GLOBAL LOGISTICS & SUPPLY CHAIN STRATEGIES

www.SupplyChainBrain.com

Complexity Masters
Making Supply Chains Run Like Clockwork

The Masters

Mazda
Zara
Mohawk Fine Papers
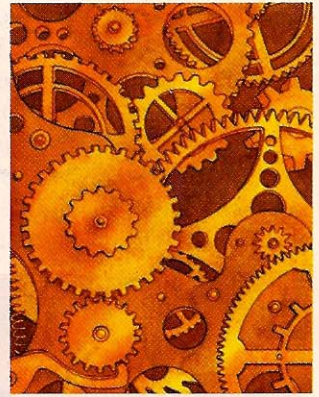Terra Industries
Tasty Baking
Sun Microsystems
Dr. Reddy's
Domino's Pizza
H.D. Smith
C1rca

Combining Art With Science, Zara Competes With 'Fast Fashion'

The Spanish retailer turns to academia for help in developing a model that can make sense of the problem of replenishing more than 1,000 stores.

The world of fashion is more art than science. Designers and retailers rely largely on intuition to predict which styles will sell. But when it comes to allocating product across a network of stores, there's something to be said for cold, hard numbers.

The Spanish distributor and retailer Zara specializes in inexpensive fashions for women and men between the ages of 16 and 35. In keeping with the spirit of that demographic, Zara moves quickly. Like many apparel retailers, it has two seasons—fall/winter and spring/summer—but selections change frequently within those periods. Items spend no more than two weeks on the shelf before making way for new merchandise, and stores are replenished twice a week.

With annual growth of around 20 percent in both sales and number of stores,

Zara was finding that strategy increasingly difficult to execute. Part of the Inditex group of fashion distributors, it currently has more than 1,100 stores in 68 countries. With so much volume flowing through the supply chain, the company could no longer rely on guesswork by store managers as to how much product it needed to replenish at each location.

Previously, managers from around the world would submit weekly requests for additional product to Zara's three central warehouses in Spain, says chief financial officer Miguel Diaz. The orders would reflect each individual's decidedly unscientific view of what would sell in the store. Moreover, there was no limit on quantities. Aggregate orders might easily exceed the available supply of a given item, leaving warehouse managers with the task of allocating limited product. The system was both labor intensive and imprecise.

In the summer of 2005, Zara heard about research being done on mathematical models for retailing, by professors Jeremie Gallien of the MIT Sloan School of Management and Felipe Caro of the UCLA Anderson School of Management. They were invited to Zara's headquarters in La Coruna, Spain. The visit marked the beginning of "an active collaboration" between Zara and the researchers, Diaz says.

The focus was on making better stock-allocation decisions for Zara's growing network of stores. A prototype of the resulting model was implemented between March and July of the following year, as part of a six-month internship at Zara by MIT graduate student Juan Correa. Between August and December, researchers ran a live pilot involving distribution of a dozen products to Zara's stores worldwide. An identical selection of products was dispatched to stores

under the old process, for purposes of comparison.

The mathematical model drew on historical sales data plus available stock in the warehouses to come up with a final number for each store. Gallien says the task was exceedingly complex. Each store carries several thousand items in up to eight sizes, with exact quantities to be determined for twice-weekly shipments. Through use of the model, computers could take over the basic number-crunching, with humans left to make adjustments based on exceptions such as bad weather or unexpected disruptions in the sales channel.

What makes the model unique, says Gallien, is that it was developed to address the world of "fast fashion." Zara makes it a point to respond quickly to consumer taste. Suppliers are given about two weeks to move from design to production of a new item. "As a result," says Diaz, "the reaction to any specific trend can reach our stores only three weeks after it has been identified."

Now You See It...
The emphasis on fast turnaround motivates consumers to purchase items on the spot. Unlike in many clothing stores, where seasonal lines remain on the shelves for weeks or months, a particular style in a Zara store can disappear within a week.

Nothing is more frustrating to a shopper than finding the right style in the wrong size. So the MIT model is careful to dictate the right selection of sizes for a given store. When a store is out of certain popular sizes, the entire supply of that item is removed to the back room.

"Many models replenish each size independently," says Gallien. "If you're missing a small, it sends you two more units of small. But rather than look at a small size in isolation, [the MIT model] looks at the whole range." It only triggers a replenishment if the shipment will result in an item making it back to the sales floor. Meanwhile, incomplete inventory is shifted between stores to create a full set of sizes at the locations where it is most likely to sell. Or it can be returned to the warehouse for discounting at the end of the selling season.

"The model captures store execution policies as well as the behavioral perception of customers when they are confronted by stockouts," says Gallien. By insisting on having the right sizes for a particular store,

Zara makes best use of its available inventory while improving the customer's shopping experience.

"The idea is to substitute a vision that can capture the impact on an entire network," Gallien says.

