

New model could solve inventory problem for retailers

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Inventory inaccuracy is common for many businesses. While cash registers track incoming orders and outgoing sales, inaccuracy arises because of unrecorded issues including spoilage, damage and theft.

Three professors in the Naveen Jindal School of Management have researched inventory management for more than 10 years, and, in their latest study, published in the January issue of *Production and Operations Management*, they developed a new mathematical model to apply to inventory problems.

Dr. Suresh Sethi, Eugene McDermott Chair of operations management, said the study of inventory management has been around for more than 100 years. It involves knowing the inventory, considering the demand and determining how much to order to have the best outcome.

"All these years, one thing was assumed—I know my inventory. I came up with this idea, 'What if I don't know my inventory, and how do I go about solving that problem?'" Sethi said. "We realized there isn't much research done in this field."

Sethi, Dr. Alain Benssousan, Ashbel Smith Professor of risk and decision analysis, and Dr. Metin Cakanyildirim, professor of operations research, began by building simple models. Over the years, they have published several papers, and currently are working on two books.

Cakanyildirim said there are several reasons for incomplete inventory

information, including employee theft, improper handling of damaged merchandise, misplaced inventory and incorrect recording of sales.

"Although companies employ technologies to keep records of their inventories, these technologies are run by people, and people make mistakes," he said. "Even if you employed the most expensive technology, it may not actually bring in the financial returns that you expect."

In a bookstore, misplacement would be the most common reason for incomplete inventory information. Theft is more common in department stores, and spoilage occurs most in grocery stores.

"There are many, many reasons, and people have recorded millions and millions of dollars of loss of profit due to not knowing what they have in their store," Sethi said. "The losses are huge, but people don't recognize it because there's no benchmark. A benchmark requires more research."

Implementing the model will require businesses to think outside of current business practices. Businesses are motivated to curb profit losses, but the benefits of the model have not been demonstrated yet, Sethi said.

The researchers aim to connect with a business so they can investigate how much can be saved by applying this new model.

"The cost of not using this model is more like an opportunity cost," Cakanyildirim said. "They have the opportunity to use it, but they don't. Sometimes people don't recognize when there are better ways of managing inventory. What is required is to go into a company and assess the benefit as well as the cost of implementing the [new model](#)."

More information: [onlinelibrary.wiley.com/doi/10 ... /poms.12511/abstract](https://onlinelibrary.wiley.com/doi/10.1002/poms.12511/abstract)

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