

## Charting the Course for RFID

Former Dallas Fed board member Julie England, vice president and general manager of Texas Instruments' RFID business, discusses the emergence of a new technology with Texas ties and ripples spreading far beyond the streamlining of global supply chains.

**Q: What are the basics of radio frequency identification, or RFID?**

**A:** RFID is the oldest new technology, in the sense that it was actually created during World War II. The British used it on their airplanes so they could distinguish friend from foe. In modern applications, a very small integrated circuit—sometimes less than a square millimeter—is attached to an antenna. The vast majority of RFID tags are passive, meaning they have no power source. When in the presence of a reader emitting electromagnetic radiation, the tag gets charged through a capacitor on board, wakes up and says, “Hi, here’s my number.” The reader senses that data and uploads it to a server that may be connected to a software application.

**Q: If RFID has a long history, why has it only now become commercially viable?**

**A:** Over the course of several decades, the technology has gone from closed-loop applications and proprietary approaches to global standards. Countries around the world have now set similar regulations and power levels, so that the same type of product can be moved from country to country and still be useful. Setting global standards opened up more market opportunities; more competitors came into the market, and prices fell. With lower prices, RFID became more popular by promising a greater return on investment.

**Q: So this technology offers a big improvement over bar codes?**

**A:** RFID is much more than a bar code on steroids. There are really three benefits to using RFID. One, it’s non-line of sight. You don’t have to get right in front of it to read



it. Two, you can read multiple tags at a time, up to hundreds of tags in seconds. Three, it’s mobile. You can move a product and read it simultaneously—for example, through a loading dock door.

**Q: What are the uses of RFID?**

**A:** When you’re dealing with chief information officers, who are typically the decision-makers on RFID adoption, they’re basically looking for return on investment for the part of the business using RFID. Usually, RFID stops pain points, such as high labor costs, as seen, for example, in ski ticketing on slopes in the Alps.

The best-known use was spurred by Wal-Mart’s mandate in 2003 requiring RFID use in their supply chain, starting with the top 100 suppliers in 2005. That gave huge visibility to RFID and opened the minds of a lot of competitors. The second biggest

application is actually cattle ear tags, mostly outside the United States, to protect the food chain. The oldest application in our 15 years in the business is automobile immobilizers, where you unlock your car remotely with a key fob.

We see RFID fighting counterfeiting in what we call the vice and vanity market, where even in China the use of RFID for cigarettes, cosmetics and liquor is very popular. And, of course, there is anti-diversion, which is part of the incentive for Wal-Mart and the big pharmaceutical companies to use it. Anything that can stop the diversion, or skimming, of products solves a pain point.

What we find is that many of the companies complying with mandates are actually trying to find value for RFID beyond mere compliance. They’re finding RFID can give them faster business processes or increase flexibility in fulfilling orders or perhaps personalize a product. In contactless commerce, a credit card today is a simple square, but in the future it will take on a multitude of 3-D shapes, like the fob you see from Exxon Mobil for SpeedPass. So a lot more creativity is coming into the market as many more companies adopt RFID, and I believe the rate of innovation will accelerate through the next decade.

**Q: How big is the industry today?**

**A:** According to ABI Research, the industry is \$6 billion overall, but that’s broken down into hardware, software and service. Hardware is about \$3.2 billion of the total. Forecasters have predicted rapid adoption, but as in most new markets, the rate has actually been more gradual as customers explore what they can do with RFID, how they can benefit from its use and even invent new money-saving approaches by adopting the technology.

**Q: Has RFID lived up to expectations?**

**A:** There was a lot of hype when Wal-Mart mandated RFID for its suppliers in 2003. I

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do think we're out of the hype phase, and the reality of the adoption has set in. In 2005, Wal-Mart's suppliers started complying without a global standard. Last year, an industry standard was adopted, called Generation 2. Now many suppliers are equipped with Generation 2 transponders, readers and printers. This has allowed broader adoption, lower prices and more choice in the market.

The main barrier revolves around this industry standard being adopted globally so that RFID tags can be used worldwide. The adoption of the standard by ISO—the International Organization for Standardization—certainly helped. A key will be getting alignment with China. In a lot of ways, the Wal-Mart supply chain begins in Asia—China and India primarily—so until China aligns on the global standard, we're really not going to tag at the manufacturing level. We're still tagging at the loading dock.

**Q: Where does Texas fit into this new technology?**

**A:** More than 121 companies in the Dallas-Fort Worth area work on RFID at different levels, whether hardware, software, system integration or service. We believe we have the largest cluster of RFID companies in the U.S. We also host RFID World, the largest RFID conference in the U.S., here every year. The Metroplex Technology Business Council has adopted RFID as a special work-

ing group and started to brand the Dallas-Fort Worth area as the RFID hub.

**Q: Why did Dallas-Fort Worth become a hotbed for RFID?**

**A:** A couple of things happened. First, Wal-Mart picked Texas distribution centers to start RFID deployment in 2005. Second, a lot of telecom employees were displaced in the first half of this decade, and their backgrounds made them an especially good fit for this technology.

**Q: What future applications do you feel have significant possibilities?**

**A:** Once you identify an item, you want to know more about it. We're convinced that RFID plus sensors for temperature, pressure, time and even location will be the next big thing in little things. Right now, the most broadly used application involving sensors is measuring pressure in tires.

RFID combined with sensors often requires a tag that's active or semipassive, which means batteries are present. Those applications are going to be slightly more expensive than a passive tag on a box or pallet. When active, RFID tags can relay in real time the pertinent information to a central database, and the benefit for companies is access to that data.

Another combination we're seeing is RFID plus biometrics, which involves measurements of the human body. That's already happening in electronic passports in countries outside the U.S.

We need to think about an Internet of things. Just like we're all connected with our handy cell phones and BlackBerrys, ultimately we're going to be able to connect things. That's got a lot of appeal for significant breakthroughs in

how companies do business and how they reduce costs.

A big idea being kicked around in the industry is near-field communications, which combines cell phones with the electronic payment systems the credit card companies are now rolling out. If we put that same chip and antenna in the cell phone, the phone becomes an electronic payment device. It's already being done in Japan. It's being discussed in the U.S. and Europe.

**Q: What's the holdup in the U.S.?**

**A:** There are two main barriers to adoption. One is working out the business model between the credit card issuer, the telecom operator and the handset maker. The second is deciding who owns the customer when there's a service issue on a payment application. Is it the telecom operator who owns the wireless network? Or is it the credit card company?

**Q: Will RFID become a truly global product?**

**A:** The globalization of RFID is being propelled by retailer use. By the end of the decade, Wal-Mart and other retailers that have mandated RFID use in their supply chains will help drive the first truly global implementation, where RFID tags move data between customers, between companies and across boundaries.

The next wave will probably happen because of cell phones and credit cards. We're going to want to take our payment instruments and use them when we travel anywhere in the world. So consumers will join retailers as future drivers of RFID-enabled functions.

