

SHOPPER-CENTRIC SALES AND OPERATIONS PLANNING: CCD'S JOURNEY TO DEMAND-SUPPLY INTEGRATION*

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CCD, Inc. is the North American division of a global healthcare and pharmaceutical company marketing, selling and distributing a portfolio of over-the-counter (OTC) pharmaceuticals, dietary supplements and dermatology products. CCD distributes its products through pharmacies, drug stores, mass merchandisers (supercenters), warehouse clubs, supermarkets and convenience stores. CCD's products are well-known consumer OTC brands with high brand recognition, and are heavily supported by national advertising, trade and in-store promotions.

Since the early 1980's, CCD had consistently grown its product portfolio. Part of this growth came from new product development, but the majority was the result of acquisition of other OTC companies' brands and products and the integration of these with CCD's product portfolio and organization. By 2014, CCD had become the third largest OTC pharmaceutical company in the United States. However, over time, a number of big retailers, representing a sizable portion of CCD's end-consumer sales, grew dissatisfied with CCD's seeming inability to deliver the right products at the right time to their stores. Some retailers even considered removing CCD brands from their stores' shelves.

CCD's Logistics Service Group (LSG) was responsible for designing, planning and managing CCD's customer support logistics. LSG managed the logistics processes that, in response to replenishment requests, delivered CCD products to customers. Mark Bend, as CCD's vice president in charge of LSG, was ultimately responsible for order fulfillment. As 2014 drew to a close, Mark realized he had to quickly find out why CCD's customer service performance was deteriorating. Even more importantly, Mark knew he must identify what could be done to correct the problems to continue CCD's sales growth as the division pursued its strategic goal to become the leader in OTC products in the U.S.

CCD's North American headquarters was located in New York, and housed the marketing, finance, accounting, human resources and C-suite executive functions. CCD also operated two warehouse and distribution locations, one in a Mid-Atlantic state and one in a Mid-South state. These locations were mainly involved in the repackaging of products for sales in the U.S. market. They had limited production capacity and received bulk shipments of product from the parent company's European production plants. The fourth U.S. location was Mark Bend's Logistics Services Group, located just outside of Chicago. LSG team members were responsible

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for fulfilling individual store orders for CCD's large retailer customers. As a result, Mark's staff served as the main point of contact for CCD customers and was in daily contact with retailers.

The OTC retail channel in the United States

The retail channel for OTC drugs and treatments like CCD's was very different from the tightly controlled distribution and sales channel for prescription drugs. As such, OTC retailing had more in common with the retail channel for consumer packaged goods than for pharmaceuticals.

The U.S. is the world's largest market for OTC products with 2014 sales of \$28 billion. In the U.S., pharmacies and drug stores were the traditional retail outlets for OTC items. However, since the 1960's, traditional grocery stores (supermarkets), mass merchandisers (supercenters), wholesale clubs and even convenience stores have steadily grown their share of the lucrative OTC market. From the manufacturers' perspective, retailers are their immediate customers, providing the final and most important touch point with the ultimate consumers.

About twelve of the largest retailers in the U.S. represent eighty percent of OTC sales. Smaller retailers typically do not deal with OTC manufacturers directly, but purchase their OTC inventory from wholesalers or distributors. Consequently, OTC manufacturers direct their sales efforts at large retailers. On the other hand, advertising and sales promotion efforts focus on shoppers and consumers, attempting to increase consumer demand. Therefore, marketing job one for each OTC manufacturer was to convince retailers to stock their products on their shelves, so that products could be available for shoppers to purchase in response to the manufacturer's marketing and promotion. Manufacturers used market data and consumer research to justify their requests for retailers' shelf space. In addition, manufacturers would coordinate specific, often seasonal, promotion campaigns with retailers. For example, during cold and flu season a manufacturer like CCD would increase its advertising spending and use of trade promotions (such as coupons, rebates and in-store displays) for its line of cold and flu remedies.

