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## Marching Toward the RFID Business Case

By Stephanie Neil

Posted on Monday, November 20, 2006 2:41:15 PM EST

Wal-Mart Stores, Inc. has done it again. Another 500 of the company's stores will be RFID-enabled and another 300 suppliers will need to meet the retailer's RFID mandate by the end of next month.

Rollin Ford, the newly appointed executive vice president and CIO of Wal-Mart, recently said in a company statement that he remains steadfast in his commitment to RFID, echoing the convictions of his predecessor, Linda Dillman. Wal-Mart has already achieved some of the benefits of RFID -- such as reducing stock-outs and excess inventory. But as the company moves forward with efforts to couple new work processes with the technology, Ford suggested the gains will become more quantifiable and more widely spread across the organization.

"RFID will transform the way we do business, and I am privileged to be a part of this technology that is bringing positive change to Wal-Mart, the retail industry, and many other sectors as well," he said.

Ford did not elaborate on the new initiatives underway, saying only that the company would announce each project as it is rolled out. His silence could be intended to protect the competitive advantage that he expects RFID will bring to the company. Or it could be that Wal-Mart, like many of its suppliers, is still trying to figure out where to apply the technology outside of having it slapped on containers moving through the supply chain.

Many manufacturers, having first adopted RFID in reaction to mandates from organizations such as Wal-Mart and the Department of Defense, are now wrestling with their own confusion. Sure, many manufacturers have deployed RFID tags, readers, and gateways and upgraded to technology that is compliant with [EPCglobal](#) specifications, all in the interest of meeting the demands of their largest customers. But now these companies are asking: Where's their ROI?

Asset tracking has emerged as one area where RFID investment can be justified. Already, medical equipment manufacturers are using RFID to track products in hospitals, while aerospace companies are using RFID to locate parts. As manufacturers begin to explore applications beyond asset tracking, some are beginning to uncover opportunities in personal safety, security, logistics, and plant data collection, all of which offer promise to industries outside of retail.

Still, despite the fact that RFID is not a new technology, many manufacturers are struggling to understand the business case for next-generation RFID deployments. It's not an issue of a young market or an immature technology. Rather, experts say, the problem may be that company executives haven't taken the time to sit down and figure out the real value-add of RFID.

"People are still missing it because they haven't looked at the business case first," says Duncan McCollum, a principal at Computer Sciences Corp. and co-author of the book *RFID Strategic Implementation and ROI*, published earlier this year. In order for that to happen, he says, RFID needs to move from the realm of the IT department into the hands of line-of-business managers.

"Two or three years ago, whoever was available in IT was the person given the responsibility for

the RFID project," McCollum says. "Now, we are seeing a real shift in awareness that this is a cross-organizational issue. You have to get the operations, manufacturing, supply chain, logistics, and finance [departments] involved."

That may be happening in some industries. Indeed, a recent report from research firm Frost & Sullivan noted that although the retail sector continues to be a sweet spot for RFID in terms of market size and growth, automotive, aerospace, and industrial products are three manufacturing sectors that are expected to see the rewards of RFID within production and logistics operations over the next several years. The combined market for production and logistics RFID applications in those three industry segments is expected to grow from \$71.3 million in 2005 to \$225.7 million in 2012, according to the study.

### **The ROI of RFID**

RFID technology, to be sure, is maturing. As of this year, there are about a dozen RFID readers that comply with EPCglobal's Gen2 standard, and a handful of silicon products -- the chips found in tags and antennas -- are in compliance. Certification means the product has been tested against a 300-page file that outlines conformance guidelines, and has met all criteria. That guarantees interoperability between tags and readers, regardless of vendor.

But, even with Gen2 ready to go and compliant products shipping, there's still a lot of room for the technology to grow, according to industry observers, who note that the RFID market will take about a decade to mature in terms of standards, pricing, and infrastructure. While the Gen2 standard is rapidly taking hold, for example, it only applies to passive RFID technologies. So far, there is no standard for active RFID technology, which, while more expensive, features an internal power source that enables greater read ranges.

And, just as in the realm of computing, vendors' RFID products will continue to evolve into smaller, faster, cheaper designs. For example, in October, [Alien Technology](#) Corp. rolled out its new ultra-high-frequency (UHF) RFID Integrated Circuit (code-named "Higgs"), which is a drop-in replacement for currently shipping Gen2 chips and offers 30% longer read ranges and 10 times faster write speeds, according to company officials.

What's more, EPCglobal-compliant Gen2 chips are selling like hotcakes. "I would tell you that the demand goes up about 20% per quarter," says Keith McDonald, Alien Technology's senior vice president of sales and marketing. In 2007, as a result of the latest Wal-Mart drive to bring more stores and more suppliers up to speed with RFID, demand will surge to 40%, he predicts.

But putting the tags and readers in place is just the beginning. In order to truly benefit from any technology, companies must get beyond the mechanics and take a deeper dive into how it can transform existing business processes. In an attempt to stimulate that type of thinking, EPCglobal is helping to form communities that will define the RFID needs of specific industries and establish frameworks that will benefit each business segment by defining where and how manufacturers can pull ROI from RFID investments.

