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Full Research Paper

# Research on the Influence Mechanism of Customer Experience on Participation Value Co-creation Behavior in Virtual Brand Community: Empirical Analysis Based on Structural Equation Model

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**Abstract:** Value co-creation is the key for enterprises to obtain sustainable competitive advantage in the network environment. Based on value co-creation theory, psychological ownership theory, social exchange theory and S-O-R theory, this study constructs a research model of the impact of customer experience in virtual brand community on participation in value co-creation behavior. Through questionnaire survey and structural equation model analysis, the results depict that: Customer experience and psychological ownership have a positive impact on willingness to participate in value co-creation; customer experience is positively correlated with psychological ownership; customer psychological ownership plays an intermediary role between customer experience and willingness to participate in value co-creation; customers' willingness to participate in value co-creation promotes their participation in value co-creation; reciprocity norms have a significant positive moderating effect on the willingness and behavior of participating in value co-creation.

Keywords: Virtual brand community, Customer experience, Participation in value co-creation behavior, Psychological ownership, Reciprocity norms

## 1. INTRODUCTION

In recent years, the way enterprises create value has gradually changed from individual value creation to co-creation. Value co-creation has become a crucial research topic in current marketing management because it breaks through the traditional value creation view. Virtual brand community has gradually become a typical platform for enterprises and customers to co-create value. The participation of community members in value co-creation has been proved to play an important role in new product development and service innovation, brand equity and maintaining brand loyal customers [1]. Therefore, enterprises need to consider from what aspects to make efforts to stimulate the virtual brand community customers positive value co-creation behavior.

Value co-creation is the result of the joint efforts of both enterprises and customers. Enterprises not only need to provide the most basic experience environment conducive to the development of value co-creation activities, but also need to establish various behavioral norms to restrict the opportunistic behavior of customers and stimulate customer value co-creation behavior. In addition to the stimulation of external factors, an important internal reason for the increase of customer participation in value co-creation is the change of their self-ability consciousness and thoughts and emotions as the other side of value co-creation. It can be seen that the process mechanism of customer experience promoting customer participation in value co-creation is profound and complex, and the lack of any link is not conducive to the achievement of the final behavior results. Therefore, it is necessary to further explore and use scientific methods to verify to clarify the reasons.

Based on this, this study attempts to draw on the existing research results in the field of value co-creation at home and abroad. Taking the virtual brand community initiated by enterprises as the background, the customers involved in value co-creation activities in the community as the research object, the psychological ownership as

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the mediating variable, and the reciprocal norm as the moderating variable, this study constructs the research model of the influence of customer experience in the virtual brand community on the participation in value co-creation behavior, and makes an empirical analysis of the whole influence process, so as to provide marketing decision-making reference for enterprises to encourage customers in the virtual brand community to participate in value co-creation practice.

## **2. THEORETICAL BACKGROUND**

### **2.1 Value co-creation**

Value co-creation is defined as the process of value co-production by multi-economic actors in the value creation system, which includes suppliers, customers, partners and other stakeholders <sup>[2]</sup>. The virtual community user value co-creation refers to the platform to provide experience and interactive basis, users according to their own needs and platform to create value. Under the service-oriented logic, enterprises put forward value proposition, and provide customers with various co-creation conditions such as platform, information technology and good experience environment. The value co-creation studied in this paper is based on the service-oriented logic of value co-creation, that is, from the perspective of enterprises, to study what kind of support enterprises provide for customers in virtual brand communities can promote customers to actively participate in value co-creation, and how to interact with customers, how to integrate and use customer resources to successfully develop new products and improve services oriented by customer needs, so as to achieve the sustainable development of enterprises.

### **2.2 Psychological ownership**

Psychological ownership is a kind of psychological state that an individual regards a target as belonging to or partly belonging to his own, and this target can be material or non-material, which reflects the internal relationship between the individual and the target. When Pierce et al. <sup>[3]</sup> studied the root causes of the formation of psychological ownership, they believed that when the three motivations of self-efficacy, self-identity and spatial demand were met, the individual's psychological ownership was easily stimulated. In the field of marketing, the traditional concept of the role of enterprises and consumers has been deconstructed in the past decade. In this process of change, enterprises generally begin to regard customers as insiders and partners of value creation, and consumers' participation in co-creation of value can also be regarded as a self-investment of consumers in products and services.

