GS1 US

The Global Language of Business

EPC/RFID Data Exchange Study

Project Zipper Executive Summary

AUBURN UNIVERSITY

RFID LAB

Auburn University's RFID Lab and GS1 US® examined the flow of product information between the brands and retailers for over a one-year period between June 2017 and July 2018. The EPC®-enabled Item Level RFID Supply Chain Brand/Retailer Data Exchange Study, dubbed "Project Zipper (Phase 1)," took a hands-on investigatory approach to analyzing and evaluating the benefits of brand owners and retailers using Electronic Product Code (EPC)-enabled Radio Frequency Identification (RFID) technology to tag and track item-level inventory from source to fulfillment.

Simply put, the teams compared data capture via barcode scans to data capture via RFID tags in the supply chain to validate ship and receive accuracy.

This use case highlights study parameters, provides high-level insights, and summarizes return on investment results.

Study Summary

The study's purpose was to survey the effectiveness and business value of item level RFID-tagged items as they travel through the supply chain, from point of manufacturer, to a brand owner's distribution center, and through to a retailer's fulfillment center.

During the one-year study, Auburn University's RFID Lab team examined the data obtained from eight brand owners and five retailers. It looked at barcode scans at the brand owners' distribution centers, and barcode data at the retailers' distribution centers, and compared that data to the data captured via RFID tags.

The study found that:

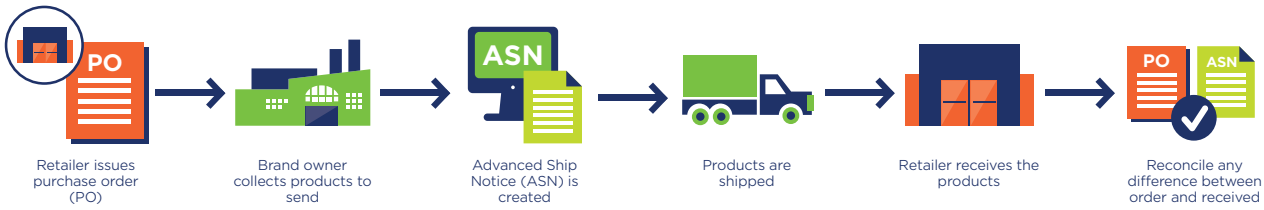
- Brand owners and retailers who used RFID technology to optimize inventory management and reconcile product shipments were capable of achieving 99.9 percent order accuracy.[1]
- Retailers who do not validate 100 percent of inbound shipments are susceptible to greater inventory inaccuracy.[1]
- When RFID was not implemented, 69 percent of inbound orders (shipped from brands and received by their retailer partners) contained errors. These errors were revealed in picking, shipping, and receiving, resulting in inventory inaccuracies and potential costly chargebacks from the retailers to the brand owners.[1]
- Brands and retailers who attempt process error "workarounds," often create additional errors and costs.[1]

1. Auburn University RFID Lab Studies, Project Zipper (Phase 1), retrieved from https://RFID.auburn.edu

> **"This study should cause retail industry stakeholders to consider the immediate positive impact item level RFID can have on supply chain efficiency—as the study uncovers some fundamental flaws in legacy ASN accuracy. Retailers and brands have a tremendous opportunity to eliminate errors, as the lack of inventory accuracy is a preventable problem that can be solved with greater automation through RFID."**
>
> **Justin Patton** *Director, Auburn University RFID Lab*

Case-level scanning at a brand owner's distribution center via a conveyor RFID tunnel.
Photo courtesy of Zebra Technologies

Historic Flow of Information in the Retail Sector



Tracking Inventory, the Retail Sector's History

Since the advent of the barcode in the 1970s, the flow of information and goods between brand owners and retailers has been relatively consistent:

- A purchase order (PO) is issued from the retailer.
- The brand owner collects the products to be sent to the retailer.
- An advanced shipping notice (ASN) is created.
- The products are shipped.
- The retailer receives the products and compares the received items to the Purchase Order (PO).
- Any difference between order and what is received is reconciled.

The process is straightforward and understood. Yet, one thing not immediately obvious is the inherent error that creeps into the process at various stages. According to Patton, "Industry as a whole has taken a blind eye to the error and built workarounds or tolerances into their systems and planning to 'accept the error' when it is even acknowledged at all."

In today's omni-channel retail world, which demands high stock keeping unit (SKU)-level inventory accuracy, the errors created in these supply chain processes ultimately negatively impact a retailer's ability to accurately deliver products to the consumer in a timely manner. Which could result in a disappointed customer due to a poor customer experience or unavailable product.

Study Findings

The study examined and compared items tagged with both a U.P.C. (Universal Product Code) barcode and an EPC/RFID tag. The U.P.C. data (collected via barcode scans) and EPC data (collected via RFID scanners) was gathered at the brand owners' distribution centers (DCs) and at the retailers' DCs/fulfillment centers, and then compared. The study also captured inventory data via ASN.

