

## Analysis on Status of Two-dimensional Code Development & Prospects Prediction

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**Abstract**—With the rapid development of mobile Internet and rapid popularization of the smart phones, consumers attach increasing importance to interaction and information dissemination. In recent years, the number of users of the two-dimensional code has been dramatically increased; consumers gradually develop the habit of “scan code”; business models have been innovated, while the two-dimensional code as a mobile Internet portal is promoting the development of cross-media. In this paper, with analysis of cases about two-dimensional code, the reasons why the applications of two-dimensional code are popular are explored and the prospects for the development of two-dimensional code are predicted.

**Keywords**- two-dimensional code; real-name system for train tickets; Emart; security mechanism; cross-media

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### I. ANALYSIS ON STATUS & CASES OF TWO-DIMENSIONAL CODE APPLICATION

With the development of the Internet and new media, changes in the pattern of people’s lives have been undertaken; the range of using two-dimensional code is being broadened; applications are becoming more diversified.

The application of mobile two-dimensional code is wide mainly including read-mostly applications (code scanning through cell phone) and read applications (electronic certificate). The former includes traceability, anti-counterfeiting, advertising media, electronic business cards and shopping train; the later includes redemption, group buying, electronic VIP membership certificate, electronic tickets, and electronic sign. After scanning the two-dimensional code, common marketing interactive types are daily uses like video electricity providers, subscription information, social media, store address and other. The statistics of cloud service platform of snapshot two-dimensional code show that the use of scanning code for train tickets tends to be substantially increased in the second quarter of 2012, and compared to the same period last year, there is an increase of 86.2% in scanning code for shopping. (Ref. Figure 1).

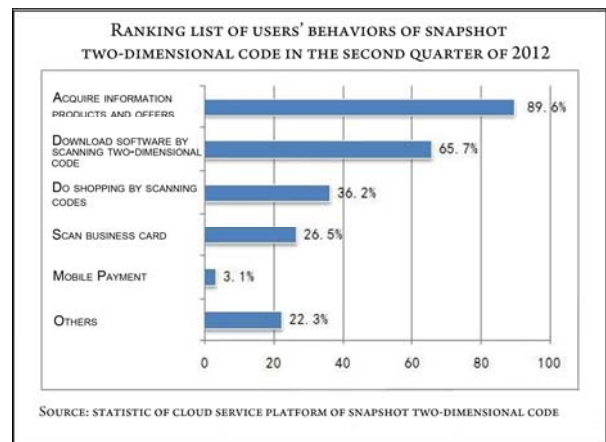


Figure 1. Source: statistic of cloud service platform of snapshot two-dimensional code

The data in the report of using two-dimensional code to market U.S. magazines in the first quarter of 2012 showed that the number of two-dimensional code printed in the magazines was 1356, much higher than 352 last year. According to survey carried out by Nellymoser, more than 10% among 100 magazines in the second quarter of 2012 contain two-dimensional code, increasing by 5% compared to the same period last year. The influence of two-dimensional code is rising as shown in more and more two-dimensional codes in ad pages (Ref. Figure 2).

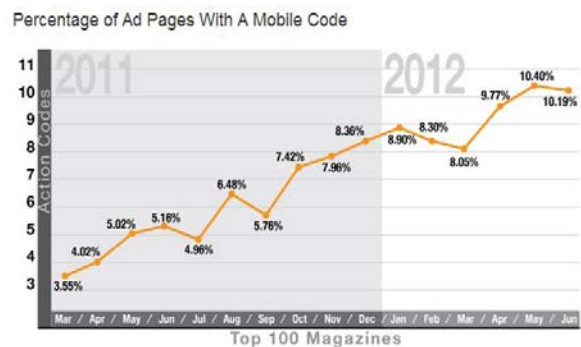


Figure 2. Source: statistic of cloud service platform of snapshot two-dimensional code

Compared to ordinary two-dimensional code advertising, two-dimensional code marketing planned by Korea Emart

supermarket chain has inspired today's two-dimensional code applications market and is leading a new trend.

