

Needs Assessment Report for the A&P Supermarkets



Automated Checkout System

Using Radio Frequency ID tags

By May Ly

1. Executive Summary

A&P Company sees a future of automated checkout system where goods will be scanned in a cart and customers have their credit card or checking account automatically billed for their purchase. If the company has RFID tags embedded on every item at their supermarkets, the customers will bag and walk out without going through a long checkout lines. Thus, the company first would like to conduct a survey to find out customers' interests and concerns of using the RFID tags. The survey was distributed randomly to thirty people in New Jersey. Eighteen complete responses were tabulated for the final results.

The survey results show that the customers would choose for RFID equipped stores because of the ability to avoid long checkout lines. However, they are very concerned about security, accuracy and personal privacy. Therefore, they are somewhat willing with the idea of using RFID tags for a quick checkout. When the technology will become more secure and more advanced, the customers will be more willing to use the automated checkout system by that time.

2. Introduction

Imagine near the future, going to grocery store and filling your cart with the goods that you need, and simply walking out of the store without stopping at a checkout counter. This situation is quickly becoming a reality, and waiting in the checkout line will soon become a thing of the past. The technology that enables this will be a Radio Frequency Identification (RFID) that is becoming more and more present in our daily lives. Soon, every item on every shelf will be fitted with RFID tags, and each item in your bag is scanned as it leaves passing under the RFID reader and the credit card or checking account of your choice will automatically be bill for your purchase. The A&P company considers using RFID tags to identify and checkout items at their stores without going through traditional checkout lanes. Following design is an attractive set of checkout aisles that A&P is targeted at their self service customers.



Fig 1 - Using RFID techniques to scan a cart or basket full of groceries in a few seconds; its features include: a scanner to detect and identify the tag attached to each item; electronic payment with smart cards or magnetic swipe cards.

3. Background

The A&P Company

The Great Atlantic & Pacific Tea Company Inc (A&P) has operated A&P supermarkets since 1880. Over the years, the company has provided needs with freshness, quality, convenient, value places for American families to shop. With corporate headquarters in Montvale, N.J., A&P has 427 stores in the United States under 8 retail banners, which include conventional supermarkets, food and drug combination stores, and discount food stores. Today, Christian W.E Haub and Eric Claus, who are an executive Chairman and Chief Executive Officer, run the company. There are 42,872 currently employs at the company and its annualized sales volume is approximately \$11 billion.

As the company grows, it provides more convenient, flexible services to customers at checkout lines. Five years ago, the automated checkout lanes were installed at supermarkets using bar code technology. The system provides all the functionality that a regular checkout lane provides, including accepting frequent shopper card, scan articles with UPC, checkout of non-UPC items like produce, vendor or store coupons, handle payment in cash, credit card, debit card, check, and food stamps. Today, the company is interested in operating their automated checkout system using RF ID tags at their retail supermarkets throughout the United States

Radio Frequency Identification (RFID) technology

RFID is an automatic identification method, relying on storing and remotely retrieving data using devices called RFID tags. An RFID tag is a small sticker-like object that can be attached into a product, animal, or person. These tags contain small antennas and silicon chips which capable of transmitting a unique serial number a distance of several meters to a reading device in response to a radio frequency query.

There are three main types of RFIDs. The first type is a Passive tag, which does not contain battery. This tag is simply powered by the antenna from an incoming radio frequency signal. Passive tags are the type of tag that people have inserted under their animals skin for tracking purposes. The second type of RFID is the Semi-passive tag. This tag has a small battery added on to it. There is a third type of RFID tag called an Active tag which has a longer range, and larger memory capabilities than the other two types of tags.

The RFID technology and the subsequent RFID tags focused on in this report have been around during the early twenties era that's considered the birth of radar time. Radar sends out radio waves for detecting and locating an object and it lead into the creation of Radio Frequency Identification. However, Leon Theremin was the first known for inventing RFID tag in 1945 for the Soviet government. Theremin's tag was more of a listening device.

During the 1990's, RFIDs were used in the express toll business, which transmits a signal every time a car drives under the RFID receiver unit. Today, these tags are used in many things. For instant, some big companies, like Wal-Mart, are using tags to monitor in and out of large containers at warehouses. Below is a diagram that shows how RFID tags identify and track items through the supply chain.

