

## **FACTORS INFLUENCING SPORT SPECTATORS' QR CODE SCANNING BEHAVIOR: AN APPLICATION OF THE TECHNOLOGY ACCEPTANCE MODEL**

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**Abstract:** Mobile marketing is a powerful tool for attracting and engaging sport consumers. Personalized mobile messages and interactivity can make sport consumers more committed to their teams and athletes. However, few studies have systematically examined sport consumers' behaviors regarding mobile marketing. This study aims to fill this gap by exploring the factors that influence sport consumers' mobile marketing acceptance and usage.

**Keywords:** mobile marketing, sport consumers, acceptance, usage, factors

### **Introduction**

As a new technology, mobile marketing has proven itself a powerful tool for attracting consumers (Stavros, Meng, Westberg, & Farrelly, 2014; Watson, McCarthy, & Rowley, 2013). Nowhere is this trend so evident as it is in the sport industry. Sport consumers can electronically receive many personalized messages based on their preferences and experience more interactivity online with their favorite teams or athletes.

This customized mobile marketing makes sport consumers become more committed to their teams and athletes (Filo & Funk, 2013). According to the Nielsen (2015), out of 151 million mobile application users, in 2014 the US population of sports-related mobile application users was 35,783 million. In spite of this growing market, few systematic approaches have been made to understand sport consumers' behaviors regarding mobile marketing (cf. Cooper, 2010; Dees, 2011).

In delivering customized message to a specific segment, one of the most effective technologies is Quick Response (QR) code. QR code is a two-dimensional barcode that can be placed on any physical object (e.g., posters, flyers, pamphlets). Using a mobile device, sport consumers scan those barcodes converting them into either text and/or graphic information visible on the mobile device or a means for identification or authorization. QR code has recently received attention as a useful way to bring electronic content to consumers by connecting physical objects to online information (e.g., website information or text messages). A typical example of this technology in the sport industry is the virtual credential. By scanning the QR code at the moment of purchase, sporting event attendees are able to keep their tickets in their smartphones, freeing them from having to keep track of print-out tickets.

A sport consumer's behavior of scanning a QR code is theoretically explained by the Technology Acceptance Model (Davis, 1989). The model suggests that technology users' behaviors are determined by perceived usefulness and perceived ease of use (Davis, Bagozzi, & Warshaw, 1989). By theorizing the effects of these components on users' intentions, the model predicts the effect of external factors on a consumer's decision to use technology as well as identifies which technology systems are deemed acceptable. The model thus provides theoretical implications that lead researchers to examine which attributes make sport consumers scan QR codes available at a sporting event. We still have much to learn about sport consumers' behavioral patterns of scanning QR codes and what makes them scan QR codes in their sport consumption.

One characteristic of sport fans is that they seek new information regarding their teams or athletes (Chung & Hwang, 2015; Ioakimidis, 2010). To satisfy their needs, sport organizations should engage in mobile marketing

that lead sport fans to the latest information on the team and its team members or exclusive content. In fact, such marketing strengthens the commitment of fans to sport organizations and athletes. Fans more likely to react to those promotional activities are of course expected to be the more committed fans (Bernthal & Graham, 2003; McDonald & Rascher, 2000).

A sport fan can be an early adopter of new technology. Wanting to know more about teams or athletes would make them adopt new technology if using such technology gives them more opportunities to be able to do so. That is, a sport consumer's fanship should be an indicator of the degree to which they adopt new technology provided by sport organizations. A number of studies in sport consumer behavior have suggested that the role of team identification factors into sport fans' behaviors on social media (e.g., Kassing & Sanderson, 2010; Kwak, Kim, & Zimmerman, 2010; Pegoraro, 2010; Phua, 2010; Sanderson, 2009). Having a grasp of sport fans and their technology usage is important because these sport fans can voluntarily spread the adoption of such technology.

QR code enables sport organizations to develop diverse marketing activities online. In addition, the technology makes sport organizations save their expenses in operating those marketing activities. If sport organizations understand their consumers' behaviors concerning QR codes, they will be better equipped to find specific ways of implementing new technology that strengthens relations with sport fans and attracts new ones. This study then aims to reveal the behavioral patterns of sport consumers in scanning QR codes. This study also aims at finding which consumer attributes make, in the context of a spectating sport, sport consumers scan QR codes. The study poses three research questions.

