Research on Information Transmission Capacity of WeChat Friends Circle

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Abstract—**With the development of network technology, the most representative "WeChat circle of friends" in the social network is increasingly becoming the main tool for disseminating information. In order to use the "WeChat friends circle" information transmission function scientifically and effectively, we introduce the existing communication mechanisms. By means of empirical analysis, the paper analyzes the propagation path characteristics and time characteristics of "WeChat friends circle" in ways that the best propagation time and path are obtained. In addition, the topology model of "WeChat friend circle" information propagation is constructed and the propagation ability is calculated. Based on the six-degree segmentation theory, we try to provide reasonable marketing strategy for enterprises.**

Keyword—WeChat friends; Transmission capacity; Topology model; Six degrees of separation theory

I. INTRODUCTION

With the advancement of communication technology and network technology, mobile intelligent terminals have rapidly gained popularity. Social software based on mobile internet technology is developing rapidly. WeChat is a product of Tencent, and it has received attention as soon as it is launched. Figure 1 shows the growth in the number of its users. WeChat broke through 100 million in just one year and two months, and broke through 600 million in three years. In 2017, WeChat monthly active users were 940 million, and the average daily login users exceeded 900 million, an increase of 17% over 2016. Among them, the daily number of transmissions is 38 billion, the number of voice calls per day is 6.1 billion, and the number of daily calls is 205 million. The usage percentage of WeChat friends circle reached 74.5%, and 87.3% of WeChat users will post friends or learn about social trends through circle of friends. WeChat is the most widely used and popular social software in China.
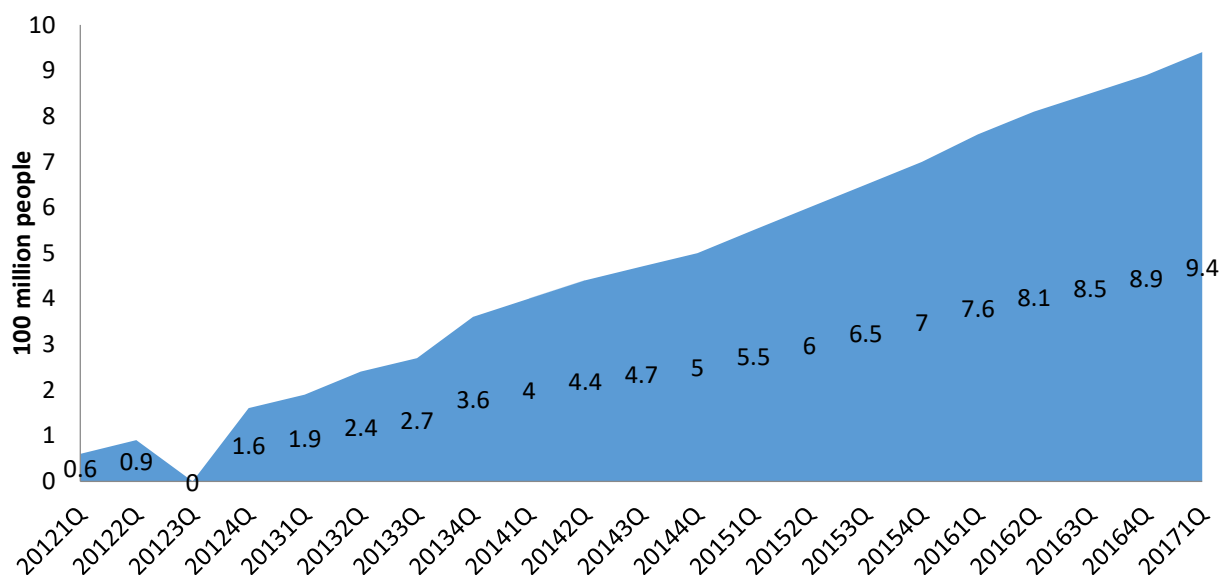

Fig. 1   WeChat monthly active account trends (100 million)

Note: The data comes from "Tencent Annual Report of 2017 "

II. WeChat Circle of Friends Communication Mechanism

WeChat has established a network of social relations. It has its own unique communication mechanism. It relies mainly on interpersonal communication of information and is a communication tool that connects people to each other. And it has directness, arbitrariness and privacy. Therefore, it has the following two transmission mechanisms:

A. Peer-to-peer propagation mode

WeChat has strong social attributes and tends to be peer-to-peer. Peer-to-peer information dissemination is achieved through real-time dialogue and is a closed communication mode. WeChat adds friends through verification information, and both parties have equal status [1]. WeChat also has repetitive features, and some articles will be repeated in WeChat group, public number and so on. Because acquaintances are more effective and more frequent, the most important feature of WeChat's circle of friends is the closer interaction between users. Interpersonal communication is the process of information dissemination between people and is the embodiment of the friendly relationship between people. There are three characteristics in the interaction between people: directness, randomness and privacy [2].

