Research on the Influencing Factors of User's Adoption of Paid Information in Social Q&A Community

Bohong Li
School of Information, Central University of Finance and Economics, Beijing, 15618158255@163.com

Yanmei Zhang
School of Information, Central University of Finance and Economics, Beijing, zhangym@cufe.edu.cn

Zhibin Cui
School of Information, Central University of Finance and Economics, Beijing

Recommended Citation

Li, Bohong; Zhang, Yanmei; and Cui, Zhibin, "Research on the Influencing Factors of User's Adoption of Paid Information in Social Q&A Community" (2021). *WHICEB 2021 Proceedings*. 70.
https://aisel.aisnet.org/whiceb2021/70

Short Research Paper

Research on the Influencing Factors of User's Adoption of Paid

Information in Social Q&A Community

Bohong Li[1], *Yanmei Zhang*[2*], *Zhibin Cui*[3]

[1]School of Information, Central University of Finance and Economics, Beijing

[2]School of Information, Central University of Finance and Economics, Beijing

[3]School of Information, Central University of Finance and Economics, Beijing

Abstract: The paid knowledge live of the social Q&A community provides users with a way to interact with content creators online. How users measure the quality of information and finally adopt the paid information has high research value. Research on users' adoption of knowledge payment is conductive to open new knowledge-paying user market. This article takes Zhihu Live as the research object, builds a theoretical framework through the information adoption model, and explores the influencing factors of users' payment information adoption behavior. We combine text analysis method to perform regression analysis on characteristic data to verify the theoretical model. The research results show that carrier richness, content live broadcast duration and content professionalism will significantly affect information quality, while content interestingness has a negative impact. Information quality and credibility of information sources will positively and significantly affect the users' final adoption decisions, while information acquisition costs will have a negative impact.

Keywords: paid knowledge, information adoption behavior, information quality, source credibility, content expressiveness

1.   INTRODUCTION

Since "the first year of knowledge payment" in 2016, a new generation of knowledge-based payment platforms such as zhihu, Fenda and DXY.com have come out in succession owing to the promotion of new concepts and new technologies such as the Sharing Economy and Internet Plus. Moreover, after having a stable user base, question-and-answer websites such as Zhihu and Baidu Knows begin trying to transition from "free knowledge sharing" platforms to "paid knowledge sharing" platforms [1]. The era of "knowledge payment" in China begins.

However, the rapid development of knowledge payment leads to new problems. Paid knowledge is a kind of special information. Different from traditional information, users have to pay to acquire knowledge, and find it difficult to perceive its usefulness in a effective manner. Before adopting paid knowledge, prospective knowledge paying users tend to make a judgement on the true quality of paid knowledge, information related to Live speakers and the prices of Live. Only by analyzing the factors of users' knowledge sharing perceived usefulness can Live speakers improve the content of knowledge and attract more knowledge paying users in a targeted way [2].

In order to study the information adoption behaviour of knowledge paying users, this paper intends to find solutions to the following problems:

1.Which factors affect knowledge paying users making a judgement on the quality information of Zhihu Live?

2.Which factors affect knowledge paying users adopting a knowledge paying Live on Zhihu?

In order to explore how the expressiveness of the Live content, the characteristics of the speaker and other characteristics affect knowledge paying users' perceived usefulness, this paper takes the Information Adoption Model (IAM) and the real-time interactive knowledge paying product Zhihu Live as the research framework and

* Corresponding author. Email: zhangym@cufe.edu.cn(Yanmei Zhang) , 15618158255@163.com(Bohong Li)

the object of research respectively. This paper builds a conceptual model of the user's information adoption behaviour in knowledge paying environment from a theoretical perspective, so as to enable the traditional Technology Acceptance Model (TAM) to evolve in such environment. Moreover, this model helps the speaker further improve the quality of information, set a reasonable price and release the price signal from a practical perspective.

2.   LITERATURE REVIEW

2.1 Research of knowledge payment

To date the research contents of "knowledge payment" have focused mainly on information governance [3] and product sales [4], but the research perspective has focused mainly on users' willingness to pay. Based on a variety of theories and in terms of system environment, knowledge acquirers and knowledge sharers, scholars explore the possible impacts exerted by the factors including the quality, value, usefulness and accessibility of knowledge service through the questionnaire. In addition, some scholars find that the attributes of both the content and the speaker affect users' paying behaviour, by exploring the data of real platforms and focusing mainly on the number of knowledge paying users [5] and their degrees of satisfaction [6].

