

RFID could revolutionize the supply chain

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Imagine you're at the grocery store the week before Thanksgiving and many of the items you're looking for are sold out. The employees restocking the shelves can't keep up with consumer demand. To make matters worse, you arrive at the checkout counter and every line is long. A new automated data collection (auto-ID) system may be able to help stores work out these kinks.

Radio frequency identification, or RFID, has the potential to revolutionize the way business is conducted. Consisting of three parts, a chip, a reader, and a database, RFID can automatically identify people and objects by a 100-digit tag and track them through the [supply chain](#). As they move through the process, RFID readers collect information on the products and match their tag numbers to a central database, which provides access to all information regarding the product.

"Because of those abilities, RFID technology can provide unprecedented speed and accuracy in a supply chain," said Smeal's Dennis Lin, distinguished professor of statistics and supply chain management, and coauthor Vijay Wadhwa, former doctoral student in the Department of Industrial and Manufacturing Engineering at Penn State, in their article, "Efficiency Gets a New Identity," published in *American Society for Quality's* magazine, *Quality Progress*.

Implementing RFID technology could increase a company's efficiency and productivity when conducting business on both a national and global scale.

RFID in Retail

There are two types of RFID tags: passive and active. The passive type, which Lin studies, works with little to no energy. The active type can use either [radio waves](#) or satellite signals to track products.

Wal-Mart is currently experimenting with passive RFID tags to help its stores meet high consumer demand. This auto-ID technology aims to reduce the likelihood of empty shelves by obtaining real-time product information.

Items with RFID tags have different identification numbers. It takes the RFID reader, which can read products within a 15-foot radius, about a second to retrieve information from the tags. Then, that information is sent to a database, which provides real-time inventory reports to help stores manage inventory and replenish shelves.

"RFID can provide several other advantages that cannot be achieved easily using a barcode system: faster product check out, theft reduction, dynamic pricing of products and tracking employees for labor efficiency," say the authors. "But those advantages come at a price."

RFID tags are more expensive than barcodes, which are the most commonly used forms of auto-ID, and have a greater impact on a company's bottom line.

RFID in Warehouses and Manufacturing

Like retail, the cost of implementing RFID technology in a warehouse setting could be an issue. According to the authors, it is estimated that an RFID-enabled warehouse would cost in excess of \$2 million.

Nonetheless, this technology would be very useful.

"The warehouse is an important supply chain entity because it acts as a buffer to minimize the effects of variability in the supply chain and serve customers in a timely fashion during peaks in demand," the authors write.

If RFID technology was used in a warehouse, shipments could be received automatically, bar codes would no longer need to be scanned before storing the products, and picking and shipping the products would be easier.

The advantages of implementing RFID in a warehouse setting are very similar to those in a manufacturing environment, except that, in manufacturing, there is the potential to improve product life cycle management, quality control, and inventory management.

"As a result, manufacturers can improve visibility and lower the overall inventory levels, labor costs and safety stocks," write the authors.

Is Big Brother Watching?

Many privacy concerns have arisen from the debate surrounding the use of RFID tags. In the case of Wal-Mart, the RFID tags on clothing are removable but do not turn off. Consumers are concerned these tags could be used to track their purchases or their current location.

A recent article in the *The Wall Street Journal* by Miguel Bustillo says that Wal-Mart is working with its suppliers to ensure that the RFID tags are placed on removable labels, not embedded in the clothing itself, in order to reduce consumers' fears of tracking. The retailer is also posting signs to ensure customers are informed about the tags.

Wal-Mart is planning to test the tags on individual pairs of jeans and underwear at first and, if this is successful, they plan to put the tags on additional merchandise at stores within the United States.

As for the future of RFID technology, the researchers list cost, standardization, and privacy as the biggest hindrances to implementing this system; therefore, RFID and barcodes will coexist in retail for some time. The next step is to develop data mining strategies to obtain useful information from the amount of data produced by RFID.

Provided by Pennsylvania State University

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