

Smart Sales and Operations Planning (S&OP) for Manufacturing and Distribution

Sponsored by IBM

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August 2018

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Executive Summary

Manufacturers are under severe pressures to improve S&OP to match supply and demand. By delivering integrated analytics solutions with predictive and optimization capabilities for S&OP, IBM is helping manufacturers and distributors reduce costs, improve productivity, reduce risks of stockouts and deliver personalized products.

Manufacturers Must Integrate Rigorous Data Analytics for S&OP

The manufacturing industry continues to expand with new orders, production, prices and employment rising while inventories are tightening.¹ To compete effectively, manufacturers (Consumer Packaged Goods – CPG, Transportation, Chemicals, Computers/Electronics and others), their suppliers and distributors are investing in analytics to improve service levels, reduce costs and better plan capacity throughout the value chain (Figure 1). Consequently, the manufacturing data analytics software and services market is expected to grow at a healthy 21.9% annually to \$8.45B by 2021.²

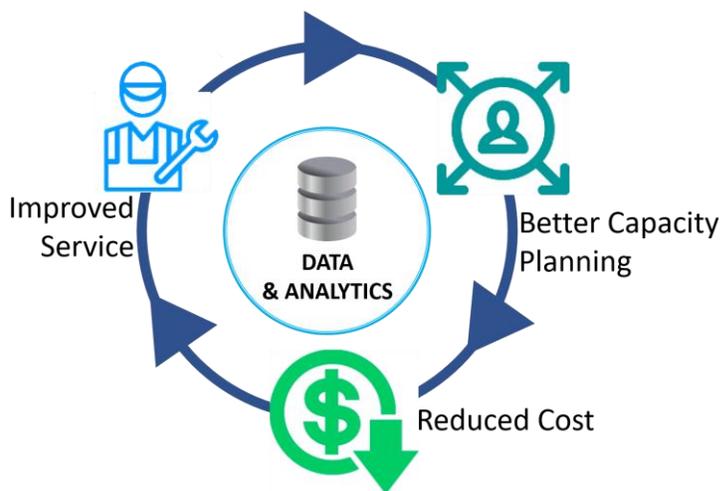


Figure 1: Benefits of Data Analytics in the Value Chain

However, siloed organizations (Figure 2) and ad-hoc Sales and Operations Planning (S&OP) processes based on “gut feel” rather than rigorous, holistic data-driven analytics are delivering subpar value for manufacturers and their distributors. Even when analytics are used, they are mostly in silos with limited predictive and prescriptive optimization capabilities.



Figure 2: A Siloed Organization

¹ <https://www.instituteforsupplymanagement.org/ISMReport/MfgROB.cfm?navItemNumber=31053&SSO=1>

² <https://www.marketsandmarkets.com/Market-Reports/manufacturing-analytics-market-125191578.html>

Manufacturing data analytics software and services market is expected to grow at a healthy 21.9% annually

Need to break silos and streamline and integrate Sales and Marketing, Operations and Finance

20% to 50% more accurate forecasts, 10% to 30% inventory reduction and 5% to 10% increase in on-time delivery

77% track financial and operational metrics but 70% report inaccurate demand forecasts as major challenge

What's needed are processes centered on data and high-value predictive and prescriptive analytics (Figure 3) that break silos and streamline and integrate Sales and Marketing, Operations and Finance. This enables functions or business units to make collaborative decisions to optimize S&OP for the entire value chain with proper governance and a single view of data. All teams can now better address supply and demand mismatches and reduce frequent, ineffective reactive plan adjustments which usually only address symptoms, not root causes.

