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The Influence of Customer Interaction on Participation in Value Co-Creation: Evidence from Virtual Communities in China

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Abstract. This study aims to investigate the influence of customer interaction on customer participation in value co-creation. Quantitative approach is employed to gather data via online questionnaires from 502 Chinese registered members of various virtual brand communities, including Huawei Pollen Club, Xiaomi Community, Meizu Community and OnePlus Community. SEM is employed to analyze data of the research model. The results confirm that customer's product engagement positively affect customer experience value including functional experience value, emotional experience value and social experience value three dimensions while interpersonal interaction significantly positive influence only emotional experience value and social experience value. Besides, emotional experience value and social experience value were found to have a significant positive effect on customer participation in value co-creation. Furthermore, our results determine that experience value plays a mediating effect in the influence of customer interaction on participating value co-creation. The findings fill in the gaps of previous relevant studies and enriches the research on the factors that drive customer participation in value co-creation. It also provides managerial insights for virtual communities to improve their service about customer participation and bring more business value.

Keywords. customer experience value, customer interaction, customer participation, value co-creation, virtual communities

1. Introduction

Virtual communities have become a place for companies to attract customers to participate in product innovation in recent years. In virtual communities, customers not only can interact with each other to meet their own needs for information, emotions and other content, but also can participate in the company's product innovation to achieve value co-creation (Nambisan & Baron, 2009). Especially those virtual brand communities centered on corporate brand products (Muniz, & O' Guinn, 2001), their members have greater interest and rich knowledge in brands and products, which are more conducive to the formation of innovative ideas in interaction (Fuller, Matzler & Hoppe, 2008), and customers also engage in value co-creation through the use of interactive communities (Schau, Muniz, & Arnould, 2009). The practices of companies such as Dell, Apple, and Xiaomi have shown that customer participation in value co-creation could enhance the innovation capabilities of enterprises,

improve customer brand loyalty, and facilitate the establishment of enterprises' competitive advantages (Xu & Mei, 2014).

The effect of value co-creation by enterprises through virtual communities has also piqued the interest of academics, who have looked at the forces that drive it from a variety of perspectives. From the perspective of customer needs, Nambisan et al. (2009) used the theory of satisfaction with usage to confirm that customers' cognitive benefits, personal integration benefits, social integration benefits, and entertainment benefits are the driving factors for customers to participate in value co-creation. Fuller et al. (2008) regarded the virtual brand community as an essential resource for corporate innovation, and they found that customer skills, creativity, brand knowledge, etc. positively impact customer participation in corporate product innovation. Meanwhile, scholars also revealed that the relationship between community members and related content of the brand community, such as the sense of responsibility to the community, the sense of partnership with the company (Nambisan & Baron, 2010), and the trust of the brand (Fuller et al., 2008) will also positively affect their participation in corporate product innovation activities.

Although scholars have conducted extensive research on customer participation in virtual community value co-creation, there are still some shortcomings. First of all, scholars ignore the effect of customer experience value in virtual communities on their participation in value co-creation. Customer experience value is the interactive and relative experience of customers. Existing research on virtual brand communities has found that customer experience value positively impacts members' behavioral inclination (Jin, 2007), and thus may also have a positive effect on participating in value co-creation. Additionally, there is also a scarcity of studies on the importance co-creation process when it comes to consumer engagement. Interaction is a key content of the virtual brand community (Zhu, Dholakia, Chen, & Algesheimer, 2012) and a crucial means for customers to create and obtain value (Li, & Ma, 2013). Parker and Ward (2000) has confirmed that customer interaction will have a positive impact on customers and enterprises. However, less research study customer interaction in the virtual environment. It is still a "black box" that the process of customers interacting with others in virtual communities until they finally participate in value co-creation. From current research status, this study constructs a theoretical model of customer interaction, experiential value and customer participation value co-creation in the virtual brand community environment, and tries to explore the following research questions: (1) How does customer engagement affect the importance of the customer experience? (2) How can the importance of a customer's experience affect their willingness to participate in value co-creation? (3) Does the importance of the consumer experience mediate the impact of customer interaction on customer involvement in value co-creation?