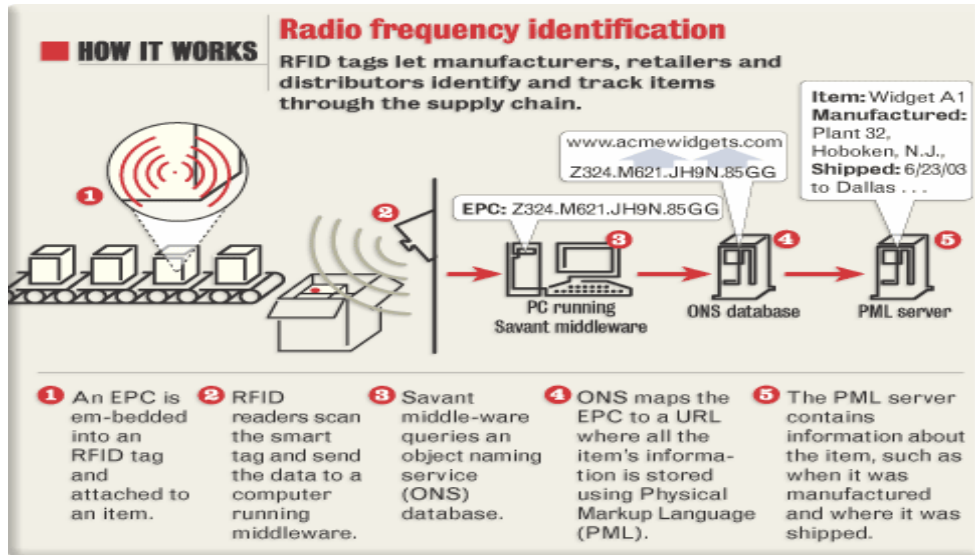


Fig 2 - RFID tags identify and track items through the supply chain

4. Purposes

Completely automated checkout where the customers simply place groceries in their cart and walk out will soon become real. RFID tags will be used to identify many types of products that will be implanted on a part of different products including groceries, apparel, books, and toys. The purposes of this needs assessment report are to conduct a survey to help the company providing more effective needs for customers and also the company.

5. Limitations

One limitation of online survey is lack of response to the survey. It is possible that some people did not check their e-mail or they did not have time to take the survey. A further limitation of this survey concerns the possibility of opinion desirability bias. Specifically, customers were asked in the survey from a small group in New Jersey. The survey was not covered across of America. Therefore, respondents' opinions and attitudes toward this survey might not be the same like other people from different areas.

6. Questions

Survey Questionnaire

The survey questions are a compilation of information provided by Opinion Center. The survey identifies key trends, challenges and issues related to those working with RFID technology. Customer inputs are very important to this survey.

1. How familiar are you with the coming use of RF ID tags?
 - Familiar with the concept
 - I heard something about it
 - I hadn't heard about it
 - I don't have any idea
 - I read the explanation above & still have no idea what it is

2. RF ID tags will be implemented in secure environments. How willing would you be to shop where they are used?
 - Very willing
 - Some what willing
 - Not willing at all

3. For what types of products might you be willing to use RF ID tags?
 - Groceries
 - Toys
 - Auto repair parts
 - Clothing
 - Books
 - Home appliances
 - Hardware store purchases
 - Retail drug stores (toiletries, etc.)
 - Furniture
 - Others:

4. Do you think RF ID tags could work effectively on most products you purchase?
 - Yes
 - No
 - Yes, it sounds simple enough to work

If you were familiar with RF ID tags before reading this survey, please indicate where you heard about it.

5. Do you believe that RF ID tags can be totally secure?
 - Of course totally accurate
 - Somewhat secure
 - Probably not totally secure, but enough to make them useful in many applications

6. Do you believe that RF ID tags can be totally accurate?
 - Of course totally accurate
 - Somewhat accurate

- Probably not totally accurate, but enough to make them useful in many application
7. Do you think petty theft in retail stores would decrease after implementation of RF ID things?
- Definitely yes
Possibly
Probably not
8. What is your first impression about RF ID tags being used in stores where you now shop?
- More convenient than today's checkouts
Different, but about the same as traditional checkouts
More difficult to use than today checkouts
9. If RD ID tags were used in stores where you now shop, would you use them to check out more quickly?
- Definitely yes
Probably, but I'd have to think about it
Definitely not
10. If after shopping at your favorite grocery store you had a choice of:
- A) bagging and walking out, or,
B) going through a traditional checkout lane, which would you use?
- Bag & walk out
Traditional checkout lane
11. Please list any concerns and questions you have the RF ID function as it would be implemented in grocery, toy, book stores and eventually everywhere products are sold _____
12. Female or Male
13. My age group is
- Under 20
20-29
30-39
40-49
50-59
60-69

7. Methods

The main source of this assessment's data was derived from the survey.

