

Usage of QR Code in Tourism Industry

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Abstract

QR (Quick Response) code scanning allows the user to obtain in-depth information about the scanned item. Apps used for scanning QR codes can be found on nearly all smart phone devices.

Travelers who have smart phone, equipped with the correct reader software, can easily access QR coded information (text, photo, video, web page, etc.) when it is available. Travelers can scan QR coded galleries, places, vineyards or monuments when they are visiting and reach the detailed information without using even a travel guide.

The aim of this study is to explore the QR code usage opportunities in tourism sector in the Information Age.

1. Introduction

Buhalis and Law (2008:610) signify that “technological progress and tourism have been going hand in hand for years”. Today tourists have tendency to use technology in every possible event. On the road, mobile phones support various needs of a tourist. Popularity of mobile Internet access and smart mobile devices are becoming valuable, especially in tourism. Mobile tagging, based on QR codes, offers an opportunity to increase the accessibility of mobile services and receive in depth information instantly. QR codes may be able to provide additional luxury among tourist. The first part of this on going study will explore the QR code opportunities and implementations in tourism, in the second part, awareness of QR code usage among tourist visiting Istanbul will be explored.

2. QR Code

In general, classic 1D barcodes show us “product identification” and QR codes put emphasis on “product descriptions” (Lingyan, Zewei, Min, and Weining, 2008). QR codes provide an irreplaceable identifier for objects and applications to automatic checkout system, commerce, industry, hospital, and etc. (Starnberger, Frohofer, and Goeschka, 2009). A smart phone can read the content from tags directly. At this point a security issues are the first concern both for user and the code provider. When barcodes contain privacy information, it may result in the risk of security issue (Rouillard, 2008). Chuang, Hu & Ko (2010) argues about the security of the QR code system, as the writer explains that the confidential data is often stored in the back-end database. When a QR code is scanned, it only gets a network link from a tag and after connected to the back-end database through the Internet, hence, the user must be connected to the Internet. Only the user who has access right can login database to retrieve the information. If there is no limitation, everyone can access the product description instantly. In our research the QR codes used in tourism industry have no access limitations, they are designed for everyone who scans them.

2.1. Technical information about QR code

The QR coding system first developed in Japan. The Japanese company Denson-Wave developed the QR code in 1994 (Denso, 2011). Figure 1 shows the basic structure of QR code. QR code can be referred to ISO/IEC18004.

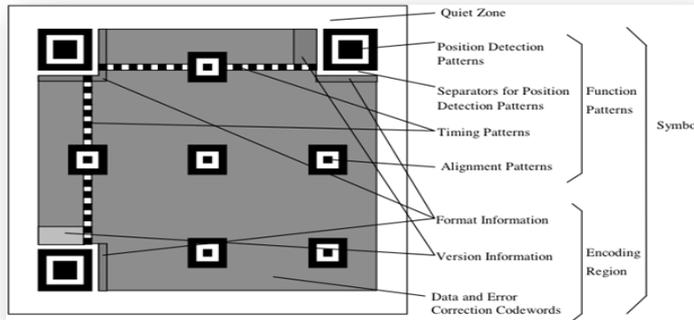


Fig. 1. The basic structure of QR code

QR code can store 7,089 numeric characters and 4,296 alphanumeric characters. A mobile phone with camera function can get the content from a barcode quickly and easily. QR codes carry data on both horizontally and vertically, thus QR codes are better than 1D barcodes in data capacity. Even if 30% areas of barcode are damaged, QR codes still can be recognized correctly (ISO/IEC18004, 2012). The most common 2D barcodes and technical specifications of them listed below.

