CROSS-MEDIA INTEGRATION OF QR CODE: A PRELIMINARY EXPLORATION

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ABSTRACT

This study examines the effectiveness of Quick Response (QR) code loyalty campaigns in two phases. In Study 1, qualitative perceptions of QR code are examined through key informant focus groups. Participants express their positive as well as negative opinions about the use of QR code. In Study 2, we examine the effectiveness of QR code loyalty campaigns in "winning back" inactive customers in terms of repeat purchases. The study manipulates information privacy concerns, level of involvement, and timing of rewards. Results from a scenario-based experiment suggest that when consumers are concerned with privacy disclosure, delayed rewards, rather than immediate rewards, induce greater loyalty among inactive consumers. By the same token, a low-involvement service, rather than a high-involvement service, is likely to develop greater loyalty. Furthermore, there is a significant interaction effect between the timing of the reward and the level of involvement. However, when consumers are not concerned with privacy, neither main effects nor interaction effects are observed. In closing, implications are discussed while limitations are recognized and future research is suggested.

Keywords: QR code; loyalty; mobile device; privacy concerns; reward

1. Introduction

Consumer participation in loyalty programs has flourished in recent years and has become more frequent in service companies [Bolton et al. 2000]. A loyalty program is a marketing program designed to build more involved relationships with customers by providing attractive incentives [Yi & Jeon 2003]. The logic behind this type of program is that loyal customers are a profitable segment as the tend to repeat their purchases, pay premium prices, and bring in new customers by word-of-mouth [O'Brien & Jones 1995]. The use of loyalty programs is particularly important when firms want to win back inactive customers. The present study sheds light on this specific segment: those former customers who have left and not come back of their own accord. How can we get them back through loyalty campaigns by using sophisticated information and communication technology (ICT)?

Recently, more and more firms have become interested in employing Quick Response (QR) code in their promotional campaigns. QR code is a unique, two-dimensional barcode that can be reproduced on a diverse range of printable surfaces (Figure 1). A typical QR code promotion works as follows: First, firms reproduce a QR code in print media. Second, customers scan the code with their mobile device to access a Web page where they are asked to register by providing their personal data in exchange for rewards.



Figure 1. QR code

Note: McDonald's pioneered the use of QR codes in Japan. Here, customers can scan the code printed on a cheeseburger wrapper to retrieve its nutritional information.

In an increasingly competitive market, QR code offers a quick way to attract the attention of inactive clients. However, QR code can also have drawbacks. The success of QR code loyalty campaigns largely depends on customers' willingness to register their personal information. Nevertheless, due to an increasing number of unethical information practices, consumers are more and more reluctant to disclose their private information.

Given this background, this study seeks to address two primary issues. First, we qualitatively examine how consumers perceive QR code in their daily lives. To this end, key informant focus groups were carried out. Second, based on the results of qualitative exploration, we examine what factors influence such loyalty formation in terms of information privacy concerns, timing of rewards, and level of involvement.

Our findings of mixed methods research suggest that consumers may hesitate to access QR code due to a lack of confidence in how their personal data will be handled. However, the timing of reward is likely to hold the key to easing such privacy concerns.

This study contributes to the literature in two ways. First, despite the increasing importance of wireless ICT, QR code promotion has received scant attention in the literature. In fact, our quick search of the Journal of Electronic Commerce Research's database shows that no study has been published on this theme. Second, this study envisages the issues associated with Internet information privacy concerns in a ubiquitous context. Information privacy has been recognized as a prominent issue in e-commerce, but has still received limited attention in m-commerce [Okazaki 2005].

The remaining of the article is organized as follows. We first explain theoretical background in terms of QR code, loyalty program, and information privacy concerns. Then, we describe the objectives, methods, and results of Studies 1 and 2. In closing we draw overall conclusions, while recognizing important limitations and suggesting future research directions.

2. Theoretical background

2.1 Characteristics of QR code

Most two-dimensional (2D) bar codes have high-density data storage capacity for a large amount of data within a small size. Compared with one-dimensional bar codes, 2D bar codes have more complex code structures with advanced features in terms of security, error detection, and correction capability, as well as the ability to encode different languages [Kato et al. 2010]. QR code is a 2D bar code that was developed by Denso Wave in 1994 for tracking parts in vehicle manufacturing [Denso Wave 2010]. The decoding is carried out automatically and easily: There are some free add-on apps (e.g., QuickMark and i-nigma Readers) that scan, read, and decode QR codes simply by positioning the device in front of the code.