2.2 Reaserch of information adoption behaviour

According to IAM, information adoption behaviour includes the selection, evaluation, absorption and utilization of information, and both the content and the source of information affect users' perceived usefulness of information and finally affect their information adoption behaviour. Users in socialized Q&A communities tend to select and judge information and evaluate the true usefulness of information according to the principles of value matching, least effort and outcome satisfaction. Source credibility refers to the reliability degree of the source of information. In other words, does the information come from highly influential KOLS or common users? The quality of information consists of the quality of the content and service interaction. The quality of the information content includes the expressiveness of the content, while the quality of service interaction includes the quality of information service, the information exchange and interaction tools provided and information transfer ways.

IAM has been widely used in the study of online information adoption. Chen et al. explored how the recreational nature and interactivity of the answer affect information adoption on social Q&A network sites and indicated that the recreational nature of the answer exerted a highly positive impact on answer adoption [7]. Wang Xiwei et al. built an information adoption behaviour model of online group-buying APP from the perspective of information ecology [8]. Li Jinhua et al. found a positive correlation between the features and quality of the answer and the features of the answerer versus the voting result of answer usefulness [9]. However, domestic and overseas research findings focus mainly on behaviour of e-commerce users or users in socialized Q&A communities, and seldom pay attention to paid information adoption behaviour.

3.   RESEARCH HYPOTHESIS AND MODEL BUILDING

3.1 Quality of information

3.1.1 Expressiveness of the content

(1) Carrier richness

Users are able to get access to the information content through a variety of carrier such as text, voices, figures and videos [10]. Liu et al. found that the content containing a variety of carrier exert a positive impact on the number of forwarding and found a positive correlation between the number of forwarding and the popularity of information [11]. Zhihu Live shares its content through voices, but users are able to select files such as text and videos in the process of live voice broadcasting. The number of appendices contained in Zhihu Live and the duration of broadcasting are used to measure the richness of carrier. On the basis of the above analysis, we put

forward the following hypothesis:

H1a:There is a positive correlation between the richness of paid knowledge carrier and the quality of information.

(2) Content broadcast duration

Knowledge payment refers to paying for knowledge online, and offering users the quality content is why Zhihu Live exists. However, the content value of Zhihu Live provides a solid foundation for attracting users. As a real-time live broadcasting product, Zhihu Live features the duration of broadcasting. According to existing research, the Live with longer long duration may bring the users who want to study by fragmenting time much inconvenience and leave a negative impression with them [12]. The duration of the Live is used to measure the duration of the content. On the basis of the above analysis, we put forward the following hypothesis:

H1b:There is a positive correlation between the duration of paid knowledge lives and the quality of information.

(3) Content interactivity

This paper defines the interactivity of the content as Zhihu Live's ability to respond to questions raised by users in the process of live broadcasting. In other words, Zhihu Live is able to respond to consumers' needs in a quick manner so as to suit their needs in time. Interactivity tends to affect users' perceived usefulness and further affect their information adoption behaviour. The number of interactive questions and answers in the Live is used to measure the interactivity of the content. On the basis of the above analysis, we put forward the following hypothesis:

H1c:There is a positive correlation between the interactivity of the paid knowledge content and the quality of information.

(4) Content interestingness

The interestingness of content is another key factor that affects the use of social media [13]. The answer containing only knowledge is less liable to attract users, compared to the answer with interesting contents. Furthermore, information with recreational and social attributes are able to satisfy users' subjective needs and further stimulate the initiative of users [14]. The humor evaluating value (stat/Ratehumor) set in "Wenxin" is used to analyze the interestingness of an answer. The higher the numerical value gets, the more interesting the answer gets. On the basis of the above analysis, we put forward the following hypothesis:

H1d:There is a positive correlation between the interestingness of the paid knowledge content and the quality of information.

(5) Content professionalism

Two ways have been used by Zhihu's official certification system to measure the professional degree of users. The first is to mark part of users as quality answerers who provide a large number of professional answers for the community. Users of this kind are specialists of a certain field and able to offer answers based on disciplinary knowledge or industry knowledge, so they tend to gain recognition. The second is to mark certain celebrities as "V" users to make visible their professionalism. Users of this kind have already gained a reputation in a certain field. In this paper, the Live shared by verified users is marked as 1, and the Live shared by the rest users is marked as 0. On the basis of the above analysis, we put forward the following hypothesis:

H1e:There is a positive correlation between the professional degree of the paid knowledge content and the quality of information.