### **2.3 Social exchange theory**

The social exchange theory relies on "economic man hypothesis", which means that the performance or behavior of organizations or individuals is inseparable from rewards, and the value maximization is the most direct and fundamental driving force for them to carry out social exchange. Homans <sup>[4]</sup> proposed that all human activities are social exchanges, reciprocity is common in human social life, and it is reflected in each node of social relations. Social exchange is sustainable because people have a belief in reciprocity. Therefore, reciprocity is regarded as the core of social exchange theory, which is the fundamental mechanism to explain the generation of social exchange between people and the change of attitude and behavior of exchange parties. However, reciprocity norms often rely on social exchange theory, which refers to a set of socially accepted trading rules, in which one party provides resources to the other and the other party is obliged to repay.

### **2.4 S-O-R theory**

The existing literature has rich research results on consumer behavior. In the early stage, it is mainly based on the input-output model. In the second-generation research hypothesis, consumers' response will be affected by various stimulus factors in the market. On this basis, Mehrabian and Russell proposed a more perfect S-O-R model in 1974. They found that various environmental stimuli can lead to emotional changes, and then cause consumers' behavioral responses. The S-O-R model is composed of "environmental stimulus factors-body psychological state-behavioral response results". With the development of S-O-R theory, environmental stimuli include not only

the social network environment in which individuals live, but also the experience gained by individuals in a particular atmosphere. The body's performance is no longer confined to pleasure and conscious awakening. As long as it involves the individual's emotional state or inner cognition, it can be regarded as an organism variable. The final behavioral response results can be either a certain behavioral tendency and attitude induced by the state of the organism or a specific behavioral output of the target orientation.

### **3. STUDY HYPOTHESIS AND STUDY MODEL**

#### **3.1 Customer experience and psychological ownership**

More and more enterprises strengthen their contact with customers by creating their own virtual community. Customers spend time and energy browsing community content, participating in comments on posts issued by enterprises or other community members, publishing their own experience of product use, and experiencing strong community information function and interactive fun, and the acquisition of this comprehensive experience further enhances customer familiarity with businesses and brands. In the context of this study, customer psychological ownership is a kind of inner cognition and emotional state that customers regard brands or products as belonging to or part of their own. Its formation depends on one of the three paths of controlling the goal, understanding the self and investing in oneself. Whether the customer contact and participate in the virtual community interaction of self-investment, or through a variety of experience process to promote the familiar understanding of brand and product, all meet the basic conditions of customer psychological ownership formation. Therefore, this study proposes the following hypothesis:

**H1** Customer experience has positive effect on psychological ownership.

Based on the research of Sha et al. <sup>[5]</sup>, this study divides the customer experience of virtual brand community into three dimensions: information experience, entertainment experience and interactive experience. Information experience is the experience that customers feel valuable to themselves when they acquire and share information in virtual communities. This functional experience can not only help customers understand the product and solve the problems encountered in the process of product use, but also meet the sense of control of customers who actively participate in information sharing <sup>[6]</sup>. Once control-based self-efficacy is stimulated, the customer's sense of psychological ownership is easily improved. Entertainment experience is a relaxed and pleasant feeling for customers to participate in virtual brand communities, such as community interfaces, videos, music, pictures, and emoji. These most intuitive contents are indispensable factors to attract customers to participate in virtual brand communities. When customers feel that the entertainment atmosphere of the community is good, they will produce a friendly emotion, which will bring about a sense of belonging to cyberspace. However, once the demand for space belonging is met, customers' psychological desire for brand ownership will be stronger <sup>[7]</sup>. Interactive experience is the friendship and social support that customers obtain when communicating with other customers in the community. Interaction with people who share the common interests and hobbies can not only fully express themselves, but also construct themselves from the support of others and obtain certain social status, so as to have more influence in social interaction, and will be more recognized in the heart. When individuals produce such self-identity and self-worth cues, psychological ownership also arises. In addition, as customers' social motivation grows stronger, customer centrality in community social networks may increase, which will further lead to an increase in customer psychological ownership of brands. Therefore, this study proposes the following hypothesis:

