



The Increasing Role of **RFID** in Retail

WHITEPAPER

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Introduction — The State of RFID

Radio frequency identification (RFID) is a fully automated inventory tracking technology that generates significant improvements in accuracy, efficiency and visibility of merchandise management at the product level.

Just as the barcode had done a few decades ago and just as the Internet has done in the last decade, RFID is *the* new technology poised to change the way retailers do business, and engage and retain customers.

Creating a more effective and efficient inventory system until recently was considered as a solution solely suited for wholesale and supply chain applications. RFID has attracted much attention in these quarters, but the scaling of the RFID technology (hardware, software, and data analytics) has allowed the scaling of “knowing what merchandise is available, where, and it moves” beyond warehouses and directly onto the sales floor. As a result, the most valuable and exciting advantage of a real-time RFID inventory management systems are being realized within the walls of the retail stores.

The RFID ecosystem has come of age and retailers hoping to drive leverage over their competition can improve productivity, completely automate inventory, prevent out-of-stock scenarios, boost satisfaction and loyalty, and boost their bottom line.

And the good news is that solutions providers have honed application expertise while software vendors now provide field proven, retail-specific applications. Encouraged by the development of industry standards, major technology companies such as Microsoft, Intel, Oracle and IBM have made significant investments, which puts standard, interoperable RFID within the grasp of many more users, especially the retailers.



The Retail Problem

Today, most retailers don't really trust their inventory systems, so they don't typically use them to find things in the store.

Managing a selling floor requires constant vigilance: new merchandise constantly arrives and must be processed quickly and accurately, and as merchandise moves out the door, it must restocked *near* “simultaneously”.

For retailers to maintain the desired “model stock” assortment that is available at all times requires knowing exactly how much stock is available on the floor at any given moment, which items have move from place as customers browsed through the aisles, and in the end what is left in the stock room, and hence what needs to be re-ordered.

Retailers are further faced with the challenges of monitoring and controlling “shrinkage”, which causes a dramatic drop in either customer satisfaction or else cost-effectiveness of managing the retail store. This is because as the retail staff becomes more engrossed in restocking the sales floor, their availability for addressing customer concerns when they are on the floor is directly affected.

The Four Key Retail Sales-Floor Challenges

1. **Keeping the floor stocked with “model stock.”**

According to studies, retail stores find themselves out-of-stock on about 8% of their model stock. This automatically translates into lost selling opportunities, and hence net revenue.

Asset Shrinkage

Compliance Cost

2. **Accurate and Economic inventory tracking.**

Counting on-hand inventory economically, while preserving the accuracy of “perpetual inventory” data is tough. The result? The notorious customer frustration when the website claims in stock, and it’s not.

Customer Experience

Supply Chain Efficiencies

The Retail Problem

3. **Efficient and accurate restocking of merchandise.** Retailers often are unable to quickly locate or restock items. This directly incurs discount on items that have reached late on the sales floor.

4. **Curbing shrinkage.** Internal theft has become a greater problem than shoplifting itself. It is estimated to have cost North American retailers \$19.5B in 2006 i.e. even more than the \$13.3B attributable to shoplifting.

It quickly becomes clear that an RFID tracking system can directly address all these problems, generating improvements in inventory accuracy, operational efficiency and stock visibility that greatly simplify the work of store associates and management, freeing them to spend more time serving customers and generating sales.

RFID as a Solution — Overview

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Item-level RFID tagging is the technology solution to increase inventory accuracy and control as well as engaging customers better. It has already proven itself as a way to address all the challenges mentioned previously across a broad range of retail formats — specialty stores, department stores, club stores, among others.

The payoffs of RFID go well beyond reducing out-of-stock situations, labor and shrinkage costs. It now includes new ways to serve customers and enhance their in-store experience.

This paper provides retail professionals with a basic understanding of how RFID works and how it can help improve day-to-day operations and boost the bottom line, highlighting the results that others have already achieved through RFID deployment.

