MOVING FORWARD WITH ITEM-LEVEL RADIO FREQUENCY IDENTIFICATION IN APPAREL/FOOTWEAR

VICS

AAFA american apparel & footwear association

KURT SALMON ASSOCIATES

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BACKGROUND

In spring 2005 the Voluntary Inter-Industry Standards Committee (VICS)/American Apparel and Footwear Association (AAFA) Joint Committee on Radio Frequency Identification (RFID) in Apparel and Footwear asked Kurt Salmon Associates (KSA) to conduct research to help member companies better understand the timing and manner in which item-level RFID would impact their businesses. Seven companies volunteered to allow KSA to interview key members of their management teams, and provided open access to their stores and distribution facilities. Virtually all of these companies derive revenue from both retail and wholesale operations. The price points of the merchandise represented in the study ranged from a few dollars to several thousand dollars. KSA's evaluation was based on a series of in-depth interviews across a variety of disciplines, including store operations, inventory management, loss prevention, merchandising, distribution/logistics, accounting, and information technology. Despite being at widely different stages of adoption, ranging from little to widely scoped pilot programs, the companies KSA interviewed were universally excited about the benefits achievable with item-level RFID.

OBJECTIVES

The study was undertaken to help apparel and footwear companies answer two important questions: 1) When must I start? and 2) Where do I start? Rather than answer those questions with narrow ROI projections, KSA investigated precisely which benefits would be validated by the companies we interviewed. In the process, we elicited practical insights to help companies assess how item-level RFID can impact their financial performance. The goal was to highlight short- and long-term benefits and challenges to provide participating companies with a macro framework for determining the merchandise categories best suited for RFID tracking, the incremental value of moving RFID upstream in the value chain from the store level, where tagging should take place, and the right time to begin adoption.

More specifically, the study attempts to:

- Highlight where along the value chain item-level tags will be of greatest value.
- Identify who stands to benefit most substantially, in the short and long term, from item-level tagging.
- Suggest alternatives for the sequencing of large-scale collaborative implementation projects based on relative financial benefit and ease of integration.
- Clarify how store-level benefits associated with item-level RFID will vary by the attributes and price points of the merchandise being tagged and by differences in retail format.
- Emphasize how item-level tagging can support overarching corporate distribution goals such as pack-by-store.
- Explain how businesses can responsibly address consumer privacy interests and earn the praise of customers and privacy advocates.
- Underscore the benefits and risks associated with being an early adopter or waiting too long to get started.

KEY STUDY FINDINGS

Unlike consumer packaged goods (CPG), the apparel and footwear value chain has the potential to realize sizeable early benefits from item-level RFID tagging, especially within the store, with relatively little difficulty and few barriers to getting started. RFID apparel pilots do not need to disrupt current operations and can be conducted in parallel with existing applications and still have a positive impact on sales and operating costs. This does not mean all pilots will run smoothly, nor should they be executed unilaterally. Retailers and suppliers need to collaborate, especially in early adoption stages, working together on the design of smart tags, basic equipment and software, and the development of processes designed to take advantage of the new information provided. Pilots that extend back into distribution and manufacturing have benefit potential too, but are harder to justify as stand-alone projects. By beginning at the store level, both retailers and suppliers can achieve early wins through increased sales, improved inventory and demand visibility, and reduced contention over invoice discrepancies. These early wins can then fund other incremental RFID investments upstream and drive further operational efficiency and collaborative inventory planning.

RETAIL SALES

The store environment offers most retailers the ability to safely test RFID without much risk or sizable investment. The most commonly cited improvement opportunity is for retailers to address floor-level out-of-stocks (OOS) through better monitoring of floor and back room inventory, and shrink. By focusing on OOS, retailers can validate the business value of RFID while achieving a necessary level of technical testing and learning.

- **SALES FLOOR OUT-OF-STOCKS:** Using RFID at the store level to monitor, prevent, or respond to incidents of shelf-level OOS is attractive in most, but not all, selling environments. It is highly desirable where product display density is high, staffing levels are low or moderate, and handling/mishandling of merchandise is frequent. Retail formats in which items are routinely replenished from back room stock rather than a single, one-time push to the floor also are more attractive candidates for item-level tagging to minimize floor-level OOS. Floor-level OOS is not a major issue in upscale formats in which shelves and racks are deliberately sparse, items are often displayed in patterns (such as two-by-two), and staffing levels are high. Upscale retailers should instead look to RFID to address supplier performance deficiencies and to expedite the receiving process at distribution centers (DCs) and stores, as described below. These benefits will also accrue to retailers selling at lower price points.

  "We're far too busy to get a true picture each day of what is missing on the sales floor. We do our best to replenish, but we know we're falling short." —Store Manager, Men's Specialty Retailer

- **AUTOMATED RECEIVING:** Universally, there is tremendous interest in using item-level tagging to expedite and ensure the accuracy of deliveries by carriers to stores and significantly streamline inbound receiving processes in the back room. This allows retailers to receive and deploy merchandise (especially high-priority items) more quickly, accurately, and with less labor. The majority of retailers perform some method of open-box audit to verify shipment integrity prior to stocking or storing goods. Today's RFID readers are capable of quickly reading 100% of the items in a carton without opening it. Retailers can gain valuable time, reduce labor, and record time-specific data that can translate into vendor, store, and associate performance scorecard metrics. Item-level tracking at the point of receipt provides a new level of visibility into receiving detail that can eliminate invoice disputes, thereby benefiting retailers, manufacturers, and brand owners.

