Extent of QR Code Adoption by Consumers

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Abstract

Quick Response codes (QR codes) were developed 20 years ago for use in auto manufacturing plants. Today, the technology is commonly used by marketers to drive consumers to their websites. QR codes can be found in advertisements, retail stores, airline boarding passes, restaurant menus, product instructions, and numerous other applications. The technology is available free for any smart phone user with a simple download. With the interest by businesses in conveying information through QR codes, the question asked by this research was the extent that consumers had adopted the technology and which applications were most useful. Results indicated almost universal awareness of QR codes but very little continued use. The Technology Adoption Model (TAM) was used to suggest that while the QR codes are easy to use, the content does not appear to be sufficiently robust to warrant continued use.

Keywords: QR codes, Adoption Model, TAM

1. Introduction

Quick Response (QR) codes were first developed in 1994 for use in the Japanese automobile industry to track parts in manufacturing plants. DENSO WAVE, a subsidiary of Toyota Motor Corporation, is credited with the development and (free) distribution of the technology.

Using a two-dimensional scheme, these codes provide more information than the standard bar codes commonly used for product inventory by manufacturers and retailers. Unlike bar codes, which must be read with a light beam, QR codes are read with an optical device similar to the camera on a typical smart phone. With smart phone market share over 50% of all mobile phones (ComScore, 2012) and rising, the ability to access QR code information is more omnipresent than ever.

QR codes, which are a form of action tags, have several inherent advantages over traditional bar codes. First, the software to build them is free and can be used without license. Second, they are capable of containing more information within the same footprint as a bar code. Third, any smart device with a camera and the proper application software can read them, and the application is free to the user.

QR codes are not the only form of action tag. Microsoft tags and digital water marks are also examples in the retail space of embedding gateways to additional information, features and/or security. However, QR codes currently represent 85 percent of all action tags in use in the top 100 magazines. (Matus, 2012)

The purpose of this study is to gauge how widespread is consumer adoption of QR codes and which applications are most often used.

2. QR Code Use

2.1 QR Code Placements in Advertising

Ralph Lauren was one of the first to use QR codes in its print advertising campaigns in 2008. Placing QR codes on upscale apparel print advertisements, store windows, and mailers offered users the opportunity to be quickly transported to the Ralph Lauren website where additional information on products and styling could be found. According to the marketing firm Nellymoser, in December 2001 QR codes appeared in 8.4 percent of all magazine ads, up from 3.6 percent at the start of the year. (Matus, 2012)

2.2 QR Codes Use in Retail

As the use of smart phones with cameras has increased so has retail interest in the use of QR codes. Recently, the Multichannel Merchant completed a survey comparing retail use of QR codes in 2011 and 2012. While only 8 percent of merchants reported that they were using QR codes in 2011, by 2012 that number had increased to 47 percent with another 15 percent considering it. (Lemenager 2012)

In a recent study examining the types of stores using and shoppers targeted, it was found that stores targeting shoppers from 14-30 with moderately priced merchandise were more likely to use QR codes. Retailers such as American Eagle, Forever 21, Sephora, the Gap, and Pottery Barn Teen were all seen to use QR codes. (Carver, 2012) Typical applications for QR codes at the retail level include: front window displays, fitting rooms, register displays, product displays, advertisements, product information, and instructions.

2.3 QR Code Access by Users

With such widespread and growing use of QR codes on the supply side, the questions that must be asked, are the extent to which customers are actually using QR codes, and for what purpose(s). In a 2011 study ComScore found that about 6.2% of the mobile phone users had used their phone to scan a QR code in June. (ComScore, 2011) In a study of college student usage of QR codes, Sago found that males were more likely than females to use QR codes, but overall, less than 13% of all college students had ever tried a QR Code. (Sago, 2011) Given the growth of smart phone usage and the fact that the application reader is free, it is surprising that the percent of users is so small, especially since retailors and advertisers have embraced the technology.

3. Technology Acceptance Model

A possible explanation for reported low usage rates may be found in the technology acceptance model (TAM) first proposed by Davis in 1989. The model identified two principle factors in the adoption of information systems technology: ease of use and perceived usefulness. The TAM model suggests that the attitude toward the information system product is shaped by the two factors and these lead to behavioral intention to use. (Davis, 1989) In the case of QR codes, apparent lack of interest in using the system may be a function of either ease of use or perceived usefulness.

