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Information Quality or Entities' Interactivity? Understanding the Determinants of Social Network-Based Brand Community Participation

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Abstract: The customer's participation is important to the survival of a brand community. By drawing on flow theory, this research identified the most important factors that motivate the customers' participation intention than others in a social network-based brand community. Data were collected from the Sina micro-blog. This study adopted two different but complementary methods to analyse the conceptual model: Structure equation model (SEM) and fuzzy set qualitative analysis (fsQCA). Results support most of the research hypothesis. Specifically, the findings obtained from the fsQCA indicate that information quality and platform-interactivity are necessary conditions that encourage the customers' participation in a brand community.

Keywords: participation intention; customer-centric relationship; information quality; flow; SEM; fsQCA

1. Introduction

Brand communities embedded in online social networks have become a powerful tool in marketing communications [1–3]. Marketers can use a brand community for product communication, promotion, and dissemination of brand-related information to their target customers; they can also use it to interact with their target customers [4–6]. Previous research on brand community has indicated the importance of the customer's participation to the survival of a brand community [4,5]. Despite this growing popularity and the general agreement on the influences of the customer's participation to a social network-based brand community, a systematic understanding by brand managers and researchers on how to facilitate the customer's participation remains elusive.

Previous research has indicated that a brand community is comprised of marketers-generated information, customers-generated information, its entities (e.g., customers, marketers, and platform), and the customer's relationships with these entities (customer-centric relationships) [7]. Thus, information and customer's relationships with other entities (customer-centric relationships) comprise the core of brand community. Another research has defined the extent of emotional and behavioral attachment of a customer to other entities (e.g., brand, marketers, platform, and customers) as brand community integration [6,8–10]. Specifically, they regarded brand community integration as a function of the customers' perceived relationships not only with the brand, but also with marketers, the platform and other community customers [8]. Brand community integration is comprised of four kinds of customer-centric relationships between customers and other entities (customer-brand, customer-marketers, customer-platform, and customer-others) [11]. Brand community integration and information quality have been suggested as two key drivers that motivated the customer's participation intention [7]. However, brand community marketers rarely develop the four kinds of customer-centric relationships in brand community integration and fail to provide high quality information equally due to energy and money constraints. However, only a few studies have investigated which factors more

importantly motivate customer's participation intention. Thus, determining the important factors that drive the customer's participation intention more than others is necessary.

In addition, McAlexander et al. (2002) indicated that the four kinds of customer-centric relationships in brand community integration are developed interdependently in a mutually influenced way [8]; however, research has yet to explore the mutual influence mechanism among them. Brand community participation studies have only investigated the integrated effect of the four kinds of customer-centric relationships on the customer's participation intention [12]. However, these studies have neglected the individual effects of the four kinds of customer-centric relationships on customer's participation intention. Another research has indicated that brand community marketers should allocate their limited energy and money to obtain the additional participation of customers [13]. Therefore, distinguishing which relationship is more important than others for participation is significant for marketers and researchers.

To address these issues, the current study proposes a conceptual model that discusses how the four kinds of customer-centric relationships (customer-brand, customer-marketers, customer-platform, and customer-others) influence each other and the customer's participation intention with information quality through perceived flow.

Previous research on brand community participation has often used the symmetric-based statistical method (e.g., multiple regression analysis) to test the symmetric relationships between the independent variables and the customer's participation intention. For example, they proposed that high information quality increases customer's participation intention, and that relationships between variables are linear. Ragin (2008) indicated that non-linear and asymmetrical relationships are often present in most real-life contexts [14]. Moreover, they indicated that the asymmetric-based data analysis (fsQCA) provides information beyond hypothesis testing using the multiple regression analysis (MRA). Therefore, this study uses two different but complementary methods to analyse the conceptual model: Structure equation model (SEM) and fuzzy set qualitative analysis (fsQCA). The SEM is used to detect the symmetric relationships between the independent and dependent variables [15,16]. The fsQCA is utilized to determine the asymmetric relationship between the causal conditions and participation intention, and found the different combinations of causal conditions that may increase customers' participation intention [14]. Thus, identifying the necessary and sufficient conditions that result in high customer's participation intention is important.

