An Empirical Study of Consumer Motivations to Use QR Codes on Magazine Ads

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Abstract

Consumers are offered an ever expanding array of telecommunication instruments by technology companies. Electronic software applications are developed in many different forms in order to serve customers' needs. In the advertising medium, smart phone QR code reader applications allow consumers to scan QR codes on magazine ads. In order to study consumer motivations to use QR codes on magazine ads, we used conclusive research. We found that consumers are motivated by getting some sort of promotion offered by the business when they scan a QR code on a magazine ad; they are looking for a useful link where they can get relevant product information and see customer reviews; and they are motivated by being entertained throughout the experience. We found that consumers who are more involved with promotional deals are especially important for marketers who choose to add QR codes to their magazine ads.

Keywords: Mobile Recognition Instruments, QR Codes, Magazine Advertising, Technology

Introduction

Consumers are offered an ever expanding array of telecommunication instruments as a result of rapidly improving technology. Electronic software applications are advancing in many different forms in order to serve customers' needs. In the advertising medium, smart phone QR code reader applications allow consumers to scan QR codes on magazine ads (Klie, 2012). A QR code is an alternative terminology for a "Quick Response", or "2D" barcode that can be scanned by a mobile device. QR codes link the mobile device to plain text, Uniform Resource Locator (URL), Short Message Service (SMS), or contact information embedded into a 2D matrix. (eMarketer, 2012).

When consumers scan QR codes on magazine ads, they are linked with the relevant business. They can learn more about the product in the ad and take advantage of sales promotions. They can explore other products offered by the business and remain educated on upcoming offerings. QR code scanning applications are set to become even more popular and offer more creativity (Akhtar, 2012).

In the U.S. market, smart phone penetration rate was 62 percent in the second quarter of 2013 and it increased to 64.7 percent in the third quarter (Nielsen, 2013). Parallel to this, spending on mobile recognition, of which QR codes are a primary component, will reach $364 million by 2015(Marketing Charts, 2013). As for QR codes printed in magazines, nearly 40% of Americans between 18 to 24 years old and 36% of Americans between 25 to 34 years old reported having scanned one (eMarketer, 2013). Overall, the number of QR code users is rising. As people become more reliant on technology, advances such as QR codes make it easier to connect businesses and consumers (Jones, 2012). The companies that choose to implement QR codes in their advertising campaigns gain an advantage because they are inexpensive to set up and use. Mobile recognition instruments such as QR codes are set to shape the marketing scene in the upcoming years.

Literature Review

Marketing research is slow in coping with the breath of this quick change. Currently, there are few studies in the marketing literature that studied this phenomenon. Jung, Somerstein and Kwon (2012) looked at the motivations of young consumers for using QR code advertising. However, their exploratory study is about QR code advertising in general and not specific to any particular medium. Similarly, Sago (2011) studied this topic in terms of effectiveness of QR codes in integrated marketing communications in general. As smart phone market matured in the U.S. and the adoption has reached the late majority phase (Nielsen, 2013), the consumer market is vastly different. Also, the applications themselves have gone through drastic changes. Therefore, consumer motivations for technology usage are greatly altered. Hence, the findings of these studies need to be updated in light of these changes.

On the international domain, Narang, Jain and Roy (2012) applied the elaboration likelihood model to QR code usage in magazine ads. However, their study is exclusively focused on consumes that live in India. Narang, Jain and Roy (2012) recommend that due to the lagging technology diffusion rates and different population demographics of India with the rest of the world, there is a need to explore this subject in other countries. Finally, Okozaki, Li and Hirose (2012) explored the motivations to use QR codes in advertising. However, their study is conducted exclusively with Japanese respondents. Hence, according to Okozaki, Li and Hirose (2012), there is a need to study this subject with North American consumers where there is a different technology diffusion rate, and a different culture about technology adoption.

