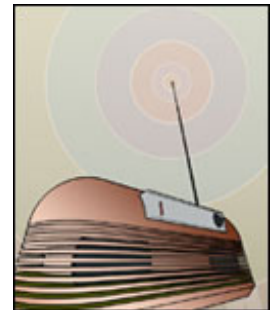




Will RFID Spark the Next Revolution in Retailing?

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Shoppers leaving Wal-Mart Stores these days are used to long check-out lines. In a few years, however, those lines well might be history. Wal-Mart is introducing radio frequency identification (RFID) tags to its products - small devices that emit radio waves containing information about product size, price, etc. Though this scenario is still far in the future, such tags could let the world's largest retailer add up the prices of purchased goods as shoppers leave the store and deduct the tab directly from their accounts. Whether such futuristic practices materialize or not, one thing is certain: RFID has begun to acquire a buzz that positions it as the next revolution in the world of retailing.



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How real is this revolution? And what does it mean for retailers and customers? Experts at Wharton and elsewhere say that RFID is a potentially powerful technology that several organizations - including retailers and government organizations - are seriously looking at implementing to ramp up the efficiency of their supply chains. While companies like Wal-Mart and Target have already announced plans to roll out RFID programs, others are waiting in the wings. Still, several hurdles remain. One big question is whether the benefits will be immediate or be spread out years into the future. "There's a bandwagon here and a lot of players say RFID is on the brink of having a big impact," says [Morris A. Cohen](#), co-director of Wharton's Fishman-Davidson Center for Service and Operations Management. "But before that, there are technical challenges to overcome."

Fans say that RFID technology promises to revolutionize the supply chain through real-time item tracking. Its goal is to keep goods on the shelves, garner more efficiency through better inventory management, enhance safety through smart recalls and cut theft, known as "shrink" among retailers. This is made possible by the fact that when RFID tags emit radio waves, that information is absorbed by a reader, which can then compile and share it with a company's enterprise software. Suppliers can benefit from real-time inventory management that keeps goods on the shelf. Consumers may not immediately see a lot of major changes, but they would certainly benefit from better in-stock levels.

Wal-Mart's Way

Wal-Mart, so far, has been the most aggressive in pushing RFID. Using the clout that comes with \$256 billion in annual sales, the company has mandated that its top 100 suppliers use RFID tagging on cases and pallets. Smaller suppliers need to be on the RFID bandwagon by the end of 2006. On April 30, Wal-Mart announced its trials in the Dallas-area were underway with eight of its leading edge suppliers—The Gillette Company, Hewlett-Packard, Johnson & Johnson, Kimberly-Clark, Kraft Foods, Nestle, Purina PetCare Company, The Procter & Gamble Company and Unilever. Some of those suppliers were experimenting with RFID before Wal-Mart issued its edict.

Cases and pallets of 21 products from the eight suppliers are being shipped to Wal-Mart's Sanger, Texas, distribution center and then to seven local "supercenters."

A few weeks later on May 18, Wal-Mart followed up with an update. "To date, no glitches -- only positive glimpses of what's to come," said Linda Dillman, executive vice president and CIO for Wal-Mart Stores.

Here are a few scenarios that Wal-Mart says it would like to see beginning in 2005 as it implements RFID on a wide scale. A case of a product leaves a manufacturer and is tracked and instantly routed when it reaches a Wal-Mart distribution center. There's no need to rip open a case and inspect the contents because the RFID reader has already identified the item. At the store, the goods are monitored in real-time so there's no need for inventory. When the shelves are empty, RFID readers alert workers to restock the shelves. If Wal-Mart's inventory is depleted, a replenishment message is automatically sent to the supplier.

"RFID could put more goods on the shelf," says William Cody, managing director of Wharton's [J.H. Baker Retailing Initiative](#). "It would certainly be better than having a skeleton crew walking around filling empty shelves. You could eliminate goods being lost in the back room."

Today, inventory processing requires line of sight for bar code scanning. Bar codes aren't going to disappear, but they do have disadvantages compared with RFID. Notably, bar codes introduce human errors, can only encode limited and static information, don't offer read/write capability and cannot read multiple codes.

Cohen explains the difference between current inventory management and RFID enabled systems this way: In current systems, you may know there are 10 items on the shelf, and that information is compiled in an enterprise planning software system. With RFID, you know there are 10 items, their age, lot number, expiration date and warehouse origin. "It's like knowing there are 1,000 people in a city," says Cohen. "With RFID, you know their names."