QR codes can encode different types of information, such as URLs, e-mail addresses, text, product images, and video. It is easy to use—by simply pointing at the code and scanning it with a mobile app, users can be directed to the encoded information, such as a brand campaign site or coupon download site. Such ease of use makes QR code particularly attractive as a promotional campaign tool. For example, McDonald's employs QR codes on its packaging as part of an ongoing nutritional content campaign to help customers make informed choices [Mobile Marketer 2012a]. Similarly, Starbucks places QR codes on in-store signage that promotes its Verismo system. Additionally, Starbucks is offering to ship the product free to consumers when they scan the QR code and buy it [Mobile Marketer 2012b].

Japan has been one of the countries where QR codes are most penetrated [The Economist 2012]. According to a recent survey, 83.6% of general consumers regularly use and access QR codes [Impress R&D 2007]. QR codes are placed on different media such as magazines, newspapers, posters, packages, labels, and receipts, and play a pivotal role in bridging the gap between these media advertisements and promotional sites in a cross-media strategy. Besides Japan, QR codes have been extended to many countries, including the United States, China, and European nations. For example, according to 3GVision [2011], global usage of QR code increased by 20% from Q2/2011 to Q3/2011, with daily scans coming from 141 different countries (Figure 2). In North America, the growth reached 42.1% and 35.1% in the U.S. and Canada, respectively.



Figure 2. Global growth in QR code use

Source: 3GV ision (2011). Q = Quarter. The growth rate is calculated on the basis of 100% of Q4/09.

2.2 Loyalty program scheme

The focal point of our study is the use of QR code in promotional campaigns; in particular, through customer loyalty programs. The effectiveness of loyalty programs has often been measured by repeat purchases, which have been considered a behavioral aspect of loyalty [Jacoby & Chestnut 1978; Oliver 1997]. Here, our major interest lies in a question as to how firms motivate inactive customers to use the service that they once decided not to use. Although prior research has indicated that in many purchase situations, consumers tend to be passive recipients of product information who spend minimal time and cognitive effort in choosing brands [Hoyer 1984], inactive customers' decision making seems to be more complex.

In this light, Thomas et al. [2004] argued that an area largely neglected in marketing literature is customer winback. Customer winback is "the process of firms' revitalizing relationships with customers who have defected" [Thomas et al. 2004]. Griffin and Lowenstein [2001] suggested that while there is a 60–70% chance of successful repeat-selling among "active" customers, this probability decreases to 20–40% among lost customers. Thus, winning back lost customers could substantially and efficiently increase firms' profitability. This study focuses explicitly on QR code loyalty campaigns as a means to recapture customers.

Dowling and Uncles [1997] proposed a loyalty program framework based on three psychological effects, namely (1) the effect of type (direct versus indirect rewards), (2) the value of the rewards, and (3) the effect of timing. Timing refers to when the rewards can be redeemed. Yi and Jeon [2003] empirically confirmed that these

three effects are significantly intertwined to influence loyalty formation, while identifying involvement as an important determinant. Focusing on the type and timing of rewards, Keh and Lee [2006] replicated their study by testing the effect of satisfaction as an additional determinant of loyalty. The present study extends this line of research by introducing a new perspective: privacy concerns.

Unlike satisfaction in service research, consumer concerns have seldom been examined in terms of the loyalty paradigm. In a way, privacy concerns are not directly related to displeasure that customers feel with what the service provider offers. Instead, privacy concerns stem from the information practice the provider may be engaged in—directly or indirectly—from which personal information may be leaked to a third party in an intentional or unintentional manner [Gauzente 2004]. Although information privacy concerns are not related to satisfaction, such a state of apprehension can be fatal in mobile communication. This would therefore affect the resulting loyalty, because loyalty program acceptance depends on how safe customers feel in accepting the message to access further information.

