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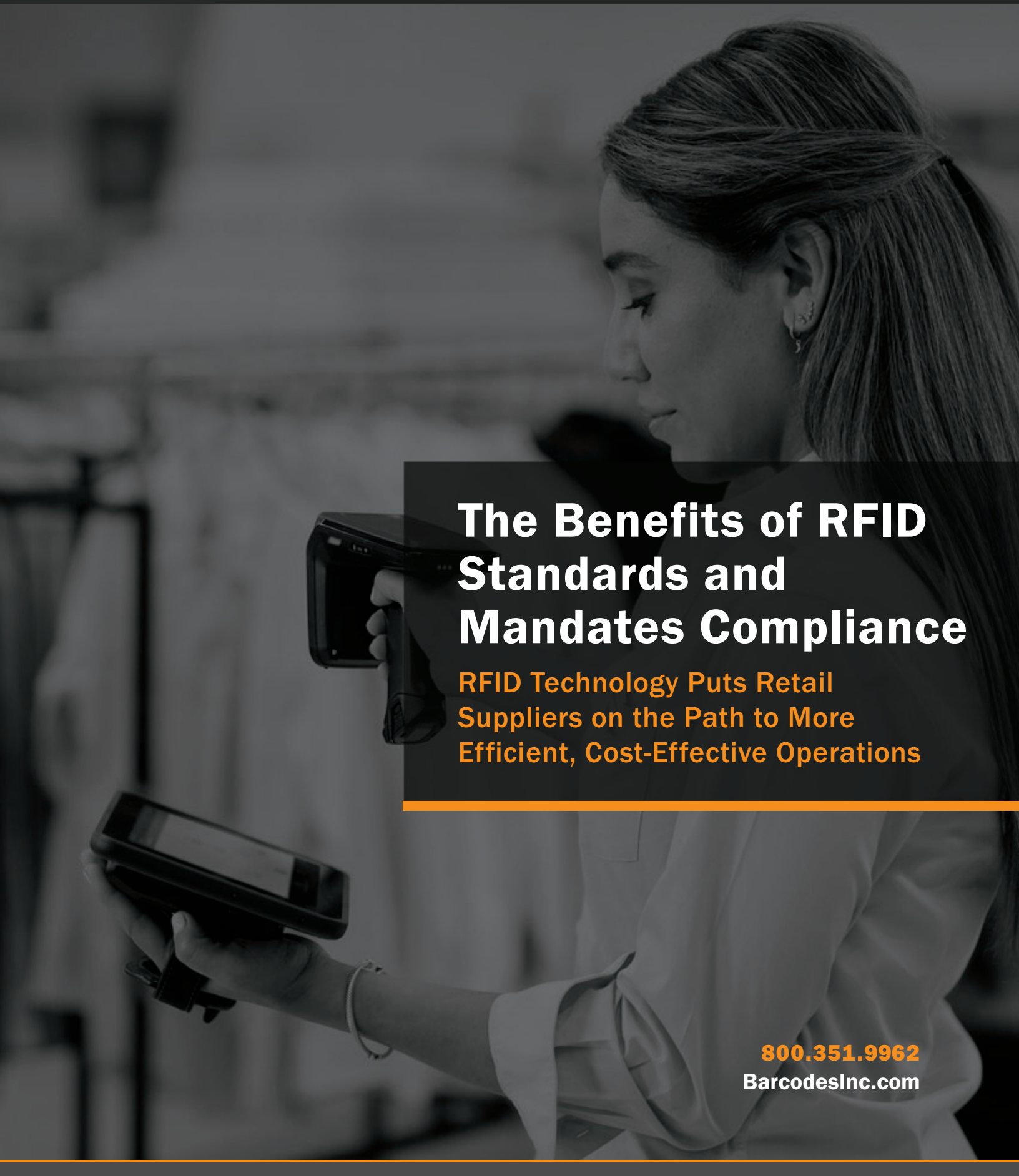

The Benefits of RFID Standards and Mandates Compliance

RFID Technology Puts Retail Suppliers on the Path to More Efficient, Cost-Effective Operations

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The retail supply chain is in the middle of one of the most significant transformations in its history. Retail enterprises like Walmart, which has embraced RFID technology, are on the leading edge of this change.

