STATISTICAL RESEARCH REGARDING THE USEFULNESS OF ACCESSING LEGAL INFORMATION QR CODED

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Statistical Research Regarding the Usefulness of Accessing Legal Information QR Coded

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Abstract

The article presents theoretical aspects related to the QR code, stages of appearance and evolution of QR code, its structure, features and benefits. The methodology of creating a QR code and the stages of work for accessing legal information by using the QR codes, as well as mobile applications, are presented along with highlighting the many advantages presented by using the QR code. Statistical research regarding the usefulness of accessing legal information encoded by QR codes addressed to legal advisers within the College of Legal Advisers from Brasov (Romania) was carried out in order to evaluate the usefulness of developing a collection of laws codified QR, the degree of ease regarding the implementation of the application, but also the level of interest in using this collection by legal advisors in their professional activity.

Keywords: legal information, QR code, legal adviser, information management, mobile applications, statistical research.

Introduction

With the development of information technology, the QR code technology in the application of information technology industry has become more and more widely, its action also is particularly important. In modern business activities, with the popularity of smart phones and all kinds of mobile intelligent device, which can realize the application is very extensive (Ou & Jiang, 2014). QR code, the two-dimensional barcode designed by Denso Wave Company, was originally intended to track millions of parts as it moved about on high-speed assembly

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lines. Since then, these increasingly ubiquitous black and white squares have been applied to an ever-broader range of nonindustrial uses. In order to make use of these codes, the vast majority of consumers use smart phone technologies in order to convert the codes into usable information (Smith & Kollars, 2015). A QR code typically points to an online resource (Close Up, 2011). In his work "Rethinking QR code: analog portal to digital world" (Baik, 2012), Baik introduced a new vision for applications and activities that use QR codes to accessing information regarding daily objects. This vision presents QR codes as similar to an analog portal, a media gateway to the digital world, because it shows a new way of internet access and may be able to change the culture of accessing information, when QR code infrastructure matures. Bar code technology has been used for special purposes in the field of logistics, the trader's management, customer management, and so on. Traditionally, bar codes are used to be scanned using special scanners in these specific areas. However, from the moment in which the software for scanning bar codes on cell phones were developed and introduced the use of bar codes has been extended to newspapers, magazines, cakes, etc. For mobile phones with a camera was developed improvement of the scanning option by adapting the technologies of filtering and auto-focus when bar codes are read without using other sensors, only through the camera. Using QR codes for purposes of exposure and distribution of the information instead of using them to limit the information in the areas of logistics can be interpreted as an analog portal that can guide users to the corresponding digital information by scanning QR codes attached to objects in the real world, without relying on internet portals or search engines. Thus, QR codes can be interpreted as a new kind of portal systems. QR code usage in daily life can be classified into two groups. First, it can be used to increase the comfort of users. For example, especially for small mobile devices, from the phone book, it can be used the service scan and call or using magazines and TV guides it can be used the service scan and watch. Secondly, QR codes can be used as signs, helping users to access information for the corresponding objects. QR codes present the advantage of avoiding the internet portals and search engines, the user having direct access to the desired information.

Currently, most users navigate to the desired sites via search engines and internet portals. In many cases, users may be disturbed by the internet services due to the following reasons: (1) most companies try to distract users who visit their Web sites by guiding them to the commercial ads online; this hampers the access of users to the desired websites; (2) users may be misguided due to the similar keywords in terms of syntactic significance; (3) in some cases, users' computers can be contaminated with viruses coming from unwonted software sites. Through direct access provided through bar codes, the above mentioned disadvantages can be avoided. The QR code shows great performance for error correction and recovers decoding errors caused by skewed image angle or luminosity (Lee *et al.*, 2015). Two main directions should be followed for

implementing the concept of analog portal: (1) QR codes should be printed, attached and distributed to various objects; (2) scanners and scanning software, especially those installed on mobile devices, should be distributed. Using the analog portal through analog through QR codes is done by executing the following steps (Figure 1): (1) Scanning 2D barcodes via mobile device equipped with a camera; (2) Decoding bar codes using scanning software; (3) Transmitting the information to the analog portal; (4) Classification and storage of information collected in the database; (5) Access to appropriate web service (Baik, 2012).
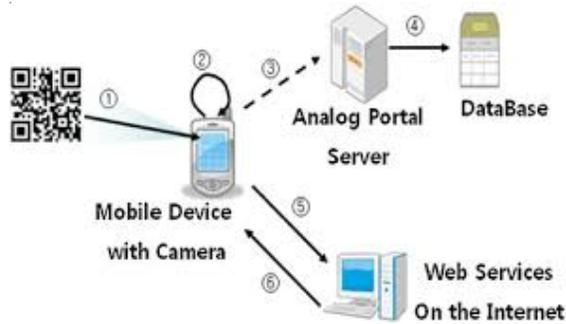

Figure 1. The use of the analog portal

Source: Baik, 2012: 433.