  "Our customers come here to get the freshest new styles. Getting product out on the shelf even one day sooner would make a world of difference in our store." —Store Manager, Fashion Retailer

- **REPLENISHMENT FROM FITTING ROOMS:** Mounting a fixed reader/antenna near the entrance to the fitting room area enables associates to more accurately track merchandise movement. Perhaps most importantly, this provides sales associates with a tool for identifying high-priority garments in need of quick return to the sales floor. RFID can be used to help sort merchandise by fixture and help expedite the return of garments to locations where customers expect to find them. Merchandise categories, such as jeans, with high trial-to-purchase ratios are strong candidates for RFID tagging.

- **SHOPLIFTING:** Mounting a fixed reader/antenna at the entry and exit points of the fitting room can also deter theft and aid in the apprehension of "would be" thieves. Intelligent software can link merchandise movement by image association, and time stamp serialized merchandise through this area of the store. When customers take garments into the fitting room area, serialized tag information will be captured along with directional movement. Garments that went in but were not recorded coming out can be considered potential loss items. Some security systems are able to associate the time stamp of serialized merchandise with video of shoppers carrying the same items, so potential suspects can also be identified. This information can aid loss prevention and legal authorities in the identification, apprehension, and prosecution of shoplifters. Professional thieves aware of such systems may be more apt to bypass this protected area of the store. Most importantly, RFID can help quickly identify what merchandise is missing and aid in the replenishment of selling fixtures.

- **RAPID INVENTORY COUNTING:** RFID can shave more than 90% off the time needed to track inventory on the sales floor, in holding areas, and in the back room. Most retailers simply cannot allocate sufficient labor hours to properly execute the store merchandise recovery process using current methods. These activities are often performed in an inconsistent, unsystematic, and ineffective manner. Formal merchandise recovery in lower-price-point formats often occurs as infrequently as once per week, with predictable results — popular items are not replenished for days or weeks, while the merchandise sits in the back room. Handheld RFID readers, similar to today's portable barcode scanners, are a practical solution. For economic and technical purposes, some early-adopting retailers have devised customized portable solutions to aid in the tracking process, particularly on the retail floor. Retailers are using portable readers to monitor inventory with increasing frequency and are saving substantial labor hours vs. previous manual methods. In these situations, in-stock position improvements of up to 30% have been observed. This positively impacts sales and customer satisfaction and improves profit margins by preventing fashion or seasonal merchandise from sitting undetected in the back room and having to be sold at significant markdowns. Merely identifying stock holes is, by itself, insufficient. Retailers have begun to teach employees how to interpret reports and convey the importance of timely re-stocking.

- **ACCURATE PERPETUAL INVENTORY DATA:** Taking a full inventory once or twice per day, compared to every four to eight weeks, instills confidence in the integrity of perpetual inventory data. For basics and in-season fashion merchandise, the data can be used to drive upstream replenishment and provide for earlier detection of shortages, remediation of inventory deficiencies, and more effective allocation of end-of-season merchandise. In the longer term, this data can be used to better understand true customer demand for future forecasting and historical performance evaluation.

  "Inventory accuracy is a big challenge. November and December distributions are the worst. Our inventory data is in the worst shape precisely when we need it to be at its best." — Merchandise Planning Manager, Apparel Specialty Retailer

- **RAPID CHECKOUT AT POINT OF SALE (POS):** Using a fixed RFID reader/antenna at POS allows sales associates to process sales transactions more quickly by avoiding the physical handling associated with bar code scanning. Technical challenges related to fixed antennas supporting multiple POS units in close proximity must be considered. In early adoption pilots, readers can be used to read tags at POS that would then be removed and read in a batch method. While this forecloses the use of RFID for validating product returns, it does close the loop on managing serialized tag inventory. Due to privacy concerns, most retailers interviewed agreed with the practice of physically removing or electronically disabling tags to avoid unnecessary customer concerns.

- **QUALITY OF SALES SUPPORT:** Interactive display screens can expand the range and depth of information available to the customer, enhancing the shopping experience. Retailers interviewed see the use of handheld readers with some form of contextual interaction (e.g., cycle counting, inventory availability lookup, find function, fixture identification) as improving associates' effectiveness performing their jobs, highlighting problem areas (e.g., stock-outs, misallocated merchandise, missing merchandise), and providing more timely response to customer inquiries.

CONCLUSION: Store managers and operations executives were enthusiastic about the potential application of item-level RFID processes. Most see the technology as a means of refining labor planning, gaining greater consistency of performance within and across stores and departments, and enabling associates to spend more time with customers in a selling capacity. While the prioritization of store applications varied widely, the overall needs are common. Higher-price-point retailers find value in more accurate store inventories for store transfers and identification and aging of merchandise in hold areas. Mid- to lower-price-point retailers find more value in the effective use of labor and space. Both see the potential for more creative loss prevention detection for merchandise or stores prone to shrink.

MANUFACTURING & DISTRIBUTION OPERATIONS

Benefits to supplier operations and retail DCs are based largely on the ease of readability of merchandise inside cartons and reduced physical handling and improved visibility across the value chain. When garments are accurately tagged and packed, downstream facilities can accelerate receiving by foregoing the process of opening cases. These internal carton content reads can be accomplished with 100% success using today's technology. This capability helps eliminate facility bottlenecks, reduces lead times and labor, and enables goods to flow more reliably to their end destination. Disputes are greatly reduced, and visibility, for the purpose of planning or exception management, is enhanced. When combined with the benefits of store execution, historical demand becomes more meaningful and inventory planning is driven by a new set of data that is reflective of true customer demand rather than a series of unpredictable supply disruptions and lumpy demand signals.

- **UPSTREAM QUALITY CONTROL:** Tagging and tracking at item level allows for detection of errors prior to departure from the factory or DC. RFID-tagged items can be monitored in cases or as individual garments through all handling steps in the value chain. The key to success is having accurate RFID tag application, low tag failure rates, and software that maintains manifest details (associates multiple items within cases) and tracks this association throughout the journey from factory to store. Shipping facilities that can provide this high degree of integrity benefit from more accurate shipments in the form of lower freight costs, fewer invoice deductions, and higher vendor performance ratings. Downstream recipients of these cartons will experience reduced lead times and less variability in the value chain.