2.3 Information privacy concerns in loyalty programs

The success of marketing strategies increasingly depends on the effective use of vast amounts of detailed customer transaction data [Culnan & Armstrong 1999]. Most marketers request consumer information in exchange for some economic or social benefit from a loyalty program. However, there are serious questions with regard to the extent to which marketers should be allowed to gather and use personal information without permission [Phelps et al. 2000]. Information privacy concerns surface when individuals perceive information collection procedures as an invasion of privacy [Zhou 2012]. Information privacy can be defined as the claim of individuals, groups, or institutions to determine for themselves when, how, and to what extent information about them is communicated to others [Westin 1967]. Information privacy has become a key issue in marketing in general, and in e-commerce in particular, because the interactive process can collect significant amounts of personal information and store it indefinitely for later use. The organizational literature offers several theories about consumers' information privacy concerns. Malhotra et al. [2004] developed an extended scale to measure Internet users' information privacy concerns, and to identify three factors related to privacy practices on the Internet: collection, control, and awareness of privacy practices. Okazaki et al. [2009] extended Malhotra et al.'s [2004] model in a context of mobile commerce and found that consumers are generally susceptible to the risk of privacy disclosure through mobile promotional campaigns, regardless of the sensitivity of the information requested. Lwin et al. [2007] used a Power-Responsibility Equilibrium framework and examined the antecedents and consequences of online privacy concerns. Their findings suggested that the level of defensive responses would depend on how consumers perceive corporate and governmental policies on consumer privacy protection.

Privacy issues are no longer confined to spam—they have extended to "smishing" or "phishing" in recent years [Thompson & Lee 2012]. For example, QR codes can be malicious if the encoded information includes a hyperlink to a Web site that contains a virus, malware, or fraudulent information. However, research that connects online privacy concerns with wireless ICT has been extremely scarce. The present study is motivated to fill this research gap in a context of QR code promotion.

3. Study 1

3.1 Objective

Study 1 aims at exploring psychological factors that may affect consumers' attitudes toward, or perceptions of, QR code loyalty promotion. To this end, we conducted key informant focus groups. Key informants are defined as individuals who hold sufficient knowledge of, or have experience with, the topic under scrutiny [Marshall 1996]. We used open-ended questions to interview key informants in a series of focus group sessions. The complete transcripts of these sessions were then generated and rigorously coded for the extraction and interpretation of key concepts.

QR code is a quick and easy data retrieval tool, but its success as a promotional tool depends largely on users' psychological factors. If the encoded contents do not attract any attention or arouse curiosity, nobody will access the code. Uses and gratifications perspective indicates that the type of incentive may serve as a motive to use specific media content [Katz et al. 1974]. In our study's context, incentives are the core elements of any sales promotion, and researchers have long focused on monetary incentives [Buzzell et al. 1990]. The more recent trend, however, is to develop a broader framework of perceived benefits that includes both monetary and non-monetary incentives. Due to insufficient knowledge of QR code promotion, it seems reasonable to address the following research question:

RQ1: What primary impressions do consumers have when they find QR codes?

QR code often acts as a cross-media marketing tool because it allows users to switch from one media form to another. For example, when individuals find QR codes printed in a newspaper, they scan the code and "jump" to a Web site where additional information is encoded. In so doing, users also gain greater independence in searching for information, in a way that enables them to control their temporal and spatial flexibility in accessing the coded information. On the other hand, such flexibility may make users feel reluctant to access a QR code. If their surrounding situation—their physical and/or social environment—discourages access at the moment of contact, users may save the code and retrieve the information later; or, with a complete absence of interest, users may ignore the code, or see it as a part of message execution, and thus provide no response activation. This negative aspect of access motivation is explored as the second research question:

RQ2: What are the primary obstacles that impede QR code access?

3.2 Method

We contracted a professional marketing research firm to organize focus groups. Each focus group consisted of five key informants, who were carefully selected from the firm's pool of panel participants. The site of the study was Japan, where QR code penetration is among the highest [The Economist 2012]. In this study, we defined key informants as a select group of experts with special knowledge of, or ample experience with, QR code. Furthermore, we sought a heterogeneous set of mobile users with sufficient experience in QR code promotion. In this light, we first screened the panel participants by age, gender, and occupation. Diversity of professional experience was thought to be especially important in stimulating discussion. Finally, the participants were singled out according to their daily mobile usage (e-mail and Internet browsing) and QR code experience.

One week before the focus group session, the participants were given an "assignment"—to bring eight QR codes that they had actually used—to the discussion. In doing so, they were instructed to record their expectations, anecdotal stories, and personal thoughts related to these QR codes. The participants were paid \$50 for their collaboration. In total, four sessions were conducted. On average, each session lasted 120 minutes. A moderator with sufficient professional experience was hired by the firm. During the session, open-ended questions were used to extract activities, anecdotal stories, thoughts, emotions, and perceptions related to the QR codes. 3.3 Results

<u>Utilitarian benefits</u>: Our research questions sought to determine what motives—both positive and negative—general consumers usually possess when they find or see QR codes. Our key informants almost unanimously responded that their access motives were closely related to utilitarian benefits, such as sales discounts, promotional offers, coupons, and sweepstakes or product samples.

