

## On Applications of Cell phone Two-dimensional Code in China

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**Abstract**—Cell phone two-dimensional code is the product of the combination of the two-dimensional code technology and mobile terminal cell phone, applied to give full play to the superiority of the two-dimensional code recognition technology with the convenience of mobile cell phone use. With the upgrading of Chinese communication network, the popularity of smart cell phones as well as the change of people's lives concept in recent years, the range of applications of the two-dimensional code has been increasingly wider. The paper makes analyses on the classification application of the two-dimensional code in China and at the same time explores a number of constraints existing in its development cause in China, and then it puts forward development strategies of the cell phone two-dimensional code applications in Chinese market and provides a reference to its popularity and application.

**Keywords**- *E-commerce; cell phone two-dimensional code; Two-dimensional code applications; Mobile internet*

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### I. INTRODUCTION

In recent years, with the outbreak of the mobile Internet and the rise of new consumption patterns like mobile e-commerce, the two-dimensional code, no longer the latest technology, quickly gains the attention of the public and more users begin using mobile intelligent terminal to scan and read the information behind the line. The two-dimensional code technology combines media elements such as text, image, audio and video with information play and storage technology, promotes the transition of the print media to era of commerce and object-connection and realizes real-time interactivity and interconnection between newspapers and cell phone, TV as well as Internet. After being in silence for many years, with the public release of Tencent micro-channel's public number, the cell phone two-dimensional code appears in front of the public, besides, the Sina micro blog immediately catches up with the pace and introduces the two-dimensional code, thus making cell phone two-dimensional code popular overnight in China. Progressive development is the fundamental method to obtain continuing popularity for cell phone two-dimensional code.

### II. INTRODUCTION OF CELL PHONE TWO-DIMENSIONAL CODE

Two-dimensional code is a new generation of barcode technology to record data symbol information through alternating black and white rectangular phalanx formed by specific geometric graphs distributed on a two-dimensional plane at certain regularity. While cell phone two-dimensional code is the application of two-dimensional code technology in the new generation of mobile Internet terminal cell phone. It encoded the information which the cell phone needs to access and use in the two-dimensional code and then the information is identified by cell phone's camera. The two-dimensional code has advantages of large information capacity, wide range of coding, good confidentiality, good orientation performance, high reliability of decoding and so on; therefore, cell phone two-dimensional code makes use of the convenience of cell phone use to give full play to the superiority of the two-dimensional code's recognition technology.

Applications of cell phone two-dimensional code can be divided into two kinds - active reading and passive reading. Active reading application refers to that the user takes the initiative to reading two-dimensional code, and generally, it refers to install the cell phone with the scan code software and scan the two-dimensional code or input the number and keyword under the two-dimensional code with cell phone camera to get access to the information which users need. At the same time, users can easily use the cell phone to identify and store business cards, automatically input SMS, get access to public services (such as weather forecast) and realize a variety of functions such as electronic map query and positioning, cell phone reading and so on. While passive reading applications refer to such things as the electronic receipt, which is, encode the traditional certificate's content and holder's information into a two-dimensional code graphic, and then send it in the method of short MMS to the user's cell phone through professional channels and scan and verify the code in the business stores with the scanning device to confirm the user would obtain goods or services from the merchant.

### III. EMERGENCE OF TWO-DIMENSIONAL CODE AND ITS DEVELOPMENT IN CHINA

The two-dimensional code was first invented in Japan, and before 2005, the two-dimensional code has had a relatively sound development in Japan, South Korea as well as a number of countries in Europe and America. Especially, it's effectively applied in the urban management and service

system as well as the daily life of people. For example, there are two-dimensional codes on the passports of all people who enter Japan. Thus it brings more convenient to manage and also is beneficial to provide convenient services for people who enter Japan. Besides, in Korea, vegetables are printed with the two-dimensional code, so the user can easily scan and read information of food through the cell phone. And in the market, about 15 million cell phones are supported by barcode business of Iconlab, South Korea's largest cell phone two-dimensional code provider.

Media discovered the cell phone two-dimensional code in Japan and introduced it into China. In 2006, China Mobile cooperated with the Galaxy Linkage and launched Internet applications of China Mobile cell phone two-dimensional code. However, as the domestic mobile intelligent terminal was not common and the general public did not have a good understanding of the use of cell phone two-dimensional code, it resulted to that the cell phone two-dimensional code hasn't got sufficient development for many years.

However, with the outbreak of the China mobile Internet, two-dimensional code quickly gained the attention of the general public. Since 2010, China cell phone two-dimensional code's market has penetrated into all aspects of airports, restaurants, subways, cinemas and conferences. As Chen Shaotao, vice president of Mecoxlane believes the two-dimensional code is the future development trend and cell phone fragment time and utilization of young people will increase and then the two-dimensional code will seize the share of online shopping.