Online Survey

Knowing what consumers want is the key factor to success in any type of business. The A&P needs to know what the public thinks and wants in using the automated checkout system. The best way is to conduct a survey to see how the customers react on using RFID tags for a quick checkout. Thirty individual from 19 to 63 years old were randomly chosen and asked to complete the survey online. Eighteen people responded to the survey.

8. Instrumentation

Zoomerang software provides a powerful tool to conduct accurate, comprehensive surveys for free or with a minimum of cost and effort. For this needs assessment report, Zoomerang tool was used to complete the survey.

9. Results

RF ID tags and automated checkout system concept

Although RF ID tags are still a relatively new concept, 77% of respondents indicated that they are familiar with the technology and products or have heard about it. There were just only 22% of respondents that had not heard about RF ID tags.

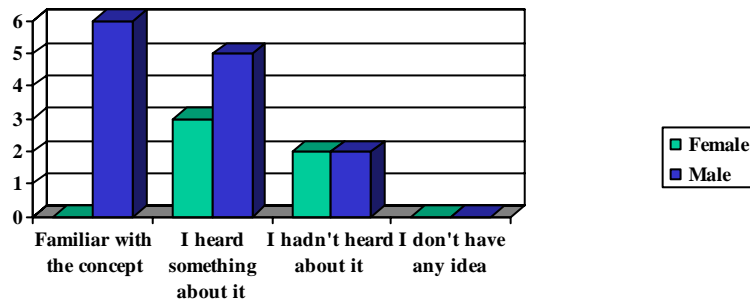


Fig 3 - Most of male respondents from 30 to 49 years old are either familiar with the concept or have heard about it. Women, young and elders were still trying to catch up with it.

Interest Level

A whopping 100% of respondents indicated that they were somewhat or very willing to use RF ID tags for automated checkout if the tags were implemented in secure environments. The main reason associated with this interest and

willingness because the idea of bagging and walking out without going through a traditional checkout lane is great.

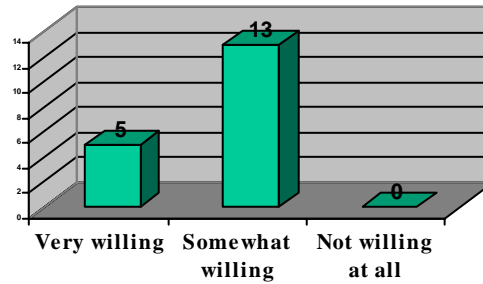


Fig 4 - Respondents are probably willing to use RF ID tags if they are implemented in secure environment. Without doubt, customers are still new with the idea of using automated checkout system.

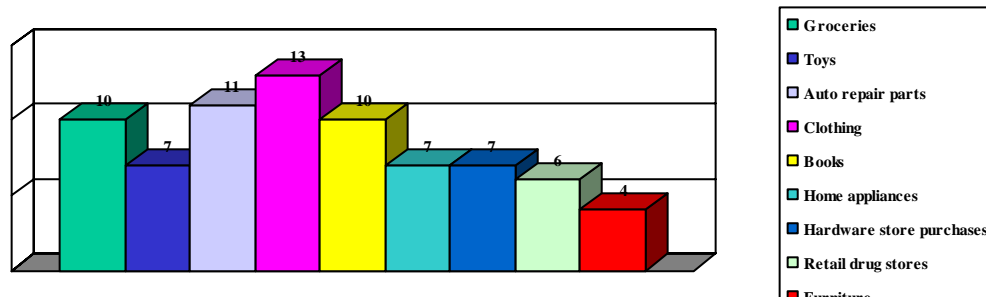


Fig 5 – Clothing, toys, groceries and books are type of products that respondents would be willing to use RF ID tags when they shop in stores.

Benefits and Drawbacks

All of respondents loved the idea that they just bag and walk out. However, security, accuracy and personal privacy were the issues that made respondents somewhat willing to use the automated checkout system

Benefits

- 83% liked the fact that the automated checkout would be more convenient than today's checkouts.
- 94% respondents believed petty theft in retail stores would decrease after implementation of the RFID tags
- 73% believed that RF ID tags could work effectively on most products they purchase e.g. clothing, groceries, auto repair parts...etc

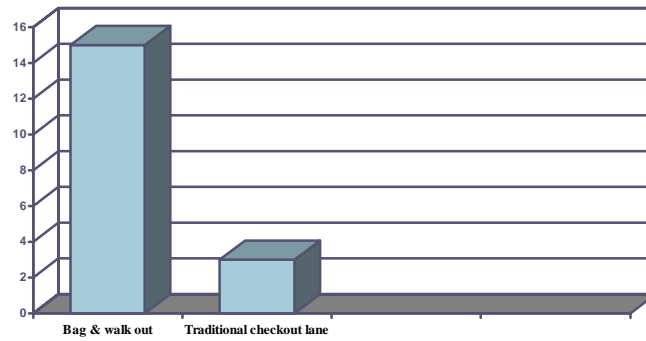


Fig 6 - Of 18 people surveyed, 15 preferred to have a choice of bagging and walking out

