

Putting Together the Pieces

A Guide to S&OP Technology Selection
to Build a Market-driven Value Network

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Research

This independent research was 100% funded by [Supply Chain Insights](#) and is published using the principle of Open Content research.

It is intended for you to read, share, and use to improve your decisions in buying sales and operations planning (S&OP) technologies. When you use it, all we ask for in return is attribution. We publish under the [Attribution-Noncommercial-Share Alike 3.0 United States](#) Creative Commons License and Supply Chain Insights' [citation policy](#).

Disclosure

Your trust is important to us. As such, we are open and transparent about our financial relationships and our research processes.

Research Methodology and Overview

This report is the third in a three-part series. First we define a market-driven value network, then we apply these concepts to the Sales and Operations Planning process, and finally, we discuss the purchase of technology to enable this vision. Here are links to the reports:

- [Building Market-driven Value Networks](#)
- [Market-driven Sales and Operations Planning](#)
- [Putting Together the Pieces](#)

This report is based on nine years of observations of the Sales and Operations Software market's evolution. It is built on the premise that the best research is based on year-over-year studies and ongoing market triangulation. Input for the report includes:

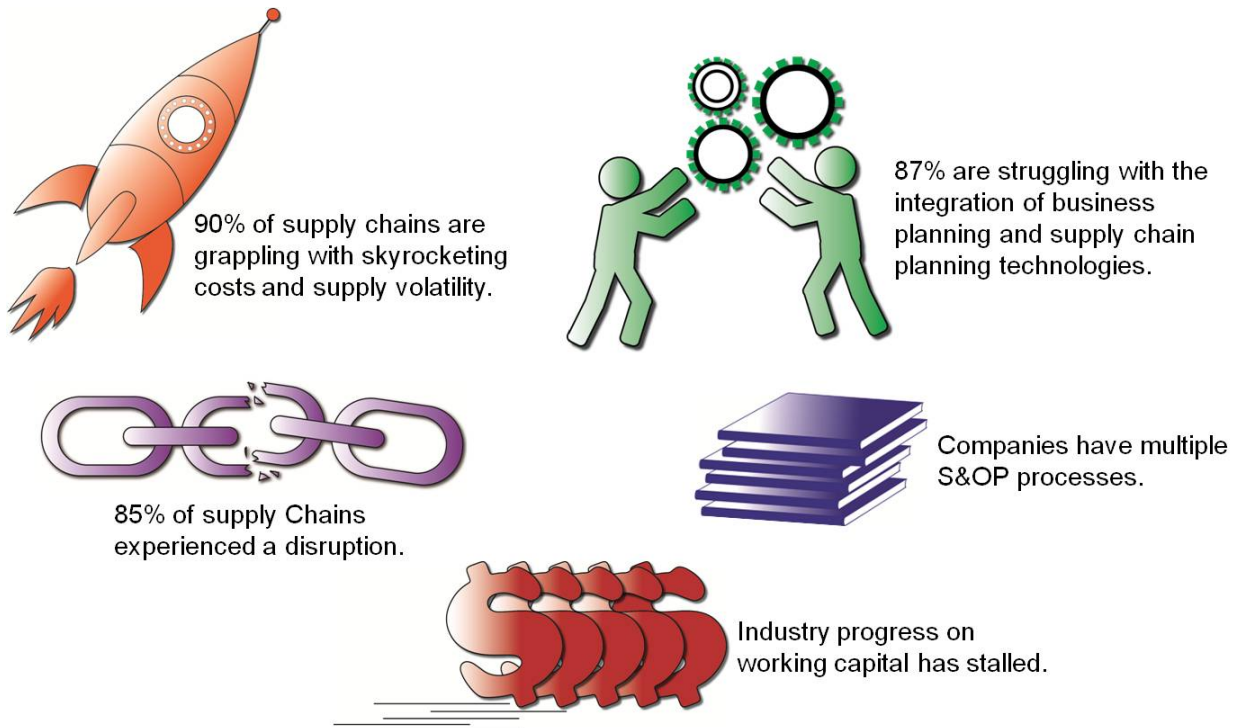
- **Supply Chain Insights Quantitative Research Findings (for more on this see the Appendix).** Supply Chain Insights has completed multiple studies on the use of Advanced Planning Systems within manufacturing and retailing companies.
- **Vendor Briefings.** Structured interactions with suppliers of technology over the past ten years.
- **Discussions with Software Vendor Client References.** On an ongoing basis, vendors will supply references to analysts to substantiate their software claims. These are one hour phone conversations.

- **Dialogues with Supply Chain Consultants Implementing Software.** During conferences, and through ongoing dialogues, discussions about the implementation of S&OP technologies have taken place over the years. In the process of writing this report, several experienced software implementers were consulted for input.
- **Personal Observations of Clients Implementing Sales and Operations Planning Software.** The author of this report has worked with over 150 companies implementing S&OP software. Those observations are reflected in this report.

Before the final publication of this report, each of the vendors listed in the Appendix was asked to comment on the factual accuracy of their solution overview/descriptions.

Executive Overview

Supply chain practices are three decades old. Over the past thirty years, supply chains have increased in complexity and become more core to driving business results. They have morphed from chains to networks built on inter-enterprise connectivity that stretches around the globe. It is no longer a discussion of internal and static processes. It is much more dynamic and fluid. For manufacturers and distributors, supply chain is now business.



Sales and Operations Planning (S&OP)—the process of aligning demand and supply to drive a business outcome—has become more important to power growth, improve resiliency and drive efficiency improvements. Process maturity requires technology, and it cannot be sustained without it. The question is what to buy, how to buy it, and when. That is the purpose of this report.

The selection of a solution is not easy. Companies have defined S&OP very differently; and there is no one standard definition, or a perfect technology solution. Instead, there are many variants. It is not as easy as picking a solution from an analyst report using a simple two-dimensional grid. Better results can be achieved by following a three-step methodology:

1. Identify S&OP Organizational Maturity
2. Characterize Industry-specific Requirements
3. Ascertain Organizational and Information Technology (IT) Requirements

In the process, remember that system selection cannot just be about supply. With the advances in computing power, demand and supply modeling have improved; and new categories of technologies have evolved for inventory and financial modeling. These new data models can enrich traditional supply chain planning processes; however, it requires a redesign in S&OP architectures to accommodate the input. It cannot be effectively accomplished through tight integration. Instead, the best modeling is accomplished through iterative planning.

Over the past five years, the solutions have also expanded in scope and capabilities to power teams and improve human interaction. With global expansion, and mergers and acquisitions, the processes have grown more complex and even knotty. They are anything but simple. The expansion of global supply chains requires both global and regional input and modeling. The management of governance structures in these larger organizations, in the more advanced software solutions, is improved through S&OP workflows, enterprise social networking and knowledge management. In

addition, these companies do not have just one supply chain; instead, the average company has five to seven distinctly different rhythms and cycles and 63% of companies have more than one S&OP process. Consequently, there is increased interest in a visualization layer and an executive dashboard to finalize operational plans and actions.