"I sometimes buy canned drinks sold in vending machines that offer many different kinds of give-aways. These firms often use QR codes inside the cans. It's fun to access the code and find out what you can get. Sometimes it's a mobile game or a digital coupon for a free drink." (28, female, office worker)

Discount coupons are not always linked to the QR code. Instead, users may be redirected to Web sites or e-mail addresses that then require some kind of membership through signing up for e-mail magazines. In doing so, users have to register their personal information. Subscriptions to e-mail magazines are often required to receive discount coupons or free samples. Consumer goods, such as beverages, snacks, and cosmetics, typically use this kind of campaign.

"When I scanned a QR code from a Fanta vending machine, I was directed to a campaign Web site. To participate in the campaign, I was asked to enter my e-mail address. This was necessary to receive an e-mail magazine that offers free drinks. I hesitated a little bit, but finally decided to do it." (33, male, school administrator)

Convenience-seeking was one of the key concepts referred to during the sessions. Indeed, given that QR code is one of the few ways to retrieve information without any computing operation, convenience seems to be key to attracting consumers via this tool.

"Many cosmetic brands offer QR code coupons. The other day, I got a 300 yen discount when I accessed a QR code from a flyer! It is so convenient and beneficial." (31, female, secretary)

To our surprise, hedonic benefits proved to be minor motives, compared with utilitarian benefits. Our interpretation is that curiosity arousal or entertainment could have been motives for use when QR codes were initially introduced. However, now that a wide penetration has been achieved, people tend to seek out these codes for rational rather than emotional reasons.

<u>Social nervousness or hesitation</u>: One of the most common comments from participants was how their access behavior in a crowd is perceived by the public. Because consumers can use a mobile device at any time and in any place, users tend to be cautious, in particular in public arenas.

"I usually don't like to scan QR codes when taking public transportation. For example, in the metro, there are many ads with QR codes. But I often hesitate to scan them because of the people around me—they may think I am strange or distracting." (29, male, security trader)

Since metros and railways are major means of passenger transportation in Japan, this type of concern seems understandable. In addition, it should be noted that voice calls are prohibited on public transportation in Japan—silence is a virtue. For these reasons, immediate access of QR codes may not be commonplace.

"When I access a QR code, I prefer doing it at home. I don't like scanning the code on a train or on the street. I

just want to make sure the information I am accessing is safe, and I want to read all the necessary conditions so that my personal data won't be misused." (24, female, university student)

Immediate action on streets or trains may be seen as imprudent, as such circumstances usually oblige people to make a rather hasty decision. Thus, there are two sides to "Quick Response"—a benefit when people seek ubiquitous communication, and a drawback when it is encountered in inappropriate places or at awkward times.

<u>Information privacy concerns</u>: In light of our theoretical framework, these comments reflect general information privacy concerns, which have been identified in e-commerce literature [Gauzente 2004] but documented very little in m-commerce literature. As QR code is a symbol that does not reveal the encoded entities, consumers may feel that when their personal information is collected, they have little control over privacy practices.

"One of my friends recommended that I use a coupon book that lists all kinds of QR codes, but they all look the same. When we access the code, we cannot distinguish whether it is from a famous brand or an unknown brand, or whether the advertiser is honest or dishonest or even obnoxious! Once you scan the code, you feel like all your mobile information is transferred or stolen by the code." (34, male, accountant).

Receiving spam is one of the reasons why some respondents expressed concern over the use of registered personal information.

"When I found a QR code on a coupon in a magazine, I wasn't sure if I wanted to scan it. You know, nowadays, we receive so much spam. We really don't know how our personal information is used...I ended up accessing the code because I wanted to know what it was." (33, male, sales representative)

"When I saw a QR code on a McDonald's Quarter Pounder wrapper, I accessed it immediately to get a discount for my next purchase—with no hesitation at all. But when I see a QR code for an unknown brand, I easily get suspicious, because I had a really bad experience with spam. Nowadays we are so familiar with phishing..." (41, male, dentist)

All in all, while promotional campaigns using QR code could lead to serious information privacy concerns, many consumers were tempted to enjoy the campaign benefits.

