ROI Calculator

RFID can help apparel and footwear retailers reduce out-of-stocks, improve inventory management and boost sales—while cutting labor costs. This report explains the assumptions behind RFID Journal's Apparel Retail ROI Calculator.

RFID JOURNAL

PRODUCED BY THE EDITORS OF RFID JOURNAL

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To download an electronic version, go to:

www.rfidjournal.net/apparel_roi_calculator.xls

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Calculated Benefits

APPAREL AND FOOTWEAR retailers just weathered the worst recession and slowest recovery in 75 years. Now, they are dealing with changing consumer buying habits. More purchases are being made online and through mobile devices. Retailers are struggling to provide a consistent experience across all channels, because they can't, for example, be sure that an item purchased through a mobile phone will be available in the store when the customer arrives to pick it up. Many apparel retailers are now turning to radio frequency identification. because RFID can provide the inventory visibility needed for omnichannel retailing. RFID also boosts sales by ensuring that products are on the shelves when shoppers want to buy them.

Is RFID right for your stores? Until now, companies had to spend $30,000 or more to run a pilot just to answer that question, so it's no surprise that many chose not to make that investment. That's why RFID Journal developed the Apparel Retail ROI Calculator. We wanted to give you a tool that enables you to get an estimate of how much RFID might cost, and how much return you might get on that investment. Armed with that information, you can make an informed decision regarding whether it's worth investing time and money in conducting a pilot.

We know that every retailer is different. No calculator can account for all the differences in store formats and business processes. But here's how and why our ROI calculator can provide you with a useful estimate of RFID's value.

First, we focused on the main tasks that employees in all retail stores must perform—receiving, cycle counting and replenishing. Then, we estimated labor savings based on the average labor savings achieved by retailers that have already deployed the technology. We also estimated the cost of taking inventory more frequently with RFID to improve in-store inventory accuracy. We then factored in the likely increase in sales that will result from improving on-shelf availability.

If the calculator shows a positive ROI with a payback of less than 12 months per store, you should launch a pilot to refine the inputs. The labor savings and sales increase might be bigger or smaller than expected. But the pilot will give you solid numbers to put in the calculator so you can see the likely ROI you'll achieve if you decide to more forward and deploy RFID in your stores.

We hope this tool will help you make smart decisions about when and where to deploy RFID. We will continue to refine the calculator, so if you have suggestions for how we might improve it, please e-mail editor@rfidjournal.com. And if you do run a pilot, we'd love to hear if the benefits were in line with our estimates. If not, I hope we underestimated the ROI!

Mark Roberti
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Marks & Spencer in the United Kingdom is among the retailers that have realized benefits from adopting RFID technology.

PHOTO: MARKS & SPENCER

RETAILERS globally lose $818 billion (yes, billion with a B!) in sales, due to out-of-stocks and deeply discounting overstocks, according to a 2012 study by the IHL Group, a research and advisory firm focused on retail technologies.

Out-of-stocks or misplaced stocks lead to goods being marked down later. Apparel and footwear retailers could capture some or most of the lost revenue by hiring and training additional employees and increasing inventory (though a study by the Wharton School of the University of Pennsylvania suggests there is a point at which increasing inventory exacerbates out-of-stocks because it makes store execution more difficult). But most retailers, particularly in the current economic climate, don't want to take on additional labor costs and the risks associated with higher inventory.

There's another option. Increasingly, apparel and footwear retailers have been examining the potential for radio frequency identification technology to reduce out-of-stocks, improve inventory management, enhance customer service and boost sales—while cutting labor costs. American Apparel, Macy's and Bloomingdale's in the United States, the Gerry Weber Group in Germany, and Marks & Spencer in the United Kingdom are among the retailers that have realized such benefits from adopting RFID technology.

Some apparel and footwear retailers still have some reservations about adopting RFID technology in their stores. Some retailers don't believe they have an inventory problem that requires fixing. Other concerns include the accuracy and reliability of reading RFID tags on items, and the complexity and cost of deploying an RFID system.

This report will address those issues. The accompanying RFID Journal Apparel Retail ROI Calculator is designed to help apparel and footwear retailers determine whether the likely benefits of deploying RFID technology in stores— labor savings and an increase in sales from better-managed inventory—would outweigh the costs. That is, would there be a return on investment from using the technology?

To demonstrate how the ROI Calculator works, we have created a "typical" specialty apparel retailer—XYZ Apparel—and entered data for that company: the amount of labor it has been using to receive goods, take inventory and replenish. The company has 400 stores, each with 10,000 items on the retail floor and 5,000 items in the stockroom. It performs five inventory turns annually, with an average selling price of $30 per item.

We used fairly conservative assumptions—such as the estimated changes in the amount of labor needed with RFID—based on real-world pilots conducted with American Apparel, Dillard's, Karstadt, Marks & Spencer, Throttleman and other retailers. We also provided the costs for hardware, software, services and maintenance to manage inventory with RFID, based on what vendors, systems integrators and consultants told us was reasonable, as well as on ballpark figures provided by retailers that have undertaken deployments. We have deliberately overestimated the cost a bit.

The ROI Calculator shows that XYZ Apparel would realize significant savings from deploying RFID in its stores. In the first year, the company would achieve an ROI of $33,029 for each store; in the second year, $60,890 per store; and in the third year, $64,846 per store. Systems would likely be phased in over time, but when fully operational at all stores, RFID could contribute more than $25 million to the company's bottom line after three years.

We have constructed the ROI Calculator to enable retailers to enter their own data in key areas—the number of items; labor spent receiving, managing inventory and replenishing; the number of receiving areas; monthly sales and so forth—and estimate the potential benefit RFID will deliver. Retailers can also run what-if scenarios or enter data based on the pilots' results.

You'll find a printed version of the Calculator on page 14. To download an electronic version, go to www.rfidjournal.net/apparel_roi_calculator.xls.

Taking inventory at an American Apparel store can now be done in a fraction of the time it once took.

SOME retailers have begun RFID-tagging individual items at the point of manufacture and tracking them through the supply chain to the point of sale. These retailers report a time savings of 70 percent or more when taking warehouse inventories, and a 7 percent increase in accuracy of picked orders in factories.

But this report and the ROI Calculator focus on RFID deployments in stores, because research and early pilots indicate that's where the greatest benefits can be achieved. Retailers that have suppliers tag at the point of manufacture can easily add supply-chain tracking, to improve shipping and receiving accuracy.

A seminal study of the out-of-stock problem in grocery and mass merchandise stores, conducted by Thomas W. Gruen of the University of Colorado, and Daniel Corsten of the IE Business School Madrid, shows that 70 percent to 75 percent of out-of-stocks result from problems at the store, while only 25 percent to 30 percent are due to upstream supply-chain issues. For apparel and footwear retailers, poor store execution is likely an even bigger issue, because their inventory is more complex. It's much harder to see that merchandise is misplaced, due to the fact that items of the same styles but in different sizes look almost identical on a shelf or rack.