2. Literature Review and Hypotheses

2.1. Online Social Network-Based Brand Community

Muniz and O'Guinn (2001) defined brand community as a customer-brand triad formed by two types of relationships: The relationship between the brand and customers, and between community customers [17]. McAlexander et al. (2002) extended the research of Muniz and O'Guinn; they built a customer-centric model, and indicated four crucial relationships in an offline brand community: The relationships between the customer and brand, the customer and firm, the customer and product in use, and among fellow customers [8]. This kind of classification is widely accepted [8,9,18–20]. However, unlike offline brand communities, online social network-based brand communities build on a third party platform (e.g., Sina micro-blog, Twitter, and Facebook). McAlexander et al. (2002) indicated that "a community is made up of its entities and the relationships among them" [8]. Various studies have indicated that the social media platform can provide an efficient communication and distribution channel to a brand community [2]. A social media platform is a powerful tool that brings like-minded people together and influences customers' perception and behavior through interaction. However, as an important entity of the social network-based brand community, the role of a platform is not implied in past customer-centric models. Thus, this study will add the customer-platform relationship in the customer-centric model. In addition, the brand community in this study mainly focuses on promoting its brand rather than its product. Therefore, we exclude customer-product in

the customer-centric model. In conclusion, we develop a new brand community customer-centric model in an online social network context that includes four kinds of relationships: Customer-brand, customer-platform, customer-marketer, and customer-other customer.

Many previous research on the customer-centric model have defined the relationships between a focal customer and other entities as an integrated construct-brand community social integration [8,20]. Brand community integration has been deemed as an important factor that induces consumer's participation intention [21–24]. Marketers can develop brand community integration by enhancing the multi-way interactions between the customer and other entities in the community. In addition, customers will perceive additional enjoyment through these interactions. Customers will also tend to participate in a brand community [23].

2.2. Customer's Participation Intention

Algesheimer et al. (2005) defined the customer's participation intention as "the intrinsic motivation to interact and cooperate with community customers" [23]. Customers with high participation intention suggest their interest to help other customers and participate in joint activities [25–27]. Burnett (2000) indicated that the customer's participation behavior in community can be interactive or non-interactive [28]. Non-interactive customers are also called lurkers, they merely browse an online brand community website. Thus, by considering the non-interactive behaviors, Zhao et al. (2016) defined the social network-based brand community participation intention as the propensity of customers to read, repost, review and interact with managers and other peer customers [4]. We defined customer's participation intention similar to [4].

Past studies have reported that community participation is caused by the feeling of enjoyment when customers engage in an activity with total involvement. Two kinds of drivers motivate customers to participate in brand community: Brand community social integration and functional drivers (sharing or acquiring information) [1,21–24]. Many previous literatures have investigated the effect of brand community social integration on brand community participation. As we previously mentioned, brand community social integration is comprised of four kinds of customer-centric relationships. Brand community marketers rarely develop the four kinds of customer-centric relationships equally due to energy and money constraints. Thus, studying the individual effects of the four kinds of customer-centric relationships on customer's participation intention and identifying which relationship is important to customer's participation intention, rather than focusing only on the integrated effects of four kinds of customer-centric relationships will be helpful and important. In addition, McAlexander et al. (2002) indicated that the four kinds of customer-centric relationships in brand community integration are developed interdependently in mutual ways [8]. However, researchers have yet to consider how each relationship affects each other.

To address these questions, this study develops a model as shown in Figure 1 to examine how information quality and the four kinds of customer-centric relationships influence each other, and how they combine to determine customer's participation intention through the flow. In addition, we will identify the necessary and sufficient conditions for high participation.

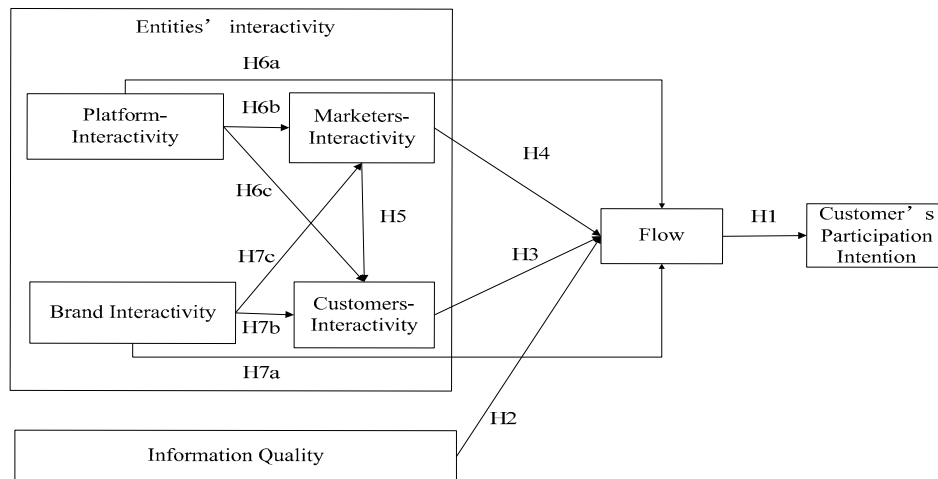


Figure 1. Research model.