4. Study 2

4.1 Objective

The objective of Study 2 is to focus on the cross-media integration of QR code loyalty campaigns. The results of Study 1 indicate that QR codes are often used for promotional campaigns, such as loyalty programs, discount coupons, and sales information, all of which are aimed at increasing market share. At the same time, Study 1 also crystallizes a focal point of our research—accessing QR code may lead to serious information privacy concerns, due to its ubiquitous capacity and ease of use. This leads to two important questions: First, how effective would loyalty campaigns be if consumers were highly concerned with their privacy when accessing QR code? What if consumers were not concerned with disclosing their private information? In addressing these questions, we introduce three additional variables: timing of campaign rewards, involvement, and repeat purchase. Here, timing denotes "whether the rewards can be redeemed immediately or at a later time" [Keh & Lee 2006, p. 127]. Involvement reflects "a strong motivation in the form of highly perceived personal relevance to products or services in a particular context" [Yi & Jeon 2003, p. 233]. Repeat purchase of a particular product or service during a certain period of time has often been used as an indicator of loyalty [Dowling & Uncles 1997]. Prior research in retailing suggests that timing of rewards has significant effects on customer loyalty formation, in terms of repeat purchases [Yi & Jeon 2003].

Consumers typically participate in loyalty programs to obtain economic benefits (e.g., special discounts, sales), emotional benefits (e.g., sense of belonging, identification), and/or access to an exclusive treatment or service [Wietz et al. 2007]. Study 1 corroborates that QR code loyalty programs attract consumers because they offer these benefits in a diverse range of rewards. In this light, the service recovery literature suggests that dissatisfied customers would prefer to receive some immediate reward, as it would help to improve their attitude toward the product or service [Brinberg & Wood 1983]. The effects of privacy concerns may be explained by the concept of "mental accounting." The logic behind consumers' mental accounting is based on costs and benefits accruing from the reward redemption. That is, those who are highly concerned with information privacy may decide not to respond to QR code loyalty campaigns immediately, as it sounds risky with regard to privacy disclosure.

Consistent with this argument, the findings of Study 1 suggest that consumers become more cautious when rewards are attached to high-priced products. When consumers are particularly concerned with privacy, they may ponder the safeness of responding to the campaign right away, because an immediate offer of economic benefits makes the campaign or the advertiser seem suspicious. In this light, the service recovery literature suggests that the postponement of reward redemption from the time of choice may cause consumers to underestimate the future effort or uncertainty of redemption [Keh & Lee 2006]. Holding the value of the reward constant, when consumers

demonstrate apprehension over privacy, a delayed reward may be perceived as more trustworthy, thus stimulating repeat purchase. Furthermore, such apprehension over an immediate decision is stronger when customers are highly involved with the service. Because involvement represents the strength of motivation in the form of personal relevance, the higher the involvement, the more likely it is that customers will pay more attention to uncertainty and insecurity [Mittal 1989]. Based on these arguments, we posit the following hypotheses for customers who are concerned about privacy:

H1a: A loyalty program with delayed rewards, compared with immediate rewards, would more likely lead to a repeat purchase.

H1b: A loyalty program for a low-involvement service, compared with a high-involvement service, would more likely lead to a repeat purchase.

H1c: The positive effects of a delayed over an immediate loyalty program reward on a repeat purchase would be more pronounced if the loyalty program promoted a low-involvement service rather than a high-involvement service.

Next, when consumers are not concerned about privacy disclosure, they may not hesitate to receive the immediate rewards of the loyalty program, because the benefits of the rewards would be directly derived from intrinsic properties of the service but not diluted by circumspect attitudes (i.e., worry, fear, or threat). The findings of our Study 1 seem to corroborate this thesis—the immediacy effect of the rewards is well accentuated in QR code loyalty campaigns, precisely due to a "quick response" from the encoded information. Discounting for the effects of privacy concerns, the retailing literature suggests that rewards from low-involvement products may lead to brand loyalty via loyalty programs, because value perception elicited by rewards is primarily toward the loyalty program, not the product itself [Rothschild & Gaidis 1981]. We contemplate that this propensity would be stronger when consumers are not concerned with privacy disclosure. In addition, prior research indicates that consumers tend to perceive higher value when the rewards are immediate, rather than delayed [Yi & Jeon 2003]. Thus, when consumers are indifferent to privacy disclosure, we propose the following hypotheses:

H2a: A loyalty program with immediate rewards, compared to delayed rewards, would more likely lead to a repeat purchase.

H2b: A loyalty program for a low-involvement service, compared with a high-involvement service, would more likely lead to a repeat purchase.

H2c: The positive effects of an immediate over a delayed loyalty program reward on a repeat purchase would be more pronounced if the loyalty program promoted a low-involvement service rather than a high-involvement service.

