Store: RFID — Making it Real for You

With iWatches, Google glasses and cars, and even Amazon delivery drones on the horizon, RFID's future may be closer than we think. The implications for your supply chain are significant.

*Dec 6, 2013***By John Hill**

When MH&L asked me to update my article on radio frequency identification (RFID) published a little over year ago (["Ready for Identifiable Deliverables," July 2012](#)), my muse whispered that unless there was something dramatic that could be highlighted, she'd help me to do a rewrite of something I wrote two or three years ago. Dismissing that alternative as a cop-out and having a reasonable perspective on the technology and current state of the market, let's take a look at what's happened.

Thirty-one years ago, I joined a band of Silicon Valley engineers to assist an entrepreneurial tanner (that's right, a tanner) with adapting the somewhat primitive RFID technology the company had developed with Los Alamos National Labs to track cowhides from the ranch to the leather curing room. At the time, we dreamed of the day when an RFID-encoded shipment would be able to detect that it had been mishandled or misrouted and send an alert in time to either correct the problem or expedite a replacement.

We talked with food processors who wanted to monitor cold chain shipment temperatures, detect in-transit refrigeration problems and direct the trucker to the nearest maintenance depot.

Other prospects asked for handheld terminals equipped with readers that with the press of a button could direct them to the location of an item that had been misplaced in the warehouse, on the sales floor or in the back room of a retail store.

We even thought of refrigerators and a device for the pantry that could monitor expiration dates on perishables and send alerts to a display panel.

Fast forward to the present and guess what? Every one of these "dreams" is now technically, if not economically, feasible. In fact, at least a couple are on the market today—and the rest are likely to be here by or before 2020 at prices that will simplify the ROI assessment. Coupled with the latest developments in sensor technology, there's even an RFID-supported smart gun that will be introduced early next year. The gun's firing pin can be remotely disabled by the owner if it is unexpectedly moved from a defined location.

"Preposterous" Growth?

IDTechEx Research's latest report on the RFID market suggests that global revenues will increase from about $7 billion in 2012 to $23.4 billion in 2020 including tags, readers, software and services. For those of us in the supply chain, at first glance, the numbers seem to be preposterous. We've certainly seen activity, but not that much. On closer examination, however, they may not be so far-fetched.

Beyond the supply chain, representing the bulk of the projected revenue, applications covered in the report include access control, livestock and pet tracking, highway toll collection, contactless smart cards, passports, patient and asset tracking in hospitals, smart tickets, books and vehicle immobilizers as well as financial and other security uses.

In manufacturing and the supply chain, the use of RFID for work-in-process and pedigree tracking, smart cabinets, inventory management, pharmaceutical tracking, airline baggage handling, reusable containers including ocean container identification, fixed and mobile asset tracking, and high-value item identification (particularly apparel) is growing. What we are not seeing, however, is use of the technology for item and carton level identification of lower-priced consumables (e.g., boxes of corn flakes or Cheerios). Why?

Costs vs. Benefits

The answer boils down to the trade-off between tag costs and benefits to be obtained from being able to identify a product by a "fingerprint" unique to that item, so critical to drug and food product traceability. The benefits cannot be denied, but if tag cost consumes the lion's share of a product's margin, RFID is a tough sell.

In 2002, when a national technology magazine announced, "If you produce (RFID tags for retail consumables) in the billions, (they'll) cost as little as 5 cents, my reply at a national conference in Chicago was "I'm likely to be in the home before they cost a nickel."

Well, here we are eleven years later and I'm not in the "home" and they still don't cost a nickel. In the 2002 presentation, multiple hurdles to market growth were highlighted, but the focus was on technology performance, the cost/value relationship and the capacity and capability of existing information systems to process and disseminate the enormous amount of data generated by trading partners sharing an RFID-enabled supply chain.

On technology performance, particularly as it related to tagging consumer non-durables, it seemed that there was a direct correlation between tag costs and read rates, i.e., the lower the cost, the lower the read rate and 95% or less was not going to fly. Other issues at the time included those associated with reading tags on metal as well as packages and cartons containing liquids. Though not entirely resolved, progress has been made in the past ten years including the emergence of a variety of antenna designs that are better matched to the characteristics of the items being tagged and the environments through which they move.

On costs and value, as unfortunately suggested above, one tag type does not fit all; the implication being that it will be a long time before anyone buys billions of the same tag type. Accordingly, prices are unlikely to match those of the ubiquitous bar code any time soon. The major components (and costs) of an RFID tag are a microchip that holds the data and an antenna that enables data transfer. Here we're not talking about an industrially hardened tag for use in an automotive plant or attached to a railcar or ocean container, but rather a label similar to those used for bar coding shipping cartons.

Though unlikely in the short term, company researchers and universities are working on alternatives to the microchip, grouped under the name "Chipless RFID" and using conductive polymers or RF reflecting fibers instead of silicon. Others are investigating the feasibility of printing tag antennas with conductive inks. Success in either or both areas will have a dramatic impact on the market and my guess is that we'll begin to see it before 2025.

On IT infrastructure capacity for the inevitable RFID explosion, we've come a long way with hardware, software and supply chain systems since the turn of the century and the Cloud is getting ready for "Big Data." In parallel, international standards organizations are developing guidelines and offering testing services to ensure RFID interoperability as technology adoption and deployment grows.

Get Your Answers

Where do you go from here? Whether it's compliance with a customer requirement or assessment of RFID for your own use, the first order of business is to determine if deployment is worth the investment. What will the costs be—initial and recurring? Note that although broader acceptance of RFID will continue to drive down tag, reader, antenna and associated infrastructure costs, base your analysis on the pricing that suppliers are prepared to commit to today. Additionally, develop answers to the following questions:

• Where are the benefits for your operations? Quantify and put a value on them.

• What is your gross margin on shipments today? What will that margin be with the introduction of RFID, including the expected value of internal benefits?

• Does it make sense from this perspective to move forward?

• What are the consequences of delay?

If the answers to these questions show a favorable cost/value relationship or, alternatively, if the strategic value of retaining a given customer demanding RFID tagging gives you no option, how do you get underway?

Your process should begin with measured assessment of current operations, establishment of realistic performance improvement targets and development of an implementation plan that defines all tasks, user/supplier responsibilities, schedule, milestones and related costs. Although perhaps daunting, the approach outlined in the table on p. 24 will enable you to build a comprehensive business case for technology deployment—or deferral. Even if the latter, the analysis will provide a foundation for fine-tuning your existing infrastructure to improve current performance.

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