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RESEARCH ARTICLE

Model Construction and Empirical Study on Unsustainable Usage Behavior of Paid Knowledge Users

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This work involved human subjects or animals in its research. Approval of all ethical and experimental procedures and protocols was granted by the China Institute of Science and Education Evaluation.

ABSTRACT Knowledge payment is a new method of electronic learning that has developed in the era of social media. With the impact of the COVID-19 pandemic, the market for knowledge payment is rapidly expanding. Exploring the factors that influence users' sustained willingness is beneficial for better communication between knowledge payment platforms and users, and for achieving a healthier and more sustainable development of the knowledge payment industry. The model of unsustainable usage behavior of knowledge payment users was constructed on the basis of expectation inconsistency theory, price equilibrium theory, and perceived value theory, using the "cognitive-emotional-behavioral" model framework of cognitive emotion theory. The data were collected from 348 users through a web-based questionnaire and analyzed using structural equation modeling. Findings show that expectation inconsistency, price equilibrium, and quality value, emotional value, and social value have significant effects on discontinuous use intentions. Discontinuous use intentions also significantly affect discontinuous use behavior.

INDEX TERMS Knowledge payment, expectation inconsistency theory, cognitive emotion theory, price equilibrium, perceived value theory, discontinuous use behavior.

I. INTRODUCTION

The rapid development of China's mobile Internet and the upgrading of residents' consumption structure have led to an increasing demand for knowledge and convenient access to knowledge information. However, the quality of knowledge information on the Internet is uneven. Knowledge payment is a new way of information interaction and an important form of sharing economy, including paid knowledge Q&A, content reward, paid courses, and content subscription. China's knowledge payment industry developed rapidly in 2016, and major knowledge platforms have launched new products one after another, such as: Answers, Zhihulive, and Creatorsmith. According to the "2020 China Knowledge

Payment Industry Operation Development and User Behavior Research Analysis Report" by Ai Media Consulting, the scale of Chinese knowledge payment users is growing at a high rate [1]. Research indicates that as users become more adept at identifying and filtering content during their online experience, the open and repurchase rates for paid knowledge products have decreased. While there was a surge in paid knowledge products a year or two ago, consumer interest appears to be waning. Nonetheless, the Chinese market for knowledge payment is still substantial, with 360 million users and a 2019 market scale of 27.80 billion yuan. Despite its potential, paying for knowledge can be a time-consuming and arduous process as users must sift through a categorized structure of questions to find the information they need. This discourages many users from participating, as evidenced by recent surveys [2], [3]. Therefore, it is

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crucial to study user behavior and identify the factors that influence payment in order to increase engagement and promote the sustainable growth of knowledge payment platforms.

II. LITERATURE REVIEW

As early as during the rapid development of the knowledge payment industry, scholars have paid attention to the research on knowledge payment. In China, scholars have mainly discussed the development status of knowledge payment, users' willingness to pay and payment behavior, and business models. Some scholars pointed out three major bottlenecks that affect the sustainable development of knowledge payment platforms: the payment bottleneck from knowledge consumers, the supply bottleneck from knowledge producers, and the survival bottleneck of knowledge platforms themselves, and proposed countermeasures for each bottleneck. From the perspective of theory of planned behavior (TPB), supplemented by theory of rational behavior and theory of perceived value, Yu et al. [4] constructed users' knowledge payment behavior. Their study showed that payment behavior was directly influenced by willingness to pay and perceptual behavior control. Specifically, willingness to pay was directly influenced by attitude to pay, subjective norm, and perceptual behavior control factors; attitude to pay was directly influenced by perceived quality, experience, and trust; attitude to pay and payment behavior were directly influenced by perceived cost is negatively and directly influenced by perceived behavior control; perceived behavior control is directly influenced by time resources and monetary resources.

By contrast, literature related to knowledge payment in foreign studies is limited, among which the main research directions are: knowledge payment technical support research, user behavior research, and pricing research. By incorporating users' interest expertise and reputation ratings into the model, Zhou et al. [5] developed an effective link analysis technique that provides a useful reference for the expert finding mechanism of paid Q&A communities. Consumers may face multiple candidate responders in the process of searching for experts. Wen et al. [6] proposed a hybrid recommendation algorithm based on user networks and social networks for improving the efficiency of ranking recommendations for responders in the platform based on the characteristics of responders such as positivity, authority, and social reputation. For the respondent, the many users and questions increase the pressure of respondent selection and knowledge sharing, and a respondent experiences difficulty finding questions he can answer quickly. Shah and Pomerantz [7] proposed a model for evaluating and predicting answer quality by extracting questions, answers, and relevant user characteristics from the platform. They confirmed the accuracy of the model through model exercises to help the platform evaluate the quality of respondents' answers. Yin and Shi [8] established a user payment behavior model based on the Integration of technology acceptance and usage model,