3.1.2　Quality of follow-up service

Value-added service refers to that Zhihu Live provide both knowledge related to the theme and high level contents/experiences for users. The Knowledge payment platform is emerging, so few studies focus on the value-added service of Knowledge payment platforms. Wang Qianmin found that users perceiving the quality of value-

added service exerts a positive impact on their degree of satisfaction [15]. In this paper, the product detail page of the Live with "Return of goods without reasons within 7 days" is marked as 1, and the product detail page of the Live without "Return of goods without reasons within 7 days" is marked as 0. On the basis of the above analysis, we put forward the following hypothesis:

H2:There is a positive correlation between the quality of paid knowledge follow-up service and the quality of information.

At the end of the Live, paying users are able to write a review and grade it, and the rating and the number of reviews mirror the the quality of information in the Live. According to IAM, the quality of information exerts an impact on users' perceived usefulness. On the basis of the above analysis, we put forward the following hypothesis:

H3:There is a positive correlation between the quality of paid knowledge information and users' information adoption behaviour.

3.2 Source credibility

The recognition degree of knowledge receivers determines the credibility of a answerer. The voting mechanism and the reputation system of Zhihu help answerers lay bare their credibility. Low source credibility leads to low information acceptability [16]. If The higher recognition an answerer gain in a socialized Q&A community, the higher probability other users recognize the usefulness of knowledge shared by him/her. The computing method suggested by Song et al. (the number of likes / the number of knowledge sharing) is used to measure source credibility [17]. On the basis of the above analysis, we put forward the following hypothesis:

H4:There is a positive correlation between paid knowledge source credibility and users' information adoption behaviour.

3.3 Information acquisition costs

Information adoption in traditional Q&A communities is free, so the information acquisition cost is relatively low. Before the new mode knowledge payment emerges, the interrogation mode "free knowledge" has rooted deep in questioners' mind and cognitive lock-ins form [18]. When questioner have to pay to acquire knowledge, users' information acquisition cost increases dramatically and they are less liable to realize the value of payment-based platforms. In this paper, the price of Zhihu Live is used to measure users' information acquisition cost. On the basis of the above analysis, we put forward the following hypothesis:

H5:There is a negative correlation between paid knowledge information acquisition cost and users' information adoption behaviour.

3.4 Theoretical model

Based on information acceptance theories, this paper tries to build a theoretical model of paid knowledge adoption behaviour of users in socialized Q&A communities.
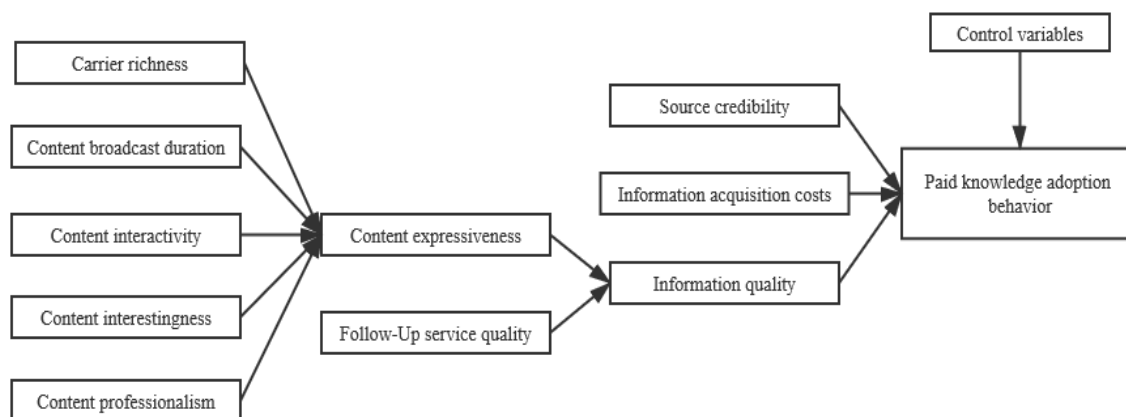

Figure 1.   Theoretical model

4.   RESEARCH DESIGN

4.1 Data sources

The research sample of this paper comes from the real data of Zhihu Live. The information about 733 Lives and their speakers from Jan. 2020 to Apr. 2020 at intervals of 10 days is collected by web crawlers. The data is preproccessed by removing 0 rating Lives (when the number of the participant users of a Live are relatively small, the rating will not be displayed) and the Lives that have not started yet. As a result, the rest 660 Lives have been used as research data.

