

Summer 6-1-2014

Study on Diffusion Mechanism of Viral Marketing Based on Social Networking Web Sites

Huiping Ding

School of Economics and Management, Qingdao Agricultural University, China

Follow this and additional works at: <http://aisel.aisnet.org/whiceb2014>

Recommended Citation

Ding, Huiping, "Study on Diffusion Mechanism of Viral Marketing Based on Social Networking Web Sites" (2014). *WHICEB 2014 Proceedings*. 67.

<http://aisel.aisnet.org/whiceb2014/67>

This material is brought to you by the Wuhan International Conference on e-Business at AIS Electronic Library (AISeL). It has been accepted for inclusion in WHICEB 2014 Proceedings by an authorized administrator of AIS Electronic Library (AISeL). For more information, please contact elibrary@aisnet.org.

Study on Diffusion Mechanism of Viral Marketing Based on Social Networking Web Sites

Ding Huiping

School of Economics and Management, Qingdao Agricultural University, China

Abstract: With the development of information technology and social network, viral marketing model which is a newly network marketing has been adopted by most companies in the recent years. We use social network analysis to make the preliminary study on the diffusion mechanism of viral marketing, and focus on finding how to accelerate social contagion. This article offers some suggestions as the reference value to apply the viral marketing model for the companies in the future.

Keywords: viral marketing, network marketing, diffusion mechanism, social commerce, information technology

1. INTRODUCTION

Rapid advances in information and communication technologies (ICT) allow people to influence each other more and more easily. Twitter, Facebook, Blog, Weibo, Renren and other social media all belong to ICT. These virtual social networking systems offer great networking platforms for enterprise marketing. Viral marketing is a new network marketing model which has essential difference with traditional marketing. The traditional marketing is a kind of enterprises-customer communication that is initiated by companies, such as the sales staff and customers, a variety of advertising of the mass media. However viral marketing is a kind of customer-other customer interaction communication, such as word of mouth. Social networking or social media has increased the possibility of such interaction. Specially, social networking and social media have increased the possibility of such interaction. Mass media communication is 1 to n marketing model, that the content for the customer is control by the company. Nevertheless word of mouth communication is n to n marketing model, which propagation may be similar to the spread of infectious diseases [1].

2. THEORETICAL BACKGROUND

According to the data of the Internet in China which is published by information office of the state council of China, the scale of China's Internet users has reached 564 million, which Weibo users are 309 million, Renren users are 280 million. China internet coverage rate is more than 42% at the early of 2013. Therefore virus marketing which is based on social network and social marketing becomes more and more popular among enterprises from home and abroad.

During the early stage of viral marketing, the dissemination of information is primarily through Email as a carrier. But the information arrival rate is fairly low because the anti-business sentiment. Some researchers suggest key differences between Web1.0 and Web2.0 is that the web2.0 includes the growth of social networks. Web2.0 has changed the Internet; it has brought people into a more liberal and open Internet Age. People in the social networks have the common interests and relatively stable social relationships. It may accelerate the adoption of information when the messages are transmitted through the recipients with close ties. The credibility and influence of the diffusion based on social network are much better than the other modes of publicity. Hence it can increase the rate of interaction between individuals, and cause them more likely to pass along information.

The article on viral marketing is relatively broad and has been studied in a variety of areas, including marketing, sociology and communication. For example, some paper applied the empirical method to analysis the

significance, characteristics and implementation steps of viral marketing in the perspective of cases; from the microscopic point of view, some scholars use quantitative methods to study the interaction relationship of social networks. This paper will involve the network structure to study on diffusion mechanism of viral marketing, and then make a theoretical study to find the social infection factors which accelerate social contagion.

3. SOCIAL NETWORK STRUCTURE OF VIRAL MARKETING

3.1 Modeling Diffusion through a Social Network

Broadly speaking, virus marketing models are analyzed based on the social network, and the relationship between individuals is one of the key establishments of viral marketing network. The information disseminate through social network: each node represents an individual, the edges between two nodes show they can contact, and information will be passed from one to another. For purposes of analysis, we begin with probably the simplest model of diffusion, it works as follow.