and analyzed user payment behavior through the model. Nie and Sundar [9] studied users' payment behavior in terms of their personal and social identities using the Facebook platform. Li et al. [10] conducted interviews on the factors influencing users' choice to pay, and did a qualitative analysis of the various influencing factors using software analysis. Foreign research focuses on pricing issues in the Google Answers platform, including pricing mechanisms and pricing implications. By modulating the price of quizzes in Google Answers, Chen et al. [11] found that higher prices tend to result in more and longer answers, but do not imply higher-quality answers. Hsieh et al. [12] further built on previous studies by noting that questioners are willing to pay more for more difficult questions, indicating that such questions have high archival value.

Domestic and international studies on knowledge payment have certain similarities; they focus on what factors affect users' payment behavior and business models. However, these studies have different directions, and only a few studies have focused on users' refusal to use behavior persistently from the side. Therefore, this paper will examine what factors have an impact on users' willingness and behavior of discontinuing to use. The findings will provide decision implications for how knowledge platforms can retain users for the long term.

III. REVIEW OF RELATED CONCEPTS AND THEORIES

A. EXPECTATION INCONSISTENCY THEORY

Oliver [13] proposed expectation inconsistency theory. As early as 1977, Oliver [14] had pointed out that two elements, performance-specific expectations and expectation uncertainty, play an important decision-making role in terms of satisfaction decisions. In order to integrate the suggested antecedents and hypothetical cognitive outcomes into a coherent satisfaction-related conceptual framework, a functional model representation was used to represent consumer satisfaction as expectation consistency and uncertainty. According to the expectation inconsistency theory, a user's willingness to use a product depends on the satisfaction after using the product, and such satisfaction is determined by the comparison between the expectation before purchase and the performance of the product after purchase [15]. User satisfaction is considered the subjective emotion of users' satisfaction in using an IS. Oliver defined satisfaction as "the overall evaluation of users' experience and emotional feedback after using the product," whereas other scholars define it as "the impact of actual use of the information system by customers" [16]. Although expectation inconsistency theory links satisfaction with expectation inconsistency, positive expectation inconsistency increases user satisfaction with IS, whereas negative expectation inconsistency decreases satisfaction with IS. Oliver constructed the expectation inconsistency model after expectation inconsistency theory was proposed to analyze the factors influencing user satisfaction and continuous use. Oliver pointed out that user

satisfaction does not only depend on perceived performance, but also on the expected performance of users. In general, users' expected performance is mainly expressed through the comparison of word-of-mouth marketing, advertising, and experience of using similar products with the results obtained from actual use. Expectation inconsistency can reflect the mismatch between users' expectation before paying for online knowledge products and their performance after paying for the products. When users' performance after paying for products is higher than their expectation before paying for products, then expectation inconsistency is positive and can enhance users' satisfaction and willingness to continue to use and purchase products. By contrast, when users' performance after paying for products is lower than their expectation after paying for products, expectation inconsistency is negative and will reduce users' satisfaction and refusal to continue to use and purchase the product.

EDT theory and models are widely used in many fields. Hsu et al. [17] integrated the technology acceptance model, expectation inconsistency model, and traffic theory in the context of Facebook to construct a new model to investigate how users persist in using a social networking site. Moreover, they conducted an analysis by using a structural equation approach to examine the intrinsic and extrinsic motivations for persistent use. To examine the association between social networks (SNS), user satisfaction, and the effect of gender on user satisfaction, Chan et al. [18] developed a new model based on the expectation inconsistency model, focusing on SNS-specific motivations to enrich the understanding of user satisfaction in the context of SNS. Liao et al. [19] examined the influence played by information quality (IQ), system quality (SYQ), and service quality (SEQ) in determining user satisfaction and regret purchases in the context of e-commerce on the basis of expectation inconsistency theory and empirical methods. They found that expectation inconsistency is an important factor that directly affects users' continued use through satisfaction. Roca et al. [20] proposed an E-learning model on the basis of expectation inconsistency theory. Their model divides perceived value into perceived quality and perceived usability. They also found that users' sustainable use is determined by satisfaction, which is determined by perceived usefulness, IQ, confirmation, SEQ, SYQ, perceived ease of use, and cognitive absorption.