- 1) Where do sport consumers mostly scan QR codes?
- 2) What types of QR codes do sport consumers mostly scan?
- 3) Which consumer attributes that pertain to accepting new technology affect sport consumers' intentions to scan QR codes?

Answering these questions would hold theoretical implications for sport consumer behavior by adding to our knowledge of how such behavior is influenced by new technology.

## 2. Literature Review

### 2.1. Technology Acceptance Model

The Technology Acceptance Model (TAM), which explains how people's behavior using new technology is affected by external factors, was developed by Davis (1989). TAM posits that important factors that influence online consumers' behavioral intentions to use technology are "perceived usefulness" and "perceived ease of use" (Davis, 1989; Davis et al., 1989). In the model, the perceived usefulness means the prospective user's subjective probability in using a specific application system to increase their job performance within an organizational context. The perceived ease of use is the degree to which the prospective user expects the target system to be free of effort. These factors affect consumers' attitude toward using the technology; their attitudes then influence their behavioral intention to use the technology. A number of studies have demonstrated that the perceived usefulness and perceived ease of use are significant in affecting a consumer's behavioral intentions to use technology (Lee, Kozar, & Larsen, 2003; Legris, Ingham, & Collette, 2003; Pavlou, 2003). In particular, Pavlou (2003) examined a consumer's acceptance of electronic commerce, finding that an online consumer's intention to transact using an electronic commerce system was significantly affected by perceived usefulness and perceived ease of use. Koufaris (2002) found that a consumer's perceived usefulness and perceived ease of use significantly affected his or her willingness to make an online purchase.

As mobile applications have been becoming popular, such components of applications' content as design, color, and logo have become another key in shaping technology users' attitudes. A number of studies have found a role being played content attractiveness in making consumers respond to mobile marketing (Chang, Kaasinen, &

Kaipainen, 2013; Sparks, Perkins, & Buckley, 2013; Zhang, Yao, & Zhou, 2012). Chang et al. (2012) suggested mobile application's content attractiveness affected users' attitudes and their decisions to use the applications.

## 2.2. QR Code in Sport

QR code refers to a two-dimensional barcode that can be read by readable devices such as mobile scanners or smartphones (Lai, Chang, Li, Fan, & Wu, 2013; Okazaki, Li, & Hirose, 2012). QR code may contain not only basic information such as location, phone numbers, or email addresses but also the capacity to transfer such information to physical objects and to include hyperlinks to mobile coupons or tickets (Canadi, Höpken, & Fuchs, 2010). QR code has played an important role in mobile marketing in that it allows consumers, through offline media such as magazines or posters, to access online media information by scanning the QR code (Dou, & Li, 2008; Okazaki et al., 2012).

In the sport industry, by linking to webpages, QR codes are usually used as a means of providing additional information about a team, an athlete, or a sporting event. Sport organizations also implement QR codes either to promote merchandise by offering coupons and discount tickets or to enhance a company's brand image by advertising a product or symbol. Although a number of studies regarding sport consumer behavior have found how sport consumers use social media and the internet-driven technology for their consumption (Kassing & Sanderson, 2010; Wallace, Wilson, & Miloch, 2011; Witkemper, Lim, & Waldburger, 2012), only a few studies have looked at sport consumers' QR code-scanning behavior (c.f. Filo & Funk, 2013; Smith, 2009; Tolliver-Nigro, 2011). Such a lack of studies is somewhat surprising when compared to the number of systematic attempts made to know QR code scanners' motivations and behavioral patterns outside of sport settings (cf. Ertekin & Pelton, 2014; Lai et al., 2013; Shin, Jung, & Chang, 2012).

## 3. Method

### 3.1. Sample and Procedures

The surveys were conducted in the parking lots of a Major League Baseball (MLB) stadium in the Midwest. Participants were spectators who had come to the stadium. Researchers asked about their willingness to participate in the survey and whether or not they had scanned QR codes that day. Upon their approval, they were given the self-administered questionnaires. Researchers were on hand to answer any possible questions. Most of the data were collected when spectators exited the stadium after the game. The final sample consisted of 93 females and 82 males (N = 175).

### 3.2. Measurement

The survey consisted of two parts. The first part asked participants about behavioral patterns of QR code scanning. Participants answered questions regarding the frequency of QR code scanning, where scanning took place, and the types of QR codes scanned. The second part asked participants about their attributes in scanning QR codes. Based on TAM (Davis, 1989; Davis et al., 1989), participants specifically answered questions about the degree to which they perceived content usefulness, content attractiveness, ease of use, and attitude toward QR codes.

