# The ezra team

" Fast fashion" is a term often associated with this Spanish clothing manufacturer and retailer, which has rapidly sped up the process of designing and delivering fashionable clothes throughout the world. Sara's supply chain includes two primary warehouses located in Spain that periodically receive shipments of finished clothes from suppliers and ship replenishment inventory directly to every Ezra store in the world twice a week.

A key associated challenge Is to determine the exact number of units of each size (up to eight) of each article (up to 3, 000 at any time) that should be in each shipment to each store (more than 1, 500). This problem is critical because its solution determines the " bloodstream" of Sara's merchandise to its stores, and it is challenging because I. The number of associated shipment decisions reaches several millions, II.

The amount of relevant data (warehouse inventory, store inventory, and store sales history for each article) Is also enormous, Ill.

The available warehouse Inventory Is often Limited, ' V. Most stores will only sell merchandise when the set of available sizes Is complete enough (introducing complex dependencies across sizes), and V. These decisions must be made in Just a few hours. B.

Solution Development: In 2005, the process used by Ezra for determining shipments Involved the examination by a large team of warehouse employees of shipment requests sent by every store, which presented an opportunity to improve both scalability and revenues.

The Ezra team started to develop an alternative decision process relying on proven analytical methods, including forecasting algorithms, stochastic analysis, ND a large-scale mixed-integer programming model. Its implementation presented many technical difficulties, including the need to capture forecast uncertainty and store-level Inventory policies, the live integration of a complex mathematical model with many large databases, and the development of the software and hardware infrastructure necessary to solve thousands of optimization problems in just a couple of hours every day.

It also presented human challenges, because Sara's culture greatly values human Judgment and intuition for decision making. C. Solution Validation: purported by analytics to all its stores and items sold worldwide, and has since been using it continuously.

Before full-scale deployment, Ezra conducted a controlled pilot field experiment involving a limited number of articles and half of its stores worldwide to test this new analytics-based process.

That experiment showed, with a high level of rigor, that the new process increased in-season sales by a conservative estimate of 3%-4%, reduced transshipments between stores, and increased the time many articles spent in store displays. From the sales impact alone, the realized uncial benefits can thus be estimated, as of late December 2008, at about $233 million (2007) and $353 million (2008) in additional revenue or $28 million (2007) and $42. 4 million (2008) in additional net income, with both measures of impact predicted to grow at a rate of 13% per annum in subsequent years.

On the cost side, Ezra was able to maintain its warehouse inventory allocation team at its early 2007 staffing level of 60 individuals worldwide, even though it was initially planning on expanding that team proportionally to sales growth. The optimization model has also had a significant impact on the daily lives of these employees: they have all become enthusiastic users of the new tool, gratefully seeing their responsibility shift from repetitive manual data entry to exception handling, scenario analysis, and process improvement.

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