Overall, there are no empirical studies in marketing literature that examined American consumers' motivations to use QR codes in the context of magazine ads. Technology products have very short lifecycles and fast diffusion rates. Therefore, there is a need for updated studies that reflect these changes. Also, there is a need to focus on a particular medium because the dynamics of various advertising media are different. Recent studies show that consumers in the U.S. are more familiar with scanning QR codes located on magazines than any other media such as posters, mail, product packaging, website, e-mail or television (eMarketer, 2013). Hence, a focus on magazines deserves particular attention. Due to the practical importance of this subject, efforts to develop an empirical analysis of what affects shoppers' motivations to use QR codes on magazine ads in the U.S.is exigent.

Specific Goals

This study focuses on retail consumers that are active technology adopters. In order to study their motivations to use QR codes in magazine ads we used conclusive research. Our research mission was to quantitatively assess the salient dimensions of consumers' states of being (demographics), states of mind (motivations related to the usage of QR codes in magazine ads), and states of action (consumer behavioral intentions to use QR codes on magazine ads). Specifically, we focused on Generation X and Generation Y as they are the main segment of retail consumers that are existing technology adopters. Consumers in these generational segments are tech savvy, more educated and resourceful and hence profitable target markets for technology products. Overall, this study explores a relevant and timely situational context for consumer behavior, by proposing an empirical framework that studies the topic among current adopter categories.

Theoretical Framework

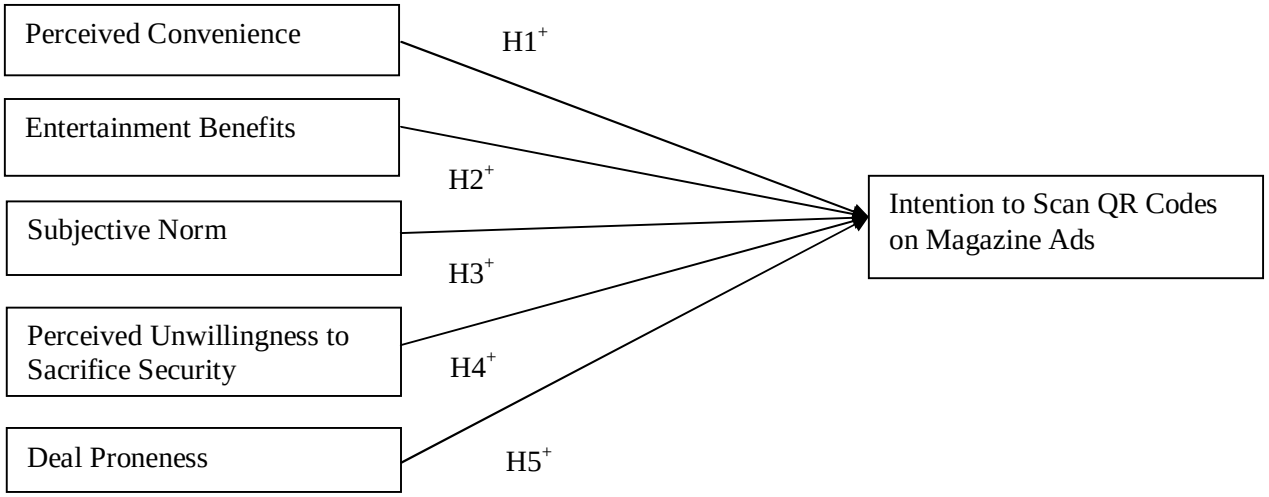
This study uses the theoretical lens of technology acceptance model (TAM) (Davis, 1986, 1989; Davis, Bagozzi and Warshaw, 1989), and theory of planned behavior (TPB) (Ajzen, 1991), combined with consumer general deal proneness (Lichenstein, Netemeyer, and Burton, 1995) (or involvement with sales promotion deals) and perceived unwillingness to sacrifice security.

Introduced by Davis (1986), the TAM is adapted from the theory of reasoned action (TRA) (Fishbein and Ajzen 1975) for modeling user acceptance of information systems. The goal of the TAM is "to provide an explanation of the determinants of computer acceptance that is general, capable of explaining user behavior across a broad range of end-user computing technologies and user populations, while at the same time being both parsimonious and theoretically justified" (Davis, Bagozzi and Warshaw 1989).