According to previous literature, expectation inconsistency theory is mostly applied to social media, social network, and e-commerce. A few scholars use expectation inconsistency theory to study knowledge payment behavior, and conventional knowledge payment research mainly focuses on the association between knowledge payment platform and knowledge payment users, and knowledge payment users' consistent use behavior. This paper tries to take expectation failure test as an influencing factor by analyzing their influential role on online knowledge payment users' willingness to use unsustainably.

B. PERCEIVED VALUE THEORY

Traditional theories held that companies are not only the creators of value, but also the transmitters of value, whereas customers are the users of value, and companies play a more important role in value. With the development of in-depth customer-oriented research, scholars found that the attributes of value are diverse, and what frames value is highly personal and unique, which means that the realization of value is mainly perceived through customers. Therefore, customer perception is important for value. Zeithaml [21] first proposed customer perceived value, pointing out that perceived value is a customer's overall assessment of the utility of a product on the basis of the comparison of what they paid for and what they gain. Online consumption allows consumers in the network to have more platforms to express their demands. Consumers can express their needs and perceptions after using a product in a timely manner, and information technology makes this information easy to obtain for companies. As a result, the position of consumers in the value expands; hence, the value creation and marketing of products in the context of online consumption have shifted from being value-centered by companies to being perception-centered by customers. Hu and Zhang [22] used the expectation–confirmation model and the technology acceptance model while combining perceived value theory to study mobile book app user behavior, and found that perceived usefulness and satisfaction directly affect the willingness to continue using the app. Mathwick et al. [23] created an innovative experience value scale under the Internet platform, reflecting the benefits gained from the perception of entertainment, aesthetics, customer “return on investment,” and service excellence. They classified perceived value into aesthetic value, fun value, service excellence value, and customer “return on investment” value in two dimensions: intrinsic/external and active/passive. On the basis of perceived value theory, consumer experience module theory, and Maslow's hierarchy of needs theory, Gentile [24] divided perceived value into six indicators: association, lifestyle, cognition, emotion, feeling and utility, and constructed a structural dimensional model of experience value.

Only a few studies utilize perceived value theory in the topic of knowledge payment, and no study has incorporated perceived value theory into the willingness to use online knowledge payment unsustainably yet. Therefore, this paper explores users' willingness to refuse to use online knowledge payment consistently by using perceived value theory.

C. COGNITIVE EMOTION THEORY FRAMEWORK

Cognitive emotion theory (CET) is a branch of emotion theory, which is derived from social psychology. It states that when an individual receives external information into the perceptual system, two results are produced: on the one hand, the information will be organized by the perceptual

system into information that the individual understands; on the other hand, the information received will trigger an emotional response (both negative and positive) that will lead to behavioral tendencies [25]. Emotions arise from the comparison between users' expectations before paying for knowledge and their usage performance after paying for knowledge. The occurrence of emotions depends on the expectation confirmation of paying for knowledge rather than paying for knowledge itself. The CET theoretical framework is chosen because it can explain expectation inconsistency theory of online knowledge payment users' unsustainable use. The CET framework reflects the expectation inconsistency formed by individuals before paying for knowledge and after paying for it, which generates individual emotions leading to behavioral tendencies. The CET model follows the psychological paradigm and logic of "cognitive-emotional-behavioral," which evaluates whether to perform behaviors under the dual role of cognition and emotion. The CET model has been widely applied in the analysis of user behavior in various fields. Zhang et al. [26] used "cognitive-emotional-behavioral" theory and framework to explore the discontinuous usage behavior of users in the social network environment. Moreover, they proposed a model of cognitive-emotional relationship framework to investigate the factors affecting users' discontinuous usage in accordance with the three factors of perceptual overload: system feature overload, information overload, and social overload. Lim and Yang [27] used cognitive emotion theory and social comparison theory in the context of social networking services to explore the impact of discrete jealousy and shame emotions on social network users' intention shifts, with implications for discontinuous use behavior. The cognitive-emotional theory framework is able to link expectation inconsistency theory, price trade-off factors, and perceived performance under user satisfaction to explain users' knowledge payment discontinuity usage intention and behavior. The framework can explain user dissatisfaction caused by expectation inconsistency and other factors, and can introduce perceived performance negative emotions to enrich users' emotions. Thus, this study identifies expectation inconsistency theory and price trade-off as the dimension of user knowledge payment dissatisfaction, and negative emotions under perceived value as the dimension of users' intrinsic emotions to explain online users' knowledge payment discontinuous use willingness and behavior.