4.2 Measurement and description of variable

The dependent variables set in this paper include information quality and information adoption. Paying users are able to rate the content of a Live after buying it on Zhihu Live. The number of commodities and services can reflect information quality to the full [19]. Hence, the Live rating can be used to measure the information quality of paid knowledge. After users adopt the paid information, the number of users who are interested in the Live is used to measure the information adoption degree of paid knowledge. The control variables set include the gender of speakers and the interval of web crawlers. There are 502 male speakers that account for 76.0% of users, while there are 158 female speakers that account for 23.94% of users. A Live is still available after finishing, and users are unable to interact with the speaker once the Live is finished. Therefore, the time factor is controlled by recording the interval between the Live web crawler and the finishing time. The final description of variables is as shown in Table 1:

Table 1. Variable description and explanation

Variable name	Measured variable	Variable symbol	Min	Max	Avg	Sd	Skewness
Information quality	Live rating	Live_star	2.11	5	4.36	0.48	-1.40
Information adoption	The number of Live paying users	Live_adopt	70	55286	1873.45	3760.13	6.87
Carrier richness	The number of Live appendices	Live_attachment	0	328	20.30	26.60	5.16
Content broadcast durtion	Live broadcast Duration	Live_time	0.52	154.69	50.72	23.57	1.24
Content interactivity	The number of Live interactive Q&A	Live_reply	0	299	26.28	27.70	2.78
Content interestingness	Stat/Ratehumor set in "Wenxin"	Live_entertainment	-3	2	0.223	0.486	1.85
Content professionalism	Live professional certification	Certification	0	1	0.83	0.38	-1.74
Follow-Up service quality	Return of goods without reasons within 7 days	Isrefund	0	1	0.19	0.39	1.26
Source credibility	The number of likes/knowledge sharing	Credibility	0	5.18	0.843	0.831	1.603
Information acquisition costs	Live price	Live_price	2.32	598	27.40	31.48	10.58
Control variables	Interval time	Interval_time	8	76	32.28	92.97	-0.02
	Sex	Gender	0	1	0.76	0.43	-1.22

According to Table 1, the standard deviation of the number of Live information adoption, followers and likes is relatively large. In order to meet the conditions of regression analysis, the independent variables mentioned above are given a logarithmic transformation.

4.3 Empirical models

In order to study the influence factors of information adoption, we build the following models on the basis of correlation analysis:

$$Live\_star = \beta_0 + \beta_1 Live\_attachment + \beta_2 Live\_time + \beta_3 Live\_reply + \beta_4 Live\_entertainment + \beta_5 Certification + \beta_6 Isrefund \tag{1}$$

$$lnLive\_adopt = \beta_0 + \beta_1 Live\_star + \beta_2 lnCredibility + \beta_3 Live\_price + \beta_4 Interval\_time + \beta_5 Gender \tag{2}$$

Model 1 is the inquiry model of influence factors of information quality, the dependent variable is the rating of Zhihu Live and OLS regression is used to examine.

Model 2 is the model of information adoption, the dependent variable is the number of paying users of Zhihu Live which is the non-negative integer and does not satisfy the hypothesis that dependent variables are distributed continuously, and negative binomial regression is used to examine.

5. ANALYSIS OF EMPIRICAL RESULTS

The glm()、glm. nb() function of the MASS package in R are used to carry out carry out regression analysis, and the final result is as shown in Table 2:

Table 2. Model regression results

	Model 1			Model 2	
Variables	Coef.	VIF	Variables	Coef.	VIF
Live_attachment	0.002***	1.027	Live_star	0.085***	1.254
Live_time	0.005***	1.307	Credibility	0.166***	1.633
Live_reply	0.002	1.275	Live_price	-0.004***	1.036
Live_entertainment	-0.080**	1.020	Interval_time	0.002***	1.390
Certification	0.230***	1.054	Gender	-0.155	1.033
Isrefund	0.106	1.049			

Note: ＊＊，p ＜ 0. 01; ns，p ＞ 0. 05 not significant ; β，regression coefficients; VIF，variance inflation factor

In order to avoid the influence of multicollinearity, the Variance Inflation Factor(VIF) is used to measure the colinearity between variables. According to Table 2, the VIF values in two models are less than 5, which shows that the colinearity between variable is relatively weak.

Model 1 explores the influence factors of Live information quality in terms of content expressiveness and follow-up service quality. The research findings show that content expressiveness has a highly positive correlation with the richness of carrier ($\beta = 0. 002$), the duration of the content($\beta= 0. 005$) and the professional degree of the content($\beta= 0. 230$) respectively, a highly negative correlation with the interestingness of the content($\beta=-0.080$), and there is no relation between content expressiveness and the interactivity of the content($\beta= 0. 002$).