QR code is one of the many types of two-dimensional codes currently used in various fields. In an attempt to give a definition, Robin Ashford believes that QR codes are hyperlinks, essentially pictographic, which can be incorporated into the physical environment (Asford, 2010). In essence, QR codes are a convenient way of adding virtual to the physical, to deliver useful content, often in the very moment when the situation so requires. QR codes are ubiquitous in Japan, in the place where they originated and have been popular for years (Shintaro *et al.,* 2012). They appear in shop windows, on posters, billboards and buildings, in medical offices, TV commercial; on McDonald's packaging the code is scanned to provide information on nutritional ingredients (Sandipan & Ranganathan, 2013). A Japanese company embedded QR codes directly in tombstones, so that people may be able to learn more about the person buried there. QR codes are gaining ground in most of Europe, where many cities, University libraries and campuses have explored their potential. Association of College and Research Libraries has predicted the emergence of new services as a direct consequence of the unprecedented growth of mobile devices and their applications. The wide-spread use of QR codes could certainly be one of them.

There are several reasons which lead us to believe that the time has come for mass use of QR codes in the United States, and starting to implement this

technology in academic institutions and libraries. The number of smartphones and mobile phones that have enabled the Internet in this country is growing rapidly. Marketing research indicated that by the end of 2011, smartphones were found in the hands of half of the total number of mobile users in the US. As cell phones are amended, as is changing and the way we use these devices. The times in which the students used to walk around campus with ears glued to cell phones, have gone. Now you have the attention directed towards text. The voice became less relevant; they focus on data. They are still largely unknown, but the first users in higher education and promotion campaigns can change this. As with any new technology, it is important to understand what can do these codes and when they can help the users. A QR code can be read by the array of smartphones and mobile phones which are equipped with cameras. These are sometimes referred to as 2D codes, bar codes, 2D codes, or mobile codes. On most phones purchased in United States, a free application should be downloaded which allows to read the QR code, although some phones have it preinstalled (Qian *et al.*, 2012). In some authors opinion (Bhargava, Kumawat & Bhargava, 2014) QR codes are two-dimensional bar codes that can contain any alphanumeric text and are given in binary form or only in numerical form, Kanji form and have URLs that directs users to sites where they can get more information about an object or place (practice known as mobile tagging). Type codes QR (quick response) are composed of a two-dimensional image that can be scanned using a Smartphone camera; as a result of this process, it opens on the phone display as a web page, a picture, video or text (Coleman, 2011). In terms of descriptive, QR codes connect physical world (a poster, or any physical object) to an electronic environment (web resources) or facilitate the process of communication (SMS, phone call). Given these properties, the QR code adds an extra value to the process of improving access to information, which becomes more efficient (Ramsden, 2008).

The Emergence and Evolution of QR Code

Stages in the evolution of QR codes, as can be seen in Figure 2, are: (1) 1970: IBM has developed the UPC symbols formed of 13 numbers, allowing automatic entry into computers (these symbols are still widely used in the Point Of-Sale (POS); (2) 1974: development of Code 39, code which can encode approximately 30 numbers (alphanumeric characters); (3) early 1980s: development of code 16k and code 49; (4) 1994: development of QR code that can encode 7000 characters, including Kanji (Chinese characters used in China).
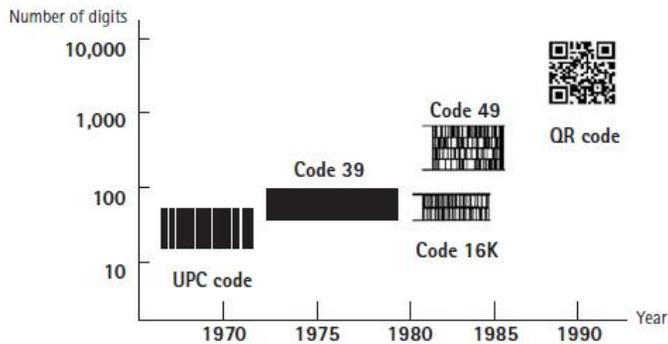
Figure 2. Evolution of QR codes

