

Research on the impact of mobile social network users' quantified-self consciousness on online participation behavior——the regulatory role of relationship strength

Hong Jin^a, Wanfeng Wang^{b,*}, Jian Chen

School of Business, Jiangxi Normal University, Nanchang, Jiangxi, China

^ajinhong0206@hotmail.com, ^b965605770@qq.com

*Corresponding author

Keywords: Quantified-Self Consciousness, Relationship Strength, Customer Participation Behavior

Abstract: With the rapid development of mobile social networks, the mass production of mobile wearable devices with data collection and monitoring functions provides technical support for consumers' quantitative self. The improvement of consumers' quantified-self consciousness promotes more and more consumers to participate in the action of quantifying the self. In recent years, academia and business circles have become increasingly interested and concerned about consumers' quantified-self. Therefore, it is of certain significance to explore how consumers' quantified-self consciousness affects their online participation behavior. Through literature review and research in this article, it is found that consumers' quantified-self consciousness has a positive effect on customer online participation behavior, and the relationship strength between the members of the consumer's circle plays a regulatory role. This study enriches the research on the influencing factors of quantified-self consciousness on customer online participation behavior to a certain extent, and provides management enlightenment for enterprise product R & D design and optimization, guiding consumers to participate in quantified-self.

1. Introduction

With the rapid development of mobile communication technology, the upgrading speed of various advanced mobile devices is accelerated, and the price of mobile communication devices is no longer high so that everyone can integrate into the mobile social network through mobile devices. People's social and life ideas have changed greatly, and their willingness to a healthy lifestyle is becoming stronger and stronger. At the same time, more and more consumers participate in self-quantification driven by business intelligence application platforms and portable quantization devices. The progress of Internet technology has promoted the arrival of the era of digital quantification.

Consumers monitor their own data through electronic wearable devices and software platforms and analyze the information contained behind the data (such as heart rate and frequency are important indicators reflecting heart condition) to accurately grasp their own situation and control themselves [1]. Through this effective self-tracking, we can get real and accurate data about consumers, which is helpful to guide and help consumers further understand their self-state, stimulate consumers to change and optimize their self-behavior, and promote consumers' more rational behavior activities [2], and attract more consumers to take active actions to participate in quantified-self.

With the continuous expansion of the field of quantified-self, consumers no longer meet the quantified-self in a few aspects such as their health status, exercise level and physical characteristics. The demand for quantitative self in other aspects has increased sharply [2], and consumers' quantified-self consciousness is becoming stronger and stronger.

At present, the academic research on consumers' quantified-self has rich theoretical results. Relevant research mainly focuses on the connotation and concept interpretation of "quantified-self" behavior, pointing out the complexity of participation motivation and the stage of the process in the

process of quantifying self, as well as the possible obstacles for consumers [2-3]. However, the current academic research on quantified-self consciousness is still in the preliminary stage, and it is still necessary to deeply explore the internal mechanism of the impact of consumers' quantified-self consciousness on consumers' behavior. Therefore, in the mobile social network environment, this study analyzes the impact of quantified-self consciousness on consumers' online participation behavior, which can enrich the theoretical content of quantified-self consciousness to a certain extent.

2. Literature Review

2.1. Quantified-self Consciousness

In 2007, Wolf and Kelly, editors in chief of Wired magazine, put forward the concept of quantified self for the first time, which is defined as consumers' reflection on their own behavior and wanting to acquire their own knowledge[4]. It is a process for consumers to track the activities or lifestyles they participate in and relevant situational information[5]. Quantified-self consciousness is produced in the process of consumer self-tracking, which will lead to the change of behavior and attitude. It is not difficult to see that consumers' daily quantitative actions will lead to the formation of consumers' quantified-self consciousness, and then affect consumers' behavior under the guidance of quantified-self consciousness. Consciousness is a unique form of differentiated cognition that responds to internal and external stimuli. It is the basis for driving individual behavior. Consumers only have quantified-self consciousness first. This consciousness will guide consumers to monitor their behavior by using quantitative tools. Quantified-self consciousness can help consumers achieve the purpose of self-control and self-rationality[1].

Combined with the previous scholars' definition of quantified-self, the "quantified-self consciousness" is defined as the consciousness that consumers want to reflect and optimize their own behavior by collecting, analyzing, and sharing information about their physiology, physics, behavior, or environment. Under the guidance of quantified-self consciousness, consumers participate in various online participation activities such as popular theme activities, research surveys, and user satisfaction feedback organized by enterprise merchants. According to the data obtained from quantified-self consciousness, consumers' behavior will be affected, so as to ensure positive change and self-improvement of consumers' behavior[6-7]. To achieve the purpose of self-change, optimization and promotion, and get better quantified-self data in the future.