2.3. Flow Theory

First introduced by Csikszentmihalyi (1975) [29], the concept of flow is described as an overall experience that people feel when fully involved in an activity. Hoffman and Novak (1996) showed that the characteristics of flow experience include: (1) a seamless sequence of responses facilitated by machine-interactivity; (2) intrinsic enjoyment; (3) a loss of self-consciousness; and (4) self-reinforcement [30]. Hsu and Lu (2004) regarded flow as a psychological state in which people experience extreme enjoyment when they engage in an activity with total involvement, control, concentration and intrinsic interest [31]. Finneran and Zhang (2005) indicated that flow occurs when the skills and challenges of users exceeded the threshold values and reached a good match [32]. By contrast, users feel apathy when both skills and challenges are lower than the threshold values. They also showed that if their skills exceeded challenges, users felt bored. However, the users felt anxious when challenges exceeded their skills. Widely used studies in the context of information system and electronic commerce have shown that the online behavior of users is significantly affected by the flow experience. For instance, Hsu and Lu (2004) found that people will likely play online games when they feel flow [31]. Wu and Chang (2005) explored the factors that affect the flow and how it affects the transaction intentions in the travel community [33]. Zhou (2013) indicated that the flow can facilitate the consumers' continuance usage of mobile payment services [34].

In the online social media context, when users plan to participate in a brand community, they must have the skills to use the social media service and brand community, namely, the ability to read posts, as well as social skills, etc. They may also face challenges, such as operation difficulty and low response rate from others. Customers in a social network-based brand community must match both skills and challenges to obtain an enjoyable experience when they participate in a brand community.

With the flow, customers experience extreme enjoyment when they participate in a brand community, and they may expect to obtain this enjoyable experience again. As such, they will continue to participate in a brand community. Thus, we propose that:

H1. Flow has a positive effect on customer's participation intention.

2.4. Information Quality and Flow

Information quality has been widely studied in information system [35,36]. Previous studies have indicated information quality as the user's assessment of "whether the information output from the information system is useful to the end user". High quality information is well-formatted, up-to-date, and complete [37,38]. Thus, we define information quality as the degree to which a system provides useful content to their users. The majority of customers in a brand community are information consumers [39]. Information is important for the customers to continue using a brand community.

When customers perceive great intensity, frequency, breadth and quality of information exchanged, they will feel enjoyment, involvement and time distortion. Thus, high quality information will lead customers to experience flow in the brand community. Accordingly, we propose that:

H2. *Information quality has a positive effect on flow.*

2.5. Four Kinds of Customer-Centric Relationships and Flow

According to the customer-centric model, we indicated that a brand community comprises of four kinds of customer-centric relationships (customer-brand, customer-platform, customer-marketers, and customer-others). Research has indicated that interactivity efficiently builds relationships, and the quality of these customer-centric relationships can be evaluated by the interaction quality between the customer and other entities in the community [40]. Thus, we use interactivity to evaluate customer's relationship with other entities (marketers, others, platform, and brand).

2.5.1. Customers-Interactivity

From an interpersonal communication perspective, interactivity is defined as the extent to which the communicator and audience respond to the communication needs of each other [41–43]. In a brand community, customers interact with each other by responding to the posts of others to build relationships. This type of social interaction induces customers to respond and share additional information in a brand community. Thus, we defined customers-interactivity as the extent to which customers perceived the willingness of others to respond to their communication needs. Specifically, customers-interactivity also means that other customers are willing to assist in the brand community [44]. In a community, if the posts or questions of customers can promptly receive reply from others, then these seamless sequences of responses will make customers subjectively feel enjoyment, involvement and time distortion. Furthermore, the high intensity customer-interactivity will improve customer's participation intention in a brand community. Thus, we propose that:

H3. *Customers-interactivity has a positive effect on flow.*

2.5.2. Marketers-Interactivity

By following the definition of interpersonal interactivity, we defined marketers-interactivity as the extent to which customers perceived the willingness of marketers to respond to their communication need. Specifically, marketers-interactivity refers to the willingness of marketers help customers and provide prompt service in a brand community [44]. Zhao et al. (2015) indicated that high intensity marketers-interactivity creates two types of values: Perceived communication efficiency and perceived a high level of respect from the marketers [5]. Thus, a high intensity marketers-interactivity will make customers subjectively experience enjoyment, involvement and time distortion. Furthermore, it can help marketers' improve the customer's participation intention. By contrast, if marketers respond in a low speed, then customers perceive a brand community as ignoring their needs [45], and may feel less enjoyment and low involvement in this brand community. Thus:

H4. *Marketers-interactivity has a positive effect on flow.*

A good interaction between the customer and marketers can make customers feel support from a brand community, and it will help a brand community build a good communication environment where customers will likely interact with others and help others actively [46]. Thus, we propose that:

H5. *Marketers-interactivity has a positive effect on customers-interactivity.*

2.5.3. Platform-Interactivity

In the social network-based brand community, using a platform forms the consumer-platform relationship. Interactivity is an important factor to evaluate the quality of a social network platform. Therefore, we use the platform-interactivity to evaluate the interaction quality of the platform. Platform-interactivity refers to an individual's feeling of connection with like-minded customers and information by sharing experiences and feelings in a platform [7]. Specifically, platform-interactivity means that a platform can provide a venue to interact with other like-minded customers and browse the experiences and feelings of others. The high interactive platform can fulfil the social needs of customers and the feeling of being close to or connected with others. Thus, customers will experience high enjoyment, involvement and time distortion in a high interactive platform. Thus, we propose that:

H6a. *Platform interactivity has a positive effect on flow.*

In the social network-based brand community, if a platform has a high interactivity, then customers can easily read responses from marketers and the posts of others [2], their questions and posts can also be read easily and receive responses from others. Therefore, the platform with a high interactivity level will lead to customers that perceive high marketers-interactivity and customers-interactivity. Thus, we propose that:

H6b. *Platform-interactivity has a positive effect on marketers-interactivity.*

H6c. *Platform-interactivity has a positive effect on customers-interactivity.*

2.5.4. Brand-Interactivity

France et al. (2016) defined brand-interactivity as a customer's perception of the willingness and genuine desire of a brand to interact with customers [47]. In the social network-based brand community, we defined brand-interactivity as the customer's overall assessment of the brand's willingness and genuine desire to interact with them. Research indicated that customers will feel welcomed and encouraged to communicate with the brand when they perceive it as interactive [47]. Furthermore, a high level of brand-interactivity will make customers feel enjoyment and involvement. Thus, we propose that:

H7a. *Customer-brand relationship quality has a positive effect on flow.*

A brand with high interactivity will attract additional customers to join brand community. The questions and posts of customers can be easily read and receive responses from other customers in a brand community with many members. Thus, we propose that the brand-interactivity has a positive effect on the customers-interactivity.

Brand communities with a high level of brand-interactivity will welcome and encourage customers to communicate with the marketers in a brand community. Thus, customers will more easily perceive the interactivity of marketers with a brand with high interactivity. Thus, we propose that:

H7b. *Brand-interactivity has a positive effect on customers-interactivity.*

H7c. *Brand-interactivity has a positive effect on marketers-interactivity.*

3. Methodology

3.1. Measurement Development

To develop our survey instrument, we adopted existing validated scales when necessary. Variables were measured using a seven-point Likert scale (1 = strongly disagree, 7 = strongly agree). A total of 23 items were finally generated (Appendix A). These 23 items were translated into Chinese using the double-translation/back-translation skill [48]. We also distributed the questionnaires to

several researchers and brand-microblog users for further revisions based on their feedback. Finally, we conducted a pilot study to ensure the reliability and validity of the scale before the formal large-scale survey. We collected 48 responses. The results of the data analysis show that Cronbach’s alphas were all above 0.7, which implies a strong internal consistency of constructs. We also conducted some minor revisions to the questionnaire based on the comments from respondents of the pre-test survey.

3.2. Data Collection

To test these predictions, we conducted our survey in the Sina micro-blog. The Sina micro-blogging service is one of the largest and most popular social network-based brand communities in China. Users who are followers or fans of a brand community (such as Dell, Lenovo and P & G) were recruited to participate in this survey by providing opportunities to win monetary awards after the survey. We provided a hyperlink to the survey web page. We removed surveys that proved invalid after scrutinising the responses. As a result, we collected 273 valid responses. The respondents were from 135 brand communities. Approximately 54.6% of the respondents were male, whereas 45.4% were female. Most respondents were between the ages of 21–30. A summary demographic profile of the samples is depicted in Table 1.

Table 1. Of the research sample.

	Options	Participants Number	Percentage (%)
Gender	Male	149	54.6
	Female	124	45.4
Age	12–20	10	3.7
	21–30	235	86.1
	31–40	27	9.9
	>41	1	0.3
Education	High school or below	5	1.8
	Two-year college	7	2.6
	Four-year college	120	44.0
	Graduate school or above	141	51.6
Brand community type	Cosmetics brands	32	11.7
	Clothing brands	46	16.8
	Consumer electronics brands	35	12.8
	Car brands	21	7.7
	Fashion accessory brands	43	15.8
	Food product brands	31	11.4
	Personal care brands	32	11.7
	Retailer brands	23	8.4
	Others	10	3.7
Length of follow	<1 month	59	21.6
	>1 month and <3 months	60	22.0
	>3 months and <6 months	71	26.0
	>6 months and <12 months	60	22.0
	>12 months	23	8.4
Average frequency of use	At least 1 time per day	175	64.1
	Every few days	68	24.9
	1 time per week	19	7.0
	1 time per months	6	2.2
	Every few months	5	1.8
Average time of use per day	Less than 15 min	30	11.0
	15–29 min	106	38.8
	30–59 min	67	24.5
	60–119 min	34	12.5
	More than 120 min	36	13.2