Retailers surveyed by IHL indicated that "inadequate planning by buyers" was the biggest reason for lost sales, but "store execution" ranked a very close second. RFID can't help companies choose the proper styles for the coming fashion season, but the technology can help with store execution so that when a customer wants to purchase an item, the product is available—either on the shelf or easily found within the store.

How much can RFID help improve store execution? The answer depends on the retailer—each company has different processes for managing inventory. Those retailers that execute well today will likely see a smaller increase in sales from RFID than those that execute poorly. But even those that execute well might find the labor savings and inventory reductions that can be achieved with RFID more than offset the cost of the technology.

Many retailers say the data they use to analyze their operations indicates they don't have an inventory-management problem. But the RFID Research Center at Auburn University (it was moved from the University of Arkansas) has analyzed information from numerous RFID retail apparel pilots—with companies such as Bloomingdale's, Dillard's and J.C. Penney—and found a mismatch between what store systems indicate is on hand and what is actually in inventory. "The system might say that 99 percent of the items are in stock, but the system counts are wrong," says Bill Hardgrave, the center's director. "In reality, what retailers think is in stock is not what is actually in stock. We've seen the same thing in every study we've done. The system might say 1 percent of items are out of stock, but it might really be 12 percent to 15 percent."

In 2008, for example, the RFID Research Center conducted a pilot at two Dillard's stores, to determine the impact of RFID on store operations. Dillard's performed one of two yearly manual inventory counts by scanning items with bar codes. Inventory accuracy increased by 17 percent after the manual count—and rose another 4 percent when RFID was used to count tagged items (RFID was more accurate than the manual count). In two control stores, where RFID was not employed to count inventory, accuracy declined by 13 percent within the first month after the manual count. Obviously, inventory accuracy would continue to decline until the next manual count.

American Apparel uses boutique-style retailing—each style must be available in all colors, and in one of each size, on the sales floor. It conducts inventory counts twice weekly in its stores that don't use RFID, and finds that more than 10 percent of items are not on the floor.

Poor inventory accuracy leads to lost sales, because items might be out of stock when a

PHOTO: AMERICAN APPAREL

consumer wishes to purchase them, and overstocking leads to mark-downs. Poor inventory accuracy also has an impact on customer satisfaction. Shoppers who visit a store and fail to locate what they're looking for are less likely to return.

RFID can increase store inventory accuracy—and thus capture some sales currently being lost, or enable a retailer to sell more items at or near full price—without greatly increasing the amount of labor needed to manage store inventory. American Apparel saw store inventory accuracy rise at RFID-enabled stores from approximately 80 percent to 99 percent, and its sales rose by 14 percent. In 2012, the retailer began rolling out RFID to all its stores.

RFID READ ACCURACY

MANY COMPANIES have run pilots to test whether RFID can read tags on items reliably enough to deploy the technology. While RFID is not perfect, pilots and tests conducted under real-world conditions have shown that the technology is more accurate than manually counting items—either simply counting or scanning a bar code on each item. Tests performed at the RFID Research Center found that mobile, handheld, fixed and portal interrogators could read tags on nearly all items in a variety of common scenarios. The chart below is a summary of the center's findings.

The RFID Research Center found that inventories at U.S. apparel stores are accurate only 65 percent of the time. These tests show that RFID is more accurate than manual counting, and more than good enough to enable companies to achieve a significant boost in inventory accuracy.

Test	Number of Items	Accuracy Level
Handheld interrogator used to read clothes on rounder	Varied, up to 180	100% up to 160 items, 98% with 180 items
Handheld interrogator used to read clothes on a z-bar	Varied, up to 127 (max. capacity)	100%
Handheld interrogator used to read clothes in a box	Varied, up to 50 (max. capacity)	100%
Handheld interrogator used to read clothes on shelves	145	99.31%
Handheld interrogator used to read clothes on pegboard	45 (max. capacity)	100%
Handheld interrogator used to read clothes in piles	Varied, up to 75	100%
Handheld interrogator used to read pantyhose in display, open drawer, box	120 to 240	100%
Fixed interrogator used to read clothes at point of sale	One item at a time	100%
Portal interrogator used to read clothes on z-bar	Varied, up to 92	100% up to 72 items, 98.6% with 92 items
Portal interrogator used to read clothes in boxes on handcart	Varied, up to 72	100% up to 67 items, 99.8% with 72 items

Source: "Item-Level Tagging: Feasibility, Use Cases, ROI," presentation by Bill Hardgrave, founder of the RFID Research Center, RFID Journal LIVE! 2009

THE PROCESS FOR EMPLOYING RFID to better manage inventory and improve on-shelf availability is not complex. Retailers must receive RFID-tagged goods into the store; the unique serial numbers on the tags indicate precisely which items have arrived. RFID must be used to determine which items are not on the floor with frequent inventory counts, and the items must be picked. RFID must be used to confirm which items have been replenished, and which still need to be replenished. Point-of-sale (POS) systems can still use bar codes to indicate which items have sold, though RFID provides a more accurate and reliable view of sales.

RFID-Tagging Each Item

Companies have three options for RFID-tagging items. They can use a service bureau, which provides variably printed and serially encoded RFID hangtags or labels and delivers them to the company's manufacturing facility for attachment to garments. The garment manufacturer can overprint and encode the RFID hangtags or labels with an RFID printer and appropriate software at its own facility. Or a separate RFID tag could be applied at the firm's own distribution facilities, and be associated to the UPC code before the items are shipped to stores.

For the purpose of the ROI Calculator, we have assumed that XYZ Apparel has been using a service bureau to print hangtags and labels, and will continue to do so as it moves to using RFID technology. This approach requires only that a company pay for the additional cost of embedding the transponder in the hangtag or label. Business processes do not change.

Receiving

Inventory accuracy begins with accurately recording the items received into a store's inventory. We have not found any studies that reveal the error rate for goods being received, so our calculator only examines the labor savings that can be achieved with RFID.

RFID tests at Karstadt and NP Collection found that it takes 75 percent to 85 percent less time to receive goods into inventory with RFID. We've used 80 percent as a mean. XYZ apparel is spending 25 man-hours per week receiving goods into inventory at stores not using RFID (cell C23), and its hourly wage is $12 (cell C24), so it can save $240 per week per store using RFID (cell C25 minus cell G25).

The cost of the RFID hardware needed at receiving depends on the number of dock doors or receiving stations at the back of each store. Our model assumes that XYZ Apparel has a single receiving point at each location, requiring a single fixed reader—either as a portal or at a table where goods are sorted and counted. We've used an installed cost of $5,000, including a PC with touch screen for running the inventory application (cell 70). A company could add a label printer here for generating labels on goods without RFID hangtags, or for handling returns. For stores with more than one receiving door or station, increase the number of RFID readers required accordingly (E70).