Conceptual Model and Hypotheses

The model of this study is based on the following constructs – perceived convenience (PC), perceived unwillingness to sacrifice security (SS), subjective norm (SN), entertainment benefits (EB), deal proneness (DP) and the behavioral intention to scan QR codes on magazine ads (Figure 1)

Figure 1: Model for Behavioral Intention to Use QR Codes on Magazine Ads



QR codes on magazine ads provide both utilitarian and hedonic benefits for consumers. PC embodies the utilitarian function of QR codes by reflecting consumer perceptions of information convenience and motivations for savings. EB indicates the entertainment and excitement that comes from trying something new and interesting. Consumers enjoy the experience of scanning an interesting looking rectangular object on the colorful pages of a magazine adby an ever improving electronic device in their hands. Thus scanning QR codes on magazine ads have the potential to provide a hedonic benefit for consumers.

According to TAM, perceived usefulness is defined as "the degree to which a person believes that using a particular system would enhance his or her job performance" (Davis 1989).Perceived convenience is defined with the dimensions of usefulness;"the degree to which a person believes that using a particular system would enhance his or her job performance"(Davis 1989); and perceived ease-of-use;"the degree to which a person believes that using a particular system would be free from effort" (Davis 1989).The concepts of usefulness and ease of use are not only related in the case of technology adoption, but are closely linked to the perceived value of QR code benefits, as derived from the expected utility theory(Angeles 2007). In this regard, Hossain and Prybutok (2008) combined these concepts in "perceived convenience" (PC) construct as applied to the adoption of technology. Based on these, we state that;

H1. There is a positive relationship between PC and behavioral intention to scan QR codes on magazine ads.
H2. There is a positive relationship between EB and behavioral intention to scan QR codes on magazine ads.

Theory of planned behavior (TPB) (Ajzen 1991) which follows theory of reasoned action (TRA) emphasizes that human behaviors are governed not only by personal attitudes, but also by social pressures and a sense of control (Ajzen 1991; Ajzen and Fishbein 1980; Fishbein and Ajzen 1975). Subjective norm (SN) isa component of TRA (Fishbein and Ajzen 1975) and is defined as the "degree to which significant individuals, such as relatives, friend, or colleagues, condone an act" (Ajzen 1991; Fishbein and Ajzen 1975). According to theory of reasoned action, behavior is determined by an individual's intention, explicit plan or motivation to commit a specific act. Thus, SN affects behavioral intentions. TPB assumes that rational considerations govern the choices and behaviors of individuals, and perceived behavioral control or the extent to which individuals feel they can engage in certain behaviors, also affects their intentions and behaviors (Ajzen, 1991). Hence, we state that;

H3. There is a positive relationship between SN and behavioral intention to scan QR codes on magazine ads.

According to the expected utility theory (Mongin, 1997), the decision maker chooses between uncertain or risky prospects by comparing their expected utility values of each choice. The decision maker checks for the weighted sums obtained by adding the utility values of outcomes multiplied by their respective probabilities (Mongin, 1997).Stated differently, consumers execute as swift benefit-cost analysis procedure in their minds in terms of the available information. They weigh the trade-offs before they decide to carry on in exchange transactions involving information. This means that whether consumers prefer to reveal personal data in exchange for some social or financial benefit is subject to their own internal assessment that they will not experience negative consequences for cooperation (Rust et al 2002; Milne and Gordon 1993).

Shoppers confronted with the choice of using a QR code on a magazine ad would be dealing with this trade off (Angeles 2007). Based on this argument, Hossain and Prybutok (2008) defined perceived security as the degree to which a consumer feels protected against security threats resulting from the use of technology. In this study, we focused on the perceived unwillingness to sacrifice security dimension of perceived security concept (Hossain and Prybutok, 2008) and adopted this to our research question. When consumers are unwilling to sacrifice security, they are less likely to use new computing systems. Therefore;

H4. There is a negative relationship between perceived unwillingness to sacrifice security and behavioral intention to scan QR codes on magazine ads.