Source: http://www.itsc.org.sg/pdf/synthesis08/Three_QR_Code.pdf

The company Denson Wave, the QR code inventor, a branch of Toyota, has decided not to exercise his rights on the patent, this leading to the development of an international standard: ISO/IEC 18004:2006. Since the specification is open, developers are free to create new types of QR codes (Coleman, 2011).

The Structure of QR Code

Quick Response (QR) codes are free to produce, allow access to data, and can be read with most smartphones (Jackson, 2011). The Quick Response (QR) code is the most popular graphical code in the world today (Tkachenko *et al.,* 2015). QR code (Figure 3) consists of black modules (concentric dots) arranged in squares on a white background. The information encoded can be conceived in four standard ways (numeric, alpha-numeric, binary, Kanji), or via the supported extensions, basically from the point of view of virtual, any form of data. Unlike the old bar cod which was designed to be mechanically scanned by a beam of light, the QR code is detected in the form of a two-dimensional digital images by a solid state image sensor which is subsequently reviewed by a programmed processor for this purpose. Processors locate the three squares in the corners of the image and normalize the image size orientation and angle of view. The points are then converted into binary numbers and validity is controlled using an error correction code.

Figure 3. QR Code

Source: http://www.qrcode.com/en/codes/model12.html

QR standard structure allows organizations to insert in the code not only necessary textual information, but also images, logos or special characters, to make it more attractive and easier to recognize, without loss of information. The result is called Design QR. It was provided in order to be easily recognized by customers. It usually resembles with the design of company's logo. The QR information bits are encoded into the luminance values of the image, taking advantage of the immunity of QR readers against local luminance disturbances. To mitigate the visual distortion of the QR image, the algorithm utilizes half toning masks for the selection of modified pixels and nonlinear programming techniques to locally optimize luminance levels (Garateguy *et al.* 2014).

Model 1 (Figure 4) represents the original model of the QR code, a code capable of encoding 1167 numerals, with a maximum 14 version (73 x 73 modules).

QR Code Model 1

Figure 4. QR code Model 1

Source: http://www.qrcode.com/en/codes/, 2015.

QR code became more popular outside the industry for its fast readability and large storage capacity compared to traditional information of UPC (Universal Product Code), known as barcode on products that we buy daily. The amount of data that can be stored in the QR code depends on the type, version and the error correcting code (Figure 5).

In the past, the design of QR code generators only aimed to achieve high decodability and the produced QR codes usually look like random black-and-white patterns without visual semantics. In recent years, researchers have been tried to endow the QR code with aesthetic elements and QR code beautification has been formulated as an optimization problem that minimizes the visual perception distortion subject to acceptable decoding rate (Lin *et al.*, 2015).

QR Code Model 1and Model 2	Micro QR Code	iQR Code	SQRC	LogoQ

Figure 5. Various types of QR Code

Source: http://www.qrcode.com/en/codes/

Advantages of all 2D symbols are integrated into QR code: large data capacity, high density, high speed playback (read), reading 360 ° angle, the ability to correct errors, some special characters (Kanji, etc.) other than alphanumeric. The data in QR codes can easily be read with the help of a QR code reader application installed in a smartphone with camera (Devisree & Praveen, 2015).The current process of scanning a code using a cell phone is simple. The first step is the installation of a QR code reader on the mobile phone. During the start of this process, the cell phone camera becomes a QR code scanner. The second step consists in centering the entire QR code in the viewfinder of the camera. Once the QR code was focused properly, most QR code readers will decode the code automatically. Also, some will automatically launch a request for assistance (for example, a web browser for an URL), and finally will process the code. Others will display the code and asks the user to choose an application. Worth reported that a great number of types of QR code readers allow storing QR codes, the feature that allows a user to review it at any time.QR code is a code system that is strong in against to apply image processing techniques (skew, warp, blur, and rotate) as QR codes can store several hundred times the amount of information carried by ordinary bar codes. For this reason, QR code is used in various fields, e.g., air ticket (boarding control system), food(vegetables, meat etc.) tracking system, contact lenses management, prescription management, patient wrist band (patient management) etc. (Kim, 2014).