Also, they were asked about their degree of sport fanship and intentions to continue scanning QR codes. Every item of each construct was asked using a 7-point, Likert-type scale ranging from 1 (*not at all*) to 7 (*very much*). Content usefulness refers to the extent to which QR code messages were found to be useful and important to participants. Three items were modified based on the work of Hur, Ko, and Valacich (2011). The content attractiveness is the extent to which the design and content of QR codes were attractive to participants. Three items were created based on Huang and Lo's (2012). The ease of use was operated to the extent to which participants could easily scan QR codes. Two items were modified based on the work of Hur et al. (2011). The attitude toward QR codes means a participant's predisposition to using that technology. Three items were employed from Davis et al. (1989). Regarding sport fanship, three items were modified based on the sport team

Construct (Cronbach's $\alpha$ )	Items	Mean/ <i>SD</i>
	identification and commitment scale (Wann & Pierce, 2003). Finally, one question asked participants their willingness to continue scanning QR codes. Table 1 displays the details of all the items.	
	Scanning QR codes is useful for coupons and discounts.	4.88 (1.80)
Usefulness (.78)	Scanning QR codes is useful for seeing videos and photos.	3.72 (1.94)
	Scanning QR codes is useful for receiving information.	4.32 (2.00)
		4.32 (1.62)
	The design of QR codes is attractive to make me scan it.	4.59 (1.60)
Attractiveness (.87)	The content of QR codes is attractive to make me scan it.	5.40 (1.42)
		5.12 (1.15)
	QR codes are accessible in scanning it.	3.91 (1.47)
Ease of Use (.77)	QR codes are visible in scanning it.	4.01 (1.40)
	I have fun in using QR codes.	3.87 (1.48)
Attitude (.94)	I enjoy using QR codes.	5.74 (1.41)
	Using QR codes does not bother me.	5.54 (1.35)
	I am dedicated to my sport team.	5.77 (1.47)
Fanship (.92)	It is hard to quit watching the game of my team.	
	I will continue attending games of my team.	
	I intend to continue scanning QR codes in the future.	3.88
		(1.42)

Note. \* No internal reliability is provided for the questions asking spectators' discrete event.

[Table 1: Items Descriptions and Descriptive Statistics]

### 3.3 Data Analysis

Descriptive statistics were first secured to find behavioral patterns of scanning QR codes. Then a hierarchical regression analysis was employed to find which attribute had the most effect on sport spectators' intentions to use QR codes.

To control the effects of constructs that were not directly related to scanning QR codes, the spectators' attitudes toward QR codes and their sport fanship were first entered on the intention to scan the code. Three other constructs (content usefulness, content attractiveness, and ease of use) were then entered, via a stepwise method, into the intention to scan the code. The final model suggested the significance and magnitude of each construct's effect on sport spectators' intention to scan QR codes.

**4. Results**

**4.1. Descriptive Statistics**

A majority of participants (70.9%) used a sport-related QR code one to five times per month; 24.0% used it between 6 and 10 times a month. Few (4.0%) used it 11 to 15 times a month and even fewer (1.1%) used it 16 to 20 times a month.

Regarding where QR codes were scanned, the most common location was on a wall poster (49.7%), followed by magazines (36.6%), game tickets (20.6%), websites (16.0%), and jumbotrons (13.1%). Most QR codes were related to merchandise coupons (43.4%) followed by codes related to game ticket discounts (37.1%) and sport event lottery (24.6%). More details are shown at Table 2.

Places	Frequency	%	Types	Frequency	%
Posters	87	49.7	Merchandise Coupons	76	43.4
Magazines	64	36.6	Discounted Tickets	65	37.1
Tickets	28	16.0	Event Lottery	43	24.6
Websites	23	13.1	Bonus Points	32	18.3
Stadium Screen Board	14	8.0	Videos / Photos	27	15.4
Newspapers	13	7.4	Cash Rebate	23	13.1
Restaurants	7	4.0	Event Advertising	21	12.0
Stadium Seats	7	4.0	Event News	15	8.6
Building Signs	5	2.9	Team's Public Relations	8	4.6
Clothing	4	2.3			
Transportation	3	1.7			

*Note.* Multiple answers were allowed to pick the places and types of scanned QR codes.

