Research on the Influence Mechanism of UGC Interaction Quality on Value co-creation in Virtual Brand Community

Chen Zhao[*], Panhong Fu
zhaochen989@163.com, fupanhong@163.com

Dalian Polytechnic University, School of Management, 116034 Light Industry Garden No.1, Dalian, China

Abstract--This paper use AMOS and SPSS macro to conduct empirical analysis on 512 valid questionnaires. The results verified all the assumptions among the variables listed in the paper.

Keywords Data mining; Customer engage; Value co creation behavior;

1. Introduction

In the Web2.0 era, consumers have become consumers and producers of information [1]. Virtual brand community emerged as a product of the era of social media. In this collection of social relations, customers and enterprises establish a long-term close relationship around a specific brand and continue to create dynamic value together. Consumers gradually participate in product R&D, and offer advice and suggestions for brand development.

2. Visualization and Data Mining

2.1 Source of research variables

In this paper, the data mining research from 2016 to 2022 is included in the CNKI database as the source of the research variables of this paper, and the literature is measured and analyzed from the perspective of literature distribution time, keywords and abstracts. First, the value co creation of the subject words is preliminarily searched. Secondly, the comprehensiveness of the sample is tested. Through reading the title, abstract and key words of highly cited literature, it can be seen that the samaple obtained covers not only the main variables of this study, but also customer participation, business model innovation, etc., which shows that the sample obtained is comprehensive. Visually analyze 718 documents of value co creation in CNKI general database. As of December 2022, the number of documents of value co creation is growing. As shown in the figure 1
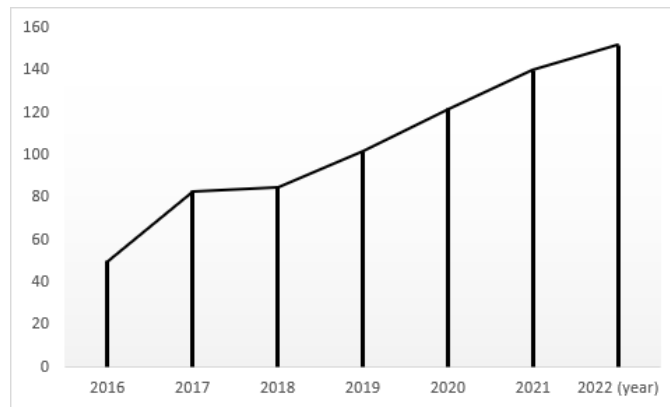
Figure 1 Distribution quantity of value co creation literature

2.2 Hot spot analysis

Based on the map of scientific knowledge, this paper uses VOS Viewer map software to visually analyze research hotspots in the field of value co creation.

Keyword, as the core of a document, reflects the main content of the document. This paper shows the research focus of value co creation with the keyword co-occurrence map (Figure 2). The results show that the keywords value co creation behavior, interactive, customer engagement, etc. co occur most frequently, which reflects the core theme of this study; Secondly, the virtual brand community shows that the literature in this field focuses on the research under a specific situation. As shown in the figure 2
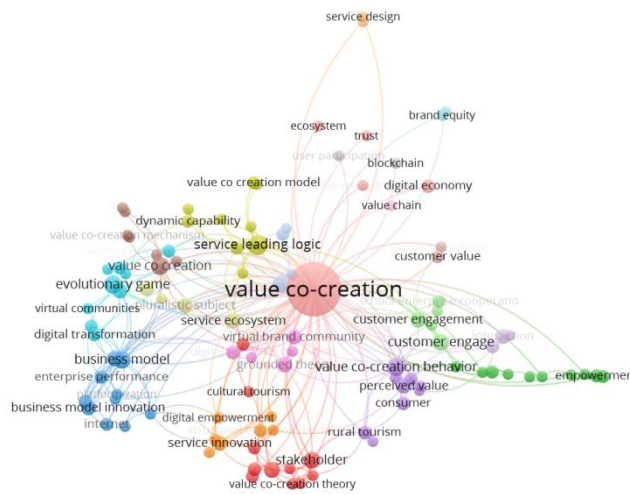

Figure 2 Hot spot analysis

3. Literature Review and Theoretical Basis

3.1 User generated content interaction quality

In the era of social media, virtual brand community, as a platform for value co-creation, has shifted consumers from passively accepting information to actively publishing creative content on the Internet. Consumers can collect product related information with the help of social media to complete purchase decisions [2]. The research believes that the interaction quality of user generated content is the degree of immersion, frequency and usefulness of acquiring content in the process of interaction between users and other consumers in the virtual brand community.

3.2 Value co-creation Behavior

This paper divides value co-creation behavior into customer participation behavior and citizen behavior [3]. The former refers that in the brand community, customers interact with other consumers through user generated content, depending on the quality of interaction, and consumers adopt behavior similar to that of brand employees. Citizenship behavior refers to the cognitive, attitude and emotional engage state.