2. Literature Review

2.1 Value Co-creation

Value co-creation refers to the integration of the resources provided by customers and enterprises in the interaction, and the ultimate realization of value creation (Cova, Pace & Skalen, 2015). This concept was originally just a description of the customer's participation in the production of value in the field of production, so it is called co-creation. Later, the concept of creating value through customer experience was extended to the field of consumption, emphasizing customer experience and its significance (Pralhalad & Ramaswamy, 2013; Prahalad & Ramaswamy, 2004). In the virtual community, customer participation in enterprise product innovation is the value co-creation in the production stage. This kind of value co-creation is initiated by enterprises, and the value co-creation between B2C (Zwass, 2010) is

mainly manifested as customers' participation in the development of new products of the enterprise, including customers' providing new product creation, design and promotion activities for the enterprise (Li, Jin & Bu, 2014). Existing researches on virtual communities pointed out that customers' participation in value co-creation is driven by customers' cognition, personal integration and other interests (Nambisan & Baron, 2009), as well as influenced by their own knowledge, skills and creativity (Fuller et al., 2008). At the same time, the relationship between the customer and the community, the company (Nambisan & Baron, 2010) and the brand (Fuller et al., 2008) will also play a positive role in promoting its participation in value co-creation.

2.2 Customer-to-customer Interaction

In the virtual community, the interaction between customers refers to the communication and exchange between individuals (Adjei, Noble & Noble, 2010), which is an important content of the virtual brand community (Zhu et al., 2012) and also a considerable means for customers to create and obtain value (Li, & Ma, 2013). Currently, the dimensions of the interaction between customers in the virtual community are divided into different dimensions. Adjei et al. (2010) set the interaction between customers as a single dimensional variable. Massey and Levy (1999) believed that the interaction between customers in the virtual environment should be divided into two dimensions: product engagement and interpersonal interaction. It was categorized into product interaction, interpersonal interaction, and cognitive interaction by Nambisan et al. (2009). At the same time, consumer attitudes, product creativity, and behaviors can also be influenced by customer engagement in the simulated brand environment. Prior studies identified customers' interaction could reduce their uncertainty about product in a simulated brand environment, and then positively influence on customers' purchasing behavior (Adjei et al., 2010). Fuller et al. (2008) mentioned that customer interaction could realize the integration of resources and facilitate product innovation. However, Li and Ma (2013) found that the interaction between customers can positively affect the community satisfaction of customers.

2.3 Customer Experience Value and Hierarchical Experience Model

Customer experience value is the experience related to customer's own preference, which is interactive and relative. Customer experience value is not exclusive to customers, but could be realized and co-created by interacting with others (Tynan & Mckechine, 2009). Some researchers believe that there is a close relationship between customer experience and different levels of needs of customers, and incorporate the hierarchy of needs theory into the study of experience value, establishing the corresponding relationship between different dimensions of experience value and different experience needs from a vertical perspective (Zhang & You, 2009). Soutar and Sweeney (2001) and Fan and Li (2006) divided the customer experience value into functional experience value, emotional experience value and social experience value these three dimensions according to the hierarchy of needs theory, and classified the five levels of customer needs into three dimensions of experience value. Gentile, Spiller, and Noci (2007) further detailed the relationship between customer needs at various levels and experiential value. Zhang and You (2009) proposed a hierarchical experiential value structural dimension model (Hierarchical Experience Model for short) on this basis.

3. Research Model Development and Hypotheses

3.1 Variables and The Construction of Research Models

Virtual brand community is centered on enterprise brand products (Muniz, & O' Guinn, 2001), and customers often interact around this central content to achieve the purpose of obtaining or creating value (Nambisan & Baron, 2009). Besides, as a type of virtual community, virtual brand community also has the character of interpersonal interaction among customers in virtual community (Li, & Ma, 2013; Massey & Levy, 1999). In other words, the interaction between customers is realized through product content and mutual communication (Wu & Fang, 2010). Therefore, this study divides the interaction between customers into two dimensions: product engagement and interpersonal interaction. This is consistent with the dimension division of customer interaction in virtual community proposed by Massey and Levy (1999), while the dimension of cognitive interaction is missing in the three-dimensional division of customer interaction proposed by Nambisan et al. (2009) in virtual brand community. The reason is that as a developing country, the privacy of individuals on the Internet in China is not effectively protected, and the cognitive interaction between customers is still not widespread (Li, & Ma, 2013). Product interaction refers to the interaction between customers with brand product-related information (such as product technology, usage, brand market, etc.) as the communication content to achieve the purpose of obtaining or sharing relevant information (Nambisan & Baron, 2009). Interpersonal interaction refers to the exchange and communication between customers for the purpose of establishing relationships and emotions (Li, & Ma, 2013).