[Table 2: Places and Types of Scanned QR Codes]

**4.2. Hierarchical Regression Analysis**

In the first model, spectators' attitudes toward QR codes ( $\beta = .61, p < .001$ ) and sport fandom ( $\beta = .22, p < .001$ ) influenced their intentions to scan QR codes. Both components explained 53% of the variance in their intentions ( $p < .001$ ).

After entering three other QR code-related constructs in the model, the second model showed that spectators' intentions to scan QR codes were affected by attitudes toward QR codes ( $\beta = .66, p < .001$ ), sport fandom ( $\beta = .21, p < .001$ ), and content attractiveness ( $\beta = -.12, p < .05$ ). Although the variance only increased by 1.2%, such a change was still significant at .05 levels.

The final model suggested that spectators' intentions to scan QR code were affected by attitudes toward QR codes ( $\beta = .65, p < .001$ ), sport fandom ( $\beta = .20, p < .01$ ), content attractiveness ( $\beta = -.17, p < .01$ ), ease of use ( $\beta = .14, p < .05$ ). QR code usefulness was found to be not significant ( $p = .66$ ). These significant factors explained a total of 56% of the variance in their behavioral intentions to scan QR codes ( $p < .05$ ). More details of these results are laid out in Table 3.

Model	Constructs	Standardized $\beta$	Standard Error	$t$	$p$	R2	$p$
1	Attitude	.61	.06	10.58	< .001	.536	< .001
	Fanship	.22	.06	3.90	< .001		
2	Attitude	.66	.06	10.65	< .001	.548	< .05
	Fanship	.21	.06	3.62	< .001		
	Attractiveness	-.12	.05	-2.09	< .05		
3	Attitude	.65	.06	10.63	< .001	.564	< .05
	Fanship	.20	.06	3.47	< .01		
	Attractiveness	-.17	.06	-2.87	< .01		
	Ease of Use	.14	.07	2.48	< .05		

[Table 3: Results of Hierarchical Regression]

**5. Discussion**

Mobile marketing through QR codes has been growing in the sport industry (Filo & Funk, 2013; Kunz, Santomeir, & Woratschek, 2010). This study revealed the behavioral patterns of sport spectators’ QR code scanning. In addition, this study found which attributes of sport consumers’ technology adoption made them engage in QR codes scanning. TAM suggests that what is important in shaping consumers’ attitudes to new technology is its perceived usefulness and perceived ease of use (Davis, 1989; Davis et al., 1989). Applying this to sport consumer behaviors, this study found attitudes had a great effect on sport consumers’ intention to scan QR codes. Such results are compatible with previous studies (Lee & Chang, 2011; Narang, Jain, & Roy, 2012; Suki & Suki, 2011). Watson et al. (2013) studied how consumers shaped their attitudes toward QR codes and found that scanning behavior was prevented by a lack of prior experience and the attendant lack of knowledge about how to scan QR codes. That is, major determinants for the behaviors of QR codes scanning were what experience they had and how confident they were about using such technology. Understanding the impact of sport consumers’ attitudes toward QR codes would encourage sport organizations to include social aspects in promoting the benefits of QR codes to their specific market. Such a function has already become an attracting point for sport consumers (Stavros et al., 2014).

For example, running mobile applications provide not only fitness management information but also an opportunity where runners can find other runners geographically and form a community based on their interests. The social aspect of technology has also been proven by the rapid growth of social media online (Whiting & Williams, 2013). Given the chance to enjoy social aspects in sporting events more, it is more likely that sport consumers would shape positive attitudes toward technology and continue using it.

Regarding content attractiveness, it is surprising to find its negative effect on sport consumers’ intentions to scan QR codes. This result might be explained by instrumental purposes of QR code scanning. This study found that sport spectators mostly scanned QR codes to receive financial benefits (i.e., coupons and price discounts). Also,

the frequently scanned places were not their final destinations. Participants scanned QR codes on their way to a game or while they sought valuable information about the game (i.e., posters, magazines, and game tickets). These behavioral patterns explain well what they really wanted to obtain from scanning QR codes. Spectators' QR code scanning was not an ad-hoc behavior but purpose-driven and preplanned so as to bring more benefits to their consumption. They rarely scanned them to satisfy mere curiosity or for fun. This claim becomes stronger when the TAM is theoretically rooted in the model of preplanned behavior (Ajzen, 2002). Nonetheless, the visual look of technology plays a powerful role in determining its popularity (Sparks et al., 2013; Zhang et al., 2012). It should be noted that QR codes are two-dimensional bar codes that consist of unidentifiable and abstract patterns of shapes and objects. This might distract spectators' attention from the intention to scan them. They would be more likely to scan QR codes if the design of the QR code was attractive and easily identifiable and its appearance included an informative sign that was directly matched with the consumer's interests.

