

## December 2003 Commentary

### The next big productivity driver?

**"Progress might have been all right once, but it has gone on too long."**

Ogden Nash

Bar codes are something that most of us never think about. We go to the grocery store to buy food, the items are run over a scanner, there's an audible beep, and then we're told how much money we owe. Bar codes have been with us for so long, and they're so ubiquitous, it's hard to remember they are a relatively new technology that took a while to catch on. The patent for bar codes was issued in 1952. It took another twenty years before a standard for bar codes was approved, but they still didn't catch on. That changed in 1984 when Wal-Mart said that it wanted to use bar codes as a better way to manage inventory. By 1987, only three years later, 75,000 suppliers were using bar codes. When Wal-Mart talks, suppliers listen and bar codes quickly became the standard.

The same thing is happening now. The bar code's days are numbered. There's a new technology and Wal-Mart is once again pushing it, mandating its use by all of its suppliers by 2005. So what is this new technology?

#### Radio Frequency Identification (RFID) tags.

Well, the technology is not really all that new. In World War II, the British used it to make sure incoming planes were theirs, not Germany's. RFID tags are essentially very small microchips. The RFID tag can transmit a unique identifying code using radio waves. The chips can be used like bar codes printed on packaged goods. Bar codes identify a category of products. All Gillette Mach 3 razor blades, for instance, have the same code. With RFID tags, each packet of Mach 3 blades could have its own unique Electronic Product Code embedded in a microchip no bigger than a piece of glitter (see image below) and RFID tags offer advantages in that they can carry more information and can be read without having to pass a scanner directly over them. An RFID reader emits a radio wave to scan the tiny chip and an RFID reader can theoretically scan every item in a case or pallet. Most of these broadcasts are designed to be read from a few inches to several feet away, even in rotten conditions like inside a freezer or in a sandstorm.

Wal-Mart expects a big payoff from the technology, mainly from having fewer logistical errors and reduced labor costs related to inventory processing. Wal-Mart would love to be able to point an RFID reader at any of the 1 billion sealed boxes it receives every year and instantly know exactly what is inside. No unpacking, no unnecessary handling, no barcode scanners required. One analysis indicated that the world's largest retailer could save as much as \$8.4 billion per year (about 3% of the company's sales) with a full implementation of this technology.

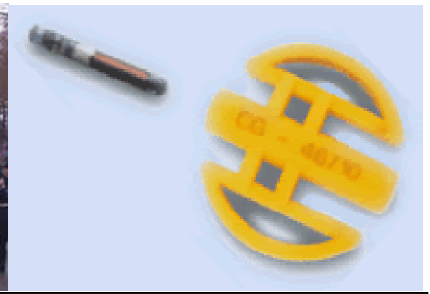
For now, RFID tags are still expensive (from \$0.25 to \$2 each), but prices are dropping. Once they get to 5 cents each, many analysts believe that it will be cost-efficient to put RFID tags in almost anything. Who's using RFID now?

Radio-frequency identification is, in fact, already pervasive in our lives - used to track everything from pets to prisoners to products. Cars zip through tollbooths thanks to payment systems (EZPass) using RFID. ExxonMobils' SpeedPass payment system also uses RFID. More than 50 million pets worldwide are tagged with RFID chips. At least 20 million livestock have RFID tags for tracking them in case of possible disease breakouts. A museum in Rotterdam uses RFID to guard its Rembrandts and Renoirs. And for the past two years, Oscar-goers have been screened and tracked by RFID. Automakers produce electronic car keys that enable the driver to unlock and open a car door by pressing a button - the RFID chip sends a signal to an electronic lock.

There are many excellent ideas for applications for RFID. Safety and Security: Airlines could tag customer bags to reduce loss and make it easier to route bags if customers change their flight plans. Automotive companies can use RFID to monitor tire pressure and the status of other vehicle parts. Seaport operators can use RFID tags to track the thousands of containers that arrive each day at US ports. Currently, less than 2% are inspected. RFID tags can be used to track the containers and the employees handling them.



**A thin RFID tag that could be virtually undetectable when sandwiched between paper or cardboard. Note that the solid dot in the center is the microchip. The lines running out from the chip are the antenna.**



**"No flying machine will ever fly from New York to Paris ... [because] no known motor can run at the requisite speed for four days without stopping."**

Orville Wright

One interesting application already in use is a sports timing system, based on RFID technology, which collects timing data at major marathons around the world from Boston to Berlin to Cincinnati's Flying Pig Marathon. Coordinating the times of thousands of runners during a marathon is no longer a Herculean task. The ChampionChip timing system (photos above) begins when a runner outfitted with a transponder laced to their running shoe passes over an antenna under the starting line. The process is completed as the runner crosses an antenna at the finish line. This creates an ability to track individual times; important for runners minutes away from the starting line and guards against cheaters by placing antennas at interim points. Supporters can also track runners on the Internet during the race.

The biggest user of RFID today is probably the U.S. military. During the Gulf War II, the Army Materiel Command required all air pallets and commercial shipments to be digitally tagged so commanders knew when and where critical cargo like tanks would arrive. Taking inventory, normally a two-or three-day job, was completed in less than 30 minutes - highly convenient when you're under fire. (The system also proved handy one night for hungry soldiers, who used the RFID reader to hunt down milk for their cereal.) In all, RFID technology helps the military track 300,000 containers in 40 countries every day.

There will be thousands of potential applications for RFID tags, but corporate uses will likely have the biggest overall economic impact (due to the large potential cost savings and efficiencies). Corporations can use the tags to put a stop to theft of corporate PCs, networking equipment, laptops and other valuable equipment. Hospitals can use the tags to track equipment and supplies, and when supplies are low, they can be automatically reordered. Manufacturing firms might use RFID tags during the manufacturing process to track very single part involved in the process, allowing for better scheduling of just-in-line inventory throughout the entire supply chain. These types of applications could save organizations billions of dollars.

With the ability to track everything from cases of razors to a car passing through a toll booth, some analysts say the electronic tags are to this decade what the Internet was to the 1990s - a promise of radical change in the way business is done. At its full potential the RFID tags could be used to identify and track every item produced on the planet. Of course, radical changes often take some time and aren't without their drawbacks.

The challenge with this technology is its privacy concerns. We could all be tracked because we'll be wearing, eating and carrying objects that are carefully designed to do so. Civil libertarians fear that, under the guise of protecting national security, RFID will be used to invade peoples' privacy by monitoring their activities. For example, inserting RFID tags into tires also sounds good. The tag could store a unique number for each tire, a number that will be associated with the car's VIN (Vehicle Identification Number). Good for Michelin, and car manufacturers, and for fighting crime. But potentially bad for you. Who will assure your privacy? Do you really want your car's tires broadcasting your every move?

Visa could combine smart cards and RFID chips so people could make transactions without having to use cash or coins. These smart cards could also be incorporated into cell phones and other devices. Thus, you could pay for parking, buy a newspaper, or grab a soda from a vending machine without opening your wallet. This is wonderfully convenient, but who would enjoy the idea of targeted personal ads popping up at you as you walk through a store.

The European Central Bank may embed RFID chips in the euro note. Ostensibly to combat counterfeiters and money-launderers, it would also enable banks to count large amounts of cash in seconds. Unfortunately, such a move would also make it possible for governments to track the passage of cash from individual to individual. Cash is the last truly anonymous way to buy and sell. RFID embedded notes would change all that. Certainly, as with the adoption of any new technology, both the benefits and threats are enormous, but will take time to sort out.

### **Madison Financial Advisors**

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