Transforming Retail Sales and Operations Planning (S&OP) with Integrated Analytics

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Executive Summary

Retailers are under severe pressure to improve S&OP and operate with tight inventory budgets, store display space and marketing funds. By delivering integrated analytics solutions with predictive and optimization capabilities for S&OP, IBM is helping retailers reduce costs, improve productivity, personalize offers and reduce risks of stockouts.

Retailers are Deploying Advanced Data Analytics for S&OP

The retail industry continues to grow at over 4.5% annually with online retailers growing at over 11%.[1] However, traditional brick and mortar retailers continue to be challenged with frugal customers, flat or declining sales (ignoring online sales), large, expensive store networks and tight labor markets.[2] The number of stores closed in 2017 reached an all-time high of over 7000 stores – 200% more than prior year closures.[3] So, taking a cue from online retailers, traditional brick and mortar retailers (department, supermarket, specialty, warehouse, convenience, discount and others) are investing in advanced analytics to improve revenues/profits by streamlining their supply chain and offering their customers better pricing, personalization, recommendations and promotions (Figure 1). Consequently, the global retail analytics market is expected to grow at a healthy 18.26% annually to $10.34B by 2023.[4]
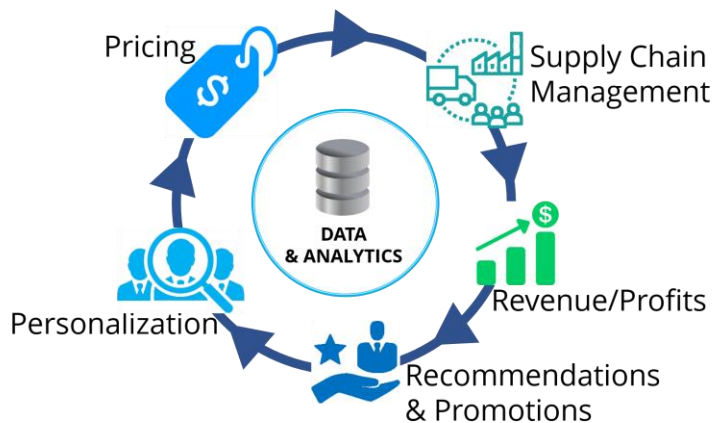

Figure 1: Benefits of Data Analytics for Retail

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 retailers. Even when analytics are used, they are mostly in silos with limited predictive and prescriptive optimization capabilities.
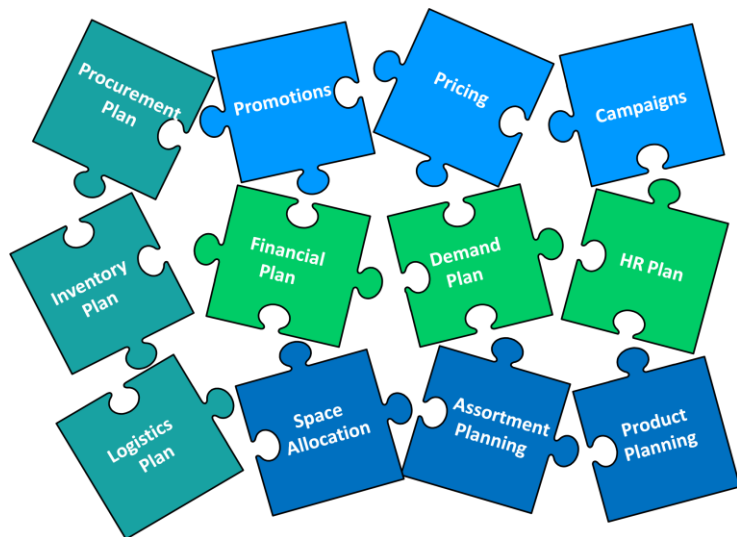

Figure 2: A Siloed Organization

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[1] https://nrf.com/media/press-releases/july-retail-sales-increase-49-percent-over-2017
[2] PwC, "2017 Retail Industry Trends", 2017.
[3] https://www.cnbc.com/2017/12/26/store-closures-rocked-retail-in-2017-and-more-should-come-next-year.html
[4] https://www.mordorintelligence.com/industry-reports/global-retail-analytics-market-industry

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, Finance and Merchandising. This enables functions or business units to make collaborative decisions to optimize S&OP with proper governance and a single view of data. Retailers can now better address supply and demand mismatches, improve long-term and detailed assortment planning,

