

RFID Item-Level Tagging in Fashion Apparel and Footwear

One-Size-Fits-All Solution for Retail Business Process Improvement

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1. Introduction

Item-level RFID represents the missing link to optimal in-store intelligence. When used in conjunction with complementary technologies — including POS (Point-of-Sale) retail automation (barcode, payment terminals, and so on), EAS (Electronic Article Surveillance), inventory management automation, and people counting — it has proven to enable enhanced strategic decision-making, which facilitates significant improvements to a number of key business operations, ultimately resulting in better margins.

According to those interviewed for this Research Brief, RFID has become a “C-level” issue in the fashion apparel and footwear sector. Wall Street analysts are increasingly prompting organizations to outline their RFID roadmaps, and major executives are beginning to develop a greater sense of ownership of projects. This is a crucial driving force behind the transition of many end users from pilot testing to full-scale deployments.

The increased automation enabled by RFID can shorten physical inventory processes drastically and decrease the need for human intervention. In turn, reduced labor cost benefits are nearing the elimination of OOS (Out-of-Stocks) as the most important value proposition for adoption of item-level RFID among fashion apparel and footwear companies, already strained by the troubled economy. And, in retail environments where RFID is used to support in-store applications, enhancing the customer experience becomes an additional top-tier value proposition.

End users are experiencing favorable ROI (Returns on Investment) with item-level RFID systems, despite transponder prices being higher than they would prefer. Until recently, the general rule of thumb for retailers was to tag only items priced \$15 or higher, with many organizations choosing to tag only items more than \$25. However, many companies have begun tagging

items as inexpensive as \$5 because of the severe impact of out-of-stock inventories.

Retailers have alleviated many consumer privacy concerns associated with the RFID tagging of retail goods through a number of strategies.

While some countries and government bodies — including the EU (European Union) — have established rules about notifying consumers when RFID systems are being utilized, most retailers are doing so without mandate. Signage is playing an instrumental role in helping consumers become more comfortable with RFID.

There are no “fast followers” to RFID success; deployment is a company-specific issue. In addition to learning from the experiences of the industry and leveraging benchmarking data and best-practice examples, end users must work closely with partners to develop a comprehensive understanding of how RFID can be optimally deployed throughout their retail organizations.

It is important to note that early multi-site RFID deployment successes in fashion (such as American Apparel) have been associated with specialty apparel retailers that operate closed-loop supply chains (in which they are responsible for the manufacture, distribution, and sale of their goods in their own stores). While this has been a boon in terms of providing proof points, the industry must focus beyond this specialty retailer category.

In the future, stronger market growth likely will be largely dependent on RFID adoption among fashion apparel manufacturers that sell to multiple stores and retailer categories such as department stores and mass merchants in open-loop supply chains as well as large retailers that elect to tag received goods/apparel items to support in-store applications.

2. Market Developments

2.1 Item-Level RFID Emerges as a Competitive Advantage

Like other sectors, the fashion apparel and footwear areas are being squeezed by current economic conditions. The fight for the consumer dollar and customer loyalty is at an all-time high. An unrelenting economic recession is forcing companies, including many retailers, out of business at a record pace. In order to survive in today's market, retailers increasingly are being forced to meet aggressive operating margin goals as stores close, consumer spending dwindles, and financial and human resources are cut.

In response to this trend, leveraging item-level RFID has become a popular competitive differentiation strategy due to its ability to help end users increase inventory control/visibility, enhance service and the overall customer experience, solidify customer loyalty, lift sales and, ultimately, boost the bottom line.

2.2 A Significant Volume Opportunity

An estimated 15 billion pairs of shoes and roughly 10 billion fashion apparel items are manufactured annually. Given the rising costs associated with conducting manual inventory of these items — in addition to problems of out-of-stock, theft, and counterfeiting — it is becoming more economical to track them with RFID.

Declining technology costs, improved reader form factors, and innovation in passive UHF also are positive factors in the increase in market activity.

The counterfeiting of fashion apparel items costs designers worldwide more than \$10 billion annually. It also puts a black eye on their image of exclusivity by making high end products (or those thought to be high end) easier to procure. RFID has emerged as a promising brand protection solution for apparel companies, due to its ability to automate high volume authenticity checks.

