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# Are QR codes here to stay or a thing of the past? A study into the perception of QR codes

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**Abstract** Quick response (QR) codes, a type of two-dimensional barcode, are a marketing tool used all around the world, particularly Japan and China. Early adopters of this mobile information-sharing tool have generally utilised it in higher education and promotional marketing campaigns. QR codes are now widely used as a marketing tool by many companies. An increasing amount of firms and sales representatives are using QR codes as a channel to market their products/services to their customers' mobile devices. This research investigates consumers' perceptions of QR codes. The results suggest that incentives and exposure are the most important factors contributing to the consumer's perception of QR codes.

**KEYWORDS:** QR codes, mobile marketing, technology, smartphone, applications, promotions

## INTRODUCTION

'Mobile devices represent a fruitful avenue for advertisers and consumers. For advertisers, mobile devices offer another way to reach potential consumers with interactive, persuasive messages. For consumers, mobile devices can empower would-be shoppers by giving them greater access to useful, product-relevant information on demand and in the retail environment.'<sup>1</sup>

One way that marketers are utilising mobile technology is through quick response (QR) codes. QR codes originated in Japan and have remained popular there for years. Back in 1994, Denso-Wave was the first organisation to use QR codes for quick and convenient inventory tracking.<sup>2</sup> As QR codes are not patented, it is easy for marketers to get the tools to generate, scan and decode them.<sup>2</sup>

Advantages of QR codes include fast readability and large storage capacity compared with standard universal product code (UPC) barcodes. QR codes appear on posters, billboards, receipts, in store windows and doctors' offices. One Japanese gravestone maker has even implemented QR codes on gravestones so that people can scan them and find out more about the person whose grave they mark.<sup>3</sup> As the number of consumers with smartphones increases, so too does access to QR codes. Of course, access alone does not make them an effective marketing tool; the codes must provide value to users. Nevertheless, this useful and accessible technology offers good opportunities for marketers. Indeed, the worldwide usage of QR codes has been growing in recent years and many different companies now use QR codes for marketing purposes.<sup>4</sup> As consumer perception is of the utmost importance to marketers, this study will investigate the following research question: what are the factors that influence consumers' perceptions of QR codes?

Opinions about QR codes vary; some embrace the technology as a new communication tool to connect with customers while others suggest the codes are just a fad — a transitional technology to something bigger and better.<sup>5</sup> What is agreed, however, is that QR codes are poorly used by companies and communication agencies and that many campaigns using QR codes fail.<sup>4</sup> The challenge for marketers today is to cut through the clutter. Markets need to catch consumers' attention and provoke interest and desire so that they proceed to trial, increased purchase intentions, positive word-of-mouth communications and even brand loyalty. Because of those numerous messages, consumers are increasingly selective about brand messages. Consumers are scanning for something relevant — something that will bring them value. To

be efficient and more likely to be scanned, QR codes need to bring value to the consumer and, more importantly, communicate that value.<sup>6</sup>

In the spring of 2012, Macy's conducted a successful campaign using QR codes. The success of the campaign was mostly due to the national television ads explaining how to scan the code and what would happen once the code had been scanned. The campaign increased viewer awareness about QR codes and their purpose. Simply put, the campaign demonstrated that education and information are essential for any campaign using QR codes to work.<sup>6</sup> The preceding discussion prompts an interesting question: marketers love QR codes, but do consumers?

As technology has advanced, mobile advertising has become a convenient and productive approach to get a product or ad noticed in the market. As advertising through text messaging has evolved with the addition of QR codes in the past few years, increasing numbers of consumers have been actively involved in free mobile advertising. Globally, consumers are becoming more familiar with the purpose of QR codes in mobile advertising. But how frequently are these consumers engaging in QR code mobile advertisements? How effective is the technology really becoming? Furthermore, what are the best conditions for using QR codes to gain a competitive advantage?

## **LITERATURE REVIEW**

Recent literature on the subject of QR codes is focused on perception toward QR codes, possession of a device equipped with scanning software, ability to locate the QR code, perception of benefit or incentive, involvement with the message and demographic information. The following is an overview of relevant literature on the subject of QR codes.