Figure 3: Integrated S&OP for Retail

promotion planning and inventory planning. This helps optimize cash, space and improves staff productivity – all critical to improve a retailer's revenues and profits.
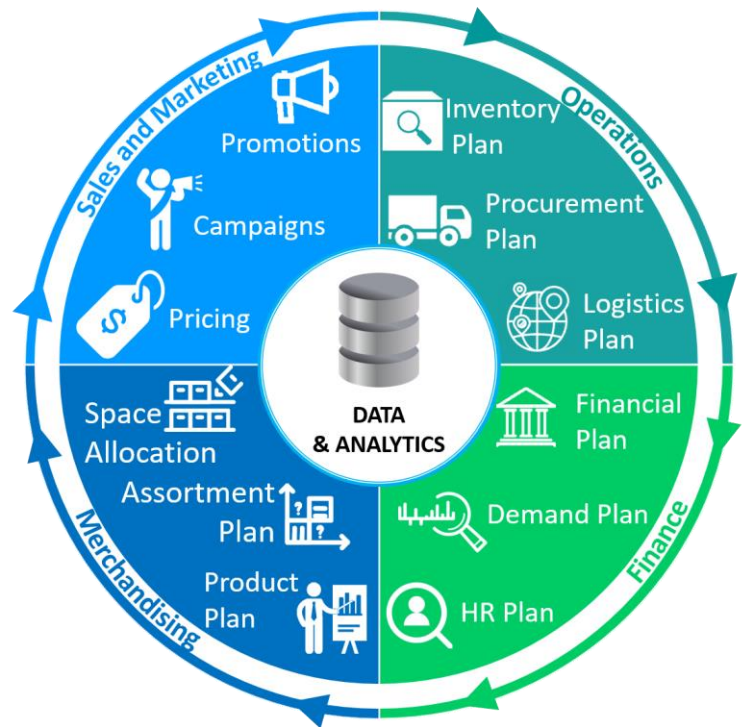
Why Retailers Must Invest in High Value Analytics for S&OP

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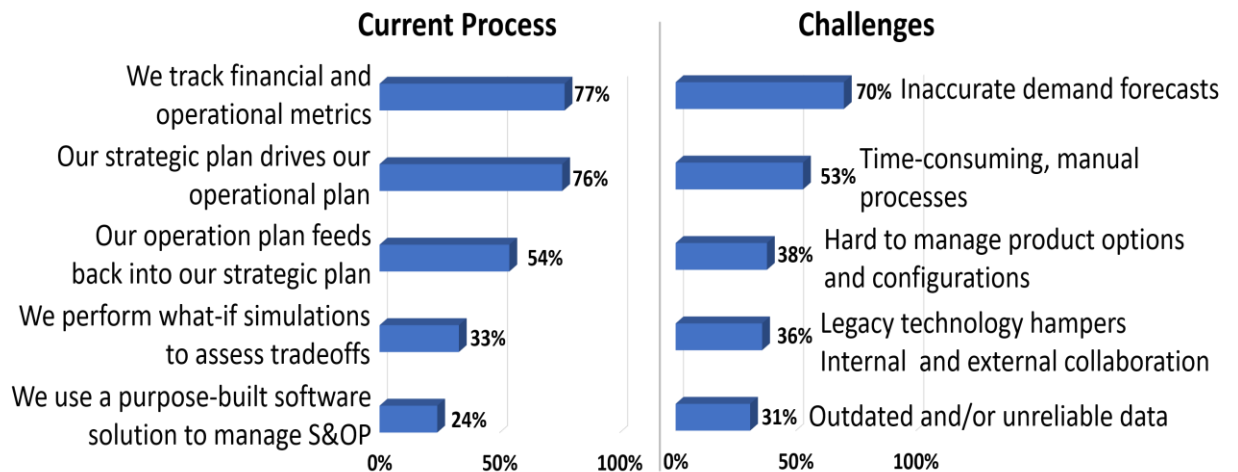

Current Process

We track financial and operational metrics	77%
Our strategic plan drives our operational plan	76%
Our operation plan feeds back into our strategic plan	54%
We perform what-if simulations to assess tradeoffs	33%
We use a purpose-built software solution to manage S&OP	24%

Challenges

70%	Inaccurate demand forecasts
53%	Time-consuming, manual processes
38%	Hard to manage product options and configurations
36%	Legacy technology hampers Internal and external collaboration
31%	Outdated and/or unreliable data

Figure 4: Current Process Tracks Metrics but is Manual resulting in Inaccurate Forecasts[6]

[5] www.bain.com/Images/BAIN_BRIEF_Good_Sales_and_Operations_Planning.pdf
[6] E2OPEN, "Sales and Operations Planning Trends", Survey Results, 2017

Increasingly, retailers must compete for price-sensitive customers who demand choice and personalized products with little or no delivery costs and delays. So, retailers must deal with an ever-increasing proliferation of store keeping units (SKUs), more overseas sourcing with extended supply chains and unpredictable demand for a specific SKU.