IV. RESEARCH HYPOTHESIS AND MODEL

Oliver defined expectation confirmation as the psychological perception resulting from customer's psychological expectation before using a product compared to the actual performance of the product after use. The psychological expectation before use and the actual performance after use are related to satisfaction. When the expectation of users' knowledge payment is higher than the performance after product payment, then the expectation inconsistency is positive, which can enhance users' satisfaction and willingness

to continue to use and buy knowledge payment products. By contrast, when the expectation of knowledge payment is lower than the performance after knowledge payment, the expectation inconsistency is negative, which will reduce users' satisfaction and compel them to discontinue to use and purchase the products of knowledge payment. In a study conducted by Wu et al. [28] on the intention to use mobile instant messaging service users, they noted that inconsistency influences the intention not to use consistently through the mediating effect of perceived dissatisfaction. On the basis of this finding, the following hypotheses are proposed.

H1: Inconsistency between expectations and actual experience will significantly affect the dissatisfaction of online knowledge paying users.

Price value is the trade-off between the monetary cost paid by a user and the benefits reaped. When consumers perceive the price trade-off as positive, that is, consumers feel that they can gain more benefits by paying the same cost, then the willingness and behavior to continue to purchase will be obvious. Conversely, when consumers perceive the price trade-off as negative, that is, users feel that the cost paid is higher than the benefits, then consumers will not have the willingness and behavior to continue to use the product. As an emerging consumption method and consumer product, knowledge payment has only changed the form of products and the path of consumption, and has not changed much for the psychology of consumers. Eggert and Ulaga [29] studied users' continued purchase of services and pointed out that perceived value is the most important factor for continued purchase. They also found that the greater the price equilibrium users personally feel, the stronger their willingness to continue purchasing services. On the basis of this finding, this paper proposes the following hypothesis.

H2: High or low prices will significantly affect the dissatisfaction of online knowledge-paying users.

Functional dimension is the user's perception of the product or service provided by the knowledge payment, which is at the core of the whole product and is generally divided into three dimensions: functional, social, and emotional. The "quality value" sub-dimension is measured by the "quality value," which is the high-quality service provided by the knowledge payment platform to users. In a study on the factors influencing user satisfaction and loyalty of paid knowledge platforms, Jin and Xu [30] pointed out that SYQ, IQ, and SEQ significantly affect perceived utility value, whereas SEQ and product novelty affect perceived hedonic value, and perceived utility value and perceived hedonic value have significant effects on user satisfaction. Zhou et al. [31] conducted a study on Internet banking users. They showed that the quality, reputation, and security of Internet banking services influence users' continued use through trust and satisfaction. On the basis of this finding, this paper proposes the following hypotheses.

H3a: Improving quality and value can lead to a decrease in dissatisfaction among online knowledge-paying users.

H3b: Reducing quality and value can lead to online knowledge-paying users being unwilling to continue using the service.

Knowledge payment users have not only economic attributes but also social attributes. Moreover, social experience value emphasizes the relationship between users and society; hence, the social dimension corresponds to users' need to satisfy self-actualization, respect demand, and belonging demand, and more to pursue the perception given by the external social environment. Thus, this paper classifies them as "social value" in users' online knowledge payment. Therefore, in this paper, users' online knowledge payment is classified as "social value." In essence, users choose the platform and product type of knowledge payment to establish a "behavioral identity" relationship. Users pay for online knowledge through the knowledge payment platform, which is the social space of users, and users can establish social connections in the knowledge payment platform. Xie et al. [32] explored the influence of perceived value on customer satisfaction and purchase intention of knowledge-based products on the basis of college students' perceived value of knowledge payment products. Their results showed that perceived value is the most important factor in consumers' willingness to purchase knowledge-based products online and influences satisfaction, among which, functional value, emotional value, and social value have significant effects on purchase intention. On the basis of this finding, this paper proposes the following hypotheses.

H4a: The social value of online knowledge-paying services will significantly affect user dissatisfaction.

H4b: The social value of online knowledge-paying services will significantly affect user's willingness to continue using the service.

The affective dimension mainly includes belongingness and security needs in the user experience needs hierarchy. It is generally measured by the "affective value" sub-dimension, which refers to the emotional changes that users have when they experience knowledge payment products or services. Conversely, when users have more downward sentiment when experiencing a P2P product or service, their satisfaction will be significantly reduced, which will then prompt them to adopt negative behaviors, such as rejection, avoidance, and discontinuity. Some scholars have also studied users' willingness to continue to use in knowledge payment platforms, and the results show that the value of emotional experience positively affects user satisfaction and willingness to continue to use knowledge payment platforms. On the basis of this finding, this paper proposes the following hypotheses.