With the development of new technology, the field of quantifying self is no longer limited to the field of health. Consumers also bring the action of quantifying self to daily social, work, consumption and other situations. Consumers' field of quantifying themselves has become more open. At the same time, more and more people began to track and record their own or relatives' data indicators, such as nutritional intake, exercise energy consumption, etc.[8]. Because individuals are often interrelated, the action of quantified-self began to change from individual action to group interaction. Sharon and Zandbergen believe that it is more universal to define and analyze the quantified-self from the group perspective than from the individual perspective[9]. Mutual supervision and mutual assistance among groups are conducive to the continuous participation of consumer groups in the quantified-self.

In short, both the expansion of the quantified-self field from small to large and the transformation of the quantified-self group from individual to group reflect the fact that consumers' quantified-self consciousness is gradually popularized and strengthened. According to previous relevant studies, few scholars study the impact of quantified-self consciousness on consumer participation behavior from the perspective of consumer behavior.

2.2. Customer Online Participation

The concept of customer participation was first introduced by Lovelock et al (1979), and it is regarded as a key element in the production and service process of enterprises. At the same time, it is pointed out that whether in the process of product production or product upgrading, if a company wants to obtain higher production or service efficiency, it must pay attention to the degree of

customer participation in the production and innovation process of the company, and allow customers to participate as much as possible. Some literatures pointed out that the new ideas of product development and design mainly come from customers. Therefore, when developing new products, enterprises should pay enough attention to managing customer relations. By incorporating customers into development activities, the new products designed by enterprises can better meet the demands of consumers, and such product development is successful[10].

In the research of customer participation behavior, many scholars have rich theoretical results on customer offline participation. Although more and more scholars pay attention to and study the customer participation in the virtual network, the customer online participation in the mobile social network environment is not only different from the production and service enterprises but also different from other virtual networks. The existing customer participation theory and meaning can't be used to directly explain the customer participation behavior in the mobile network environment. In addition, with the development of mobile Internet information technology, Internet platform is an important way for users to participate in enterprise product development and update and put forward consumers' self-demands[11]. Because of its various forms, convenience and the flexibility, online participation can meet the needs of consumers to participate in various marketing activities, interact freely and comment online anytime and anywhere. It is precisely because of the flexibility and convenience of online participation that online participation is more favored by consumers than traditional forms of participation. The progress of Internet information technology once again promotes the development of consumers' quantified-self, and meets the needs of consumers to share quantitative data in social networks[12]. Consumers' quantified-self behavior can be realized through the network platform. Consumers analyze the data obtained in the process of quantifying themselves, reflect on themselves through the data, and to feedback their demands, put forward suggestions and strive for their own rights and interests to enterprises through online participation, so as to achieve accurate intervention and control of self-behavior[1] and obtain more rational self-cognition. With the strengthening of consumers' quantified-self consciousness, it will guide consumers to conduct quantified-self action in other aspects, expand the field of consumers' quantified-self, and have an important impact on consumers' online participation behavior. At present, few scholars examine the impact of consumers' quantified-self consciousness on their online participation behavior from the level of consciousness. Therefore, at this stage, the research on customers' online participation behavior is more urgent.

2.3. Relationship Strength

Relationship strength comes from the theory of social networks. It's an important part of social network research. In mobile social networks, relationship strength refers to the closeness of social relations between people in the mobile social network circle. Factors such as the intimacy of mobile social network users, the degree of mutual trust, the frequency and duration of member interactions, and other factors will affect the relationship strength between members in their circles[13]. We can grasp the circle characteristics of consumers' online community from the perspective of relationship strength. Relationship strength can be divided into strong relationship and weak relationship. In the network circle, consumers' sharing and exchange of information largely depends on the relationship between consumers. Granovetter believed that the strength of the relationship among members of the circle is reflected in the degree of intimacy and contact frequency among members[14]. Because different relationships have different effects on organizations and individuals, they can be divided into strong relationships and weak relationships. Strong relationships include family and friends. Compared with weak relationships, consumers' family and friends know more about their personal preferences and personality characteristics. Therefore, compared with weak relationships, consumers are more willing to trust them, thus affecting consumers' attitudes and behaviors. Weak relationships show that people who are not familiar with or know more than strong relationships. They can contact various types of organizations or groups, which is more conducive to the dissemination of various types of information[14].

