

Chapter 37

RFID Technology and Privacy

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ABSTRACT

RFID plays a critical role in the improvement of supply chain management and consumer applications. This chapter introduces a brief history of RFID and how it works. The recent shift of incorporating RFID into consumer-oriented products has raised serious concerns of customer privacy and security. These concerns are rooted in the fact that consumers are typically unaware that their purchases are being tracked and monitored, as well as the fear of private information being hacked or stolen via insecure RFID systems. This chapter provides a theoretical debate over the privacy rights and addresses the consumer role in the RFID technology. This chapter concludes that the government must ensure legislation to maintain protections on the individual's security and privacy in the society.

INTRODUCTION

Radio Frequency Identification is a form of technology that tracks objects via radio wave transmission. While the technology itself is not groundbreaking, the RFID market has recently experienced significant innovation and growth. The technology is increasingly used for a multitude of purposes, across a wide range of industries. This increased usage signifies that companies find strong value in RFID technology (Heim, Wentworth, & Peng, 2009; May, 2007; Thiesse, Al-kassab, & Fleisch, 2009). Businesses are attracted to RFID technology because it enables them to create a more efficient supply chain, effectively track and manage inventory levels, monitor consumer behavior and demand, and better forecast future sales (Beitelspacher, Hansen, Johnston & Dietz, 2012).

Many large retailers, such as Wal-Mart and Target, as well as the Department of Defense, now require the use of RFID within all aspects of their supply chain because of the cost-savings associated with the technology, mainly in reduced labor costs (Asif & Mandviwalla, 2005; Roberti, 2010; Smart, Bunduchi, & Gerst, 2010). This mandate caused the economy of scale for RFIDs to decrease prices, and also led to an industry technology standard to use EPCglobal's Electronic Product Code standard (EPCglobal Inc., 2005). Previously, the technology was stifled by a lack of uniformity between different RFID manufacturers' software platform causing customers to need different receivers to detect and use different RFIDs.

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These advances are expected to continue the growth of the use of RFIDs across industries. Businesses are demanding that their suppliers use RFIDs to track incoming shipments as it allows the organizations to make real time decisions for inventory management and control. When businesses can project the time their supplies will arrive, they can coordinate to make business decisions based on projected inventory. This practice helps things such as manufacturing scheduling, floor layouts, and even sales (May, 2007; Zhou & Piramuthu, 2013).

RFIDs are also commonly used in tracking individual objects that are high value enough to warrant the additional expense of a tag (Kapoor, Zhou, & Piramuthu, 2009). In the case of one Tennessee hospital, instead of relying on nurses to scan barcodes high value implantable surgical devices or catheter bags prior to using them in a patient, the use of RFIDs on the products has helped save over \$500,000 annually in wasted items, preventing theft, and preventing incorrect billing due to incorrectly tracked items that patients did not receive (Swedberg, 2009). It is very common now that expensive, pilferageable, or items with a high theft rate in a store such expensive liquors, condoms, pharmaceuticals, and jewelry have RFIDs included in the packaging to prevent theft and retain profits.

Instead of tracking shipments and products, another application of RFID is tracking animals. Cows are high value items to ranchers that are commonly stolen or escape when they are allowed to graze over large pasture land. In the US, Canada, and Australia, the beef industries are actively encouraging the use of RFID to track cows (Dobkin, 2013). This tracking allows for individual tracking of large herds of animals to be able to keep an accurate count of moving animals, their locations, and ages which allows farmers to identify specific cows at the optimum time for slaughter and ensure no loss of accountability. Additionally, researchers have been tagging various wild animals so that they can further their studies of things such as migration patterns, lifespan, and even establish protection zones for the animals or even people. In the case of whales, knowing their locations by RFID allows protection groups to set up boundaries so that ships do not get too close and harm the animals. In the case of sharks that have been tagged, RFIDs allow protection groups to keep out swimmers when they are in the area to protect humans (Wang & Loui, 2009).

RFIDs can even be used for tracking humans. They are commonly used in prisoner bracelets as a way of maintaining accountability of the prisoners. Even some resorts and theme parks sell RFID tracking brackets that can be worn by children so that their parents can always track their whereabouts (Dobkin, 2013). RFIDs are becoming commonplace for use to get quickly through toll booths to debit a user's account when they pass through a toll area. The US Government uses RFID chips in their passports so that Customs and Border Protection inspectors will be able to access photographs and other biographical information stored in secure government databases as the traveler approaches an inspection station. With RFIDs located in smart phones, it is also possible to track the location of almost any smart phone user (Martinez-Balleste, Perez-Martinez, & Solanas, 2013).

Understandably, with this advanced technology come concerns over the privacy and security of the information being transmitted (Good & Benaissa, 2013; Kamruzzaman, Azad, Karmakar, Karmakar, & Srinivasan, 2013; Li, Deng, & Bertino, 2013). This is particularly true for RFID technology that has become introduced to the public and consumer goods market (Dean, 2013; Golding & Tennant, 2010). For instance, a product that has an RFID tag can continue to be monitored once the product has been purchased. The technology that makes up an RFID tag or chip does not automatically shut down upon consumer purchase (Chen, Fung, Mohammed, Desai, & Wang, 2013; Grover & Berghel, 2011; Song, 2013).

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