### Consumers' perceptions toward QR codes

As QR codes are an image that brands use to connect with consumers, it is reasonable to consider the studies about attitude towards advertising in non-mobile situations. A study about the relationship between attitude towards the advertisement and attitude towards the brand concluded that 'brand-related beliefs relate positively to attitude towards the advertised brand under both brand and non-brand set conditions'.<sup>7</sup> When considering QR codes, the recall of the ad around the code is typically less important than the information with which the code leads the user to interact, but the code must first do its job of persuading consumers to scan it in the first place. Referring to the aforementioned study, the attitude towards a QR code as an advertisement would be positively correlated with the attitude towards the brand that is using the code. This drives home the point that consumer attitude towards these codes is a key variable in a brand's QR code success.

There is further evidence supporting the concept that the evaluation of a target brand is influenced by its presentation in the context of advertising.<sup>8</sup> The effect of context depends on the decision maker's knowledge of the brand and the accessibility of the information. In the study by Sternthal and Myungwoo, the views of experts versus novices were directly correlated with attitudes towards particular target brands.<sup>8</sup> Their findings suggest that experts are more likely to focus on the context of the message, while novices are expected to focus on the message itself. In other words, consumers who have more experience with QR codes have a more positive attitude towards them as they will understand their purpose. This study shows that understanding the potential QR literacy of the target consumer is a key factor for any

marketing campaign. This is useful information for brands evaluating which medium to use to reach their target market.

### Technological environment

The number of smartphones and internet-enabled mobile phones is growing. Voice has become less relevant and the focus has transitioned to data.<sup>3</sup> With this shift in emphasis, marketers are expanding the reach of QR codes as a major marketing channel. Mobile applications account for, on average, 660+ minutes of face time for smartphone users per month.<sup>9</sup> The iOS Passbook app now includes a scanner to read QR codes; Android phones, meanwhile, rely on the software reader built into Google Now. A 2010 study of undergraduate students found that 51.2 per cent of students owned an internet-capable device, and another 11.8 per cent planned to purchase one within the next 12 months.<sup>3</sup> 'Mobile site creation by academic institutions, easy social network access, and the growing number of popular mobile apps, points to the likelihood that more students will opt for the convenient and useful data available to them via handheld devices'.<sup>3</sup> Many markets are now reaching saturation, meaning that everyone who wants a phone has one; indeed, many people even have separate phones for work and personal use.<sup>10</sup> The growing functionality of smartphones has contributed to making them one of the most prevailing communication aids in modern society. With more and more consumers obtaining smartphones, access to QR codes has become widely recognised. In a 2011 study, 65 per cent of smartphone users reported having seen QR codes in some form; of these, 52 per cent were aged 35–54 years; 34 per cent were aged 18–34 years; and the remaining 14 per cent were aged 55 years or older.<sup>11</sup>

### Perceived benefits of QR codes

The results of a literature search on the perceived benefits of QR codes are mixed. In many cases, the mobile experience sitting behind the QR code is a disappointment. One study tested the consistency of attitude and the use of low-involvement conditions.<sup>12</sup> The researchers focused on finding what low-involvement settings led to the consistent formation of attitudes. They studied how different levels of attitude consistency can be changed by certain features of an ad but still in a low-involvement context. The results of their study supported their predictions that different levels of signal lead to different levels of attitude.<sup>12</sup> The findings of this study are relatable in that attitude and the consistency of attitude can be influenced by many factors. Although the interactive nature of QR codes requires high involvement, as a form of advertising, the image itself is a very low-involvement cue.

