

EPC Reduces Out-of-Stocks at Wal-Mart

A study by the University of Arkansas found the retailer was able to reduce out-of-stocks by 16 percent through the use of Electronic Product Code RFID tags on cases of goods from suppliers.

By Mark Roberti

Oct. 14, 2005—Wal-Mart announced today that an independent study by the University of Arkansas has concluded that Wal-Mart has been able to reduce out-of-stocks by 16 percent by tracking cases of goods with radio frequency identification tags carrying Electronic Product Codes (EPCs). The study, which Wal-Mart commissioned, also showed that out-of-stock items with EPCs were replenished more quickly than comparable items in cases labeled only with bar codes, and Wal-Mart saw a reduction in manual orders and excess inventory within the RFID-enabled stores.

"We're pleased with the results so far," says Simon Langford, Wal-Mart's manager of RFID strategy. "There has been great anticipation about what difference RFID is making. This is the most in-depth analysis of our RFID project so far. It was done independently, and it shows that there are benefits."

During the 29-week study, which ended in mid-September, researchers from the university analyzed the out-of-stock rate on a little less than 4,000 stock-keeping units (SKUs) at 12 pilot stores equipped with RFID technology and 12 control stores without the technology. All Wal-Mart formats—Supercenters, Discount Stores and Neighborhood Markets—were included in the study.

This study is the first to compare the impact of EPCs on merchandise availability in functioning stores. Researchers chose specific SKUs being outfitted with tags at the case and pallet level by Wal-Mart's top suppliers, and analyzed the effect of tagging on these products. More SKUs were tagged as the study went on. However, the researchers—led by Bill Hardgrave, director of the university's RFID Research Center and executive director of the Information Technology Research Institute (ITRI)--only analyzed the effect only on those items tagged at the start of the study to ensure their data was consistent.

To establish a pre-study baseline, and to measure the impact of RFID, researchers combed the shelves at the 24 stores and recorded out-of-stocks throughout the study period by using handheld devices to capture the data. Other than having EPCs and RFID technology introduced into their operations, the stores continued to operate normally. Researchers also factored out reductions in out-of-stocks at both the control and RFID-enabled stores that resulted from any process improvements unrelated to RFID.

Researchers compared out-of-stock rates in the RFID-enabled stores against the baseline data established at the start of the study, as well as the out-of-stock rates at the control stores and those of SKUs not tracked with RFID at the RFID-enabled stores. Ultimately, they determined that RFID reduced out-of-stocks by 16 percent.

To put the 16 percent reduction in perspective, the industry average for out-of-stocks has remained stubbornly at about 8 percent, despite numerous efforts by manufacturers and retailers to bring it down, such as collaborative planning, forecasting and replenishment (CPFR). If RFID were applied across the retail industry, and the same 16 percent improvement were achieved, the out-of-stock rate would fall to 6.7 percent. The

study did not measure what effect the improvement in on-shelf availability had on sales.

"We continuously saw improvements as the study went along," says Hardgrave. "As Wal-Mart made changes to its business processes, we would see that reflected in the data."

The RFID-enabled stores receive SKUs tagged at the case and pallet level from either Wal-Mart's own distribution centers or directly from suppliers. The improvement in out-of-stocks comes from using RFID to monitor how many cases have arrived at the store and how many have been brought out to the shelves, then comparing that information with how many items from those cases have been sold (Wal-Mart uses conventional point-of-sale data to determine sales).

For example, if each case of Pantene shampoo holds 24 bottles and the shelf can hold 48 bottles, Wal-Mart can determine that a shelf is close to being out of stock when 40 bottles or so have been sold. Pantene shampoo is then automatically added to a list of SKUs that must be picked from the back room and brought out to the shelves, or "merchandised." (The processes involved in detail in a case study published in the March/April 2005 issue of RFID Journal magazine, which is available online to premium content subscribers. See [Wal-Mart Tackles Out-of-Stocks](#).)

The study found that automatically creating these pick lists, rather than having associates walk around and add items whenever they found an empty shelf, resulted in SKUs tagged at the case level being replenished three times more often than untagged SKUs. Moreover, it reduced in-store inventory by reducing the number of times an associate placed an order for more cases when cases were already somewhere in the back room.

"With the RFID-enabled stores, we alert them to the fact that there is product in the back room, and that they should merchandise that first before ordering more product," Langford says. That process change resulted in a 10 percent reduction in manual orders placed by store associates. The reduction in inventory in stores was not quantified, but the improvement in on-shelf availability is visible.

"One of my colleagues was down in Dallas this week," says Langford. "He was speaking to one of the store managers down there and asked how it was going. She walked to the side counter and said, 'Look, this is tagged, this is tagged and this is tagged. This isn't tagged.' The items she was saying were tagged were all on the shelf, and the one that wasn't tagged was out of stock. You can see physically that the system is working."

Wal-Mart is expanding its rollout of RFID technology within stores and distribution centers around the country (see [Wal-Mart to Expand RFID Tagging Requirements](#)). It also plans to continue to improve processes within the stores that have already been RFID-enabled to further reduce out-of-stocks.

"We knew that RFID would have an effect [on out-of-stocks]," says Langford. "The results demonstrated in the research study are in line with our expectations, but that's just the start. We are developing new tools for store managers to try to achieve even further reductions in out-of-stocks."

"The results of the study are extremely encouraging," says Hardgrave. "Sixteen percent improvement is a major improvement when you consider all the products Wal-Mart runs through its system in a day."

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