# "What is the ROI of RFID?"

## Smart Label Solutions, Inc.

**White Paper**

# SMART LABEL
SOLUTIONS

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## What is RFID?

Radio Frequency Identification (RFID) is a method using tags or transponders to enable automatic, remote identification of objects that have been "tagged" with RFID transponders. RFID tags are like little transponders that send out information to a reader, or "interrogator." An RFID tag contains a silicon chip and an antenna to enable it to receive and respond to radio-frequency queries from an RFID transceiver. The tags are small and can easily be attached to or incorporated into a product, animal, or person. Active RFID tags have tiny batteries in them, while passive tags must usually be "awakened" by a tag reader in order to send information. Active tags can store and send more data and at greater distances than passive versions.

## Applications & Benefits

RFID tags are often seen as a replacement for barcodes, with significant advantages over barcode technology. The data capacity of an RFID tag is big enough to allow each tag to have its own unique code. Current bar codes are limited to a single type code for all instances of a particular product. With an RFID tag a product can be individually tracked as it moves from location to location through a process, or through the supply chain.

**RFID capabilities**

- Since the RFID tag is a transponder, the scanners do not require line of sight access to the tag as opposed to a laser scanner trying to read a bar code. This makes it very easy to read RFID tags on items that are difficult to reach such as cartons on a pallet.
- RFID smart labels can be read and written to through dirt, paint, and many nonmetallic objects.
- RFID tags can withstand harsh environments.
- Tags can be read simultaneously, even through containers and packaging — for example, multiple individual items within one box.

- The RFID readers allow for automatic, unattended scanning. With scanning ranges between 4 inches and 10 feet, boxes on a moving conveyor belt can each be identified individually.

- The RFID chip can hold a large amount of data as well as monitor the movement of the tagged object — acquiring and delivering new information along the way like a traveling database. Greater storage capacity, combined with update flexibility, make smart labels ideal for applications such as product tracking through the supply chain, baggage tracking, or asset tracking.

RFID smart tags can be found in many applications across a wide range of industries.

In the consumer goods and retail industry, RFID technology can provide information about location and condition of an item throughout the entire supply chain, from manufacturing to distribution, all the way to the customer's shopping cart going through the checkout lane. Information gleaned from the tags can alert retailers to potential stock outs of popular items in time to do something about the situation, validate the authenticity of received goods, and allow retailers to know exactly where goods are in every step of the production and shipping process.

Museums are using RFID tags to guard and track art. Pet owners can have their pets tagged to help identification in case of loss. Attendees at large sports events or concerts can be tagged to prevent security breaches. Keyless car entry, the ExxonMobil SpeedPass and the E-ZPass tollbooth sticker all use RFID technology.

Many hospitals are experimenting with RFID tags in patient bracelets. In addition to storing important medical information, these tags can help track patients as they work their way through the hospital. Doctors and nurses could also be tagged for rapid and easy location in case of an emergency.

Car dealers are using RFID to manage the inventory of cars on their lots. The tags will alert managers whenever a car enters or leaves the lot and when a particular model is in short supply.

Law firms, libraries, and research centers are using RFID tags to track the movement of documents, files, and books, especially sensitive material with restricted access.

RFID tags can be used to safeguard against counterfeit products in the pharmaceutical industry or high-end fashion and consumer goods.

## The RFID Mandates

Wal-Mart and the US Department of Defense have published requirements that their vendors place RFID tags on all shipments to improve supply chain management.  These mandates affect thousands of companies worldwide.  Wal-Mart has required its Top 100 suppliers to apply RFID labels to all shipments to its warehouses by January 2005.  By the end of 2006 all Wal-Mart suppliers are expected to be using RFID tags on pallets and cases (RFID Journal, 8/2003).

Similarly, Target, the fourth largest retailer in the United States, has told its top suppliers that they will be required to apply RFID tags on pallets and cases sent to "select" regional distribution facilities beginning late Spring 2005.  The company wants all of its suppliers to tag pallets and cases by the Spring of 2007 (RFID Journal, 2/2004).