QR code can be added to any printed material of a brand: business cards, presentation folders, banners, posters, packaging, print, even vehicles. By reading the code, the user, who can be a potential customer or employee, has access to

information, benefiting from the advantages of digital media: multimedia content, ease of editing and data storage. QR Code is a tool through which consumers can enrich the experience of interacting with a brand, making the transition from offline environment to online environment. While the QR codes have not yet captured the interest and the attention of the general public, there are many reasons that lead to the possibility of changing the situation. The functionality of the QR Code in Japan and other Asian countries constitutes a first reason which comes in support of the claim. The second factor which contributes to the popularization of the QR Code is represented by the items of specialty occurring in profile publications and in the blogosphere. This advertising campaign can lead to the rapid dissemination of information relating to the QR codes among the trainers; these, would achieve further experiments, would make efforts to share best practices. If this practice continues, the numerous users of mobile phones can make a decisive step and start experimenting with QR code readers to discover its benefits, considered to be a truly revolutionary phenomenon.

Statistical Research on the Usefulness of Accessing Legal Information QR Coded by the Legal Advisers of the College of the Legal Advisers Brasov

According to the modern concept of marketing, any activity must be done from the knowledge of user's behaviour. The theory of user's behaviour has become a distinct field of marketing. The marketing researches collect process and analyse information on users, information which will form the basis for the development of effective marketing strategies.

General assumptions

Development of a research to find out the legal adviser's opinion regarding the usefulness of accessing legal information QR coded starting followed the general hypothesis: (1) the quality of legal information encoded QR is very good; (2) deployment of the application can be done easily; (3) a collection the use of a collection with laws QR coded is very useful for professional activity of legal practitioners.

Objectives of the research

Tabel 1. Objectives of the research

Basic aspects	Researcher questions	Objectives
Characterization of respondents	What are the main characteristics of the subjects covered by the survey.	Classification, grouping the respondents depending on age, gender and seniority in the legal field.
Respondents' attitude about the usefulness of the codified law collection with QR code	Assessment of the practical utility of the collection of laws QR coded	Identify the extent to which legal advisors consider useful for their professional activity the collection of laws codified QR
Respondents' attitude regarding the ease of implementing the application	To what extent is rated the degree of ease regarding the application deployment by legal advisers	Identify the level of appreciation of the legal advisers in relation to the degree of ease of application deployment
Legal Adviser's attitude about the use of QR code law collection	The option of using the collection of laws QR coded by legal advisers in their professional activity	Identify the extent to which legal advisors may use the collection of laws QR coded in their professional activity

Research methodology

The marketing study undertaken uses as research method the questionnaire to gather data from respondents. The questionnaire named "Study on the usefulness of accessing legal information QR coded by the legal advisers of the College of Legal Advisers Brasov" was designed on the basis of objectives and hypotheses formulated. The questionnaire comprises 6 questions: questions of characterisation of the subjects: 1, 2, 3; simple questions answers Yes or No: 6; questions with a unique numeric choice, includes prioritizing certain items, on the basis of numerical values: 4, 5. the questionnaire was originally designed and intended for online administration. The questionnaire was tested on a sample of 5 persons, for verifying and possibly eliminating ambiguous formulations or other types of errors. After testing the questionnaire there was no new requirement. The research was carried out using the electronic version of the questionnaire, which was disseminated via an email to the College of Legal Advisers to be distributed to all members. The email indicated the link from where the questionnaire can be accessed: https://www.surveymonkey.com/r/M75F8MC; the process of observation and electronic data recording took place during July-August 2015. There have been sent emails to 200 legal advisors and were obtained 95 responses.

Results

From the graphs drawn up on the basis of the analysis of the various categories of respondents, it can be noticed that: 8,4%, a number of 8 respondents, falls within the age group of 20-25 years, 49,5%, the highest percentage, corresponding to a number of 47 respondents, belongs in the age group 25-30 years. In terms of the age group 30-40 years, this is represented as a percentage of 31.6%, meaning a number of 30 respondents, that between 40-50 years in the percentage of 10,5% a number of 1 respondent; the 0%, no respondents for the age group over 50 years (*Table* 2).