  "There has to be a better way of dealing with this chargeback issue. Sometimes we look at the retailer's sell-through report and catch them charging us back for items that have actually hit their POS. We're making progress, but we still waste a lot of energy dealing with this problem." —Accounting Executive, Apparel Wholesaler

- **PRODUCT FLOW AND CARRIER PERFORMANCE MANAGEMENT:** Item and case manifest tracking using serialized RFID data will enable manufacturers or distribution facilities to have greater insight into specific merchandise tendered to carriers, thereby providing the necessary facts to more closely monitor overage/shortage claims and overall carrier performance.

  "It takes far too long for us to unload our merchandise at department stores. We think RFID could reduce this two-hour process to only 10 minutes." —Senior Manager, Apparel Wholesaler

- **PRODUCT DIVERSION:** The ability to track unique serialized garments and associate them with cartons and pallets significantly improves brand owners' ability to monitor post-shipment diversion to unauthorized sales channels. Individual garments can be associated with ship-to customers. Subsequent monitoring at off-price or unauthorized retailers will identify sales policy violators.

- **COST-EFFECTIVE PERFORMANCE AND QUALITY MANAGEMENT:** Suppliers and distributors may use RFID read points within the operation to associate internal merchandise movement with individuals and departments, and to identify performance levels and accuracy in real time. Many distribution facilities today use duplicate bar code scanning methods as a means of improving accuracy, but do so at the cost of labor efficiency. RFID-tagged merchandise packed into a case or tote can be associated with a store or DC order and automatically identified to eliminate manual bar code scanning and highlight exception conditions. Productivity will improve, along with gains in accuracy.

- **INCREASED FLOW-THROUGH DISTRIBUTION:** RFID enables manufacturers and retailers to more smoothly transition to "Pick by Store" ordering from the factory. Item-level traceability using RFID provides the speed and accuracy required to support flow-through processing from the source to intermediate distribution points and to the store. Once at the store, RFID aids in expediting product to the floor when used in conjunction with a serialized perpetual inventory. This same practice can be implemented earlier in the development cycle because it does not require brand owner or retailer DCs to have RFID reading capabilities. The stores can benefit from fast, low-cost receiving, even while upstream distribution facilities await implementation.

  "We're seeing increasing interest in drop ship delivery. The big department stores are starting to do more of this with their private label merchandise. I can see us moving in that direction too." —Supply Chain Executive, Apparel Wholesaler/Retailer

CONCLUSION: In terms of financial benefits and timing, manufacturing and distribution efficiency gains will not reach the cumulative levels of retail stores, but nonetheless will account for productivity gains, lead-time reduction, and labor savings. Since these operational changes will usually follow initial retail adoption, where much of the tag costs will have already been absorbed, upstream solutions can be justified with more modest ROI and evaluated on an incremental basis.

COLLABORATIVE PLANNING AND EXECUTION

Collaborative benefits from RFID need not be strictly a long-term vision. While the benefits from serialized movement visibility will help demystify flow issues and demand patterns, there are some near-term opportunities that do not require extensive networks or incremental improvements in data synchronization and sharing. RFID pilots provide an opportune occassion for retailers and suppliers to examine broken processes and use the technology's capabilities as a catalyst for change. Once a bond of trust and mutual benefit are achieved from basic functionality, trading partners will have a foundation on which to build an interest in more advanced collaborative capabilities.

- **CHARGEBACKS AND INVOICE RECONCILIATIONS:** Serialized item-level tracking will provide a comprehensive, automated method of reconciling shipments and receipts between manufacturing and wholesale distribution, wholesale distribution and retail distribution, and retail distribution to stores. This information will enable automated reconciliation of shipments and receipt details, redirecting efforts toward more productive activities, such as serving the customer. Invoice write-offs and unwarranted concessions should also decrease.

  "The number of shipping discrepancies we see each day is staggering. Our buying department begs me not to clamp down on our smaller suppliers, but we can't simply keep on absorbing the cost of these mistakes." —Distribution Executive, Upscale Retailer

- **CROSS-ENTERPRISE VISIBILITY:** Due to competitive pressures, most companies have come to accept the mantra of "doing more with less," be it capital or labor. As a result, merchandise in-stock positions have not significantly improved over the years and customers continue to shop different stores to fulfill their needs. To date, technology has done little to improve the situation. RFID-supported processes, however, can provide the foundation for insights into value chain performance, as well as true operational aids to expedite the physical flow of merchandise. Manufacturers and retailers benefit when they share common data from which to understand order fulfillment accuracy and supplier performance. RFID provides the information foundation for monitoring cycle times (i.e., when merchandise was received, when it was available for

picking, how accurate fulfillment was, when it was tendered to a carrier, how long it took to ship and obtain a delivery appointment, and how accurate each hand-off was along the way). This information facilitates performance goal and issue communication, enables trading partners to create a lasting bond of trust based on delivery execution excellence, and allows partners to focus on strategic business plans rather than operational and tactical performance issues.

"We need a fair deal from the retailer. There isn't enough margin in a pair of socks to absorb the cost of a tag." —Supply Chain Executive, Apparel Wholesaler

- **COLLABORATIVE OPTIMIZATION:** Factories, brand owners, and retailers must go beyond operational visibility to take advantage of new insights into customer demand. Since current practices require visual and physical inspections to validate shipment accuracy, lead times are typically longer and supply disruptions often occur. RFID can quickly remedy this issue and help drive two major improvements in value chain performance: 1) continuous flow of goods with reduced lead times, and 2) use of POS data as a true indicator of customer demand for upstream inventory planning purposes. Armed with this new information, the entire value chain can benefit by more closely aligning orders to demand, optimizing pricing, minimizing transportation costs, planning distribution resources, and increasing store activities on revenue generation. This level of collaboration will increase profits and improve competitive positions for all participants.