3.3. Data Analysis and Results

This study uses two complementary analysis techniques: Structure equation model (SEM) and fuzzy set qualitative analysis (fsQCA). The SEM is a regression-based technique [49]. It examines whether the relationships between a group of independent variables and a dependent variable are symmetric or not [15]. A symmetric relationship assumes that an increase in the degree of an independent variable will cause a corresponding increase or decrease in the values of the dependent variable. Although, research indicates that the relationships between variables are not always symmetric, they also can be asymmetric with abrupt switches occurring [50]. Thus, the fsQCA can supplement the deficiency of the SEM used to detect the asymmetric relationship between the independent variables and dependent variables [14]. The fsQCA is a set-based approach that emphasizes contextual effects and examines the effects of a combination of various causal conditions on a given outcome, thereby identifying the necessary and sufficient conditions for a high participation intention.

3.3.1. Structure Equation Model

We employed the partial least squares (PLS) path analysis as implemented in SmartPLS 2.0 M3 to estimate the parameters in the measurement and structural part of the structural model. First, the SmartPLS 2.0 M3 is a good method for conducting both exploratory and confirmatory research. Second, the SmartPLS 2.0 M3 is more useful than the covariance-based approach for screening out factors that have an insignificant effect on the dependent variable. Moreover, we used SmartPLS 2.0 M3 for model analysis because our study attempted to predict the factors that influence brand community participation. It leaned more toward a predictive research model less toward a theory confirmatory model. We also wanted to simultaneously evaluate the reliability and validity of the measures of the constructs in the model, and estimate the relationships among these constructs. Thus, we used SmartPLS 2.0 M3 to test our model.

(A). Measurement Model Test

We first conducted the reliability and validity analysis to measure the model and summarised the scale properties in Table 2. The reliability of measurement was assessed using Cronbach’s alpha. As shown in Table 2, all values were above the 0.70 threshold, indicating that all items reached the recommended levels of CR. In addition, all composite reliabilities (CR) were above 0.7, showing that the scales have a high internal consistency [51]. This finding demonstrated the reliability of the study measurement items.

Table 2. Scale properties.

Factor	Cronbach’s Alpha	Composite Reliability	AVE
Information quality	0.877	0.924	0.803
Marketers-interactivity	0.935	0.959	0.886
Customers-interactivity	0.889	0.930	0.817
Platform- interactivity	0.825	0.896	0.741
Brand- interactivity	0.794	0.880	0.710
Flow	0.780	0.871	0.693
Customer’s participation intention	0.795	0.867	0.619

The standardised loading of items was mostly above 0.7. Table 3 shows that all the average variances extracted (AVEs) were above 0.5. The square root of AVE for each construct exceeded the correlations between constructs and all other constructs, demonstrating adequate discriminant validity of all constructs.

Table 3. Correlation coefficient matrix and square roots of AVEs (shown as diagonal elements).

	IQ	MI	CI	PI	BI	F	P
IQ	0.90						
MI	0.26	0.94					
CI	0.24	0.45	0.90				
PI	0.36	0.36	0.36	0.86			
BI	0.30	0.24	0.39	0.41	0.84		
F	0.40	0.41	0.51	0.53	0.58	0.83	
P	0.40	0.32	0.39	0.49	0.46	0.59	0.79

(B). Structural Model Test

Table 4 presents three sets of index data to show the goodness of model fit (SRMR, d_{ULS} , and d_G): original value, 95 percent bootstrap quantile (HI95) and 99 percent bootstrap quantile (HI99). For the criteria of model fit, the HI95 of SRMR, d_{ULS} and d_G were greater than the original values. Thus, the goodness of the model fit in this study meets all of the criteria. In this study, we tested the structural model and summarized the results with the SmartPLS coefficients shown in Figure 2. The results support all of our hypotheses (H1, H2, H3, H4, H5, H6a, H6b, H6c, H7a, H7b and H7c). As Figure 2 shows, the flow had a positive influence on customer’s participation ($\beta = 0.60, t = 11.29, p < 0.001$). Thus, H1 is supported. Platform-interactivity ($\beta = 0.22, t = 3.99, p < 0.001$), marketers-interactivity ($\beta = 0.11, t = 1.98, p < 0.05$), customers-interactivity ($\beta = 0.21, t = 3.24, p < 0.01$), brand-interactivity ($\beta = 0.33, t = 6.11, p < 0.001$), and information quality ($\beta = 0.15, t = 3.04, p < 0.01$) positively affected flow. Thus, H6a, H7a, H3, H4 and H2 are supported. In the model, the platform-interactivity is shown. In addition, marketers-interactivity is positively affected by platform-interactivity ($\beta = 0.31, t = 3.96, p < 0.001$) and brand-interactivity ($\beta = 0.12, t = 1.97, p < 0.05$); customers-interactivity is positively affected by platform-interactivity ($\beta = 0.13, t = 1.96, p < 0.05$), brand-interactivity ($\beta = 0.26, t = 4.16, p < 0.001$), and marketers-interactivity ($\beta = 0.34, t = 5.02, p < 0.001$). Thus, H6b, H7c, H6c, H7b and H5 are supported. In the model, the explained variance of marketers-interactivity, customers-interactivity, flow and community participation intention is 14.1%, 30.5%, 52.1% and 35.3%, respectively.