Table 1. Different types of 2D barcodes

3D Code	QR code	PDF417	DataMatrix	Maxi Code	Color Code	Microsoft Tag High Capacity Color Barcode (HCCB)
Developer	Denso Today: Denso Wave	Symbol Technologies	RVSI Acuity CiMatrix	UPS	Yonsei University, Korea	Microsoft (Gavin Jancke)
Type	2D matrix	stacked bar codes	Matrix	Matrix	color matrix	
Numeric capacity	7089	2710	3116	138	10 = "17 billion patterns for 4 color 5x5 code"	
Alphanumeric capacity	4296	1850	2355	93	7	"3500 characters per square inch"
Binary capacity	2953	1018	1556		34	
Kanji capacity	1817	554	773			
Main features	large capacity, small size, high speed scan	large capacity	small size	high speed scan	server based business model	high data density server based
Main usage	Logistics, factory automation, mobile phone tags	office automation	factory automation mobile tags	logistics	TV multimedia advertising	advertising labeling of commercial items
Standard	AIM, JIS, ISO	AIM ISO	AIM, ISO	AIM, ISO		
Sample						

Source: <http://www.eurotechnology.com/2011>

QR codes are becoming increasingly popular with today's mobile culture. Figure 2 shows results of a recent survey conducted by a British company, Econsultancy. The survey question was "Which of the following mobile channels or technologies do you plan to invest in during 2012?" (Econsultancy, 2012).

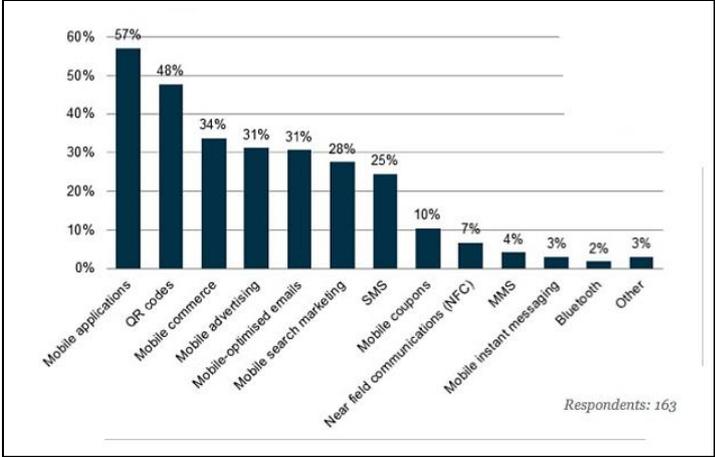


Fig. 2 Technology investment intention in during 2012.

Significant numbers of results show that mobile applications and QR code investment rank in the first rows. The figure gives us an idea that companies are considering investment on QR code. On the other hand QR code users growing in certain developed countries. A survey conducted by 3GVision (a worldwide 1D/2D code reader company) shows us the growth numbers of QR code usage around the world (2d-code, 2012).

Worldwide usage on growth path: Q3/2011 growing by 20.0% over Q2/2011, with daily scans coming from 141 different countries around the world. QR code usage in North America continues to expand in Q3/2011 with 42.1% growth in the USA and 35.1% growth in Canada compared to Q2/2011. QR code activity in the Spain and Australia showed a significant growth in Q3/2011 of 66.5%, and 50.9% respectively over Q2/2011.

Top 10 users of mobile barcodes during Q3/2011

- (1) 1. United States
 - (2) 2. Germany
 - (5) 3. Canada
 - (3) 4. UK
 - (4) 5. Italy
 - (6) 6. Netherlands
 - (7) 7. France
 - (9) 8. Spain
 - (10) 9. Australia
 - (8) 10. Hong Kong
- () – Position in Q2/2011

The above numbers are based on the total number of QR code, Datamatrix and UPC/EAN scans recorded by 3GVision system during the relevant periods. Because of 3GVision's prominence in many markets worldwide, they believe that these numbers are likely to be indicative of global mobile barcode activity. Japan is not included during the survey.

2.2. QR code generator and readers

Special QR code generation app is used to create QR code. Once you create the QR code a printer prints this code for your usage. Free QR code generators are available at Android, iOS, BlackBerry, HP webOS, Symbian_OS, and Windows_Mobile markets support typical application. Today the most popular application stores mostly offer the scanner programs free of charge. Popular ones are: i-nigma, Bakodo, QRset and Scan. Some of them can scan 1D and 2D codes.