CONCLUSION: Broader collaborative efforts require adoption of industry standards; resolution of tag issues, such as convergence of Electronic Article Surveillance (EAS) and RFID technologies; scaleable networks and data warehouses to accommodate massive volumes of data; and the ability to mine the data to improve the value chain. For this reason, collaborative RFID planning and execution will take longer to materialize, but will provide an improvement in overall performance.

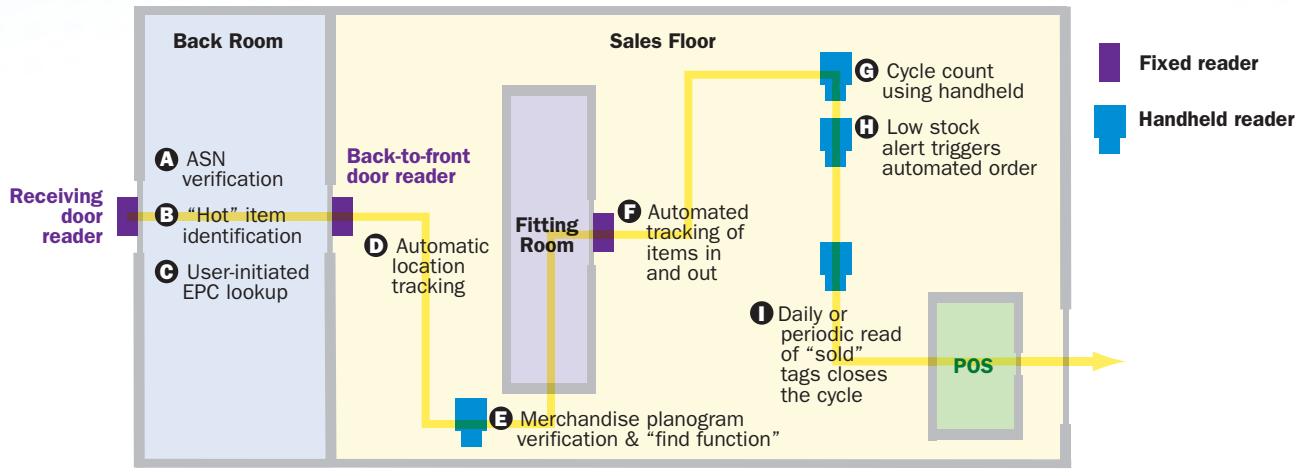
WHERE TO BEGIN?

Apparel retailers and suppliers that have not yet contemplated their RFID strategies should consider multiple factors when selecting the merchandise with which to commence RFID piloting. Unlike CPG tagging, which was mandated to begin at the case and pallet levels, most fashion and higher priced basics apparel merchandise can support item-level tagging based on current tag and equipment prices. They are also spared many of the physics challenges faced by CPG companies because apparel tends to be a radio frequency-friendly material, having little to no effect on signal absorption or reflection.

STORE LEVEL

Item-level RFID processes can be implemented effectively at the store level from the point of receiving through POS. While not all retailers will begin with all functions, there are some common starting points to consider. To begin the RFID journey, a serialized perpetual inventory can be established for the selling floor and back room areas of the store, and maintained through frequent reads in all fixture and storage locations. This can be accomplished through a stand-alone application that, in the near term, does not need to be integrated into legacy store inventory systems. Retailers can then supplement this by adding readers at receiving and POS points and within the store to expedite merchandise flow and improve store performance. A suggested sequence of store priorities is based on a foundational perpetual inventory and an expansion to other in-store functions to improve the timeliness and specificity of data. In general, stores should build upon a location tracking approach to deal with specific business problems such as customer-perceived OOS, receiving, planogram integrity, shrink, recovery, etc. We recommend the business benefit of each area be measured against the incremental investment in additional hardware and software, as well as the labor and margin impact of enhanced functionality. See Exhibit A for the recommended sequence and reading methods.

EXHIBIT A: PROCESS FLOW RETAIL FOR PILOT ROLL-OUT



SUGGESTED PILOT PRIORITIES

1. **CYCLE COUNTING**: Establish model stocks representing the presentation quantities desired for merchandise on the selling floor. Using a portable reader/antenna device, monitor inventories at fixed intervals (perhaps once or twice per day) from floor-level and back room stock.

2. **LOW STOCK ALERT**: Use a basic replenishment algorithm to generate replenishment instructions. For retailers that replenish frequently from DCs rather than the back room, this could be used to generate store replenishment orders.

3. **VERIFY MERCHANDISE TO THE PLANOGRAM**: Establish a "home" for merchandise on the selling floor and enhance the cycle count program (see item No. 1 above) to validate the fixture merchandise as part of the process.

4. **RECEIVING**: Use a fixed reader/antenna to receive and update an Electronic Product Code (EPC)/RFID perpetual inventory at the point of receipt.

5. **POS**: Enable the perpetual inventory to recognize valid sales rather than assumed sales. Reconcile POS data with EPC/RFID transactions to confirm sales, thus enabling reporting of "missing" items.

6. **ITEM LOOKUP**: Provide functionality on a portable device to look up the floor or back room location where an item is expected and use a "find" feature to speed identification of items requested by a customer, for replenishment, or for other needs.

7. **FITTING ROOM**: Record merchandise tags moving in and out of the fitting room area for the purpose of inventory control reporting. Use a fixed reader/antenna to track garment movement and portable devices to help identify and separate garments by fixture for merchandise recovery purposes.

8. **AUTOMATIC LOCATION TRACKING**: Link items to their fixtures based on logic and/or RFID tagging on the fixtures themselves.