## What is the ROI of RFID?

Major manufacturers, particularly in the consumer-goods market, face intense pressure from Wal-Mart, Target, Albertson's, and others to get on the RFID bandwagon.  But for many other companies, it's more of a chicken-or-egg game: manufacturers are waiting to see how many retailers install RFID-reading equipment before they invest heavily in RFID tags, while retailers are holding off on such investments until enough of their suppliers start shipping tagged goods. (CFO Magazine, March 2005)

Many major consumer packaged goods manufacturers do not foresee any quick Return-on-Investment (ROI) from adding RFID tags to their packaging and distribution systems.  Instead, they see it as the cost of doing business with major customers such as Wal-Mart and the U.S. Department of Defense, which mandated the use of RFID tags by January 2005.

Consumer goods manufacturer Kimberly-Clark Corp. sees RFID as an investment needed to meet supplier requirements.  Similarly, Procter & Gamble is still trying to figure out the "value proposition" of RFID and the Campbell Soup Company views the incorporation of the technology as "tactical in nature" to meet the requirements of major customers such as Wal-Mart. (Computer World, March 2004).

The Return-On-Investment for RFID may be longer than some users and early adopters are prepared to wait.  The ARC Advisory Group found that 95% of companies surveyed expect a positive ROI for RFID to be more than two years out and that "more efficient warehouse receiving and better management of inbound materials may have to wait until companies have been able to

negotiate with their upstream suppliers to engage in more RFID tagging." ARC interviewed 24 companies actively investing in electronic product code RFID. Respondents found that even at 20¢ a tag, a company that ships 50 million cases a year will incur a $10 million cost. And it's likely to incur another $1 million in expenses to prepare the infrastructure for RFID. In addition, the labor content of warehouse processes is likely to increase, adding perhaps another $500,000 in operating costs. (Purchasing Magazine Online, 12/2004)

Getting the most out of your RFID investment requires not only a commitment to the technology but a vision to use RFID for collecting business information. To realize ROI from RFID, companies need to see this technology as a way to collect valuable business intelligence that can help increase profits and reduce costs. Before companies start tagging anything, they should first consider their business goals and how information obtained from RFID could help them achieve these goals. A systematic approach is needed for a successful RFID deployment:

- Which problems can RFID solve?
- Which business processes can be improved or enhanced with location identification?

After these questions have been addressed, the available technology can be evaluated, and vendors selected. We recommend first deploying a small, focused pilot program within the company to address one or two goals. When planning an RFID deployment, businesses should also ensure that their computing infrastructure can support the deployment. RFID can produce a tremendous amount of data that can quickly become a burden on a company's computing infrastructure. Companies need to have robust and reliable back-end systems capable of collecting, filtering, and processing these large quantities of data.

In order to get a real Return-On-Investment on RFID, the collected data should be coming from multiple sources — upstream and downstream. Manufacturers who only use RFID as a high-tech replacement for bar codes will only see limited benefits. Efficient deployment of RFID technology requires that all supply chain partners — suppliers, manufacturers, and distributors — look at RFID as an enabler of doing business differently, and to solve key customer issues or gain a competitive differentiator.

In order to assess the value of implementing the Return-on-Investment, an organization needs to consider not just the cost of the RFID tags, tagging its products, developing an RFID infrastructure, and so on. It is tantamount to assess the benefits that RFID technology can bring. What is the value of better information about the location of products, the product flow, the condition of a perishable product, customer buying behavior? What is the value of being able to

control or prevent counterfeiting or reselling of product?  How can this knowledge be utilized by a company to differentiate itself from the competition, provide a better, safer product or service to its customers, and, as a result, increase its pricing power?

Kimberly-Clark Corp., a pioneer in RFID, has dedicated an extensive 5,000-square-foot R&D facility to studying the benefits of RFID and for equipment.  According to Kimberly-Clark the recent ratification of a new global protocol for RFID chips should allow more manufacturers to enter into the chip business, and this will drastically bring chip costs down during the next couple of years.  However, they feel that investments in "class-one," or existing RFID technology, will not be in vain.  The readers and the software are all upgradeable and will work in the next-generation product.  None of the existing technology needs to be scrapped.  Assuming that chip costs drop, manufacturers of small goods such as toothpaste and bar soap should be able to place RFID chips into product packaging instead of just on pallets and shipping containers.  This, combined with an investment on the retail side in RFID readers that can be used to create "smart shelves," will allow a product to be truly tracked from the factory straight to the store shelf and checkout line. (CFO Magazine, March 2005)