#### **Case 1: Shadow QR Code of Emart Supermarket**

In order to improve sales at noon in Emart Supermarket, it set up a special QR 2D code device outdoors. It doesn't work in normal hours. However, when it comes to noon, sunshine makes it meaningful as the shadow of the prisms will project a QR code! In other words, it is a QR code only appearing at noon on sunny days. It is when to use smart phones to scan these QR 2D codes and get supermarket coupons. If purchasing online, the logistics personnel of this supermarket will make delivery as soon as possible.

During the activity, over 12,000 SunnySale coupons have been distributed. Compared with January, the number of members increased by 58% in February; the turnover at noon increased by 25%. The activity attracted tracking reports of television stations and websites. It was highly praised by the advertisers and judges on Cannes Festival of Creativity and the Asia Advertising Festival this year and won five awards and seven awards. It brought in unprecedented effects in sales, brand communication and interaction with consumers.

The success of two-dimensional code application to Emart Supermarket brought a new direction for development of two-dimensional code. The wide use of two-dimensional code and easy access to mobile software also make two-dimensional code faced with unknown risks. Despite full swing of development of two-dimensional code today, security has become one of the important factors restricting the rapid development of two-dimensional code.

#### **Case 2: two-dimensional code of China's real-name train ticket system**

The real-name train ticket system has been enforced in China since January 1, 2012. The passengers are able to buy train tickets just with valid identification information. The ID information is printed on the ticket which gives the lawbreakers illegal chance and is the reason why the ticket-picker comes into being who picks up the train tickets lost or thrown away after ticket checking by the passengers.

The two-dimensional code on real-name ticket is different from the previous ticket used, on which the user's ID information cannot be indentified visually, but can be accessed to by any two-dimensional code recognition software on network, including date of birth and ID number and other complex data. And the introduction of security measures makes it difficult for the lawbreakers to steal passengers' information even if picking up the tickets.

## II. WHY TWO-DIMENSIONAL CODE IS POPULAR

### *A. Popularization of Smartphone terminal*

The statistical report of China Internet Network Information Center shows that the number of Internet users in China has reached 513 million as of the end of 2011, among which the scale of mobile Internet users has risen to 69.3%, reaching 356 million. The popularity of smart phones among consumers in the domestic market solves the problems of terminal decoding, equipment placing and data networking, which makes possible the development and application of two-dimensional code.

### *B. Small square with large capacity*

The two-dimensional code is a two-dimensional bar code. URL, text, photos, and other information can be compiled by encoding algorithms in a square bar pattern. The mobile phone users can use the camera and decoding software to re-decode related information and view the contents.

The two-dimensional code features in uniform arrangement of black modules in a square pattern on a white background, small size, and failure of identification of a large amount of integrated information with the naked eyes, which increases people's curiosity about this contents linked with two-dimensional code. Due to exploration of the unknown contents and the negative stereotype of "entertainment" of the two-dimensional code, it is easy obtain information behind the two-dimensional code so as to meet consumers' curiosity and get the targeted information by using a mobile phone and corresponding software.

### *C. Use of fragmented time*

With the accelerated pace of life, people's time is divided into a number of blocks. Meanwhile, the Internet has entered an era dominated by fragmented time. At the time of waiting for the bus, dinner or toilet, the phone has unwittingly filled up the fragmented time. CEO of Focus Media, Jason Jiang made a prediction that in the future, the success of all new media lies in the successful use of consumers' fragmented time.

Two-dimensional code takes up a part of the mobile applications with its advantage of getting information in a short period of time, and makes successful use of consumers' fragmented time. Because there is little limitation on the release of two-dimensional code, consumers can see two-dimensional code filling the void everywhere.