H5a: The emotional value of online knowledge-paying services will significantly affect user dissatisfaction.

H5b: The emotional value of online knowledge-paying services will significantly affect user's willingness to continue using the service.

Satisfaction has a significant impact on whether users adopt the behavior of continued use, as shown in many studies. On the basis of expectation confirmation theory,

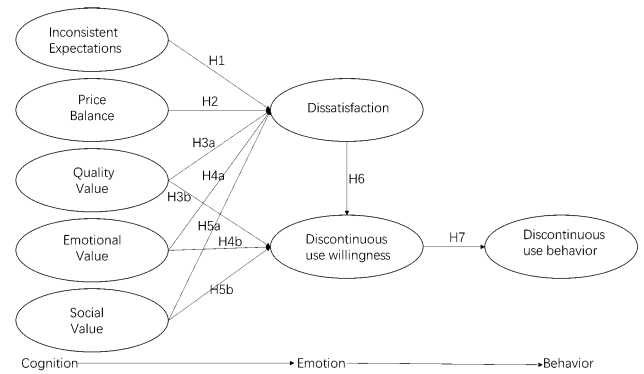


FIGURE 1. Model of online knowledge payment users' unsustainable usage behavior.

Bhattacharjee proposed the information system continuous use model, which then pointed out that users' expectation confirmation affects satisfaction, and satisfaction affects users' willingness to use continuously. On the basis of these studies, this paper proposes the following hypothesis.

H6: Dissatisfaction will significantly affect the user's willingness to continue using the online knowledge-paying service.

TPB proposes that behavioral intention is the primary way to predict and explain individual behavior and is influenced by behavioral attitudes and subjective norms. Attitude refers to an individual's positive or negative evaluation of a behavior; subjective norms refers to individuals' perceived social pressure to perform a behavior or not when making decisions; and behavioral intention refers to the motivational factors of an individual's behavior, indicating the effort the individual puts into performing a behavior. Ajzen [33] explained the great variation in actual behavior by accurately predicting the intentions of different types of behavior through attitudes toward behavior, subjective norms, and perceived behavioral control. Some studies of consumer behavior have shown that over time, consumer intent significantly influences ongoing purchase behavior. On the basis of this finding, this paper proposes the following hypothesis:

H7: User dissatisfaction with online knowledge-paying will significantly affect user's behavior of discontinuing use.

Based on the framework of perceived value theory, price trade-off theory, expectation inconsistency theory, and cognitive emotion theory, this paper proposes eight variables of expectation inconsistency, price trade-off, SEQ, emotional value, social value, dissatisfaction, discontinuous use intention, and discontinuous use behavior to construct a model of discontinuous use behavior of knowledge payment users. Figure 1 presents the model.

V. SCALE DEVELOPMENT AND DATA COLLECTION

The study designed the questionnaire on the basis of the theoretical model. The questionnaire was divided into two parts. The first part examined the demographic characteristics of the survey sample and the use of knowledge payment,

TABLE 1. Measurement indicators and sources.

Variables	Measurement issues	Source
Expectation inconsistency	1. My experience with a paid knowledge product or service was less than I expected. 2. The benefits of the paid knowledge product or service are less than I expected. 3. My expectations for the paid-for-knowledge product or service were not met.	Min et al. [34] Bhattacharjee [16]
Price balance	1. The paid knowledge product or service does not provide high-quality knowledge service that matches its price. 2. The cost of using online paid knowledge products or services is not worth it. 3. On balance, the cost of online paid knowledge products or services is unacceptable.	Venkatesh et al. [35]
Dissatisfaction	1. Dissatisfaction with a paid knowledge product or service 2. I am disappointed with my use of the paid knowledge product or service. 3. I am unhappy because the paid knowledge product or service does not meet my needs.	Bhattacharjee [16] Thong et al. [36]
Quality value	1. The paid knowledge product or service is not easy to understand and accept because the content is not thorough and easy to understand. 2. The paid knowledge product or service is unreliable. 3. The quality of the content of the paid knowledge product or service is unsatisfactory.	Sweeney and Soutar [37]
Emotional value	1. Paid knowledge products or services are not a treat for me. 2. The paid knowledge product or service does not satisfy my desire to learn. 3. Paid-for knowledge products or services do not bring me pleasure.	Sweeney and Soutar [37]
Social value	1. The paid knowledge product or service did not enhance my public image. 2. The paid knowledge product or service did not make me more popular among my friends. 3. The paid knowledge product or service does not give me social recognition.	Kim et al. [38] Wan et al. [39]
Discontinuous use willingness	1. I may not use paid knowledge in the future. 2. I don't plan to pay to learn about knowledge content. 3. Next time, I will not pay for knowledge products or services.	Maier et al. [40] Ravindran et al. [41]
Discontinuous use behavior	1. I will use less knowledge-paying behavior in the future. 2. I may not continue to pay for knowledge in the future, 3. I will never pay for knowledge again.	Turel [42] Bhattacharjee [16] Gefen D and Straub [43] Kim et al. [44]