B. Point-to-face propagation mode

The information dissemination method at the opposite point mainly exists in the spread of WeChat friends circle and public number. It is based on the user's strong relationship network, so the information dissemination efficiency of WeChat is much higher than that of Weibo, but at the same time, because WeChat semi-closed friend setting method, friend circle information must be visible to friends, so the speed of propagation Far less than Weibo [3-4]. In the information dissemination of WeChat friends circle, the social attributes of WeChat evade the public's meaningless onlookers to a certain extent, the dissemination of information is more direct and efficient, and also realizes the deep dissemination of information [5]. Compared with other social networks, the biggest feature of the circle of friends is that only the same friends can see comments and likes. It has a strong secret and can be said to be a platform for acquaintances. And the information that can be seen is limited to the content shared by the friends, which makes it impossible to trace back to the source of the message. Therefore, the content of information dissemination, the efficiency of communication and the frequency of interaction are far superior to Weibo. The circle of friends also has "Do not look at his circle of friends" and "Don't let him see my circle of friends", resulting in ineffective feedback and interaction between the two parties, resulting in the inability to effectively disseminate multiple information and limit the scope of communication [6-7]. Nowadays, we have launched a time range that allows friends to view their circle of friends, so users can protect their privacy more effectively.

III. Samples of the Communication Ability of WeChat Friends

The empirical analysis adopts the form of questionnaires. The 1610 sample data are from college students and people from all walks of life across the country. The content is based on the investigation and research on the communication ability of WeChat friends circle, and analyzes and makes recommendations based on the displayed results. In the sample, men accounted for 41.61% and women accounted for 58.39%. The undergraduate degree is 60.87%, and the least is a doctoral degree.

As shown in Figure 2, there are 740 friends with 100-300 friends, accounting for the vast majority of the entire survey. As can be seen from the figure, people's circle of friends is constantly expanding, indicating that WeChat not only has marketing Function, but also to expand people's circle of friends.
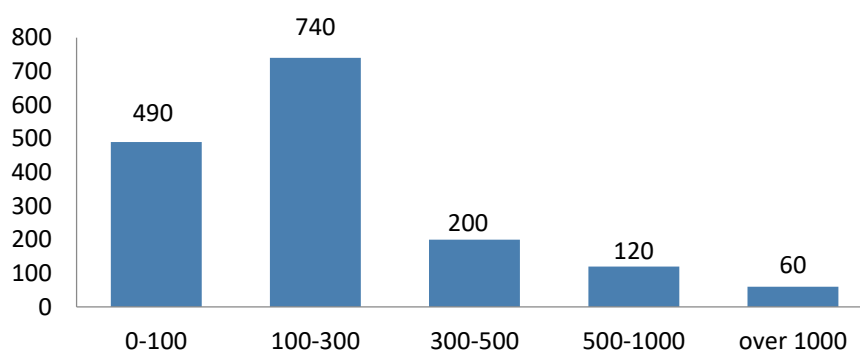

Samples

Fig. 2   Number of existing WeChat friends

75.16% of the people in the sample use the WeChat circle for 3 to 6 years, and 24.84% use WeChat for 1 to 3 years, which indicates that the WeChat circle of friends is indispensable in people's lives. In addition, 63.98% of the people viewed the circle of friends daily for more than an hour, 14.26% of the people use the time of 30-60 minutes, 13.99% of the people use the time to reach 11-30 minutes. The majority of WeChat friends who visit WeChat when going to bed, getting up early and waiting are relatively infrequent, while those who go shopping or work in class are relatively infrequent. It shows that in free time, people will

choose to refresh the WeChat circle of friends to avoid being bored.

As shown in Figure 3, 80.12% of the users use the circle of friends to focus on their friends' friends and narrow the relationship between their long-term friends. Half of the people shared their ideas, shared their leisure time and expressed their opinions and feelings. Some 13.04% of them made advertisements for their products and services, and 7.45% wanted some people's attention.
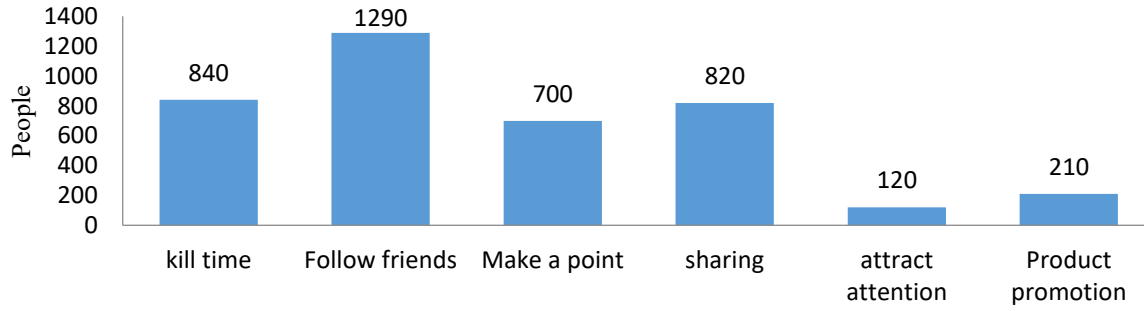