A study investigating QR codes in the tourism domain has shown user acceptance and also potential benefits with using QR codes.<sup>13</sup> A key finding was that consumers are more likely to access the QR code if they understand where it will lead them. The study also found that:

‘According to the technology acceptance model (TAM), basic factors determining the users’ intention to use an innovative technology or service are the perceived benefit on one hand and the ease of use of the service on the other. The connection between physical products and subsidiary product-information in the form of direct link to information within a mobile service created additional benefits for the test users.’<sup>13</sup>

Mobile marketing allows a company to utilise an entirely new channel to reach potential consumers. It is important to identify which specific factors drive these potential consumers to react positively

towards mobile marketing strategies.<sup>14</sup> The most positive responses to mobile marketing occur when a consumer is provided with something they perceive as useful or beneficial and if the context in which they are presented is relevant.<sup>14</sup>

QR codes and their campaigns will be more efficient if their purpose and rewards are clearly explained. Communication about the value of QR codes is critical, just like communicating value through any other marketing communication tool. Consumers do not want to waste their time with data or products that are not relevant for them. Individuals need to know what the QR code will do for them. If they do not perceive the benefit quickly, then their attention will not be gained, and neither interest nor desire will be stimulated.

### Incentives

An incentive is something given or offered that can motivate a consumer to choose a particular course of action or to favour one choice over the alternatives. The use of incentives with QR codes could be very beneficial if used correctly by a company. ‘What makes a QR campaign successful is the marketing strategy directing the customer experience.’<sup>15</sup> By understanding and utilising the consumer perspective, a company will have a greater chance of generating a productive consumer experience.<sup>15</sup> In a 2011 study of QR code scanning behaviour by incentive offered, access to discounts, deals or coupons was the highest motivating factor among 53 per cent of respondents.<sup>15</sup> Other top reasons included the ability to enter a contest sweepstakes (33 per cent), the ability to receive additional information (26 per cent), and ability to access videos (24 per cent).<sup>15</sup> Other research shows that when compared with both incentive and non-incentive based reasons for scanning, like ‘curiosity’ or a ‘great ad’, a destination that includes some

form of coupon or deal remains at the top.

A study was conducted to determine if QR codes are effective marketing tools.<sup>16</sup> The study reported that only 28 per cent of people who scanned a QR code felt it was usually worth their time and 52 per cent of those people reported that it was sometimes worth their time. This reflects a dissonance between what consumers want and what they actually get from QR codes. Marketers should work on this gap in order to bring better value to their customers. They should also communicate the features of QR codes to their target audience so that they will be more likely to scan the code. Marketers need to give consumers a reason to scan their QR codes.<sup>16</sup> Certainly, QR codes are scanned more frequently when consumers understand the benefit they will get once they have scanned it.<sup>17</sup>

There are also arguments that adding value through QR codes goes beyond offering coupons and discounts. Indeed, mobile phone users want a more individual approach to the give-and-take of QR code interaction. Such is the case with Tesco, the UK-based retailer, which constructed fake stores in subway stations in South Korea that allowed consumers to scan QR codes on items which then redirected the consumer to the online store to complete their purchase.<sup>16</sup> The results showed that 23 per cent of respondents scanned a QR code in order to make a purchase. The data suggest that consumers are gaining a higher comfort level with both QR codes and making purchases with a mobile device.<sup>15</sup>

#### **Location of QR code (high-traffic versus low-traffic)**

QR codes are low-cost and easy to implement and use. This makes them an innovative technology that can provide significant value if implemented correctly. Globally, many big brands are beginning to implement QR codes in large cities to

promote their brands and market to their customers in new and innovative ways. The physical location of a QR code can be a major factor affecting a consumer's perception towards it. However, some QR codes end up in places with no Wi-Fi or connectivity (eg aeroplanes, subway stations). Huge brand names such as Ralph Lauren and Calvin Klein are beginning to implement QR codes as key components of their marketing strategies. In July 2010, a giant QR code was displayed in the middle of Times Square. When scanned, the code took users to a site where they could watch a campaign video and sign a petition to help clean up the Gulf oil spill.<sup>3</sup> Greater use of QR codes in television ads can be expected in the near future, which will in turn raise awareness and eventually may lead to their mainstream use.

