Case Study

The Art of Analytics

Crate and Barrel balances store-level SKUs with company profits

When Crate and Barrel decided to mathematically evaluate inventory management, the prevailing assumption was that scientific analysis would indicate the housewares and furniture retailer carried more than enough inventory, a logical premise given Crate and Barrel's commitment to exceptionally high customer-service levels. However, the analytics program tested in 2004 and subsequently rolled out chainwide in 2005 yielded surprising insights—not the least of which was the revelation that in order to optimize profits, more inventory is sometimes better than less.

Art plus science: Ed Rennemann, Crate and Barrel's CIO and VP of MIS, explained that the Chicago-based retailer had managed in-store inventory essentially the same way since 1984. "We collected detailed SKU-level, location-level information such as inventory on hand, rate of sale and inventory on order, and we delivered that information to different areas of the business for people to make decisions," he said.

Crate and Barrel's inventory forecasting has always employed both push and pull philosophies, although store-level replenishment of year-round products was, and continues to be, predominantly a pull process driven by store managers. "Our store managers understand their customers and their markets, so we empower them to make informed replenishment decisions," Rennemann continued.

Fortifying the decision-making process with detailed analytics was an initiative led by CEO Gordon Segal, the Crate and Barrel founder known for proactively seeking improvements even when processes are running smoothly. "No one in store operations or merchandising was saying there was a problem with our system, he [Segal] just thought it was worth looking into," said Rennemann.

Ironically, the solutions provider that Crate and Barrel turned to, 4R Systems of Wayne, Pa., agreed that the retailer's existing system was one of the best it had seen. However, even the best can be improved.

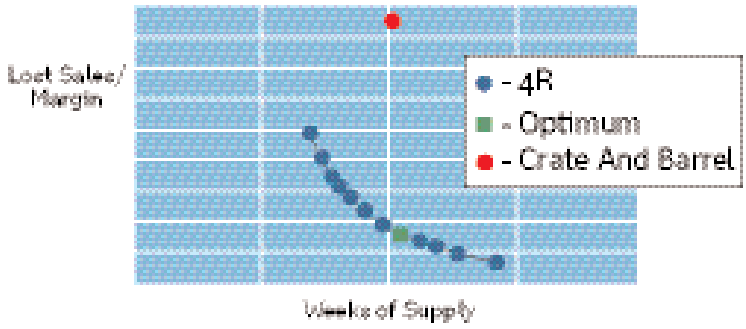
The first step was a benchmark study conducted by 4R Systems utilizing three years of data supplied by Crate and Barrel. "We gave 4R very specific location-level, SKU-level, weekly rates of sale, and they used the information from the two oldest years to forecast and model what the third year should have been," explained Rennemann. "Then they compared their analysis for that third year against our actual activity in the third year, and we found several opportunities for improvement."

Store-level accuracy: Crate and Barrel chose to focus its initial test on store replenishment for several reasons, one being that it is the closest point to the customer. From a fundamental perspective, even if an initial forecast is on target and the vendor-replenishment processes are running smoothly, if store-level replenishment is off, there will be out-of-stocks.

For its pilot test that began in October 2004, Crate and Barrel identified five stores representing a diverse mix of geographic locations, physical footprints, managerial experience and proximity to company DCs. A key contributor to the success of the test was the retailer's hands-on involvement in the analysis process.

"People sometimes think we are crazy because we develop most of our systems in-house, including our WMS, POS and merchandising systems," noted Rennemann. "There are 140 people in our IT department and more than 100 people in software development. When we started the test with 4R, we assigned one of our functional architects to the project full-time. Each week when replenishment recommendations came in from 4R, she was physically located at one of the test stores."

Inventory Forecasts for Optimized Profitability



4R Systems benchmark study for Crate and Barrel; hypothetical, not actual, results.

Mathematical analytics enabled Crate and Barrel to evaluate the relationship between lost sales, inventory levels and profit margins.

The Crate and Barrel architect worked with the replenishment order for the store she was in and held conference calls with the other four stores. Then she made recommendations back to 4R on modifications that would improve the process.

Almost immediately, stock-outs at the test stores began to decline—and as a result, lost sales also declined. The mathematical approach yielded a new understanding of inventory management, including the following insights:

- The deeper one drills into store-level sales, the more granular the information becomes, making sales appear random on products stocked year-round. Because of these volatile, unpredictable patterns, decisions should be based on longer-term aggregated demand across the chain; and
- Seasonal or promotional products should be forecast differently than year-round merchandise, focusing more on each store's individual market nuances than chainwide demand.

The scientific approach was not an automatic guarantee. There were negative results as well as positive results on individual SKU forecasts, but from a big-picture perspective, there were more wins than losses.

For the most part, utilizing analytics enabled Crate and Barrel to identify the inventory level that would generate the most profit. "In aggregate, there was a big win even though there were some individual losses and the net result led to more gross-margin dollars," noted Rennemann. "From an optimization standpoint, we learned that our inventory levels within a department could be right and we would still lose sales if the inventory was in the wrong store or if we had the wrong SKU within the department."

Scientific forecasts yielded an unexpected perk: Crate and Barrel saw significant improvement in its gift-registry program due to increased confidence that inventory would be in stock.

Positive results: The chainwide implementation of the analytics tool went smoothly and was completed before the 2005 holiday season. From a technical standpoint, Rennemann described it as simple and straightforward. The most challenging and critical aspect was training the store managers.

"If the test had shown the analytics were a win every time, it would have been obvious that the scientific approach should take over," he explained. "Instead, we had to teach store managers the thought processes and the principles behind the gross margins so they could make decisions based on the model or alter the model if they knew something specific about their store that was not included in a forecast."

In the early stages of the test, store managers had a 70% acceptance rate of the scientific forecasts. By the end of the test, their acceptance rate had grown to between 85% and 90%.

Crate and Barrel also gained some unexpected knowledge from the scientific approach. "It helped us understand the difference between a pattern and a fluke," stated Rennemann. "Now we can identify low-frequency events with high pay-offs, for instance when someone buys 24 place-settings. If the profit margin warrants it, we can decide to increase inventory of certain items year-round in anticipation that those unique events will recur."

Similarly, there are low-frequency unit items that turn slowly. When these were identified, Crate and Barrel reduced the size of unit packs coming from its warehouse, which resulted in increased picks at the warehouse but lowered the inventory carrying costs on low-selling, lower-profit items.

"One of the most surprising and significant results has been increased selling confidence among store associates," concluded Rennemann, citing Crate and Barrel's successful gift-registry program. "Before we implemented the new process, some sales associates were hesitant to encourage customers to register for certain items because they were fearful the item would not be in stock. We have seen substantial improvement in the registry within the last year, in terms of the quality of products being registered and in sales of the registered items." **RTQ**

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