The bottom-line success of all of a manufacturers' marketing efforts, especially short-term and/or seasonal promotions, depended on the physical availability of the manufacturer's products on the retail shelf. Shoppers and consumers routinely purchased substitutes for most OTC products, whether the substitutes were competing nationally-advertised brands, generic or store-brand items. Therefore, it was critical for OTC manufacturers to ship the right product, in the right quantity, at the right time to the right retailer location, whether that location was a distribution center or specific store. Shipping the wrong product, shipping a smaller quantity than the retailer customer requested, or shipping late (e.g., after the promotion was underway or had ended) meant that the promoted products likely would not be available for shoppers to purchase when and where the shopper wanted to buy them. In most cases, for the manufacturer, the result of such a breakdown in supply chain execution was that a sales opportunity was lost forever, as many shoppers, when confronted with a stockout, will buy a substitute product.

In retailing, the shopper's purchase decision is sometimes referred to as "the moment of truth" signifying the specific point in time, or truly the one opportunity, when all of the marketing and sales efforts by manufacturer and retailer are converted into sales dollars. Therefore, the ability to consistently keep product in stock on retail shelves, or on-shelf availability (OSA), is, as for

CPG channels, a crucial performance metric for OTC channels. If, because of low OSA, shoppers couldn't find products on retail shelves, it didn't matter if there was inventory available in a manufacturer's plants or warehouses, the retailer's distribution centers, or even the stores' stock room. Without OSA a retail sale could not be made, especially for highly substitutable items. Because of the direct impact on their sales revenue, retailers monitored OSA closely. They frequently checked their shelves to assess whether suppliers were meeting their OSA requirements.

Most retailers decided twice a year what products they would offer for sales in their stores for the next six months. They based these decisions on their own and manufacturer-provided market and consumer research. Based on the estimated sales for each item, retailers decided where in the store they would stock the item, how much of the item they would stock on their shelves and at what price they would sell the item. This sales plan or "planogram" as it is called in retailing, then determined the retailers' initial orders with OTC manufacturers as well as replenishment requirements such as minimum inventory levels and order quantities. Retailers responded decisively to poor supply chain execution, and the resulting low OSA, which they considered an impediment to effective execution of their sales plan. Typically, retailers financially penalized suppliers with low OSA to compensate for their lost sales. Suppliers consistently providing low OSA faced a great risk that their products would be eliminated from the next iteration of the retailer's planogram. Retailers would even remove a popular brand from a planogram and replace it with a substitute item from another manufacturer that provided better OSA and thus more revenue.

Sometimes rather than eliminate an item from its planogram a retailer would reduce the amount of shelf space allocated to the item. Retail shelf space was limited and was therefore valuable as a revenue generator. OTC manufacturers competed fiercely for shelf space and once a product was (partially or totally) removed from a planogram, it was difficult for the manufacturer to regain its lost position.

Logistics Service Group's Challenge

In May 2013, CCD managers had estimated that achieving the company's main strategic objective of becoming the U.S. OTC market leader would require at least an additional \$200 million in net sales by 2015. In order to facilitate this level of revenue growth, CCD had acquired other OTC brands and, each time these new product lines were added to its OTC portfolio, restructured its sales and marketing organizations. As a result of these continuous changes in the marketing and sales organization, as well as the simultaneous implementation of an enterprise resources planning (ERP) system mandated by its European parent company, CCD's supply chain reporting structure had changed dramatically and there no longer was a clear structure in place to plan and coordinate CCD's marketing and supply chain activities.

At the same time, there was a strong focus on reducing supply chain costs in order to compensate for margin lost because of pressure from CCD's customers to reduce product prices. CCD's parent could achieve cost reduction by increasing production efficiency, but that meant larger production batch quantities, which would reduce product cost but sacrifice production flexibility and decrease market responsiveness. In their constant drive to offer shoppers a more

personalized shopping experience, retailers expected CCD to improve product quality, expand product offerings, and deliver smaller quantities more frequently in order to reduce the retailers' inventory levels and improve OSA. In other words, retailers expected CCD to increase, not decrease, their market responsiveness.

It was clear to Mark that customer service mandates had become the number one pressure that CCD faced. He had analyzed the recent operational performance of CCD's supply chain and didn't like what he found. For the last three years, CCD had been unable to meet most of its biggest customers' key performance indicators (KPIs) including, most importantly, OSA. As a result, a number of important customers had recently decided to cut some of CCD's products or product variations (known as stock keeping units or SKUs) from their planograms. In addition, some retailers were so disappointed by CCD's delivery performance they demanded weekly meetings with Mark's staff to verify CCD had shipped sufficient quantities of product. One retailer expressed concern that the availability of CCD products was not improving but instead continued to deteriorate. The Vice-president of merchandising for another retailer described CCD's replenishment performance as unacceptable. And the Executive Vice-president of merchandising for a third retailer even threatened to stop promoting CCD products if availability did not improve. Table 1 provides a breakdown of CCD's 2013/2014 product cuts (i.e., reduction in or elimination from retailer planograms) by cause, as identified by CCD managers.