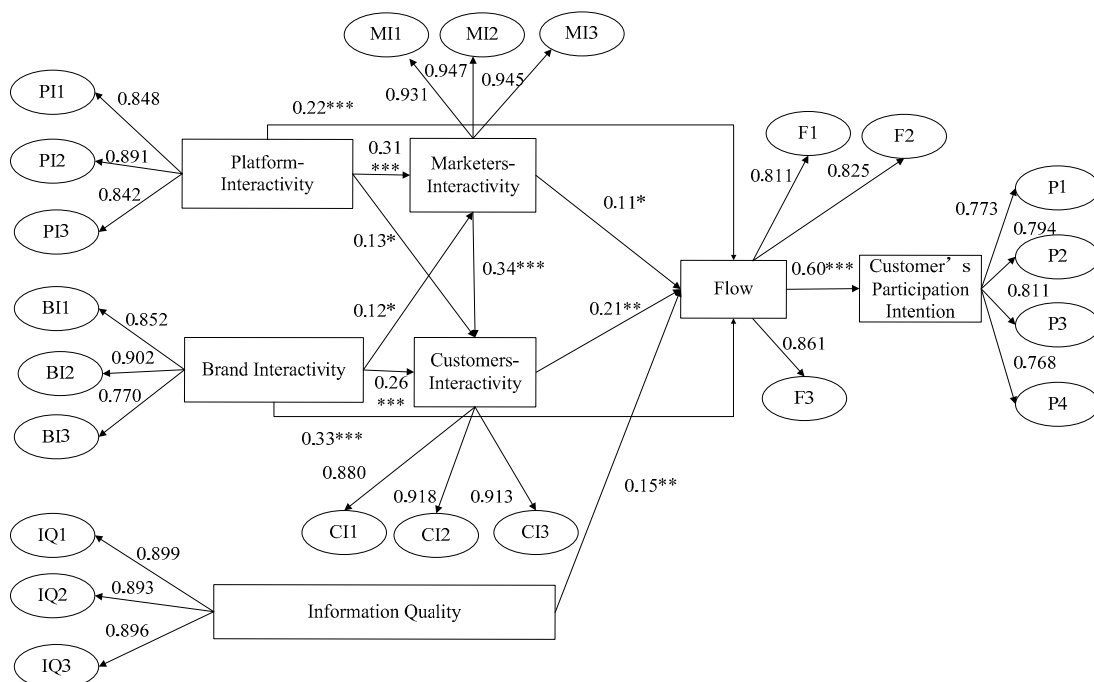


Figure 2. Model testing results by SmartPLS. Note: * $p < 0.05$; ** $p < 0.01$; *** $p < 0.001$; n.s = not significant.

Table 4. Goodness of model fit.

Goodness of Model Fit/Values	Original Value	HI95	HI99
SRMR	0.044	0.046	0.049
d_{ULS}	0.502	0.527	0.597
d_G	0.386	0.395	0.405

3.3.2. Fuzzy Set Qualitative Comparative Analysis

First, we used the fsQCA to calibrate variables with set scores ranging from 0–1 in order to assess the membership degree of each variable. Fuzzy set scores were calculated using three anchors for each condition. In this study, all the constructs were measured by a 7-point Likert-type scale. Following the work of Fiss (2007) [52], we coded full membership as six and non-membership as two; the crossover anchor is four which is the neutral point in a 7-point Likert scale. We identified the anchors based on the number of the items for each construct.

Second, to conduct the fsQCA, we generated the full truth table for the specified outcome (participation intention) using the specified causal conditions (information quality, marketers-interactivity, customers-interactivity, platform-interactivity, brand-interactivity and flow) for fsQCA 2.5.