H1a is possible. The richness of carrier has a highly positive correlation with Live information quality. Previous studies found that multimedia were able to stimulate users' senses so as to leave a positive impression with them [20]. Identical with previous research findings, this paper finds that users tend to have a more positive attitude towards the content with rich carrier and the content with a variety of carrier is a key factor in improving information quality.

H1b is possible. The duration of the content has a highly positive correlation with Live information quality, which is identical with the expectation. The longer the Live broadcasting gets, the deeper and broader its content gets.

H1c is impossible. There is no relation between the interactivity of content and Live information quality.The reason may be that most of participant users buy the Live after their finishing and fail to participate in the real-time interactive session, and the interactive questions may not produce an effect on these users,

H1d is impossible. Information quality has a highly negative correlation with the interestingness of the content. The reason may be that Lives have a high threshold and high requirements for professionalism, so their content tend to more serious in style and highly recreational Lives tend to lose their core value.

H1e is possible. The professional degree of the content has a highly positive correlation with Live information quality and has the greatest influence on content expressiveness. All candidates for Live speakers are carefully vetted by providing the identity card, the certificate of employment and the schooling certificate. Therefore, verified users tend to post Live with higher quality, compared to common users, so the professional degree of the content is able to affect information quality.

H2 is impossible. There is no relation between the quality of follow-up service and Live information quality. Since the Live is a kind of non-entity experience product, its users pay much attention to the experience and feel in the process of acquiring knowledge and pay less attention to follow-up quality.

On the basis of Model 1, Model 2 transforms the dependent variable in model 1 "information quality" into an independent variable. Moreover, a model of information adoption is built in terms of Source Credibility and information acquisition costs, and Negative-binomial (NB) regression models are used to explore. According to the regression results, both the Live rating (β= 0. 085) and the number of followers (β= 0. 166) have a highly positive correlation with users' information adoption behaviour, which shows that both information quality and source credibility have a highly positive correlation with users' information adoption behaviour. Hence, both H3 and H4 is possible. Moreover, the Live price (β= -0.004) has a highly negative correlation with users' information adoption behaviour, which shows that information acquisition costs have a highly negative correlation with users' information adoption behaviour. Hence, H5 is impossible.

6.   CONCLUSIONS AND IMPILICATIONS

This paper takes Zhihu Live and IAM as the object of research and the theoretical basis respectively and analyze the influence factors of users' knowledge paying information adoption behaviour through OLS Regression, Negative-binomial (NB) regression and text analysis. The study finds that information quality, information acquisition costs and source credibility have an obvious influence on users' information adoption behaviour; the richness of carrier, the duration of the content, the professional degree of the content have a highly positive influence on user's judgment on information quality, the interactivity of the content and the quality of follow-up service has no obvious influence on user's judgment on information quality, and the interestingness of the content has an adverse influence on user's judgment on information quality; Live information quality and speakers' source credibility have a highly positive influence on users' Zhihu Live adoption behaviour, while Live acquisition costs have a negative influence on users' Zhihu Live adoption behaviour.

For Speakers of Zhihu Live, we have three suggestions. First, the richness of carrier and interactivity of the content have an obvious influence on user's judgment on information quality, so speakers need to take the distribution of sharing duration and interactive duration into consideration. In addition, the randomness of questions require the speakers to have a wider range of knowledge. In order to make users understand the sequence of ideas of a Live, the speaker needs to divide the content of the Live into several chapters. Moreover, the speaker can also improve the professionalism and credibility of the content through community verification and

bibliographies. Second, Live speakers should focus on content expressiveness, information quality instead of improving follow-up service quality. Third, Live speakers should improve the professionalism of the content by sharing more professional knowledge so as to attract more users and further promote influence in the process of Live broadcasting.

For suppliers of community services, we suggest that the content expressiveness of knowledge paying Lives can be improved to help users extract the value of the Lives so as to further improve the commercial value and profitability of a community. In order to highlight Live speakers' credibility and authoritativeness and display the features and advantages of the Live content to the full, suppliers should add relevant functions and services.

However, this paper has some limitations. First, this paper studies users' knowledge paying information adoption behaviour on the basis of objective data, but information adoption are also affected by psychological factors such as perception integrating degrees and satisfaction degrees under the background of knowledge payment. Therefore, these factors can be analyzed in depth by combining with questionnaires, depth interviews and quasi experiments in future studies. Second, the assessment of Live information quality made in this paper is based on the purchase page and the speaker page of Live rather than the data of the real process of the Live. Hence, the content of a specific Live can be analyzed by combining with grounded theory in future studies.