Table 2. Subjects age

How old are you?		
Answer Options	Response Percent	Response Count
20 – 25 years	8.4%	8
25 – 30 years	49.5%	47
30 – 40 years	31.6%	30
40 – 50 years	10.5%	10
over 50 years	0.0%	0
answered question		95
skipped question		0

Table 3. Subjects gender

Gender:		
Answer Options	Response Percent	Response Count
female	43.3%	39
male	56.7%	51
answered question		90
skipped question		5

Gender – generated 90 valid answers and 5 skipped questions.43.3% of those to whom it was addressed the questionnaire, a number of 39 respondents, are females; the highest percentage, 56.7%, a number of 51 respondents, are males (*Table 3*). The rate of 8.4%, the lowest, meaning a number of 8 respondents, have between 0-2 years of work experience in the legal field, and a percentage of 26.3%, a number of 25 respondents, have between 2-5 years. 51.6%, a number of 49 respondents, highest, belong to those that fall within the range of 5-10 years of work experience in the legal field. In the range of 10-20 years of work experience is included a rate of 12.6%, a number of 12 respondents, and over 20 years of work experience, a percentage of 1.1%, a number of 1 respondent (*Table 4*).

Table 4. The experience of subjects in the legal field

For how long have you been working in the legal field?		
Answer Options	Response Percent	Response Count
0 – 2 years	8.4%	8
2 – 5 years	26.3%	25
5 – 10 years	51.6%	49
10 – 20 years	12.6%	12
over 20 years	1.1%	1
answered question		95
skipped question		0

70 respondents appreciate the collection of laws QR codified as being very useful, 18 respondents consider it useful and 7 of them don't consider neither useful nor useless (*Table 5*).

Table 5. The rate of usefulness of the collection

Rate the usefulness of the collection of laws codified QR on a scale of 1 to 5: pointless least useful neither useful nor useless useful very useful							
Answer Options	1	2	3	4	5	Rating Average	Response Count
1	0	0	0	0	0	0.00	0
2	0	0	0	0	0	0.00	0
3	0	0	7	0	0	3.00	7
4	0	0	0	18	0	4.00	18
5	0	0	0	0	70	5.00	70
answered question							95
skipped question							0

49 respondents find very easy to implement the application, 33 respondents find it easy, while 13 respondents find it neither difficult nor easy to be implemented (*Table 6*).

Table 6. The degree of ease in implementing the application

Rate the degree of ease in regard to the implementation of the application on a scale of 1 to 5: difficult / not very difficult / neither difficult nor easy / easy / very easy							
Answer Options	1	2	3	4	5	Rating Average	Response Count
1	0	0	0	0	0	0.00	0
2	0	0	0	0	0	0.00	0
3	0	0	12	0	1	3.15	13
4	0	0	1	32	0	3.97	33
5	0	0	0	3	46	4.94	49
answered question							95
skipped question							0

100% of respondents, meaning a number of 95 subjects, admit the fact that they will use in their professional activity the collection of laws QR codified. In conclusion, legal advisers, members of College of Legal Advisers Brasov, who tested the app by scanning the QR code provided through the questionnaire declared themselves pleased with this application, consider it useful and easy to use. From the data analysis of this survey, all 95 respondents, legal advisors, will use the collection of laws QR codified in their professional activity.

Conclusions

There is a new vision for applications and activities that use QR codes for accessing information regarding the everyday objects: QR codes are presented as an analog portal, a media gateway to the digital world, because it shows a new way for accessing the internet and may be able to change the culture of accessing information when QR code infrastructure matures. Barcodes can be viewed not only in terms of digital information containing details about a product, but also by the analogue information that can be printed on the label or packaging of the product. This feature suggests that analog forms of everyday life can be integrated into the portal that connects the digital world with analog real world. The emergence and evolution of QR code, code structure, characteristics, advantages of using him, make the transition to the practical side of QR code use in the legal field. The use of QR code for identifying a law that can be accessed almost instantaneously, can be viewed entirely, in open access, at no additional cost, creates many benefits. This study has highlighted the fact that the respondents have the desire to use the collection of laws QR coded in their professional activity. Most of the respondents appreciate the collection of laws QR codified as being very useful, find vey easy to implement the application and admit the fact that they will use in their professional activity the collection of laws QR codified.

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