According to Mecoxlane earnings announcement in the second quarter of 2012, due to part of users shunt to the Internet, relevant call centers' net operating income was \$ 11.4 million, a decrease of 23.3% compared to the second quarter of 2011's \$ 14.8 million; self-operated stores' net income of sales was \$ 4.9 million, a decrease of 18.9% compared to the second quarter of 2011's net operating income of \$ 6 million dollars. At the same time, statistics of Snapshot two-dimensional code cloud service platform show that the number of users of Snapshot two-dimensional code had exceeded 20 million until the end of June 2012 with more than 100 million times of monthly scanning code. Wang Pengfei, president of Smart snapshot said that the goal of the snapshot two-dimensional code in 2012 was that the users could reach 50 million.

#### IV. PROBLEMS EXISTING IN DEVELOPMENT OF CELL PHONE TWO-DIMENSIONAL CODE

Although applications of the cell phone two-dimensional code have developed rapidly in China and are favored by countless businesses and media, most of the businesses have opted for a wait-and-see attitude rather than practice. In addition to the reason in the technical aspect, it's more related to marketing.

The two-dimensional code may seem simple, but in fact three types of enterprises constitute a very complex industry chain. The first kind of enterprise is hardware manufacturers like two-dimensional code's decoding equipment; the second one is shot code applications, such as the common cell phone

encode and decode tools; the third one is application solutions provider like logistics management solutions.

##### A. *The code system is not uniform.*

At present, there is a variety of code standards in Chinese market. In addition to the international standard code system QR code, DM code and two-dimensional bar code grid matrix code, a number of manufacturers have defined their own proprietary 2D code system. Every code system has its own advantages and disadvantages, moreover, the standards are also not uniform, thus objectively fragmenting the market and hindering the development of the industry.

##### B. *Technical support is not enough.*

There're only a few hardware manufacturers, the first kind of enterprises in the industry chain, and users can directly use the cell phone to scan two-dimensional code. But as for electronic receipt, merchants and stores need the corresponding two-dimensional code decoding equipments. However, there's only a few two-dimensional code decoding equipment and it has a relatively high requirement. Besides, not all two-dimensional code decoding device can scan all the two-dimensional code, while some decoding devices only support scanning paper two-dimensional code. The number of related chips and software developers and service providers are relatively limited.

##### C. *Mobile terminals have low adaptability.*

Although Chinese cities have become one of regions with the highest penetration of the world's top five smart cell phones, now most of smart cell phones in the market which are worthy of a thousand yuan are equipped with fixed focus camera rather than auto-focus. Thus, it cannot scan two-dimensional code from a long-range, besides, in a very large extent, it limits the range of users to scan two-dimensional code. Many terminal providers are still in a wait-and-see status.

##### D. *Only a few carriers support the service.*

Presently, operators support the two-dimensional code with fewer efforts and the domestic industry chain is far from perfect, thus it needs vigorous promotion by China Telecom, China Unicom, China Mobile as well as the traditional industry giants.

##### E. *Users' habits are not easy to change and it needs high marketing costs.*

Most users are accustomed to the operation to open the net page and input search information, while the cell phone two-dimensional code scanning realizes getting access to the Internet by a key compared to searching for information, moreover, it provides the convenience of searching. But cell phone does not have the function of scanning the two-dimensional code which must be scanned relying on the appropriate downloaded cell phone.. Therefore, how to prompt the user to change the online habits and take the initiative to download the two-dimensional code scanning software is very difficult.

F. *There is no price advantage.*

Cell phone two-dimensional code shopping makes great convenience to users, but in fact this scan shopping behavior has no price advantage. Therefore, it can only arouse temporary interest of users, but as for the long-term promotion, it has no advantage.

G. *Supporting systems such as logistics and distribution are not established.*

After users scan the two-dimensional code to undertake the shopping operation, it ultimately requires the merchant receiving client's information to processes it and make distributions to it. Currently, two stages of two-dimensional code scanning and decoding have quickly developed, but the logistics and distribution and other related systems haven't kept pace with its development and haven't reached the required demand.

H. *Identification is difficult in the cell phone platform.*

As the production of two-dimensional code is relatively simple, there's a lower barrier to enter the market of two-dimensional code, the virus can transmit by being attached to the two-dimensional code and security issues remain to be strengthened. The lack of credit system *as well as relevant legislation* by financial institutions are also key factors restricting the development of the two-dimensional code.

V. APPLICATION AND DEVELOPMENT OF CELL PHONE TWO-DIMENSIONAL CODE IN CHINA

A. *Unify the code systems.*

Learn from Japan's experiences in developing the two-dimensional code and use a code system more suitable for Chinese identity and identification, as well as extend applications uniformly, so as to avoid the chaotic situation in code system of the market.

