What retailers need to know about AI-powered RFID Right NOW.

RFID has always had the potential to dramatically transform retail. Combined with AI, it now has the potential to revolutionize the entire retail supply chain.

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RETAILING

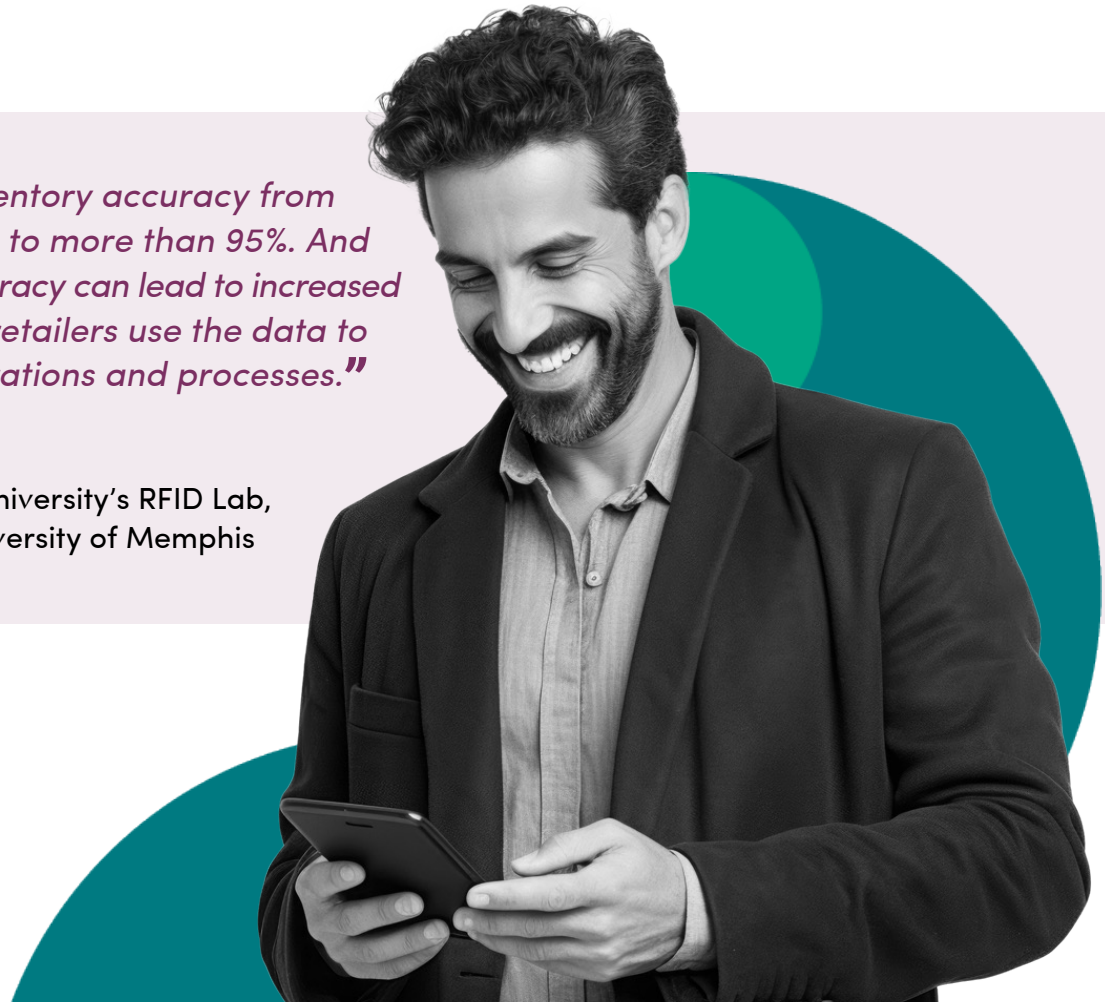
Introduction

The idea of being able to track every product from the point of creation to the point of consumption has long been the dream of many supply chain, merchandising and operations managers, not to mention CFOs. They all want to have full product traceability to help with everything from inventory optimization to order fulfillment for performance, customer service and compliance reasons.

For decades, radio-frequency identification (RFID) technology has promised revolutionary improvements in inventory management and customer experiences in the retail industry. However, many retailers have struggled to unlock its full potential, often due to inadequate software integration strategies, incomplete staff training and expensive technology. This position paper explores the opportunities and challenges retailers face in implementing RFID and offers insights into maximizing its benefits through the use of artificial intelligence (AI).