The needs of customers in some industries (such as tourism, catering services, etc.) are hierarchical, so scholars establish the corresponding relationship between different customer needs and different experience values from the vertical, so as to realize the research on the level of experience value based on customer needs (Soutar & Sweeney, 2001; Fan & Li, 2006). Recent research showed that the needs of customers in virtual brand communities are also hierarchical. Functional needs, self-expression needs, social needs, esteem needs and self-actualization needs are the low to high needs of community members in the virtual brand community (Yan, Wang & Liu, 2015). Therefore, based on the Hierarchical Experience Model and the five levels of customer needs in the virtual brand community, this study draws on the division of customer experience value from Soutar and Sweeney (2001), and divides the customer experience value in the virtual brand community into functional experience value and emotional experience value and social experience value these three aspects. The functional experience value of customers corresponds to the satisfaction of their functional needs, including the acquisition of enterprise product information and experience as well as efficiency or convenience (Wang & Fesenmaier, 2004). Emotional experience value is the customer's self-expression and the satisfaction of social needs, which is mainly reflected in the trust between members and the recognition of the community. The value of social experience is the satisfaction of customers' need for esteem and self-actualization, which is manifested in the improvement of reputation and personal sense of achievement in the community.

Interaction is an important content of virtual brand communities. According to interaction theory, interaction will have an impact on the experience value of individuals (Collin, 2004; Wang & Wan, 2012). At the same time, experience value will also affect customer behavior (Adjei et al., 2010). Therefore, this research uses the virtual brand community as the research background to establish a conceptual framework of customer interaction, experience value, and customer participation in corporate product innovation behavior, to explore the effect of customer interaction on experience value, experience value on customer participation in value co-creation and the effect of customer interaction mediated by experience value on customer participation in value co-creation.

3.2 Hypotheses Development

3.2.1 The Impact of Customer Interaction on Experience Value

1) Product Engagement Between Customers Enhances Customer Experience Value

In the virtual brand community, customers often interact with the product knowledge, experience and other relevant content. The more frequent such interaction is, the greater the opportunity for customers to acquire product knowledge (Hertel, Niedner, & Hermann, 2003) and customers could better understand the product and more effectively use the product (Nambisan & Baron, 2009), so as to gain more value of customer functional experience. Around the same time, as consumers' product engagement become more in-depth, their comprehension of product-related contents becomes more in-depth (Algesheimer, Dholakia & Herrmann, 2005), and this shared understanding is a central factor in customers forming a sense of relationship or social identity. Furthermore, product engagement encourages consumers to share their expertise. Customers who gain expertise will be able to complete those tasks and will become more competent as a result (Kohler, Rohm, Ruyter, & Wetzels, 2011). Sharing product information offers a forum for consumers on the knowledge-sharing side to demonstrate their own skills, boosting the sharers' trust and sense of self-competence (Hsu, Ju, Yen & Chang, 2007). Therefore, the following hypotheses are proposed:

H1a: Product engagement has a significant positive impact on functional experience value;

H1b: Product engagement has a significant positive impact on emotional experience value.

H1c: Product engagement has a significant positive impact on social experience value.

2) The Interpersonal Interaction Between Customers Enhances the Experience Value of Customers

In the virtual brand community, customers interact with each other as well as the product content. In terms of consumer product awareness acquisition, interpersonal interaction among customers will draw customers' attention to and emphasis on product-related information, encouraging active learning. And the improvement of the interaction level between customers will also enhance the efficiency of learning activities. The reliability of the customer's practical experience would increase as a result of this. Customers' subjective experience satisfaction can be improved by interpersonal interaction, which could help them feel that other customers really appreciate their unique challenges and encourage shared empathy and social identity (Nambisan & Baron, 2009). Customers could articulate and show themselves as they interact with other members, which helps them boost their self-image and position in the group (Lim, Yeow & Yuen, 2010). As a result, the following hypotheses are proposed:

H2a: Interpersonal interaction has a significant positive impact on functional experience value;

H2b: Interpersonal interaction has a significant positive impact on emotional experience value.

H2c: Interpersonal interaction has a significant positive impact on social experience value.

3.2.2 The Influence of Experiential Value on Customer Participation in Value Co-Creation

The increase of customers' functional experience value will have a positive impact on their participation in value co-creation. Interaction provides customers with more functional

experience benefit, as well as increased awareness and skills for brand products. According to information management research, if a group member believes his or her knowledge is important and beneficial, he or she will be eager to share it with others (Fuller et al., 2008). Wasko and Faraj (2005) also mentioned that customers who believe their information is inadequate are often less likely to share it with others or contribute to the culture. As a result, as consumer satisfaction rises, they will be more able to exchange information and contribute to the community, and therefore more likely to engage in the value co-creation of the virtual brand community. Hence, the following hypothesis is proposed:

H3: Functional experience value has a significant positive impact on customer participation in value co-creation.