3. QR code usage in tourism sector

QR code technology has completely redefined the potential utility and function of signage. Instead of being a stand alone, one off product with a fixed message communicated in just a single language, signage can now serve as a portal to an interactive world whereby people can easily access a much greater depth of content related to a given sign.

The tourism industry is commonly considered as an innovative activity (Buhalis & Law, 2008). The essential feature of the QR code system is that it allows material buried deep within a website to be accessed via a smart phone. What needs to happen in support of this is for the requisite web pages to be built and integrated into a customized website. A key thing to note here is that the means to translate this content into any one of over 120 languages is now with us and hence the value of this media in communicating with people of non-English speaking backgrounds is enormous.

While the technologies associated with portable electronic devices will continue to evolve and improve, as will their overall uptake and use by domestic and international visitors, the current systems are sufficient to justify integrating them into the overall visitor communication product platform.

QR code can be very usable on the following tourism areas:

3.1. Museums and galleries

Museum and art galleries may offer detailed explanation about the items and the artworks without spending large amount of money. Museums use QR codes to offer a multi-media experience for their visitors. An exhibit can only display so much information, but a QR code can hold even more video, data, pictures, audio or combination of presentation media. Guided tours can become a video guided tour for the visitor. Traditional headphone informative systems may be backed up by QR codes and videos bring the artworks alive. Today some galleries use different presentation techniques for attracting more art lovers. An Australian company, Grande Exhibitions, created Van Gogh Alive experiences in Karaköy/Istanbul, at Antrepo 3. Grande Exhibitions undertook a challenging assignment to create this new Van Gogh Alive exhibition completely from scratch; utilizing the latest technology, new choreography and creative direction - incorporating new music and images to tell the story of Vincent van Gogh in greater depth than the first exhibition. Photographs and video have also been augmented with Van Gogh's works to demonstrate his sources of inspiration.

The Cleveland Museum of Art and Bologna's Museum of Archeology are using QR codes to do audio tours of their collections. The tour is for the new galleries: ancient Near East, Greek, Roman, Egyptian art; Byzantine and medieval art; African art; and prints and drawings. Once the code has been scanned, the user is taken to an online version of the audio tour.

The Brooklyn Museum has been taking QR code use one step further. Rather than simply being satisfied with QR codes for artist information, the Brooklyn Museum is experimenting with using QR tags to enhance information about accessibility and even printed two versions of the museum map – a traditional one and one with QR codes.

Smithsonian Natural History Museum in Washington DC used QR codes as part of an exhibit on Neanderthals. And their exhibit about Neanderthal man included QR codes for mobile apps letting visitors see what they would look like as Neanderthals and enabled them to share the photo with their friends on facebook (Smithsonian, 2012).

Similarly, the National Museum of Scotland uses Tales of Things too. Around 80 objects in the Scotland: A Changing Nation gallery has been ‘tagged’ with QR codes. The visitor is taken straight to a website page with further detail about the item, from video and audio clips to images and fun facts.

3.2. Accommodation sector

QR codes are used on cards in the rooms, notices in elevators, at the concierge desk and message boards in the lobby to engage clients with tips on where to dine or what to do during their stay.

Upon scanning the QR code, users are diverted to the hotel website’s blog which contains the latest events, restaurant tips, attractions and activity recommendations, our favorite shops, etc. From here the guest can also navigate to social media pages. This is a simple way to increase the guest service level in a hotel, and at the same time connect the guest through social media platforms such as the property’s blog, Facebook, Twitter and Google+ profiles. These codes could also direct users to help and information about local restaurants, attractions and activities in the area. You could even create a call to action whereby scanning the QR code gives guests money off their dinner or a free drink in the bar.

A hotel in Turkey has just announced the usage of QR code at Otium Eco Club Side. The hotel uses QR code in the following areas for different purposes;

- Motorway hotel signs with QR code on them show the hotel address and the communication data to the smart phone users and they can easily receive the information visually.
- Otium Hotel restaurant menus use QR codes that give the users nutritional information for each menu item in detail.
- Restaurant menus with QR code will show the related preparation videos of the menu item. They believe that families with children watch these children menu preparation videos with great interest (turizmhabercisi, 2011).