Taking Store Inventory

Some have sales associates adjust sales floor inventory, while others use dedicated staff members—and many employ a combination. Some perform inventory counts twice annually, plus weekly bulk counts (to obtain the total number of items in the store). Some have systems that issue "need to count" orders when inventory appears in the system but there are no sales for several days. We assume that XYZ Apparel's store associates spend 24 hours per week conducting bulk inventory counts (they count all items but don't scan bar codes) and another six hours per month locating items that need to be replenished and counting individual SKUs based on "need to count" orders issued by their ERP system, for a total of 30 man hours per store per month (cell C32).

To maintain inventory accuracy of 99 percent or better, a company might need to conduct inventory at the end of each day and replenish items accordingly. Even with RFID, this would likely be too costly. We have heard consistently from retailers that staff can count inventory with RFID about 20 times faster than with a bar-code scanner. We assumed that each XYZ Apparel associate can scan 2,000 items per hour (cell G29) and the store performs a complete inventory count with RFID eight times per month (cell G31).

The actual labor required might be less over time. The RFID Research Center's Hardgrave suggests that as companies deploy RFID, they'll be able to perform more effective cycle counting. "The nice thing about RFID," he says, "is that you can match your cycle counting to the needs of the store's departments. Some departments might need to be counted only once a month. Others will need it every day. But having accurate data and visibility into real inventory allows you to set that strategy."

Replenishment

Most apparel retailers replenish based on POS data and physical checks by store associates. Both methods, however, are inaccurate. POS data can be wrong because a cashier might see six red cotton shirts and assume they're all the same, when in fact three are mediums and three are smalls. If the associate scans the bar code on one medium-size shirt and enters an amount of six, the inventory-management system will show three smalls in inventory that don't exist, and indicate three mediums have been sold when they are still on the shelves.

Staff checks on inventory are more difficult in an apparel store than in other types of retail outlets, because items look so similar. When a shopper tries on a pair of jeans with a 30-inch waist and returns them to the rack with 33-inch waist jeans, for instance, it's very difficult for associates to spot these misplaced items. If another shopper later arrives to purchase jeans with a 30-inch waist but is unable to find them because they're in the wrong location, the retailer loses a sale.

RFID solves both of these problems. Because each RFID tag contains a unique serial number associated with an item of a specific style, color and size, a POS system correctly decrements inventory no matter how similar items look. And software that runs on handhelds can be programmed to indicate when a tag associated with a misplaced item is read.

With both RFID and manual systems, a store system generates a pick list based on sales. If a manual system generates a pick list of 30 items, a worker might pick only 15 items when busy, and indicate he picked all 30. Or the associate might have picked 25 items accurately and chosen the wrong item five times. The system now thinks all 30 items have been properly replenished, when they have not. This leads to out-of-stocks and lost sales.

Manual systems can also lead to "frozen inventory." Say there are 20 pairs of jeans on a rack and a replenishment order is triggered when 15 have been sold and there are five left. If five items have been stolen, no items remain on the rack. No replenishment order is issued, because the system shows five items still in inventory. When there are no sales for three or four days, the system will issue a "need-to-count" order.

"The problem is that you've lost a couple of days of sales before the need-to-count order," Hardgrave states. "Then you do the manual count and place the order. It might be three days before the items are replenished. You've missed a week of sales."

Given that the most popular items are likely to be stolen or subject to inventory inaccuracies because of rapid turnover, it's likely that these items are going to be frozen more often, leading to lost sales.

Moreover, store processes tend to break down during peak periods. Replenishment isn't done because employees are busy. "In American Apparel stores, the paper [pick lists] would stack up on a busy day," says Zander Livingston, former director of RFID at American Apparel and now CEO of Truecount (a supplier of RFID systems for retail). "Then you have to try to find out who was responsible for filling certain items and so on. With RFID, you remove hand counting, so when the store is under stress, processes don't break down. The RFID stores perform during peak periods the way other stores perform during slow periods."

As with the manual process, replenishment with RFID involves generating an accurate pick list from POS data, picking the items in the back of the store, staging them to be brought to the store floor and then replenishing. The time required to fulfill these tasks is greatly reduced. A sales associate can use an RFID handheld reader to quickly locate items in the back of the store. An RFID reader can check the items against a pick list while the associate prepares the goods to be brought to the floor. If an item is missing or an incorrect item is being prepared, the system can alert staff members to the problem. A portal or fixed reader located between the back of the store and the sales floor can then validate that the proper items have been brought to the floor.

We have assumed that XYZ Apparel spends approximately 25 man-hours per month replenishing the shelves from stock in the store room (cell C37). Based on the results reported by American Apparel, Charles Vögele, Gerry Weber, Macy's and other retailers, we have assumed that RFID will cut the amount of labor in half due to the technology's ability to identify exactly which items need to be replenished, and to locate those items quickly with a handheld reader.

Labor Costs

Retailers could hire more staff to count inventory more often and improve store execution. We have estimated the cost of hiring additional labor to do more frequent cycle counts and more aggressive replenishment from the back room. This will improve sales, but it is unlikely to have as large an

impact as RFID because of problems with any manual processes. We have included the column labeled "With Additional Labor" so you can see how RFID compares to hiring more staff. However, we assume revenue from selling more goods at a higher price will rise only 3 percent (cell E54) and incremental sales based on reordering more effectively will rise 0.5% (cell E56) because there will still be problems with execution.

REDUCING SHRINKAGE

MOST RETAILERS THAT HAVE DEPLOYED RFID at the item level have not employed the technology as an anti-theft application, but anecdotal evidence from pilots and rollouts suggests that the greatly improved inventory visibility can reduce internal shrinkage (employee theft). That's because workers are less likely to steal if they know a specific item can be accounted for in a particular place (the back room, for example) on a given day when they were on duty. To be conservative, we have assumed internal shrinkage will decline just 10 percent (some retailers report a reduction of 20 percent to 25 percent).

To calculate the benefit, we have assumed that 2 percent of sales are lost monthly in each store (cell G45) and 40 percent of that, on average, results from employee theft (cell G46). These estimates are based on the University of Florida's Annual Retail Security Survey. For XYZ apparel, internal shrink is $18,000 annually, or $1,500 monthly. Reducing this amount by 10 percent (cell G48) would yield a net savings of $150. But we can only attribute the value of the cost of these goods (48 percent, based on a 52 percent retail margin) to RFID. The net benefit is $72 per store per month.

SALES INCREASES

DETERMINING THE POTENTIAL sales increase from achieving 95 percent inventory accuracy or better is very difficult, because the level of increase will depend on how effective or ineffective a retailer's current practices are. The IHL study found that apparel retailers could increase sales by 7 percent if they eliminated out-of-stocks.

Retailers are reluctant to make information public regarding sales increases due to RFID, but based on information RFID Journal has received pertaining to various pilots, most companies can expect a 5 percent to 10 percent increase in sales. American Apparel has determined that its sales have risen by 14 percent in RFID-enabled stores, but we have used 5 percent for our calculator, to remain conservative.