**H1a** Customer information experience has positive influence on psychological ownership.

**H1b** Customer entertainment experience has positive influence on psychological ownership.

**H1c** Customer interaction experience has positive influence on psychological ownership.

#### **3.2 Customer experience and willingness to participate in value co-creation**

The willingness to participate in value co-creation is a subjective state that customers are willing to pay time and energy to actively interact with enterprises on products or services in virtual brand communities to achieve the value co-creation. Customers feel that the virtual brand community brings them rich social network experience,

which means that their various needs (such as cognitive, enjoyable, and social integration needs) are met to some extent. That is to say, taking care of the community and participating in interaction can bring them certain material or non-material interests, which is in line with the value expectation of customers' participation in the virtual brand community, conducive to improving their subjective possibility of participating in corporate value co-creation activities<sup>[8]</sup>. Therefore, this study proposes the following hypothesis:

**H2** Customer experience has a positive effect on willingness to participate in value co-creation.

Information acquisition is one of the main purposes for customers to participate in virtual community interaction. Strong information experience means that the quality of information in the community is high. A information exchange with brand and product as the topic can bring knowledge growth and substantive helping to customers, which is conducive to customer motivation to remain active in the community for a long time, and then show higher willingness to participate in co-creation activities such as product upgrading and replacement of enterprises to capture more useful information<sup>[9]</sup>. Entertainment is one of the most direct motivations for consumers to participate in social media. When customers browse the community attracted and infected by multimedia elements, they will feel physical and mental pleasure. Entertainment experience can enhance the curiosity and pleasure of customers to participate in community interaction. Driven by the spirit of exploration and proactive personality, customers are likely to have a strong willingness to accept and tolerate new things, so they are more willing to participate in product innovation activities advocated by enterprises. Interaction is the essence and soul of value co-creation, the stronger the sense of interactive experience is, the deeper the customer embeds in social networks, the more resources and interpersonal relationships accumulate. In order to gain more personal advantages in the future, customers are likely to invest more interest in corporate value co-creation<sup>[10]</sup>. Therefore, this study proposes the following hypothesis:

**H2a** Customer information experience has a positive impact on willingness to participate in value co-creation.

**H2b** Customer entertainment experience has a positive influence on the willingness to participate in value co-creation.

**H2c** Customer interaction experience has a positive impact on willingness to participate in value co-creation.

### **3.3 Customer psychological ownership and willingness to participate in value co-creation**

Customer psychological ownership reflects the highest form of relational connection between customers and the brand or product, connecting the most stable customers. When a customer feels that a brand or product belongs to himself or herself and becomes an extension of his or her self-concept, it tends to trigger two outcomes: First, to increase customer satisfaction and improve customers' evaluation of brand products. Second, customers are more concerned about the status of target results, resulting in responsibility for the results. Zhao et al.<sup>[11]</sup> believes that the expectation of virtual brand community members on their own behavior results is strongly related to their willingness to participate in co-creation, that is, the more optimistic customers' expectations of behavioral outcomes, the more willing they are to engage in value co-creation activities. Psychological ownership stimulates people's desire to protect the target. People feel responsible to take some measures to make these targets develop in a good way as they are expected, and hope that others also have this sense of responsibility to safeguard their common interests and reduce the possibility of failure. According to this logic, the responsibility consciousness of brand or product inspired by customer psychological ownership makes customers more willing to contribute their time and energy, knowledge resources and other cooperation with enterprises in value creation, so as to maintain their expectation of brand or product. Therefore, this study proposes the following hypothesis:

**H3** Positive correlation between psychological ownership and willingness to participate in value co-creation.

### **3.4 The mediating role of customer psychological ownership**

S-O-R theory believes that the external environment stimulation will lead to changes in the body's state, and changes in the internal state will bring individual behavioral responses. Virtual brand community is an environment for customers to participate in interaction, and its release, transmission, sharing and use of information make customers have a unique information experience. Its beautiful interface, interesting content,

vivid music video, so that customers have a wonderful entertainment experience. Its various forms of interaction and participants make customers have an unforgettable interactive experience. These external experiences are conducive to strengthening customers' understanding and control of the brand and product, enhancing their emotional connection with the community, and promoting the identification of self-concept in the whole interaction process. All these may trigger customers' sense of psychological ownership, that is, the brand or product "as their own". However, customers with this psychological cognition and emotional state are easy to actively evaluate brands or products, and also easy to form a responsibility from the owner, so they are more willing to participate in enterprise value co-creation practice to achieve common goals. Therefore, this study proposes the following hypothesis:

**H4** Customer psychological ownership mediates the relationship between customer experience and willingness to participate in value co-creation.