While its suppliers are trying to determine a Return-On-Investment, Wal-Mart is already seeing the benefits.  In January 2006 Wal-Mart reported a 16% reduction in out-of-stock products at Wal-Mart and Sam's Club stores.  With five Dallas-area distribution centers, nearly 500 Wal-Mart and Sam's Club stores, and 140 suppliers equipped to handle RFID-tagged shipments as of last October, the retailer reduced the number of product out-of-stocks on store shelves by 16% during a 29-week period last year, according to a study conducted for Wal-Mart by the University of Arkansas.  Wal-Mart operates its system of RFID tags and readers on its corporate web-based Retail Link network, providing suppliers, its own managers and employees with web access to data on the movement of shipments.  Wal-Mart also reported that the process of ordering and receiving RFID-tagged shipments is three times faster than for non-tagged shipments.  In addition, RFID has helped to eliminate excess store inventory due to unnecessary replenishment by suppliers.  As RFID tags move toward a price of less than 10 cents this year, Wal-Mart's RFID project will expand more quickly.  Wal-Mart expects to have more than 300 suppliers live with RFID early this year and more than 1,000 Wal-Mart and Sam's Club locations live by year-end. (Internet Retailer, January 2006).

# The Future

In December 2005, research firm Gartner released its inaugural report on RFID market size, share, and forecast *Market Share and Forecast: Radio Frequency Identification, Worldwide, 2004-2010*. According to Gartner the RFID market will grow from $504 million in 2005 to $3 billion in 2010. For RFID technology to gain wider acceptance successful implementations are needed; companies announcing large projects with substantial benefits rather than just decisions to deploy. Broader implementations across emerging sectors are likely to become more evident in 2006 and 2007. In addition, the industries in which RFID is deployed will continue to diversify, expanding what may have been a preoccupation with applications in the consumer packaged goods and retail industry. Aerospace and defense, healthcare, logistics, and pharmaceuticals are all ready for adoption. Each of these industries will adopt RFID in a different way and at a different pace as vertical applications are discovered. (RFIDUpdate.com)

# In Conclusion

The next interesting phase of RFID deployment will involve comprehensive implementations with real ROI for all partners in the supply chain. RFID is a significant part of the broad movement toward sensor-actuator, always-on devices; smart tags with capabilities ranging from monitoring the date of perishable goods and automatically reducing the price as the expiration approaches, to sounding an alarm when a forklift operator places a palette of flammable chemicals in a restricted area. Reaping all the benefits from RFID and achieving positive ROI requires more than just tags and readers. A thorough rethinking of how to do business and a restructuring of systems and processes throughout an organization will be necessary. This is a daunting task that most small companies scrambling to meet their suppliers' deadlines have yet to address. (AlwaysOn.com)

There is no doubt that RFID will eventually revolutionize business processes throughout the supply chain, and result in greater efficiency and value for everyone. However, simply adding the tags before shipping, as many vendors are now required to do, provides little benefit other than to the companies such as Wal-Mart and Target. RFID requires careful planning and implementation. Companies that take the time to invest carefully and position themselves for the future will be best able to profit when that future arrives.

Another solution for companies that feel overwhelmed may be to turn to a managed-services firm to handle the management, archiving, filtering, and integration of RFID data, much as companies now turn to outside vendors to manage product catalog data or EDI. If there is a need to share information across the supply chain with logistics suppliers, banks, retailers, and dealers, a managed-services provider could give everyone a protected view of only the data they need, in whatever format they want. (CFO Magazine, March 2005)

## About Smart Label Solutions

Smart Label Solutions provides automated identification and data collection barcode and RFID solutions for use in streamlining supply chain management (SCM) operations.

We help you address the full supply chain spectrum:

- Strategy, planning and SCM Blueprint for success
- Entry-level & integrated demand-driven supply chain applications
- Logistics, inventory and operational improvements

Products and solutions:

- Barcode Data Collection and RFID Solutions
- RFID compliance solutions, including Wal-Mart and DOD mandates
- Supply chain peripherals (printers, scanners, RFID tags, barcode labels, terminals)