9. **"HOT" ITEM IDENTIFICATION**: Using the model stock developed earlier, enable "hot" item reporting at the time of receipt to bypass back room putaway and expedite deployment of this high-priority merchandise.

MERCHANDISE SELECTION

We advise that selection of merchandise categories for the pilot and beyond be based on a variety of attributes, including merchandise value, inventory policies, physical characteristics, loss/shrink experience, and seasonal selling profile. Exhibit B illustrates the relative attractiveness of different merchandise types based on these product attributes.

EXHIBIT B: RELATIVE VALUE OF ITEM-LEVEL RFID TAGGING

	Several Variations	High Trial-to-Purchase Ratio	Difficult to Locate	High Shrink	Short Sales Window Before Markdown	Attractiveness for Item-Level RFID
Jeans (designer)	M	H	M	H	H	Very High
Intimates	H	M	H	M	L	Very High
Jeans (basic)	M	H	M	L	VL	High
Women's Sweaters	M	M	L	L	H	High
Women's Leather Boots	M	H	VL	L	H	Moderate
Socks (basic)	L	VL	L	L	VL	Very Low

H M L VL L

Actual selection should consider the retail format, display appearance, target customer segments, and retailer selling methods. For example, stores with more densely merchandised fixtures and more limited labor hours dedicated for merchandise recovery processes are very strong candidates for item-level RFID. Conversely, merchandise that has relatively low value and low seasonality will have less to gain from RFID.

While there are no hard and fast rules for determining which situations are better suited to RFID tagging, we have created a list of general guidelines to assist in conducting an initial screening (see Exhibit C).

EXHIBIT C

Item-Level RFID Highly Useful

- Merchandise requires frequent replenishment from back room or DC
- Garment unit price points should be above $25 (USD)
- Seasonal or fashion goods with short time to first markdown
- Intensive receiving process (e.g., supplier's cartons require heavy auditing or DC's pick/pack accuracy is known to be low)
- Receiving from suppliers with history of poor on-time performance
- Low staff-to-customer ratio on sales floor
- Extensive use of merchandise hold areas
- Higher-than-average shrink categories prone to perpetual inventory inaccuracy

Item-Level RFID Less Useful

- Merchandise receives solitary push to floor with no planned replenishment from back room or DC
- Sparsely merchandised items for which visualization is easy
- Merchandising fixtures do not accommodate the full assortment of goods on the floor
- Highly automated distribution in which error rates are extremely low
- Retailers with highly professional sales staff that provides personalized service

RFID DEPLOYMENT IN THE SUPPLY CHAIN

The analytical framework illustration below can help those planning RFID investments consider two key questions: 1) Where should the tagging process take place? and 2) Where in the value chain should RFID "events" be recorded and shared?

To answer these questions, we propose three main considerations for how RFID-supported processes will improve interactions between trading partners. Companies should ask themselves:

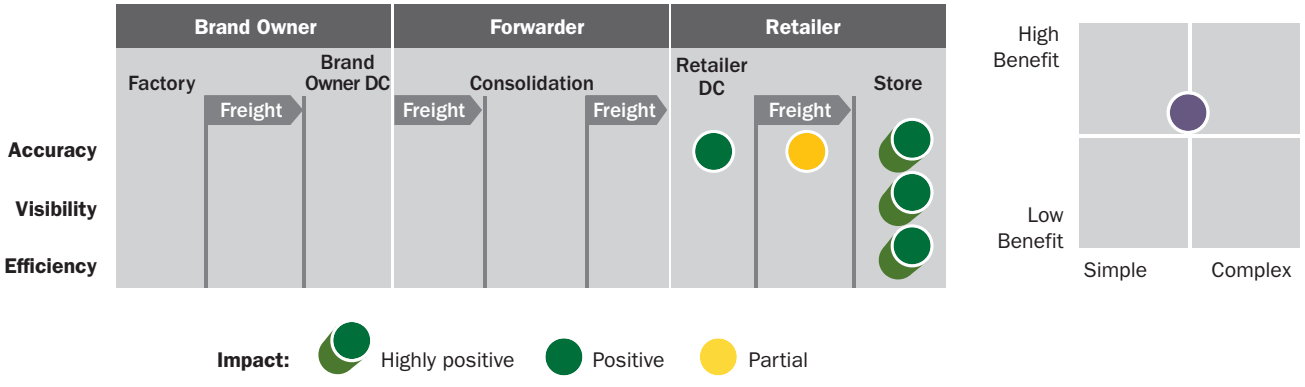
- **ACCURACY:** Are physical shipments and supporting documents at levels such that errors rarely occur, resulting in few deductions or claims between us and our trading partners?
- **VISIBILITY:** Will RFID events and transactions be fully visible to our trading partners, enabling them to make informed decisions about their inventory and asset investments as a result of this information? Will this detailed RFID data help us systemically and effortlessly measure our trading partners' performance, as well as that of the logistics and transportation companies upon which we collectively rely?
- **EFFICIENCY:** To what extent will accurately applying RFID tags upstream of critical processes within our operations (e.g., picking in advance of shipment verification) improve our performance? How will this information enable operations to run more efficiently (e.g., fewer open-box audits, touchless cycle counting)?

We have developed three scenarios to help illustrate how variation in the point of introduction of RFID processes along the extended supply chain creates different levels of benefit attainment and implementation complexity.

SCENARIO NO. 1: In the first example, tagging occurs at the retailer DC and all potential in-store processes are RFID-enabled, per our earlier description (see Page 7). This gives stores advanced visibility into what they will be receiving and enables them to receive without having to physically open and inspect individual cases. DCs introduce the tag as part of the packing process and therefore have the ability to more accurately verify the content of each case. This improvement in shipping accuracy reduces reconciliation activity between the DCs and the stores. DCs can also reduce the amount of time and effort required to audit cases in outbound shipping.