whereas the second part used a 5-point Likert scale to examine users' feelings in using and willingness to refuse to use. The indicators in the questionnaire are derived from adapted existing literature, mainly to avoid repetition in survey items, improve the quality of questions, ensure their effectiveness, and support research hypotheses. In designing the questionnaire, to ensure that each variable has the same weight in the tester's mind and that the repetition rates of the three questions are different, three questions were selected to test each variable. Due to the potential impact of different media platforms on researchers' psychology, which may lead to biased questionnaire results, social media platforms were not restricted during the questionnaire design process. The final indicators of the questionnaire can be found in Table 1. Generally, questions related to expected relevance often cite Min et al.'s research, price equilibrium often use Venkates et al.'s research, satisfaction often use Bhattacharjee et al.'s research, quality value and emotional value often use Sweeney et al.'s research, social value often use Kim and Wan's research, and intention to continue using often use Maier, Ravindran, Gefen D, and others' research. Studies by these authors are often highly cited in their respective fields and have a certain level of authority.

Ethics Statement

The studies involving human participants were reviewed and approved by the Ethics Committee of Hangzhou Dianzi University China Academy of Science and Education Evaluation. Written informed consent for participation was

not required for this study in accordance with the national legislation and the institutional requirements.

The questionnaires were created and distributed through an online platform, with the help of social media tools for online questionnaires. A total of 395 questionnaires were collected over two weeks, and 348 valid questionnaires were obtained after eliminating those with errors such as too short a filling time and too consistent options.

The demographic information of the sample was first analyzed. Among the 348 respondents, 181 were male, accounting for 52% of the total, and 147 were female. This distribution is relatively similar to the actual gender distribution of Chinese netizens. Approximately 79.31% of the sample have a bachelor's degree or above, 62.07% have used knowledge payment for more than 1 year, and more than 61% of them frequently engage in knowledge payment behavior. From the classification of communities, users use Baidu Know (23.24%), Zhihu (40.23%), Sina Weibo (15.65%), and Himalaya FM (12.21%). Zhihu is the most used knowledge platform by Chinese users and has content advantages. The reason for this preference is that Zhihu is the first high-end large knowledge Q&A community in China. It has a large group of high-quality "cattlemen" and professionals in various fields. Zhihu is followed by users who are mainly aged between 24 and 35, most of whom have high education and high income and are concentrated in first-tier and second-tier cities, with a certain level of consumption power and a greater demand not only for products but also for

discernment and quality. Baidu, which deals with all kinds of questions and has accurate answers, has a number of users.

VI. DATA ANALYSIS

This study used SPSS 23.0 and AMOS 24.0 software to analyze the data. First, the measurement model was analyzed to examine the reliability, validity, and standard loading of the scale. The reliability of the questionnaire needs to be measured by using Cronbach’s α coefficient (Cronbach’s α) value. The size of Cronbach’s α coefficient is positively correlated with the reliability of the questionnaire, that is, the higher the reliability of the questionnaire, the more stable the results obtained. Specifically, when the α coefficient falls between 0.60 and 0.65, the questionnaire should be discarded. If the α coefficient reaches 0.65 or above, then the questionnaire is barely acceptable. If the α coefficient reaches 0.7 and above, then the questionnaire has excellent results. The data in Table 2 show that the lowest Cronbach’s α among all variables is 0.701, and the lowest combined reliability is 0.788, indicating that the measurement scale in this study has high reliability and the internal consistency of the scale is good.

The convergent validity of the questionnaire must meet two conditions. First, the standardized factor loadings of the measurement items must be greater than 0.5 and reach the statistically significant level, and each potential variable must have at least three measurement items. Second, the average variance taking value (AVE) of each potential variable must be greater than 0.5. According to the data in Table 2, the minimum value of the standardized measurement items of the questionnaire is 0.707, and the maximum value is 0.858. Each latent variable is three measurement items, and the lowest value of the AVE of latent variables is 0.554. These results fully meet the requirements of convergent validity and have high convergent validity.