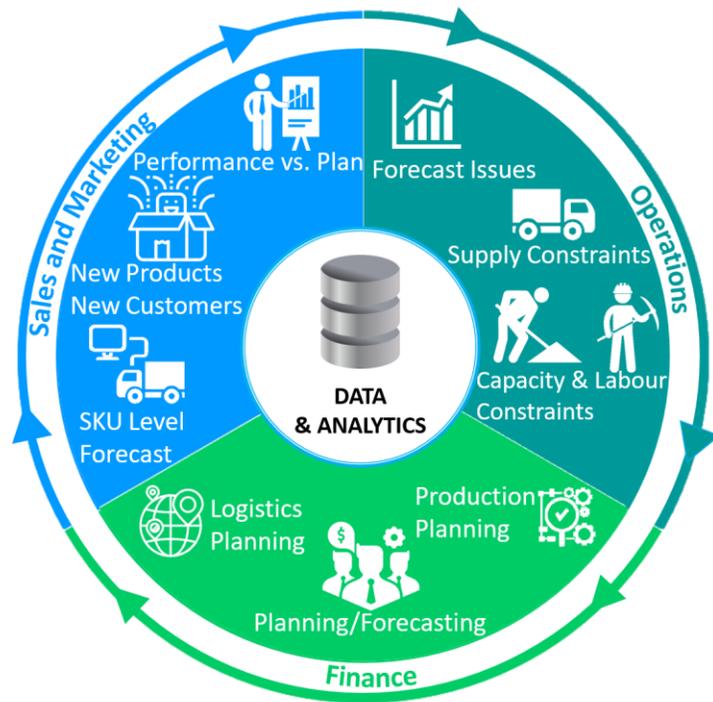


Figure 3: Integrated S&OP

Why Manufacturers Must Invest in High Value Analytics for S&OP

Many organizations are already centralizing S&OP and can track financial and operational metrics and integrate strategic and operational plans (Figure 4 – left).⁴ In fact, this has delivered 20% to 50% more accurate forecasts, a 10% to 30% inventory reduction, a 5% to 15% lower manufacturing downtime and a 5% to 10% increase in on-time delivery.³ While these benefits are substantial, many challenges remain with S&OP.

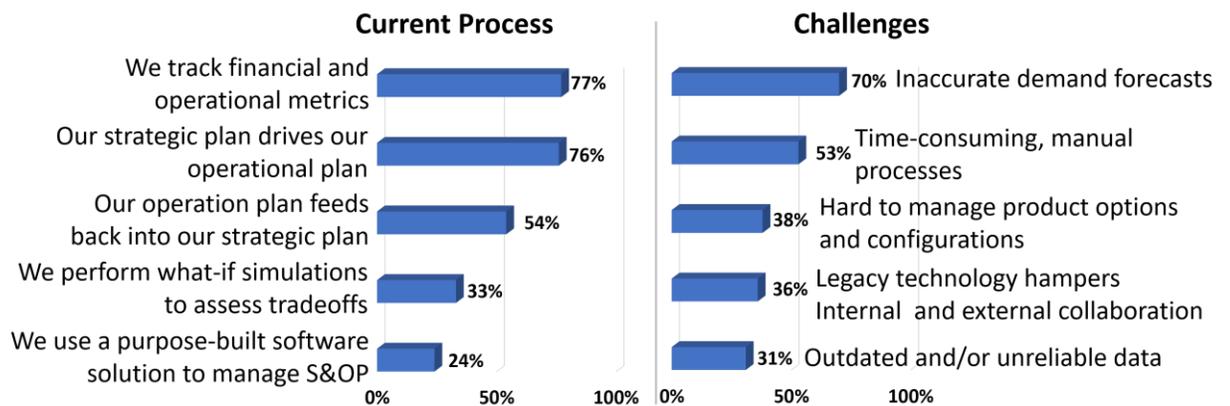


Figure 4: Current Process Tracks Metrics but is Manual resulting in Inaccurate Forecasts⁴

³ www.bain.com/Images/BAIN_BRIEF_Good_Sales_and_Operations_Planning.pdf

⁴ E2OPEN, "Sales and Operations Planning Trends", Survey Results, 2017

Major challenges with S&OP include inaccurate demand forecasts, influenced by the reliance of time-consuming manual processes (Figure 4). Over 80% of survey respondents think it is important to improve S&OP so that they can achieve timely visibility of the shifts in supply and demand, and to better manage the volume, velocity, and variety of data (Figure 5 – left).