Most of the benefits from RFID at present will be tied to the supply chain and within three- to five-years electronic tags carrying product specific codes should be common, according to EPCglobal, the organization creating standards for the electronic product codes carried on RFID tags.

Despite all the promise surrounding RFID, there are hurdles to be overcome. Collectively, these developments serve as an RFID reality check. "We're not going to see broad-scale deployments overnight even with Wal-Mart's announcement," says Chris Boone, an IDC analyst, speaking at a National Press Club roundtable April 27.

Among the key issues yet to be resolved:

The Cost of Tags

Depending on whom you talk to, RFID tags cost anywhere from 20 cents to a dollar. To be cost effective, the price of tags needs to fall to 5 cents or so. It's a chicken-and-egg conundrum: If tags were less

expensive, there would be more pilots. If more companies were forging ahead with RFID installations, tags would be cheaper.

Meanwhile, big players such as Philips Electronics and Texas Instruments are waiting until the next generation of RFID tags enters the market. Smaller players such as Alien Technology currently dominate tag manufacturing. The price of tags is no small issue. Forrester Research estimates RFID tags represent 80% of implementation costs. "If Wal-Mart and Target can prove the economics, more and more companies will follow and bring the costs down," says Cody.

Cohen says the importance of tag costs largely depends on the value of the item being tracked. For example, a \$3 million Department of Defense missile can still get a benefit even if an RFID tag costs \$100 or more. A can of cola needs a tag with a lower price point, say a penny.

Standards in Flux

Wal-Mart's mandate requires suppliers to use "Class 0," which are factory programmable only, or "Class 1" tags that can be programmed by the retailer or supplier. EPCglobal is currently working with manufacturers on "Class 2" standards, which will carry more memory and data. Given that Class 2 tags are expected to be more flexible and useful overall, potential suppliers are holding out until those standards are set.

For now, Wal-Mart is accepting earlier versions of RFID tags, but analysts fully expect it to adopt the next generation technology as quickly as possible. In an April report that recapped interviews with 41 technology providers and Wal-Mart suppliers, Forrester analyst Christine Spivey Overby noted that some of Wal-Mart's suppliers and vendors expect the RFID infrastructure being installed today to be ripped out for more advanced technology a year later. Overby predicts that less than 25% of Wal-Mart's top suppliers will be prepared to roll out RFID in their supply chains by Jan. 1.

That estimate was cut from 60% just a few months earlier. The biggest reason: No compelling business case to rush. "Even the obvious benefits--like preventing shrinkage and automating receipt--are out of reach," wrote Overby. Apart from the costs of the tags, suppliers may find that they don't have the technology infrastructure to absorb the data provided by RFID and use it accordingly.

By itself, RFID is merely a data collection tool, says Sean Campbell, partner and worldwide RFID leader, distribution sector, IBM Consulting Services. What a company does with the information generates value. But RFID readers grab data every second, so a company has to filter out information that doesn't make the supply chain more efficient. To grab the most meaningful information may require business intelligence tools, data mining and standard data definitions across an enterprise. "One of the biggest barriers to making RFID work is figuring out how to manage the data," says Cohen, who adds that companies will need to make sure they have the proper processes and decision-support tools to make use of an influx of information.

Slap-and-Ship Approach

Given the large investment necessary to implement RFID and garner benefits from it, Overby recommends Wal-Mart suppliers adopt a "slap and ship" approach. This technique looks at Wal-Mart's mandate as a cost of doing business. The technique: Slap RFID tags on pallets and cases and send them to Wal-Mart as required. The problem is that the supplier to Wal-Mart garners little benefit, but can learn the technology and wait for it to develop further.

To be sure, manufacturers supplying products to retailers that require RFID in the supply chain will have to use it in some form — even in a slap and ship format. But being an early adopter may be costly. Cody says there may be more benefits in being a fast follower. The logic: Allow other companies to figure out intricacies such as where to place tags and readers and how to work around the physics of radio waves. RFID signals have trouble penetrating liquid and metal. Some companies have also found it hard to place RFID tags on frozen goods, though fixing them on paper is relatively simple.

Learning these practical lessons is important because Wal-Mart requires 100% readability rates, a goal that may not be possible given the solutions currently available. Instead, suppliers are likely to have to spend a lot of time integrating different technologies from various vendors.

Meanwhile, there's little experience in the field when it comes to integrating multiple RFID systems from various partners in the supply chain, notes Overby. To be sure, there will be kinks, but Cohen says RFID has potential to deliver big benefits. "A lot still needs to be done, but the potential is great," he says.

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