Fig. 3 The purpose of updating the moment

In addition to users can view the real-time dynamic friends, but also can publish their own dynamic, what they see and hear want to share with friends. As shown in Figure 4, there are 1-2 articles released weekly and 26.71% of the total, with 20.5% of them published 1-2 articles monthly, while only 9.94% of them are willing to publish daily more than 3.
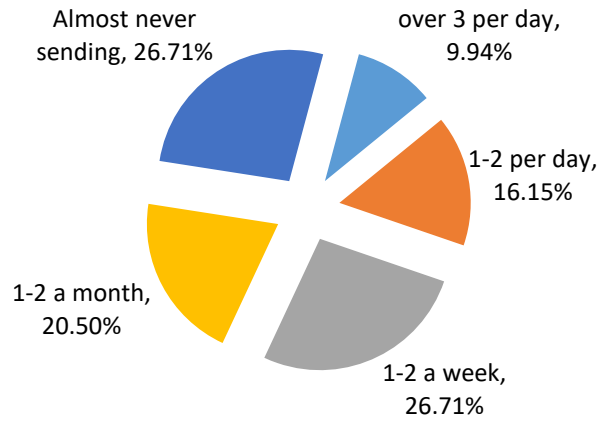

Fig. 4 Frequency of updating the moment

IV. THE COMMUNICATION ABILITY OF WECHAT FRIENDS CIRCLE

WeChat friends circle is built according to the interpersonal relationship between users. The strength of social relations has a great relationship with the information dissemination of online social networks. It is necessary to consider the basic attributes, social status, and integrity of the information disseminator. We will use this data to build an evaluation model to characterize the influence of the information communicator.

C. Topology Model

We abstract the computer and communication equipment in the network into a point, abstract the transmission medium into a line, and the geometry composed of points and lines is the topology of the computer network [8]. According to the questionnaire, 1610 samples are the node set V; the set W of weights is the frequency of forwarding; the set E of edges is the forwarding relationship between users. If the user posts a circle of friends, his friends will see it and he can choose whether to forward it according to his or her own wishes. When a user sees content that he or she is interested in, even if the publisher of the information is not in his or her own attention list, he can forward the information.

Standardize the various indicators of user information dissemination capabilities. Let x_j denote an index value, $\overline{x}$ is the mean value of the index value, and s is the variance of the index value, then the normalized index value and the node weighted clustering coefficient are calculated as:

$$x_i = \frac{x_j - \overline{x}}{s} \tag{1}$$

$$F = \sum_{i=1}^{4} \frac{u_i}{u_1 + u_2 + u_3 + u_4} * w_i \tag{2}$$

Where $u_1 \cdots u_4$, respectively indicated the number of WeChat friends, the number of likes, the number of readers, and the number of people who forwarded. w_i represents the weight of the relevant indicator.

This thesis uses principal component analysis [9]. We applied WeChat friends, likes, and forwarding numbers, etc., and bring them index values into the formula to calculate their information dissemination ability. Each user represents an information dissemination ability. As shown in Figure 5, we can find: (1) there is a positive correlation between WeChat friends, likes, forwarding numbers and forwarding frequencies, (2) there is an exchange relationship between one user and other 4 users, on average, one user has friendships with other 33 users.
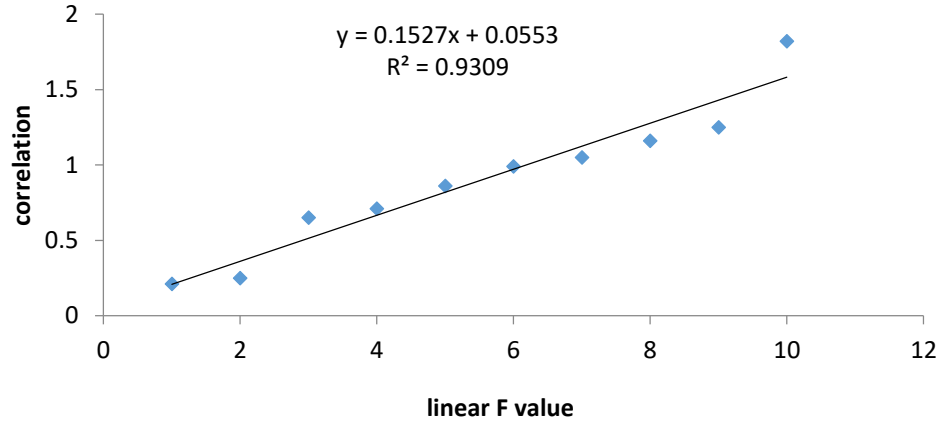