Walmart issued an updated playbook in 2023, requiring suppliers to comply with GS1 Electronic Product Code (EPC) Tag Data Standard (TDS) and the Auburn University RFID Lab ARC inlay standard. Merchandise for several store departments, including home, electronics, toys, sporting goods, and automotive, are in the scope of the new program, building on the store's playbook already in place for RFID tagging for apparel.

Walmart's mandate states that suppliers are responsible for ensuring all items delivered to its stores are accurately tagged in compliance with the RFID standards, and the retailer will hold them accountable for costs related to RFID errors in its stores.

Other retailers, including Macy's and Nordstrom's, also require RFID tagging to enhance processes from inventory management to loss control, and more are sure to follow suit. One reason is that the business case of RFID is much more apparent than in the past. Companies are ready to automate data collection with RFID now that the costs of RFID technology have decreased, enabling quicker ROI.

RFID adoption is poised for growth in light of the functionality this technology offers retailers and the more budget-friendly solutions available on the market. Research for Zebra's 15th Annual Global Shopper Study found that **95% of retailers** plan to deploy RFID technology by 2027.

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> [Zebra's 15th Annual Global Shopper Study, 2023]

Furthermore, Justin Patton, Director of the RFID Lab at Auburn University, predicts that all retail inventory will be serialized within the next decade, enabling item-level identification and tracking. Therefore, retail suppliers have little choice but to comply with RFID standards and mandates. However, implementing a solution merely for compliance will mean that retail suppliers are missing an opportunity to optimize their operations by addressing common pain points with RFID solutions.

An Analysis of Retail Supplier Challenges and RFID Solutions

A strategic approach to RFID implementation is to identify challenges within operations and consider how RFID technology can provide a way to overcome them.

The 2020s decade has exacerbated long-time issues for the supply chain; RFID technology offers solutions. Retail suppliers should ask which of these challenges they want RFID to solve:

Operating During a Labor Shortage

In April 2023, the U.S.Bureau of Labor Statistics reported 561,000 job openings in transportation, warehousing, and logistics, more than 25,000 more than in 2023. Furthermore, about **half of businesses** believe it will be just as hard in 2023 to find workers as in 2022. Additionally, with operations turning to temporary workers to fill vacant positions, they face the challenges of hiring employees who need extensive training and may not stay with the company.

> John Wirthlin, Industry Principal for Manufacturing, Transportation, and Logistics, comments, "Warehouse operators admit that finding and training workers in a timely manner remains a big challenge. As a result, over 8 in 10 decision makers agree they'll have to rely more on automation in the future."

With a labor shortage persisting while retail RFID mandates are handed down from retailers, many supplier operations are left with the question of how to comply. RFID technology offers the automation organizations need to accomplish more with fewer employees. The RFID tags that suppliers use to label inventory for their retail customers can also allow suppliers to replace manual data collection processes, capturing data more quickly and enabling employees to focus on other tasks. Additionally, an RFID reader doesn't require a line of sight and can read thousands of tags and labels at a long range per second, transforming processes that previously took hours or days to complete.

With labor representing 60-65% of an operation's budget, saving time with RFID can perform data collection more quickly and help control costs.

Achieving Inventory Accuracy

Using manual processes to manage inventory is difficult, particularly in a retail supplier's warehouse or distribution center that contains hundreds or thousands of SKUs in racks, bins, and bays. However, it's critical that operators find ways to increase inventory accuracy to provide production managers, supply chain leaders, and other decision-makers with accurate data, minimize phantom or obsolete inventory, and provide customers with an accurate account of what's available for shipment.