"RFID increases inventory accuracy from an average of 65% to more than 95%. And high inventory accuracy can lead to increased sales – but only if retailers use the data to improve their operations and processes."

Bill Hardgrave,
Founder of Auburn University's RFID Lab, now President of University of Memphis



Retail RFID Yields ROI

At the start of the 21st century, RFID was focused on pallet and case load movement in the supply chain, with suppliers and retailers using either tagged assets (reusable containers or shipping platforms) or encoded labeling applied to the unit load as the auto ID technology. These were coupled with bulky reading equipment and even bulkier backend technology systems that relied on wired communications to transfer the data to servers where the laborious task of analysis and actionable insight generation started.

Retailers experimenting with RFID technology at the time were trying to control movement of product to the store, so inventory management and security were two of the initial business use cases. In fact, many early applications focused on tracking the assets carrying or containing products and then marrying that data to the bill of lading that listed the contents. This was due both to the cost of systems and the limitations of the data connections.

As the RFID chips and the reading equipment got less expensive, more business use cases became available and, more importantly, item level RFID became feasible. It became possible to increase compliance to merchandising plans and better manage inventory, increasing retail in-store efficiency and effectiveness, reducing labor costs and creating a better shopping experience for customers.

Retailers also started leveraging RFID in innovative ways beyond just inventory tracking and security. An important early business use case was RFID tags embedded in products to control which items were on display. For instance, in a shoe store, knowing the exact styles, colors and even sizes of shoes on the store floor helps ensure salespeople have stock of the right lines and can quickly remove displayed shoes that aren't available. Another was using RFID tagged items to gather customer interaction data and provide personalized recommendations. If a customer picked up a particular book or product, the system could suggest similar items or related accessories. Other examples include smart fitting rooms, real-time inventory management, asset tracking and anti-counterfeiting measures.

All of this resulted in 93% of North American retailers testing or using RFID in some way or capacity, and those that have fully adopted RFID reported 10% ROI in 2021 compared to 9.2% two years prior, according to Accenture.

But the retail industry is just getting started.

How AI is Transforming RFID in Retail

Every second counts in retail and precision is more critical than ever. As a result, the fusion of AI with RFID technology is revolutionizing the ecosystem. This dynamic duo is not merely streamlining processes but reshaping the entire retail experience for both the shopper and the retailer's personnel, from inventory management to customer engagement.

In the past, inventory management was plagued by inaccuracies, leading to lost sales and frustrated customers. However, AI-powered RFID systems now offer real-time insights into stock levels, enabling retailers to maintain optimal inventory levels effortlessly. Through predictive analytics, AI forecasts demand patterns, minimizes overstocking, and prevents stockouts, thereby optimizing shelf availability and maximizing sales.

By combining the vast item-level data RFID produces with the processing power of AI, merchants automate the mundane tasks that inhibit staff from using actionable insights and recommendations to truly engage the shopper how, where and when she wants throughout the buying journey. The key areas RFID-driven AI automation offers value to retailers by assisting store personnel and customers and optimizing inventory management across entire chains.

What this means in practical terms is that front level employees have access to data that helps them do every part of their job better and that access and data is constantly being updated to reflect more accurately what the customer demands. This takes the form of promotions and merchandising that will be more likely to be used by customers, as well as activities that eliminate friction from the supply chain. More specifically, AI-powered RFID delivers the actionable insights, like the real-time performance of product placements and promotions, retailers need to optimize merchandising, enhance customer experience and drive bottom line profitability.

BY INTEGRATING RFID TAGS INTO PRODUCTS, RETAILERS CAN OFFER PERSONALIZED RECOMMENDATIONS BASED ON INDIVIDUAL PREFERENCES AND PAST PURCHASES. THROUGH AI-DRIVEN ALGORITHMS, RETAILERS CAN ANALYZE CUSTOMER BEHAVIOR IN REAL-TIME, ANTICIPATE NEEDS, AND DELIVER TARGETED PROMOTIONS, THEREBY FOSTERING CUSTOMER LOYALTY AND DRIVING SALES.