Today, companies are faced with a dilemma. Today there are so many pieces, so much opportunity, and so many requirements that the selection of a solution is confusing. Companies question how to put the pieces together. They often get so caught up in assessing new technologies that they forget that the foundation of a solution is the determination of a feasible plan. In our research, over 85% of companies lack a road map of how to assemble these pieces of S&OP technology to drive process maturity. Overcoming this challenge is the goal of this report.

To improve success, sidestep conventional myths and use this report to help navigate the market hype; and improve success by charting your path with a road map and a goal in mind.

Conventional Myths - The market is rife with unsubstantiated claims and myths:

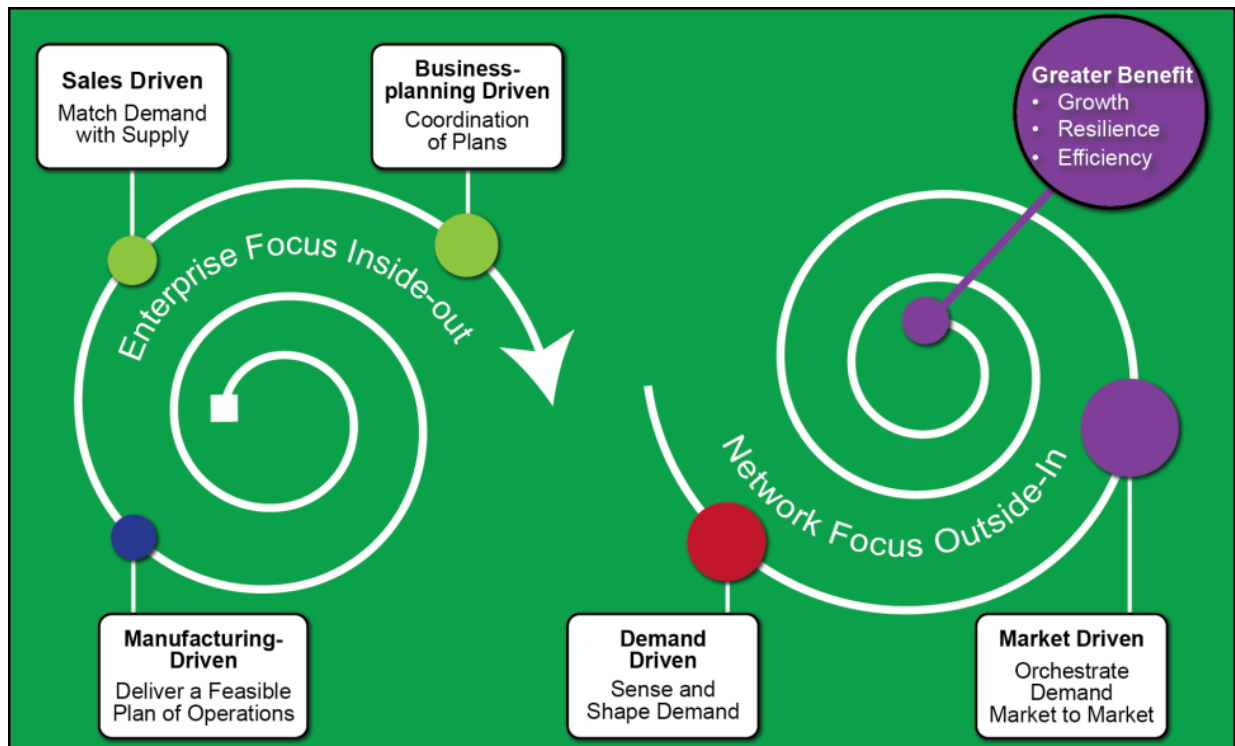
- You don't need a technology to drive an effective S&OP process.
- An 80% technology fit is good enough for an enterprise solution.
- Standardize: One solution provider is all you need.
- S&OP is dead. Integrated Business Planning (IBP) is the new solution.
- Supply chains are moving so fast that companies don't have time to plan.
- Real-time S&OP is a desired outcome.
- Tight integration improves the S&OP process.

The Evolution of S&OP Processes

Over the last thirty-five years of Supply Chain Management (SCM), S&OP processes have evolved. S&OP is a horizontal process that can connect and align the vertical silos of make, source and deliver to drive a better supply chain outcome. Today, based on our interviews, we see five stages of S&OP maturity. Each stage offers increasing opportunity to maximize business results and Return on Investment (ROI). It also requires the assembly of different “pieces” of technology.

The most mature stage in the S&OP model, as outlined in Figure 1, is achieving a Market-driven Sales and Operations Planning Process. Currently, this stage is aspirational. For many it is a goal or a future-looking process objective. It is a more mature end state than demand-driven.

Fig. 1 Sales and Operations Planning Maturity Model



For clarity, within this report, a market-driven value network is defined as an adaptive supply chain that can quickly drive alignment within the organization market-to-market (buy- and sell-side markets) to improve value-based outcomes. When market-driven, these supply chain processes sense and translate market changes bidirectionally with near real-time data latency to better optimize and align sell, deliver, make and sourcing operations to the goal. In the Market-driven Value Network, the focus is on horizontal process orchestration. The redefinition of S&OP processes to be market-driven is a radical shift from the supply-centric historic process definitions in three different ways:

- **Outside-in.** As the S&OP Maturity Model progresses through its five stages, there is a shift in focus from inside-out to outside-in. Stages 1 through 3 are mapped from inside the organization to the external markets, while Stages 4 and 5 are mapped from the outside in (from the markets into the enterprise) with a focus on sensing and translating market drivers for both buy- and sell-side markets. This is a radical departure from traditional supply chains that are inside-out and are based solely on order and shipment data.
- **Depth of Analytics Required to Orchestrate the Right Response.** Each supply chain has fundamentally different levers that can be adapted to orchestrate the response market-to-market (e.g., Alternate Bills of Materials, Alternate Suppliers, Changes in the Network, Substitution of Products, Changes in Demand Shaping, etc.) The use of advanced analytics allows companies to make end-to-end trade-offs between revenue management and supplier development to orchestrate the value network.
- **Improved Planning Capabilities and Requirements.** To drive a Market-driven Value Network, companies need to invest in “what-if” capabilities and Network Modeling Expertise to maximize opportunity and mitigate risks. In research studies, only 8% of companies feel that they have sufficient *what-if Modeling Capabilities* today for Stages 2 and 3 of the model, much less Stages 4 and 5.

Getting Started

Understanding where you are in the evolution of this S&OP maturity model is the first step in selecting the right technology solution. While the S&OP technologies are well defined in Stages 1 and 2 of this model, this is not true for the later and more mature stages of the market-driven value network. As companies move through the stages they will find they will need to have greater depth in supply chain what-if analysis, inventory and financial optimization modeling and supply chain visualization. It will not be as easy as buying everything from one vendor. Instead, many mature companies will need to buy multiple pieces of technology and assemble them.

