

Consumer Attitudes Toward RFID Tracking In The Retail Environment

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ABSTRACT

Radio Frequency Identification (RFID) technology has great potential to lower costs and improve customer service in the retail environment. Anecdotal evidence indicates that consumers may resist the adoption of this technology due to its privacy implications. This study attempts to determine what variables influence consumers' attitudes toward RFID tracking of their purchase behavior. Results indicate that retailers' efforts should focus on reducing consumer fears about how RFID data might be used rather than on incentivizing participation in RFID programs.

Keywords: RFID; Consumer Attitude; Consumer Behavior; Smart Card Identification System

INTRODUCTION

The use of technology to identify consumers and the products they purchase has been discussed extensively in both the popular press and in the general academic literature. However, little attention has been devoted to examining this topic from the perspective of the consumer (Milne and Bahl 2010). This is surprising since RFID devices and smart card identification systems continue to grow in popularity, while consumers become ever more vigilant about protecting their privacy.

In 2010, Wal-Mart announced plans to roll out sophisticated electronic ID tags to track individual pairs of jeans and underwear in their stores. This policy went a step beyond their previous inventory control methods, which tracked inventory down to the level of a single pallet. For the first time, individual items are now being tracked. For example, workers may now wave a handheld scanner over stacks of jeans on store shelves to learn which sizes of a specific style are out of stock. This represents the first step in a system that privacy advocates say better controls inventory but some critics say raises privacy concerns (Bustillo 2010). While the tags can be removed from clothing and packages, they can't be turned off, and they are trackable. As a result, some advocates express concern that unscrupulous marketers and criminals may now drive by consumers' homes and scan their garbage to identify recent purchases.

The purpose of this study is to determine what circumstances and individual characteristics would influence a person to acquiesce to RFID tracking of their purchase behavior. Specifically, we examine individual differences based on financial compensation, convenience, gender and age. The following section presents an overview of the impact of these variables on individuals' privacy concerns.

LITERATURE REVIEW

Legal scholars have said that a "reasonable expectation of privacy" exists when a person has "exhibited an actual (subjective) expectation of privacy" and, second, that the expectation is "one that society is prepared to recognize as reasonable. Thus, a man's home is, for most purposes, a place where he expects privacy, but objects, activities, or statements that he exposes to the plain view of outsiders are not protected, because no intention to keep them to himself has been exhibited" (Katz 1968). The right to privacy is based on the theory of natural rights, which are considered to self-evident and universal. Thus one would predict that a consumer would be more sensitive to perceived privacy violations in locations in which he or she had a "reasonable expectation of privacy," such as a private home. Similarly, consumers may be less sensitive to such violations in locations in which such expectation would not reasonably exist, such as a grocery store sales floor.

Incentives have long been used to increase consumer involvement in programs in which they might otherwise be reluctant to participate. For example, financial rewards have been shown to increase response rates in survey research (Petrolia and Bhattacharjee 2009). Tax incentives are commonly used and effective in inducing charitable giving (Mayo and Tinsley 2009). “Cash-back rewards continue to be very important in acquiring new credit card customers” (Fitzgerald 2011). Tax credits are used to encourage a wide array of socially beneficial behaviors including charitable giving and the purchase of energy efficient appliances and vehicles. Similarly, access to high occupancy vehicle lanes is used to encourage carpooling (Downing 2009).

Consumers’ desire convenience and time savings both in terms of what they purchase (i.e. microwave ovens and fast food products) as well as how they purchase (i.e. internet shopping and convenience stores). For example, a recent study showed that fees and interest rates ranked behind convenience when consumers are shopping for a primary bank (Coleman 2004). One factor known to influence the purchase of bundled products is time savings (Nguyen, Heeler and Buff 2009).

Many studies have noted differences between men and women in terms of privacy issues, especially when technology is involved. In general, women tend to perceive more risk online and report more privacy concerns than men (Fogel and Nehmad 2009). Men were also more likely to be receptive to potentially invasive technologies than women (Milne and Bahl 2010). In addition, even when controlling for differences in Internet usage, women perceive a higher level of risk online (Garbarino and Strahilevitz 2004) and are more cautious when shopping online (Kehoe et al. 1997) than men.

This result is fairly robust in that it applies to non-purchase behavior as well. For example, Hoy and Milne (2010) noted that women were significantly more concerned about the privacy of the information that was posted on social networking sites than men. Specifically, women are more likely than men to read the privacy policy of a website before joining, and men are much more likely not to have read the privacy policy at all. In addition, men provide their telephone numbers and addresses on their social network profiles more often than women (Tufekci 2008).

Age differences with regard to privacy have also been noted. For example, according to Forrester Research (2010) generations X and Y are less likely to express discomfort online than are baby boomers and seniors. This applies to offline technology as well. Older workers were more likely to feel that their privacy was violated by the use of GPS tracking to verify location during business hours (Gordon and Ponemon 2008). Further, older (45+) people supported more severe punishments for businesses that knowingly violate privacy laws than younger (18-24) respondents (Evangelista 2010). One study, however, reported contrary results showing that older consumers were more likely to be receptive to potentially invasive technologies than younger consumers (Milne and Bahl 2010). On balance, however, it appears that there is more evidence that younger consumers are less concerned with privacy issues than older consumers.

HYPOTHESES

Based on our literature review, we propose the following hypotheses:

- H1:** Consumers will be more likely to participate in programs where RFID technology is specifically removed upon checkout rather than programs where chips remain in products for tracking beyond the local store.
- H2:** Consumers will be more likely to participate in RFID programs in which they are compensated financially than in programs in which they are not compensated.
- H3:** Consumers will be more likely to participate in RFID programs in which they benefit from time savings than in programs in which no time savings is realized.
- H4:** Men will be more likely to participate in RFID programs than women.
- H5:** Older consumers will be more likely to participate in RFID programs than younger consumers.

