Will Radio Frequency Identification (RFID) Technology Ever Replace Bar Codes?

In 1974, bar codes were first used to read price tags on groceries in supermarkets. Today, billions and billions of bar codes are scanned every day for a huge variety of uses beyond purchasing products (Shih). Bar codes are used to record prices for purchases, track millions of pieces of mail at the US Postal Service, identify patients in hospitals, manufacture goods, and more. Bar codes are everywhere in our global economy, but will they be replaced with a system that uses newer technologies? Radio Frequency Identification (RFID) tags use wireless technology and offer some benefits over bar codes. “RFID uses a method of remotely storing and retrieving data using a small object attached to or incorporated into a product.” RFID tags can store more information than a bar code and do not need to be scanned. Both bar codes and RFID offer benefits and drawbacks; time will tell whether they will continue to coexist together, or whether one will win out over the other.

Any consumer knows what a bar code looks like. “A bar code is a series of parallel black bars and white spaces, both of varying widths.” (Inman) A bar code can be decoded to provide a unique reference number to particular item that can then be looked up by a computer. No other information about the item is stored in the bar code; it contains only a unique reference number. Any information about the product or item is stored elsewhere; not on the bar code itself.

A bar code must be scanned by a bar code reader. For instance, at the grocery store each grocery item with a bar code must be swiped over a bar code reader until it is recognized, usually with a beep sound. Until recently bar codes were used only in business or retail settings. Japan was the first country where it was possible for consumers to use cameras on cell phones as bar code scanners. As Louise Story reported in 2007 in The New York Times:

Consumers can already point their cellphones at the wrapping on their hamburgers and get nutrition information on their screens. Users there can also point their phones at magazine ads to receive insurance quotes, and board airplanes using their phones rather than paper tickets. And film promoters can send their movie trailers from billboards.

Smart phone apps that scan bar codes are widely used by consumers today. In 2009 ShopSavvy released an application that allows iPhone users to point their iPhone cameras at a bar code, scan it, and then display product information including product reviews and where to get the best deal in your area. (Hertz) The San Francisco company GoodGuide released the first application for the iPhone that allows users to use their iPhone camera to capture bar codes to get rating information on how eco-friendly a product is. (Moore)

One of the biggest benefits of bar codes is that they are inexpensive. Adding a bar code to a product costs just a half a cent. (Shih) Another benefit to using bar codes is that they are in place now and used virtually everywhere. (Inman)All the infrastructure to manufacture, read, and use bar codes is in place now; switching to a new system, even one that has greater benefits, would be costly.

RFID tags provide many advantages over bar codes. An RFID tag is a tiny device that emits a signal, which is transmitted, read by an RFID reader, and then transmitted to a network for processing. RFID can store much more information than bar codes. For instance, RFID tags can store information about location, or detailed information about the contents of a product. RFID tags do not need to be individually scanned (as bar codes do); hundreds of RFID tags can be read at once. RFID tags can also store information that is unique to a particular item. (Inman)

RFID tags are used today for a variety of purposes. They can be used to manage inventory, track the location of shipments, collect tolls at toll booths, or monitor the location of prisoners in prisons. (Inman) The Federal government has recommended that RFID tags be used to track livestock; doing so would enable speedy and efficient recalls of meat associated with a particular diseased animal. (Eckholm) RFID tags are also frequently used to monitor medical devices in hospitals.

The RFID Journal reports that Europe’s adoption of RFID technology is on the rise, even though they are suffering difficult economic times. RFID is now seen as an immediate solution that can boost productivity and increase cost savings. (Edwards)

Although there are benefits to using RFID tags, there are controversies and obstacles, too. First, they are much more expensive than bar codes. While bar codes cost just a half a cent each, RFID tags cost five cents or more. (Shih) Adopting the use of RFID tags would require updating systems and infrastructure to allow for their use. There is also controversy about the use of RFID tags in hospitals. Eric Nagourney writing for The New York Times reported that signals from RFID tags are interfering with critical care equipment in hospitals. (Nagourney)

Privacy advocates are also concerned about the widespread use of RFID tags. RFID systems are now being promoted to schools as a way to inventoried items such as books or equipment. Two Middle schools in San Antonio, TX require students to wear RFID tag on their ID cards, for the stated purpose of being able to track attendance and get more money from the state. (Sullivan) However, the systems are a privacy threat because they could also be used to track students’ attendance as well as their movements. Tracking people using RFID is widely seen as dehumanizing activity that violates people’s privacy and inhibits their freedom of speech. (Rezmiersky, Judith McGeary and Griffin)

Bar codes are the most common system for tracking items used today. Now that consumers can access information from a bar code using their cell phones, bar codes connect consumers with information about products while they are on the go. Because bar codes are so inexpensive, they are likely to remain in use for a while. RFID tags offer benefits that extend beyond those of bar codes. Although the use of RFID tags will continue to grow for RFID tags might not replace bar codes due to their high cost and privacy concerns.