The emotional experience value of customers in virtual brand community is the satisfaction of identification, belonging, connection and other related needs. Among them, customer community identity will increase the closeness between customers and brand community. The higher the degree of customer community identity, the more customers will believe that the community can represent their own self-esteem and image. Previous studies have found that community identity has a positive impact on customers' participation in brand community activities, which is not only reflected in the information exchange and question-answering activities between customers, but also reflected in the product creation and product testing activities of customers to enterprises. Nambisan (2002) believed that customers' identification with virtual communities was an important factor driving their participation in the development of new products of enterprises, while Fuller et al. (2008) proved that community identification had a positive impact on customers' participation in product innovation. Hence, the following hypothesis is proposed:

H4: Emotional experience value has a significant positive impact on customer participation in value co-creation.

In the virtual brand community, customers enhance their social experience value through interactive activities such as knowledge sharing, so as to meet customers' needs such as self-esteem, which will enable customers to have a confident perception and feel that they have value, power, ability and position in the world (Yan et al., 2015). Lin, Hung and Chen (2009) found in their research on virtual brand communities that the sense of self-competence experienced by community members is the confident perception of their own abilities, which will promote the positive attitude and contribution of community members to the community. In virtual communities, participating in enterprise product innovation is an important part of community contribution (Nambisan & Baron, 2010). Therefore, customers are likely to participate in product innovation activities under the influence of self-efficacy. Based on this, the following hypothesis is proposed:

H5: Social experience value has a significant positive impact on customer participation in value co-creation.

3.2.3 The Mediating Role of Experiential Value

The interaction between customers is not only an integral part of the virtual brand community, but also a key way to add value to customers (Li, & Ma, 2013). As the virtual brand community is centered on the brand products, customers often interact with the related content of the products. Such interaction can not only realize the sharing of knowledge, so that customers can experience the functional value of solving practical problems, but also enhance the relationship between each other and the recognition of the community, and experience the

emotional value. At the same time, answering other customers' questions will boost their peer standing and self-esteem, giving them a sense of social value. On the other hand, the interpersonal interaction between customers will also have a positive impact on customer value experience. Emotional communication between customers not only accelerates the efficiency of product content communication, but also positively influence the emotional relationship between customers and other customers and communities. Moreover, in interpersonal communication with other customers, customers themselves are also conducive to self-expression, so that they gain social experience value. Customers' participation in value co-creation activity is positively impacted as they perceive improved value in the virtual brand environment. To be specific, the function of customer experience value increase will let customers think they have more knowledge, and emotional experience value enhancement means that customer has more community identity, social experience value of ascension, make them have more confidence to participate in community activities, and all of these will promote customers' participation in the value co-creation of the virtual brand community. As a result, the following hypotheses are proposed:

H6a: Functional experience value plays a mediating role in the influence of product engagement on customer participation in value co-creation;

H6b: Emotional experience value plays a mediating role in the influence of product engagement on customer participation in value co-creation;

H6c: Social experience value plays a mediating role in the influence of product engagement on customer participation in value co-creation;

H7a: Functional experience value plays a mediating role in the influence of interpersonal interaction on customer participation in value co-creation.

H7b: Emotional experience value plays a mediating role in the influence of interpersonal interaction on customer participation in value co-creation.

H7c: Social experience value plays a mediating role in the influence of interpersonal interaction on customer participation in value co-creation.