Brands trying to get creative with location may experience a low response rate due to the lack of practicality. The classic QR blunder is 'placing QR codes in remote areas: QR codes are useless if they can't be scanned. If you're placing QR codes in areas like subways, it's not going to fly'.<sup>18</sup> Furthermore, the information to which the consumer is sometimes directed is frankly not worth the effort of scanning for it. Of course, there are ways to avoid this myopia. 'Placing your customer first and thinking of ways a QR code will add value to the process should be top of mind.'<sup>18</sup> Companies can use this information by placing their QR codes in high-traffic areas with an enhanced likelihood of being scanned.

Another study presents a similar viewpoint by suggesting that QR codes are not often utilised the way they should be.<sup>4</sup> In this list of reasons why many QR code campaigns fail, the author mentions that codes on billboards are unfit for purpose as they are too high up to get a clear scan.<sup>4</sup> Another bad location is on

television ads: 'by the time you run and get your phone, find the scanner, and try to take a shot, the ad's over'.<sup>4</sup> Specifically, the unfavourable factors here are time and distance, but generally these campaigns used inconvenient locations for QR code information sharing. The factor of convenience (of location) will be measured in the present study by using examples of crowded mobile areas as well as examples of the opposite, ie more private or stationary places.

One of the key things that marketers should consider is the importance of medium selection.<sup>16</sup> 'The ideal location for a QR code is one where the user has both enough time to pull out their phone to scan the code and no other means to quickly engage with the messaging.'<sup>16</sup> This statement has two key components: convenience and usefulness. The convenience factor can be compromised when the QR code is located in a busy area. For most consumers, stopping to stand in a particular spot on a busy footpath for even a short amount of time is not a typical behaviour. More convenient locations for the placement of QR codes include print magazine ads, product packaging, direct mail and point-of-purchase signage.<sup>16</sup> These are more feasible and useful media to share mobile information.

According to one set of data focusing on QR code source and location, newspapers/magazines and product packaging are the most convenient locations for QR codes; while the most likely location to scan QR codes is at home (58 per cent) or in a grocery/retail store (64 per cent).<sup>19</sup> Specifically, 20 per cent of consumers scanned while at work, 12 per cent while outside or on public transit and 7 per cent at a restaurant.<sup>19</sup> These results show that as the typical population density/mobility of these locations increases as the percentage of QR code audience decreases. A researcher

could reasonably assume that most restaurants and public transit areas have more traffic at any given time than at home or in a retail store. The results directly support the idea that consumers who are not in a high-traffic area (busy areas with many people or little privacy) will have a more positive perception towards QR codes.

The concept of effective QR locations can be applied to effective advertising locations in general. According to one study, a consumer's motivation, opportunity and ability (MOA) to process the information provided by the advertisement is what makes communication effective.<sup>20</sup> The purpose of the framework is to make conceptual use of executional cues to enhance the MOA of advertising.<sup>20</sup> The point of this study that is relevant to the location of QR codes is the opportunity aspect of MOA. 'Opportunity is defined here as the extent to which distractions or limited exposure time affect consumers' attention to brand information in an ad.'<sup>20</sup> The study suggests that the greater the brand's control over the amount of exposure to the advertisement, the more it increases the opportunity to the consumer.<sup>20</sup> In regard to QR codes being treated like any other visual advertisement, this would mean that a code location with high population density and high traffic leaves the brand with little control over the amount of exposure and therefore less opportunity for the consumer. The conceptual framework provided suggests that advertisements can increase opportunity by utilising non time-compressed print media.<sup>20</sup> For QR codes, this would mean locations that are more personalised, such as direct mail, product packaging, or locations with consumer down-time. Regardless, it supports the idea that as traffic increases in the physical QR code location, the consumer's perception towards the code decreases.

## Gender

The next question that arises is who is more apt to engage in QR codes: males or females? One study has focused on mobile device ownership and gender awareness and familiarity with QR codes.<sup>21</sup> The results showed that more males knew about QR codes than females. QR codes are becoming increasingly popular all over the world because the advertisement delivering the QR code aims to catch consumers' attention. Additionally, studies have shown that females appear better able than males to articulate symbolic meanings of certain characters on mobile devices. Another interesting statistic about smartphone users was that educational level and household income were directly correlated to the percentage of people who had access to QR codes and who knew about them.<sup>11</sup>

Based on this overview of the relevant literature, five hypotheses are proposed.