There are two types of sales benefits that RFID can deliver. The first is squeezing more revenue out of existing inventory. Better store execution enables a retailer to sell more units at full price, or closer to full price. Since this inventory is already paid for and shipped to the store, any increase in sales flows directly to the bottom line. Essentially, RFID helps improve the retail margin on existing inventory, so we attribute 100 percent of the benefit from this increase in revenue to the bottom line. (For an excellent analysis of the two types of sales benefits, see "RFID: Well Within Reach," a study written by Marshall Kay for *Apparel* magazine. You can also view the Ladder worksheet within the ROI calculator spreadsheet to get a clearer picture of how RFID improves your retail margin.)

RFID also enables retailers to react more quickly to demand and thus reorder faster and achieve incremental sales. In this case, the net benefit from RFID is equal to the increase in sales times the retail margin.

For XYZ Apparel, we have attributed 4 percent of the sales increase to squeezing more revenue out of existing inventory (cell G54), and 1 percent to incremental sales through better response to demand (cell G56). Thus far, no pilots or rollouts have distinguished between these two types of inventory. We chose to be conservative in our assumption,

because demand in the current economic climate is growing slowing, and capturing incremental sales requires additional tasks that must be executed properly (reordering, moving goods quickly through the supply chain, replenishing and so forth).

Will sales really increase 5 percent or more? The focus of any retail RFID pilot should be to quantify the sales increase (as well as labor costs or savings). But we believe 5 percent is a reasonable—even conservative—expectation for the following reasons:

- Five percent is conservative, based on the results achieved by retailers that have conducted pilots or rollouts. American Apparel's sales rose by 14 percent in RFID-enabled stores, and Dean Frew of SML, an RFID solutions provider that has done deployments for apparel retailers, says others have seen even better results. "Sales lift is actually lower at American Apparel than what can be achieved at larger chains, because the volume through the store isn't as great," Frew says. "We have worked with other retailers that have seen a much larger lift as a result of deploying RFID, because they have three or four times the number of items on the floor to sell."

  Inventory accuracy at most apparel stores is poor, and customers leave the store without the product they came to buy more often than retailers realize. Marshall Fisher, co-director of Wharton's Fishman-Davidson Center for Service and Operations Management, says one major consumer electronics retailer hired an outside company to walk the aisles at the end of the day, looking for out-of-stocks. "Nearly 30 percent of the time, the computer said there was a positive inventory, but somehow the store couldn't find that inventory," he says. "There was a clear store execution problem." And in a 2008 IHL Group study, 57 percent of surveyed retail executives rated their company better or much better than other retailers they shop, while 37 percent rated their chains the same. Only 6 percent rated their chain as worse than the other places in which they shop for goods and services.
- Better inventory management with RFID will reduce the amount of inventory needed and, therefore, reduce markdowns. Many retailers load up on inventory in an effort to avoid out-of-stocks, but the Wharton School study found that greater inventory was harder to manage and thus increased both out-of-stocks and markdowns of the excess inventory.
- RFID reduces "frozen" inventory, which leads to out-of-stocks and lost sales—particularly on hot items.
- RFID-driven processes won't break down when a store is at its busiest. Without RFID, associates don't have time to replenish when the store is extremely busy, leaving hot items out of stock during peak selling periods. RFID allows for more efficient use of labor and processes that are triggered by real-time data and confirmation of tasks, so items can continue to be replenished during peak selling periods.
- RFID enables companies to replenish stolen items. Electronic article surveillance systems alone only tell a retailer that something was stolen, but not what specifically was taken, so they fail to replenish that item, potentially leading to lost sales.
- RFID increases customer satisfaction, thereby leading to more loyal customers. The Wharton School study found that having the product on the shelf when a shopper comes in to buy it is a critical component of customer satisfaction, so out-of-stocks lead to not just a loss of an immediate sale, but potentially future sales as well.

POTENTIAL BENEFITS NOT FACTORED IN

RFID IS LIKELY to be able to deliver additional benefits not included in the ROI Calculator. It's possible, for example, to use the technology to reduce employee theft by more than the 10 percent we allocated in our model. American Apparel, for instance, found that internal shrink declined by 50 percent or more in stores using RFID.

RFID could also be used to reduce theft in fitting rooms. Systems could be set up to alert security when, say, more than four items at a time are brought into a fitting room, so an employee could make sure the items are all accounted for when the

customer leaves the fitting room.

RFID will likely reduce the amount of labor spent marking down items, since better store execution will result in fewer items needing to be marked down. It could reduce employee fraud, by which items are substantially marked down for friends. And RFID could reduce losses associated with fraudulent returns, in which people steal items at one store and return them at another for cash.

Having accurate, real-time data regarding the speed of sales and the location of goods in inventory could enable retailers to transfer inventory among stores. For instance, if there were a heat wave in one area and more mild weather in another, retailers could more confidently ship swimsuits from stores in cooler climates to those in warmer areas. That would enable them to lose fewer sales when stocks sell out in the hot areas, and to have fewer markdowns in stores located in the cooler climates.

RFID could also have an impact on sales by enabling better overall planning and product allocation, because it takes the "guess work" out of the way that retailers currently plan, replenish and allocate their stock. "When you have the true inventory position of every store in the chain, you can more intelligently replenish and allocate stock in the current cycle and plan for the next cycle," says John-Pierre Kamel, principal at RFID Sherpas, an RFID technology consulting firm. "Increased visibility will allow retailers to do a better job of transferring stock between locations, replenishing stock, and the ordering and allocation of new stock, which can boost sales significantly for some retailers."

RFID might also improve price optimization. New visual tags that display pricing could be employed to mark prices up or down, based on sales.

COSTS

WE HAVE MADE several assumptions that could affect costs. First, we assumed that stores have a wireless network to enable communication between handhelds and the host system (handhelds can also use a cradle to transfer data). We also assumed that the stores have a virtual private network to share data with a central server. And we further assumed that the central server and some other components will come out of the IT budget.

We have used an incremental tag cost of 12 cents for a UHF EPC Gen 2 transponder (cell C66). Prices vary with volume, but companies tagging more than 1 million items per year should be able to obtain tags for 12 cents or less. There is no additional cost for tag application. For our three-year view, we increased the cost of tags by the amount of incremental sales, or 1 percent (cell C56).

We have used a figure of $15,000 for software for each store (cell G67). We spoke to some of the major players selling to apparel retailers, and were quoted prices that ranged from $12,000 to $20,000 per store, but are confident that retailers could negotiate a $15,000-per-store price. We have also allocated $8,000 per store for integration costs, which means integrating the RFID system into existing back-end store systems (cell G68).

We have used a price of $5,000 for a receiving station (cell C70), which includes a PC and touchscreen. We allocated $4,500 for a fully installed RFID reader, with antennas and cabling, at the door between the back room and sales floor (cell C71). We allocated $3,500 for a point-of-sale reader, which requires less cabling and structural support for antennas (cell C72). We budgeted $4,000 for each handheld, which includes accessories, such as batteries and a cradle (cell C73). And we included $10,000 for professional services, including project management, hardware installation, configuration and training, plus go-live support (cell G69).

We allocated $3,000 for software support for years two and three (cells E91, G91), and set aside 10 percent of the hardware cost for support (line 95). We have not budgeted for ongoing training, since new employees need to be trained whether or not RFID is used.