Retail, CPG, and the chemicals industries are the first segments working to build a set of ROI models, called EPC Value Models, notes EPCglobal's Director of Industry Adoption Sue Hutchinson. And now, interest is starting to take hold in healthcare, life sciences, aerospace and defense, and automotive. "We are starting to see a good number of interesting implementations," she notes. It all starts with an outline of business processes, she says.

### **Training Wheels**

As with many challenges, it's best to start simply. Automotive manufacturers, for example, have shown they can save money by RFID-enabling some contained, plant-centric business processes. DaimlerChrysler has been working with [Intermec Technologies](#) Corp. and others to implement RFID technology at one of the automaker's Michigan-based truck factories to help keep track of the carriers that hold the vehicles as they move along the assembly line. DaimlerChrysler uses information generated by the tags to identify which carriers may need maintenance -- before a failure causes a breakdown on the line.

"Bar codes, in a greasy, grimy place, could fall off," says Chris Kelley, director of RFID at Intermec. "RFID is durable and reusable." Moreover, DaimlerChrysler's was a very simple application that was easy to implement and garnered a quick return. "Payback on the project was \$1.1 million in four months," simply from avoiding additional overtime, Kelley says.

Similarly, in the aerospace industry, the new Boeing 787 Dreamliner is being built with RFID throughout, Kelley says, as a way to provide maintenance history on parts. In healthcare, medical equipment maker Hill-Rom Inc. is coupling RFID technology with service-delivery management and asset-tracking applications from Indus International, providing hospitals a way to keep track of movable equipment.

The long-term goal for Hill-Rom is to use RFID to collect a complete history of the product lifecycle for maintenance purposes. This can even extend beyond Hill-Rom's own equipment, establishing a new revenue opportunity by offering a way for the company to track and service all equipment, regardless of brand.

RFID tags attached to equipment or even people can help beef up security and safety at facilities. From a security standpoint, RFID tags attached to equipment -- be it hospital equipment or factory-based computer equipment -- can trigger an alert if, say, a notebook computer is carried off premises.

[Honeywell](#) Process Solutions is one vendor that has been selling RFID tags that are used to keep track of plant assets. In June, the company demonstrated a prototype of a tag that a person wears. It provides a way to track people moving throughout a plant -- either for security reasons or for worker safety. The tag could help locate individuals in the event of an accident or explosion in the plant, for example.

"The value that comes from that is not necessarily quantifiable. It is really creating a safer environment for employees," says David Kaufman, director of business development at Honeywell Process Solutions.

Honeywell is also working on a wireless solution that integrates RFID and wireless industrial networks. The unofficial name is the Honeywell Next Generation Wireless Solution, and it's scheduled to ship mid-2007. It is a multifunctional infrastructure that can handle Wi-Fi and sensor applications.

While the combination of RFID and other wireless technologies will offer manufacturers a way to more completely instrument the plant floor, vendors will need to resolve concerns such as bandwidth limitations, communication conflicts over the airwaves, power management of sensor-based networks, and security, experts say. In addressing security -- the most worrisome aspect of a mixed-mode wireless network -- Honeywell uses multiple techniques that include device identity, access control lists, cryptography within the communication layers, and automatic key management.

## Managing RFID

As RFID evolves and new applications emerge, manufacturers will need a way to manage it all if they are to gain ROI from these deployments.

Enter start-ups like Reva Systems Corp., which offers network equipment that captures data from readers and delivers it to an enterprise system. "We haven't redefined the factory or thrown out the MES or process control; we are just giving them the possibility to improve with RFID data," says Ashley Stephenson, Reva's chairman and co-founder.

Reva's Tag Acquisition Processor, coupled with the network intelligence of its Tag Acquisition Network, provides a way for companies to scale RFID deployments. This middle layer is so important that [Cisco Systems Inc.](#) and [SAP](#) Ventures recently invested in Reva.

Meanwhile, [Oracle](#) Corp. is addressing the issue of RFID information management with its own Fusion middleware, which includes the Sensor Edge Server used to manage sensors and RFID

tags and funnel information back into core applications.

"The more information we can capture from the physical world and bring it back into IT to integrate into enterprise applications, the more insight customers can get about what is happening in the manufacturing plant to make better decisions that transform and improve business processes," says Peggy Chen, Oracle's product director of marketing for RFID and sensor-based services. "That's what it comes down to in order to achieve ROI. It gets beyond just the cost of doing business with Wal-Mart or the Department of Defense."

While RFID technology is evolving and opportunities for using RFID to improve business processes are appearing, it will take time for manufacturers to figure out how best to justify its widespread use.

But that won't deter the pioneers like Wal-Mart. "We're already fully convinced of [RFID's] value and are ready to step up the pace since we know we are only touching the tip of the iceberg when it comes to the benefits of this technology," Wal-Mart's Ford noted.

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