4. Research Questions

Given the sharp increase in QR code use by retailers and advertisers, this research sought to understand the extent of QR code adoption by consumers. Using Rogers (2003) adoption model – knowledge, persuasion, decision/implementation, and confirmation – as the framework, the following research questions were investigated:

- Likelihood consumers have heard of QR codes (knowledge)
- Likelihood that consumers have downloaded a reader on their smart phones(persuasion)
- Likelihood that consumers used their smart phones to read at least one QR code(decision/implementation);
- Likelihood that consumers will continue to use QR codes(confirmation)
- With which applications have consumers used QR codes

5. Methodology

The data was gathered through a convenience sample with an on-line survey. Undergraduate students enrolled in a marketing research course at a southern university were instructed to email friends or Facebook a request to complete the survey. Additionally, the request included a request to respondents to send the questionnaire to their friends to complete.

A total of 419 usable questionnaires were completed. Demographics of the sample included:

55% female, 45% male;
69% under 41 years of age, 31% who were 42 years of age or older;
48% with an associate's degree or less, 52% with at least a bachelor's degree;
44% earning less than $50,000 annually, 56% earning $50,000 or more annually
27% full-time students, 73% part-time students.

6. Results

6.1 Knowledge

Knowledge of QR codes was very high within the sample. Ninety-three percent of the respondents reported that they had seen QR codes somewhere. Men were significantly more likely ($p < .05$) to recall seeing QR codes than women, with 96 percent of the men and 90 percent of women to have seen. Still, both genders exhibit high degrees of awareness of QR codes. The only other demographic showing significant differences was age with younger respondents significantly more likely ($p < .05$) than older respondents to have seen QR codes.

6.2 Persuasion

To test the persuasion component in QR codes, the number of individuals who had taken time to download a free application on their smart phone was used. Overall, 59% of all individuals surveyed have downloaded a QR code reader on their smart phone. Therefore it would appear that the majority of individuals with the means to use QR codes exhibited enough interest to down load the reader. Interestingly however, 10% of those who had downloaded a reader indicated they no longer had the reader due to changing phones or deleting it. Thus nearly 6% of those with initial interest are no longer interested in the technology.

6.3 Decision/Implementation

The percentage of all sample respondents who tried a QR code was 46%. Therefore it can be concluded that if a smart phone user down loads the application, it is likely that they will try QR codes at least once. Interestingly, 13% downloaded the reader but never tried it. It was not clear from the data why these smartphone users took the time to download the application and then did not try it at least once.

6.4 Confirmation

To test confirmation, respondents who had tried QR codes at least once were asked if they planned to continue to use them. Only 53% said that they were likely to continue to use the codes. Further, of those who had tried QR codes,82% felt that QR code technology had worked satisfactorily. This suggests that the QR code reader had worked well, but the content did not warrant further use. This would tend to confirm the TAM model prediction that a new technology must have both ease of use and useful content to be adopted. In the case of QR codes, respondents did not have a problem using the technology, but since almost half were not planning to use the codes again and 10% no longer had the application on their smart phones, the perceived usefulness of QR codes appears in question.

7. Applications

To understand possible applications, respondents were presented a list of applications that was selected from a list of 100 applications (Simgrod, 2010). The scale used for each application was: (i) never used, (ii) used once or twice, (iii) used once or twice a month, (iv) used once or twice a week, and (v) used once or twice a day. Only respondents who said that they had tried QR codes at least once were allowed to answer this question. The median response is shown on table 1 below.

Table 1: Application Usage

Advertisement	Once or twice
Boarding Pass	Once or twice
Product Information	Once or twice
Business Cards	Never
Product Instructions	Never
Restaurant Menu	Never
Travel Brochure	Never
Magazine Product Information	Never
Google Maps	Never
Movie Advertisements	Never
Home Sales Information	Never
Political Campaign Information	Never

When asked for other applications, the following were mentioned once; floor plans, concert seating, golf course hole information, and flyers. It appears that even among those who use QR codes, the use is infrequent.

8. Conclusion

It appears that QR codes may have quickly become the latest technology fad to burst on the scene but may just as quickly recede into a black hole of different-but-not-necessary gadgets. Initially QR codes offered consumers a convenient gateway to on demand additional information which popped up on smart phones with a click of a button (the QR reader). But the promise of information worth the effort appears lacking. Consumer knowledge was high, and resulted in a majority downloading the app. In addition, most followed through by using it at least once. Hence, one-half of Davis' technology acceptance model was validated as users found it easy to use the technology.

It seems that consumers were not sufficiently fascinated by their resulting experience to sustain a behavioral change to repeat the experience. Perhaps the information at the website was not stimulating, interesting, or compelling, or perhaps consumers expected a "reward" for completing the circuit to arrive at the retailer's website. Whatever the reason, QR codes apparently offer consumers a diversionary treasure hunt without the pot of gold at the end.

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