> **Warehouse inventory accuracy is about**
> **63%, on average**
> [Auburn University RFID Lab, 2021]

An often-cited study by Auburn University's RFID Lab reveals that warehouse inventory accuracy is about **63%**, on average. However, RFID technology can increase accuracy to 95%. By automatically collecting data and reading every tag or label, inventory is accounted for as it's stored, picked, packed, and shipped, with minimal chance of human error. This gain in efficiency can make a substantial impact on the organization. First, accurate inventory ensures that retailers can see that items are in stock and order them rather than walking away because the data shows them that the items are unavailable. Additionally, accurate inventory data prevents expedited shipping or split shipments when the items retailers ordered were incorrectly recorded as in stock.

Finally, retail suppliers must consider finances. Inventory accuracy is particularly crucial during periods of high inflation and high-interest rates, and accurate inventory allows a business to increase inventory turns and control the carrying costs of excess inventory. RFID technology offers a solution for purchasing with accurate real-time data so that they order only what's necessary.

Streamlining Shipment Verification

Mis-shipments are costly. If the products a warehouse manages are perishable, seasonal, or from product lines that are continually upgraded, making old models obsolete, a mis-shipment can lead to significant waste and losses. Mis-shipment costs also mount with return shipping, return processing, customer service resources' time, and, possibly, incentives to appease the retailer. In total, reshipping costs and expedited shipping **increase costs by 5x**.

> Reshipping costs and expedited shipping
> **increase costs by 5x**
> [Auburn University RFID Lab, 2019]

The organization may also be penalized with a chargeback, which can total as much as 20% of the invoice, which can amount to thousands of dollars of lost revenue per shipment. According To Auburn University RFID Lab data, chargebacks cost the industry $36 billion annually.

Unfortunately, organizations that rely on manual processes are more prone to encounter these costs due to human error. RFID minimizes that risk by automatically collecting data throughout shipping processes, confirming that the right items are in the shipment and the shipments are on the correct pallets. Furthermore, a well-designed RFID system can provide nearly a 99% read rate and share data with the warehouse management system (WMS) or other business applications so issues discovered with shipments can be corrected immediately.

The ability to decrease the number of mis-shipments and chargebacks alone is often enough to build a business case for RFID for most organizations.

Increasing Picking and Packing Efficiency

Warehouse and distribution center operations have traditionally raced to fulfill orders quickly and accurately. However, pressures mounted with the spike in e-commerce that began in 2020 and continues, signaling consumers' ongoing preference for this type of engagement. U.S. e-commerce sales totaled $500 billion in 2019 and could reach as much as $1.2 trillion by 2026. Furthermore, while demand increased, so did customer expectations. Two-day or same-day shipping has become the norm for many fulfillment centers.

For operations that ship directly to consumers in addition to filling brick-and-mortar retailers' orders, RFID technology can help keep pace with high accuracy. John Wirthlin, Industry Principal at Zebra Technologies, explains that when RFID is used as a part of a real-time location system, it can optimize order picking. "Instead of weaving through the aisles to find the items in an order, RTLS can provide the best pick route based on the items' locations and whether machinery or robotics are in use in the area." The result is faster, more accurate fulfillment and enhanced employee safety.

Additionally, inventory tagged with item-level details helps employees accurately pick the correct item, even with challenging lines like apparel with a complex matrix of sizes, styles, and colors. Data from the RFID Lab at Auburn shows apparel picking supported by RFID technology can be more than 99% accurate.

RFID technology is also a key component of solutions leveraging autonomous mobile robots (AMRs) for picking to decrease the labor demand for picking, which is typically **55% of warehouse labor allocation**.

"When you look at the synergies between Zebra and Fetch Robotics," says Melonee Wise, Zebra Technologies, "we're able to orchestrate all of the technologies as part of one solution and process. This means if you have the WMS give a command to the robot to pick up a cart, as the cart arrives at a pack-out station, the robot is asking a printer to print the labels, then the hand scanners or heads-up display that the person is wearing basically helps them unpack the cart and put the items in containers for pack-out or the next process."

"All of that orchestration helps to create a more trackable and traceable world that enables us to focus on where we're seeing loss as part of an end-to-end process and help improve the overall throughput of that process," Wise adds.