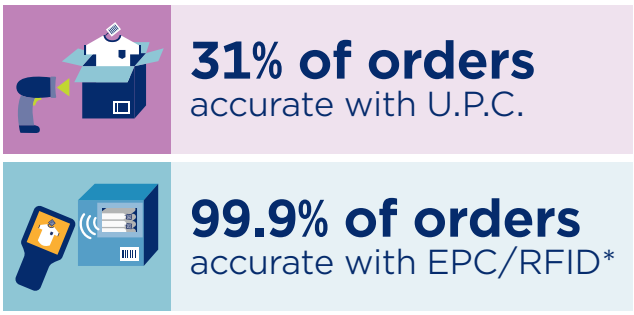
The results were surprising.

> **We assumed given the longevity of use and the stability of the U.P.C. ASN process, that errors would be few. On the contrary, using U.P.C. data—currently the primary form of data capture and sharing—almost 70 percent of the orders contained an error somewhere in the process."**
>
> **Justin Patton** *Director, Auburn University RFID Lab*

These errors were revealed in picking, shipping, and receiving, resulting in inventory inaccuracies, at best, and claims (i.e., chargebacks) from the retailers to the brand owners, at worst.

Conversely, for those brand owners who use EPC/RFID to capture information and reconcile shipments, order accuracy was more than 99.9 percent.

Over 3x Order Accuracy Improvement With EPC/RFID



*99.9% accuracy occurs when vendors reconcile orders

> **In fact, we found that only one order had an error of a single item. During this study, those using RFID and reconciling any errors they noted, saw retailer claims completely eliminated. This study, using real world source-to-consumer fulfillment, clearly demonstrated that RFID eliminates the data errors in the supply chain process, ensuring the accurate flow of information and products."**
>
> **Justin Patton** *Director, Auburn University RFID Lab*

RFID in Retail

In 2004, the retail sector began discussing the addition of RFID labels to its supply chain and brick-and-mortar stores. And in late 2008, several leading retailers and their trading partners began rolling out and testing item level RFID. Since then RFID has been transforming global commerce.

Today, leading retailers are embracing the new constant state of change with innovative ideas to win over digitally-savvy consumers. These consumers are using a smartphone to pinpoint the exact aisle where an item is located even before they step through the retailer's door. They can buy online and pick up in store, or instead have their purchases shipped to their home. They can search for an item from a dressing room mirror or consult with a mobile device-armed sales associate who can expertly suggest different sizes, colors, or add-on items.

EPC-enabled item level RFID is the critical technology underpinning these digital and physical experiences in retail today. Item level RFID tagging can help retail operations run smoother, faster, and with more agility. Retailers are maximizing the benefits of item level RFID to generate new levels of customer satisfaction. In addition, major retailers are attributing cost savings and increased sales to RFID technology; the numbers simply don't lie (see below).

From display audit compliance, to multi-location customer order fulfillment flexibility, to improved replenishment execution—these use cases have shown the tangible results of item level RFID technology, proving its value in improving item-level inventory accuracy and availability.

We share a common goal with our retailer partners—we all want to focus on what the consumer needs and we need our data to match in order to achieve that. This study gave us solid evidence that we can serve consumers faster and more accurately using RFID."

Bryan Epner *Domestic Operations Manager, SwimUSA*

Raises inventory accuracy from an average of **63% to 95%**[2]

Reduces retail out-of-stocks (OOS) by up to **50%**[2]

Cuts cycle count times by **96%**[2]

2. Auburn University RFID Lab Studies, retrieved from https://RFID.auburn.edu

Brand Owner Value

Inventory Intelligence and Improved Operations

The benefits of using RFID in the upstream supply chain have received far less publicity than those benefits at the retail store level. As more brand owners install RFID read tunnels and audit stations, the value of RFID is being shared more regularly. Brand owners have cited receiving, pick/pack, and shipping accuracy as the core business case for supplier-side RFID. For them, RFID solutions are:

- Proving their value in helping reduce operating expenses and improve margins.
- Streamlining the pack-out process and reducing inventory errors with instantaneous counting.
- Reducing labor costs, handling errors, and improving productivity via automation of current manual inventory tracking tasks.
- Lowering required inventory levels, increasing working capital savings, and lowering associated carry-cost expenses by optimizing inventory levels and reducing safety stock.
- Reducing obsolete inventory write-downs through better planning and visibility.
- Improving production asset visibility, helping to track inventory locations, and reducing maintenance issues.
- Reducing claims and returns by assuring the right goods are sent where they should be.
- Enabling better audit and asset control, lowering inventory shrinkage as well as helping to eliminate losses and theft by keeping better track of goods.

Data reconciliation issues, manual processes, mispicks—all of these challenges slow down the supply chain and can be improved, even eliminated, with the use of item level RFID. Our customers are demanding excellence and RFID will help us truly evolve to meet the needs of the omni-consumer."

Chris Clark *CIO, Levi's*

Tagging at the source helps retailers and suppliers drive true inventory accuracy and visibility to meet the consumer omni-channel promise."