**H4a** Customer psychological ownership mediates the relationship between information experience and willingness to participate in value co-creation.

**H4b** Customer psychological ownership mediates the relationship between entertainment experience and willingness to participate in value co-creation.

**H4c** Customer psychological ownership mediates the relationship between interactive experience and willingness to participate in value co-creation.

### **3.5 Customers' willingness to participate in value co-creation and participation in value co-creation behavior**

Customer participation in value co-creation is the actual behavior of customer resource interaction and integration in the process of value co-creation. In this study, the main content is to participate in the collection, evaluation and marketing promotion of new products. However, behavioral tendencies are not equal to the behavior itself, and will is the forerunner of behavior. The transformation of "willingness-behavior" is reflected in the technology acceptance model and the planned behavior model and has been widely confirmed. Similarly, whether the virtual brand community customer participation in co-creation behavior occurs depends on the level of customer participation willingness. Higher willingness indicates that customers are more likely to implement a certain behavior at a certain time. Then when enterprises publish activities related to new product development in communities at certain times, customers with higher willingness to participate in co-creation are more likely to actively contribute their creativity and experience, and assist enterprises to push new products to the forefront of public opinion<sup>[12]</sup>. Therefore, this study proposes the following hypothesis:

**H5** Customers' willingness to participate in value co-creation is positively correlated with their behavior.

### **3.6 The moderating role of reciprocity norms**

Virtual communities often lack the clear structure, institutional constraints and incentive mechanisms of traditional organizations, coupled with the instability and ambiguity of community members, which makes the behavior of individuals in the community at a certain opportunistic risk. At this time, enterprises are more required to assume management responsibilities and establish appropriate interaction rules in the community to ensure that the exchange of community members is not unbalanced. The more perfect the community reciprocity system, the more fair the communication between customers and enterprises, customers and customers<sup>[13]</sup>, customers respond positively to the posts of enterprises and other members and contribute their knowledge. According to the social exchange theory, these behaviors should receive equal returns in the near future. These returns may be similar helping behaviors, or material rewards and spiritual support, which can motivate customers with certain willingness to participate in co-creation. In addition, based on such reciprocity, customers will also have a higher level of satisfaction and trust in the whole community, which is conducive to promoting the transformation of the real value co-creation behavior of willing customers. Therefore, this study proposes the following hypothesis:

**H6** Reciprocity norms positively affect the relationship between customer willingness to participate in value co-creation and co-creation behavior. The higher the reciprocity norms are, the stronger the positive relationship

between “willingness” and “behavior”.

### 3.7 Study model

Based on the above research hypothesis, we can construct the study model as shown in Figure 1.