REFERENCES

[1] Cai S, Luo Q, Fu X, et al.(2018).Paying for Knowledge: Why People Paying for Live Broadcasts in Online Knowledge Sharing Community?. pacificasia conference on information systems.

[2] Ning Jingjing.(2014).Study on knowledge sharing situation of zhihu.Thesis.Beijing:Beijing University of Posts and Telecommunications.(in Chinese)

[3] Zhang Anqi,Li Yuanxu.(2020). Information Overload Effect and Weakening Mechanism of Internet Knowledge Sharing Platform—A Case Study on Zhihu.Information Science,38(01):24-29+41.(in Chinese)

[4] Cai Shun,Shi Hairong,Fu Xin,Chen Xi.(2019).Research on the Factors Influencing the Sales of Paid Knowledge Products: Taking Zhihu Live as an Example.Journal of Industrial Engineering/Engineering Management, 33(03):71-83.(in Chinese)

[5] Zhao Yang,Yuan Xini,Li Luqi,Zhao Yu.(2018).The Impact Factors of Users' Paying Behavior for Knowledge on Social Q &A Platform Based on Social Capital Theory. Document,Informaiton & Knowledge, 2018(04):15-23.(in Chinese)

[6] Zhang J, Zhang J, Zhang M, et al.(2019) From free to paid: Customer expertise and customer satisfaction on knowledge payment platforms. decision support systems.

[7] Chen X,Deng S.(2014).Influencing factors of answer adoption in social Q&A communities from users' perspective: taking Zhihu as an example. Chinese Journal of Library and Information Science,7(3):81-95.

[8] Wang Xiwei,Li Jiaxing,Guo Yu,Yang Mengqin.(2015). Research on Influencing Factors of Information Adoption Behavior of Mobile Network Group Buying APP——Analysis Based on the Perspective of Information Ecology.Library and Information Service, 38(04):20-28(in Chinese)

[9] Li Jinhua,Zhang Tingting.(2018).Research on Influencing Factors of User Perceived Usefulness of Knowledge Sharing in Social Q&A——A Case Study of Zhihu.Journal of Modern Information ,38(04):20-28(in Chinece)

[10] McMillan S J.(2004).Effects of structural and perceptual factors on attitude toward the website[J].Journal of Advertising Research,43(4):400-421.

[11] Liu Z, Liu L, Li H, et al.(2012) Determinants of information retweeting in microblogging[J]. Internet Research,22(4): 443-466.

[12] Wang Qianmin.(2018).Research on the Factors of User Satisfaction in Online Knowledge Payment Products:taking Zhihu-Live as an example. Thesis.Nanjing: Nanjing University(in Chinese)

[13] Brandtzaeg P B, Heim J.(2009) Why People Use Social Networking Sites. international conference on online communities and social computing, 143-152.

[14] Ko H, Cho C, Roberts M S, et al.(2005).INTERNET USES AND GRATIFICATIONS: A Structural Equation Model of Interactive Advertising. Journal of Advertising, 34(2): 57-70.

[15] Wang Qianmin.(2018).Research on the Factors of User Satisfaction in Online Knowledge Payment Products:taking Zhihu-Live as an example. Thesis.Nanjing: Nanjing University(in Chinese)

[16] Grewal D, Gotlieb J, Marmorstein H, et al.(1994). The Moderating Effects of Message Framing and Source Credibility on the Price-perceived Risk Relationship. Journal of Consumer Research, 21(1): 145-153.

[17] Zhao Yuxiang,Liu Zhouyin,Zhu Qinghua.(2020).From Free to Fee: Exploring Askers Switch Behavior on Online Q&A Platforms from the Perspective of Cognitive Lock-in. Journal of the China Society for Scientific and Technical Information, 39(05):534-546(in Chinese)

[18] Farhadloo M, Patterson R A, Rolland E, et al.(2016). Modeling customer satisfaction from unstructured data using a Bayesian approach. decision support systems,1-11.

[19] Fortin D R, Dholakia R R.(2005).Interactivity and vividness effects on social presence and involvement with a web-based advertisement. Journal of Business Research,58(3): 387-396.

[20] Sabate F,Berbegalmirabent J,Canabate A,et al.(2014).Factors influencing popularity of branded content in Facebook fan pages. European Management Journal,32(6): 1001-1011.