The model was analyzed by deconstructing it using AMOS24.0 software. Table 3 shows some of the fitting index values. The values of each fit index are better than the recommended values, showing a better fit and a good model fit. Figure 2 shows the path coefficients and significance levels.

According to the results of the structural model test, there are a total of 10 hypotheses, and all of them are confirmed except for hypothesis H3a. Meanwhile, according to the results in Figure 2, it can be seen that: expectation inconsistency, price equilibrium, emotional value, and social value all significantly affect dissatisfaction, and their influence coefficients reach 0.21, 0.16, 0.21, and 0.12, respectively; while quality value, emotional value, and social value all also significantly affect discontinuous use intention, with influence coefficients of 0.13, 0.34, and 0.31, respectively; in addition, dis Satisfaction significantly affects the intention of not continuing to use, and the intention of not continuing to use significantly affects the behavior of not continuing to use, with coefficients of 0.33 and 0.66, respectively.

TABLE 2. Factor loadings, Cronbach’s alpha values, AVE, CR values.

Factor	Indicator	Factor Load	AVE	CR	Cronbach’s α
Expectation inconsistency (EI)	EI1	0.823	0.664	0.855	0.855
	EI2	0.801			
	EI3	0.821			
Price balance (PB)	PB1	0.762	0.554	0.788	0.701
	PB2	0.707			
	PB3	0.764			
Dissatisfaction (DIS)	DIS1	0.742	0.555	0.789	0.703
	DIS2	0.767			
	DIS3	0.726			
Quality value (QV)	QV1	0.786	0.68	0.864	0.773
	QV2	0.858			
	QV3	0.829			
Emotional value (EV)	EV1	0.767	0.57	0.799	0.721
	EV2	0.735			
	EV3	0.763			
Social value (SV)	SV1	0.795	0.627	0.834	0.784
	SV2	0.785			
	SV3	0.796			
Discontinuous use willingness (DUW)	DUW1	0.719	0.587	0.809	0.824
	DUW2	0.854			
	DUW3	0.718			
Discontinuous use behavior (DUB)	DUB1	0.73	0.645	0.844	0.858
	DUB2	0.832			
	DUB3	0.844			

TABLE 3. Fitting index values of the structural equation model.

Fitted index	Recommended value	Fitted value
χ^2/df	< 3.0	1.814
GFI	> 0.9	0.911
AGFI	> 0.8	0.885
RMSEA	< 0.08	0.048
IFI	> 0.9	0.941
CFI	> 0.9	0.940

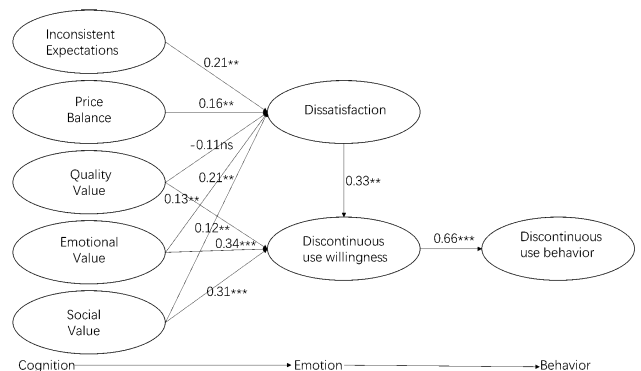


FIGURE 2. Structural model test results.

VII. DISCUSSION

It is not uncommon to conduct research based on one or more variables to measure whether they would induce users’ willingness to pay for knowledge-based services. For example, Yu [4] built a theoretical model of the factors that influence the payment behavior of knowledge-based platform users from the perspectives of users, knowledge

providers, and platforms. In addition, they incorporated variables such as age, gender, experience, and voluntariness that could affect user behavior. The study found that content quality, peer influence, Key Opinion Leader influence, perceived interactivity, effort expectancy, and perceived trust significantly affect users' willingness to pay, which indirectly influences their payment behavior. In Chen's [45] study, the determining factors of online learning consumers' purchase intention were investigated, and the results showed that trust and performance expectations played a positive role in consumers' purchase intentions. Moreover, the instructor's expertise, previous learning experience, and personal trial experience were positively correlated with trust and performance expectations, which, in turn, affected consumers' purchase intentions for online courses. From the perspective of constructing theoretical frameworks and adopting models, Zhou [46] borrowed the stimulus-organism-response framework to construct a new model to predict whether factors such as the interactivity and information quality of the knowledge platform, knowledge scarcity, and the professionalism and attractiveness of knowledge contributors would have a positive impact on consumers' willingness to pay for knowledge.