2.3 Industry Challenges

The following considerations underscore the challenging economic situation unfolding in the fashion apparel and footwear space that is driving demand for cost-saving automation technologies proven to create business value and powerful business process change through increased automation and improved inventory visibility:

- 148,000 US retail stores shut down during 2008. Some estimates for 2009 place the figure around 200,000 by the end of the year, which would represent the biggest year-over-year decline in thirty-five years.
- The worldwide fashion counterfeit market may exceed \$200 billion.
- One-third of Russia's 42,000 clothing stores will close in 2009. This will result in drastically reduced demand for many European fashion designers and their products in countries such as Germany, France, and Italy.
- Hong Kong, a leading apparel producer, saw clothing exports tumble 43% during 2008.
- Apparel experts have stated that China's 2009 clothing exports could decline by as much as 15%.

2.4 Key Retailer Deployments

2.4.1 American Apparel

With 275 stores in twenty countries and annual sales exceeding \$540 million, American Apparel is the largest clothing manufacturer in the United States. The vertically integrated nature of the company and its dedication to having one item available in every size, color, and style at all times make it a prime candidate for RFID adoption.

American Apparel's RFID endeavors began with a pilot test in 2007 that tracked 40,000 items in one of its New York stores and subsequently expanded into an eight-store pilot in 2008. The results of the ongoing trial are highlighted by a 14% per-store sales increase, improved inventory accuracy above 99%, and subsequent elimination of 10% to 20% in lost stock, and monthly labor savings of nearly 190 hours per-store.

Important vendors involved with the project include Motorola: Readers (XR440 fixed reader and MC-9090 handheld readers); Avery Dennison: Tags (AD-222 RFID inlays) and Printers; and Vue: software (TrueVUE platform) and antenna.

American Apparel plans to roll out item-level systems in an additional thirty-eight locations over the next twelve to eighteen months as part of a longer term strategy that entails adoption throughout its entire organization.

2.4.2 Bloomingdale's

Bloomingdale's, a leading upscale department store in the United States with more than forty stores nationwide, recently announced the results of a thirteen-week RFID trial conducted in the fall of 2008. The project was executed in conjunction with the ITRI (Information Technology Research Institute) at the Sam M. Walton College of Business at the University of Arkansas.

The fact that Bloomingdale's waited more than six months to discuss its pilot publicly underscores the tight-lipped nature of retailers with regard to their adoption of RFID. Significant vendors involved with the project include Avery Dennison (EPC Gen 2 Passive UHF RFID Tags), Motorola (EPC Gen 2 Passive RFID Readers), and Vue (software). Stealth Network Communications provided the project management and system integration support.

The pilot test compared the inventory accuracy of an item-level RFID system installed in a Bloomingdale store located in a major metro area in the northeastern United States to that of a store in a similar location utilizing existing barcode technology. Men's and women's jeans were tagged during the study with between 8,500 and 10,000 items tracked at any given time, depending on sales activity. Products were tagged upon entry to the retail outlet.

The results of the project demonstrate RFID's ability to improve inventory accuracy significantly in retail environments. In the test store utilizing RFID, 10,000 items could be scanned in just two hours, compared to fifty-three hours in the control store employing a barcode system. Ultimately, RFID facilitated a 27% improvement in inventory accuracy and a 96% reduction in cycle counting time.

While loss prevention was not a major focus of the pilot, results indicate that RFID is useful in deterring theft. Although Bloomingdale's has not announced plans to expand pilot testing of item-level RFID, the results of the company's initial evaluation are compelling and likely will warrant additional exploration.

2.4.3 New Balance

While New Balance ultimately decided not to expand its testing of item-level RFID beyond one product line in one store, due to the unique dynamics of its operational structure, the company's 2006 technology evaluation helped lay a solid foundation for future large-scale deployments.

According to executives, the principal benefit of their project was that it proved that item-level RFID is capable of facilitating significant time and labor cost savings as well as improved inventory accuracy by automating manual processes.

Strategic vendors involved with the project include Vue (software), Motorola and ThingMagic (readers), and Avery Dennison (tags). The pilot served as an invaluable learning experience for Motorola and Vue. Both companies were required to spend months debugging and optimizing their offerings in order to produce favorable results and both companies have gone on to establish leadership positions in the market.

2.4.4 Jones Apparel Group (Nine West)

Jones Apparel Group Inc conducted a pilot test of item-level RFID in two Nine West footwear stores during August 2008. The goal of the project was to evaluate the technology's impact on enhanced productivity, customer service, and inventory accuracy.

Vendors involved with the pilot included Vue Technology (software), Motorola (readers), Avery Dennison (tags), and inCode Wireless (systems integration).

Key results of the study include a 21% sales increase, a 91% conversion increase, and a 92% cycle-time improvement.

Despite the positive results, the company has yet to publicly state plans for expanded pilot testing or deployments in additional retail outlets.