Table 1. 2013-14 CCD Product Cut Analysis

	Cause of product cut	
Demand	Forecast accuracy	42%
Supply	Supply center delays	14%
	Production problems - bulk	11%
	Production problems – finished goods	11%
	Procurement/third party products	10%
	Quality issues	8%
	No stock out	2%

Mark realized that the organizational changes prompted by the acquisitions were starting to hurt CCD's supply chain execution. Most managers in the sales, marketing and LSG functions had been given new roles, responsibilities and reporting relationships over the last eighteen months. Furthermore, the implementation of the ERP system, with its centralized data base, led to the elimination of some of the reports that CCD managers had traditionally accessed for decision support information. This led to further communication and process breakdowns.

Even more problematic in Mark's opinion was the fact that some CCD managers had conflicting KPIs that did not align with each other or even with CCD's strategic goals. For example, marketing and sales managers had KPIs that focused only on revenue maximization. The parent company's production managers' had KPIs that focused only by cost minimization. The KPIs of Mark's LSG managers focused only on maximizing product margins. Mark realized that goal conflict, limited availability of accurate operational performance data and the new roles/responsibilities for many in the organization, had created a clear loss of communication, and sometimes trust, between the various functions and managers within CCD.

As is common in the OTC industry, the majority of CCD's revenue was generated by a small number of SKUs of its biggest brands. Therefore, because a decrease in the sales of these top-performing SKUs could cause a significant drop in revenue, CCD had to continually analyze, and react to, changing market conditions affecting the sales performance of these products. Besides, this dependence on a limited number of SKUs, Mark was aware of at least three developing market forces that could potentially further weaken CCD's supply chain execution and so its ability to support retailers and improve OSA:

- **changing consumer requirements** as consumers became more hands-on about their health and wellness and wanted more options in form, type and package size of existing brands of medication as well as new types of vitamin supplements (e.g., gummy vitamins for children and adults);
- **more stringent customer requirements** as retailers attempted to differentiate themselves from their competition, they demanded more custom products (e.g., fifty instead of forty tablets per bottle) and retailer specific in-store promotions (e.g. displays with the retailer logo, special packaging);
- **demand volatility intensified by unanticipated marketplace events**, normal fluctuations in demand had recently increased when a competitor's pain-killer was the subject of a nationwide recall which created an unexpected opportunity for CCD to take sales volume away from this competitor.

Mark knew that CCD had to immediately deal with these market realities. But, Mark also knew that market volatility and CCD's inability to consistently ship complete (i.e. full quantities of each item requested) and on time (by the agreed upon deadline) were the main reasons CCD products had relatively low OSA scores, a major issue for retailers.

Like many companies, CCD used a sales and operations (S&OP) planning process to translate strategy into long- and short-term sales plans driving sales and production planning. To Mark, it seemed clear that CCD was incapable of accurately matching product supply with customer demand.

Mark realized that in the current S&OP process many functions of the company played a role and provided input to the sales and operations plan. S&OP participants included marketing and sales at headquarters, distribution and re-packaging facilities, European manufacturing and the logistic services group. Given this complexity Mark was unable to isolate the problem to one particular company function or location especially since the different functions involved in the S&OP process operated under different financial KPIs. For instance, manufacturing managers focused on efficiency and utilization, i.e. return on capital investment, the sales function focused on top-line revenue growth and Mark's LSG team concentrated on maximizing margin through efficient order fulfillment. Consequently, the different inputs to the S&OP process varied substantially and it was difficult, if not impossible to develop a coherent sales and operations plan from these mismatched opinions on what CCD and its parent company should emphasize.