METHOD

An experimental survey was conducted in order to gauge consumers' level of comfort with RFID technology in the retail environment. Students enrolled in business classes at a large Southeastern university were asked to administer two questionnaires. Students were awarded extra credit for their work. Each questionnaire specified that its respondent be within a specific age group (i.e. 30-39). Age ranges were specified in order to ensure a representative sample. Students were required to obtain a signature and a phone number for each respondent and told that credit would be awarded only for surveys that could be validated. Three hundred ninety two individuals were contacted using a quota sample of age ranges. Approximately 25 percent of the respondents were contacted, and 100 percent of those were validated.

We created two scenarios representing different levels of invasiveness. (A sample scenario is shown in Appendix.) In the first scenario, respondents were told that an RFID tag would be used to track merchandise in the store, but that the tag would be removed from the products upon checkout. In the second scenario, respondents were given exactly the same information, but told that the RFID tag would be left in the merchandise so that products could be tracked to a consumer's home.

In order to add a sense of realism to the potential scenarios that consumers might encounter, we created various incentives to determine under what circumstances consumers would accept tracking technology. These incentives were a) a 5 percent discount on purchases, b) a special time-saving checkout lane, and c) coupons worth at least \$15 every month. In addition, a control group with no incentive was included. In order to measure consumer sentiment regarding RFID, we asked consumers three questions: 1) Does this program sound appealing? 2) Would you be willing to participate in this program? 3) Would you recommend this program to friends?

RESULTS

Hypothesis 1

Results indicated that consumers found the program in which RFID tags were removed (mean = 3.99) to be more appealing than the one in which the tags remained with the products (mean = 3.04, $p < .001$). Consumers were also more willing to consider participating in a program in which RFID tags were removed (mean = 4.21) than a program in which tags were not removed (mean = 3.08, $p < .001$). Finally, consumers were more willing to recommend a program in which tags were removed (mean = 4.13) versus a program in which tags were tracked beyond the store (mean = 3.26, $p < .001$). Hypothesis 1 was supported in each of the three cases.

Hypothesis 2

Although results were in the hypothesized direction, consumers were not *significantly* more likely to participate in a program in which they received a 5 percent discount (mean = 4.33) than in one in which they were not compensated (mean = 4.09, $p = .532$). Similarly, consumers were not *significantly* more likely to participate in a program in which they received \$15 in monthly coupons (mean = 4.06) than in a program in which they received nothing at all for their participation (mean = 4.09, $p = .936$). Hypothesis 2 was not supported in either case.

Hypothesis 3

Consumers were not significantly more likely to participate in a program in which they were able to use a special "instant" checkout lane (mean = 3.86) than in one in which there was no benefit in terms of time savings (mean = 4.09, $p = .554$). Therefore, hypothesis 3 was not supported.

Hypotheses 4

Men were significantly more likely to find the RFID programs to be appealing (mean Error! Bookmark not defined.= 3.81) than women (mean Error! Bookmark not defined.= 3.40, $p = .043$). In addition, men were more likely to recommend participation in an RFID program to friends (mean = 3.92) than

women (mean = 3.55), but the difference achieved only marginal significance ($p = .061$). Finally, no significant difference was found between males' (mean = 3.88) and females' (mean = 3.55) likelihood of participation in an RFID program ($p = .111$). Hypothesis 4 was therefore supported for appeal, but not for participation or recommendation.

Hypothesis 5

Age data was collected as a metric variable and therefore, bivariate correlation was used to examine the results. As with the studies cited in the literature review, results were mixed. Age was not related to finding the RFID programs to be appealing ($p = .13$), however age was negatively correlated with willingness to participate in an RFID program ($p = .01$). Age was also negatively related to attitudes about recommending an RFID program to friends, however the level of significance was marginal ($p = .08$). Hypothesis 5, therefore, was supported with regard to participation and recommendation.

CONCLUSION

In summary, the findings of this paper indicate the following:

- Consumers do not want to be tracked beyond the retail environment regardless of the incentive offered.
- Financial compensation was not able to induce consumers to participate in RFID programs in which they were not otherwise predisposed to participate.
- A time-saving checkout lane was not able to induce consumers to participate in RFID programs in which they were not otherwise predisposed to participate.
- Men were more likely to find RFID programs appealing than women.
- Older consumers were less willing to participate in RFID programs than their younger counterparts.

Because of its usefulness as an inventory management tool RFID technology has great potential to simplify inventory tracking on the sales floor, lower costs within the channel and ultimately provide lower prices to consumers. For these reasons, the future of RFID in the retail industry is evident. However, our study suggests that consumer sentiment regarding this technology is mixed at best. Retailers need to be aware of these sentiments in order to avoid potential public relations nightmares and lost sales. Our results indicate that retailers' efforts should focus on reducing consumer fears about how RFID data might be used rather than on incentivizing participation in RFID programs.

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APPENDIX

Scenario A

A major national grocery store chain is testing a system that will allow it to track products and consumers throughout the store. They will be able to determine: when you pick up an item (e.g. a box of cereal) from the shelf, how long you examine the item, what competing items you looked at, and whether you eventually purchased the item. You may voluntarily participate in this research by signing up for and carrying a key chain tag with you throughout the store. *This will allow the store to match your demographic information with the products that you examine and/or purchase.* Your name will not be associated with the products. The information will be sent to participating manufacturers who will use it to improve their products and promotional strategies. **The chips that enable tracking will be removed from all products upon checkout.**

For your participation, you will receive a 5% discount on all purchases at this store.