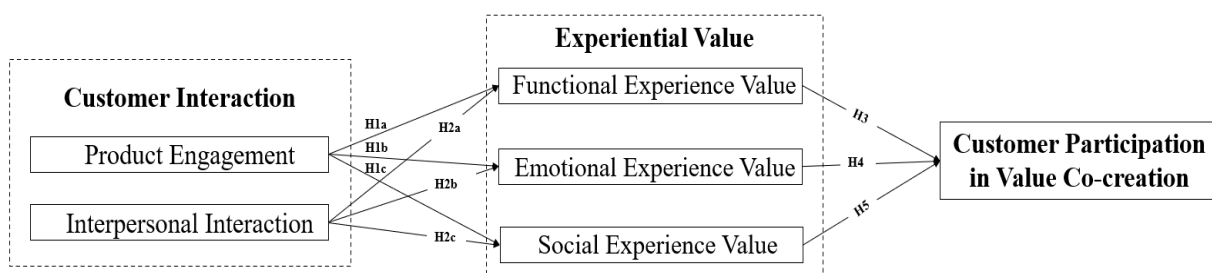


Figure 1. Conceptual Framework

4. Research Methodology

4.1 Sample and Data Collection

The population of this study were registered members of the different virtual brand community in China. The virtual brand community for data collection should meet the following conditions: first, the virtual brand community has a certain popularity in China. Second, it must have large number of members (a minimum of 500,000). Third, the members in community interact frequently, and the cumulative number of posts is large (a minimum of 3 million). Based on this, this research selects Huawei Pollen Club, Xiaomi Community, Meizu Community and OnePlus Community as research samples for data collection. The online questionnaire was distributed in two ways: virtual brand community distribution and snowball

sampling method. In order to ensure that the respondents are registered members of virtual community, the author conduct the survey by using text or member email in virtual community. For the snowball sampling method, the first step is to register members in the virtual brand community, and then the method of introducing members to their friends in the community is adopted to spread. The online questionnaires are collected through the short message and mailbox of the forum of virtual brand community. Since the size of the target population of this study is difficult to define in actual size, the formula of Cochran (1977) will be chosen for calculating the sample size used in the quantitative analysis. Hence, the actual sample size was 385. The authors collected data during December, 2020 to March, 2021. Among 537 collected questionnaires, 35 were invalid resulting in 502 usable questionnaires finally.

4.2 Measurement Scales

The measurement of constructs in this study adopts the measurement scales of relevant literature, such as virtual brand community, interaction between customers, experience value, participation in value co-creation, etc. All variables were measured using a five-point Likert scale, with 1 representing strongly disagree and 5 representing strongly agree. Table 1 shows the details of the measurement items in the research.

Table 1. Source of Measurement Item in Questionnaire

Variable	Measurement Items	Source
Product Engagement (PE)	I often communicate with other community members and get a lot of product information from them.	Nambisan & Baron (2009); Liu & Yang (2011)
	The information I get from the community help me a lot	
	I often share my product knowledge with others in the community.	
	I often provide information to other community members to help them solve problems and difficulties	
Interpersonal Interaction (II)	I often post in the community and get a timely response from other members	Preece (2001)
	I often participate in discussions about the topic of other community members, helping each other.	
	In the community, I meet a lot of people who are worth socializing with.	
	I often communicate with other community members to exchange feelings and build relationships	
Functional Experience Value (FEV)	Participating in the brand community helps me feel that the product was more usable.	Zwass (2010); Li et al. (2014)
	Participating in the brand community helps me find more convenient ways to use it.	
	Participating in the brand community enables me to learn more products knowledge and get more skills	
	Participating in the brand community has improved my product knowledge and skills.	
Emotional Experience Value (EEV)	Participating in the brand community makes me feel the warmth of the big family from other members.	Soutar & Sweeney (2001)
	Participating the brand community helps me to stop being lonely and bored.	
	It fits my social identity to be part of a brand community.	
	I feel a sense of belonging in this community.	
Social Experience Value (SEV)	Being in the brand community gives me more self-esteem	Soutar & Sweeney (2001)
	It gives me more status in this brand community.	
	Participating the brand community has helped me find meaning in my life.	
	I feel I have realized my value in this brand community.	

Customer Participation Value Co-creation (CPVC) in	I often participate in new product ideas solicitation activities initiated by enterprises or communities.	Yan et al. (2015)
	I often participate in new product design solicitations initiated by enterprises or communities.	
	I often participate in new product evaluation activities initiated by enterprises or communities.	
	I often participate in new product promotion activities initiated by enterprises or communities.	

5. Research Analysis and Results

5.1 Descriptive Analysis

Among the 502 respondents, the ratio of male to female was balanced. Among them, 269 were male, accounting for 53.59%, and 233 were female, accounting for 46.41%. Most of the respondents are young people between the ages of 19-35, with a bachelor's degree or below. Moreover, more than half of the respondents have been members of the virtual community for 1-3 years, accounting for 54.78% of the total, and more than 80% of the respondents log in to the community over 7 times per week. The detailed personal profile is shown in Table 2.