The ROI of Complying with RFID Standards

The benefits of complying with new industry RFID standards equal real ROI for operations. McKinsey & Company research shows that RFID technology:

- Improves inventory accuracy by 25%
- Increases full-price sell-through by 1% to 3.5%, increasing revenues
- Decreases labor hours related to inventory management by 10% to 15%
- Lowers shrinkage, which contributes to a revenue lift of 1.5%

Additionally, Accenture points out that organizations that use RFID in five or more use cases, aka “full adopters” of RFID, see as much as **20% higher ROI** than businesses that use it in fewer applications.

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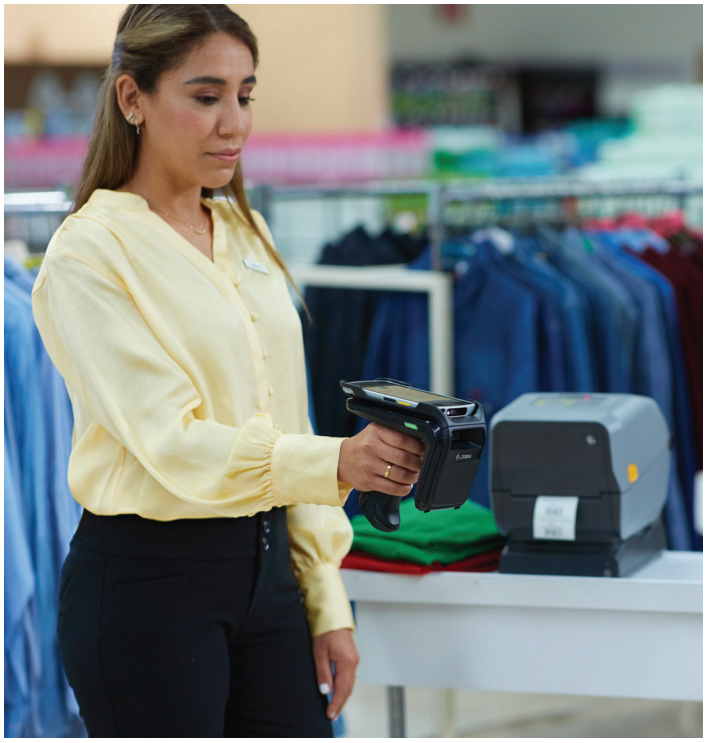
> [Accenture, 2021]



RFID Label Compliance and Approvals

A key factor retail suppliers must consider when implementing an RFID solution is whether it can meet retailers’ requirements, scale, and adapt to changes. For example, Walmart suppliers must deploy solutions enabling GS1 Electronic Product Code (EPC) Tag Data Standard (TDS) and Auburn University RFID Lab ARC Standards.

EPC TDS

This RFID standard creates unique identifiers for objects and specifies the data format for encoding the RFID label or tag. GS1 standards focus on UHF and HF passive tags, with emphasis on UHF technology.

Auburn RFID Lab ARC Standards

Retail Suppliers must also follow inlay standards for how the inlay (IC/chip with a dipole antenna) is embedded in the label or tag.

The retailer will also provide information on how to appropriately apply hanging tags and adhesive labels, whether an RFID label can be used with other tags, how to apply tags to packaging, and other requirements. Suppliers must refer to the retailer’s requirements for how to tag or label to comply and avoid chargebacks for inappropriate labeling.

Additionally, before shipping products to retailers with RFID tags, they must be approved. Walmart has selected the Auburn University RFID Lab approval. Once the lab has all the label or tag samples necessary, it will test the labels to ensure compliance.

The Future of RFID

Analysts predict that RFID adoption will continue to grow. Allied Market Research is looking for a **10.2% CAGR from 2022 to 2031** to result in a $31.5 billion market value, with the retail segment driving the most growth. However, innovation can drive that value even higher. “RFID solves pain points in the retail supply chain, but RFID technology can give organizations new capabilities,” Kent Landry, Director of Location Solutions Sales, North America at Zebra Technologies, points out. “For example, RFID can provide businesses with information before materials or products arrive at their facilities, providing greater visibility and efficiency to the entire supply chain.”