Fig. 5   Correlation scatter plot

D. Application in Marketing

According to the theory of six-degree segmentation, the WeChat platform can bring together people with similar interests and similar occupations to form a marketing network. The WeChat circle of friends mainly gathers people through three aspects: event, interaction and value transfer. Companies can use these methods to engage users and increase loyalty. Interactivity is the key to the continued development of WeChat's circle of friends. Friends need to communicate regularly. Over time, emotional connections will be generated, and this connection will be durable and sturdy. If some benefits are given to some extent, users will be more loyal.

V.   SPREAD ADVANTAGES AND SUGGESTION OF WECHAT CIRCLE OF FRIENDS

A. Advantage and Disadvantages

The positioning of marketing and services is more accurate and the communication is more efficient [10]. WeChat is a social software spread by acquaintances. The trust between friends is not comparable to other software, so the platform can acquire a more realistic customer group, and they have natural credibility. Therefore, its dissemination is more effective. According to the closedness and precision of WeChat's circle of friends, we can accurately understand the attributes of customers, promote more personalized marketing and services, and improve customer satisfaction. WeChat can provide lasting information and services anytime, anywhere, enabling businesses and customers to build more stable and lasting relationships. The communication between WeChat friends is different from other network media.

Merchants can provide valuable services and information to customers based on this "strong relationship", continuously improve attention and maintain customer value.

Although the WeChat circle of friends has greatly improved the communication between people and promoted the friendship between users. However, there are also some limitations. Firstly, the information flow of WeChat circle of friends is relatively lagging, there is too much second-hand information, too little original information, too many duplicate information; Secondly, the fragmented reading habits of WeChat friends circle make the circle of friends not suitable for publishing too much information [11]. Thirdly, the information of the WeChat circle of friends belongs to the self-media, which leads to rumors and false information. Moreover, the WeChat circle of friends seems to be unable to face false information and rumors. Fourthly, too much marketing information can cause dislike of friends and even cause messages to be blocked.

B. Suggestions

According to the above analysis, on the one hand, when accepting information, users should make accurate judgments on the content of information dissemination, avoid false information and rumors, and thus improve the quality of information dissemination in the circle of friends. On the other hand, users cannot have rumors or false information when posting or commenting on a circle of friends. China has relevant laws and regulations that have severe penalties for issuing or forwarding false information such as rumors.

For merchants, on the one hand, we should grasp the time characteristics of WeChat release, such as the golden period of publishing information from 7:00 to 11:00 every night.

Usually, the frequency of people viewing friends circle and forwarding friends circle is higher during this time period. On the other hand, according to the topology model, the number of friends is positively related to the communication ability. Therefore, the merchant can select some users who have a large number of friends to release their products, especially those who have certain influence in the industry, such as actors and media. Staff, etc. In addition, some special promotions need to be held regularly to enhance the loyalty of users. Finally, the company WeChat must adhere to the release of original content adhere to the promotion of positive social energy; adhere to mainstream ethical standards and universal values.

VI. CONCLUSION

In summary, the research on the communication ability analysis of WeChat friends circle provides some accurate information for merchants. Merchants can post the latest product information through WeChat circle every 2-3 days every night from 7:00 to 11:00. If you get more friends, you can use some promotions, because any people who don't know each other will have an intersection through certain contacts, so that you can know more friends, have more careers in media, performances, exhibitions, students, etc. Friends can promote the number of people in the circle of friends, the frequency of forwarding and the number of people who like it, which will promote the continuous promotion of products, and thus the profit will continue to increase.

WeChat friends circle is bringing together more and more people from different industries to make it have certain advantages: interaction and precision push. Under this circumstance, more and more enterprises are beginning to study the platform of social software. Enterprises need to know the advantages and disadvantages of WeChat friends and the value of marketing, understand the habits of using social software users, and attract WeChat through event promotion. The attention of friends and family in the circle of friends promotes corporate culture and products to more users, thus establishing a highly reliable marketing strategy.

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