Advantages RFID Can Offer Retail

RFID provides an accurate, automatic, convenient scan that does not rely on “direct line of sight” to read encoded data. This has made it the ideal solution for tracking inventory goods in motion. Initially, RFID systems were embraced for a diverse range supply chain applications, because they delivered dramatic improvements in labor and time needed by retailers to track inventory movement.

Recent developments in and scaling of tracking technologies now allows retailers to overcome various

RFID offers the following advantages to retailers:

1. Smarter and Faster Sales Floor Stock Replenishment
2. Greater Inventory Accuracy
3. Greater location Visibility
4. Expedited Receiving
5. Improved Validation of Shipment Integrity
6. Fewer Items Sold at Markdown
7. Reducing Internal Theft
8. Reduced Shoplifting
9. Interactive Retail
10. Better Consumer Research



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Greater Inventory Accuracy

According to studies, by enabling real-time inventory at the SKU level, RFID allows retailers to achieve inventory accuracy of 99% or better. Retailers are often relying on “piece count” sales statistics that grossly underestimate the variance between actual on-hand position and POS-driven facts.

Smarter and Faster Sales Floor Stock Replenishment

With RFID, the sales floor can be quickly read/scanned and the software can automatically generate lists making it easier and faster to re-stock the sales floor. RFID analytics can even alert managers in case too much “put back” merchandise is accumulating in fitting rooms, and hence resolve problems before customers ever notice them.

Greater location Visibility

RFID not only tells you what is and is not in stock, it also identifies where a specific item can be found in the store. This reduces search and stock room trips, hence leaving more time to engage with customers and generate sales.

Expedited Receiving

RFID can avoid the common problem of newly arrived stock sitting for days on end without being processed. RFID allows reading of pre-tagged merchandise and hence cuts the receiving time to minutes. Furthermore RFID can be used to prioritize merchandise e.g. needed immediately on the sales floor. This is crucial for time-sensitive items such as fashion apparel, new DVD titles, and other seasonal merchandise.

Improved Validation of Shipment Integrity

Retailers often accept merchandise into inventory by simply trusting that the shipment is complete and complete because an open box audit would be too costly in terms of time and labor. RFID allows retailers to validate 100% of their shipments, instantly notifying them of any discrepancies e.g. in-transit theft/loss, or packing errors.

Fewer Items Sold at Markdown

Large number of items only reach the sales floor when they have hit markdowns. RFID dramatically increases merchandise visibility, easing stocking and hence recapturing lost revenue opportunities.

Reducing Internal Theft

RFID allows retailers to regularly count every item in their store. It serves to deter dishonest employees who may take advantage of the retail's lack of real-time visibility. With RFID, the entire journey of the item till the stock is possible, often yielding valuable clues.

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Reduced Shoplifting

RFID readers at doorways can easily track items brought in and taken out of store by customers. RFID reader-equipped “smart” screens and mirrors offer a dual advantage: of allowing a more interactive customer experience as well as informing the retailer the precise item selected by a customer.

Interactive Retail

The introduction of display screens and mirrors with RFID readers allows possibility of cross-selling suggestions about the merchandise held by the customer, increasing conversion rates and boosting cost per transaction, and making retail shopping a more fun and engaging experience.

Better Consumer Research

RFID tags carry unique product numbers. If consumers pay for goods with a credit, debit or shopper’s discount card, retailers can link the purchases to the recorded RFID data and use that marketing information to map out individual consumers’ movements through a store. This sort of data can help a retail store make improvements, for example, by helping to optimize a store’s layout to match typical consumer behaviors.

Understanding RFID

RFID — The Basics

RFID allows retailers to automate their entire supply chain. It allows them to identify individual items, cases, and pallets, the same way bar codes let them — but wirelessly, and without the need for line of sight, and with richer data, and with the ability to employ better analytics for *bigger* Big Data.