S&OP currently produces inaccurate demand forecasts because of the reliance of time-consuming manual processes (Figure 5). Over 80% of survey respondents would like to improve S&OP so that they can achieve timely visibility of the shifts in supply and demand and better manage the volume, velocity, and variety of data (Figure 5 – left).
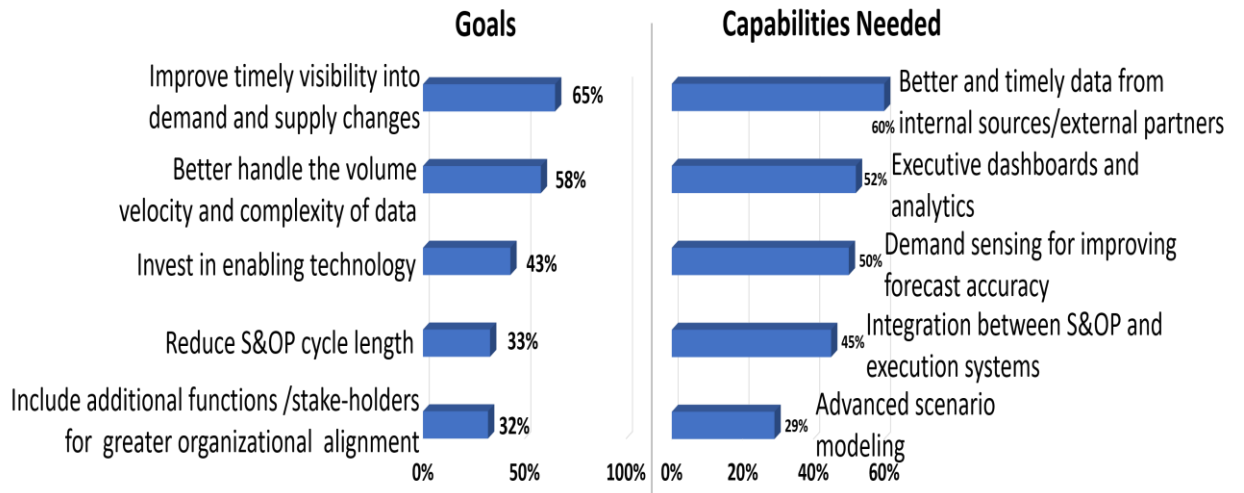
Goals

Improve timely visibility into demand and supply changes	65%
Better handle the volume velocity and complexity of data	58%
Invest in enabling technology	43%
Reduce S&OP cycle length	33%
Include additional functions /stake-holders for greater organizational alignment	32%

Capabilities Needed

Better and timely data from internal sources/external partners	60%
Executive dashboards and analytics	52%
Demand sensing for improving forecast accuracy	50%
Integration between S&OP and execution systems	45%
Advanced scenario modeling	29%

Figure 5: Need Timely Visibility in Demand/Supply Changes and Internal/External Data Access[6]

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. Many retailers have already invested in planning analytics (future depends largely on hindsight or past behavior).

To optimize operations, improve loyalty, foster supplier collaboration, improve product assortments and pricing, get deeper and more granular predictive (foresight – what will happen) insights on sales across all channels, retailers are investing in high-value in-store Wi-Fi and prescriptive (optimization – what is the best plan) analytics (Figure 6). But this is not easy to implement.

Figure 6: Retail Advanced Analytics Trends and Benefits

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Deploying higher-value analytics is complex and labor intensive. Data Scientists typically spend about 79%[7] of their time with cumbersome data preparation and cleansing tasks. With high-value analytics, retailers have the potential to increase net margins by more than 60 percent and the U.S. retail sector could boost annual productivity growth by 0.5 to 1.0 percent. However, they have captured only 30-40% of this 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).[8]

What's needed are high-value Analytics S&OP solutions that integrate easily across companies, functional silos and the entire the value chain to personalize offers at the right time, optimize staffing levels, improve sourcing and streamline shipping and transport. IBM provides these high-value S&OP platforms and solutions for retailers.