> **Allied Market Research is looking for a 10% CAGR from 2022 to 2031 with RFID adoption.**
>
> [Allied Market Research RFID Market Report, 2023]

Examples of current work to provide supply chain visibility include:

RAIN RFID

The RAIN RFID Alliance aims to standardize RFID technology to the GS1 UHF Gen2 protocol. The vision for the global standard is to automate data collection, even at the item level, as shipments travel through the supply chain, from manufacturer to logistics company to the distribution center and retailer.

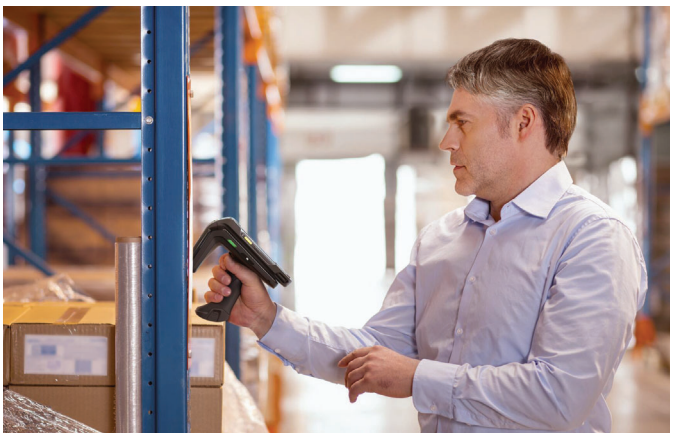
With all supply chain partners using the same standard, each can leverage RFID’s read/write capabilities to capture and update data, creating a complete chain of custody. This data can provide consumers with, for example, information on materials sourcing or a true farm-to-fork story that answers their questions about sustainability, social responsibility, and product authenticity.

RAIN RFID enables real-time tracking as materials and products move through the supply chain, giving supply chain partners information on shipment location, temperature, humidity, or other conditions. Currently, that visibility is lacking. A 2021 McKinsey & Company study found that only **2 percent** of companies have visibility into their supply base beyond the second tier. Only 21 percent have visibility beyond tier 1, and 11 percent have no visibility.

> **Only 2% of companies have visibility into their supply chain base beyond the second tier.**
>
> [McKinsey & Company Study, 2021]

Rich Nemesi, General Manager of Smart Label Solutions (SLS), says, “RAIN RFID can provide the supply chain visibility retail suppliers need so they can coordinate production with material shipments, accurately estimate product shipment dates, and proactively address issues that can throw schedules off track.”

“It’s a way to create an efficient, visible supply chain that improves operations for all partners,” Nemesi comments.



RFID and Blockchain

An Auburn University Chain Integration Project white paper details a proof of concept of a blockchain system that leverages RFID for data collection. The system ensures product authenticity, improves ASN accuracy, and shares data with supply chain partners.

The solution studied in the PoC standardizes data streams and then routes data to the system's blockchain. Its distributed ledger maintains an immutable record of transactions, eliminates paperwork between supply chain partners, and ensures that each partner has accurate, real-time, serialized information. It also enables a detailed story of each product as it passes through the supply chain, ensuring authenticity and providing the transparency consumers demand.

Do More than Comply

Although retail suppliers must comply with retail RFID mandates to continue to do business, there's no reason to limit RFID technology's functionality to that one purpose. A smarter approach is to identify how RFID can improve operations and build an ecosystem of partners that can help its operation get optimal value from the solution.

Suppliers should view RFID standards mandates as an opportunity to automate, increase efficiency and accuracy, and overcome pain points such as labor shortage issues and chargebacks once and for all. It's also an opportunity to lay the groundwork for tech advancements, giving the supplier more agility in the future.

A strategic approach will turn RFID standards compliance into enormous gains for suppliers.

Let's Do This Together

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- Fastest response time
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