The above costs are based on input from end users, systems integrators and consultants. We assessed a capital cost of 10 percent (line 97), but you can change the percentage (cell E20). And we depreciated the hardware over three years (line 91).

RECOMMENDATIONS

TECHNOLOGY CAN PROVIDE, at best, a temporary competitive advantage. Retailers compete on their ability to provide the products that consumers want to buy, and that is a huge challenge that technology cannot overcome. But apparel retail is more competitive than almost any other retail segment. "If you are out of a size-eight black cocktail dress, there are six or seven other companies in the mall that can sell you a size-eight black cocktail dress," says Greg Buzek, president of IHL Group. "That's different from electronics, where you might have to drive 20 miles, depending on where you live, to find the same item at another store."

All evidence from RFID retail apparel pilots and deployments undertaken to date suggests the benefits can be significant. In general, stores with a large number of items on the floor and in the back room, as well as fast inventory turns, will see the greatest return on investment.

We recommend that businesses plug their own figures into the calculator. Enter the average number of items you have on the retail floor and in the back room, the number of inventory turns and the average selling price and margin. Then enter the number of labor hours spent receiving, taking inventory and replenishing. Use 5 percent for the sales increase, and see if you would likely receive an ROI within one year.

If the calculator indicates you would receive an ROI in each store within a year, run a pilot in five stores and monitor five control stores to determine what your company's labor savings would be, in addition to what the actual sales increase would be from deploying the technology. If the pilot validates the ROI, it probably makes sense to bring in a business process consultant who can help you to optimize in-store processes using RFID and look at the potential benefits that could be achieved in the supply chain. These should be incorporated into a broader rollout plan.

ARTICLES AND STUDIES REFERENCED IN THIS REPORT

Seizing the In-Store Opportunity: 2008 Store Systems Study
By the IHL Group
risnews.edgl.com/retail-research/Store-Systems-Study-2008--Seizing-the-In-Store-Opportunity39141

Delving into the Mystery of Customer Satisfaction: A Toyota for the Retail Market?
knowledge.wharton.upenn.edu/article.cfm?articleid=1255

A Comprehensive Guide To Retail Out-of-Stock Reduction In the Fast-Moving Consumer Goods Industry
By Thomas W. Gruen, University of Colorado, and Daniel Corsten, IE Business School Madrid
www.nacds.org/pdfs/membership/out_of_stock.pdf

RFID: Well Within Reach
By Marshall Kay, in *Apparel* magazine
www.apparelmag.com/Media/PublicationsArticle/App-RFID-1006.pdf

Dillard's, U. of Ark. Study Quantifies RFID's Superiority to Manual Inventory Counts
www.rfidjournal.com/articles/view?4881

Improving Sales Floor Processes by Using RFID
This PDF is from a presentation at RFID Journal LIVE! Europe 2008
www.rfidjournalevents.com/europe2008/pdfs_np/Vieweger_Nov%206_220_Retail.pdf

Finnish Retailer Gets Quick ROI on Item-Level RFID
Expected payoff time is just six months.
www.rfidjournal.com/articles/view?6866

IHL Report Shows $818 Billion Lost Annually in Global Retail "Inventory Distortion"
www.retailtouchpoints.com/in-store-insights/1647-ihl-report-shows-818-billion-lost-annually-in-global-retail-inventory-distortion

American Apparel Case Study Write-up
By Reik Read, Robert W. Baird & Co.
www.rfidjournal.net/PDF_download/American_Apparel_Case_Study.pdf

APPAREL RETAIL ROI CALCULATOR: EXAMPLE

Company Information	
Name	XYZ Apparel
Total items on the floor	10,000
Total items in the back room	5,000
Total stock turns	5
Average selling price per item	$30
Annual revenue per store	$2,250,000
Number of stores	400
Total revenue	$900,000,000
Tax rate	32%
Cost of capital	10%

Receiving Goods into Inventory	Currently	With Add'l Labor	With RFID
Hours spent per store/month	25	30	5
Labor cost/hour	$12	$12	$12
Receiving cost per store/month	$300	$360	$60

Inventory Counts	Currently	With Add'l Labor	With RFID
No. of items on the floor	10,000	10,000	10,000
No. of items counted per person/store/hour	200	200	2,000
No. of man-hours for complete inventory	50.0	50.0	5.0
No. of complete counts per month		8	8
Total no. of man-hours per store/month	30	400	40.0
Labor cost/hour	$12	$12	$12
Total cost per store/month	$360	$4,800	$480

Back-to-Front Replenishment	Currently	With Add'l Labor	With RFID
Man-hours per store/month	25	50	12.5
Labor cost/hour	$12	$12	$12
Cost per store/month	$300	$600	$150

Total labor per store/month	$960	$5,760	$690
Labor savings (cost)		($4,800)	$270

Reduction in Shrinkage	With RFID
Total shrinkage as a % of sale	2%
Internal shrinkage as a % of total shrinkage	40%
Internal shrinkage per store/month	$1,500
% reduction due to RFID	10%
Value of reduction in shrinkage per store/month	$150
Net benefit of shrinkage reduction	$72

Sales Increase	Currently	With Add'l Labor	With RFID
Sales per month/store	$187,500		
% revenue increase from higher AUR*		3%	4%
Rev. increase per month based on higher AUR		$5,625	$7,500
% revenue increase from incremental sales		0.5%	1%
Revenue increase from incremental sales		$938	$1,875
Retail margin		52%	52%
Profit from incremental sales attributable to RFID		$488	$975
Gross incremental profit per store/month		$6,113	$8,475

Total benefit per store/month		$1,313	$8,817
Total benefit per store/year		$15,750	$105,804

Cost for RFID System per Store	Cost Per Unit	Units	Total
Incremental cost of RFID hang tags	$0.12	75,000	$9,000
Software			$15,000
Software integration per store			$8,000
Professional services			$10,000
Receiving/tagging station	$5,000	1	$5,000
Impact door	$4,500	1	$4,500
Point-of-sale	$3,500	1	$3,500
Handhelds	$4,000	2	$8,000
Total hardware costs			$21,000
Total investment in RFID per store			$63,000

Payback period (months)	7

Three-Year View			
Depreciation (years)	3	Resale Value	$3,300
Return on Investment	**Year 1**	**Year 2**	**Year 3**
Profit contribution from higher AUR	$101,700	$104,751	$107,894
Reduction in shrink	$864	$873	$881
Elimination of 2 yearly physical inv. counts	$1,800	$1,800	$1,800
Labor savings (cost) attributable to RFID	$3,240	$3,240	$3,240
Benefits attributable to RFID	$107,604	$110,664	$113,815
Costs			
Annual cost of tags	$9,000	$9,090	$9,181
Software license	$15,000		
Software maintenance and support	$0	$3,000	$3,000
Software integration	$8,000		
Professional services	$10,000		
Hardware cost (depreciated)	$9,660	$5,216	$2,817
Cost of hardware maintenance	$2,100	$2,100	$2,100
Corporate overhead (IT and other)	$4,000	$4,000	$4,000
Cost of capital	$5,376	$1,941	$1,710
Total costs attributable to RFID	$63,136	$25,347	$22,808
Per store gross profit	$44,468	$85,317	$91,007
Taxes	($14,230)	($27,301)	($29,122)
Net profit per store	$30,238	$58,015	$61,885
Chain-wide net profit	$12,095,296	$23,206,115	$24,754,003
Net present value**			$48,772,380