Accelerate Value with IBM Analytics Solutions for S&OP

IBM Analytics solutions for S&OP help retailers align plans with financial goals by optimizing tradeoffs in revenue, margin and working capital, by considering real-world constraints such as labor, capacity, logistics, budget and shelf space. A consensus forecast drives supply, demand, inventory and assortment planning, and ultimately the financial plan. Key IBM solution components are depicted in Figure 7:
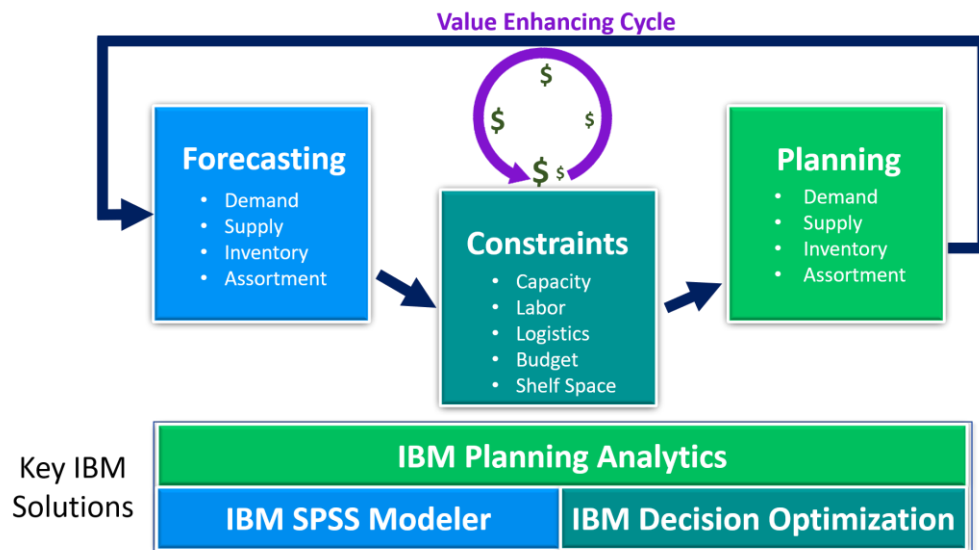
Figure 7: IBM Analytics Portfolio and Integrated Sales and Operations Planning Architecture

- **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-premises 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.

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[7] CrowdFlower, "2016 Data Science Report".
[8] McKinsey Global Institute, "THE AGE OF ANALYTICS: COMPETING IN A DATA-DRIVEN WORLD", December 2016.

- **IBM Decision Optimization** is a proven prescriptive analytics solution that enables retailers 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.

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.

Retailers can use these solutions to sift through millions of alternatives to create an accurate plan in minutes instead of days to empower human resources and provide the best product assortments 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.[6]

Client Example
IBM Analytics solutions are generating significant value for many retailers worldwide. Here is how one prominent client optimized its S&OP process.

Rotkäppchen-Mumm Sektkellereien GmbH

Reduce inventory without risking stockout

Background/ Challenges	- German retailer of sparkling wines, spirits and other drinks. Market leader in sparkling wine in Germany with a 55% share of the market. - Needed to boost working capital and cut warehouse costs by shrinking inventory levels without risking stockouts or impacting customer service levels.
Solution/ Results	- Automated and enhanced forecasting processes with IBM Planning Analytics and IBM SPSS. - Extracted data from ERP and CRM systems into Planning Analytics and using SPSS constructed time-series models to forecast sales. - Assessed the significance of several potential sales drivers, including seasonal factors such as public holidays, special events like the FIFA World Cup and trade promotions such as advertising and discounts. Drilled down to the level of individual

		SKUs, enabling them to assess the accuracy of their models at a highly granular level. • Produced the optimal product quantities based on accurate insights into demand and future trends. The result was a 22% rise in the accuracy of selected sales forecasts with a corresponding decrease in stock levels without risking stockout.
Benefits	•	Deployed a new hybrid sales planning and performance management solution that serves both sales and production teams with a three-month and a 24-month view of future sales and complements account team knowledge with proven, rigorous predictive statistical models.

Summary and Recommendations

Analytics is a game-changing business opportunity for retailers to transform 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 high-value analytics to better predict demand for specific SKUs, increase forecast accuracy and optimize inventory and staff resources in real-time. These capabilities give retailers the potential to improve profit margins by up to 30%.[8]

While many retailers are only considering planning 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 how to optimize human resources. This requires a strong foundation to leverage all the exploding volume, velocity and variety of data that retailers 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 retailers deliver exceptional customer experience and product personalization, enhance marketing effectiveness, increase operational efficiencies, enhance staff productivity, 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 retailers.