General Mills Enables Growth through In-Store Display Volume Forecasting

With roots going back to 1856, founded in 1928, and headquartered in the Minneapolis suburb of Golden Valley, Minnesota, General Mills, Inc. is a multinational manufacturer and marketer of branded consumer foods and other packaged goods sold through retail stores in more than 100 countries.

The company, which is the sixth largest food manufacturer in the United States, reported 2017 revenue of $15.6 billion, operates approximately 79 food production facilities in more than a dozen countries, and has approximately 38,000 employees. It manufactures more than 100 different consumer food brands, including cereals, snacks, yogurt, and other food products under such well-known brands as Gold Medal flour, Annie's Homegrown, Betty Crocker, Yoplait, Colombo, Totino's, Pillsbury, Old El Paso, Häagen-Dazs, Nature Valley, Cheerios, Trix, Cocoa Puffs, Wheaties and Lucky Charms.

Special Pack (SPPK), also known as palletized display, is the company's second largest manufacturing platform and supports 8 percent of overall U.S. sales, totaling approximately $960 million a year. With over 1,300 new configurations created every year, SPPK is highly customizable and presents significant obstacles when trying to forecast demand beyond the immediate future.

Last year, General Mills experienced 70 percent growth in SPPK demand, which disrupted the supply chain and resulted in an increase of stock-outs, wasted labor, and finished inventory deconstruction. In order to cut costs and reduce the probability of over- or under-producing inventory, General Mills needed to develop better process visibility and enhanced forecasting methods. These changes would smooth out SPPK production and produce significant opportunities for savings.

In order to reduce variability in the company's palletized display business, General Mills brought in a student team from the Tauber Institute for Global Operations at the University of Michigan, consisting of **Rodrigo Martinez De La Mora**, working on Master of Business Administration and Master of Engineering in Manufacturing degrees, and **Andrew Trahan**, seeking a Master of Business Administration degree.

"A large driver behind the project was how much disruption under- or over-forecasted palletized displays cause for the business," said Trahan.

Above, L to R: Andrew Trahan (MBA) and Rodrigo Martinez De La Mora (MBA & Master of Engineering in Manufacturing)

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"Every pallet is custom made by hand, so they are very expensive to build and sometimes even more expensive to break down if they overproduce. General Mills is very committed in allowing customers to change their orders up to the last minute, so increasing the forecasting ability to anticipate these changes and reducing the variability could result in tremendous savings."

The Tauber team focused their efforts into three phases. First, the team mapped out the entire process from customer order to delivery. A gap analysis of the process revealed several opportunities for improvement, most notably the standardization of communication.

Second, the team focused on designing a new forecast methodology to anticipate changes in demand 60 days out to smooth out inventory and capacity at the manufacturing facilities.

Mariel Lavieri
College of Engineering

Joseph Walls
Ross School of Business

"One challenge that was difficult to overcome was the lack of purchase history for each type of palletized display," said Trahan. "Since each customer can customize each pallet, every pallet had its own specialized Stock Keeping Unit (SKU). As such, 50 percent of the pallets created every year were brand new SKUs, giving us very little in regards to seasonality trends and purchase history.

"In order to overcome this problem, we had to break down the pallet SKUs into their base products, such as Cheerios. Doing so allowed us to see year-over-year the trends of customer demand and appropriately modify our forecasting model."

In the last phase, the Tauber team modified the existing reporting procedures to create more realistic expectations of customer behavior and adjust manufacturing accordingly.

"One innovative approach used in the project was the implementation of a customized R code," said Trahan. "Since different types of palletized displays carry different products which have different seasonality trends, by using this custom R code we were able to identify the best forecasting method for any particular pallet type."

Upon completion, all deliverables, including the forecasting method and tool developed for the project, were transferred to designated employees within General Mills, who will continue the work and oversee its implementation. With an estimated savings of $425,000 to $1 million in the first year of implementation, the Tauber team is confident that its recommendations will provide immediate and continued value to the company and support its growth in the near term and future.

L to R: Sujit Pawar, General Mills; Andrew Trahan (MBA); Carol Heppes German, General Mills; Rodrigo Martinez DeLaMora (MBA & Master of Engineering in Manufacturing); Mariel Lavieri, University of Michigan College of Engineering, and Frederick Zhou, General Mills.

General Mills Project Team

Student Team
Rodrigo Martinez De La Mora—MBA/Master of Engineering in Manufacturing

Andrew Trahan—Master of Business Administration

Project Sponsors
Christine England—Technology & Analytics Senior Manager

Carol Heppes German—Supply Chain Optimization/Holistic Margin Management Leader

Sujit Pawar—Inventory & Capacity Analytics Manager

Frederick Thou—Technology & Analytics Manager

Faculty Advisors
Mariel Lavieri—College of Engineering

Joseph Walls—Ross School of Business

About Tauber Team Projects

Tauber 2018 Team Projects resulted in $564.4 million in savings according to sponsoring company calculations, an average of $28 million per project over 3 years. Each two to three person Tauber Team consists of graduate engineering and/or graduate business students. Along with receiving high-level corporate support from the sponsoring company, each team is advised by a College of Engineering and a Ross School of Business faculty member and overseen by a Tauber Institute Co-Director. The projects begin on-site in May and continue for 14 weeks. Students present the results of their projects and compete for over $40,000 in scholarships at the U-M Tauber Institute's annual *Spotlight!* event, held each September in Ann Arbor, Michigan. *Spotlight!* provides outstanding opportunities for students and corporate partners to establish relationships while exploring innovations in operations and manufacturing.

To learn more about the Tauber Institute for Global Operations, visit tauber.umich.edu or contact us at 734-647-1333.

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