Table 2. Demographic Profile of the Study Respondents

Variable	Frequency	% (n=502)
Gender	Male	269 53.59%
	Female	233 46.41%
	Under 18	20 3.98%
Age (years old)	19-25	136 27.09%
	26-35	221 44.02%
	36-45	102 20.32%
	Above 46	23 4.58%
Your Education	High school or Below	73 14.54%
	Diploma	179 35.66%
	Bachelor's Degree	226 45.02%
	Master's Degree	22 4.38%
Weekly Login Frequency	Doctoral Degree	2 0.40%
	< 2 times	8 1.59%
	3-6 times	73 14.54%
	7-10 times	172 34.26%
How long have you been a member in this community?	> 10 times	249 49.60%
	< 6 months	67 13.35%
	6-month -1 year	98 19.52%
	1-2 years	112 22.31%
	2-3 years	163 32.47%
	3-4 years	36 7.17%
	> 4 years	26 5.18%

5.2 Reliability and Validity

“Assessing the degree of accuracy between different measures of a variable” is what reliability means (Hair et al., 2013, pp123). The reliability of the measurements was determined using Cronbach's alpha. According to Hair et al. (2013), the threshold standard for ensuring instrument reliability and accuracy was set at 0.7 Cronbach's alpha coefficient. In Table 3, Cronbach's alpha values for all constructs were greater than 0.7, which means each construct's reliability is acceptable. Validity is concerned with determining how well the measurements reflect the research concept (Hair et al., 2013). Convergent validity and discriminant validity is used to determine construct validity. Composite Reliability (CR), Factor Loadings, and Average Variance Extracted (AVE) were used to evaluate convergent validity. If the CR is 0.7 or higher, and the factor loadings and AVE values are all 0.5 or higher, the measurement model has strong convergence validity (Hair et al., 2013). All constructs met the criterion in Table 3, showing that the measurement model used in this analysis had good convergent validity. As for discrimination validity, the square root of each construct's AVE is compared to the correlations between the construct and all other constructs to determine discriminant validity (Fornell & Larcker, 1981). Table 4 shows that the square root of each construct's AVE value is greater than the squared correlations of this construct and every other construct. As a result, the discriminant validity has been established (Hair et al., 2013).

Table 3. Results of Validity and Reliability Analysis

Constructs	Indicators	Factor Loadings (>0.5)	AVE (>0.5)	CR (>0.7)	Cronbach's Alpha (>0.7)
Product Engagement (PE)	PE1	0.879	0.722	0.894	0.902
	PE2	0.836			
	PE3	0.843			
	PE4	0.805			
Interpersonal Interaction (II)	II1	0.801	0.703	0.901	0.931
	II2	0.785			
	II3	0.806			
	II4	0.822			
Functional Experience Value (FEV)	FEV1	0.831	0.765	0.913	0.946
	FEV2	0.827			
	FEV3	0.789			
	FEV4	0.764			
Emotional Experience Value (EEV)	EEV1	0.762	0.713	0.848	0.905
	EEV2	0.759			
	EEV3	0.743			
	EEV4	0.788			
Social Experience Value (SEV)	SEV1	0.839	0.796	0.876	0.893
	SEV2	0.841			
	SEV3	0.816			
	SEV4	0.827			
Customer Participation in Value Co-creation (CPVC)	CPVC1	0.823	0.684	0.918	0.953
	CPVC2	0.865			
	CPVC3	0.844			
	CPVC4	0.823			

Table 4. Discriminant Validity

Constructs	1	2	3	4	5	6
1. PE	0.851					
2. II	0.319	0.825				
3. FEV	0.308	0.187	0.847			

4. EEV	0.365	0.467	0.189	0.853		
5. SEV	0.418	0.256	0.261	0.367	0.869	
6. CPVC	0.457	0.336	0.284	0.521	0.481	0.876

5.3 Structural Equation Model Analysis (SEM)

This study employed structural equation modeling (SEM) and used the maximum likelihood estimation method to test the research model. Table 5 lists some fit indexes, recommended values, and real results of this study. The results showed that $\chi^2 / df = 1.024$, GFI = 0.941, AGFI= 0.923, CFI = 0.946, NFI = 0.958, RMSEA = 0.034, all of which satisfied the critical standard, indicating that this structural model had good fitting degree and could be used for path analysis.