4.3 Method

A quasi-experimental survey of mobile users was conducted in Japan. We recruited 680 participants from a research firm's online panel. Filter questions associated with mobile Internet usage, QR code usage, and mobile campaign participation were employed, while the respondents' demographic distribution matched approximately that of the general Japanese population. We used a 2 x 2 between-subject design in which 170 participants were randomly assigned to each of the four scenarios. The sample was almost equally divided between males and females, with occupational composition approximated to the Japanese population. The participants were asked to read and complete the questionnaire. Missing or incomplete data were eliminated from the dataset, leaving 667 usable data for the subsequent analysis.

We created four scenarios based on two independent variables: the timing of rewards (immediate versus delayed) and the level of service involvement (high versus low). We chose a bank and a supermarket as high- and low-involvement services, respectively. The basic scenario presumed that an inactive client was given a QR code promotion leaflet offering cash back (an immediate reward) or a gift voucher (a delayed reward) if she or he participated in its loyalty program by subscribing to e-mail newsletters. Specifically, in the scenario employed for the bank (a high-involvement service), an individual was handed a promotional flyer in front of a train station. The flyer described a loyalty program for a famous bank where s/he had an inactive savings account. If s/he scanned a QR code on the flyer, s/he was led to the firm's campaign registration Web site. If s/he subscribed to an e-mail newsletter, the bank would immediately deposit \$50 in her/his account. In order to participate in this campaign, s/he needed to register his or her name, birth date, home address, marital status, and annual income. In the low-involvement scenario, the service was replaced by a famous supermarket chain promoting a loyalty program in the same way.

In addition, the level of information privacy concern was considered as the third independent variable. Our dependent variable was repeat purchase.

All measures used in this study were adapted from prior research. The level of involvement was measured by a scale suggested by Mittal [1989]. Four items were used: "In selecting from many types and brands of this service

available in the market, would you say that $(1 = I \text{ would not care at all as to which one I buy, and 7= I would care a great deal as to which one to buy)"; "Do you think that the various types and brands of this service available in the market are all very much alike or are all very different? (1 = They are all alike, and 7 = They are all different)"; "How important would it be for you to make the right choice for this service? (1 = Not at all important, and 7 = Extremely important)"; and "In making your selection of this service, how concerned would you be about the outcome of your choice? (1 = Not at all concerned, and 7 = Very much concerned)." The involvement level for the two types of services included in the scenarios was found to be statistically different (<math>t = 8.82$, p < 0.001), in the manipulated direction.

The level of information privacy concern was measured by four items adapted from Lwin et al. [2007]. These items were: "How concerned are you that your personal data may be used for purposes other than the reason for which you provided the information?"; "How concerned are you about your online personal privacy on this Web site?"; and "How concerned are you about this Web site sharing your personal information with other parties?" The participants indicated their responses on a seven-point scale anchored by not at all/quite a lot. Based on the resulting scores, the sample was divided into two groups, concerned and unconcerned, using a median split method.

Repeat purchase was measured by the scales used by Keh and Lee [2006]. It was measured with two items: "I am likely to return to the bank/supermarket" and "In the future, I intend to use the services offered by the bank/supermarket again, just as I have in the past." They were both based on seven-point scales, in tandem with what was asked (1 = Completely disagree, and 7 =Completely agree).

Cronbach's alpha for the level of involvement, information privacy concerns, and repeat purchase were 0.96, 0.91, and 0.87, respectively, all of which showed a satisfactory level of reliability [Hair et al. 2006]. Next, we conducted a confirmatory factor analysis with these three constructs with maximum likelihood estimation, using AMOS 18.0. The model fit the data reasonably well. The items loaded on to their respective latent constructs with all standardized coefficients being statistically significant at p < 0.001. The fit indexes were acceptable: $\chi^2_{32} = 175.10 \ (p < 0.001)$, AGFI (Adjusted Goodness of Fit Index) = 0.92. CFI (Comparative Fit Index) = 0.97, and RMSEA (Root Mean Square Error of Approximation) = 0.079. For all constructs, composite reliability and average variance extracted exceeded 0.7 and 0.5, respectively, which were deemed satisfactory [Hair et al. 2006]. Finally, discriminant validity was also confirmed.

4.4 Results

Table 1 summarizes cell means and ANOVA results for H1a–c. H1a postulates that a repeat purchase could be better fostered through delayed rewards, compared with immediate rewards. Our ANOVA results indicate that this was truly the case (4.04 vs. 3.73, p < 0.05), thus providing support for H1a. In H1b, we predict that a low-involvement service generates more repeat purchases than a high-involvement service does. Our results indicate that the mean value of the supermarket service (4.20) was statistically greater than that of the bank service (3.57) at p < 0.001. Therefore, H1b was supported.