Suppose that a sender transmits information to each person he meets independently with probability p . Moreover, suppose that he meets n people; let's call these n people the first level of the diffusion. Based on the random diffusion of the message from the initial sender, some of the people in the first level may receive the information and spread it to others, while others may not. Then, each person in the first level will meet n different people, resulting in a second level of n^2 people. Each receiver in the first level transmits independently to each of the n second-level people they meet, again independently with probability p . Further levels are formed in the same way, by having each person in the current level meet n new people and transmit the information to each independently with probability p shown in the "Figure. 1" [2]

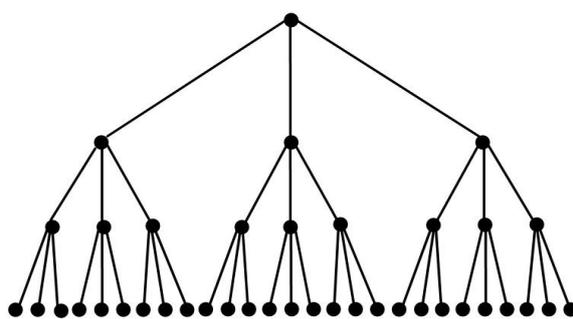


Figure 1. Information transmission network

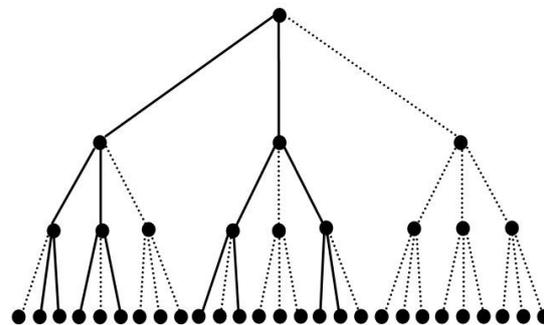


Figure 2. Reproduction rate is greater than 1

3.2 Reproduction Rate

To consider individual-level and aggregate behavior, we introduce the concept of "reproduction rate," or R . Each person will meet n different people and transmit the information to each independently with probability p . Here we define the reproduction rate R is equal to n multiply p , and the degree of information diffusion in the network is governed by it. If R is less than 1, then with probability 1, the information disappears after a finite number of levels shown in "Figure 2". If R is greater than 1, then with probability greater than 0, the information spreads at least one person in each level shown in "Figure 3". In particular, suppose we have a process where R is very slightly below 1, and viral information with an R of less than 1 are generally considered failures. But if we increase the probability p by a little bit; the result could push R above 1, suddenly resulting in a positive probability of an enormous outbreak. Similarly we can increase the number of n person. It is the same to the method to create potentially enormous seeds [3]. As a result, the reproduction rate is a key point to accelerate social contagion.

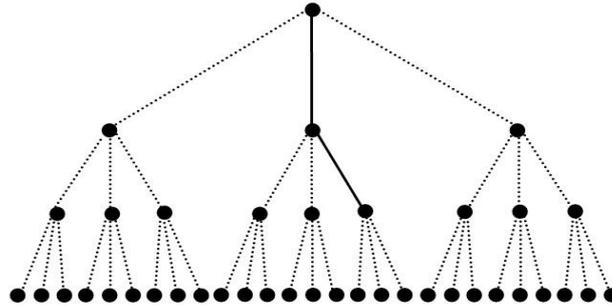


Figure 3. Reproduction rate is less than 1

4. DIFFUSION MECHANISM OF VIRAL MARKETING

Often, promoting social interaction is necessary to achieve viral marketing strategies. Therefore, we choose three factors which may accelerate social contagion to analysis: (1) the role of hubs (2) the role of connector (3) characteristics of the messages [4].

4.1 The Role of Hubs

In social systems, growth processes are believed to be strongly influenced by the people who have a large number of ties to other people. In marketing literature, such people are called opinion leaders or influentials, such as the great V in the Sina Weibo. Opinion leaders are those persons who exert a lot of influence on the behavior of others because of their expertise in some given area. They play a very important role on the transmission when they accept new ideas or innovation. If the hubs boycott a product, this innovation will fail to diffuse. If they accept some kind of product, it will affect lots of crowds. According to the definition of reproduction rate, hubs could alter both the probability p and the number of n person, thus enterprises should actively deal with the relationship with the opinion leaders. In summary, defining them accurately and encourage them to give positive advice is essential for viral marketing [5].