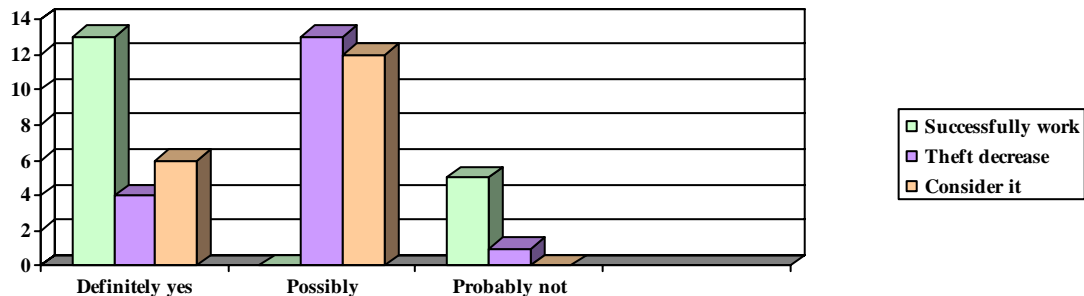


Figure 7 - More respondents definitely believed that using RF ID tags could work effectively on most products and could prevent theft in stores. In contrast, they possibly used the system if the tag were used in stores where they shop. Again, customers were confident on how well the tags worked but they were expecting the technology to be more advanced before they were willing to use the system.

Drawbacks:

- All of respondents did not think that using RF ID tags were totally secure while 100% respondents believed the RF ID tags were somewhat secure, or not totally secure but enough to make them useful in many applications.
- 82% thought the RFID tags were somewhat accurate. There were only 18% respondents truly think RF ID tags are accurate.
- 35% expressed concerns about security and personal privacy invaded when using RF ID tags.
- 66% respondents just somewhat consider using RFID tags if they were used in stores where they are now shop.

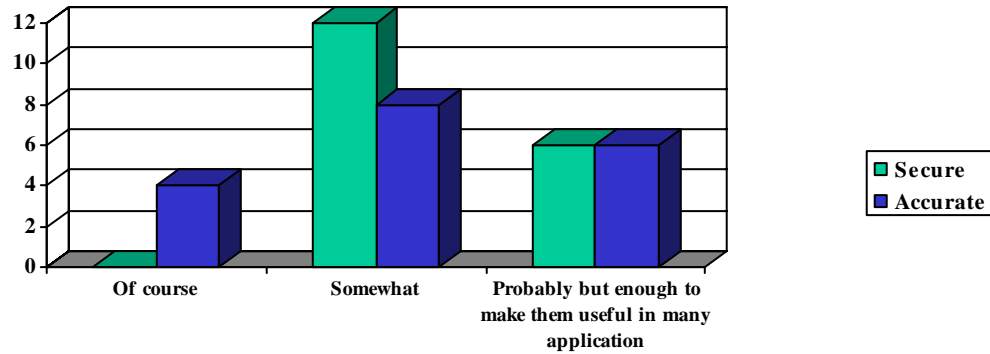


Fig 8 – None of the respondents believed that RF ID tags were totally secure but few thought they could be accurate. If the customers did not think the tags were totally secure, they would be more hesitate using the automated checkout system

10. Recommendations

Radio frequency identification (RFID) tagging is an alternative to bar coding for automated checkout at the A&P supermarkets. The technology promises a streamline operation by enabling automated checkout and providing better theft protection. Yet RFID is controversial because of the privacy and secure issues. Majority of respondents from survey would love to use the automated checkout system but they are still uncertain and still don't trust the system totally for security and accuracy. Besides, they are concerned about their privacy invaded. Therefore, they are still not totally sure and totally support the automated checkout system. As a result, the A&P supermarket needs to wait until the technology become more secure and more advanced. Then, its benefit and accuracy can make consumers more willing to use this technology without a doubt.

11. Summary

There were some limitations when conducting this survey because of time and cost limited. Over all, the inputs from the survey were very helpful to analyze this report. The results have showed how seriously customers are concerned about the security, accuracy and personal privacy. They wanted to wait until the technology become more secure and more advanced. Then they would be more willing to use the automated checkout system. In conclusion, the results were able to help the company understood more about customers' interests and concerns.

12. References

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