B. *Support of operators.*

Figure 1 shows that among users of the cell phone two-dimensional code, 45 million are from Taobao, only about 6 million are from China Telecom and 5 million are from China Unicom. The development of cell phone two-dimensional code must be jointly and vigorously promoted by China Mobile, China Unicom, China Telecom as well as traditional industrial giants in order to drive the development of the whole industry chain.

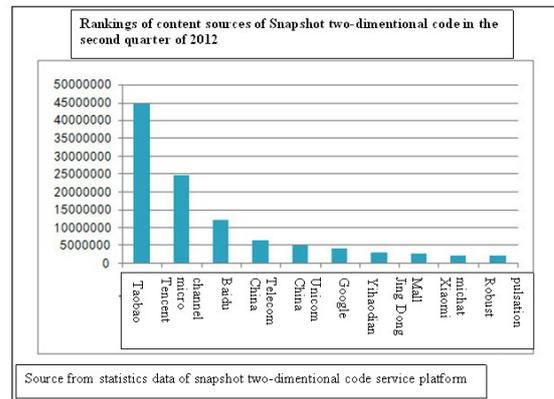


Figure 1 sources of the content of snapshot two-dimensional code

C. *Cell phone built-in scanner.*

Installing built-in scanner in the cell phone is not only convenient to the user, but also avoid losing their interests in using two-dimensional code because of some reasons of their owns or the lack of identification of mobile terminals.

D. *To attract the interest of the user.*

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1) *Know about the habits of users.*

Most of the users are using two-dimensional code connecting URL, by scanning a two-dimensional code to achieve a net, then download the program; while the text reading and purchasing train tickets are the third. This shows that the use of cell phone two-dimensional code is still (staying)at the basic stage, through the network promotion, making the user more extensive to use cell phone two-dimensional code, as well as letting the application of two-dimensional code more close to life.

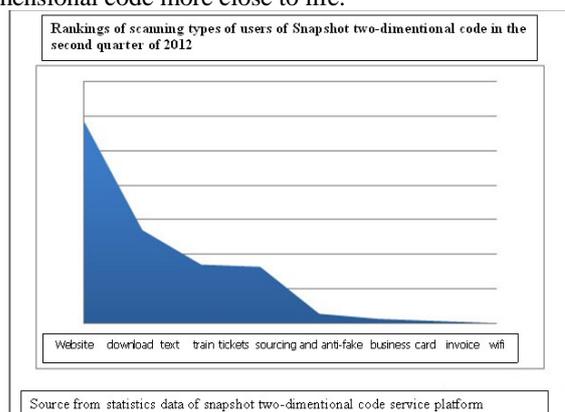


Figure 2 Scanning types of users of Snapshot two-dimensional code

2) *Understand the sources of information about users.*

Figure 3 shows that carriers of the domestic 2D code transmitting are mainly websites followed by magazines and newspapers; the next are some small media and activities.

This shows that users still have relatively high degree of trust for new media and traditional media, thus some PR campaign or marketing activities can be done through the network media to attract the attention of users.

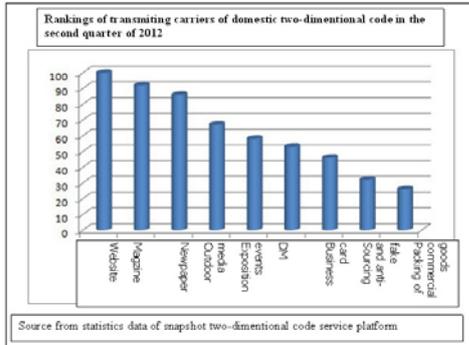


Figure 3 Transmitting carriers of two-dimensional code

3) *Make users take the initiative to close the two-dimensional code.*

a) *Make the cell phone two-dimensional code different.*

To use colored two-dimensional code is a more direct method and businesses which can be used to combine brand with creative so as to provide related services for the users. The main group of cell phone two-dimensional code is the young people pursuing for fashion and thus such people may not care about what the two-dimensional code can fundamentally bring to them, but that the use of cell phone two-dimensional code is the most stylish thing today. Colored two-dimensional code looks different and can make them feel fresh.

b) *Combine cell phone two-dimensional code with marketing.* Once a huge billboard of a group of sexy beauty

(with code) was placed in the streets of America, so the ad tipped people that as long as using cell phones to scan the two-dimensional code of the blocked key parts, the beauty of the full version could be seen, but in fact the covered part by the two-dimensional code was Victoria's Secret's new underwear. The interesting combination of two-dimensional code with marketing can produce infinite power.

## VI. CONCLUSION

Generally, the former using of barcode is only for saving costs rather than attracting business. But from the outlook of the development of two-dimensional code, the application of cell phone two-dimensional code should be a method to attract business in a real sense. Therefore, the method to developing two-dimensional code needs to be discussed. From the most fundamental aspect, in fact, that is how to use the two-dimensional code to better attract the user's attention so as to make them consume.

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