3.3 customer engage

The psychological school focuses on the resonance of cognition and emotion, and the behavioral school believes that customer engage is a series of transactional and non transactional behaviors, including word of mouth communication, recommendation comments, or participation in activities launched in the community. This paper adopts the view of integration school that this is a process of both psychology and behavior.

3.4 Sense of belonging

In the process of continuous participation in the community, consumers perceive that they belong to this social group, and believe that the community can represent individual self-esteem and image. The emergence of this collective consciousness gradually deepens the connection between consumers' sense of belonging to the community and emotional ties.

Social identity theory can explain the formation of this sense of belonging [4]. Social identity theory holds that individuals identify with their own groups through social classification, and generate internal group preference and external group bias [5].

4. Research Of Hypothesis

4.1 User generated content interaction quality and value co-creation behavior

Content interaction refers to the creation and exchange of content by customers on the social media platform. Deep interaction can also broaden the scope and level of user communication topics, assist other potential consumers in making rational decisions on visual and textual content [6]. Therefore, the assumption is put forward:

H1a: User generated content interaction quality has a significant positive impact on participation behavior.

Citizenship behavior is a behavior outside the role. When consumers get help and emotional recognition from other user generated content, customers voluntarily provide valuable information to other consumers from the perspective of exchange, such as exchanging and sharing knowledge [7].

H1b: User generated content interaction quality has a significant positive impact on citizenship behavior

4.2 The intermediary role of customer engage

The interaction quality of user generated content is reflected among customers, and also involves the interaction and feedback between customers and brands, so there is a good opportunity to establish a partnership [8]. Based on this, this paper makes assumptions:

H2: User generated content interaction quality has a positive and significant impact on customer engage

Customer engage is driven by motivation. Customers with a high degree of engage can deepen their emotional ties with other consumers, and improve their participation, which has an important impact on enterprise performance [9].

Based on the above, the following assumptions are made:

H3a: Customer engage has a positive and significant impact on participation behavior

H3b: Customer engage has a positive and significant impact on citizenship behavior

User generated content, as an external stimulus, acts on the psychological state and behavior of consumers, achieves consistency in cognitive emotion, and acts as a motivation to drive the occurrence of value co-creation. Therefore, we believe that:

H4a: Customer engage mediates the interaction quality and participation behavior of user generated content

H4b: Customer engage mediates the interaction quality of user generated content and citizenship behavior

4.3 Regulation of sense of belonging

When consumers have the collective consciousness of belonging to the community, they narrow the psychological distance between customers, constrain themselves with the values and norms of the community, and create close emotional connection [10]. Therefore, based on the above reasons, the following assumptions are proposed:

H5: Sense of belonging positively regulates the relationship between interaction quality and customer engage

5. Research Design

5.1 Questionnaire design

The questionnaire is divided into two parts: measuring items and personal information, and the measurement of each variable is based on a mature scale that has been empirically studied at

home and abroad, which is adjusted and optimized according to the research theme of this paper.

5.2 Data collection

The questionnaire was made on the platform of questionnaire star, and the distribution objects selected websites such as Pollen Club, Xiaomi Community as the sample source. After verifying the reliability and validity of the pre survey questionnaire, 512 valid questionnaires were obtained, with an effective rate of 93.94%.

Table 1 Basic Demographic Information

basic information	option	frequency	percentage /%
sex	male	292	57.0
	female	220	43.0
age	under 20	38	7.4
	20-25years old	128	25.0
	26-30years old	159	31.1
	over 30	192	36.5
education level	high school and below	60	11.7
	junior college	129	25.2
	undergraduate	201	39.3
	master or above	122	23.8
Community participation time	less than 6 months	107	20.9
	6 months - 1 year	125	24.4
	1-2 years	105	20.5
	more than 2 years	175	34.2

6.   Empirical Analysis

6.1   Reliability test

This study used SPSS26.0 and AMOS24.0 for reliability and validity analysis. According to Cronbach's α Coefficient to verify the internal consistency of the measurement items. The coefficients are greater than 0.8, indicating that the internal consistency of each construct is high. The CR value of the combination reliability coefficient is above 0.85, and the combination reliability of the variables is high, so the scale has a good reliability level. Therefore, the scale had good aggregation validity.

Table 2 Reliability Test Results

variable	item	Estimate	Cronbach's alpha	AVE	CR
interactive quality (IQ)	IQ1	0.84	0.886	0.66	0.886
	IQ2	0.811			
	IQ3	0.812			
	IQ4	0.785			
customer engage (CE)	CE1	0.691	0.847	0.59	0.85
	CE2	0.774			
	CE3	0.764			
	CE4	0.828			
participation behavior (PBH)	RBH1	0.822	0.851	0.66	0.853
	RBH2	0.796			
	RBH3	0.817			
civic behavior (CBH)	CBH1	0.832	0.867	0.69	0.868
	CBH2	0.821			
	CBH3	0.831			
virtual community belonging (VCB)	SEVC1	0.852	0.898	0.69	0.899
	SEVC2	0.81			
	SEVC3	0.845			
	SEVC4	0.815			
	IQ3	0.812			
	IQ4	0.785			
	SEVC2	0.81			
	SEVC3	0.845			
	SEVC4	0.815			

6.2   Validity test

The research results show that the hypothesis model is superior to the other four models in terms of fitting indicators, and the five factor model has a good fitting degree, which is superior to other selected models. The results show that the discrimination validity between potential variables is good.