Lichenstein, Netemeyer, and Burton (1995) defined consumer general deal proneness as an eight-item scale measuring a consumer's enjoyment of sales promotion deals and tendency to buy products associated with such offers. It reflects a general tendency rather than the likelihood that the behavior occurs for any particular product category. Consumer general deal proneness (Lichenstein, Netemeyer, and Burton, 1995) was also referred to as involvement with sales promotion deals. It is found in the literature that general deal proneness has a strong relationship with most of the marketplace behaviors. QR codes on magazine ads can be used to provide consumers with coupons, contests, sweepstakes or other promotional deals by marketers. We argue that consumers who are involved with sales promotion deals would be more interested in using QR codes on magazine ads. Thus,

H5. There is a positive relationship between DP and behavioral intention to scan QR codes on magazine ads.

Methodology

Descriptive research, based on survey analysis, was used to study relevant dimensions of consumer motivations toward QR codes on magazine ads among the target consumer groups. The use of a quantitative research approach is suitable for the problem that we studied because there are existing applicable theoretical frameworks for the phenomenon under investigation. However, existing research does not address our research question because of a lack of focus on a particular medium. Also there are changes in marketing strategy variables, including the technological and sociocultural novelty as well as the modifications of the product itself. Descriptive research would provide insights into research questions where there are existing concepts to define the research objective (Burns and Bush, 2010).

To test the hypothesized relationships, data was collected from a sample of students in Midwest at Astate University through a paper based in-class survey. We used pre-existing scale items that were previously validated in the literature (Table 1).

Table 1: Construct-Wise Sources of Pre-Existing Scales

	Construct	Source
Dependent Variable		
is	Usage Intention (behavioral intention to scan QR codes on magazine ads)	Okazaki (2008); Jung, Somerstein and Kwon (2012)
Independent Variables		
pc	Perceived Convenience	Adapted from Hossain and Prybutok (2008)
eb	Entertainment Benefits	Adapted from Dwyer and Kim (2011); Jung, Somerstein and Kwon (2012)
dp	General Deal Proneness (Involvement with Sales Promotion Deals)	Lichenstein, Netemeyer and Burton (1995)
sn	Perceived Cultural Influence Dimension: Subjective Norm	Ajzen (1991); Malhotra and Galletta (2005)
ss	Perceived Unwillingness to Sacrifice Security	Ajzen (1991); Malhotra and Galletta (2005)

Survey instrument design. For behavioral data collection for this research, all items were rated on a psychometric scale for the main constructs. A six item Likert scale that ranged from "Strongly Disagree" (1) to "Strongly Agree" (6) was employed, to exclude neutrality in responses. We concluded our survey with demographics questions.

Analysis and Results

The final sample of this study consisted of college student respondents. The sample is representative of the target demographic (Table 4). The surveys were administered through April - May 2014by professors of several classrooms with sizeable non-traditional student population. Overall, 162 students participated in surveys. Twenty one responses were invalid because all or most questions were left unanswered. With 141 valid responses, the requirement for the minimum final sample size of the data for exploratory factor analysis (EFA) was satisfied for a medium effect size and five predictors (see Table 2). The detailed demographics of the surveyed students show that respondents were members of Generation X and Y. Hence the results have acceptable external validity, and consequently generalizability to Generation X and Y (Huck 2008; Kerlinger and Lee 2000).

Table 2: Profile of the Survey Respondents

Demographics (sample size=141)		**Frequency***	**Percentage****	
Gender	Male	60	42.5	%
	Female	79	56	%
Age	18-21	58	41.1	%
	22-25	56	39.7	%
	26-29	8	5.7	%
	30-33	7	4.9	%
	34-37	2	1.4	%
	Over 37	6	4.2	%
Education Level	Some High School	2	1.4	%
	High School / GED	67	47.5	%
	A.A. or A.S. Degree	23	16.3	%
	Bachelors Degree	47	33.3	%
	Masters Degree	-		%
	Doctoral Degree	-		%
Annual Household Income	Below $20,000	65	46.1	%
	$21,000 – 40,000	23	16.3	%
	$41,000-60,000	19	13.5	%
	$61,000-80,000	11	7.8	%
	$81,000-100,000	11	7.8	%
	Above $100,000	9	6.4	%
Employment Status	Unemployed	27	19.1	
	Part-time	83	58.9	%
	Full-time	15	10.6	%
	Summers Only	14	9.9	%