Stage 1: Deliver a Feasible Plan

The S&OP process originated with a goal of developing a feasible plan. Early evolution of the Advanced Planning Solution (APS) market enabled organizations to develop a forecast, visualize operational requirements and align metrics. The introduction of constraint-based theory in the 1990s and the evolution of manufacturing planning enhanced this capability. It allowed organizations to identify constraints and build a feasible or a realistic plan based on

operations. Note: These models are very industry-specific. A conglomerate composed of process, discrete and apparel manufacturing may find that it needs multiple modeling systems. Similarly, the building of a one-size-fits-all model by the ERP expansionists has delivered generic models that do not fit any company very well.

While many companies have become enamored with new solutions--the advanced capabilities of Software as a Service (SaaS) technologies, and advanced workflows and analytics of some of the more recent solutions—before organizations invest in these new technologies they must first ensure that they are building off a firm foundation that ensures a feasible plan. To do this, organizations have to ensure the supply chain planning models represent constraints, variability and current capabilities of operations. This is an ongoing exercise. As operations change—outsourcing, new machinery, new modes of shipments—the planning models need to be corrected to reflect true operational capabilities. An S&OP plan that is not feasible is quickly discounted and loses credibility within the greater organization.

Stage 2: Match Demand with Supply

As organizations mature, teams need a solution to better model the trade-offs of volume and product mix. These analyses are complex. They need to balance customer service, asset strategies and inventory plans to best match demand with supply against the business strategy. To meet this requirement, Advanced Planning System (APS) vendors introduced what-if modeling environments in the late 1990s using deterministic optimization techniques. Over the last ten years, these processes were augmented by inventory management specialist capabilities to evaluate multi-tier inventory analysis.

Over the past two years, many of the multi-tier inventory analysis technologies were merged with other S&OP technology providers (**IBM** purchased **LogicTools**, and **Logility** purchased **Optiant**). In parallel, **JDA**, **Oracle** and **SAS Institute** introduced stand-alone inventory management modules. **SmartOps**, **Terra Technology** and **ToolsGroup** remain as stand-alone solutions to manage inventory trade-offs. While traditional technologies determine the right inventory levels for the organization's supply chain, these more advanced technologies focus on multi-tier modeling to determine the best “form and function” of inventory within the network.

Stage 3: Drive the Most Profitable Response

While Stage 1 is supply-driven and Stage 2 is sales-driven, Stage 3 is business-planning-driven. This is commonly dubbed, in the market, as integrated business planning (IBP). At this stage, it is critical to have a clear supply chain strategy and a well-defined definition of supply chain excellence. For most, this clarity, or the lack thereof, is a gating factor for success.

To accomplish this modeling, the demand and supply hierarchies must be decoupled to enable volume/mix what-if trade-offs iteratively between process steps. The output can then be improved through the use of financial modeling technologies (**Acorn Systems, Jonova, River Logic and Tagetik**). These technologies allow companies to analyze financial trade-offs of tax and compliance; working capital impacts from changes in contracts and network relationships; fixed and variable cost impacts from changes in the network design; and margin contribution of product mix and customer scenarios. This is a very different view than plugging fixed values into an Advanced Planning System (APS) and seeing the financial impact from a change in supply. Instead, this analysis evaluates the financial options and implications of changing a supply network given manufacturing and procurement assumptions.

This S&OP Maturity Stage requires the addition of two new capabilities: demand translation and supply orchestration. The process of modeling demand volume/mix trade-offs between demand and supply is demand translation. In supply orchestration, these trade-offs are made in commodity markets to determine the most effective formulation or platform design to schedule for manufacturing. The best results happen when this analysis is iterative: starting with demand, passing it to supply modeling, evaluating the right form and function of inventory, and then doing financial analysis. This iterative approach can require multiple cycles. At the end of the analysis, a “constrained demand plan” is passed to demand planners, the nodes of the network are established and the inventory targets for each stage of the supply chain are set.

Stage 4: Build Demand-Driven Supply Chain Capabilities

At this stage of S&OP process refinement, the technology flows are designed from the outside-in. This analysis is focused on sell-through into the channel, whereas the earlier steps of the S&OP maturity model are focused on selling into the channel.

The first step at this stage of maturity is to get really good at channel modeling using market drivers. These market drivers are based on end-user consumption and are mapped as parallel inputs or “indicators” into the demand plan. The demand plan is then used to sense market conditions based on downstream demand signals, followed by active shaping of demand, using technologies like price optimization; trade promotion planning; new-product launch plan alignment; and social, digital and mobile convergence. While demand sensing reduces the latency to see true channel demand, demand shaping combines the techniques of price, promotion, sales and marketing incentives, and new-product launch to increase demand lift.

For most companies, the movement from Stage 3 to Stage 4 of the maturity model requires a redesign and a reimplementation of the data model implemented in Stages 1 through 3.

Stage 5: Orchestrate Through Market-Driven Value Networks

The development of horizontal processes in Stages 1 through 4 of the S&OP Market-driven Maturity Model is foundational, and a prerequisite, to build Market-driven Value Networks. Companies cannot skip steps, and they cannot effectively build strong horizontal processes without operational excellence and process reliability.

When done right, this market-driven technology portfolio helps companies to sense and shape demand and supply bidirectionally between sell- and buy-side markets. This process of bidirectional trade-offs between demand and a commodity market is termed *demand orchestration*. This capability allows companies to win in this new world of changing opportunities and supply constraints. It is especially relevant with the tightening of commodity markets and increasing price pressures on today's supply chains.

To orchestrate demand horizontally, companies need to identify the leverage points in the supply chain. These include price, promotions, sales incentives, changing bills of materials, choosing alternate suppliers or modes of transportation or substituting products. Each industry and each company has a unique profile of options. While it may be down binning in the semiconductor industry, or initiating a SWAP plan in the chemical industry, or changing the process for alternate bills of materials in food and beverage, each industry has levers to pull.

The issue is how to best synchronize the coordination of buy- and sell-side market drivers. Today, with a focus on volume, they are not synchronized. As a result, companies will promote products with high price or scarce ingredients, customer commitments are made for configurations that are not profitable, and promises are made to the market for plans that are not feasible. With the growing scarcity of materials, and the intense price pressures on new product launch margins, demand and supply orchestration will grow in importance. Today, companies are cobbling together solutions in the absence of well-defined capabilities. Early evolution of this capability can be seen in **Kinaxis'** allocation logic based on material constraints in high-tech and **Signal Demand's** demand orchestration capabilities for reverse bills of materials in food and beverage.

As these processes mature, a subtle but important shift in the maturation of the S&OP process is the change of the data model in the optimization and foundational level of the Advanced Planning Solutions (APS) solution. This will often result in the reimplementing of the Advanced Planning Solution with a different focus and data model.