Section 3. BENEFITS OF ADOPTION

3.1 Quick ROI

A quick (six to twelve months, in most cases) demonstrable ROI enables executives to make an investment and show the impact during the same fiscal year. This factor has been favorable for adoption in the wake of the economic meltdown and has helped RFID to become one of the few exceptions to the rule of tightened spending among fashion and footwear organizations. As a point of reference, it has been noted publicly that American Apparel is spending less than \$50,000 to equip each of its stores with item-level RFID infrastructure and is able to generate an ROI in under five months. While a multitude of pilot tests are being conducted by various end users, American Apparel represents the most significant full-scale deployment of item-level RFID in the fashion apparel and footwear market aside from Marks & Spencer.

3.2 Minimal Roadblocks to Implementation

Vendors interviewed for this study share the sentiment that the fashion apparel and footwear sectors represent the greatest near-term opportunity for business improvements and the fewest impediments to growth in the retail industry.

The roadblocks to implementation in closed-loop environments within the sector are minimal. Most customers are able to integrate RFID infrastructure smoothly into existing operations. Moreover, fashion apparel and footwear products generally comprise RFID-friendly materials, thus avoiding the need for highly specialized and more expensive tags as well as solutions.

After years of extensive pilot testing conducted by numerous organizations, a sufficient amount of industry benchmarking data and best practice examples now exists to provide end users with a clear path to successful implementation. This also mitigates risk and facilitates a lesser need for extensive pilot testing.

In open-loop deployments, collaboration between business partners is critical to success, and there are additional challenges. Although vertically integrated apparel companies have been the first to deploy item-level RFID solutions, large department stores and other apparel retailers are beginning to work closely with suppliers to deploy the technology throughout their supply chains.

3.3 Discussion of Benefits

3.3.1 Reduced Labor Costs

The ongoing economic recession has established reduced labor costs as the most important value proposition associated with item-level tagging in fashion apparel and footwear organizations. By automating manual inventory processes, end users are able to significantly lower personnel expenses. In addition to improving inventory accuracy, RFID also negates the need for yearly manual inventory counts.

In one recent pilot, item-level RFID was found to facilitate a reduction of nearly 170 man-hours per-month associated with manual inventory. That is both a significant time-on-task and overall cost savings. At the current US minimum wage rate, this equates to an annual saving of nearly \$15,000. In a real-world deployment, American Apparel recently reported that an item-level RFID system facilitated a nearly 90% reduction in the time it takes to conduct weekly inventory at one of its stores from thirty-two man-hours to just four.

Table3.1 Proven Business Benefits Leveraging RFID at the Item-Level in Fashion Apparel and Footwear

Benefit	Percentage
Reduction in Out-Of-Stock by:	60% to 80%
Better Inventory Accuracy:	Between 98% and 99.9%
Reduction in Cycle Count Time by:	75% to 92%
Reduced Inventory Carrying Costs by:	30% to 59%
Reduced Receiving Time by up to:	91%
Improved Conversion Rate by up to:	92%
Increased Units/Transaction and \$/Transaction by:	19% and 6%
Increased Sales from:	4% to 21%

(Source: ABI Research)

(1) Data from Motorola and partner implementations

3.3.2 Increased Sales and Profit Margins

Fashion apparel and footwear organizations currently find themselves in a tight spot. They are forced to improve sales, offer more value to customers, and compete with discount retailers without dropping prices too low or sacrificing significant margin. In order to achieve these goals, end users must become more efficient in every aspect of their operations.

By improving product visibility and automating manual inventory through adoption of item-level RFID, end users are able to achieve higher sales levels and lower costs. Products are available for purchase more frequently and sales representatives are able to spend more time serving customers rather than searching for items. Item-level RFID also allows end users to turn what would typically be losses into sales. Rather than having seasonal items misplaced in backrooms, these products can be quickly identified, shipped out, and sold in other regions.

3.3.3 Reduced Out-of-Stocks

Customer perception of quality service hinges on the ability of the retailer to keep desired items in stock. A consumer will cease shopping at a particular store after three or four experiences in which desired products were not available.

By gaining greater control over their inventories, fashion apparel and footwear companies can preserve their own revenues while capitalizing on rivals' out-of-stocks. This is an important dynamic that has established item-level RFID as a key competitive advantage in today's economy.

3.3.4 Reduced Shrinkage and Anti-Counterfeiting

Fashion apparel and footwear organizations have enough to worry about these days without the threat of theft and counterfeiting. These activities put a drain on corporate profits and force companies to pass on additional costs to consumers to offset losses. Global retail theft reportedly reached \$104.5 billion in 2008 while the fashion counterfeit market is believed to have exceeded \$200 billion.