*Two respondents did not provide demographics data.
**Percentages based on N=141

Analysis. We conducted a principal component analysis with varimax rotation in order to study the internal factor structure of the scales (Table 3).The bivariate correlation chart showed higher within-construct correlation than across-construct correlation in the case of each of the five constructs. The items loaded on five factors with eigenvalues greater than one. The factor loadings were above 0.7 which supports construct validity. Factor loadings of 0.5 or higher are preferred according to Hair et al. (2010). Cronbach's Alpha was found to be higher than 0.7 for all the six factors implying acceptable reliability (Nunnaly, 1978). This establishes convergent as well as discriminant validity for the dimensions measured by the model.

Table 3: Factor Structure with Cronbach's Alpha

Subjective Norm	1	2	3	4	5
sn1 My friends would approve my scanning QR codes on magazine ads	0.82				
sn2 My fellow students / colleagues would approve my scanning QR codes on magazine ads	0.814				
sn3 My family would approve my scanning QR codes on magazine ads	0.843				
sn4 Other people who are important to me would approve my scanning QR codes on magazine ads	0.789				
Perceived unwillingness to sacrifice security					
ss1 I am willing to sacrifice secure applications in my decision to use a network computing system		0.824			
ss2 I am willing to sacrifice computer and network system security in my decision to use a network		0.805			
ss3 I am willing to sacrifice protection from malicious software in my decision to use a network system		0.862			
ss4 I am willing to sacrifice user identification and authentication in my decision to use a network		0.836			
ss5 I am willing to sacrifice backup and recovery in my decision to use a network system		0.84			
General Deal Proneness					
dp1 I enjoy buying a brand that is "on deal"			0.822		
dp2 Beyond the money I save, buying brands on deal makes me happy			0.803		
dp3 Compared to other people, I am very likely to purchase brands that come with promotional offe			0.762		
dp4 Receiving a promotional deal with a product makes me feel like I am a good shopper.			0.853		
dp5 I'm usually not motivated to respond to promotional deals on products (reverse coded)					
dp6 When I purchase a brand that is offering a special promotion, I feel that it is a good buy			0.81		
dp7 I feel like a successful shopper when I purchase products that offer special promotions			0.838		
dp8 I love special promotional offers for products			0.598		
Entertainment Benefits					
eb1 I scan QR codes on magazine ads because it makes learning about products more enjoyable				0.609	
eb2 I scan QR codes on magazine ads because it is a fun way to spend my time				0.842	
eb3 I use QR codes on magazine ads because it provides an entertaining escape from my day to d				0.851	
eb4 I use QR codes on advertising when I have nothing better to do				0.847	
eb5 I use QR codes on magazine ads to pass time when I am bored				0.768	
Perceived convenience					
pc1 I am more likely to scan QR codes on magazine ads if it helps in getting me some kind of promotion such as coupons, discounts, free shipping, games, or contests					0.743
pc2 I am more likely to scan QR codes on magazine ads if it helps in getting me to a useful link that provides me relevant product information					0.724
pc3 I am more likely to scan QR codes on magazine ads if it helps in bringing me to quick access e-mail sign-up lists, in case I need to remain in touch with the company for a special					
pc4 I am more likely to scan QR codes on magazine ads if it helps in providing me with the ability to see customer reviews about a product					0.725
pc5 I am more likely to scan QR codes on magazine ads if the code allows me to make an impulse purchase					
FACTOR STRUCTURE: 75.28% of total variance explained	14.5	15.4	20.9	15.6	8.8
CRONBACH's ALPHA for RELIABILITY: For Dependent Variable: 0.911	0.93	0.91	0.92	0.91	0.82

Italized items dropped from analysis

Regression. Stepwise multiple linear regression was performed. The beta weights, t-statistics and the significance values are given in Table 4.