AI-driven RFID solutions are also revolutionizing supply chain management by providing end-to-end visibility. From production facilities to distribution centers and retail stores, every step of the supply chain is seamlessly monitored. AI algorithms analyze data collected by RFID tags, identifying inefficiencies, predicting delivery times, and even detecting anomalies that may indicate potential disruptions. As a result, retailers can proactively address issues, minimize delays, and ensure a smooth flow of goods from manufacturer to consumer.

Counterfeiting and theft pose significant challenges for retailers, leading to revenue loss and erosion of brand reputation. AI-powered RFID technology serves as a powerful weapon in the fight against illicit activities. By embedding RFID tags with unique identifiers and leveraging AI algorithms for authentication, retailers can verify product authenticity and track items throughout the supply chain. Moreover, RFID-enabled security systems can detect unauthorized removal of tagged items, acting as a deterrent against theft.

The convergence of AI and RFID technology is ushering in a new era of efficiency, accuracy, and innovation in the retail sector. From optimizing inventory management and supply chain operations to delivering personalized customer experiences and enhancing security measures, the impact of AI on RFID is profound and far-reaching. As retailers continue to embrace these transformative technologies, they are poised to unlock new opportunities for growth and success in an increasingly competitive market landscape.

Implementing AI and RFID in Stores

Step-by-step guide on how retailers and brands can successfully integrate AI and RFID technology into their stores, including:

- Conducting a thorough needs assessment.
- Choosing the right AI and RFID solutions based on business goals and requirements.
- Planning and executing the implementation process, including staff training.
- Monitoring and evaluating the performance of the technology post-implementation.

How AI is Transforming RFID in Retail

Like any other technology or process solution, RFID does have some challenges that may need to be overcome in order to realize long-term benefits. The types and impacts of these challenges are going to differ from retailer to retailer.

First, cybersecurity remains a potential weak link for RFID -- hacking the technology may be possible with just a smartphone and a series of apps. RFID tags can be cloned, especially if there is no serialization or authentication mechanism, which means the information from the tag of a lower-priced item can be inputted to a tag for a much more costly one.

Second, unless RFID tags are deactivated or removed at checkout, product tracking doesn't stop when a customer leaves the store. While RFID is a game-changer for all sorts of customer insights, shoppers likely don't retailer to continue tracking them after the sale. In addition, while the GDPR and other privacy laws don't list RFID data as personal, most do include guidelines regarding the use and privacy of RFID data.

Last, but most important for many retailers, is that while RFID is a catalyst for new customer experiences, improved analytics and streamlined operations, these enhancements can require extensive investments of time and money.

The RFID ecosystem includes not just the tags and multiple readers, but also increased Wi-Fi capacity, software and software integration, employee training and more.

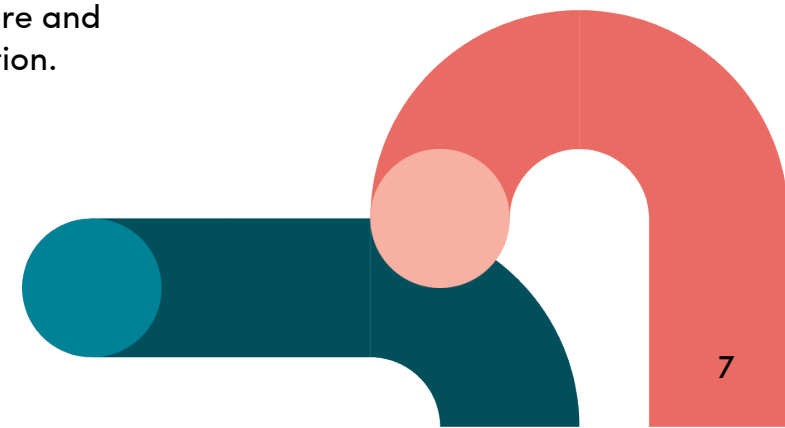
Most of these issues can be addressed with the help of AI. AI can spot cybersecurity challenges before they happen by "learning" from attempted attacks and blocking them proactively. For privacy, AI helps retailers take action to comply with regulations and, more importantly, understand the level of discretion each customer demands. On cost, the price of RFID ecosystems is now a fraction of what they were even 10 years ago and will go lower as mass adoption continues.