Table 5. Indicators of Model's Goodness of Fit

Fit Index	χ^2 / df	GFI	AGFI	CFI	NFI	RMSEA
Recommended Values	<3	≥0.9	≥0.8	≥0.9	≥0.9	<0.05
Results in this study	1.024	0.941	0.923	0.946	0.958	0.034

5.4 Hypothesized Direct Relationship Testing

Standardized path coefficient analysis is shown in Table 6. With regard to H1a, H1b and H1c, the results assert that product engagement has a significant positive effect on functional experience value ($\beta = 0.348$, $p < 0.001$), emotional experience value ($\beta = 0.246$, $p < 0.001$) and social experience value ($\beta = 0.531$, $p < 0.01$). Therefore, H1a, H1b and H1c are supported. Our results show that interpersonal interaction have no impact on functional experience value ($\beta = 0.142$, $p > 0.05$). Thus, H2a failed to be supported. Concerning H2b and H2c, interpersonal interaction is significantly positive affect emotional experience value ($\beta = 0.486$, $p < 0.001$) and social experience value ($\beta = 0.201$, $p < 0.01$), Thus, H2b and H2c are supported. Regarding H3, functional experience value ($\beta = 0.103$, $p > 0.05$) is found have no impact on customer participation in value co-creation. Therefore, H3 is rejected. In line with our hypothesis, emotional experience value ($\beta = 0.412$, $p < 0.001$) and social experience value ($\beta = 0.685$, $p < 0.001$) these two factors are found to generate a significant positive effect on customer participation in value co-creation. Thus, H4 and H5 are fully supported.

Table 6. Test Results of Research Hypothesis

Hypothesis	Path	Path Coefficient (β)	C.R.	P	Results
H1a	PE→FEV	0.348	4.893	***	Supported
H1b	PE→EEV	0.246	2.168	***	Supported
H1c	PE→SEV	0.531	6.092	**	Supported
H2a	II→FEV	0.142	1.367	1.236	Rejected
H2b	II→EEV	0.486	5.291	***	Supported
H2c	II→SEV	0.201	2.469	**	Supported
H3	FEV→CPVC	0.103	1.057	0.368	Rejected
H4	EEV→CPVC	0.412	6.291	***	Supported
H5	SEV→CPVC	0.685	7.913	***	Supported

* $p < 0.05$; ** $p < 0.01$; *** $p < 0.001$

5.5 Mediation Testing

Table 7 shows how experience value (functional experience value, emotional experience value, and social experience value) acts as a mediating factor in the relationship between independent variables like product engagement and interpersonal interaction, as well as dependent variable customer participation in value co-creation. The results of mediation were assessed using the bootstrapping process, which is considered to be the most effective method for testing mediation and other interfering consequences (Biesanz, Falk, & Savalei, 2010). Under the 95% bias-

corrected bootstrapping confidence interval, 5000 samples were used to determine whether there was a mediating effect. The mediating effect was formed if there was no zero between the upper and lower limits of the bias-corrected confidence interval (Hayes, 2009). As can be seen from Table 7, experience value plays a significant total mediating role in the impact of product engagement on participating in value co-creation, with 95% confidence interval of (0.316, 0.526), excluding zero. The mediating effect of functional experience value, emotional experience value and social experience value were all significant, and the indirect effect was 0.053, 0.192 and 0.257, respectively. Hence, H6a, H6b and H6c are all supported Concerning of H7, the total mediating effect of experiential value on the influence of interpersonal interaction on participatory value co-creation is also significant, with 95% confidence interval (0.287, 0.385), excluding 0. To be more specific, the mediating effects of functional experience value, emotional experience value and social experience value were significant, but the mediating effects were smaller than the previous, which were 0.048, 0.169 and 0.042, respectively. Therefore, H7a, H7b and H7c are fully supported.

Table 7. Test Results of Mediating Effect

Hypotheses	Paths	Effect	Bootstrapping 95% Confidence Interval		Whether Mediating Effect or Not?
			Lower	Upper	
Total Mediation Effect		0.502	0.316	0.526	YES
H6a	PE→FEV→CPVC	0.053	0.051	0.127	YES
H6b	PE→EEV→CPVC	0.192	0.038	0.144	YES
H6c	PE→SEV→CPVC	0.257	0.017	0.194	YES
Total Mediation Effect		0.259	0.287	0.385	YES
H7a	II→FEV→CPVC	0.048	0.016	0.154	YES
H7b	II→EEV→CPVC	0.169	0.087	0.136	YES
H7c	II→SEV→CPVC	0.042	0.123	0.189	YES