Variables		Overall	Imme	ediate	Delayed		ANOVA F (1, 360)		
			М	SD	М	SD	Level of	Timing of	
							Involvement (I)	reward (T)	I x T
Involvement	High	3.57	3.26	1.56	3.89	1.41	17.17***	4.61*	4.00*
	Low	4.20	4.19	1.40	4.21	1.41			
Overall		3.88	3.73	1.55	4.04	1.42			

Table 1. Means, standard deviations, and ANOVA results for hypotheses 1a-c.

Note: * *p* < 0.05, *** *p* < 0.001

H1c suggests that the positive effects of delayed rewards would be greater in a low-involvement service. In other words, we expect that delayed rewards encourage people to repeat their consumption if the service in question entails minimal effort and consideration. The interaction effect between the timing of the reward and the level of involvement was indeed statistically significant in the predicted direction at p < 0.05 (Figure 3). Thus, H1c was supported.



Figure 3. Interaction effect between involvement and timing of reward on loyalty for H1c

H2a-c addresses similar questions when customers are not concerned with privacy disclosure. Table 2 summarizes cell means and ANOVA results for these hypotheses. H2a contemplates that immediate rewards are better than delayed rewards in terms of the resulting repeat purchase. This relationship was neither true in raw scores (4.20 vs. 4.23) nor statistically different. Thus, H2a was not supported. In H2b, a low-involvement service is expected to generate more repeat purchases, compared with a high-involvement service. However, although the raw scores supported our predicted direction (4.29 vs. 4.14), the difference was marginal and statistically insignificant. Thus, H2b was not supported. Finally, H2c posits the interaction effect between the timing of rewards and the level of involvement. Specifically, we expect that, when the service in question does not require long and careful consideration, immediate rewards are more likely to increase repeat purchase. However, this interaction was neither manifest nor statistically significant. Therefore, H2c was not supported.

Variables		Overall	Imme	ediate	Delayed		ANOVA F (1, 313)		
			М	SD	М	SD	Level of	Timing of	
							Involvement (I)	reward (T)	I x T
Involvement	High	4.14	4.09	0.82	4.18	0.91	2.02	0.15	0.19
	Low	4.29	4.29	1.04	4.28	0.80			
Overall		4.21	4.20	0.96	4.23	0.86			

Table 2. Means, standard deviations, and ANOVA results for hypotheses 2a-c.

5. Discussion

The present study explored the effects of QR code mobile promotion in two ways: qualitatively as well as quantitatively. While any oversimplification should be avoided, our research could advance our knowledge on the utility of QR code in several ways.

In Study 1, our key informant focus groups found that consumers perceive QR code as a useful tool to access promotional information, such as discount coupons or free samples. At the same time, they are likely to be cautious about providing their personal information. Some informants claimed that they avoid accessing the code outside or in public places, and prefer doing so at home. In fact, because of widespread spam, many people hesitate to provide their personal data without knowing the detailed conditions of the QR code promotions' mechanism.

In Study 2, based on Dowling and Uncle's [1997] loyalty program scheme, the results corroborate Keh and Lee's [2006] findings in that, holding the value of rewards constant, delayed rewards are more attractive in fostering repeat purchases when consumers are in a state of anxiety. In a way, this study demonstrates that privacy concerns significantly impede customers' positive mental accounting, and firms should plan an appropriate lapse in time between choice and redemption of the rewards. Given that time consciousness is a crucial factor in the value creation in mobile commerce [Kleijnen et al. 2007], this finding is uniquely important in a mobile promotion

context: When customers are concerned with their privacy, a QR code loyalty campaign with delayed rewards *could* be a useful tool for winning back inactive customers.

In addition, the fact that customers concerned with their privacy handling proved that a low-involvement service (a supermarket) with delayed rewards was more effective in repeat purchase generation, seems to be significant. This finding contradicts Yi and Jeon [2003], who found that under low involvement, immediate rewards were perceived to be more valuable than delayed ones. Our study therefore demonstrates that when consumers are concerned with their privacy, the service itself, rather than the timing of the reward, is of utmost concern.