RFID tags read at shipment create an item-specific Advance Shipping Notification (ASN) manifest that can be visible to stores to help plan receiving. If the retailer elects to share POS and receipt data upstream, others can understand the flow from DC to store to consumer. This can have a small but growing positive impact on the retailer's planning function. With a complete audit trail between the DC and store, there are also fewer unexplained discrepancies between the retailer and the carrier.

SCENARIO NO. 1: APPLY TAG AT RETAILER DC; FULL STORE RFID FUNCTIONALITY



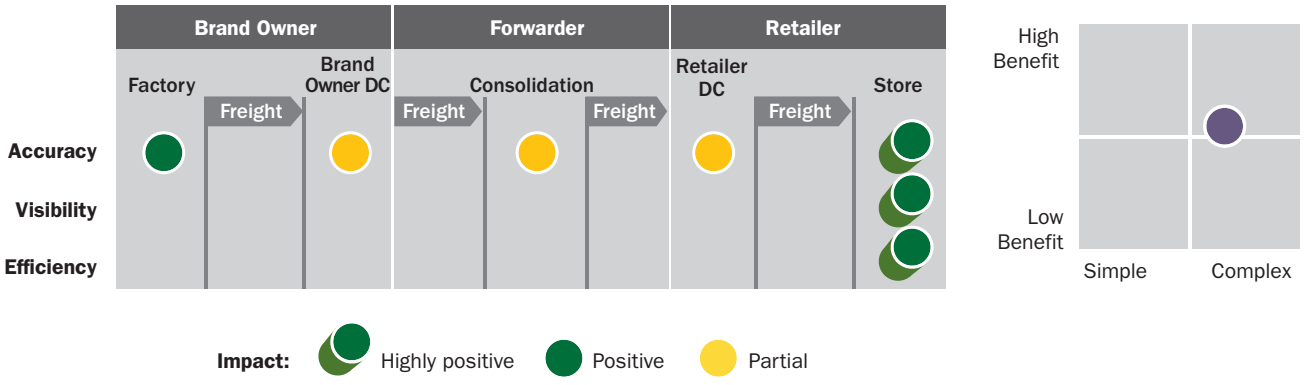
In this first example, in-store management of inventory from the point of receipt through sale has a major impact on overall profit performance. Today, store personnel and management often have little confidence in the accuracy of perpetual inventory data, making it very difficult to know whether an item is in the store, and if so, where. Using continuous or frequent RFID cycle counts, combined with automated merchandise recovery, associates can remedy OOS situations before they become apparent to customers. This minimizes disruptive associate hunts for correct colors, styles, or sizes, and keeps associates in front of the customer, where they are better able to convert the interaction into a sale. Automated merchandise recovery also helps maintain clean merchandise presentation.

CONCLUSION: Tag costs can be fully absorbed by store-level benefits alone. Benefits are relatively high and complexity is more a function of the number of stores requiring integration and training, and not due to anything inherently complex about the applications, processes, for the technology itself. Future upstream business case justification does not need to consider absorbing the entire cost of the tag. Instead, those ROI calculations can focus on the incremental benefit of those specific operations. The DC must minimize disruption and cost to its normal process. The reduction in outbound audits and shipping discrepancies is not likely to cover the incremental operational expense. Other benefits, such as elimination of duplicate scanning processes, must be factored into the evaluation.

SCENARIO NO. 2: In the next example, all processes at store level are RFID-enabled per the earlier description, but tagging is moved upstream to the producing factory. Not only does it cost less to apply tags upstream, it also increases the percentage of the value chain that can be positively impacted by improved accuracy. Since intermediate read points along the value chain are not yet activated, there is no real impact on end-to-end visibility. **Remember that these scenarios only address the current low-volume state of RFID trials.**

Stores can derive a little more insight from knowing what was produced and shipped from factories, but will not have sufficiently high confidence in their inbound shipments to base their day's receiving/staffing plan on what might be arriving. If the retailer elects to share POS data, the supplier can get a better sense of consumer takeaway rates and the time it took for goods to move through the value chain. This will help them better plan production of replenishable items.

SCENARIO NO. 2: SOURCE TAG; FULL RETAIL STORE FUNCTIONALITY



The further upstream tag application occurs, the greater the benefits. This is due to improved visibility of the value chain for planning purposes, as well as increased efficiency created by shifting work to lower-cost operations. With upstream tagging comes the opportunity to provide data visibility at selected read points. In this case we know when items are produced and shipped, and when items are likely due to arrive at intermediate locations. Improved receiving integrity at the