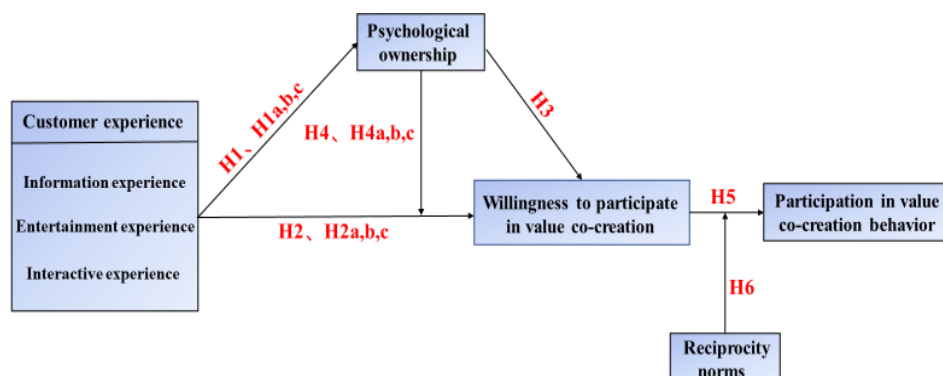


Figure 1. Study model

## 4. STUDY METHOD

### 4.1 Data collection

The data of this study are collected by questionnaire survey. The respondents are customers of Meizu Community, Weiphone Community, OPPO Color OS, Xiaomi Community and Huawei Pollen Club Community. Refer to Li <sup>[14]</sup>, Peng and Shen <sup>[15]</sup> two ways of issuing questionnaires, one is to register as a community member, by posting in the popularity plate to show their research purpose, and attach a questionnaire link to ask other members to help fill in, but also contact the publishers and service personnel, ask them to help spread; second, recommend sampling, that is, in relatives and friends, colleagues, classmates ask people with relevant experience, through them to recommend similar groups they know, and help online forwarding questionnaire. A total of 282 questionnaires and 245 valid questionnaires were collected, and the effective recovery rate was 86.88 %.

### 4.2 Measurement of variables

The variable measurement scale was designed based on the content and purpose of this study, the research object and the opinions of relevant experts. Customer experience is divided into three dimensions: information experience, entertainment experience and interactive experience. Referring to Sha et al. <sup>[5]</sup>, three items are set up to measure the scale of virtual brand community development in China. Psychological ownership variable is based on the scale of Pierce et al. <sup>[3]</sup>, combined with the views of Fuchs et al. <sup>[16]</sup> by feeling that the target object belongs to “mine”, having a sense of intimacy with the target object and feeling that others have the target object to measure four items. The measurement of participatory value co-creation behavior is mainly based on the scale developed by Zwass <sup>[17]</sup> and Li <sup>[14]</sup>, and three kinds of target value co-creation behaviors initiated by customer participation enterprises, namely new product development, evaluation and promotion, are selected in this paper. The variable of willingness to participate in value co-creation refers to Yi and Gong <sup>[18]</sup> on the amount of value co-creation behavior Table, designed with “I would like to.....” (the ellipsis refers to the specific behavior of customers participating in co-creation matching this study). Reciprocity norms refer to Pai and Tsai <sup>[19]</sup> for online brand community reciprocity norms research, through others reward me and I reward others two aspects of a total of four items to measure. A total of 23 items of all research variables are measured by the Likert 5 scale, namely, very disagree, disagree, uncertain, agree and very agree.

## 5. DATA ANALYSIS

### 5.1 Demographical characteristics of samples

In the gender of the respondents, males accounted for 61.63%, and female accounted for 38.37%, so the proportion of men was significantly higher. According to the age distribution, the proportion of young people

aged 18-25 (45.31%) and 26-30 (21.63%) was more than half, and the proportion decreased gradually. In terms of educational level, undergraduate (37.96%) and master's degree (33.47%) were the majority, followed by college (12.65%) and high school and below (11.02%). In the occupations of the respondents, the occupations except students (57.14%) are evenly distributed. In the most commonly used virtual brand community, Huawei pollen club (41.63%) is the highest, followed by Weiphone community (25.71%). The survey found that more than half of the respondents (64.49%) have participated in the target virtual brand community for six months to two years, and the frequency of participation is mainly concentrated in 3-5 days (29.80 %) or once a week (24.49%).

## 5.2 Reliability and validity analysis

The reliability of the scale was tested by Cronbach's  $\alpha$  reliability coefficient method. The results showed that the overall Cronbach's  $\alpha$  coefficient of the scale was 0.888, and the Cronbach's  $\alpha$  coefficients of each variable were between 0.841 and 0.9, which indicated that the scale had good construct reliability. Exploratory factor analysis results showed that the KMO value was 0.859, Bartlett's sphericity test approximate chi-square was 3246.082, and the significant level was 0.000 (very significant). The above results showed that factor analysis of the scale was appropriate. SPSS22.0 was used for principal component analysis, A total of seven factors were extracted and the total interpretation rate of cumulative variance reached 77.638%. The standardized load of each observation item was greater than 0.742 ( $>0.5$ ), and all the observation items had only one factor load, indicating that the characteristic validity passed the test.

Since the measurement of research variables in this study is based on existing mature scales at home and abroad, and make appropriate adjustments combined with the research situation, so it has good content validity. This study also tested the convergent validity and discriminant validity of variables. Confirmatory factor analysis results showed that the factor load of 23 measurement items was more than 0.7, the AVE of 7 research variables was more than 0.6, and the CR was more than 0.8, indicating that the measurement model had good convergence validity. It can be seen from Table 1 that the correlation coefficients of each variable are significantly different from 1, and the correlation coefficients are less than the square root of AVE both horizontally and vertically, so the discriminant validity is verified.