Zara speeds up its supply chain by strategically selecting and locating suppliers. A "proximity model" judges not only

their geographic placement, but their ability to respond quickly to production orders, Diaz says. About half of the retailer's production meets the proximity threshold, mostly coming from suppliers in Spain, Portugal and Morocco. From a geographic standpoint, nearly 65 percent of production is sourced in Europe. Zara also buys from suppliers in Asia, but
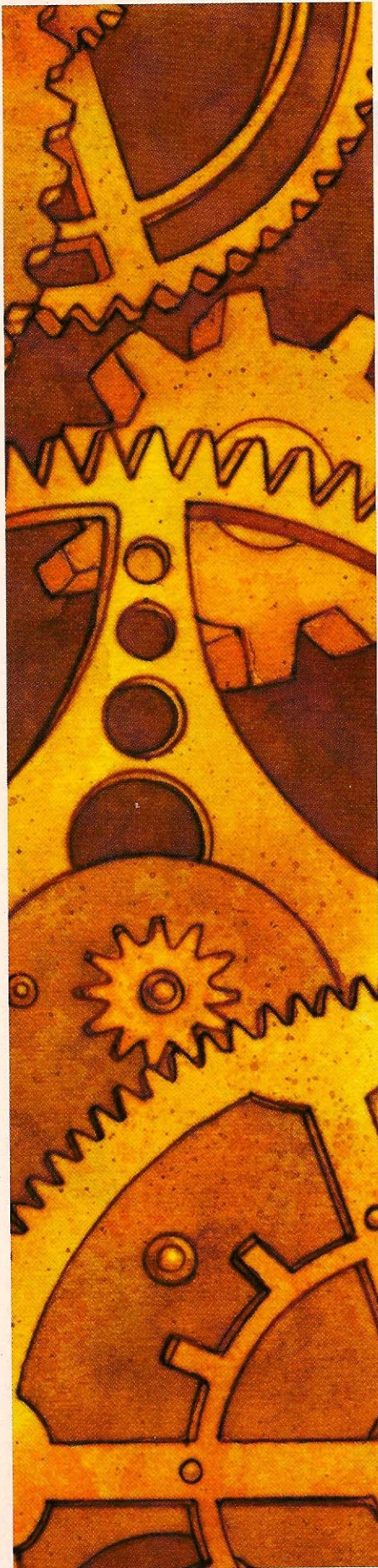
because of the need for speed, their number is "considerably less" than the industry's average, says Diaz.

The process begins with a demand forecast, which is carried out just once for the entire lifecycle of a given product, at the time of the production order. For replenishment purposes, demand is forecasted on a daily basis.

It's on the replenishment side that the MIT model comes into play. The model looks at inventory in the warehouse, what's remaining in all sizes at all stores, and the recent history of sales data. Diaz says the initial conclusions seemed intuitively right to the humans who had previously made those decisions. What was different was the model's ability to process a massive amount of relevant data in a matter of seconds. By contrast, "the previous method was limited ... by the cognitive limitations of human decision-makers, who could each only examine a small fraction of the relevant data at a time, and had to do so under intense time pressure."

With several million individual shipments to calculate each week, "differences by only a few units here and there quickly added up," Diaz says.

Gallien says MIT and Zara didn't fully appreciate the system's impact on sales, especially its ability to shift items between stores, until the pilot was in effect. When the results of that model were compared with the old way of replenishing stores, Zara had achieved an increase in sales of 3 to 4 percent.

In fact, the retailer last September beat analyst forecasts with an overall 7-percent increase in same-store sales for the first half of 2007. Other factors in Zara's success included the favorable impact of currency-exchange rates.

Out of the Back Room

The model has yielded additional benefits. Product now spends more time on the sales floor, and less in a back room or warehouse. With a reduction in misallocated inventory, there are fewer returns to the warehouse and transfers between stores. And, as Zara's distribution network continues to grow, the retailer won't need to expand its warehouse team as fast as the old process required.

Results seen first in the pilot remained steady when the model was rolled out to all items and stores, in a combined effort by Zara's Logistics Group and IT department. The task was completed by June 2007, Gallien says.

At some point in the future, he says, Zara wants to expand its use of the model to help determine the initial allocation of product to the stores. The only catch is that the company won't have historical demand data on which to rely, for product hitting the sales floor for the first time. However, Zara could obtain some information by testing new products in a handful of stores that are representative of larger sales patterns. In the process, says Gallien, it could "generate some knowledge about how the item is going to sell, then leverage that information when doing the massive initial shipment."

The right sampling of stores can afford a bigger picture of demand. "You don't need to observe data in all of the stores to get a good sense of what the [total] sales are going to be," says Gallien. "You can quantify how representative a given store is, vis-a-vis other stores."

Such intelligence can at least put a retailer on the right track, at which point it can follow up with a rapid replenishment model such as the one developed for Zara by MIT and UCLA. "The question is never whether the forecast is right or wrong," Gallien says. "The only good question about forecasts is how wrong they are. It's important that the model generates information that makes sense, that doesn't conflict with human instinct."

Zara is continuing to collaborate with Gallien and Caro in the area of clearance-sale pricing optimization, Diaz says. At the same time, the original model will likely be expanded to other units of the Inditex group, whose other brands include Massimo Dutti, Bershka, Stradivarius and the casual youth line Pull and Bear.

Gallien believes that Zara's "fast-fashion" strategies offer big opportunities for North American retailers, especially if they are willing to source product closer to the consumer, in countries such as Mexico. "I'd be very surprised if strategic planners and other leaders of major U.S. retail companies were not very closely scrutinizing that company's success," he says.

Resource Link

MIT Sloan School of Management,
www.mitsloan.mit.edu