A hotel may convert the elevator on the effective sales tool. Placing a QR code you can use travel times from one floor to another to deliver services to customers, new proposals and other information of interest.

3.3. Restaurants and Bars

Restaurants can also easily utilize QR codes to give their customers more information about the food and drink being served that wouldn’t otherwise fit on the menu. Scanning QR codes on the menu could give users calorie and recipe information, but you could also use the technology to direct customers to preparation videos to show them exactly what goes into your food and why your food is better than the competitors’. Again, you could create a call to action on advertising boards outside the restaurant whereby scanning the QR code gives customers discounts on the food or a free glass of

wine with their meal – you could also reveal a secret menu or dish available only to customers who've scanned the QR code. Everyone loves to be exclusive.

Micro-brewery WJ King have recently become the first brewery in the world to put their head brewer into every pub – and to make the most of new marketing technology, they've starting putting QR codes onto each and every bottle of beer and onto all pump clips. WJ King's customers generally want to know how their food and drink is made and prepared and to exploit this, WJ King are using QR codes to direct customers to information about the brewing process as well as the flavor profile and style of each beer so that customers can make informed choices about which of their beers to try. Coming up with useful and creative content to direct your customers to is probably the most important thing to keep in mind when developing a new QR code campaign. But you should also take a leaf out of WJ King's book and know your target market inside out – that way, your QR code campaign has a much higher chance of succeeding (Kingbeer, 2012).

Similar usage is very popular at Radisson Edwardian, which operates several hotels around the UK. It has been running QR code campaigns recently.



Fig. 3. Radisson Edwardian Menu QR code

These include adding QR codes to its menus, which send users to videos of dishes being prepared. They found that a lot of people were tech and social media savvy, and a surprising number of people picked up on it quickly.

The same hotel have a lot of original art works in their hotels, and Radisson Edwardian plan to add QR codes to give background information on for their guests (Econsultancy, 2012).

Restaurant, hotel and pub companies are beginning to tune into the benefits smart phone payments can provide, both for the business and its customers. McDonalds, Costa and Starbucks have recently introduced contactless payment, while customers at the latter are able to automatically send and pay for their order via a downloadable application. From iPhone applications and QR codes to eGift vouchers and pre-pay cards, paying for goods and services using a smart phone is fast becoming a replacement for credit cards and cash.

3.4. Air travel sector

Today many airlines use QR code for promotion and boarding. Securidox, a document delivery firm, believe that the inclusion of a QR code on their securely delivered airline boarding passes will not only enable the passengers' smooth transit through their airport, but also it will take them immediately to the airline's onboard sales portal. Airports can also use them to facilitate fast-track security or parking offers.

When asked, Mark Scott MD of Securidox said, *“ID is essential, but a boarding pass is the one piece of paper that every passenger must have to travel. We can add web page specific QR codes to each of our boarding passes, so that the mobile traveller can then scan for pre-flight offers. We are developing this idea with Ivor Smith of dutyfreeonarrival.com who has secured QR codes and airline duty free data for every world airline.”* (Securidox, 2012).

Dutch airline KLM have taken serious approach to social media by allowing fans to check in to their flights in Holland recently by scanning a QR code on the floor. It has been made for KLM Queen’s day. Using the code made a fast check in for the passengers. Delta uses QR code boarding passes. Gate employees can scan the bar code and see the details of your flight. Scandinavian Airlines, who recently launched the “Couple Up to Buckle Up” 2 for 1 campaign that used two unique QR codes across every touch point (emails, facebook app, banners, print ads .etc), leveraging an insight into how couples most commonly book trips.

Couples would each scan the QR code assigned to them, which would sync their half of a video based offer and reveal the discount code split across both screens . During the campaign they sold out every ticket available Flysas (2011).

The mobile boarding pass is essentially a paperless e-ticket. Here is how it works:

- The airline sends your boarding document, with a link to your QR code, directly to your mobile device via e-mail.
- You click the link in the email to retrieve your QR code.
- Anytime you need to present your boarding pass – at security checkpoints or at the gate – you hold up your QR code to a scanner, which reads the information.
- The QR code acts as a unique link to all of your flight information.