Table 1 Data Model Overview of the S&OP Maturity Model

| | Stage 1 | Stage 2 | Stage 3 | Stage 4 | Stage 5 |
|----------------------------------|---|---|--|---|---|
| Process Goal | Feasible Plan | Match Demand with Supply | Integrate Business Plans | Demand Driven | Market Driven |
| Demand Model Focus | Ship from modeling: What should manufacturing make? What should I ship? | Ship from modeling: What should manufacturing make? What should I ship? | Ship to modeling: What is being sold into the channel? | Ship to modeling: What is being sold into the channel? | Ship to modeling: What is being sold into the channel? |
| Replenishment Model Focus | Sell into the channel | Sell into the channel | Sell into the channel | Sell through the channel | Sell through the channel |
| Process Model Focus | Inside-out | Inside-out | Inside-out | Outside-in | Outside-in |
| Model Elements | Demand Supply | Demand Supply Mix Volume Form and Function of Inventory | Demand Supply Mix Volume Form and Function of Inventory Profitability | Demand Supply Mix Volume Form and Function of Inventory Profitability Market Demand Drivers | Demand Supply Mix Volume Form and Function of Inventory Profitability Market Demand Drivers Commodity Market Drivers |




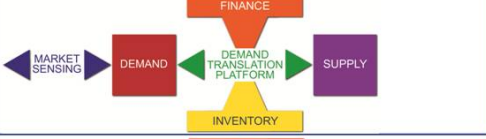
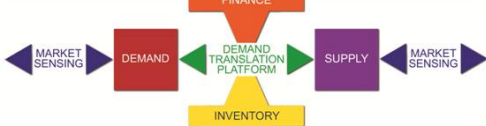
Putting Together the Pieces

After the purchase decision, companies also struggle with how to put the pieces together. The evolution of the technology to support iterative planning between demand, supply, inventory and financial planning systems requires increased functionality for demand translation, supply chain visualization and “what-if” analysis. This platform shift is outlined in Figure 2. In the appendix, to help the reader, we categorize solutions by the categories in Figure 2.

The demand translation elements shown in Stages Four and Five of the S&OP Maturity Model map the “ship-to data model configuration” for demand to the “ship-from data model configuration” of supply. This capability is found in the evolution of Software as a Service providers like **Kinaxis**, **SAP HANA**, **SAP-ICON** and **Steelwedge**.

Fig. 2 Putting the Technology Pieces Together

Technology Platform Changes

| Platform | Goal | Characteristics |
|---|----------------------------------|--|
|  | A feasible plan | <ul style="list-style-type: none"> Model the network Recognize and respect constraints Gain plan visibility |
|  | Match demand with supply | <ul style="list-style-type: none"> What-if analysis Multi-tier inventory analysis Network design |
|  | Deliver the most profitable plan | <ul style="list-style-type: none"> Demand translation Supply orchestration Optimize financial drivers |
|  | Demand-driven | <ul style="list-style-type: none"> Sense channel demand Shape demand Drive the most profitable response |
|  | Market-driven | <ul style="list-style-type: none"> Sense buy- and sell-side market conditions Bi-directionally orchestrate demand |

Source: Supply Chain Insights LLC

In Figure 2, the definitions of the pieces of technologies outlined above are:

Demand. Demand modeling is the use of statistical modeling technologies to develop an operational forecast. The most advanced models have the ability to manage seasonality, predict lift associated with revenue shaping events, anticipate market changes based on causal factors, drive accountability in consensus forecasting and drive continuous improvement through forecast value-added analysis.

Supply. The predictive analytical technologies allow companies to understand the available capacity of manufacturing and distribution. The more advanced technologies enable the modeling of constraints and costs in source, make and deliver decisions processes.

Inventory. As companies mature, there is a need to shift from just looking at the right level of inventory, to considering the right form (raw material, semi-finished good and finished product) and function (cycle stock, safety stock, pre-season build) of inventory to improve enterprise agility and reliability.

Financial. These models allow companies to take the inputs from demand and supply modeling and evaluate the financial impact of mix, demand or supply shifting, customer and product policies or the financial impact of changes in network sourcing.

Demand Translation. This capability allows companies to model the market (what is going to be sold in the channel) and translate the requirement to manufacturing (what needs to be manufactured when).

Market Sensing. The use of channel data for either buy- or sell-side markets to reduce the organization's latency to recognize market shifts and evaluate the impact of these shifts on the supply chain plans.

While Figure 2 shows the assembly of a single S&OP process, for companies with multiple S&OP processes, the same logic holds. For most organizations, they will have to build a similar figure to show multiple S&OP processes from different business units at various levels of maturity knitted together. These multiple technology platforms are mapped to enable iterative planning by the business unit resources with a visualization layer for executive review. This functionality is the genesis of the Kinaxis Control Tower concept and the SAP S&OP HANA release.

Industry Requirements

The solutions are industry specific. The greatest differences are in the area of supply. This is more so than the areas of demand, finance and inventory. The vendor classifications in the appendix are designed to help the buyer of technology understand the industry fit for each solution.

Conglomerates or companies with multiple processes will find that they will need to assemble multiple systems to ensure that they are meeting the process requirements. While these industry-specific definitions vary greatly, a general overview is listed below:

Retail. Retail modeling is characterized by seasonal planning cycles, store format changes, markdown and price changes, and marketing calendars. In specialty retail for apparel, unique functionality is required to manage style/color/size combinations. These processes are also usually characterized by long lead times for offshoring and the management of multi-tier distribution requirements. These solutions are designed for mass merchants, grocery retail, drug and convenience retailing and specialty retailing. Orchestration includes price, markdown, merchandising strategies, changing

assortment, allocation logic, shifts in channel strategies and alternate sourcing scenarios.

Process. Flow. In general, these products flow out of tanks, through pipes, and into bags, boxes, tank cars and totes. These processes are asset intensive and involve the modeling of process-intensive scenarios like reverse bills of materials, tank yard scheduling, yield and grade variations, industry swaps between manufacturers, and floating bottlenecks on equipment with the changes in mix. These operations are usually flow-based and heavily influenced by raw material availability and costs. Demand orchestration is usually a trade-off between price, grade, service terms and formula changes. These processes are found in the process chemical, pulp and paper, textiles, oil and gas, and wine and spirits industries.

Process. Mix and Pack. These processes are characterized by stages of preparation, mixing and batch transfer, packaging and palletizing. This is normally based on batch size and go-to-market requirements. These operations are often make-to-stock with push-based logistics. Demand orchestration touch points are price, promotion, sales incentives, formula and recipe changes, alternate sourcing and transportation mode, and network shifts. Industries characterized by these requirements are food and beverage, consumer packaged goods, and industrial chemical.

Discrete. Make to Order. In these industries, there is a focus on make-to-order processes where units are discrete and assembled based on Bills-of-Materials (BOM) and manufacturing routings. Orchestration options include materials, finishing, sourcing and shipping options. These processes are most frequently found in apparel, automotive, high-tech and electronics, and parts and component manufacturing for machinery.

Discrete. Configure or Assemble to Order. These industries work off of variants of platforms. The platform is designed for a value-based outcome, but is configured for specific customer requirements. Orchestration includes contract terms and conditions, service and warranty plans, platform design options, and alternate assemblies. These processes are found in aerospace and defense, heavy equipment, and transportation (e.g., truck, rail, barge) industries.