Having the second largest effect on intention to scan QR codes was sport spectators' fanship. Seeing the role that sport fanship plays provides a new dimension of understanding sport consumers' behavior online by revealing how sport consumers' psychological commitment affects their adoption of technology. This study's findings suggest that sport consumers' adopting of technology is predicted not only by technology-related attributes but by their tendency to affiliate with a sport organization. For sport consumers, employing new technology is a contextual outcome in which their sport fanship interacts with the possible benefits of using the technology. This suggests how QR codes should be leveraged to provide sport spectators a quality experience. To maximize its utilization, sport organizations should understand that such mobile marketing as QR codes ought to be directed toward providing fundamental benefits to sport fans as well as satisfying sport fans' loyalty to team or athletes.

## 6. Practical Implications

Although a diversity of places were found related to the location that QR codes were scanned, it should be noted that most were not directly related to a sport venue (i.e., posters, magazines, game tickets, and websites). Relatively less popular locations for scanning were stadium scoreboards and seats.

Given this, it may be surmised that sport spectators' QR codes scanning occur ubiquitously and simultaneously. Thus, sport organizations should place QR codes near the spectators' traffic flow (e.g., parking lots, public transportation stations) and time to time across diverse locations.

Frequently scanned QR codes pertained to tangible benefits such as coupons or discounts. This also suggests where QR codes ought to be placed. Sport organizations should place QR codes where a volume of consumers gather for shopping (e.g., concession, merchandise store). In addition, sport organizations would be better off creating mobile content that incorporates spectators' tangible benefits into QR codes by synchronizing such benefits with their marketing promotions.

Finally, it is highly suggested that sport organizations implement QR codes toward developing spectators' fanship. One example would be providing exclusive content via QR codes. Further, more diverse content needs to be made, via scanning QR codes, to generate revenue from highly committed sport fans.

## 7. Limitations and Future Research

It should be noted that this study has several limitations. First, the samples were only collected from one particular MLB stadium in the Midwest. In other words, the results of this study might be limited in being able to predict sport consumers' technology usage in other sports and in other parts of the country. Second, the survey was performed at a time when smartphones had become popular. Since mobile devices are essential to scanning QR codes, the results should be interpreted in light of that social trend which continues even today.

Future research should focus on how sport consumers use new technology differently according to the demographics of sport consumers. Age, gender, and education have significant influences on the attitudes of

having new technology and consequent behaviors (Morris, Venkatesh, & Ackerman, 2005). These studies would help sport organizations identify a specific segment and create a customized mobile marketing agenda, particularly when they try to integrate new technology into their sporting events.

It would be worthwhile knowing when scanning QR codes frequently occurs. It has been reported that posting on social media is done mostly right before and after a game (Rice, 2015). Considering QR codes are informative and functional, knowing these things would be useful in finding a way to incorporate mobile marketing activities into sport organization's sales such as tickets or merchandise. Finally, a number of sport venues have just begun using technology by which spectators can order food and have them delivered to their seats. Further studies should be more context-oriented, including such elements as facility support or social components.

## 8. Conclusion

QR code marketing has been extensively examined in a variety of fields. In the field of sport management, however, there has been minimal research regarding how to utilize QR codes to attract more fans.

Results of study suggested that spectators of MLB tended to mostly scan sportrelated QR codes that appeared on posters, and that the most frequently scanned type of QR code was the merchandise coupon. The results of hierarchical regression analysis showed that sport fanship, content attractiveness, ease of use, and attitude toward new technology affected sport spectators' intentions to scan sport-related QR codes. Results of this study provide sport marketers with practical implications. To attract more fans using QR codes, marketers should offer sport fans simple and instant benefits such as merchandise coupons, discount tickets, or lotteries. In addition, sport marketers should consider designing QR codes with appropriate names, of proper size, and in a good location to encourage fans to scan sportrelated QR codes. Future study should focus more on sport consumers' technology acceptance based on diverse demographic variables such as age, gender, and level of education.

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