RFID RESEARCH CENTER WHITE PAPERS

RFID Item-level Quantity Auditing for Apparel Supplier Distribution Centers
itri.uark.edu/104.asp?code=rfid&article=ITRI-WP159-1211

An Empirical Study of Potential Uses of RFID In The Apparel Retail Supply Chain
itri.uark.edu/104.asp?code=rfid&article=ITRI-WP156-0111

RFID-Enabled Visibility and Retail Inventory Record Inaccuracy: Experiments in the Field
itri.uark.edu/104.asp?code=rfid&article=ITRI-WP154-0910

Item-Level RFID for Apparel/Footwear: The JC Penney RFID Initiative
itri.uark.edu/104.asp?code=rfid&article=ITRI-WP151-0410

Item-Level RFID for Apparel: The Bloomingdale's RFID Initiative
itri.uark.edu/104.asp?code=rfid&article=ITRI-WP147-0809

Item-Level RFID for Apparel: The Dillard's RFID Initiative
itri.uark.edu/104.asp?code=rfid&article=ITRI-WP146-0409

RFID Item-Level Tagging for Apparel/Footwear: Feasibility Study
itri.uark.edu/104.asp?code=rfid&article=ITRI-WP112-0608

Does RFID Improve Inventory Accuracy? A Preliminary Analysis
itri.uark.edu/104.asp?code=rfid

RFID JOURNAL CASE STUDIES

(These articles are accessible to premium members only.)

Marks & Spencer Embraces Change
Based on the benefits achieved from RFID-tracking all apparel—and recognizing the importance of omnichannel shopping—the U.K. retailer plans to tag all general merchandise in stores.
www.rfidjournal.com/articles/view?11952

Brazil's Valdac Turns to RFID for Style and Savings
The technology proves to be the perfect match for a new fashion store model.
www.rfidjournal.com/articles/view?8784

Gerry Weber's Pain-Free RFID Revolution
The clothing designer and retailer tracks garments from manufacturing sites to warehouses and retail stores, to improve inventory management and deter theft.
www.rfidjournal.com/articles/view?8622

A Diamond Ping
Steinmetz Diamond Group uses RFID to track, manage and secure tiny, highly valuable gemstones.
www.rfidjournal.com/articles/view?8481

Creating a Unique Retail Experience
Common People blends chic ambiance, a mix of art and fashion, and RFID to wow consumers.
www.rfidjournal.com/articles/view?8195

An RFID Fashion Statement
Switzerland's Charles Vögele Group discovers that fashions tracked and managed via RFID are always in style.
www.rfidjournal.com/articles/view?5081

Zipping Up Benefits
In the new economic reality, where the apparel and footwear industry can't count on consumers' boom-time shopping sprees, retailers are turning to RFID to increase sales, reduce losses and gain efficiencies.
www.rfidjournal.com/article/view/5018

On the Trail of Hush Puppies
Indexport, the manufacturer and distributor of Hush Puppies footwear, employs RFID to manage its real-time stock at its Spanish distribution center.
www.rfidjournal.com/articles/view?4712

Apparel Retail News Articles from RFID Journal

Marc O'Polo Discovers RFID's Benefits
Having deployed an EPC UHF system at its 86 European stores, the apparel company says it expects an increase in revenue, thanks to the higher availability of goods on the sales floor.
www.rfidjournal.com/articles/view?12657

Decker s New UGG Australia Store Uses RFID to Promote Products, Engage Shoppers
The retailer installed four huge RFID-enabled touchscreens to allow customers to automatically view data about the shoes or boots they try on, by simply standing on a floor mat.
www.rfidjournal.com/articles/view?12456

Decker's New UGG Australia Store Uses RFID to Promote Products, Engage Shoppers
The retailer installed four huge RFID-enabled touchscreens to allow customers to automatically view data about the shoes or boots they try on, by simply standing on a floor mat.
www.rfidjournal.com/articles/view?12445

Chico's Finds RFID a Good Fit at 13 of Its Soma Intimates Stores
The technology enables the stores to track merchandise as it arrives and leaves, providing visibility into inventory levels and ensuring that customers can always find the sizes and styles they need.
www.rfidjournal.com/articles/view?12296

Norwegian Apparel Company in Good Mood Over RFID
Moods of Norway boosted sales of men's shirts and suits by double digits during a six-month pilot at two stores using an RFID solution from Nedap, by ensuring inventory is accurate; the company has now rolled out the technology at 13 of its locations.
www.rfidjournal.com/articles/view?12273

Macy's Expands RFID and Beacon Deployments
The retailer has begun tagging fashion garments at its Macy's and Bloomingdale's stores, to help make sure the merchandise is on the sales floor and to reduce the need for markdowns.
www.rfidjournal.com/articles/view?12183

Sandro Ferrone to Expand RFID Deployment
Already using Tageos passive UHF RFID tags to track its merchandise at its factory and primary distribution center, the Italian clothing company is preparing to deploy the technology at a second DC and its stores.
www.rfidjournal.com/articles/view?12167

BT Trace Brings RFID Retail Solutions Customized to User
The British company's customers include a global luxury retailer that is using the technology to ensure stores in North America and elsewhere are properly stocked with inventory.
www.rfidjournal.com/articles/view?12164

British Clothing Retailer Sees RFID as 'Enriching Experience'
Giulio is using privacy-protecting RFID technology from Friendly Technologies to determine which garments shoppers are interested in, and to prompt a touchscreen to display information about those products.
www.rfidjournal.com/articles/view?12099

Brazilian Clothing Wholesaler Invests in RFID
One of the country's largest distributors of baby and children's apparel, Brascol has cut the average time it takes its customers to check out their purchases by 65 percent.
www.rfidjournal.com/articles/view?12075

ISA Boutique Tracks Inventory, Shopper Behavior Via RFID
The Hong Kong retailer is installing CSL readers and antennas in its display cabinets and on its sales counters, so that it can track when jewelry is removed, returned and purchased.
www.rfidjournal.com/articles/view?11987

Small Stores in Norway See Payback From RFID
The retailers are using a low-cost solution from Front Systems, consisting of passive UHF RFID labels, as well inventory-management software, readers and printer-encoders.
www.rfidjournal.com/articles/view?11941

Swedish Men's Shirts Provide Off-the-Cuff Info

Four Levent has begun manufacturing and marketing men's dress shirts with sewn-in NFC RFID tags, enabling users to write data such as business card information that others can retrieve via a smartphone.
www.rfidjournal.com/articles/view?11885