Organizational Considerations

As organizations grow larger, the technology requirements change. Specifically, the bigger and more complex of an organization that the team is trying to automate, the requirements for internal collaboration and workflow management, assumption archiving, and scenario management increase. To purchase a solution, map how your organization makes decisions. Note the requirements and compare them to the chart below.

Table 2 Criteria to Evaluate Organizational Requirements

| | Small Company, Easy Requirements | Mid-sized Company, Regional Requirements | Large Company, Global Planning and Regional Deployment |
|---|---|---|--|
| Assumption Management | Plan assumptions notated as notes in third-party systems. | Assumptions captured in scenario management, but no repository to store scenarios based on like conditions. | Scenario libraries to catalogue and test assumptions. Assumptions categorized in the steps of the process. |
| Collaboration | Limited collaboration abilities. Collaborative demand planning completed on spreadsheets and work among team members notated in third-party technologies. | Collaborative demand planning with management overrides but no accountability measurements. Notes sections for collaboration. | Demand planning collaboration with built-in bias and error reporting. Configurable, collaborative workflow between regions and corporate to enable questions and inputs. |
| Scenario Management | Planners have limited ability to do what-if analysis simultaneously. | Role-based scenarios and what-if analysis to support multiple users at the same time. | Planning master data management to support multiple what-if analyses simultaneously. |
| Performance Management: Dashboard and Scorecard Management | Non-extensible data for reporting in organizational BI technologies. Limited data visualization. | Extensible data. Dashboards and scorecards are easy to configure and represent key scenarios. | Dashboard and scorecards are configurable in near real-time. Supports questions in an executive S&OP session in real-time. |

Key: Small: Less than 10 planners. Mid-sized: 10-40 planners. Large: Greater than 40 planners.

Recommendations

No two S&OP processes are alike and no two organizations have the same need. As a result, build with the goal in mind. Sidestep the hype outlined in the executive overview and build a solution to meet your needs based on the information in this report.

Get Ready. For each stage of the maturity model, answer the following questions before contacting a technology solution vendor or a consulting partner:

Stage 1 - What is necessary to ensure a feasible plan? What are the constraints? What is the right time duration for the planning process? Note: Ensure that you can build and deliver a feasible plan before investing in the next steps of the road map.

Stage 2 - What is required in business analytics to support what-if modeling? What depth is required in inventory modeling? (Level of inventory versus form and function of inventory components).

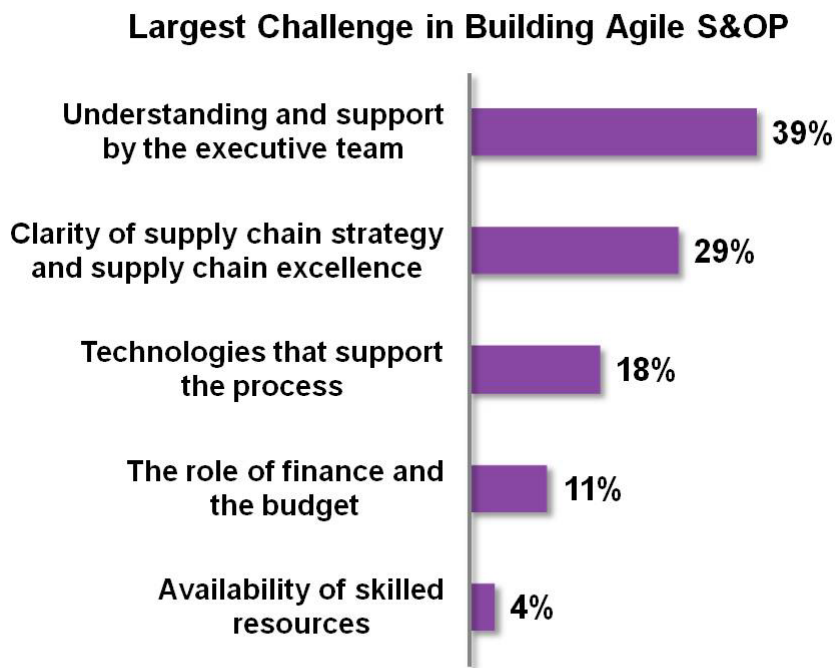
Stage 3 - What are the right trade-offs to make between demand, supply, inventory and financial modeling? How are these trade-offs supported by the supply chain strategy? How many equivalent units need to be modeled? What is required in an S&OP platform for volume and mix translation?

Stage 4 - What are the right market drivers to sense demand? Given these market drivers to sense demand, how will the company shape demand? What defines excellence for revenue management?

Stage 5 - What are the important commodity market drivers? How will market drivers be traded off (bidirectionally and horizontally) between buy- and sell-side markets? What combination of demand shaping and supply levers can be pulled to orchestrate a market-driven response?

Since one of the greatest barriers to effective S&OP is the understanding of supply chain excellence by the executive team, invest in training to ensure bottom-to-top alignment before starting the project.

Fig 3 Obstacles to Building an Agile S&OP Process



Source: Supply Chain Insights, LLC, Agility Webinar (May 2012)
Base: Webinar Attendees – Total Answered (28)
What is your largest challenge in building an agile Sales and Operations Plan?

Follow a Multi-Year Road Map and Build with the Goal in Mind. While many companies would like to accelerate the time to build S&OP maturity, do not try to skip the steps. The steps build on each other with the understanding in each step being a prerequisite for the next. Build the solutions and the processes with the goal in mind, with clarity of governance and process definition in each step. To accelerate maturation, invest in training, “what-if” modeling, and a clear definition of the supply chain strategy.

Staffing. Reward the Important. While many companies implement technology, they do not use the output of the technologies well. There are many reasons, but the most common is the lack of dedicated planning resources. Planners need time to plan. They cannot multitask between the important priorities of planning and the urgent activities of replenishment and manufacturing support. To ensure the best output, build the right solutions, and ensure that the project is staffed with adequate and trained resources. For many, this is an issue.

Recognize Differences, but Simplify where Possible. While there are often many industries and supply chains with multiple S&OP processes within the organization, most of the time these can be implemented using the same technologies and the same metrics, but adapting the data models and metric targets to recognize process differences.

Conclusion

The opportunity to automate S&OP is too great to pass up. A successful project requires technology to maximize long-term benefits. There is no one-size-fits-all solution. The first step in solving the puzzle is realizing that it will not be one technology, but multiple technologies installed over multiple years using a road map. The greatest success happens when the technology choices are based on a long-term view considering S&OP maturity, industry fit, and organizational size/maturity.

Appendix

S&OP technologies that can be assembled to solve the puzzle are listed below in alphabetical order by company name. The order of the listing does not represent solution preference:

Acorn Systems

Website: www.acornsys.com/

Deployment: License

Organizational Size: Medium-Large

Type: Financial Modeling

Relative Costs: \$\$\$\$\$

Coverage: North America and Europe

Industries: Retail, Consumer Products, and High-tech & Electronics

Strengths: Deep analytics to understand customer cost to serve and product complexity in the S&OP process. Often used to rationalize business complexity in channel strategies, and to aid team product rationalization efforts.