## HYPOTHESES

The predicted outcomes of the study are reflected in the following hypotheses:

- H<sub>1</sub>:** Consumers who have the QR code software application will have a more positive perception toward QR codes.
- H<sub>2</sub>:** Consumers who are not in high-traffic areas (areas with many people or areas without privacy or busy areas) will have a more positive perception toward QR codes.
- H<sub>3</sub>:** Females will have a more positive perception toward QR codes than males.
- H<sub>4</sub>:** Consumers that perceive a greater benefit from scanning the QR code are more likely to have a positive perception toward QR codes.

- H<sub>5</sub>:** Consumers will have a more positive perception towards QR codes when they know that they will be led to an incentive.

## DATA AND METHODOLOGY

### Sample

Data were gathered from experienced users of QR codes. This means that if the consumer had knowledge of what a QR code was they were asked to take the survey. The survey size consisted of 98 valid usable surveys.

### Methodology

To examine the perception of QR codes, several types of analysis were conducted. First, descriptive statistics were computed. Then the Pearson correlations were examined between the dependent variable and each of the five independent variables. Finally, multiple regression analysis was used to test the hypothesised relationships (software, traffic, incentive, perceived benefit and gender).

### Data analysis

#### *Descriptive statistics*

Table 1 provides descriptive statistics, including mean values, standard deviations, minimums and maximums, for the measurement scales. The mean value for perception of QR codes (2.93) denotes a positive impact. The majority of the respondents reported possessing the software on their smartphone (0.69). Generally, respondents experienced positive effects of traffic and incentives (3.132 and 3.81). When asked to rate the perceived benefit, many subjects expressed a positive effect (3.321). The sample consisted of nearly equal proportion of gender (0.54).

#### *Correlation analysis*

Table 2 displays the Pearson coefficients

**Table 1:** Results of the descriptive statistics

	<i>n</i>	Minimum	Maximum	Mean	SD
Perception of QR codes	98	1	5	2.930	0.6205
Software reader	98	0	1	0.690	0.4670
Traffic	98	1	5	3.132	0.7190
Incentive	98	1	5	3.810	1.1070
Perceived benefit	98	1	5	3.321	0.6427
Gender	98	0	1	0.540	0.5030

**Table 2:** Correlation analysis

	1	2	3	4	5	6
1 Perception of QR codes	1.000					
2 Software reader	0.268*	1.000				
3 Traffic	0.204	0.316*	1.000			
4 Incentive	0.229	0.096	0.307*	1.000		
5 Perceived benefit	0.438**	0.241	0.252	0.158	1.000	
6 Gender	-0.020	-0.147	-0.084	-0.004	-0.090	1.000

\*Significance  $p = 0.005$ ; \*\*significance  $p = 0.001$ .

**Table 3:** Dependent variable — Perception towards QR codes

	Beta (t-value)	Sig
Software reader ( $H_1$ )	0.164 (1.252)	0.216
Traffic ( $H_2$ )	0.029 (0.205)	0.839
Incentive ( $H_3$ )	0.147 (1.128)	0.056
Perceived benefit ( $H_4$ )	0.040 (0.316)	0.753
Gender ( $H_5$ )	0.358 (2.579)	0.013

$R^2 = 0.310$ ; Adjusted  $R^2 = 0.165$ ;  $F$ -statistic = 2.145; Significance = 0.0456;  $n = 98$

between all variables. The only negatively associated variable with perception of QR codes was gender (-0.02). All other variables were positively associated with the perception of QR codes. However, only software and perceived benefit were significant. Perceived benefit showed the highest correlation at 0.438.

**Regression analysis**

Table 3 shows the results of multiple regression analysis in which perception of QR codes is regressed on software, traffic, perceived benefit and gender. The test of the overall model is  $F = 2.145$ ,  $p < 0.000$ . The regression analysis of the factors found positive significance for only

incentive (beta = 0.147;  $p = 0.056$ ) and gender (beta = 0.358;  $p = 0.013$ ). All other factors in the model were positive but not significant.