4.2 The Role of Connector

Different network structures could play a different role to the spread of a message. There are many local cluster connections in some network model. In this condition, however, that even when R is greater than 1, the conclusion is simply that the message diffusion persists with positive probability, not with absolute certainty. In other words, even a most popular message can disappear from the population before it has a chance to really get going. As Romualdo Pastor-Satorras and Alesandro Vespignani suggest, in real networks, the high virulence of the virus will not guarantee widespread [6].

In small world network, if the local cluster network is connected with the outside world through the bridge, it will be more conducive to the transmission of message. Granovetter shows that weak ties serve as a bridge than strong ties are more likely to be a critical information flows within the network. There is some particularly sociable person among every level of people who are called social connector. They link the people from the different educational background and different family backgrounds together. Connectors are the people who have weak relationships play a key role in connecting in the network information transmission [7].

4.3 Characteristics of the Messages

The characteristics of the messages may accelerate or block the transmission of information, because it will change the probability p in a certain extent. Frenzen and Nakamoto argue that people embedded in social networks will share information depending on the moral hazard created by the information [8]. Gladwell has

popularized the concept of the “stickiness factor,” explaining that contagious messages must have a certain character that causes them to remain active in the recipients’ minds [9]. Therefore in order to make the message stickier, the message should be simple, unexpected, concrete, credible, emotional, and delivered in story form. The information include these factors is more valuable, thus people are more likely to believe and transmit [10].

5. CONCLUSION

With the rapid development of information and communication technologies, social network online systems received by people more and more. Viral marketing has become an indispensable means and idea of marketing because the diffusion of information is in a large population and the implementation cost is quite lower. We build a simple network structure to analysis the diffusion mechanism of viral marketing, and then find three factors to accelerate social contagion: (1) the role of hubs (2) the role of connector (3) characteristics of the messages. The study of this paper offers a suggestion in applying the viral marketing model for the enterprise.

ACKNOWLEDGEMENT

The research work was supported by National Natural Science Foundation of China under Grant No. 71071080.

REFERENCES

- [1] Sun T, Youn S, Wu G, Kuntarapom M. (2006).Online word-of-mouth (or mouse): an exploration of its antecedents and consequences. *Journal of Computer-Mediated Communication*, 11(4):1104-1127
- [2] David Easley and Jon Kleinberg. (2010).*Networks, crowds, and markets reasoning about a highly connected world*. New York: Cambridge university press, 399-424
- [3] Duncan J. Watts, Jonah Peretti. (2007).Viral marketing for the real world. *Harvard Business Review*, Vol. 2007(May): 22-23
- [4] Jacob Goldenberg, Sangman Han, Donald R. Lehmann & Jae Weon Hong. (2009).The Role of Hubs in the Adoption Process. *Journal of Marketing*, Vol. 73: 1–13
- [5] Granovetter M. (1973).The strength of weak ties. *The American Journal of Sociology*. Vol. 78(6): 1360–1380.
- [6] Vincent P. Magnini. (2011).The implications of company-sponsored messages disguised as word-of-mouth. *Journal of Services Marketing*, 2011:243-251
- [7] Hoffman, Donna L, Novak, Thomas P. (1996).Marketing in hypermedia computer mediated environments: conceptual foundations. *Journal of Marketing*, Vol. 60:50–68
- [8] Frenzen, J. and K. Nakamoto. (1993).Structure, cooperation and the flow of market information. *Journal of Consumer Research*, Vol. 20: 360–375
- [9] Gladwell M. (1994).*The Tipping Point — How Little Things Can Make a Big Difference*. New York, Abacus, 12-23
- [10] Arnaud De Bruyn, Gary L Lilien. (2008).A multi-stage model of word-of-mouth influence through viral marketing. *Intern.J.of Research in Marketing*, 2008(25):151-163