Furthermore, a significant interaction effect between the timing of rewards and the level of involvement suggests that QR code loyalty campaigns could work especially well for retailing chains where *fast moving* consumer goods (FMCG) are sold. An obvious implication of this finding is that firms from both service and FMCG industries could coordinate joint campaigns using QR code to maximize their sales. Indeed, mobile marketing literature provides some evidence that wireless communication tools may be more appropriate for low-involvement products [Okazaki et al. 2007]. It may be that, as we argued in our hypotheses formulation, people may not want to make a hasty or imprudent decision with a mobile device. This propensity is even stronger for a high-involvement product, which requires careful consideration.

On the other hand, when consumers were not concerned with privacy, no difference was found not only for the timing of rewards, but also for the level of involvement, with the interaction hypothesis being unsupported. These findings seem to indicate the complexity of QR code mobile promotion in that "indifferent" customers are somewhat more difficult to capture with a win-back campaign. Here, more complex reward stimuli may be necessary to reactivate the loyalty of customers lost in the past. For example, some stronger emotional stimuli to evoke curious, surprised, or thought-provoking reactions may be effective in awakening these customers. Apparently, this is far beyond the scope of our study, and needs further exploration in the future.

Our major findings are summarized in Table 3.

Key findings	Theoretical implications	Managerial implications	
In QR code promotion, delayed	Our results corroborate Keh and	Firms should carefully investigate	
rewards, rather than immediate	Lee's [2006] findings.	the extent to which consumers are	
rewards, would impact loyalty,		concerned with their personal	
when consumers are concerned		data. Then, according to the type	
with the firm's privacy practices.		of service they promote, firms	
		should plan an appropriate lapse in	
		time between the retrieval and	
		redemption of the rewards in the	
		campaigns.	
In QR code promotion, a low-	Our results contradict Yi and	When consumers are unwilling to	
rather than high-involvement	Jeon's [2003] findings.	share their personal data, the	
service with delayed rewards		service itself, rather than the	
would foster loyalty more		timing of the reward, would act as	
effectively.		the key driver of successful	
		campaigns.	
In QR code promotion, we could	Our results are consistent with	QR code promotion could work	
expect a significant interaction	Okazaki et al.'s [2007] findings.	especially well for retailing chains	
effect between the timing of		where <i>fast moving</i> consumer	
rewards and the level of		goods (FMCG) are sold. Strategic	
involvement.		collaboration between advertisers	
		and retailers should be	
		encouraged.	
When consumers are not	Prior research has not addressed	For those "indifferent" customers,	
concerned with the firm's privacy	this issue.	more complex reward stimuli may	
practices, neither the timing of		be necessary to stimulate	
rewards nor the level of		customers' interests lost in the	
involvement would impact on		past.	
loyalty.			

Table 3. Summary of major findings

6. Limitations and future research suggestions

Any generalization should be treated with caution due to a few limitations. First, our Study 1 only used five focus groups. While the objective of this phase was to capture qualitative information associated with general consumers' QR code use, the number of focus groups may not have been sufficient. Second, our Study 2 only focused on repeat purchase behavior. Thus, our results should not be interpreted in a broader context of general loyalty. By the same token, Study 2 used a scenario method to create an experimental setting. Thus, the participants' responses were not based on real experience, which may have suffered from demand effects. Third, with regard to our H1c and H2c, the interaction effect was only part of the relationship, which might have differed if there had been some other variables presented in the model. This is an inherent limitation of ANOVA. Thus, any generalization derived from the present study should be treated with caution. Fourth, the study results may have been affected by country-specific factors. Some participants of Study 1 indicated that they would delay processing a QR code while using public transportation, because they would not want to disturb those around them. This is clearly a cultural factor, which would warrant further investigation in other countries. In countries where public transportation is less dominant, there could be very different findings.

While overcoming these limitations, future research should address how QR code loyalty campaigns create value, and should describe the value they produce. A logical extension of this study may be to investigate a diverse range of product categories, to further the effects of involvement. Also, future research should examine perceptual or attitudinal differences between QR code campaigns and other types of wireless ICT, such as near field communication (NFC) or radio frequency identification (RFID). Intuitively, QR code is less aggressive and intrusive in terms of privacy, compared with NFC or RFID. However, the convenience and immediacy may be greater in the latter two. Thus, consumer acceptance of QR code should be further examined with relevant variables, such as perceived risk, liking, usability, and design features, among others, to find out which ICT could lead to maximum consumer acceptance.

Acknowledgment

This research was funded by a grant from the Spanish Ministry of Science and Innovation (National Plan for Research, Development and Innovation ECO2011-30105).

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