Therefore, when the circle of consumers with quantified-self consciousness is in the case of

strong relationship, compared with the circle in the case of weak relationship, the quantified-self behavior of consumers is more likely to be learned and imitated by other members of the circle because the internal relations of members in the circle are closer, the relationship is closer and the degree of mutual trust between members is higher, Individual consumers with quantified-self consciousness of online participation activities will also lead to other consumers' online participation behaviors.

To sum up, in the circle of consumers in the mobile social network, the relationship strength between internal members is an important indicator to measure the degree of interaction between members. The stronger the relationship strength within the circle, the greater the impact of consumer behavior on other members. In our study of the impact of consumers' quantified-self consciousness on customers' online participation behavior, the relationship strength of consumers' circle plays an important regulatory role.

3. Research Hypothesis and Model Construction

3.1. Quantified-self Consciousness and Customer Online Participation Behavior

In wolf's view, " quantified-self " is a mirror that consumers can use to map themselves. It can help consumers find themselves, understand themselves, realize themselves and realize themselves, so as to promote systematic self-improvement, enable consumers to better understand themselves and clarify their demands and significance[4]. In the process of self-tracking, consumers may arouse consumers' self-consciousness, bring about changes in consumers' behavior and attitude[5], and arouse consumers' quantified-self consciousness. In order to achieve the above requirements, consumers' quantified-self consciousness will guide consumers to participate in enterprise operation and management, product design and optimization through online activities, that is, consumers express their demands to enterprises. At the same time, the optimization and upgrading of enterprise products and services will further help consumers better realize quantified-self consciousness.

In the online brand community, word-of-mouth sharing and dissemination among members will enhance consumers' sense of brand and product identity, enhance consumers' sense of ownership as the brand community, and stimulate their behavior of participating in community construction[15]. In the quantified-self community, the higher the quantified-self consciousness of consumers, they will often show a higher sense of responsibility. They will actively cooperate with enterprises to build a benign community to promote the healthy development of the quantified-self community, stimulate the participation awareness of other members of the community, and then promote their online participation behavior. Based on the above discussion, this study puts forward the following hypothesis:

H1: In mobile social networks, consumers' quantified-self consciousness will positively affect their online participation behavior.

3.2. The Regulatory Role of Relationship Strength

Relationship strength is one of the important symbols reflecting the characteristics of consumers' circle. Relationship strength can be divided into strong relationship and weak relationship. The difference of relationship strength within the circle is an important reason for the significant difference of members' willingness to exchange and share information. Under strong relationships, consumers are more likely to have deeper interactive willingness such as knowledge sharing and resource sharing[16], while under weak relationships, the inner circle is more inclined to simple interactive behaviors such as the dissemination and diffusion of new information and new things, such as recruitment information sharing, brand promotion information push, etc.[17]. Quantified-self consciousness refers to the awareness that consumers want to collect and share data or information about themselves, so as to reflect and optimize their own behavior. In the process of quantified-self consciousness affecting consumers' online participation behaviors, consumers have different willingness to share quantified-self data related to self-privacy due to the different strengths of the circle relationship of consumers. Under the strong relationship, the feelings within the circle

are closer, the relationship is closer, and the interaction of members is higher. Consumers will be more willing to share their own data or information, which will stimulate consumers to actively participate in online activities. On the contrary, under the weak relationship, the intimacy and mutual degree between members in the circle are low, resulting in low willingness of consumers to share, which inhibits consumers from participating in online activities.

In the process of quantified-self consciousness affecting consumers' online participation behaviors, the stronger the circle relationship, the stronger the willingness of consumers to participate and share, which will promote their online participation behavior; the weaker the relationship strength of consumers' circle, the lower the willingness of consumers to participate and share, which will inhibit their online participation behavior. Based on the above discussion, this study puts forward the following hypothesis:

H2: in the mobile social network, the relationship strength of the circle will adjust the relationship between consumers' quantified-self consciousness and customers' online participation behavior. The stronger the relationship strength, the greater the impact of consumers' quantified-self consciousness on customers' online participation behavior.

This paper proposes the following research model as shown in Fig. 1.

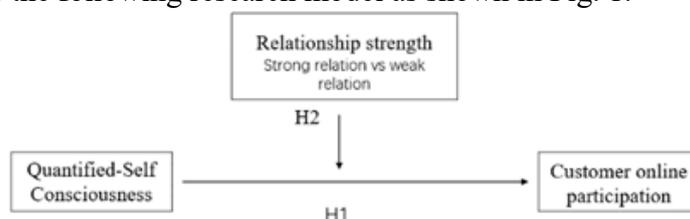


Figure 1 Research method.