### *D. Promotion of networking giants*

Since Tencent launched Vsins on January 21, 2011, the users have exceeded 100 million on March 29, 2012. The two-dimensional code as a function of Vsins drives the application of two-dimensional code. On September 24, Sina microblog officially announced to provide related services of the two-dimensional code which allow users to generate two-dimensional code directing to their own microblogging platform, to view the pages linked with two-dimensional code and directly enter a specific microblogging release box. After Focus Media, Juhuasuan and Alipay jointly announced a new service that consumers can directly purchase goods and services before the display screen of Focus by shooting two-dimensional code with phone equipped with Alipay Client.

The networking giant's participation contributes to accelerating the development of two-dimensional code, promoting the ride of development of two-dimensional code, making it popular among people and developing the habits of two-dimensional code.

### *E. Emerging media platform*

The two-dimensional code is the key entry to connect online and offline.

Mobile two-dimensional code as a new media platform based on the print media and beyond it is able to save the traditional media from the plight of spreading and connect a variety of media forms to promote the development of cross-media, which not only enhances the interests of marketing activities and convenience of participation, but also attracts many consumers to experience the brand's activities, and then interact with the corporate brand.

### III. FORECAST OF TWO-DIMENSIONAL CODE DEVELOPMENT

In early times, the development of two-dimensional code brings convenience and entertainment for people's lives. It has unlimited potential because it matches the speed of the rapid development of current era. As for the current trend, the development of two-dimensional code needs to build a comprehensive application system and purify its application environment. Meanwhile, the two-dimensional code as an emerging marketing medium will promote the integration of new media and drive their development.

#### A. *The security mechanisms of two-dimensional code will gradually be built*

The application of two-dimensional code is becoming increasingly popular, which is followed by viruses, malicious programs that also increases the potential risk of refresh code. It is necessary for the government, software developers, media and users to work together to build the security system of two-dimensional code.

##### 1) *Government*

#### a) *Establish and improve the legal system of personal information security*

Now, the protection of citizens' personal information is included in legal scope of Criminal Law stipulated by Article 7 of the Seventh Amendment to the Criminal Law for the first time in which there are two aspects of protection of citizens' personal information. They are sales and provision of citizens' personal information and illegal access to citizens' personal information. The Government should strengthen the control on making maliciously false information. The introduction of this provision is a guarantee of the security of domestic information and plays a role of cracking down on criminals and construction of safe information society.

The two-dimensional code just booms in China. Compared to Japan, South Korea, the United States and other countries, China lags behind for a few years. We can learn from and use their experiences and ways for the popularization and development of two-dimensional code, make adjustment according to China's specific national conditions and social development model so as to gradually improve the development of two-dimensional code system.

#### b) *Popularize the basic knowledge of two-dimensional code and make construction of credit system*

Based on the rapid development of China's two-dimensional code and incomprehensive understanding of the

two-dimensional code of some users, the government should consider about the living environment of two-dimensional code, offer support in popularization of basic knowledge of two-dimensional code, work together with media to make continuing reports and special reports of safe applications of two-dimensional code, encourage users to form correct habits and good application attitude, develop social integrity in whole range and advocate the construction of social credit system.

##### 2) *Software developers*

Software developers should adhere to the sense of responsibility of "Within the body of every businessman should flow the blood of morality". While developing their own business, they should provide strong technical guarantee and technical support by guaranteeing the security of the user's mobile phone and working together with the government to build a society of information security

Base on the security risks for two-dimensional code, the domestic and international software developers launch the application software to protect the security of user's mobile phone, which is used for investigation of the links behind two-dimensional code so as to achieve the effectiveness of protecting user's information. Although the defense capabilities of the two-dimensional code software can resist most of the virus from entering the user's mobile phone, they can not be fundamentally resolved.

The software developers should understand the origin of the mobile phone virus by setting some functions in the mobile security application software of statistics, classification and feedback of virus data. It is necessary to fundamentally solve the problems of the two-dimensional code link carrying the virus because the virus attaches itself to the channel of two-dimensional code link.

Monitoring the security of users' mobile phone should be carried out and a security report provided on a regular basis.

