UNCERTAINTY CURVE

Alleviate variability with more effective demand management

By Joe Shedlawski, CPIM



Whether in the supply chain, customer service, or financial performance functions, a root cause of most disruptions to business operations is some type of variability. To achieve sustained success—particularly in view of the frequently changing external environment—enlightened business leaders are taking sharp aim at controlling internal variables.

I was fortunate to see a chief executive officer of a large consumer goods supplier deliver a keynote address before a conference of academics and professionals. His topic dealt with succeeding in uncertain markets. His solution focused on taking control of variability through the proper implementation and use of a fundamental business tool: sales and operations planning (S&OP).

Uncertainty is ubiquitous. Much of it comes from external factors—regulations, exchange rates, the economy, the weather. Variability refers to the types of uncertainties a business can control through improved analysis, communication, and decision making. The variability of manufacturing output, for example, can be improved through proper operator training and machine maintenance. Process simplification, using lean and six sigma approaches, can reduce lead time variability. Standardizing communications practices can eliminate confusion and the resultant variability in interpretation.

I recommend converting from a forecast to a demand plan—and making sure to engage all key stakeholders in an assessment of capabilities, constraints, and customer information. These activities comprise the essence of the demand management portion of S&OP, and many organizations will show double-digit improvements in key business metrics as a result of being able to better control variability.

Choosing the Priorities

While any organization should set aggressive goals for variability reduction or elimination, the best opportunity for most will be found in the area of demand management. It used to be that demand management consisted of recording the statistical forecast—which was produced solely from historical data—and then comparing it against actual demand, usually to the dismay of those who were left holding the responsibility for the accuracy of the forecast. Natural responses to such a stressful situation include seeking out even more historical data or predicting even further out into the future—neither of which improve forecast quality.

It's no wonder that the greatest amount of variability in most businesses today is found in the demand plan. Statistical forecasting is seen by forward-thinking professionals as only one of several inputs into a process of true demand management. One absolute truth about a forecast is that its accuracy deteriorates as the time horizon increases because there is more uncertainty in the distant future. The other truth is that detailed forecasts have higher error rates than aggregated forecasts. Recognizing these truths, and also that most improvement opportunities lie beyond the four walls of the organization, can set a priority plan for improvement.

Priority one should be to get everyone on the same page. Establish a shared understanding of lead times, capacities, risk tolerance, financial constraints, and flexibility to respond to change. This will help manage demand within tolerance whenever possible and stimulate fast action when conditions fall outside of normal limits.

Priority two requires an understanding of the difference between precision (how many decimal places in the measure) and accuracy (how well the prediction matches actual demand.) Data usually are overabundant, but those chosen to support improving the demand model should focus on improving accuracy to the levels of tolerance that were established in priority one.

The third concern is a matter of engaging all supply chain partners—from suppliers to customers—in the improvement effort, making sure that tolerance windows are understood and acted upon. The reasons for unplanned demand variation must be identified through root cause analysis, shared, and applied. Typically, this involves determining the leading indicators upon which a longer-range, aggregate forecast can be gauged, solidifying a demand plan at the volume level of detail, and refraining from a mix level of detail outside of the cumulative lead time. Certainly, the degree of uncertainty will rise as the time horizon lengthens; however, by following this process, an organization can effectively reduce the level of ambiguity at any point in time.

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