Over 80% want to improve S&OP

60% need better and timely data from all sources and 52% considering investments in analytics

Data Scientists spend 79% of their time on cumbersome tasks

High-value analytics can improve gross margin up to 30%

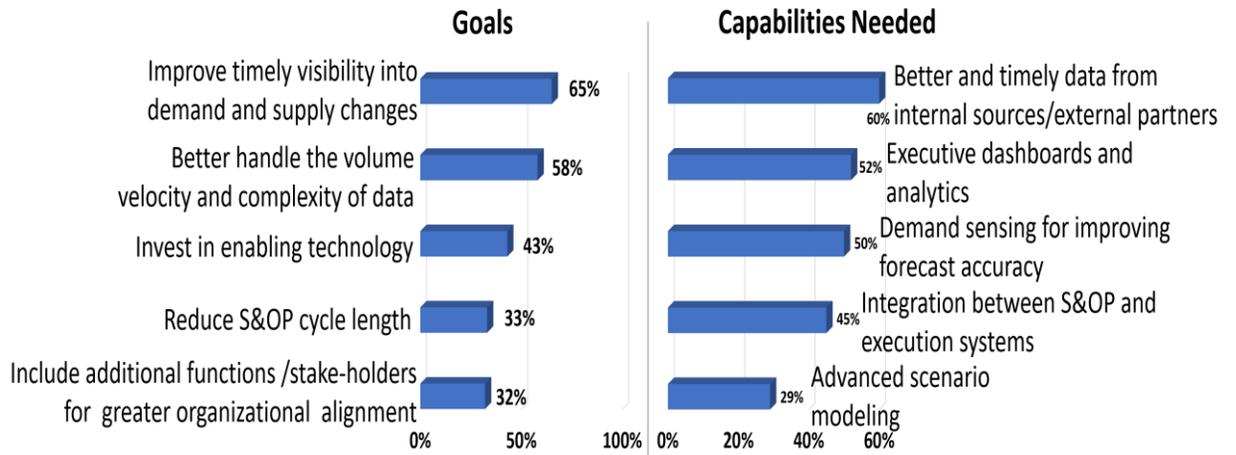


Figure 5: Need Timely Visibility in Demand/Supply Changes and Internal/External Data Access⁴

These improvements depend on data and analytics – 60% of respondents mention better and more timely data from all sources and 52% are considering investments in dashboards and analytics in the next year or two. These investments will become even more critical as manufacturers and distributors become more spread out by geography and function and need to accelerate the speed and increase the scope of decision making to satisfy customers who increasingly demand personalized products with little or no delivery costs and delays.

However, investing in only planning analytics (future depends largely on hindsight or past behavior) is not enough. What’s needed is a seamless high-value analytics solution with descriptive, predictive (foresight – what will happen) and prescriptive (optimization – what is the best plan) capabilities. But this is not easy to implement.

Deploying higher-value analytics is complex and labor intensive. Data Scientists typically spend about 79%⁵ of their time with cumbersome data preparation and cleansing tasks. With high-value analytics, manufacturers have the potential to realize up to 50% lower development cost, up to 25% lower operational cost and up to 30% gross margin increase. However, they realize only 20-30% of that potential because of existing siloed data in legacy systems and a lack of platforms/capabilities to build and implement higher value predictive and prescriptive capabilities, including Artificial Intelligence (AI)/Machine Learning (ML).⁶

What’s needed are high-value Analytics S&OP solutions that integrate easily across geographies, functional silos and the entire the value chain from raw materials to final delivery of finished products to the customer. IBM provides these high-value S&OP platforms and solutions for manufacturers and their distributors.