Finally, because CCD’s parent company was a traditional European manufacturing-focused organization, production efficiency, factory utilization and economies of scale were often “pushed-through” as being most the important decision factors in the S&OP process. As a result, in each scheduling cycle, European manufacturing plants and the U.S. repackaging operations produced large quantities of a relatively small number of different items (SKUs). This approach reduced production cost per unit but created large inventories of a limited assortment of SKUs. Mark realized that all of this had to change and change quickly if CCD wanted to improve its OSA performance with its customers. As a first step, Mark assembled a cross-functional task force and instructed its members to identify the main problems that caused CCD’s inability to improve its OSA performance with retailers.

Problems Identified by the Task Force

Forecast accuracy

Sales of CCD’s biggest OTC pain-relief medication (by market share) increased dramatically between late 2013 and early 2014. Sales of three SKUs from this brand family were significantly greater than forecast. Table 2 shows, from December 2013 to March 2014, actual sales as a

Table 2 Sales as % of Forecast Demand

SKU	Time Period	Actual Sales (% of Forecasted Demand)
1	December 2013	148
	January 2014	194
	February 2014	106
	March 2014	159
2	December 2013	131
	January 2014	89
	February 2014	138
	March 2014	150
3	December 2013	105
	January 2014	160
	February 2014	141
	March 2014	122

percentage of forecasted demand for these three SKUs. The task force reviewed forecast accuracy and found, while forecast accuracy in aggregate was within the desired accuracy target, there was an issue with the accuracy of specific product forecasts. Forecast errors reduced product availability which led to lost sales in stores. Besides the risk of being cut from future planograms by retailers, the inaccurate forecasts also led to excess inventory for CCD. So, at the brand family level of analysis the forecast was within 3% of actual demand, which was acceptable. However, at the level of individual SKUs there were significant variations in forecast accuracy. Table 3 shows for a specific pain-relief medication brand the range of forecasting accuracy and error for each SKU

and the number of SKUs in each forecast accuracy stratum.

For this pain-relief medication brand, a more detailed analysis of forecast errors showed that the forecasting for eighteen SKUs was biased low (i.e., forecasts were consistently less than actual demand). These forecast errors contributed to an estimated 2.1 million units CCD could have sold if the product had been available to ship to retailer customers. In fact, the analysis indicated that, for this brand, forecast error was the single leading cause of product cuts, accounting for over forty-two percent of all CCD products either reduced in or removed from customer planograms (see Table 1).

Conversely, forecasts for twenty-one SKUs of the same brand family were biased high (i.e., the forecasts consistently exceeded actual demand). As a result, CCD had excess inventory of 2.4 million units of these particular SKUs. Excess inventory increased inventory holding costs. Also, because medication has a limited shelf life, the excess inventory created the need for unplanned price reductions to sell the over-supply to retailers. The task force concluded that even though the cancelling effect of over- and under-forecasting made it appear that forecasting was sufficiently accurate, in actuality forecast error led to operational issues that caused sales and financial performance to suffer in relation to goal.

Table 3 Product Family Forecast Accuracy and Error

Number of SKUs	Forecast Accuracy (% of Actual Demand)	Forecast Error (% of Actual Demand)
1	50 – 60	40 – 50
4	61 – 70	30 – 39
8	71 – 80	20 – 29
6	81 – 90	10 – 19
2	91	9
0	>91	<9

Manufacturing capacity

Second, the task force found that production capacity issues effectively limited the number of different products available in CCD’s inventory, reducing CCD’s ability to meet customer requirements for diverse (on-time) shipments of all the SKUs in CCD’s product portfolio. CCD’s low, for some SKUs, on-time shipment performance reduced item availability and prevented the division from reaching its market share growth targets.

For instance, the task force found that one plant was consistently operating above 80% of its capacity. To operate at such high capacity utilization, the plant scheduled production of large batch quantities of a small number of items. Such scheduling practices limited the plant’s production flexibility and decreased its ability to manufacture other products. But also, such high utilization rates were above the optimal production level. Because of the very high utilization of its capacity, the plant experienced operational inefficiencies which incrementally increased costs. This situation is analogous to what happens when too many people try to leave a location at the same time: the overcrowding leads to congestion which increases the exit time for everyone. High incremental costs meant that the cost for each unit produced after the plant reached 80% capacity utilization was much higher than the cost for those units produced at the optimal capacity utilization level. The higher cost for some of the output meant that the average cost per unit for all output was higher than it would have been if the plant operated at optimal capacity

utilization for all of its output: thus, the higher incremental costs for some of the plant's output reduced margin. Given the high capacity utilization, the task force concluded that this plant had insufficient capacity to support CCD's sales growth objectives. Simply put; the plant's capacity constraints and over-utilization directly contributed to retail stockouts and low OSA and would limit CCD's growth.