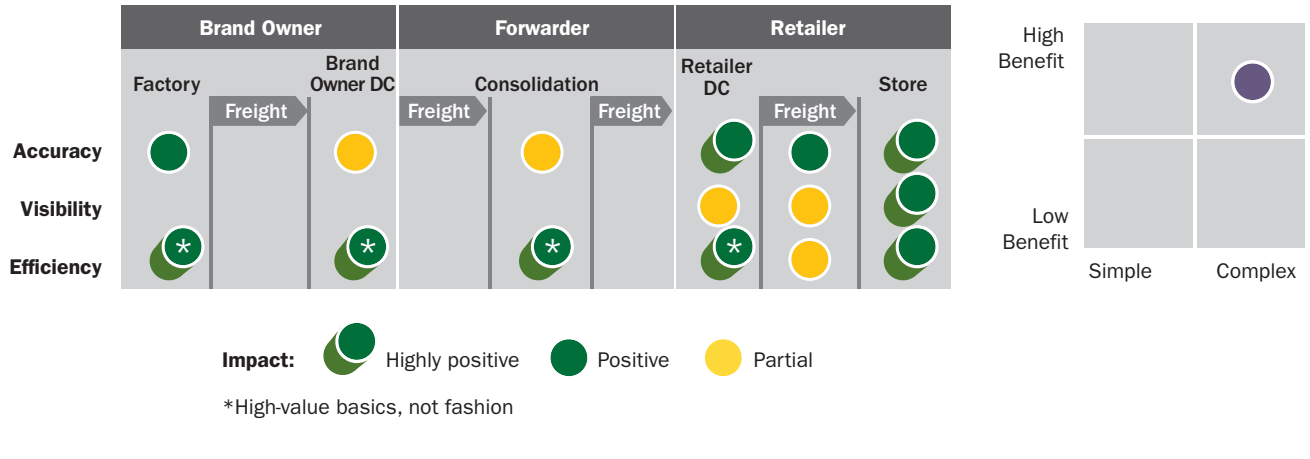
store level can provide insight into upstream operations. Suppliers and stores benefit from less frequent and less intensive audits if the supplier can demonstrate superior fill rates. The benefits will be even greater if factories pack by store rather than ship to intermediate fulfillment facilities where efficiency benefits may be squandered. In this example, intermediate locations picking and packing items do not use RFID in their operations, forcing receiving locations to expend more effort to resolve discrepancies. The level of complexity increases due to introduction of new processes at the factory. Overall, net benefit is slightly lower than in Scenario No. 1 because gains in tagging efficiency are offset by increased labor costs at the store level resulting from merchandise flowing through intermediate DCs where it might be unpacked, picked, and repacked without the benefit of 100% RFID verification. **Net benefit in Scenario No. 2 will exceed that seen in Scenario No. 1 once tagging begins in volume.**

CONCLUSION: Much greater efficiency can be gained by applying tags at the source rather than the DC on a long-term basis. At a minimum, DCs need to be RFID-enabled to justify additional tracking capabilities. During the pilot stage we recommend retailers and brand owners limit source tagging to flow-through cartons until shipping DCs have the ability to receive and process orders using RFID technology and applications. Manufacturers and retailers must consider the tradeoff between efficient tag application at the factory, and the flexibility of deploying merchandise in a post-production facility (i.e., DC). A postponement in tag application to garments increases the utility of inventory by enabling retailers to keep a single pool of inventory that can be applied to either RFID or non-RFID store orders. Retailers that elect to have items tagged at the source will be forced into separate inventories, resulting in lower overall inventory turns. Given these factors, in early-stage low-volume pilots it may be preferable to apply tags as a value-added service at a downstream distribution facility instead of tagging at the source. As pilots scale up, Scenario No. 1 will gradually be eclipsed by Scenario No. 2.

SCENARIO NO. 3: This third example enables all processes at the store level per our earlier description, enables tagging to take place at the factory source, and enables the shipping DC to receive, pick/pack, and ship using RFID verification. Additionally, we introduce auto-replenishment for the stores, DCs, and other upstream locations based on inventory velocity and sell-through data.

Established inventory thresholds for back room inventory trigger replenishment from the DC for selected merchandise. This is primarily relevant to high-value basics, in-season replenishment, and seasonal items receiving their final "push." The real complexity comes in the form of synchronized data and data sharing across multiple entities.

SCENARIO NO. 3: SOURCE TAGGING, RFID ENABLEMENT OF SELECTED INTERMEDIATE READ POINTS, RFID ENABLEMENT OF SHIPPING DC, AND AUTOMATED INVENTORY REPLENISHMENT UPSTREAM



This scenario allows value chain participants to see what has been produced, when items arrive at DCs and stores, and when items have been sold. Well defined parameters enable automated replenishment based on new lead times and a closer approximation of true customer demand. Armed with this new information for basics and in-season replenishment merchandise, the value chain can sense and respond to true demand. This helps participants eliminate spikes in production and distribution activity. This level of sophistication requires close collaboration and new levels of data synchronization and exchange. Early pioneers may need to develop their own unique protocols and revise them as the industry advances.

CONCLUSION: Value-chain-wide RFID deployment will enable more timely and responsive replenishment when aligned with customer demand. It will allow all participants to improve margin, reduce overall inventory levels, and more closely align resources with short- and long-term demand. Compared to Scenario No. 1, it provides somewhat better benefits but at a significantly higher cost. Moving RFID up the value chain is presently an expensive proposition. Companies should be prepared to increase their investment to achieve benefit from the area that requires the highest level of trading partner coordination — collaborative planning. True collaborative processes driven by RFID will not likely be achieved until there is wider scale adoption at the operational level. At that point more companies will be in a position to understand the value and provide experience-based input regarding more advanced standards. This is why we recommend initial RFID pilots be focused on store-level applications (Scenario No. 1 and then Scenario No. 2).