## 5.3 Structural equation modeling analysis

### 5.3.1 Initial model fitting and path analysis

The absolute fitting effect index, relative fitting effect index and alternative index are used to determine the fitting degree of the initial structural equation model. The fitting results are shown in table 2. From each index of the initial overall model fitting evaluation, each index has reached a good fitting standard, so the model is effective.

**Table 1. Correlation coefficient matrix**

Variable	1	2	3	4	5	6	7
1. Reciprocity norms	0.834						
2. Participation in value co-creation behavior	0.421***	0.800					
3. Willingness to participate in value co-creation	0.482***	0.448***	0.804				
4. Psychological ownership	0.214**	0.196*	0.537***	0.814			
5. Interaction experience	0.070*	0.102*	0.302***	0.491***	0.817		
6. Information experience	0.218**	0.142*	0.556***	0.512***	0.349***	0.817	
7. Entertainment experience	0.053*	0.154*	0.426***	0.371***	0.335***	0.254**	0.834

Note: \* represents  $P < 0.05$ , \*\* represents  $P < 0.01$ , \*\*\* represents  $P < 0.001$ .



**Table 2. Fitting results of initial structural equation model**

	Adaptation indicators	Adaptation indicators	Initial fitting index of model	Fitting result
Absolute fitting index	CMIN/DF	1<CMIN/DF<3	1.084	Coincidence
	GFI	>0.9	0.941	Coincidence
	AGFI	>0.9	0.920	Coincidence
	RMSEA	<0.08	0.019	Coincidence
Relative fitting index	NFI	>0.9	0.942	Coincidence
	IFI	>0.9	0.995	Coincidence
	RFI	>0.9	0.929	Coincidence
	TLI	>0.9	0.994	Coincidence
	CFI	>0.9	0.995	Coincidence
Alternative index	PNFI	>0.5	0.776	Coincidence
	PGFI	>0.5	0.821	Coincidence

The maximum likelihood estimation method is used to estimate the parameters of the model, and C. R. (critical ratio) is used to conduct the explicitness test. Table 3 shows the path analysis results of the initial structural equation model. It can be seen that except the path of the influence of interactive experience on the willingness to participate in value co-creation is not obvious, its path passes the test of obviousness. Information experience, entertainment experience and interactive experience, the three dimensions of experience had a significant positive effect on psychological ownership, assuming that H1a, H1b, H1c and H1 were supported. The effects of information experience and entertainment experience on participation intention were 0.356 ( $P<0.001$ ) and 0.243 ( $P<0.001$ ). Both of them improve the willingness of customers to participate in value co-creation. It is assumed that H2a and H2b are valid. Interactive experience had no significant effect on willingness to participate ( $P=0.548$ ), assuming that H2c was not passed and H2 partially supported. The path coefficient between psychological ownership and willingness to participate in value co-creation is 0.283 ( $P<0.001$ ), indicating that there is a significant positive impact between the two, and H3 is supported. The path coefficient of willingness to participate in value co-creation to participate in value co-creation behavior was 0.432 ( $P<0.001$ ), indicating that the willingness of virtual brand community customers to participate in value co-creation positively affects their participation behavior, and H5 is supported.

### 5.3.2 Modification of structural equation model

According to the path analysis results of the initial structural equation model, the model needs to be corrected. The unobvious path is deleted from the structural equation model, and the model is fitted and tested again by AMOS24.0. Compared with the initial model, the overall fitness of the modified structural equation model is slightly improved.

After adjusting the structural equation model, the results of path coefficient analysis based on table 4 show that they are all obvious. The change is partly reflected in the slightly increased path coefficient of information experience to psychological ownership (0.361,  $P<0.001$ ). The path coefficient of information experience, entertainment experience and psychological ownership to the willingness to participate in value co-creation (0.351,  $P<0.001$ ; 0.235,  $P<0.00$ ; 0.265,  $P<0.001$ ) decreased.