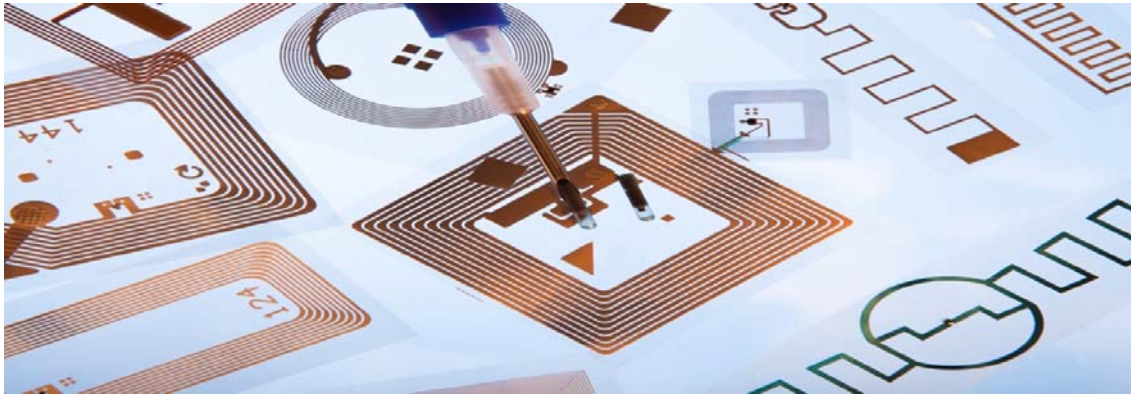
The technology has allowed the retailers to become ever more competitive with online sellers, through “omnichannel” sales that allows retailers to close a sale on the buyer’s terms — whether in store, on eCommerce stores, social media, or through a combination of all of the above.

Retail stores can now be sure that when their website states that an item is in store, it actually is and the retail inventory *knows* exactly *where* it is.

The Technology — How Does it Work?

In simple terms, RFID enables frequent inventory counting and hence increases the accuracy of the inventory. It allows a retailer to be more confident about not just store level accuracy, but also at color and size level.

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RFID Tags

The primary component of any RFID implementation is the RFID tag, a simple chip and antenna embedded *within* the product's pricing label. These tags are passively powered, relying on the radio signals that are emitted from readers — either hand-held or fixed. The chip comprises of basic memory that stores information about the product and is capable of transmitting this data via the antenna. When the RFID tag reader transmits modulated electromagnetic waves (in similar fashion to how TV shows are transmitted across cable TV or satellite TV), all RFID antennas receive the electromagnetic waves, power up, and immediately start transmitting their unique code and product information through modulated electromagnetic waves. These are collected by the reader, demodulated and converted into decipherable digital bits (the notorious '1's' and '0's'), processing the data, and displaying relevant information.

RFID Reader

As stated, the RFID tag is a passive device reliant on uniquely modulate electromagnetic waves to function. The reader is simply the device that transmit high power modulate electromagnetic waves carrying electronic message that is recognizable *and* decipherable *only* by the unique RFID tags. The reader is the primary hardware link between the RFID tags and the software that updates the retail inventory as well as analyzes retail KPIs (sales, revenues, highest sold item, and more).

Tags, in tandem with the readers, allows retailers (store associates in particular) to check and verify the inventory of an entire lane stacked with various items by simply walking around the display with a handheld reader.

Software

The readers are connected, and communicate, with the backend software which collects the information and tabulates them in the inventory database and punching the numbers to display the list specific to products i.e. these big data analytic tools allow the retailer the ability to actually categorize all products down to the individual item's expiry date.

In comparison to the normal barcodes that should be visible and require manual scanning even after being deployed, *all* the deployed RFID tags can be *automatically and simultaneously* read, monitored, and managed. Furthermore, and unlike barcodes, RFID tags can be read/written from a distance of several feet, without the line-of-sight (LOS) access, in any orientation, from in between objects, and even when in motion.

As a result, the retailers are able to easily receive replenishment alerts, increase on-floor availability and decreasing out-of-stocks, typically by a margin of 15% to 30% resulting in a sales uplift.