How companies are using RFID + AI

RFID and AI can be deployed to better control the inventory in and on its way to the retail store or fulfillment center, as well as the merchandising of that inventory. The concept of the Internet of Things yields extremely accurate and timely data that can be fed into AI systems to dramatically help retailers improve inventory management processes, eliminate out of stocks and help provide the improved customer service. **Macy's**, one of the world's largest department stores, is using AI and RFID to regularly track inventory and manage on-floor merchandising, giving the retailer better visibility and increased availability of the products choppers are demanding most. The retailer also used the technology to control its displays, ensuring that the right items are on the store floor and the wrongs ones aren't.

In the supply chain, RFID allows retailers to track the entire journey of their products, from point of production to point of sale. RFID and AI enable those retailers to take that real-time data and identify and then predictively fix potential supply chain disruptions like delivery delays. **McKesson**, a leading healthcare channel supplier, is using RFID and AI in an IoT platform to share data and insights with several of its hospital partners in near real time to better manage inventories. This helps each mode of the supply chain prepare for any contingencies.

Adopting AI and RFID technology for retail operations can certainly make the shopping experience more engaging. Data on customer reaction to product pricing or promotions can be used to help personalize the buying journey by enhancing merchandising strategies. The insights gleaned from this process can also be used to customize product assortment at store level, resulting in the right product at the right shelf at the right time to meet customer demand. As an example, **a leading food retailer** used sensor-enabled electronic shelf labels to help buyers more easily see pricing information, but also draw insights from collected data to understand the "hot spots" in each store and coordinate planagrams around that information.
[each of these should have a graphic —the first could be a photo/illustration of a store floor with products "connecting" to a RFID system.



Driving performance with RFID and AI

When combined with AI, RFID changes brick-and-mortar stores from off-the-grid, non-engaging square boxes that simply display products to dynamic environment where shopping patterns and product movement can be tracked in real-time. Think about what POS scanning did for checkouts and multiply it by 100. It's that transformative.

When combined with Optimum Retailing's retail intelligence platform, AI-driven RFID can offer real-time insights to retailers that can be used to deliver superior customer experiences. This feedback includes information on what is on display (accurate product and location data), what is in someone's shopping cart and the exact time of conversion.

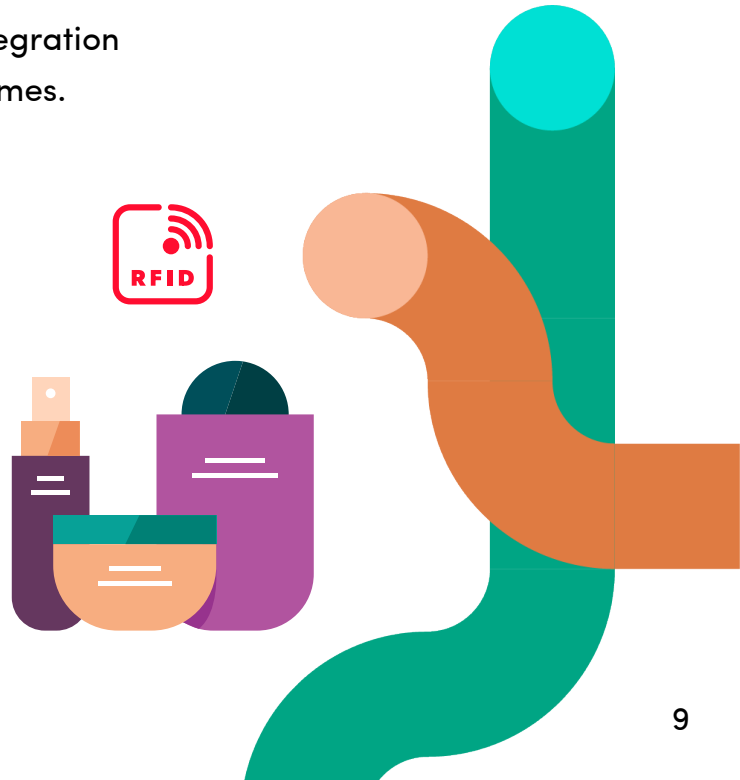
AI-driven RFID can be used for much more than security or inventory tracking and Optimum Retailing helps companies take full advantage of this technology to increase the retail store's efficiency, effectiveness and experience. By addressing common pitfalls and emphasizing the importance of artificial intelligence, retailers can unlock the full potential of RFID technology to improve the operations, enhance shopper engagement and drive profitability in an increasingly competitive market.