4. Research Method

This study will use empirical methods to confirm the impact of consumers' quantified-self consciousness on their online participation behavior in the mobile social network environment. A questionnaire is given to consumers with quantified-self consciousness. The measurement variable of the questionnaire is the motivation of consumers to participate in the midline of mobile social network, and the statistical software is used to analyze the data and draw a conclusion.

5. Conclusion

This study believes that in the mobile social network, the relationship strength plays a regulatory role in the influence of consumers' quantified-self consciousness on customers' online participation behavior. Relationship strength will affect consumers' online participation. The stronger the relationship strength of the circle, the greater the effect on the formation of consumers' quantified-self consciousness, and then affect customers' online participation behavior. Through the research on the impact of quantified-self consciousness on customers' online participation behavior under the mobile social network, enterprises can correctly understand consumers' quantified-self consciousness according to the research results, and put forward effective guidance strategies, which is of certain significance for carrying out marketing activities. At the same time, the research on consumers' quantified-self consciousness enriches the research on the influencing factors of consumers' online participation behavior to a certain extent.

Acknowledgments

This study is supported by the State Key Program of National Natural Science Foundation of China (No. 71632001), the National Natural Science Foundation of China (No.71962014).

References

- [1] Li, D. J., Zhang, Y. D. (2018). Quantitative self in the field of consumption: research review and prospect. *Foreign economy and management*, 40(1): 3-17.
- [2] Zhang Y. D., Li, D. J. (2018). Research on the obstacle factors of consumers' participation in quantitative self and its influencing mechanism. *Journal of management*, 15(1): 74-83.
- [3] Li, D. J., Zhang, Y. D. (2018). Why consumers give up: the internal mechanism of quantifying the formation of self sustained participation intention. *Nankai Business Review*, 21(1), 118-131.
- [4] Wolf, G. (2009). Know thyself: tracking every facet of life, from sleep to mood to pain. *Wired Magazine*, <http://archive.wired.com/medtech/health/magazine/17-07>.
- [5] Li, D. J., Zhang, Y. D. (2018). Quantitative self effect and its influence mechanism on consumer participation behavior. *Management science*, 31(3): 112-124.
- [6] Shin D., Biocca F. (2017). Health experience model of personal informatics: The case of a quantified self. *Computers in Human Behavior*, 69: 62-74.
- [7] Li, I. (2012). Personal informatics and context: Using context to reveal factors that affect behavior. *Journal of Ambient Intelligence and Smart Environments*, 4(1): 71-72.
- [8] Van Berkel N., Luo, C., & Ferreira D. (2015). The curse of quantified-self: An endless quest for answers. *Proceedings of the 2015 ACM international joint conference on pervasive and ubiquitous computing*. Osaka: ACM, 973-978.
- [9] Sharon T., Zandbergen D. (2017). From data fetishism to quantifying selves: Self-tracking practices and the other values of data. *New Media & Society*, 19(11): 1695-1709.
- [10] Zhang, X., Yao, S. J., & Wang, Y. G. (2014). Driving factors of customer participation in new product development: influence mechanism from the perspective of relationship. *Management review*, 26(5): 99-110.
- [11] Zhang, Y., Li, B. X., & Liu, J. P. (2017). Research on the model and mechanism of customer participation in brand value co creation under the network environment--Taking Xiaomi mobile phone as an example. *Journal of Beijing Industrial and Commercial University(SOCIAL SCIENCE EDITION)*, 32(1): 61-72.
- [12] Crawford K., Lingel J., Karppi T. (2015). Our metrics, ourselves: A hundred years of self-tracking from the weight scale to the wrist wearable device. *European Journal of Cultural Studies*, 8(4-5): 479-496.
- [13] Ju, C. H., Tao, W. Q., & Xu, Z. H., (2016). Calculation model of social network user relationship strength based on activity domain classification and indirect relationship integration. *Journal of information technology*, 35(5): 539-548.
- [14] Granovetter M. S. (1973). The strength of weak ties. *American Journal of Sociology*, 78(6): 1360-1380.
- [15] Zhang, D. P., Lin, M. F., & Chen, C. F., Liu, S. (2019). Will emotions and relationships in the brand community inspire recommendation—Research on the influence of customer psychological attachment on word-of-mouth recommendation intention. *Management review*, 31(2): 155-168.
- [16] Zhang, Y., Feick L., & Mittal V. (2014). How males and females differ in their likelihood of transmitting the negative word of mouth. *Social Science Electronic Publishing*, 40(6): 1097-1108.
- [17] Zuo, W. M., Wang, X., & Fan, F. (2014). Relationship between online word of mouth and purchase intention based on social capital in socialized e-commerce environment. *Nankai management review*, 17(4):140-150+160.