RFID

IN THE SUPPLY CHAIN TODAY

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Logistics Management

Suppose you are not already using radio-frequency identification (RFID) in your supply chain. In that case, you are missing out on the opportunity to ramp up data collection speed, improve efficiencies in today's fast-paced fulfillment environment, and ultimately reduce costs while increasing profit margins.

Many warehouses and distribution centers (DC) are still using barcode technology, handheld scanners, manual systems, or a combination of these. This is where RFID steps in to help with process complexity, data accuracy, and other key performance indicators (KPIs) that have become table stakes for every part of the supply chain.

Paul Weslake, Manager Product Management at SATO America, states that "Companies that are using RFID are gaining a significant edge on competitors that are still using older technologies in their fulfillment centers," adding that those companies are improving supply chain visibility and fulfillment accuracy while also speeding up their picking, packing, and shipping processes.

This white paper explores RFID benefits and ROI in the supply chain, but first, let's review the basics of this technology.

RADIO-FREQUENCY IDENTIFICATION (RFID) 101

RFID is a technology whereby digital data encoded in tags or smart labels is captured by a reader (interrogator) via wireless and converted into usable data. Smart labels differ from tags in that they incorporate both RFID and barcode technology and are usually made of an adhesive label embedded with an RFID tag inlay.

When a tag/label passes through the field covered by a reader or is within the reader's range, stored information is transmitted to the reader and converted into usable data via decoding software. RFID tags/labels can come in two forms: passive or active.

Passive RFID tags and labels are comprised of an integrated circuit/chip and an antenna (transponder). The chip stores data and is attached to the antenna, whose purpose is to send and receive radio-frequency waves to and from the reader (interrogator). The tag's performance is dependent on the size and location of the antenna.

The I.C. and the antenna are embedded in a protective medium or substrate that holds them together, which is commonly mylar or plastic film. The tags can be read as they pass through or are within the reader's range. Passive tags are the most widely used, being smaller, less expensive, and having a longer life expectancy. Active tags/labels also have the elements mentioned above, but their chips are usually larger in size and have greater capabilities than the passive chips. Additionally, active tags have two additional components: a built-in power supply (battery or solar) and the option to include onboard electronics.

The power supply enables them to transmit data at all times, while onboard electronics provide additional functionalities that allow active tags to be used in a wider range of applications. For example, an RFID tag equipped with a temperature sensor can track changes in temperature and exposure that might affect a perishable product during transit.

In addition, active tags can be read from distances of 100 feet or more and broadcast through barriers like metal. In contrast, passive tags can only be read from up to about 20 feet and have barrier limitations. Finally, since active tags are costlier, they are often used to secure higher-value items.

“RFID takes Auto-ID technology to the next level by allowing many tags to be read simultaneously without a line of sight and having a wide read range of coverage, while constantly and accurately providing data to measure performance and inventory,” Weslake explains. He adds that “RFID can be implemented while retaining current barcode and “human readable” systems that are already in place in the warehouse to meet their customers’ RFID mandates while also meeting ongoing barcoding requirements.”

BENEFITS

RFID has a significant impact on the supply chain when it comes to inventory, warehouse management, and the retail sector, enhancing visibility right from the point of manufacturing, via the supply chain, from the back room to the floor, and ultimately to the exit door. In addition, having clear KPIs and tracking the performance of RFID helps companies uncover performance improvement opportunities at every level of the supply chain.

At inventory level, RFID scanners can scan numerous items simultaneously in a wide area; therefore, speeding up the inventory management process while reducing human errors and rendering highly accurate inventory records. For example, materials can be offloaded onto a truck, pass through a reader, and be received into inventory in a matter of seconds. Logistically, RFID tracking can capture errors at the carton level before assembling pallets and shipping, and help locate individual products, lost products faster.

At the warehouse level, RFID supports speed, accuracy, and automation of essential tasks which take place during receiving and shipping processes and ensures the identification of products instantly. The constant flow of information derived from RFID readings leverages data that can provide additional insights to help reduce operational costs and improve upon customer satisfaction.

In addition, companies can replace the point-and-read, labor-intensive process of locating pallets, cases, cartons, and individual products, like sensors, which can track these items as they move from various vital locations without a direct line of sight.

Productivity improvements can be significant, delivering realized labor costs reductions of 7.5% or more in warehouse applications and 5% to 40% in regional distribution centers. For example, as cited in an article appearing in World Trade Magazine ("RFID: Taking Stock of the Wal-Mart Pilot," by N. Shister), Wal-Mart experienced a dramatic reduction of pallet-build, going from 90 seconds to 11 seconds, a reduction of almost 90%.

At the retail level, RFID increases the product visibility in the retail inventory that helps in re-stocking, e-commerce fulfillment, and customer experience. It also plays an integral part in dynamic pricing, theft reduction, counterfeiting, and employee tracking. For retail stores, this means having constant and reliable up-to-date information on stock availability to fulfill in-store purchases or online orders.