6. Discussion and Conclusions

This study builds a research model of customer interaction, experiential value and customer participation in value co-creation, and takes virtual brand community members as samples to test the hypothesis. The results are shown as follows. Firstly, the product engagement between customers has a significant positive impact on the functional experience value, emotional experience value and social experience value. Our result is consistent with the previous studies that mentioned the product engagement of customer positively affects their experience value (Hertel et al., 2003; Algesheimer et al., 2005). Secondly, the result found that interpersonal interaction has a significant positive impact on both emotional experience value and social experience value. This supported the study carried out by Lin et al. (2009) who found there was a significant positive relationship between customer interpersonal interaction and customer experience value. Thirdly, emotional experience value and social experience value were found to have a significant positive effect on customer participation in value co-creation in this study. A similar finding was found in Fuller et al. (2008), who stated that community identity influenced consumer engagement in product innovation. Fourthly, functional experience value, emotional experience value and social experiential value play a mediating effect in the influence of customer interaction on participating value co-creation. However, the impact of H2a on customer interaction on functional experience value and H3 the impact of functional experience value on customer participation in value co-creation are not significant. H2a is not supported, which may be caused by the contradiction between the urgency of customers' demand for functional experience value and the long-term influence of customers'

interpersonal interaction. Customer's functional experience value is mainly manifested in the improvement of customer's product information, efficiency or convenience (Wang & Fesenmaier, 2004). Different from emotional experience value and social experience value, it is often a problem that customers are facing in their daily life, and they need to find a quick solution, so it has a certain urgency. However, interpersonal interaction between customers is aimed at building mutual emotions (Li, & Ma, 2013), and it often takes a long time to have a positive impact on the acquisition of product knowledge and other contents of customers. Therefore, interpersonal interaction has no significant effect on the value of functional experience. In addition, H3 is not supported, which may be because the functional requirements belong to the hygiene factors of customer satisfaction. In this study, functional requirements are met, including access to enterprise product information and experience as well as efficiency or convenience. In virtual brand communities which belongs to the lower levels of customer demand (Yan, et al., 2015), functional experience value could avoid the customers' dissatisfaction, but cannot make customer satisfaction. From the perspective of customer behavior incentive, functional experience value could be regarded as a hygiene factor in the Two-factor Theory (Yan, et al., 2015), that is, the satisfaction of this demand will not have an incentive effect on customers, thus resulting in the impact of functional experience value on customer participation in value co-creation is not supported.

7. Implication

This research provides some theoretical contributions in the field. Currently, the analysis of customers' participation in value co-creation in a virtual world is still in its early stages (Xu & Mei, 2014), and there is still a lack of clear understanding of the mechanism of customers' participation in value co-creation, as well as why customers engage in business value co-creation practices after joining the community (Nambisan & Baron, 2009). This study determines that the customer experience value in the virtual brand community has a positive impact on customer participation in value co-creation, and reveals the influence mechanism of customer interaction on customer participation in value co-creation, which fills in the gaps of previous relevant studies and enriches the research on the factors that drive customer participation in value co-creation. Additionally, our result expands the research on hierarchical experiential value to the virtual world, confirming that consumer demands at the middle and high levels are the main demands in the virtual society, and deepening the research on the theory of hierarchical experiential value.

The results also carry some important practical implications for managers. First, in the process of managing the virtual brand community, business managers need to analyze the types of customers in the brand community, and set up the structure and content of the virtual brand community forum according to the characteristics of customers, so that customers with similar interests, preferences, backgrounds, needs, and abilities could gather together and enhance their sense of identity, which will help customers interact with products and emotions. Furthermore, managers should attach importance to the satisfaction of customers' self-esteem, self-realization and other high-level needs, and ensure that customers who actively interact with customers in virtual brand communities can receive timely rewards from community managers. For example, increasing points and grades are used to increase the experience value of actively interacting members, which not only increasing the probability of participating in corporate activities, but also further enhances the experience value of customers, forming a virtuous circle of customer experience and community interaction.

8. Limitations and Recommendations for Further Research

This study has some limitations. First, this study verifies the influence of interpersonal interaction on customer experience value and participation in value co-creation, but in fact, interpersonal interaction might have a moderating effect in this process, and the verification of this part of content needs to be further explored in the future research. Second, in this research, only a quantitative analysis approach was used, and all of the questions were closed. The author was unable to learn the cause and specifics if respondents replied "strongly disagree" to a question. As a result, qualitative methods such as interviewing may be integrated into a survey in the future since they could help to provide more in-depth evidence and increase research results. Finally, since the current study collected data from an online survey, prospective researchers will use longitudinal approaches to further validate the study's findings due to the bias of responses.

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