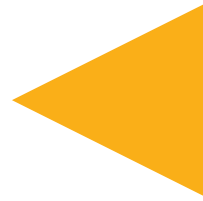


**TALLYS YUNES***Assistant Professor,
Management
Science*

handle tiny problems, with a few hundred customers and products. But our approach was the first one capable of handling problems with up to tens of thousands of customers and millions of possible products.”

To achieve this breakthrough, the researchers used a three-step process. First, they employed standard marketing tools to understand how flexible Deere’s customers were. After gathering information through customer surveys and interviews with experts, they calculated how important a certain option is to a customer and assigned it a numerical value.

Next, they needed to determine a formula that assigned a dollar amount to the complexity costs. “In the John Deere case, the company already had a mathematical formula that they gave to us,” explains Yunes. “In other cases, it has taken us a few months to find that formula.”

The last step was to use operations research techniques to build an optimization model to decide what products to offer so that the company’s profit (revenue from sales minus costs, which include complexity costs) is maximized.

The model returned a list of which products to stop offering and which to keep if John Deere wanted to attain the highest possible profit. “We were not really expecting them to use the model’s results blindly,” says Yunes, “but what they did was something we didn’t expect either.”

Rather than discontinuing any products, John Deere gave discounts to influence customers to buy those machines the model said they should sell. As a result, the company reaped complexity cost savings without having to publicly announce any reduction in its product lines.

It was a win-win result. Yunes and his coauthors saw how a company could use their ideas to develop pricing strategies, rather than just following their recommendations, and John Deere has reported saving tens of millions of dollars.

— Jill Colford

The Costs of Customization

Research recommendations save John Deere tens of millions of dollars in unnecessary expenses

When Henry Ford began to mass-produce the Model T in 1914, he understood the concept of customization: Customers could have their car “in any color so long as it is black.”

Ford’s view may seem antiquated to today’s consumers, who customize everything from their morning coffee to their evening television. But companies are finding that a wide variety of product options can translate into heavy complexity costs — in the form of changeovers, decreased efficiency and additional training — that reduce profits.

That’s why John Deere, a leading producer of machinery, wanted to know how much variety is enough. The answer, ac-

ording to Tallys Yunes, assistant professor of management science, lies at the intersection of marketing and operations research.

“John Deere was aware they were offering too many things,” he says, “and thought maybe there was a way to reduce their complexity cost.” The company looked to researchers Sridhar Tayur and Alan Scheller-Wolf from Carnegie Mellon University to evaluate the possibility of streamlining two of its product lines without sacrificing profits or upsetting customers, and Yunes was invited to join the effort. The result was recently published in the journal *Operations Research*.

“This problem is an old problem. Variety creates costs,” he says. “The issue was that the old approaches were only able to