**Table 3. Path analysis results of initial structural equation model**

Variable relationship		Estimate	S.E.	C.R.	P	Verifie results	
Psychological ownership	<---	Information experience	0.360	0.059	5.191	***	Found
Psychological ownership	<---	Entertainment experience	0.177	0.061	2.676	0.007	Found
Psychological ownership	<---	Interaction experience	0.306	0.063	4.328	***	Found
Willingness to participate in value co-creation	<---	Information experience	0.356	0.065	4.565	***	Found

Variable relationship			Estimate	S.E.	C.R.	P	Verifie results
Willingness to participate in value co-creation	<---	Entertainment experience	0.243	0.063	3.476	***	Found
Willingness to participate in value co-creation	<---	Interaction experience	-0.046	0.066	-0.601	0.548	False
Willingness to participate in value co-creation	<---	Psychological ownership	0.283	0.084	3.354	***	Found
Participation in value co-creation behavior	<---	Willingness to participate in value co-creation	0.432	0.079	5.862	***	Found

Note: \*\*\* represents  $P < 0.001$ .

**Table 4. Path Analysis Results of Modified Structural Equation Mode**

Variable relationship			Estimate	S.E.	C.R.	P	Verified results
Psychological ownership	<---	Information experience	0.361	0.059	5.209	***	Found
Psychological ownership	<---	Entertainment experience	0.177	0.061	2.684	0.007	Found
Psychological ownership	<---	Interaction experience	0.306	0.063	4.327	***	Found
Willingness to participate in value co-creation	<---	Information experience	0.351	0.065	4.537	***	Found
Willingness to participate in value co-creation	<---	Entertainment experience	0.235	0.062	3.439	***	Found
Willingness to participate in value co-creation	<---	Interaction experience	0.265	0.077	3.39	***	Found
Willingness to participate in value co-creation	<---	Psychological ownership	0.432	0.079	5.858	***	Found
Participation in value co-creation behavior	<---	Willingness to participate in value co-creation	0.361	0.059	5.209	***	Found

Note: \*\*\* represents  $P < 0.001$ .

#### 5.4 Mediating effect analysis

Bootstrap method is used to test the mediating effect of psychological ownership. As shown in Table 5, the deviation correction interval of the 95% confidence level corresponding to the indirect effect of information experience, entertainment experience and interactive experience on the willingness to participate in value co-creation is located on the right side of the zero point, indicating that the explicit psychological ownership mediates the influence of various dimensions of customer experience on the willingness to participate in value co-creation. Therefore, hypotheses H4a, H4b, H4c and H4 are supported.

#### 5.5 Moderating effect analysis

Hierarchical regression analysis is used to test the moderating effect of reciprocal norms. According to the Table 6, the coefficient of the interaction term between the willingness to participate in value co-creation and the reciprocal norm is 0.236, which is significantly indigenous at the confidence level of 0.01. The change of the R side also passes the significant indigenous test, indicating that the reciprocal norm has a significant moderating effect between the willingness to participate in value co-creation and the behavior of participating in value co-creation. In order to present the regulatory mechanism of reciprocal norms more clearly, this study draws the regulatory effect diagram shown in Figure 2. According to the slope of the regression line, it can be seen that under different degrees of reciprocity norms, the willingness to participate in value co-creation has a positive impact on the behavior of participating in value co-creation, and with the increase of reciprocity norms, the willingness to participate in value co-creation has a greater impact on the behavior of participating in value co-creation. Therefore, reciprocal norms play a positive moderating role in the positive relationship between these two variables, and H6 is supported.