Finally, we reduced the initial truth table by specifying the frequency, consistency and consistency proportion thresholds. We set our frequency threshold at two [14]. The consistency score measured the degree to which combinations are subsets of high scores in the outcome. In this study, we set the consistency cut-off at 0.9, which agrees with prior studies [14]. Moreover, as suggested by Rubinson (2013) [14], we also set a consistency proportion threshold of 0.9. This threshold specifies the minimum ratio of consistent to inconsistent cases required for classifying a configuration as one that meets the sufficiency requirement. The consistency proportion analysis can be accomplished using the Kirq software. As such, if a configuration that meets these three conditions is coded 1, then all the other configurations are coded as 0.

Research findings. The fsQCA produces three solutions, including a complex, intermediate, and parsimonious solution. Generally, intermediate solutions are superior to the other two solutions [14]. Therefore, we reported intermediate solutions in this study.

Table 5 presents the results of high community participation intention using the fsQCA and presents four configurations. The four configurations are regarded as sufficient conditions leading to high engagement in the micro-blog of a brand. These configurations imply some rules for high participation intention. As shown in Table 4, the fsQCA results are consistent with SEM in several ways, but also provide evidence of additional complex contextual effects. First, configurations indicate that high degrees of information quality, customers-interactivity, platform-interactivity and brand-interactivity, combined with a low degree of marketers-interactivity and the absence of flow, can lead to high membership score for community participation intention. Second, the pathway indicates that the combination of high degrees of information quality, platform-interactivity, brand-interactivity and flow, result in high community participation intention despite the absence of other conditions. Third, the pathway shows that the joint influence of high degrees of information quality, marketers-interactivity, customers-interactivity, platform-interactivity and flow lead to high participation intention despite the absence of brand-interactivity. Configuration four indicates that high degrees of information quality, marketers-interactivity, platform-interactivity and brand-interactivity coupled with a low degree of customers-interactivity and the absence of flow, also lead to a high membership score for community participation intention. Each configuration is fairly consistent and explains a satisfactory amount of cases with high community participation intention. The solution as a whole also has a high consistency of 0.97 and a satisfactory coverage of 0.74.

Table 5. Output-intermediate solution. Note: Filled dots (●) means the presence of the antecedent condition in the model predicting the outcome, empty dots (○) means the negations of the antecedent and blanks means the particular antecedent is not figured in the model. Information quality = IQ, Marketers-interactivity = MI, Customers-interactivity = CI, Platform-interactivity = PI, Brand-interactivity = BI, Flow = F.

Model	IQ	MI	CI	PI	BI	F	Coverage		Consistency
							Raw	Unique	
1	●	○	●	●	●		0.297238	0.011002	0.980974
2	●			●	●	●	0.684940	0.099111	0.985348
3	●	●	●	●		●	0.504589	0.023349	0.986382
4	●	●	○	●	●		0.349220	0.017007	0.981767

Solution coverage: 0.738747; Solution consistency: 0.973536.

The four configurations are compared, revealing high values of information quality and platform-interactivity appearing in all configurations and leading to high community participation intention. Thus, these two antecedent conditions are necessary for high community participation intention. This finding is consistent with the results of SEM. The fsQCA also provides some unique insights compared with SEM. The high degree of marketers-interactivity appears in combination with other antecedent conditions in two of the configurations. However, the absence and low marketers-interactivity are observed in the other two configurations, implying that the marketers-interactivity is not a necessary condition related to the high degree of community participation intention. Participation intention can also be high, even when the marketers-interactivity is low or absent. Similarly, high customers-interactivity appears in combination with other antecedent conditions in two of the configurations. The absence or low customers-interactivity in combination with other antecedent conditions can also lead to high engagement community participation intention which does not necessarily relate to a high participation intention. High brand-interactivity appears in combination with other antecedent conditions in three of the configurations. While it is absent in one configuration. So it is a sufficient condition rather than a necessary condition for high community participation intention. High perceived flow appears in combination with other antecedent conditions in two of the configurations. While it is absent in other two configurations. This study differs from past studies which have indicated that high flow must result in high participation intention. The fsQCA result provides a unique insight that the perceived flow does not always positively affect participation intention. In some situations, it has no effect on participation intention.

4. Discussion

4.1. Theoretical Implications

This article has four purposes. First, this work uncovers the mutual relationships among the four kinds of customer-centric relationships (customer–brand, customer–marketers, customer–platform and customer–others). Second, the manner in which the four kinds of relationships affect brand community participation intention independently is discussed in this paper. Third, this paper distinguishes how high quality information motivates customers to participate in a brand community. And most of all we determine the necessary conditions of brand community participation intention. The SEM results show that high platform-interactivity and brand interactivity lead to high marketer interactivity, platform-interactivity, brand-interactivity, and marketers-interactivity positively influencing customers-interactivity. Importantly, these four kinds of customer-centric relationships and information quality have been proven to positively affect community participation intention through perceived flow. The fsQCA results demonstrate that information quality and platform-interactivity are necessary conditions for community participation intention; this finding is consistent with the

SEM results. However, the different results of SEM and fsQCA found that high perceived flow does not constantly lead to high participation intention. Specifically, flow does not affect the participation intention in some contexts.