Industry Trends

According to [Research by ChainLink, 2014](#), the top reasons for implementing RFID is to improve inventory accuracy. This makes sense as improvement in inventory accuracy is central to a retailers ability to drive sales uplifting and many of the other benefits and goals for RFID. This works as RFID enables cycle counting to be done about 25 times faster than traditional manual bar code scanning. Frequent, automatic, and accurate cycle counting via RFIDs improves inventory accuracy, typically by 20% to 30% allowing number of retailers to achieve around 99% accuracy.

Some prominent uses of RFID include:

- Promotional Tracking
- Better In-Store Inventory Management of Items
- Better In-Store Inventory Management of Pallets
- Easing Brand Authentication
- Increasing Inventory Visibility in the Supply Chain
- Tracking Assets

Let's see the value RFID is delivering to retailers and the applications they are being used for in further detail:

Uses of RFID in Retail

Promotional Tracking

The Application:

- Track in-store deployment of displays to ensure timely deployment and removal of the display per the marketing plan
- Automatically record deployment of displays as they are taken on to the store floor and later retired at the box crusher

Value to Retailers:

- Boost marketing impact by ensuring timely deployment of promotional displays synchronized with advertising and other marketing efforts
- For example, Gillette reported increased sales-out of 5x in stores using RFID on a new product launch and 19% overall sales uplift on promotional items.
- Kimberly Clark announced a 33% improvement in on-time deployment of time-sensitive promotional displays

Improved In-Store Inventory Management of Items

Application:

Eliminate stock-outs of product categories with high SKU count such as apparel and books, leading to improved revenue and customer satisfaction

Value to Retailers:

Significantly reduce cost and time required for physical inventory. The time it takes to do physical inventory is reduced by 90% from several man-days to a fraction of a day – in one multi-store pilot, management was able to reduce monthly inventory from 10 man-days (4 people for 2.5 days) to one hour for one person. This not only enabled lower costs, but enabled more frequent counts. The resulting RFID-based inventory was more accurate

Improved In-Store Inventory Management of Pallets

The Application:

- Tag pallets and pallet-rack slots with Gen 2 tags
- Automatically capture the location of pallets when put away by associating pallet and pallet rack tag numbers in the database
- Provide forklift drivers with accurate locations of pallets of products for quick retrieval

Value to Retailers:

- Reduce cost of searching for misplaced pallets of product
- Provide accurate inventory of product on pallets
- Enhance customer satisfaction, improve revenue and reduce stock-outs by speeding the retrieval and distribution of product to store shelves

Brand Authentication

The Application:

- The product tag contains both a customer-writable EPC number and a factory-set, unique tag ID (TID) number
- The TID cannot be changed by a would-be counterfeiter, so an item with the correct pair of numbers is authentic. A quick check against a database using a handheld or desktop reader can verify authenticity by confirming properly paired numbers
- Much more effective than other authentication methods that can be copied – the TID number is factory set by the tag manufacturer in the IC and is unique

Value to Retailers:

- Eliminate counterfeiting of high-value cosmetics, electronics, apparel and pharmaceuticals

- Protect brand integrity by eliminating knock-offs
- Enhance customer experience by ensuring quality

Increasing Inventory Visibility in the Supply Chain

The Application:

- Track packaged goods from factory to retail floor, and produce from farm to grocery cooler
- Product is automatically registered as it passes through RFID-equipped dock doors and thruways, providing location information
- Empty case boxes and RPCs are captured as they leave the store floor, indicating usage

Value to Retailers:

- Boost revenue and customer satisfaction by reducing stock outs
- Provide vendors with real-time visibility of inventory in the supply chain, improving forecast accuracy and damping the inventory whipsaw effect
- Reduce inventory exposure, ageing and working capital requirements

Tracking Asset

The Application:

- Track reusable plastic containers (RPCs), pallets, roll cages and other assets as they move through the supply chain or within a closed loop material handling process
- Assets are automatically registered as they pass through RFID-equipped dock doors and thruways, providing location information

Value to Retailers:

- Find lost assets and boost capital efficiency by reducing the number of assets required to support the business process
- Ensure accurate billing for pooled assets like pallets

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Conclusion



The benefits of using RFID in a retail environment are many, including faster and more accurate inventory counts, fewer out of stock situations, greater full price sell-through, enhanced shopper experience, and reduced inventory shrinkage. All of these benefits add up to a more efficient, engaging retail experience for your customers and your associates, as well as increased profitability for you.