Table 3 Validity Test Results

Number	Model	X^2	df	X^2/df	NFI	CFI	RMSEA	Model
1	Single factor	860.81	135	6.376	0.882	0.898	0.103	1 vs 5
2	Two factors	789.89	134	5.895	0.891	0.908	0.098	2 vs 5
3	Three factors	539.178	132	4.085	0.926	0.943	0.078	3 vs 5
4	Four factors	457.06	129	3.543	0.937	0.954	0.071	4 vs 5
5	Five factors	401.636	125	3.213	0.945	0.961	0.066	

6.3 Model engageting and hypothesis testing

This study uses the method of structural equation model and Bootstrap to explore the impact of interactive quality of user generated content, customer engage and sense of belonging on value co-creation behavior.

6.3.1 Main effect test

Based on 512 valid data, the study used AMOS24.0 for model engageting and path test. The model engageting results are as follows: $X^2/df=3.238 < 5$, GFI=0.939 > 0.9, CFI=0.968 $>$ 0.9, IFI=0.968 > 0.9, TLI=0.959 > 0.9, RMSEA=0.061 < 0.08 indicate that the hypothetical model and actual data meet the ideal engageting standard.

Table 4 Direct effect path test

path	nonstandard coefficient	standardization co-efficient	S.E.	C.R.	P
IQ→CE	0.745	0.785	0.051	14.675	***
CE→PBH	0.74	0.618	0.079	9.416	***
CE→CBH	0.438	0.344	0.08	5.459	***
IQ→CBH	0.704	0.582	0.079	8.868	***
IQ→PBH	0.393	0.346	0.07	5.633	***

6.3.2 Inspection of intermediary effect of customer engage

The intermediary effect test adopts Amos's method to test the intermediary effect of customer engage between interaction quality of user generated content and value co-creation behavior under the control of gender, age, education background and community participation time.

In addition, the Bootstrap=5000 method is used in Amos to test. Establishment of intermediary effect. (Table 5)
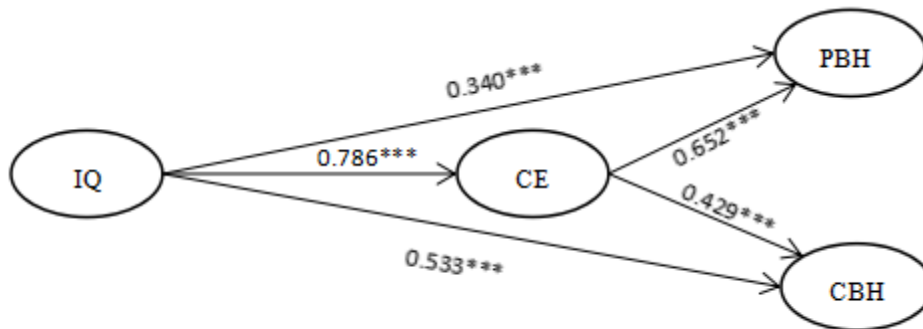
note：*represent p<0.05, **represent p<0.01, ***represent p<0.001

Figure 3 Structural equation model test results of intermediary effect

Table 5 Standardized Bootstrap Mediation Effect Test

Path	Effect value	se	Bias-corrected 95%CI			Percenntile 95%CI		
			lower	upper	p	lower	upper	p
stdIndA1	0.512	0.253	0.329	0.877	0.003	0.318	0.825	0.004
stdIndA2	0.337	0.225	0.155	0.723	0.006	0.135	0.607	0.01
stdIndA1: IQ→CE→PBH, stdIndA2: IQ→CE→CBH								

6.3.3 Adjustment effect test

Test the regulatory effect of sense of belonging (as shown in Table 6). The results are as follows: After the interaction item of sense of belonging, t=3.845 (p=0.0002), indicating that sense of belonging has a regulatory effect on interaction quality and customer fit.

Table 6 The moderating effect test of belonging

The moderating effect test of belonging				
	customer engage		customer engage	
	standardization coefficient	t value	standardization coefficient	t value
belonging	0.617	16.025	0.633	16.561
interactive quality	0.236	6.124	0.232	6.105
interactive quality×belonging			0.1	3.845
R square	0.649		0.659	
F	471.207		327.573	

7. Conclusions

With the brand as the relationship link, in the common community, consumers have a high degree of homogeneity in their interests and preferences. This paper, with the help of the questionnaire data collection method and based on the social identity theory, discusses the impact mechanism between the interactive quality of user generated content, customer engage and value co-creation behavior, and considers the moderating role of the sense of belonging, and empirically tests each hypothesis.

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