Retailers are now integrating item-level RFID with traditional in-store technologies including CCTV, EAS, and traffic-counting systems to drastically reduce shrinkage.

In addition to eliminating the sale of fake goods by authenticating the origin of all products with EPC codes and alerting security personnel when theft is attempted, these technologies allow retailers to thwart organized crime by quickly identifying and reacting to its ever-evolving theft strategies.

Recent advancements in passive UHF RFID technology have improved the performance of tags in environments where metal and liquids are present. This is driving some end users to adopt item-level RFID as a replacement to EAS technology. Retailers reportedly have realized an ROI with item-level RFID from security improvements alone.

Section 4. VENDOR EVALUATION CRITERIA

The heightened level of end-user interest and massive potential in item-level fashion apparel and footwear tagging has made the market an attractive focus for leading RFID players. While there has been a shakeout of vendors over the past five years, new opportunities continue to emerge as a wider selection of apparel items are tagged, due to the different requirements associated with tracking them.

End users have a great deal at stake when selecting vendors and integration partners. In many cases, a misinformed choice can result in challenges to RFID program management, system deployment, and future expansion.

The fashion apparel and footwear market is currently experiencing a watershed moment. Now that the concept of item-level RFID has been proven through extensive pilot testing, the quest has begun to identify the right set of vendors to bring solutions to scale and the correct criteria on which to judge them. In addition to experience with full-scale deployments, ability to innovate, availability of viable products/solutions, and dedication to the marketplace, other key criteria include:

4.1 Financial Stability

Large fashion apparel/footwear companies are becoming increasingly concerned with the financial health, strength, and stability of vendors. Item-level visibility of goods has become a mission-critical priority. End users need to have complete confidence when they assign budget to a major IT investment that the vendor(s) will be around to provide support.

4.2 Platform Flexibility

End users are increasingly demanding low cost solutions, which makes open-system architecture/flexibility essential in full-scale RFID deployments. Some retail customers have thousands of locations and it becomes cost-prohibitive to adopt RFID if the need arises to switch operating systems, platforms, application software, and so on.

4.3 Scalability

A truly scalable solution must be built around the correct set of standards to ensure that substantial expenditures will not be required for replacements/upgrades in the future. In addition, solutions must be flexible enough to leverage best-of-breed technologies as they emerge. Many vendors are able to provide a functional single-location pilot system; however, few are capable of executing and supporting multiple location rollouts. In addition, large international retailers must consider the global deployment and support capabilities of their vendors and partners.

Section 5. STRATEGIC RECOMMENDATIONS

5.1 Remember Lessons from the Barcode Industry

Barcode ubiquity in retail did not happen overnight and began with a few lead adopters. RFID is showing promise to follow suit as the impressive results of early pilot projects drive interest throughout the industry.

Total solutions, as shown in barcodes, are also a key end-user requirement in RFID deployments. Going forward, the availability of end-to-end systems comprising best-of-breed offerings will play a critical role in helping the retail space transition from somewhat limited pilot testing to widespread deployment.

As barcode technology gained popularity with retailers years ago, end users relished the fact that they could leverage the new flow of intelligent data to enhance strategic decision-making and, in turn, improve critical business areas including sales, marketing, inventory control, and customer service.

RFID can produce results that exceed barcode systems in real-time with less labor. The solution is quickly establishing a position as the ideal complement to barcode technology in apparel-related organizations.

5.2 Develop Partner-Based End-To-End Solutions

Strategic partnerships are essential to meet end-user needs and deliver end-to-end solutions. RFID players must band together to provide scalable systems that enable fashion apparel and footwear companies to capture the true value of the technology and easily transition from pilot testing to full-scale deployment.

To date, vendors including Avery Dennison, Motorola, and Vue Technology/Tyco have benefited immensely from strategic partnerships that have allowed each company to become involved in the majority of high profile projects.

5.3 Build Highly Functional Best-of-Breed Solutions

An open standards environment appears to favor VARs offering hardware-agnostic approaches to RFID. At this stage of the market's development, the opposite is in fact true. Leading retail VARs are forming strategic alliances with fewer leading vendors and focusing on delivering apparel-specific solutions. This approach leads to a deeper integration of hardware, software, and services designed to solve particular retail problems. It also ensures that development resources from multiple market-leading organizations are leveraged in concert to create new and innovative offerings that harness RFID to generate the most value from tracking each specific item in a retail environment.

Published 4Q 2009

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