⁵ CrowdFlower, “2016 Data Science Report”.

⁶ McKinsey Global Institute, “THE AGE OF ANALYTICS: COMPETING IN A DATA-DRIVEN WORLD”, December 2016.

Accelerate Value with IBM Analytics Solutions for S&OP

IBM Analytics solutions for S&OP help manufacturers and their distributors align plans with financial goals by optimizing tradeoffs in revenue, margin and working capital, by considering real-world constraints. A consensus forecast drives inventory planning, material coordination planning and ultimately the financial plan. Key IBM solution components (Figure 6) are:

IBM S&OP solutions portfolio aligns financial plans with better forecasting and planning processes that consider constraints

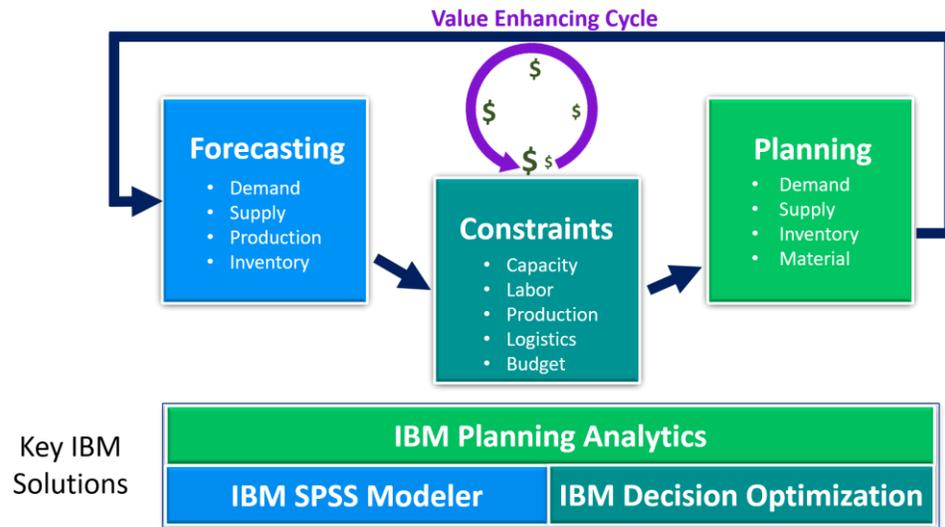


Figure 6: IBM Analytics Portfolio and Integrated Sales and Operations Planning Architecture

IBM Planning Analytics + IBM SPSS Modeler + IBM Decision Optimization provide a robust S&OP platform

- **IBM Planning Analytics** is a planning, budgeting, forecasting and analysis solution that has a customizable workspace for cost center owners and business managers. It can be deployed on premise or in the cloud and helps organizations automate manual, spreadsheet-based processes and link financial plans to operational tactics.
- **IBM SPSS Modeler** is a powerful, versatile data and text analytics workbench that can access the vast amounts of data stored in operational systems and build accurate predictive models quickly and visually, without programming.
- **IBM Decision Optimization** is a proven prescriptive analytics solution that enables manufacturers to solve a breadth of complex optimization problems using general programming language APIs like Python, Java or using powerful optimization engines.

Clients can first deploy IBM Planning Analytics and leverage this investment to enhance business value using the following two integrated IBM S&OP solutions:

- **Financial Demand Forecast:** IBM Planning Analytics and IBM SPSS Modeler
- **Financial Demand Planning:** IBM Planning Analytics and IBM Decision Optimization.

Integrated Forecasting and Planning solutions to evaluate multiple scenarios rapidly

With these solutions, Data Scientists can work together in an integrated development environment to quickly build optimization and forecast models using their method of choice. They can test and evaluate multiple scenarios to assess impact before deploying into production. These models can be deployed quickly, and business users can easily access them directly from the planning tool to see how they can avoid stockouts or shortfalls.