Considerations: Expensive and requires the support of a sophisticated user and availability of financial data to drive success.

Adexa

Website: www.adexa.com/

Deployment: License

Organizational Size: Medium-Large

Type: Demand and Supply Modeling

Relative Costs: \$\$\$-\$\$\$\$

Coverage: North America and Asia

Industries: High-tech and Semiconductor industries

Strengths: The solution has strong modeling for constraint-based planning with a strong presence in Japan. The modeling is stronger in supply than demand.

Considerations: The solution is not appropriate for process companies. It is stronger in supply than demand, but lacks a deep inventory optimization solution. For companies seeking depth in discrete modeling that cannot be found in Oracle or SAP, consider Adexa.

Key for Understanding

Relative Cost:

\$\$\$\$\$: >1500K

\$\$\$\$: 1000-1500K

\$\$\$: 500-1000K

\$\$: 200-500K

\$: Under 200K

License Software and Software as a Solution (SaaS) costs have different operating models. For the purpose of this report, when a company licenses the solution, the table represents the first year total installed costs (software, hardware, and implementation) in US \$. When a Software as a Service Solution is deployed, the costs tables represent the average of first five years costs.

Aspen Technology

Website: www.aspentech.com/

Deployment: License

Organizational Size: Medium-Large

Type: Demand and Supply Modeling

Relative Costs: \$\$\$\$

Coverage: North America and Europe

Industries: Chemical and Consumer Products

Strengths: The solution is very configurable and allows great depth for process modeling (reverse bill of materials, multiple levels of constraints and dependent demand for multiple forms of shipment) for process and mix and pack industries. It has the deepest supply modeling capabilities for the chemical industry.

Considerations: The solution is not appropriate for discrete companies. The modeling is stronger in supply planning than demand planning. Due to the level of configuration capable in the solution, the technology requires a strong understanding of what is needed and a strong user skill set to maintain. Cheaper, and easier-to-use industry solutions for the chemical industry include Arkemia (Previously Supply Chain Solutions (Zemeter)), OM Partners, and/or WAM Systems.

Boardwalktech

Website: www.boardwalktech.com/

Deployment: Software as a service

Organizational Size: Small to Large

Type: Demand, Finance and Supply Modeling

Relative Costs: \$\$-\$\$\$\$

Coverage: North America

Industries: Crosses many industries but lacks data model depth to model any industry well.

Strengths: The solution is easy to use after deployment. It is a good fit for companies that are used to spreadsheet modeling, but lack a system of record to keep all the spreadsheets in sync.

Considerations: The cost of the solution is in configuration. The solution can improve visibility, but lacks a constraint-based data model to determine the feasibility of supply or optimization algorithms to ensure the best plan. It is not a consideration for a supply chain that is supply-constrained or wants to improve demand forecast accuracy. Additionally, with the number of deployments, the usage should be limited to early adopters.

Demand Solutions

Website: www.DemandSolutions.com

Deployment: License

Organizational Size: Small-medium

Relative Costs: \$\$-\$\$\$

Coverage: Sold by a Global Network of Distributors

Industries: Consumer products, apparel, food & beverage and general manufacturing

Strengths: Established provider since 1985. Easy to use software for small or globally distributed teams

Considerations: Core functionality for simple demand and supply matching. Lacks depth in demand planning for larger organizations or constraint-based supply for manufacturers.

DCRA

Website: www.dcrasolutions.com

Deployment: Software as a service

Organizational Size: Small

Type: Demand and Supply Modeling

Relative Costs: \$-\$\$

Coverage: North America

Industries: Discrete

Strengths: Simple and easy-to-use S&OP modeling. It is ideal for a small or mid-size discrete manufacturing company seeking a Software as a Service model.

Considerations: A very simplistic approach to S&OP, the solution lacks the depth of modeling for material-centric and complex discrete manufacturers. It is best used by a company just starting on an S&OP journey that is looking for an easy to use solution for a few users without modeling depth.

Enterra Solutions

Website: www.enterrasolutions.com

Deployment: License

Organization: Medium to Large

Type: Demand and Supply Orchestration

Relative Costs: \$\$\$\$\$

Coverage: North America

Industries: All

Strengths: The solution uses a new technique of rules-based ontologies to map “multiple ifs to multiple thens” for a more dynamic response for multiple S&OP systems. While this type of solution is a new approach today, look for the use of Enterra Solutions-like solutions in S&OP execution in the next two to three years.

Considerations: Enterra is early to the market and is only suitable for early adopters looking for a co-development partner to build supply chains that listen, think, learn and then respond. While artificial intelligence has been discussed for many years, the Enterra Solution is one of the first to apply the concept.

IBM

Website: www.ibm.com

Deployment: License

Organization: Medium to Large

Type: Inventory Modeling

Relative Costs: \$\$-\$\$\$\$

Coverage: Global

Industries: All

Strengths: Strong visualization capabilities augmented by inventory analytics and reporting capabilities. IBM has purchased a number of technologies that are assembled into industry solutions. This includes the ILOG manufacturing scheduling product, the Cognos financial modeling product, and the Logictools inventory modeling technologies.

Considerations: While IBM has many complimentary applications for an S&OP process, as a company it cannot put together enough pieces to deliver a total solution. The company lacks demand, supply and financial modeling capabilities and usually partners, and adds-on IBM software components, to solutions with large ERP providers like SAP and Oracle to deliver S&OP implementations.

Infor

Website: www.infor.com

Deployment: License

Organizational Size: Medium to Large

Type: Demand and Supply Modeling

Relative Costs: \$\$\$-\$\$\$\$

Coverage: Global

Industries: All

Strengths: Combines the Lawson and Infor assets to give a buyer many options for S&OP. The solution is ideal for companies with existing Infor infrastructures. With the myriad of acquisitions, the company has a rich stable of potential solutions to draw from. The former Intentia products have strength in reverse bill of material modeling, and the Fygir application is the most commonly used tank scheduling application for the wine and beer industries.

Considerations: While the company has just released a new platform and a new S&OP product, the new solution lacks strong visualization; but is an improvement in delivering “what-if” capabilities. This new INFOR solution was released to the market this year with less than twenty-five deployments. The solution is stronger in supply than demand modeling.

JDA

Website: www.jda.com

Deployment: License or managed service

Organizational Size: Medium to Large

Type: Demand, Supply and Inventory Modeling

Relative Costs: \$\$\$-\$\$\$\$

Coverage: Global

Industries: Retail, consumer products and discrete manufacturers

Strengths: The company has a long legacy of acquired supply chain solutions — E3, Manugistics, i2 Technologies — with depth of solution demand, inventory and supply modeling. It is one of the strongest S&OP modeling tools for retail.

Considerations: The company is currently rationalizing footprints post-acquisition. The i2 Technologies software includes the deepest modeling technologies for the high-tech industry and the new JDA S&OP solution meets many of the needs of the i2 SCP and Factory Planning customers. Previous Manugistics customers are still struggling with the evolution of the solution for the process industries with many companies defecting to SAP. In general, the solutions lack the visualization technologies and ease of use that you will find from BI reformers like SAP’s use of Business Objects/HANA and IBM’s use of Cognos.

