2009 *M&SOM* Best Paper Award

Martin A. Lariviere

Kellogg School, Northwestern University, Evanston, Illinois 60208-2009, m-lariviere@northwestern.edu

It is a great pleasure to announce that the 2009 *Manufacturing & Service Operations Management Best Paper Award* goes to Nicole DeHoratius, Adam J. Mersereau, and Linus Schrage for "Retail Inventory Management When Records Are Inaccurate" (2008). This annual award is given to one paper, published in one of the prior three volumes of *M&SOM*. Nominees were first appraised by *M&SOM* associate editors to select a limited set of finalists. The finalists were further reviewed by an ad hoc committee comprised of Saif Benjaafar, Charles Corbett, and Stephen Gilbert. Martin Lariviere, the immediate-past president of the MSOM Society, served as chair. This paper was chosen as most deserving for its contribution to the theory and practice of operations management. For their accomplishment, Professors DeHoratius, Mersereau, and Schrage will share $2,000, generously contributed by the MSOM Society of INFORMS to support this award.

This paper takes on an interesting question: How can a retailer manage inventory when its records are potentially inaccurate? Inaccuracy can arise because items are misplaced or stolen or processed incorrectly at the point of sale. The problem is relevant in a setting in which a retailer relies on automated recording systems to track its inventory levels. Because such systems feed into decision support systems for ordering and planning, persistent record inaccuracies can significantly impact performance. At the extreme, the system may "freeze" and fail to order additional stock because records indicate there is material on hand when in fact the shelves are empty.

The paper considers a retailer selling an item over a multiperiod horizon that reviews its inventory level and orders on a periodic basis. The analysis begins with a simple observation: Sales in each period contain information about the inventory level of the product. The retailer cannot sell what it does not have in stock so positive sales indicate that the item was in stock at the start of the period. Conversely, not selling the product suggests that the product may have stocked out. This allows the authors to define a Bayesian inventory level. While the traditional inventory level is a fixed number, the Bayesian inventory level is a probability distribution over potential inventory levels for the product. This distribution can be updated based on observed sales and receipts. They show that it can be updated easily and sufficiently captures all relevant information.

Given the Bayesian inventory position, the paper next turns to developing simple heuristics for managing inventory. It further shows that any sensible policy based on the Bayesian inventory level avoids having the system freeze. The system will never fail to order because inventory records show a positive inventory level when there is in fact none on hand. The paper also presents a policy for triggering audits. An audit allows the retailer to remove uncertainty with regard to on-hand inventory but is costly to carry out. The proposed policy balances the fixed cost of an audit with the gain from reduced uncertainty. Finally, the paper calibrates the model on data from a large retailer. It shows how the necessary parameters and distributions can be calibrated from available data and demonstrates the value of the proposed policies in a numerical study.

Taken together, this is a complete and compelling paper. In the words of one reviewer, this paper "offers a good example of what *M&SOM* should be publishing, a nice balance between new theory and application, a serious attempt at dealing with implementation issues, including the handling of real data." Thus we are very pleased to present the 2009 *M&SOM Best Paper Award* to Professors DeHoratius, Mersereau, and Schrage.

Reference

DeHoratius, N., A. J. Mersereau, L. Schrage. 2008. Retail inventory management when records are inaccurate. *Manufacturing Services Oper. Management* **10**(2) 257–277.