Like many of the substantive changes in retail, going back to the first self-serve stores almost a century age right up to the digital marketplace, AI-driven RFID delivers performance benefits for both the consumer and trading partners. And like those dramatic industry changes, the retailers and brands that deploy these solutions early will likely create a lasting competitive advantage.

RETAIL IS A BOTTOM LINE-DRIVEN INDUSTRY, AND SUCCESSFUL RETAILERS ARE CONSTANTLY SEARCHING FOR SOLUTIONS THAT INCREASE SALES VOLUME WHILE LOWERING COSTS. AI-DRIVEN RFID IS QUICKLY PROVING TO DELIVER THE CLEAR ROI THAT RETAILERS DEMAND, YIELDING A WIDE VARIETY OF OPERATIONAL, WORKFORCE AND MERCHANDISING BENEFITS, AND COMPANIES LIKE OPTIMUM RETAILING ARE ENABLING THAT SUCCESS.

Best Practices in Retail RFID Implementation

- **Define Clear Objectives**: Establish specific goals for RFID implementation and align software integration strategies accordingly.
- **Choose the Right Software Partners**: Select software vendors with expertise in RFID integration and a proven track record in the retail industry.
- **Prioritize Data Security and Privacy**: Implement robust data security measures and ensure compliance with relevant regulations to protect customer privacy.
- **Understand limitations**: RFID doesn't work in certain applications, with liquids and metals, for instance. Retailers need to accommodate their plans and expectation based on the realities of the technology.
- **Invest in Staff Training**: Provide comprehensive training programs to empower employees to leverage RFID technology effectively.
- **Create Process Workflow**: Give store associates the specific actions to take with the insights provided and maintain an audit and monitoring system to ensure compliance.
- **Continuously Evaluate and Improve**: Regularly assess the performance of RFID systems and software integration efforts and adjust as needed to optimize outcomes.



How Optimum Retailing can help

Optimum Retailing recently developed a way for retailers to use RFID technology to passively monitor the products on a fixture, in real-time, to make sure it matches the most up-to-date planogram. This is an innovative application of RFID technology that has never been used before.

Optimum Retailing uses RFID and AI to address specific needs for retail and brand customers with its Realgram tool. Realgram addresses the complex challenges of inventory management and merchandising compliance in retail, ensuring products are accurately placed and managed on a detailed level while leveraging RFID to continuously monitor and ensure the accuracy of product displays against store planograms over time. The tool also provides real-time feedback and automated compliance checks, significantly improving operational efficiency and reducing manual efforts in confirming marketing campaigns and inventory accuracy - meeting the specific, unmet needs in the retail sector post-pandemic.

Optimum Retailing is planning to expand its AI and RFID functionalities in the future, starting with moving into the Apparel and CPG sectors in 2024. Optimum Retailing is also planning to enhance our automated service offerings to optimize staffing, supply chain, inventory management, pricing and merchandising for retail operations. For RFID + AI, the company's goal is to transform store management into a dynamic, automated and personalized process to enhance consumer engagement and conversion rates.

About Optimum Retailing

Optimum Retailing (OR) is the scalable, cost-effective retail intelligence platform that multi-unit retailers with complex businesses use to gain the actionable insights needed for better per-store performance.

Using sophisticated AI-powered technology, we transform unmanageable amounts of data into valuable information that retailers use to gain a better understanding of their locations and optimize their store operations. We enable store-level teams to do more with less, resulting in a 20-30% reduction in non-selling hours while decreasing human error. We integrate into retailers existing software solutions to make them more powerful and give them greater capabilities. We enable HQ teams to share information with front-line workers, effectively manage retail assets, and better plan their marketing and merchandising efforts.

We make complex matters clear and simple. We collaborate with our partners to constantly improve our platform and adapt to ever-changing business environments. We regularly ask why things are the way they are and how things might be better.

We are committed to improving retail operations and enhancing in-store customer experiences.

And we're here to make your store operations smoother and more productive in 2024 and beyond.

Contact Optimum Retailing to discuss how RFID can improve retail and brand operations by supporting tens of thousands of stores and tracking millions of products with the ability to cross-reference what is on display against the planogram. Additionally, the capability to confirm that the products on display should indeed be on display extends the usefulness of Optimum Retailing solutions well into the future.

Optimumretailing.com