John Galt

Website: www.johngalt.com

Deployment: License or managed service

Organizational Size: Small-Medium

Type: Demand and Supply Modeling

Relative Costs: \$-\$\$

Coverage: North and Central America

Industries: All

Strengths: The Company offers two solutions: the Wizard and Atlas products. The Wizard product allows users to invest in a small solution and grow. The Atlas product has a fuller set of features. John Galt's legacy is in demand planning with recent development of deterministic inventory modeling and manufacturing modeling. However, the solution is deeper in demand than supply.

Considerations: John Galt focuses on the small to medium customer that is seeking a single solution with an easy to use data model. It does not have the depth of planning of other larger solutions and is not a good fit for companies seeking deep supply planning or trying to harmonize and visualize data across multiple S&OP systems.

Jonova

Website: www.jonova.com

Deployment: License, Software as a Service(SaaS) and Business Process Outsourcing (BPO)

Organizational Size: Medium to Large

Type: Financial Modeling

Relative Costs: \$\$\$-\$\$\$\$

Coverage: North America

Industries: Aerospace, Automotive, Pharmaceutical, High-tech & Electronics

Strengths: Depth of modeling for profitability analysis on fixed versus variable costs and product portfolio complexity. It is best used in new product launch scenario analysis to evaluate platform scenarios. Jonova's customers are using it for value-cream modeling, capacity planning and supplier hedging analysis.

Considerations: The product requires a sophisticated user and access to deep financial data. Due to the breadth and depth of the solution, and the newness of the solution approach, companies should consider using Jonova Managed Services Offering. When implementing, companies should realize that there are limited deployments and that the solution should only be considered by an early adopter.

Kinaxis

Website: www.kinaxis.com

Deployment: Software as a service

Organizational Size: Medium-Large

Type: Demand and Supply Modeling

Relative Costs: \$\$-\$\$\$\$

Coverage: North America and Europe

Industries: Material-intensive discrete industries

Strengths: Strongest discrete-material-intensive solution on the market. New visualization capabilities make decisions easier, driving insights for the executive S&OP meeting.

Considerations: Stronger on supply modeling than demand. Not the solution for a company needing a deep demand management solution. Also not a strong constraint manufacturing modeler.

Logility

Website: www.logility.com

Deployment: License

Organizational Size: Medium to Large

Type: Demand, Supply and Inventory Modeling

Relative Costs: \$\$-\$\$\$\$

Coverage: North America and Europe

Industries: Consumer products, apparel, and wholesale distribution industries.

Strengths: An easy-to-use, comprehensive solution with advanced capabilities in demand management, inventory management/postponement, and new-product launch forecasting.

Depth of solution for inventory modeling and postponement. Strongest solution for S&OP for apparel. Strong after-sale support by the organization.

Considerations: Decision support for executive S&OP lacks the visualization of other options, and it is not appropriate as a S&OP platform connecting multiple S&OP processes. It is also not a good fit for semiconductor or high-tech industry client.

Oliver Wight

Website: www.oliverwight.com

Deployment: License

Organizational Size: Small

Type: Demand and Supply Modeling

Relative Costs: \$-\$\$

Coverage: North America and Europe

Industries: All

Strengths: Complements the Oliver Wight training and enables pilot activities.

Considerations: The solution should only be considered for someone looking for a tool to get started on S&OP following training. Serious scalability and depth of modeling issues for most organizations as they move past the stage of a conference room pilot.

OM Partners

Website: www.ompartners.be

Deployment: License

Organizational Size: Medium to Large

Type: Demand and Supply Modeling

Relative Costs: \$\$-\$\$\$

Coverage: Europe and North America

Industries: Process chemical and consumer products

Strengths: Strong depth in manufacturing modeling and scenario modeling. The solution is stronger in supply than demand. Strong client references and is often seen in European implementations complimenting SAP APO.

Considerations: The solution requires configuration and deep understanding of the user. However, when properly installed, the solution provides what if analysis. For S&OP, the solution lacks visualization capabilities of other solutions like Oracle, Steelwedge or SAP HANA.

Oracle

Website: www.oracle.com

Organizational Size: Medium to Large

Type: Demand, Supply, Financial and Inventory Modeling

Relative Costs: \$\$\$\$-\$\$\$\$\$

Coverage: Global

Industries: Consumer Products, High-tech, and Discrete

Strengths: Strong demand planning capabilities and visualization of decisions for the executive S&OP meeting. The strong user interface of the Oracle solution is appealing to customers. With the wide-installed base of Hyperion, many companies prefer to use their Hyperion (Oracle acquisition) modeling capabilities for Stage 3 of Financial Modeling. The company has global presence and support capabilities for emerging economies.

Considerations: The solution lacks depth of modeling for supply. While the company has a strong demand planning tool for all industries, the supply solution is not recommended at all for distribution-intensive industries due to the lack of a distribution requirements modeling capability. The product lacks a demand translation platform capability and visualization for multiple S&OP processes. The inventory modeling technology is the weakest of any multi-tier modeling technology on the market and the demand planning tool has a stronger requirement for clean data than other solutions.

Portfolio Decisions

Website: www.portfoliodecisions.com

Deployment: License

Organizational Size: Medium

Type: Financial Modeling

Relative Costs: \$\$\$-\$\$\$\$\$

Coverage: North America

Industries: Process chemical

Strengths: Analyzes product portfolios and determines the most profitable portfolio to manufacture.

Considerations: The company is a niche provider with a specialized solution with a few clients in the chemical industry. The solution lacks depth in demand or supply planning modeling and will need to be coupled to an S&OP platform to manage scenarios.

River Logic

Website: www.riverlogic.com

Deployment: License

Type: Financial Modeling

Relative Costs: \$\$\$-\$\$\$\$

Coverage: North America

Industries: All

Strengths: Financial modeling of fixed and variable costs.

Considerations: This technology is a complimentary modeling tool for an S&OP process for financial modeling. It is not a demand or supply modeler and has limited dashboard capabilities for the executive S&OP meeting. As such, it should be considered as an add-on to an S&OP platform to compliment the process.

SAP

Website: www.sap.com

Deployment: License (SAP HANA S&OP is also offered as SaaS (Software as Service))

Organizational Size: Large

Type: Demand, Supply and Financial Modeling

Relative Costs: \$\$\$-\$\$\$\$\$

Coverage: Global

Industries: All

Strengths: Global presence with an established ecosystem of implementers. The company has financial stability and a strong range of solutions crossing all industries. The new SAP HANA solution is an in-memory solution with social collaboration and imbedded “what-if” analysis. The promise of the solution is provide faster in-memory visualization of S&OP decisions.

Considerations: Demand and supply solutions (APO) require a sophisticated user and care in implementation. Users frequently complain that the solution is hard to use and lacks depth of modeling for both demand and supply; however, it is the most widely deployed advanced planning system in the market. The recent release of the SAP HANA platform offers promise as an S&OP integration platform for demand translation, process visualization and the harmonization of multiple S&OP systems. SAP has invested time and money to build an S&OP data model in HANA that can be deployed multiple ways (license, private and public cloud); however, the HANA solution is new and evolving and only to be considered by early adopters.