Using the Unified Theory of Acceptance and Use of Technology as a theoretical framework, Lu [47] further extended the model and added two dimensions, price and product involvement, to investigate consumers' willingness to purchase game apps. The results showed that structure, performance expectations, and social influence had a significant impact on consumers' behavioral intentions towards game applications, and facilitating conditions and price had a direct impact on their purchasing behavior. Su [48] borrowed the cognitive-emotional-intention framework and customer value theory to propose that consumers rationally evaluate the customer value of online knowledge payment during the cognitive stage, generate trust and identification during the emotional stage, and make purchasing decisions accordingly. The study confirmed that customer value and identification with knowledge contributors significantly affect consumers' trust in online knowledge payment. Trust in online knowledge payment and identification with knowledge contributors both significantly influence consumers' purchase intentions, whereas trust in the platform does not affect either consumers' trust in online knowledge payment or their purchase intentions. Based on the information adoption model, Daradkeh [49] established a new research model and used a combination of text and regression analysis to examine the relationship between information adoption patterns and knowledge acquirers' payment behavior, as well as to explore the moderating effect of product type on this relationship. The results showed that the completeness, vividness, and relevance of product descriptions had a significant positive impact on knowledge payment behavior, and the reputation, experience, and integrity of knowledge providers had a positive impact on knowledge payment behavior.

Overall, this study draws inspiration from existing research in terms of variable selection, theoretical framework, and model, while also innovating in certain aspects. For example, in terms of variable selection, both this study and other research use the variable of expectations to examine its impact on consumers. Most research results show that expectations have a significant influence on consumer willingness to pay for knowledge-based products or other products. The variables of quality, emotion, and social value in this study share similarities with other research, while price equilibrium is rarely studied as a variable. Additionally, new variables in other studies still provide a new direction for discussion of consumer willingness to pay, such as perceived interaction and peer influence. In terms of theoretical framework, most research still adopts mainstream frameworks, including cognitive-affective-conative model, unified theory of acceptance and use of technology, and stimulus-organism-response theory, which have similarities with the cognitive-affective model used in this study. Furthermore, the innovation of this study lies in the factors that influence the discontinuous use intention and behavior of knowledge-based products. There is currently limited research considering users' willingness to use products from a reverse perspective. However, the study does not fully consider the technology and human-machine factors that may affect user behavior, which provides a certain supplement to the research paradigm and direction for future studies.

VIII. CONCLUSION AND RECOMMENDATIONS

This article focuses on user behavior in online knowledge payment, constructing a user refusal to continue using model based on expectation theory, price equilibrium theory, perceived value theory, and cognitive emotion theory. The data was collected through a questionnaire survey and empirical analysis was conducted. The study found that inconsistent expectations, price equilibrium, emotional value, and social value significantly affect user dissatisfaction, while inconsistent expectations, price equilibrium, quality value, emotional value, and social value significantly affect user willingness to discontinue use. Based on the research results, some corresponding ideas are proposed: 1) improving the consistency of expectations. Knowledge providers should set clear expectations for the type and quality of knowledge they provide, which will help users make wise decisions and avoid disappointment; 2) reasonably pricing knowledge payment content based on quality, improving the gold content of knowledge products. Users also balance the price in the process of knowledge payment. Only when users perceive that the price paid is equivalent to the value obtained, can they continue to use it; 3) ensuring accessibility. Regardless of economic status or geographic location, everyone should have access to knowledge. Providers can consider offering discounts or free use to those who may not be able to afford it; 4) emphasizing emotional and social value. In addition to the practical value of knowledge, emotional and social benefits should also be considered. For example,

learning from someone who is passionate about their subject is more inspiring than learning from someone who is just knowledgeable; 5) addressing user dissatisfaction. Knowledge providers should be open to user feedback and take measures to solve any problems that arise. This can help establish trust and loyalty among users; 6) cultivating a mature knowledge sharing community. Establishing a community around knowledge sharing can help create a sense of belonging and encourage collaboration. Providers can consider hosting online forums or network events to connect users and providers.

Of course, this article also has the following shortcomings: (1) The article only considers the impact of factors such as perceived value, price, and expectation on user behavior, while in fact, there are many other factors in the process of knowledge payment that need to be explored further using qualitative research methods; (2) In the theoretical model, there are a certain number of indirect effects, such as experience, age, gender, etc., but the current model does not include these indirect variables for research, and in future research an appropriate number of indirect effects can be included to more clearly identify the factors of continued willingness to use; (3) Different knowledge payment platforms have significant differences in payment methods and operations, and future research can conduct comparative analysis by classification.

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