Barcodes prevented the frequency and accuracy with which inventories could be scanned and verified. Prior to RFID becoming commonplace, inventories could be scanned once or twice an year. With RFID, [reports indicate](#) big retailers accurately checking their inventories up to 24 times per year.

Hence, whether retailers decide to implement buy online/pick up in-store, buy online/ return to store, buy in-store/ship to home or other strategies, it is imperative that they establish a 360-degree view of inventory availability and better understand customer behavior by employing RFIDs.

RFID is truly a win-win solution, capable of solving chronic store operation problems while creating opportunities for retailers across a wide spectrum — ranging from generating promotional and selling opportunities to more elaborate on floor customer satisfaction options.

Retailers savvy enough to embrace RFID today will be able to gain leverage over competition and capture a greater market share and watch their revenues rise.

The logo for iConnect, featuring the word "iConnect" in a stylized, italicized, light blue font. The "i" is lowercase and the "Connect" is uppercase. The logo is positioned at the bottom of the page, with a large, faint QR code watermark in the background behind it.

About Amitesh Sinha

Amitesh Sinha is a contemporary technology consultant based in North America. With over 20 years of hands on experience in developing and deploying innovative solutions for retail, Sinha has gained a distinguished reputation for inventory software solutions, creating data bases, STORIS Furniture Software, POS Furniture Software, and reengineering of software with extended features and support.

Mr. Sinha's professional synergies make him a significant choice for commercial and government agencies where he has been successful delivering cutting edge solutions and services according to the company demands and contemporary business requirements. He is in the list of top most furniture consultants, retail consultant and retail home furnishing specialist, facilitating Ashley home-stores providing centralized, unified and easily replicated database system to perform their query operations on a single click.

Sinha earned MBA from JBIMS, Mumbai India and started his professional career from Stock Holding Corporation India Limited and served for 07 years. In 2000, he moved to USA, and established iConnect group, a professional consultancy business with a focus on technology management and delivering services. The iConnect group currently works with top notch companies to steer short-term and long-term technology strategies, and providing flexible solutions by anticipating their needs and requirements.

About iConnect

iConnect is a leading technology service provider as well as a consultant in technological innovation, management, and IT. Our services span the length of the software development spectrum including integration, infrastructure services, mobile apps, staffing, and web design solutions for our clients.

Committed to technological innovation and progress, we have been serving retail, homebuilders, public sector, transportation, RFID, and more.

About SIA Technology

Shopper Intelligence Analytics (SIA) is our propriety technology that answers business actionable questions for you:

1. How much shoppers are you drawing into your store?
2. How often are shoppers visiting your store, and for how long?
3. Which zone is attracting the most shoppers?
4. How is your staff interacting with shoppers?
5. Are queues being managed properly? and more.

SIA helps you solve your retail challenges and unlock sales opportunities. It allows you to easily obtain actionable business insights and metrics about customer foot traffic patterns, behavior, and interaction with staff members in your store(s).

[Our SIA technology](#) can automatically and passively detect and collect information about your shoppers and staff members while completely complying with the industry standards and privacy regulations. This includes sensing customer/staff-member presence and location in the store and portraying the data in a meaningfully actionable manner.

Rollout with SIA in no time — It's easy to install, offers high accuracy of location, does not require customers to install apps on their devices, and allows you to manage multiple sites and stores as well as multiple floor plans and/or zones per site/store in real-time.

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The ROI for RFID in Retail

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