Weslake points out that "Consumers also want to be able to track their orders/products in real-time as they move through the supply chain. As this trend becomes less of a luxury and more of a mandate, companies will have to implement RFID or risk falling behind their competitors."

THE ROI

When Walmart requested RFID to be implemented by their suppliers back in 2004, the industry was not ready to adopt the technology for lack of more insight and its prohibitive cost; since then, the price has gone down immensely to 0.5 cents for passive tags and up to $15 for active ones.

The technology has also been improving and now allows for current systems to integrate with the RFID technology. Weslake pointed out that "The beauty of RFID is that it allows companies to control their supply chains without having to construct new buildings and invest millions of dollars in automation."

RFID is proving to bring a substantial return on investment (ROI) in a short amount of time. Although RFID implementations are not without costs and risks, typical companies in manufacturing, warehousing/ distribution, and retail have achieved a 200% ROI. This means that for every dollar invested in RFID, companies are getting $2 back in benefits.

Many case studies and research have concluded that the high ROI and relatively short payback periods allow the fuel to move forward with RFID. For example, a 2018 study from GS1 and the RFID Lab at Auburn University (Project Zipper) reported that RFID technology raises inventory accuracy from an average of 63% to 95% and reduces retail out-of-stocks by up to 50%. Furthermore, it found that RFID technology can help reach 100% order accuracy and could therefore eliminate claims costs in the supply chain, justifying the cost of the technology.

In a 2020 case study presented by Confidex, RFID is said to have proved cost-efficient in fostering lean operations and smart automation that yielded a return of 99.6%. In addition, a decade-old report by Motorola about RFID in the supply chain already showcased robust statistics on ROI in warehouse and distribution productivity-increasing up to 40%, and inventory and shrinkage reducing by 18%.

Other findings show that RFID is capable of achieving:

- Reduced out-of-stocks by up to 80%
- Reduced labor costs by as much as 30%
- Reduced inventory carrying costs by up to 59%

WHAT'S DIFFERENT IN 2021?

A 2020 survey by the Institute of Supply Management found that three in every four U.S. businesses reported supply chain disruptions due to the COVID-19 pandemic, evidencing the importance of contactless and automated technologies to protect workers and consumers. RFID is the solution to automate processes and data collection that reduces the risk of employees putting themselves in harm's way to collect data, remaining compliant with social distancing regulations, and doing so by decreasing the density of workers on the floor.

As supply chains operate at unprecedented levels, RFID prices are coming down, and technology being more accessible, companies are turning to RFID, real-time location systems (RTLS), the Internet of Things (IoT), artificial intelligence (A.I.), blockchain, and other advanced technologies for help. Working together, these applications are driving new levels of supply chain innovation across the manufacturing, distribution, and retail segments.

Managing supply chain logistics with a knowledgeable partner and provider of RFID solutions is key to leveraging the current playing field and overcoming future crises. An RFID provider must offer hardware, software, and support and the ability to integrate emerging technologies, adapt to changes quickly, and customize solutions to fit client needs. In the current business landscape, it is also important to partner with a company with a global presence and deliver its solutions anywhere in the world.

GAINING AN EDGE WITH SATO

A well-known American multinational computer technology company is just one of many companies leveraging SATO's RFID solution, including printers and encoders, software, reading devices, training, and support.

The computer company subcontracts with a third party to handle the return and repair of its products via centralized distribution centers (CDCs) at a global scale. Wanting to reduce chargeback costs and automate a highly manual process, the company invested in SATO's CL4NX RFID printers and RFID labels to be implemented in the labor-intensive processes and to keep each player apprised of serviced parts order statuses.

Today, the solution provides a real-time inventory system that helps the computer giant track the service process for its equipment while also reducing the incidence of lost/misplaced equipment within that supply chain.

DON'T GET LEFT BEHIND

The COVID-19 exposed several weaknesses within supply chain strategies yet provided an opportunity for companies to evaluate current supply chain performance and rehaul their processes to become more sustainable. That's why companies are looking closely at what RFID can do for them in terms of capacity, capabilities, safety, and adaptability to unforeseen and rapidly evolving challenges.

In addition, with 40% of the world's brands now selling direct to consumers, and with these direct-to-consumer sales projected to reach $130 billion by 2025, companies are being asked to implement technologies that they had not previously considered. In turn, RFID benefits are maximized when the technology is adopted at different points within the supply chain, resulting in more complete data for analysis and cost reduction across the entire supply chain ecosystem.

In the near future, Weslake predicts that RFID will separate the better-managed companies from those struggling to keep up with modern-day demands around fulfillment and asset-tracking. "That makes RFID the new competitive advantage for supply chain improvements; this is all coming together to create a perfect storm for greater RFID adoption," he concludes.

ABOUT SATO

SATO is a global provider of auto-identification solutions, aiming to provide everything its own I.D., so it connects with the world. Allowing for a connected world of productivity that starts where you are.,because we are powered on site.

With offices worldwide, we have accrued the expertise to serve markets and their needs, making us experts in our field. For more information on SATO America, visit **www.satoamerica.com**

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