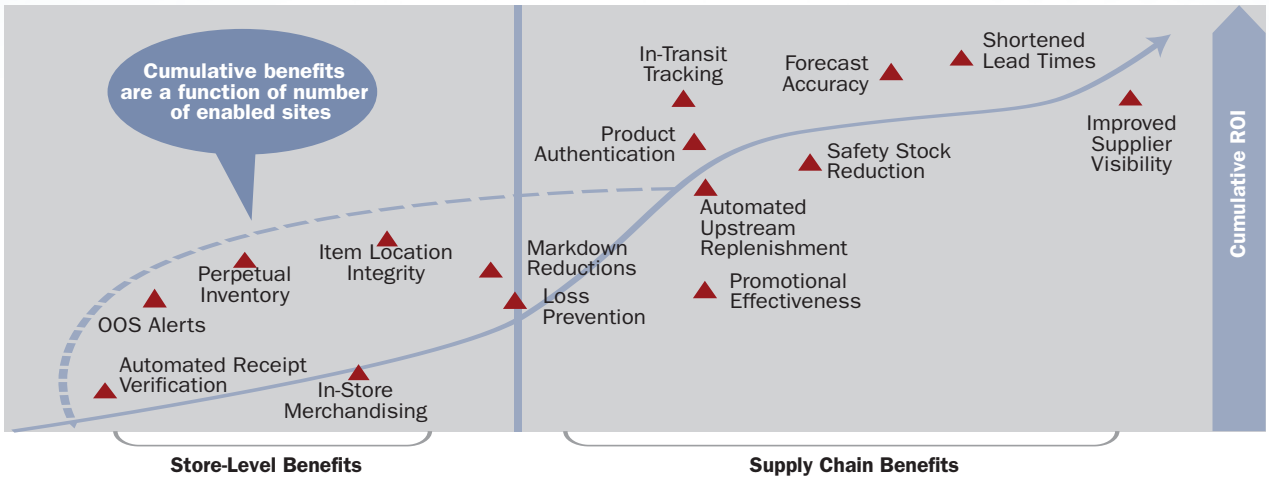
LONG-TERM OUTLOOK

With the exception of big-box discounters, most apparel retailers will achieve their first benefits in a "localized" manner at the store level in the form of targeted applications focused on a small number of product categories, or even as few as one or two important SKUs. Item-level tagging applications address classic store execution challenges: in-stock position, item location, merchandise presentation, and inventory accuracy. Benefits should be realized at each and every "enabled" site. Cumulative "local" benefits (illustrated in Exhibit D) will depend directly on the number of sites enabled.

These benefits are distinct from any equally important benefits attainable once a critical mass of stores (and DCs) becomes RFID-enabled. These systemic benefits are only possible when clusters of "enabled" sites are managed collectively within a company's value chain. When this is achieved, cross-enterprise benefits such as factory capacity planning, demand planning, inventory target setting, and category management can be significantly re-engineered. Broader deployment, coupled with the introduction of sophisticated automated replenishment modules, can give suppliers and retailers confidence to reduce excess safety stock previously required to compensate for long lead times and high variability.

While facility-level benefits can and should drive adoption in the near term, systemic benefits must also be addressed over the long term to achieve the next level of performance and true cross-enterprise transformation. Advanced industry standards development of data sharing, synchronization, and transaction networks need to be defined with greater clarity before this level of RFID integration planning can truly become a reality.

EXHIBIT D: LONG-TERM ROI BENEFIT PATH



When RFID deployment is pervasive and the organization has confidence in its ability to operate as a leaner, more responsive enterprise, the company will be able to fully capitalize on its new levels of inventory accuracy. Merchandise can be deployed more effectively and lead times can be reduced, benefiting the retailer, the supplier, and ultimately the consumer.

WHY WAITING DOESN'T MAKE SENSE

Many companies believe they can delay taking any real action on RFID until the cost of tags comes down even further and the reliability of the technology is beyond question. Based on our research, the significant benefit potential of item-level visibility makes tag and infrastructure cost less of an obstacle to the achievement of a very positive business case than has been experienced thus far in the CPG industry. The technology is already sufficiently reliable for companies to begin their pilot programs, and in most cases it is upgradeable.

Today, progressive, integrated retailers are proving OOS on the retail floor can consistently be improved by 20% or more and barriers to implementation are not as high as many believe. These retailers are investing in a source of competitive advantage by creating a capability gap that will take those who have not yet started substantial time to close. The learning curve is steep and relies not just on basic technology, but on several other areas of major institutional learning, including:

- **RULES OF PHYSICS:** Selecting the right tag and tag placement; fine-tuning and testing every building environment to ensure data is captured reliably
- **SOFTWARE:** Managing RFID network devices; defining context of reads and writes; managing population of tags, event management, etc.
- **BUSINESS PROCESSES:** Ensuring the benefits from technology can yield sustainable business improvements and can be scaled and extended
- **BUSINESS AND TECHNOLOGY PARTNERS:** Collaborative planning on tag technology, physical tagging process, assumption of costs, and sharing of results

There is no such thing as a "fast follower" with RFID. Much of the learning described above will be company-specific, and there are few shortcuts to be gleaned from the experiences of others to speed up the learning process. Companies, and in particular individual employees, do not adapt to new technologies overnight. Develop an RFID game plan that is right for your company, and begin your journey now rather than have it dictated to you later.

ABOUT VICS

The mission of the Voluntary Interindustry Commerce Standards (VICS) Association is to take a global leadership role in the ongoing improvement of the flow of product and information about the product throughout the entire supply chain in the retail industry. The Association's overall global objective is to improve product availability to the consumer by providing leadership and encouragement in the identification, development and implementation of volunteer standards, protocols, guidelines, and other mechanisms. The VICS Association approach allows companies to better anticipate and react to changes in consumer demand for these products, with the subsequent optimization of production and carrying costs. For more information please visit, www.vics.org.

ABOUT AAFA

The American Apparel and Footwear Association (AAFA) is the national trade association representing apparel, footwear, and other sewn products companies, and their suppliers. AAFA's mission is to promote and enhance its members' competitiveness, productivity, and profitability in the global market by minimizing regulatory, legal, commercial, political, and trade restraints. For more information please visit, www.apparelandfootwear.org.

ABOUT KSA

Kurt Salmon Associates (KSA) is the premier global solutions provider focused exclusively on the retail, consumer products, and health care industries. Celebrating 70 years of excellence, KSA helps clients achieve significant gains through strategic growth initiatives, superior product performance, and comprehensive enabling technologies. From concept to consumer, KSA's portfolio of services helps clients in the Americas, Europe, and Asia-Pacific achieve lasting, meaningful improvements that create true distinction in the marketplace. For more information please visit, www.kurtsalmon.com.

VICS

AAFA american apparel & footwear association

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