In addition, the primary overseas manufacturing plant for another one of CCD's main products, a vitamin supplement, had significantly over-produced in 2013. So CCD had plenty of bulk inventory of the product available. However, the task force again found that the best-selling SKUs (package-sizes) were often unavailable throughout 2014 as demand for this vitamin supplement grew much faster than forecast. The product shortages did not improve even after inventory levels of the best-selling SKUs were increased. Case fill rate, a measure of on-time and accurate shipments, declined steadily over the last part of 2013 and the first part of 2014, falling from a high of 99.6% in April 2013 to a low of 91.6% in November 2013, before settling at 93.5% in March of 2014. The task force calculated that by the first quarter of 2014, stockouts for this vitamin supplement brand alone represented \$5.7 million in lost sales. Obviously, even with sufficient product inventory available CCD was still unable to effectively respond to demand increases because of the inability to change over to different package sizes in the U.S. repackaging plant.

Supply Chain Execution

Besides the manufacturing capacity issues, the task force found more problems with CCD's supply chain execution in general. In scheduling production, manufacturing's highest priority was maximizing capacity utilization. As a result, production schedules were made up of large batch quantities of a relatively small number of items. Consequently, manufacturing did not consistently produce all SKUs in the product line. Therefore, LSG frequently did not have sufficient availability of some SKUs to fulfill orders from retailer customers. The task force documented how CCD's distribution function was unable to ship the correct quantities of specific SKUs to retailers. Because of the low availability of some SKUs, retailers demanded to be paid the fines and deductions they were allowed under the purchase agreements in place with CCD. It is an industry practice that retailers get compensated by suppliers for inadequate inventory replenishment and sub-standard availability of product. The per-event amount of these fines and deductions specified in CCD's agreements with retailers were at industry standard levels.

Between 2010 and 2012 the number of orders shipped complete (all products, full quantities ordered) had declined by nine percent; the number of orders for which CCD shipped all SKU's ordered (lines complete) declined by thirteen percent and the number of orders for which CCD shipped full quantities, by SKU ordered (cases complete), declined by thirteen percent. As a result of the incomplete shipments from 2010 to 2012, CCD experienced a 359% increase in customer compliance fines assessed for late shipments and a seventy-one percent increase in deductions taken by customers to account for incomplete shipments.

Manufacturing capacity issues did not cause all of these incomplete shipments. The task force identified administrative and process control problems within several supply chain functions,

from order picking to transportation management and product shipment. Because of CCD's inadequate supply chain execution, average inventory levels increased, relative to plan, by twenty percent from 2011 to 2012 and by eighteen percent from 2012 to 2013. Total cost of inventory increased by twenty-six percent from 2011 to 2012. This increase was attributed to the \$3 million in carrying costs CCD incurred in 2012 for, in effect, holding the wrong inventory. In addition, the cost of inventory write-offs increased by more than \$3 million from 2011 to 2012 as CCD had to destroy products that aged beyond their expiration dates.

The task force concluded that the effect of CCD's manufacturing issues and poor supply chain execution on financial performance was significant. It estimated that since 2009, product cuts by customers alone contributed to \$93 million in lost sales.

Management Quandary

The final conclusion the task force presented to Mark was rather straightforward: CCD's S&OP process should be able to produce reliable three-, six- and nine-month forecasts that could be rolled up into the parent company's one and five-year corporate strategic plans. Based on the task force's findings, Mark concluded that CCD's current S&OP process was indeed the main source of the OSA performance issues plaguing CCD. Therefore, the task ahead for Mark was to re-design the sales and operations planning process in such a way that CCD would be able to consistently balance demand for its products with the ability of its supply chain to efficiently and profitably provide them.

Since the S&OP planning process involved all functions (and locations) of CCD's business, including the European manufacturing plants, the sales and marketing departments at the New York headquarters, the repackaging plants and distribution centers in the Mid-Atlantic and Mid-South and finally, as the main point of contact for CCD's retailers, Mark's LSG team. Mark realized he had to carefully re-design the whole process.