Optimize product mix and production quantities by locations in minutes

Streamline supply chain to deliver spare parts anywhere at the right price and time

Improved efficiencies, maintained right staffing levels, reduced overtime expenses and ensured customers had minimal delays in repairs

Manufacturers and distributors can use these solutions to sift through millions of alternatives to create an accurate plan in minutes instead of days to provide the best product mix and production quantities for the right location at the right time. This represents a major source of business value for IBM clients since currently only 33% perform “what-if” scenarios to assess trade-offs and fewer (24%) use purpose-built software for S&OP. An IBM client example illustrates this best.

Client Example

IBM Analytics solutions are generating significant value for many manufacturers and distributors worldwide. Here is how one prominent client optimized its S&OP process.

FleetPride

Streamline supply chain to deliver spare parts anywhere at the right price and time

Background/ Challenges	<ul style="list-style-type: none"> • Leading U.S. distributor of spare parts in the aftermarket channel for heavy-duty vehicles. Has five regional distribution centers and over 260 locations nationwide. • Must consistently deliver parts to customers when they need them, wherever they are in the country, at the right price. • Need to improve and optimize entire supply chain with data-driven processes instead of random “gut feel” approaches.
Solution	<p>Harnessed operational data from its warehouses and logistics network to implement integrated analytics using IBM Planning and Cognos Analytics, SPSS Modeler and Decision Optimization to:</p> <ul style="list-style-type: none"> • Design and distribute daily warehouse stock and inventory reports; giving warehouse managers a comprehensive overview of the level and location of stock with recommendations on where to store each type of item based on customer demand. • Build a model that uses three years of historical shipping data to predict the number of in- and outbound shipping orders per warehouse, over daily, weekly and monthly time horizons. • Optimize complex distribution network issues with constraints.
Results	<ul style="list-style-type: none"> • Most popular items are stored near the shipping dock – saving a lot of time for warehouse staff and increasing productivity. • Positioned new warehouses to minimize delivery time and costs across the entire network. • Warehouse managers can adjust labor planning and maintain the right resources to match customer demand every day.
Benefits	<ul style="list-style-type: none"> • Better informed-decisions with integrated advanced analytics transformed the entire supply chain • Improved efficiencies; helped maintain accurate staffing levels • Reduced overtime expenses • Ensured customers had minimal delays in vehicle repairs with 99.5 percent error-free packing in dispatches.

Summary and Recommendations

Analytics is a game-changing business opportunity for manufacturers and distributors to become smarter with their Sales and Operations Planning (S&OP) processes. Many organizations have reaped the benefits of centralizing and integrating S&OP. They are now increasingly considering deploying analytics to better predict demand, increase forecast accuracy and optimize inventory in real-time. These capabilities give manufacturers the potential to realize up to 50% lower development cost, up to 25% lower operational cost and up to 30% gross margin increase.

While many manufacturers are only considering descriptive analytics that provide hindsight, leaders are investing in AI/Machine Learning capabilities that provide deeper and more granular foresight on current product use/purchase patterns, competition, price elasticity and new product opportunities. This requires a strong foundation to leverage all the exploding volume, velocity and variety of data that manufacturers and distributors deal with every day.

By combining IBM Planning Analytics, SPSS Modeler and Decision Optimization in one S&OP solutions portfolio with AI/ML capabilities, IBM is uniquely positioned to help manufacturers and distributors deliver exceptional customer experience and product personalization, enhance marketing effectiveness, increase operational efficiencies, reduce stockout and shortfall risks, and more.

With a flexible pricing model, these solutions eliminate silos, reduce deployment risks, improve productivity and can drive revenues and profits and significantly improve the S&OP process for manufacturers and distributors.

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Advanced analytics help better predict demand, increase forecast accuracy and optimize inventory in real-time

IBM provides a robust foundation and proven solutions with AI / Machine Learning capabilities for S&OP