##### 3) *Media*

The two-dimensional code is dependent on the objective conditions of development of traditional media and new media so the media are required to strengthen the publicity of credit mechanism (joint action with the government was mentioned above).

For related events such as disclosure of train ticket's two-dimensional code information, it should make in-depth analysis in straightforward language and make the program easily understood so as to achieve the largest popularization of information security knowledge

##### 4) *User*

#### a) *Raise self-prevention consciousness and consciousness of legality*

If personal information is infringed upon, firstly, the citizens should report to the public security organs and investigate for criminal liability; secondly, make criminal investigation of civil liability for infringement of personal privacy. The citizens should use the law as a weapon to defend their legitimate rights and interests.

#### b) *Form good habits*

Users should improve their ability to identify the two-dimensional code. It is irrational to scan every code without

knowing them first, especially for some strange website links and non-standard two-dimensional code environment.

If any victimization experiences and stories associated with the two-dimensional code, use them to warn a majority of users not to be fooled with the social networking platform with fast spreading speed and numerous users

*B. The two-dimensional code will promote the development of the print media*

*1) Typesetting*

While extending information with two-dimensional code application, the print media should focus on the novelty of the layout and make the second creation with two-dimensional code by combining with the contents on the page layout so as to attract consumers to scan codes spontaneously.

According to the characteristics of the commodity, make change and innovation on the pattern of black and white square of two-dimensional code to express the corresponding demands.

*2) Release forms*

*a) Space*

Take for example the application of two-dimensional code in print advertising. Print advertisement is released where crowds of people gather so as to achieve the effect of word of mouth and reach the peak of the number of people who scan the codes. It is applicable to CBD. Combined with VI (Visual Identity) in exclusive shop, it makes consumers shop in the way of incorporating online and offline.

*b) Time*

Release in public places where people have nothing to do but waiting such as in subway stations, bus stations, elevators for people to use their fragmented time. Present two-dimensional code stores before the user rather than guide the user to the store, especially not make the guiding channel very difficult. It applies to all products that are available online: retail, clothing, household and children's products, and encourages users to act through "channel time".

*c) Select the object*

Currently, two-dimensional code is released on paper media. The objects for selection for two-dimensional code tend to be more diverse based on the specific needs. A breakthrough will be made in material, not just limited to the paper; the two-dimensional code will be directly combined with different materials of physical commodities.

*d) Audience*

The majority of smart phone users are the young people. The two-dimensional code can be released on the trunk streets and near office buildings where young people frequent in order to cater to young people who like new things. If presented in creative ways, it will be more popular.

What is worthy of attention is that if the media, information content or target customers are not taken into account, a bad experience will make it easy for consumers to have a negative impression of two-dimensional code.

*C. Fields of two-dimensional code application will be further expanded.*

*1) Actual involvement in purchase*

For now, the two-dimensional code scanning software is just a tool, not involved in the consumer purchase action. Actual purchase behavior can be formed by updating the code scanning software and supporting payment function of two-dimensional code.

*2) Anti-counterfeit*

Encrypted 2D coded information on each product can be generated by means of anti-counterfeit system. Two-dimensional code is printed or labeled on the product packaging. The user can access to series of information of authentic product simply by specified anti-counterfeit system of two-dimensional code or testing with mobile phone software decoding, which makes people assured to buy and counterfeit goods over sighted because encrypted two-dimensional code increases the counterfeiters' cost and makes counterfeits unprofitable.

IV. CONCLUSION

Two-dimensional code will adapt to high-speed development of the economy in the future with its inherent advantages. Its economic value that is gradually enlarged will promote the integration of the industries and drive the innovation of commercial models. However, two-dimensional code in China is still in incubation period on the market. There are obstacles to the development of two-dimensional code such as lacking security mechanism, comprehensive awareness of it and good habits to be developed and complex application environment. The development of two-dimensional code is faced with both opportunities and challenges.

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