**Table 5. The mediating effect test results of psychological ownership**

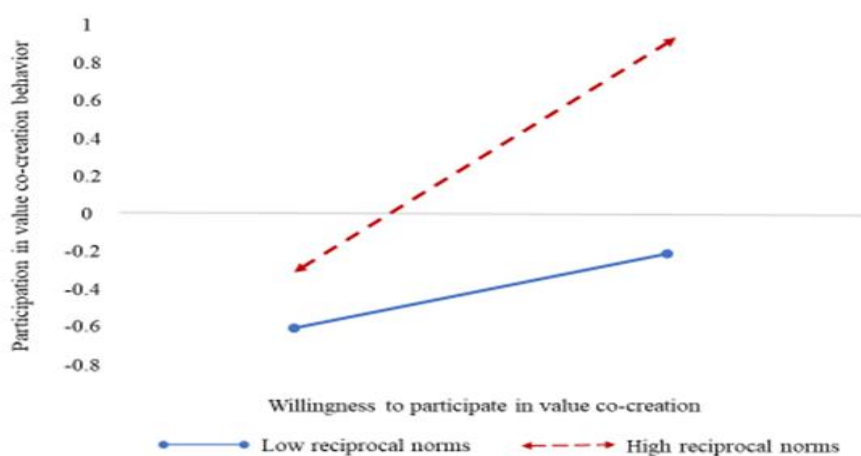
Hypothesis relationship	Direct effect	P	95% confidence interval		Indirect effect	P	95% confidence interval	
			Lower limit	Upper limit			Lower limit	Upper limit
Willingness to participate in value co-creation <- Information experience	0.351	**	0.159	0.457	0.096	*	0.030	0.162
Willingness to participate in value co-creation <- Entertainment experience	0.235	**	0.094	0.341	0.047	*	0.011	0.103
Willingness to participate in value co-creation <- Interaction experience	0.000	...	0.000	0.000	0.081	*	0.020	0.150

Note: \* represents  $P < 0.05$ , \*\* represents  $P < 0.01$ .

**Table 6. Results of moderating effect analysis**

Variable	Participation in value co-creation behavior	
	Model 1	Model 2
Willingness to participate in value co-creation	.268***	.358***
Reciprocity norms	.265***	.341***
Willingness to participate in value co-creation * Reciprocity norms		.236**
R <sup>2</sup>	.202	.239
$\Delta R^2$	.196	.229
$\Delta F$	30.697***	11.519**

Note: \*\* represents  $P < 0.01$ , \*\*\* represents  $P < 0.001$ .

**Figure 2. Moderating effect of reciprocal norms**

## 6. CONCLUSIONS AND FUTURE RESEARCH

### 6.1 Study conclusions

This study explores the evolution mechanism of customer experience to participate in value co-creation behavior, and selects the customers of virtual mobile phone brand community as the research object. Through the empirical analysis of the path of customer experience in virtual brand community affecting participation in value co-creation behavior, and the test of the mediating effect of psychological ownership and the moderating effect of reciprocal norms, the following conclusions are drawn: Virtual brand community customer experience significantly positive impact on psychological ownership; the stronger the customer information experience and

entertainment experience are, the higher the willingness of customers to participate in value co-creation is, and psychological ownership partially mediates the relationship between the two. The influence of interactive experience on the willingness to participate in value co-creation is not obvious, but it can promote the willingness to participate in value co-creation through the complete intermediary role of psychological ownership. In addition, the higher the reciprocal norms of virtual brand community, the stronger the positive relationship between the willingness to participate in value co-creation and the behavior of participating in value co-creation.

## 6.2 Theoretical contributions

This study investigates the influence mechanism of customer experience in virtual brand communities on customers' participation in value co-creation behavior, which not only explores the important internal and external links affecting the relationship between the two, but also better explains the complex process of how the two evolve, making this influence mechanism more perfect and reasonable, enriching the results of studying value co-creation in virtual brand communities from the perspective of enterprise management strategy, and providing some theoretical complement to the existing studies. It also provides some theoretical supplements to the existing studies. At the same time, psychological ownership theory is used to dig deeper into the psychological trajectory of good customer experiences that stimulate their participation in value co-creation behaviors, opening the black box of customer participation in value co-creation. The mediating factors such as customer satisfaction, relationship quality, and benefit perceptions examined in previous studies do not include obvious individual initiative, self-efficacy, sense of competence, and close personal emotions, while psychological ownership integrates these connotations and fully reflects the active participation of customers as value-creating partners, which is more compatible with this study. Therefore, psychological ownership provides a new theoretical perspective for research on the relationship between customer experience and participation in value co-creation behavior.

## 6.3 Limitations and future research directions

This study divides the customer experience of the virtual brand community into three dimensions, namely, information experience, entertainment experience and interactive experience. Factors such as thinking experience and behavioral experience are not included in the research model for analysis, which can be improved in future research. Similarly, for the two influencing variables of psychological ownership and reciprocal norms, this study only studies them as a single dimension. In the future, it is necessary to continuously enrich its theoretical knowledge and make the research model more perfect and reasonable based on more detailed variable connotations.

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