Ritani Creates RFID Solution to Engage Shoppers, Increase Sales

The jewelry company is preparing pilots of a system that automatically displays information about items removed from a showcase, and enables consumers to share that data with others via the Internet.
www.rfidjournal.com/articles/view?11836

U.K. Company Kiroco Adorns Its Jewelry With RFID-Delivered Messages

The firm's Touch technology allows buyers of its pendants and charms to add text or video greetings that recipients can access via a tap of an NFC-enabled phone.
www.rfidjournal.com/articles/view?11621

Alex and Ani Rolls Out Swirl's Bluetooth Beacons at 40 Stores

Swirl Networks' solution enables the fashion retailer to track shoppers' in-store locations, and to send targeted product information to their smartphones. Kenneth Cole and Timberland plan similar rollouts.
www.rfidjournal.com/articles/view?11475

Retailers Test ByteLight's Light-Based Indoor Positioning Technology

The system modulates the light emitted by an LED fixture, and includes an app that enables a mobile phone to determine its location based on the light signals received by its camera.
www.rfidjournal.com/articles/view?11474

Kohl's Rolls Out RFID for Select Product Categories at Its Stores

The RFID solution, provided by Checkpoint, is live at the retailer's stores and distribution centers.
www.rfidjournal.com/articles/view?11341

Hong Kong Leather Goods Company Uses RFID to Track Inventory, Fight Diversion

The manufacturer of the Fortune Duck brand of purses and bags is using passive UHF tags to track goods from the point of manufacture to the point of sale, raising inventory accuracy by nearly 10 percent.
www.rfidjournal.com/articles/view?11379

Heidi.com's New Store Uses NFC RFID to Enable Omni-Channel Shopping

The Swiss clothing company has installed virtual shopping kiosks so that customers can shop not only for garments at its flagship store, but also for those available via its website, as well as receive personalized services and promotions.
www.rfidjournal.com/articles/view?11321

Bon-Ton Brings NFC to Shoe Displays

The U.S. department store retailer has installed an NFC RFID-based solution within 32 of its shoe departments, to test how the technology can help shoppers locate the size, color and style of shoes they seek while at a store.
www.rfidjournal.com/articles/view?11235

RFID Speeds Up Preparations for Flash Sales

High-paced online retailer Vente-privee.com is using Tageos passive UHF tags to manage product samples, to ensure they are properly photographed and described as they circulate around the French facility.
www.rfidjournal.com/articles/view?11174

High-End Sicilian Jeweler Tags Inventory, Recoups Investment

Thanks to RFID, Matranga can conduct frequent inventory checks within a fraction of the time required to perform manual counts, and has also streamlined its bridal registry.
www.rfidjournal.com/articles/view?11071

Saks' RFID Deployment Ensures Thousands of Shoes Are on Display

By placing an EPC passive tag on every shoe sample, four Saks Fifth Avenue stores have reduced the amount of labor required to inventory the sales floor from 16 hours down to 20 minutes.
www.rfidjournal.com/articles/view?11003

Bag Maker Adopts RFID Solution to Prevent Counterfeits, Gray Market

Bagjack is using Serfides' authentication software to track high-end messenger bags shipped from its German manufacturing site and within a store.
www.rfidjournal.com/articles/view?11021

American Apparel Deploys Real-Time, Storewide RFID Inventory-Management Solution

The system, provided by Senitron, includes Impinj readers that capture the locations of all tagged items within a store in real time, eliminating the need to conduct inventory counts using handheld interrogators.
www.rfidjournal.com/articles/view?10906

Wolky Reduces Stock-Outs, Boosts Sales With RFID

The Dutch retailer is tagging all of its shoeboxes, and is using handheld readers to take inventory for its online and brick-and-mortar stores.
www.rfidjournal.com/articles/view?10814

RFID a 'Very Big Part of Macy's Future'

At a recent investor meeting, the retailer's top executives, including its chief omnichannel officer, reiterated how item-level tagging is a key driver for growth.
www.rfidjournal.com/articles/view?10783

Italian Purse Company Finds a Discreet Way to Prevent Gray Market

Braccialini is using Tertium Technology's BlueBerry keyfob readers to inconspicuously determine if unauthorized outlets are selling its goods, and to investigate the history of such diversions.
www.rfidjournal.com/articles/view?10711

C&A Expands RFID Usage to Track Inventory

The clothing company plans to employ EPC tags and readers to manage shipments of high-demand items to a total of 25 stores, and to use the technology to monitor inventory at each location.
www.rfidjournal.com/articles/view?10556

RFID Eliminates Shrinkage at Borsheims' Jewelry Store

The Berkshire Hathaway-owned retailer is using TJS' ZeroShrink software and RFID technology to capture daily inventory counts and sales data for watches and high-value jewelry.
www.rfidjournal.com/articles/view?10279

Canadian Leather Retailer Pilots RFID for Replenishment Visibility

Danier Leather is testing a Truecount UHF Gen 2 system at three of its stores to track when goods are received on the sales floor, as well as when they are sold, and to automatically alert employees when an item needs to be replenished.
www.rfidjournal.com/articles/view?10084

California Sporting Goods Retailer Gains Visibility With RFID

Mammoth Outdoor Sports uses the technology to merge its Internet and retail store inventories, and to gain a daily report regarding which products are at its warehouse and stores, or at exhibitions.
www.rfidjournal.com/articles/view?9933

Arkansas Jeweler Cuts Inventory Time By 75 Percent With RFID

A UHF system from Northern Apex enables Sissy's Log Cabin to conduct inventories of its jewelry, as well as determine when an item is misplaced or missing.
www.rfidjournal.com/articles/view?9894

CentrObuv Finds RFID a Good Fit for Shoes

The Russian footwear retailer is using an item-level RFID system from Avery Dennison to track inventory, sales and security at one of its Moscow stores, and at a corresponding distribution center.
www.rfidjournal.com/articles/view?9594

CentrObuv Finds RFID a Good Fit for Shoes

The Russian footwear retailer is using an item-level RFID system from Avery Dennison to track inventory, sales and security at one of its Moscow stores, and at a corresponding distribution center.
www.rfidjournal.com/articles/view?9539

RFID Has Shoppers Running to New Balance's Store in Boston

With EPC tags attached to various models of shoes and in promotional cards, customers can learn more about a product and redeem prizes, while also recording data about shopping behavior on the premises.
www.rfidjournal.com/articles/view?9459

RFID Tracks Spanish Shoppers' Interest in Shoes, Books

Two retailers in Spain are attaching EPC Gen 2 tags to some of their merchandise, in order to gauge the popularity of products by tracking how often customers pick the items up.
www.rfidjournal.com/articles/view?9308

American Apparel Adopting RFID at Every Store
After several years of trialing item-level EPC Gen 2 passive tags and readers at select locations, the clothing company is now installing the technology at all of its retail operations worldwide.
www.rfidjournal.com/articles/view?9202

B:MING Clothing Stores Try RFID
A solution from Fujitsu enables the Japanese retailer to track inventory from its distribution centers to its stores, and to increase efficiency at the point of sale by reading the tags of goods sold.
www.rfidjournal.com/articles/view?10321