**RESULTS**

According to Table 3, incentive is significantly related to the perception of QR codes, supporting Hypothesis 3. The regression analysis also shows significance of gender in the model, supporting Hypothesis 5, that females have a more positive perception to QR codes. This study did not find support for Hypothesis 1 (software), Hypothesis 2 (traffic) or Hypothesis 4 (perceived benefit).



## CONCLUSIONS AND RECOMMENDATIONS

The results of this study indicate that using QR codes as a medium to connect with a target market can be ineffective. QR codes are useful for companies to direct consumers instantly to online marketing efforts; however, consumer scanner application level is low, which makes the codes trivial and useless in most marketing efforts. There were many respondents who did not truly understand the concept of what a QR code was, and there were also many who lacked the motivation to scan them. Companies that use QR codes should keep in mind that consumers may become more involved with the codes if code scanning becomes a common action among a large amount of consumers. Unless more people become aware of what the codes do, code scanning will not succeed as a successful marketing channel.

As expected, the strongest motivating factor to stimulate consumers to scan QR codes was the redemption of a coupon or another form of incentive. A recommendation for firms to consider would be to use this form of marketing to encourage code scanning among younger adults. Previous studies show that QR codes were accepted most among mature audiences with higher education levels, and less among younger audiences. Thus, any a firm wanting to interact with a younger market using QR codes would need to find an appealing way to stimulate these young adults to start scanning codes more often.

The most significant finding was that the majority of respondents were more likely to scan QR codes out of curiosity and if they knew where the code would take them (perceived benefit). This can be difficult for marketers, not only because they have to grab the consumer's attention, but also because they need to balance information about the code's destination while creating a feeling of suspense and wonder. A

recommendation of how to maintain these attributes without being an annoyance to the target market could be to add humour to the labels that explain the destination. Marketers would like to see a more positive perception towards these codes because they can be very beneficial and useful. According to the present study, however, respondents are more likely to have a negative or unbiased perception towards QR codes than a positive perception.

Respondents claimed to be more willing to scan QR codes in low-traffic areas, free from large groups of people and distractions. Firms may want to consider placing QR codes in magazines, flyers, packaging, coffee cups, fuel pump ads, movie tickets, sports tickets and other physical locations where the consumer is idle, rather than placing the code where it could easily be overlooked.

QR codes and the associated campaigns would be more efficient if their purpose and reward were clearly explained. This study into the use of QR codes finds a disconnect between the brand and the target market. Communication about the value of QR codes is critical, just like communicating value through any other marketing communication tool. Consumers do not want to waste their time with data or products that are not relevant for them. When used correctly, QR codes can be marketing marvels. While some people will use QR codes merely for the sake of using them, most individuals want to know first what the QR code will do for them. If they do not perceive value quickly, their attention will not be gained, and neither interest, nor desire will be provoked.

## LIMITATIONS OF THE STUDY AND FUTURE RESEARCH

Most consumers own a smartphone, but a significant drawback is that not all of the participants in the study could give

substantial feedback because they did not have the QR application on their phone or know how to use it. A disadvantage of QR codes is that newer technologies, such as Snap Tags, could interfere with the conclusions in this particular study.

Future research should include researching the purchasing intentions of individuals after scanning QR codes and if they are more likely to purchase, which can be very valuable information to businesses. Other future research may include new technologies such as Snap Tags or clickable paper. These new technologies could be a new tool for marketers, although, like Microsoft tags, they could be destined to fail. Different types of research designs should also be investigated. An alternative method that could be effective in determining factors that affect consumer perception toward QR codes would be to use experimental research design, and to observe reactions to different presentations of QR codes in different locations. The controllable variables would include the location of the advertisement, where the QR code takes the consumer, how much information is given about the QR code on the advertisement, size of the code and many more. Researchers would not only be able to track the number of scans for the codes, but could gain insight by observing how respondents interact with the code. This would take much more time and planning, but could be beneficial to study should those resources be available.

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