If you have a seat change or upgrade, or a change in the departure gate, your boarding pass can be refreshed electronically to display the new information. The pass can also be used to check any bags at self-service machines, airline counters and curbside kiosks.

For Qantas, the QR Code boarding pass system is being implemented for domestic flights and is available via the Mobile check-in counter, as opposed to the conventional long lines at the airport. These mobile check-in counters will be made available at Brisbane, Canberra, Adelaide, Melbourne, Perth airports.

United Airlines has added QR Codes as part of their mobile check-in process. In Turkey Pegasus Airlines uses mobile check in process recently.

3.5. Guided Street Tours and open air museums

Visiting a foreign city can be interesting if the city streets have the informative codes. Many cities use the codes for providing area information to the tourist. QR codes can take you to the history of the area where you are.

QR codes are now found at many locations such as D.C. libraries and bus stops. In fact, a recent initiative has placed QR codes on the local D.C. Circulator buses to offer citizens new ways to engage with their services in real time. Each QR code is personalized to each bus – allowing riders to quickly get up-to-the moment progress reports, post traffic status updates, view bus schedules per route and stop and, of course, interact by commenting or tweeting.

Ready or not, the discovery of information is digitized. It's e-discovery. Museum exhibit placards or written displays now have QR codes which allow visitors to quickly link their real-world experience to rich web content via their smart phone. Such QR codes on museum placards are at the National Museum of Natural History, the National Museum of the American Indian, and more.

In Manchester, UK, Decoding Art has just been launched. The 20 monuments that now come with their own QR codes can be covered on foot in about an hour; the casual interpretation provided by conservator Beth Courtney en route keeps the pace flowing, while 12 audio commentaries by historian and broadcaster Jonathan Schofield help animate the scene (Manchestergalleries, 2011). Streets, castles, vineyards, rivers, parks all open air venues can inform the tourist with QR code.

Philippine wireless leader Smart Communications, Inc. (Smart) and Cebu-based website MyCebu.ph have partnered to deliver information on tourism and heritage sites to mobile phones and tablets through QR code scanning. The project is being undertaken in partnership with the Department of Tourism.

Smart and MyCebu.ph will place special markers on tourism and heritage sites all over Cebu. The markers will contain a snippet of information about the site and a QR code that, when scanned, will open an article about the landmark.

The highlight of the tour was the display of the San Juan Bautista parish church through a QR code marker at the chapel that is built on where the church used to stand. The parish church is described by historical records as the most opulent in Cebu.

Same kind of scheme started in the UK. This scheme will run in Shrewsbury, Leicester, Chester, Rochester and Rutland as a pilot for six months (visitengland,2012).

3.6. Shops

Gift shops use QR codes for the same purpose, information about the product. Some shops add music to the product. Shops turn the QR codes in to successful marketing campaigns.

J.C. Penney (USA department store) used QR codes last Christmas season to create a special experience for both gift givers and receivers. During the holiday season, J.C. Penney offered a QR code promotion at 1,100 of their stores. But, rather than simply linking customers to a QR code created by them, they are letting the customers do the creating.

By going to customer service, shoppers get QR code gift tags that allow them to scan the code, record a personal voice message, and then affix the tag to their gift. Once the gift recipient scans the QR code, they hear the pre-recorded message from the gift-giver (Jcpsanta, 2011).

In Korea Tesco company launch a campaign called "Let the store come to people". They created a virtual Tesco store at the metro station. Customers have been purchasing the products by scanning the QR code of the product, later when they finish shopping; purchased products are delivered to the home addresses. After the campaign the company's online sales increased %130 (youtube, 2012).

4. Conclusion and Implications

Technology and tourism are two areas that people involved in their daily life today. This study has identified the usage of QR codes in various areas in tourism. In Turkey, these implementations are not common yet, although ownership of cellular phone is high, awareness of these practices still looks away from desired point. Another part of this study will investigate the potential of awareness of QR code usage among tourist visiting Istanbul will be explored.

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