Colombian Retailer Crystal Vestimundo Plans Second Item-Level RFID Pilot
Results of its first three-month pilot showed a significant reduction in labor associated with the shipping, receiving and inventorying of tagged apparel items; now, the company is preparing to run a more ambitious in-store trial.
www.rfidjournal.com/articles/view?8963

Lord & Taylor Tags Shoes, Boosts Sales
By attaching EPC Gen 2 RFID tags to shoes displayed on its sales floor, the retailer can ensure that customers can see every shoe style it sells.
www.rfidjournal.com/articles/view?8924

New Brazilian Fashion Chain Launches With RFID
At its debut store, Memove is using its garments' sewn-in EPC Gen 2 tags to increase efficiency at its DC and store, as well as improve its customers' experiences.
www.rfidjournal.com/articles/view?8912

RFID Delivers Unexpected Benefits at American Apparel
A major reduction in employee theft, fewer processes errors and lower employee turnover add to the company's return on investment in RFID.
www.rfidjournal.com/articles/view?8843

Macy's Inc. to Begin Item-Level Tagging in 850 Stores
The company plans to RFID-enable its Macy's and Bloomingdale's stores in 2012, and will tag garments most often replenished—accounting for about 30 percent of the retailer's sales.
www.rfidjournal.com/articles/view?8815

RFID Brings Intelligence to Billabong Store in Brazil
The store is applying EPC Gen 2 tags to its merchandise, and piloting applications that allow customers to make clothing selections in changing rooms, and provide inventory, point of sale and security data to the staff.
www.rfidjournal.com/articles/view?8722

At Surplus, Inventory Takes Just a Few Minutes
One of the apparel chain's stores is using EPC RFID tags to track men's jeans stored on shelves in stacks up to eight feet high.
www.rfidjournal.com/articles/view?8685

Texas Jewelry Retailer Scores With RFID
Dallas Gold & Silver Exchange (DGSE) is using EPC Gen 2 tags to improve the management of its inventory of jewelry, diamonds, watches, rare coins and other products.
www.rfidjournal.com/articles/view?8590

American Apparel Adding 50 More Stores in Aggressive RFID Rollout
The retailer states that RFID has helped it reduce shrinkage, improve stock levels and decrease employee turnover, and that RFID-enabled stores are outperforming those not using the technology.
www.rfidjournal.com/articles/view?8374

L.L. Bean Tries to Hike Sales With RFID
The apparel and outdoor gear retailer is testing an RFID system that can track when a shopper handles a hiking boot on display, thereby triggering a video screen to play informational media, while also measuring shopper interest.
www.rfidjournal.com/articles/view?8193

Cleor Strikes Gold With RFID Solution
The custom system enables the French jewelry retailer to read RFID tags on each item of jewelry at its distribution center, as well as in stores, reducing manual labor and improving shipment accuracy.
www.rfidjournal.com/articles/view?8105

German Clothing Company s.Oliver Puts RFID to the Test
The retailer recently completed a trial involving the tagging of 12,000 items, to determine if the technology can provide an adequate ROI by preventing out-of-stocks.
www.rfidjournal.com/articles/view?8013

RFID VENDORS FOCUSED ON RETAIL

RFID Tags

Alien Technology
www.alientechnology.com

Argo Wireless
www.argowireless.com

Avery Dennison
www.rfid.averydennison.com

Checkpoint Systems
www.checkpointsystems.com

Confidex
www.confidex.net

Controltek (EAS)
www.isscontroltek.com

Data2
www.data2.com

Hangzhou Century Link
www.centurylinkrfid.com

HID Global
www.hidglobal.com

Intermec by Honeywell
www.intermec.com

Invengo
www.invengo.cn/main_en.asp

Junmp Technology
www.junmp.com.cn/en

Lab ID
www.lab-id.com

Laxcen
www.laxcen.com

Nedap Retail
www.nedap-retail.com

Primo1D
www.primo1d.com

Repacorp
www.repacorp.com

Retailer's Advantage
www.retailersadvantage.com

Sekura
www.sekura-global.com

Shanghai Boing Information Technology Co.,Ltd
www.boingtech.com

Shenzhen Hyan Microelecronics
www.hyanlabel.com.cn/en/

Smartrac Technologies
www.smartrac-group.com

SML
www.sml-iis.com

Tageos
www.tageos.com

TexTrace
www.textrace.com

Trace ID
www.traceid.us

Xiamen Xindeco IOT Technologies
www.codetag.com.cn/en

Fixed Readers

Acura Global
www.acura.com.br/en

Applied Wireless ID
www.awid.com

Caen RFID
www.caen.it/rfid

Convergence Systems Ltd.
www.convergence.com.hk

Controltek
www.controltekusa.com

Impinj
www.impinj.com

Intermec by Honeywell
www.intermec.com

Invengo
www.invengo.cn/main_en.asp

Keonn Technologies
www.keonn.com

Mojix
www.mojix.com

Zebra Technologies
www.zebra.com

Mobile, Handheld and Embedded Readers

Asterisk
www.asreader.com

Acura Global
www.acura.com.br/en

Caen RFID
www.caen.it/rfid

CipherLab
www.cipherlab.com

Controltek
www.ivscontroltek.com

Convergence Systems Ltd.
www.convergence.com.hk

Embisphere
www.embisphere.com

Identix
www.idntx.com

Intermec by Honeywell
www.intermec.com

Invengo
www.invengo.cn/main_en.asp

Nedap Retail
www.nedap-retail.com

Nethom
www.nethom.co.kr

Nordic+
www.nordicplus.co.uk

Star Systems International Ltd.
www.star-int.net

Technology Solutions (UK) Ltd.
www.tsl.uk.com

ThingMagic
www.thingmagic.com

U Grok It
www.ugrokit.com

Zebra Technologies
www.zebra.com

Overhead Readers

Impinj
www.impinj.com

Mojix
www.mojix.com

Tyco Retail Solutions
www.tycoretailsolutions.com

Printer-Encoders

Avery Dennison
www.rfid.averydennison.com

Datamax-O'Neil
www.datamax-oneil.com

Intermec by Honeywell
www.intermec.com

Kirk-Rudy
www.kirkrudy.com

Zebra Technologies
www.zebra.com

Label Converting Equipment providers

Bielomatik
www.bielomatik.com

Melzer
www.melzermaschinenbau.de

Muhlbauer
www.muehlbauer.de

Tamarack Products
www.tamarackproducts.com

Shelf Readers and Antennas

Convergence Systems Ltd.
www.convergence.com.hk

Times-7
www.times-7.com

Venture Research
www.ventureresearch.com

Portals

Jamison RFID
www.jamisonrfid.com

Software

Checkpoint Systems
www.checkpointsystems.com

Componentsoft
www.componentsoft.com/index.php

Controltek
www.ivscontroltek.com
KooBraSoftware
www.koobra.de

Nedap Retail
www.nedap-retail.com

Seeonic
www.seeonic.com

Tagsys
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