SAS Institute

Website: www.sas.com

Organization: Medium to Large

Type: Demand, Financial and Inventory Modeling

Relative Costs: \$\$\$-\$\$\$\$

Coverage: Global

Industries: All

Strengths: Strong demand-planning technology for market modeling with some inventory optimization capabilities. The product is one of the deepest demand planning modeling technologies with emerging functionality for inventory optimization.

Considerations: When looking at the SAS solution for S&OP, the buyer should look at it as “piece parts” that will need to be assembled using someone else’s platform. The product lacks supply modeling for manufacturing and distribution constraints and S&OP process visualization, workflow and assumption management. It should be considered as an augmentation strategy to another solution needing depth in demand planning.

SignalDemand

Website: www.signaldemand.com

Deployment: License

Organizational Size: Medium to Large

Type: Market Sensing

Relative Costs: \$\$\$-\$\$\$\$

Coverage: North America

Industries: Process-based industries and consumer products

Strengths: Deep optimization for demand orchestration. Should be considered by Stage 5 clients as an additional technology to make the trade-offs between revenue management and supply alternatives.

Considerations: This technology is an enhancement tool for S&OP and should not be confused as a technology to model demand or constraint-based supply.

SmartOps

Website: www.smartops.com

Deployment: License and Software as a Service

Organizational Size: Medium to Large

Type: Inventory Optimization

Relative Costs: \$\$-\$\$\$\$

Coverage: Global

Industries: Consumer Packaged Goods, Life Sciences, High Tech, Chemical, Manufacturing, Distribution/Retail

Strengths: Deep multi-echelon inventory optimization for manufacturers and distributors.

Considerations: Strong visualization within the technology to see form and function of inventory with deep modeling to determine the best plan for the optimization of safety stock, cycle stock and appropriate customer service levels. Companies is releasing a demand sensing technology in the fall of 2012, but for now should only be considered as a complementary inventory modeling technology for S&OP. It should be deployed into an S&OP process to deepen inventory analysis.

Steelwedge

Website: www.steelwedge.com

Deployment: Software as a service

Organizational Size: Medium to Large

Type: Demand, Supply and Demand

Relative Costs: \$\$\$-\$\$\$\$

Coverage: North America with recent expansion into Europe and Asia

Industries: Discrete, chemical, and consumer products

Strengths: Product strength is in demand translation, attach rate forecasting and mix/volume analysis. It is a strong visualization tool for executive scenario modeling. One of the first Software as a Service (SaaS) offerings.

Considerations: Steelwedge was one of the first systems built for S&OP and has a common data model that facilitates the translation of demand to understand mix changes and translate across multiple equivalent units. The platform is stronger in supply than demand and lacks the depth of modeling for demand or supply planning that most organizations require. As a result, it is best deployed as a complimentary technology to existing APS implementations in large organizations.

Tagetik

Website: www.tagetik.com/

Deployment: License

Organizational Size: Medium

Type: Financial Modeling

Relative Costs: \$\$-\$\$\$

Coverage: North America and Europe

Industries: All. (Current focus in consumer products)

Strengths: Easy to use financial modeling to compliment the S&OP Process.

Considerations: Tagetik is a financial modeling tool to visualize trade-offs, but does not offer predictive analytics. It is a more general financial modeling tool than Acorn Systems, Jonova, or River Logic.

Teradata

Website: www.teradata.com

Deployment: License

Type: Demand and Supply Modeling

Organizational Size: Large

Relative Costs: \$\$\$-\$\$\$\$

Coverage: Global

Industries: Retail

Strengths: Very scalable product for retail distribution. Good modeling capabilities for distribution-based replenishment.

Considerations: While Teradata is usually thought of as a business intelligence solution, their purchase of Stirling Douglas software makes them fit for consideration for S&OP in a retail environment. While the solution can model demand and supply, companies will need to tailor the analytics to model the S&OP executive workbench. The solution is not a good fit for a manufacturer or for a company that needs to model multiple-S&OP processes at multiple stages, or complex distribution environments.

Terra Technology

Website: www.terratechnology.com

Type: Demand Sensing

Organizational Size: Mid-Large Companies

Deployment: License Sales

Relative Costs: \$\$\$\$-\$\$\$\$\$

Coverage: North America and Europe

Industries: Consumer Products and Distribution-Centric Industries

Strengths: Depth of optimization and co-development activities on demand sensing (reducing the latency from channel data to understand demand patterns) and inventory optimization.

Considerations: Best fit for a company that is comfortable with deep analytics in a black box.

Terra Technology has the deepest experience with the use of math to sense demand from either order and shipment streams or channel data. Five years ago, the company also launched an inventory optimization solution to help companies better translate demand.

ToolsGroup

Website: www.toolsgroup.com

Deployment: License

Organization: Medium to Large Companies

Type: Inventory Modeling

Relative Costs: \$\$-\$\$\$

Coverage: North America and Europe

Industries: Distribution Intensive

Strengths: Deep inventory optimization capabilities for organizations in distribution intensive environments like food and beverage, consumer products and wholesale distribution.

Considerations: The solution is not a good fit for a manufacturing intensive inventory data model involving work-in-process or late-stage postponement in the extended manufacturing network.

ToolsGroup is piloting a demand sensing application with several customers and should be considered by early adopters.

WAM Systems

Website: www.wamsystems.com

Deployment: License

Organizational Size: Small-Medium

Type: Demand and Supply Modeling

Relative Costs: \$\$-\$\$\$

Coverage: North America and Europe

Industries: Chemical and Other Process Manufacturing Industries

Strengths: Self-contained modeling workbench to model demand and constraints. System is designed for the chemical industry.

Considerations: Supply modeling is stronger than demand. User interface is not consistent across the application and the business intelligence for the executive S&OP meeting is a concern for many clients. Application has deep manufacturing scheduling logic for the small-medium chemical company looking for an easy-to-use solution.

Methodology:

Figures 1 and 2 in this report are based on analyst pattern recognition from interviews and client experiences. Figure 3 is based on a web-based survey from a webinar of twenty-eight supply chain executives. Data sourced in the infographic on page one is based on other [Supply Chain Insights S&OP reports](#).

About Supply Chain Insights LLC

Supply Chain Insights LLC (SCI) is a research and advisory firm focused on reinventing the analyst model. The services of the company are designed to help supply chain teams improve value-based outcomes through research-based Advisory Services, a Dedicated Supply Chain Community and Web-based Training. Formed in February 2012, the company is focused on helping technology providers and users of technologies improve value in their supply chain practices.

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Lora Cecere (twitter ID [@Icecere](#)) is the Founder of [Supply Chain Insights LLC](#) and the author of popular enterprise software blog [Supply Chain Shaman](#) currently read by 4500 supply chain professionals. Her book, **Bricks Matter**, publishes in the fall of 2012.

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