Table 4: Multiple Linear Regression Results

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.858[a]	.736	.726	.72294

a. Predictors: (Constant), DPA, SSA, EBA, SNA, PCA

ANOVA[a]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	196.924	5	39.385	75.357	.000[b]
	Residual	70.557	135	.523		
	Total	267.481	140			

a. Dependent Variable: ISA

b. Predictors: (Constant), DPA, SSA, EBA, SNA, PCA

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	-.814	.262		-3.108	.002
	PCA	.194	.063	.191	3.069	.003
	SNA	.204	.067	.187	3.042	.003
	EBA	.535	.066	.475	8.140	.000
	SSA	-.057	.062	-.044	-.915	.362
	DPA	.280	.066	.231	4.230	.000

a. Dependent Variable: ISA

According to the regression results, the model was found to be significant for intentions to use QR codes (R^2=.73, F(5,135) =75.35, p<.000). Perceived convenience (PC) (β=.194, *p*<.003), subjective norm (SN) (β=.204, *p*<.003), entertainment benefits (EB) (β=.535, *p*<.000), and deal proneness (DP) (β=.280, *p*<.000) are significant at the 0.05 level in predicting consumer intentions to use QR codes on magazine ads and hence support for**H1, H2, H3** and **H5**at 0.05 level. The *p*-value was found to be 0.362 for SS (β=-.057) as the independent variable, and hence no support for **H4**. Thus perceived unwillingness to sacrifice security (SS) was not found to be significant for predicting consumers' behavioral intention to use QR codes on magazine ads

Discussion

In this study, we explored consumer motivations to use QR codes on magazine ads. We used survey research in our study. "Survey research captures a fleeting moment in time, much as a camera takes a single-frame photograph of an ongoing activity. By drawing conclusions from one transitory collection of data, we may generalize about the state of affairs for a longer time period" (Leedy and Ormrod, 2013, p.190). Hence we identified several key findings. Both the utilitarian and hedonic benefits of QR codes on magazine ads are a predictor of consumer intentions to use them. This means that consumers are motivated by getting some sort of promotion offered by the business when they scan a QR code on a magazine ad. They are also looking for getting to a useful link where they can obtain relevant product information and see customer reviews. Getting information through QR codes on magazine ads is efficient because it is easy and free of charge. Marketers who choose to add a QR code in their magazine ad must strive to make the information relevant and efficient for the consumers. Merely proving a link to the corporate webpage would be a big turn off for consumers because they are looking for information that pertains to the product on the ad.

Consumers also scan QR codes on magazine ads because it is entertaining for its own sake. Scanning an interesting looking tiny square on the colorful pages of a magazine adby an electronic device is an appealing and exciting way to get information and being entertained at the same time.

Therefore, creative marketers may consider having games or other interesting instruments as an added incentive to entertain the consumers who scan QR codes on magazine ads.

Consumers are influenced by social factors while using the codes. This is not surprising given the fact that most innovations are diffused in societies under social dynamics. Therefore marketers who like to use QR codes in magazine ads must take into consideration where these codes could be scanned and what kind of peer pressure will likely affect their usage.

Our research points at the importance of consumer general level of deal proneness when it comes to QR code usage on magazine ads. We found that consumers who are more involved with promotional deals are especially important for marketers who choose to add QR codes to their magazine ads. Deal prone consumers are particularly drawn to QR codes on hopes for getting a promotion. Therefore, marketers must try to bring consumers a deal out of their experience with QR codes.

Our analysis also indicated that sacrificing security was not a significant factor that influenced consumers' intentions to use QR codes on magazine ads. This may be explained by the fact that most consumers use their smart phones on network systems without tangible problems. Viruses are not as common for smart phone users as they are for other computer systems. Also, if the QR code on the advertisement belong to a business that consumers trust, than consumers may not feel at risk.

Overall, we conclude that QR codes on magazine ads are a feasible surrogate to printed coupons, mail-in promotions, computer screen browsing and physical store visits for researching and purchasing products. In light of the importance of mobile recognition in the future of marketing, this study is expected to have a significant contribution in the technology and advertising area. Our conclusive approach focused on a particular medium, i.e. magazines. The findings of this study lay the foundation for successive studies that may study future mobile recognition instruments, which may replace the QR codes in magazine ads.

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