As previously noted, extent research has focused on the effects of brand community social relationship and information quality on community participation intention and has seldom considered the importance of each effect critical to research on brand community. This research fills this gap. By comparing the results of fsQCA and SEM, this research found that information quality and platform-interactivity are necessary conditions for community participation intention. However, the other customer-centric relationships affect participation intention only in some contexts. In addition, many previous studies have only examined the overall effect of the four kinds of customer-centric relationships on participation intention. However, they have neglected the individual effect of the four kinds of customer-centric relationships on participation intention. Our paper filled this gap and discussed the influence of the four kinds of customer-centric relationships on participation intention. Importantly, previous research has yet to explore the mutual influence mechanism among the four kinds of customer-centric relationships. To address this issue, we showed that brand-interactivity and platform-interactivity can facilitate marketers-interactivity in a brand community. Furthermore, marketers-interactivity, brand-interactivity and platform-interactivity can facilitate customers-interactivity.

4.2. Managerial Implications

From the practical perspective, our study results also provide implications for brand community managers who want to facilitate customers' participation intention. The four kinds of customer-centric relationships generally have significant effects on brand community participation intention, which means that improved customer perceived relationships with other entities (marketers, other customers, platform and brand) can motivate customers to participate in a brand community. We also find that markers-interactivity, brand-interactivity and platform-interactivity have significant effects on customers-interactivity, and thus, the higher the interactivity of the marketers, the brand and the platform, the more customers will likely interact with each other in the brand community. Therefore, our results imply to brand community managers that if customers communicate with a brand community actively, then the brand community must have a timely response. In addition, brand community managers can obtain a high level of marketers-interactivity and customers-interactivity by building a high interactivity platform. Moreover, we find that information quality and platform-interactivity are the necessary conditions for the community participation which means that if managers want customers with high levels of participation in a brand community, then they must choose an interactive platform and provide high quality information to their customers first. Otherwise, they will never realize their high participation degree goal.

4.3. Limitations and Further Research

This paper has several limitations that suggest directions for future research. First, apart from the four kinds of customer-centric relationships, information quality and flow, other factors affecting participation intention may exist, such as community identification and emotional stimulation when participating in a brand community. Future research can examine their effects. Second, we only collected data in the Sina micro-blog platform, neglecting differences from other micro-blogs platforms, such as, Twitter and Tencent Weibo. Thus, we believe that additional research should collect data from different platforms. Third, we mainly conducted a cross-sectional research. However, this research may not fully capture the long-term behavior of customers in a brand community. Thus, a longitudinal research may provide additional insights into the development of user behavior. Fourth, brand types may influence customers' behavior, while due to the small sample size; we did not compare the effects of the four kinds of customer-centric relationships (customer-brand, customer-marketers, customer-platform and customer-others) on brand community participation in the current study.

Future research can compare the effects of the four kinds of customer-centric relationships on brand community participation.

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Appendix A

Community participation intention [23]

- P1. I like to repost the information published by the brand community.
- P2. I like to participate in the brand community's activities.
- P3. I like to comment on the information published by the brand community.
- P4. I will recommend this brand community if some people ask for my suggestions.

Flow [53]

- F1. When I participated in the brand community, my attention was focused on the activity.
- F2. When I participated in the brand community, I felt in control.
- F3. When I participated in the brand community, I found a lot of pleasure.

Information quality [30]

- CQ1. The brand community provides well-formatted information.
- CQ2. The brand community provides up-to-date information.
- CQ3. The brand community provides the information I need.

Marketers-interactivity [30]

- MI1. It is easy to contact the marketers in this brand community.
- MI2. The marketers in this brand community have great pleasure to answer questions.
- MI3. When I participate in the brand community, the marketers can response to my questions fairly quickly.

Customers-interactivity [30]

- OI1. It is easy to get a response from the other customers in this brand community.
- OI2. The other customers in this brand community have great pleasure to answer questions.
- OI3. When I participate in the brand community, the other customers can respond to my post fairly quickly.

Platform-interactivity [30]

- PI1. It is easy to get a response from the other users in this platform.
- PI2. The other users in this platform have great pleasure to answer questions.
- PI3. When I participate in the platform, the other users can respond to my post fairly quickly.

Brand-interactivity [47]

- BI1. This brand listens to what I have to say.
- BI2. This brand would respond to me quickly and efficiently.
- BI3. There is good two-way communication with the brand.

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