Richard Haig *CTO and CIO, Herman Kay*

Retailer Value

Inventory Intelligence and Consumer Satisfaction

Item level RFID is driving visibility and efficiency as well as playing a critical role in helping retailers create a seamless omni-channel customer experience. RFID-enabled systems help retailers:

- Achieve unprecedented levels of inventory accuracy, which helps retailers with "last item" sales opportunities, fewer markdowns, and customer loyalty (sales associates never have to say, "I don't know if we have it.")
- Decrease out-of-stocks and even eliminate the need for safety stocks or over-ordering of inventory to meet demand.
- Improve loss detection with increased visibility and knowing exactly what is on hand and what has been sold.
- Expedite the costly returns process by being able to trace products at the item level.

Inbound RFID scanning at a retailer's distribution center.

Participants and Products

The study included volunteer participation from eight (8) retail brand owners and five (5) retailers. They were selected for the study based on their interest in EPC data exchange. It is important to note that not all participating brands had a trading relationship with all of the participating retailers. Those that did were considered a "partner pair." Some participants only had a single partner in the study.

The study included a total of 11 partner pairs.

As part of the study parameters, each brand owner and retailer had to RFID enable at least one DC for data capture. In general, brand owners have fewer U.S.-based distribution centers than their retail trading partners do. The RFID-enabled brand owner and retailer DCs were chosen based on their geographic alignment to optimize EPC data capture between retailer and brand owner.

Most of the products chosen for this study were apparel products that were already EPC tagged at the source to support current industry EPC/RFID programs; as a result, temporary tagging solutions were not required.

Conclusion

Phase 1 of the study, conducted between June 2017 and July 2018, found that calculating return on investment is a much simpler process than previous EPC implementations in retail sales environments. The equation is simply the cost of RFID tags plus RFID scanning equipment directly compared to the cost of claims for the shipments of that DC. According to the study, a proper RFID reconciliation process will eliminate the claims cost.

$ RFID tags + $ RFID Scanning Equipment ≤ $ claims for shipments for DC

EPC-enabled item level RFID has been proven to provide many benefits to retailers, brand owners, logistics suppliers, and other supply chain trading partners. It can be used to automate process, record item location, identify objects, and provide increased network-wide inventory visibility and accuracy.

RFID's ability to read tags, without direct line of sight, provides countless advantages over barcodes and allows retailers and brands to extract benefits proven by research and real-world deployments. It helps ensure that the right goods are available, in the right place, at the right time improving the efficiency, precision, and reliability of the whole supply chain.

The study identified several areas of opportunity where using EPC/RFID data in retail operations would improve the accuracy of supply chain shipment data.

A Look Forward

The research conducted by Auburn University's RFID Lab did not end with the conclusion of Phase 1. The team has added more retailers and brands for Phase 2. Data is currently being collected to update the findings of the study regarding order shipment accuracy. Finally, additional use cases for traceability, authenticity, and data exchange will also be investigated in the Phase 2 report expected to be released in 2019.

Read the full Project Zipper study at

www.gs1us.org/ProjectZipper

Warehouse and conveyor automation enabled with RFID.

About Auburn University's RFID Lab

Thanks to funding provided in part by GS1 US, researchers at the Auburn University RFID Research Center Lab are studying the benefits of using EPC-enabled RFID technology in the apparel industry. Researchers are quantifying the effects of EPC-based tracking on improving inventory accuracy, traceability, productivity, costs, and revenues. Access Auburn University's library of research papers at https://rfid.auburn.edu to learn the benefits of leveraging RFID to enable the omni-channel consumer experience.

AUBURN UNIVERSITY RFID LAB

About GS1 US

GS1 US®, a member of GS1® global, is a not-for-profit information standards organization that facilitates industry collaboration to help improve supply chain visibility and efficiency through the use of GS1 Standards, the most widely-used supply chain standards system in the world. Nearly 300,000 businesses in 25 industries rely on GS1 US for trading partner collaboration that optimizes their supply chains, drives cost performance and revenue growth while also enabling regulatory compliance. They achieve these benefits through solutions based on GS1 global unique numbering and identification systems, barcodes, Electronic Product Code-based RFID, data synchronization, and electronic information exchange. GS1 US also manages the United Nations Standard Products and Services Code® (UNSPSC®). www.gs1us.org

About the GS1 US Apparel and General Merchandise Initiative

The GS1 US Apparel and General Merchandise Initiative is a retail industry group that is committed to defining business challenges and opportunities, and organizing members to explore solutions and create adoption plans. More than 100 suppliers, distributors, retailers, and logistics providers are participating members in Initiative activities focused on improving inventory accuracy, exchanging standardized product data, and achieving traceability with GS1 Standards. More information about the GS1 US Apparel and General Merchandise Initiative is available at www.gs1us.org/ApparelGM.

In this publication, the letters "U.P.C." are used solely as an abbreviation for the "Universal Product Code," which is a product identification system. They do not refer to the UPC, which is a federally registered certification mark of the International Association of Plumbing and Mechanical Officials (IAPMO) to certify compliance with a Uniform Plumbing Code as authorized by IAPMO.

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