

CUSTOMERS' PERCEIVED BENEFITS OF INTERACTING IN A VIRTUAL BRAND COMMUNITY IN CHINA

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ABSTRACT

This study examines how customer interactions in virtual brand community (VBC) affect perceived benefits and brand loyalty. We propose an integrated framework to conceptualize the relationships between VBC interactions, perceived benefits, participation and loyalty, with brand identity as moderating variable. Given the popularity of Apple's products in China, Mcfans, a VBC frequented by Apple customers, was chosen as study platform to administer an online survey to 207 Mcfans members. Results were analyzed by Partial Least Squares method, revealing (1) different customer interactions (i.e. product-content, human-computer, & interpersonal) have different effects on perceived benefits (including cognitive, social-integrative, personal-integrative and affective); (2) customer VBC interactions significantly influence future participation and brand loyalty; (3) brand identity has positively moderating effects on the links from interpersonal VBC interactions to perceived cognitive, social-integrative, personal-integrative and affective benefits; and (4) brand identity also negatively moderates the impacts of product-content VBC interactions on perceived cognitive and personal-integrative benefits. This research addresses a literature gap in relation to VBC participation and its benefits, from both customers' and managers' perspectives. Findings offer practitioners actionable measures for facilitating VBC interactions and boosting desired benefits for customers and the brand.

Keywords: virtual brand community in China, customer interactions, perceived benefits, brand identity, brand loyalty

1. Introduction

Advances in information technology have redefined the roles of customers play in all aspects of business. For instance, in virtual brand community (VBC), customers can voice opinion and influence product innovation, value creation, and even delivery processes [Bagozzi & Dholakia 2006; Bitner et al. 2000; Kim et al. 2012; Nambisan & Baron 2009; Urban & Hauser 2004]. VBCs are defined as computer-mediated, virtual spaces where customers communicate and exchange information on specific brand and/or product [Chen et al. 2013; Hagel & Armstrong 1997; Kim et al. 2008; McWilliam 2000]. Compared to traditional brand communities [McAlexander et al. 2002;

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Muniz & O'Guinn 2001], VBCs have the advantages of both because they are specialized, structured (in terms of communication patterns among brand admirers), non-geographically bound, with no time constraint, and allow continuous communications between many-to-many members [Heinonen 2011; Kim et al. 2008; Laroche et al. 2013; Watson 1997; Wu & Fang 2010]. As people are now keen to share their every opinion online, VBC becomes a very important platform for brand manager to "listen" to and interact with their customers. In spite of its growing importance, research on VBCs is relatively limited and mostly inconclusive [e.g. Laroche et al. 2013].

We attempt to address this knowledge gap, with special focus on Chinese customers, who are characteristically distinct and avid users of online communication platforms. Among the many luxury products and services offered to Chinese consumers, Apple is a reputable and well-admired brand with many loyal customers. Mcfans is a VBC popular among Apple fans in China; hence was chosen as our research platform. Collecting data from a single VBC allows us to solicit sufficient responses while minimizing errors. This is also a good starting point to develop a knowledge base on how and why Chinese consumers participate in VBCs.

We begin with a review of extant literature on virtual communities and VBCs. An integrated framework is derived by expanding Nambisan and Baron's 2009 conceptual model of interaction-based antecedents and customer perceived benefits from participating in virtual customer environments (VCEs). The Nambisan-Baron 2009 model however focuses exclusively on value co-creation in product development and support processes, while our proposed framework incorporates more than product-related interactions in VBCs. Research questions to be addressed include (1) why customers participate in VBCs, (2) what customers perceive as benefits from VBC interactions, and (2) whether customer interactions in VBCs result in brand loyalty? Research hypotheses are developed along with review of relevant concepts. Description of research methodology, data analysis strategies and findings follow, with discussions of theoretical and managerial implications, as well as study limitations and future research directions.

2. Literature Review, Conceptual Model and Hypotheses

2.1 Literature Background

With the many advances in communication technology, consumers are now able to share experiences and opinions easily in online or virtual communities. Virtual community (VC) is defined as a social network where information exchange functions as social interaction [e.g. Andersen 2005; Bagozzi & Dholakia 2002; Wellman & Gulia 1999]. Interaction refers to inter-sector, reciprocal activities such as meeting, formal and informal communications [Kahn & McDonough 1997]. Through continuous interactions among community members, shared norms and values are formed [Watson 1997; Wu & Fang 2010]. Such interactions also serve as bases of online collaboration, in research and business; hence are often the focus of research on virtual community [Craig & Zimring 2000; Wu & Fang 2010]. Extensive research has been accumulated on community identity, motivations, needs, and participation commitment in customer communities [Algesheimer et al. 2005; Foster et al. 2010; Kastner & Stangl 2012; Ouwersloot & Odekerken-Schröder 2008; Wang & Fesenmaier 2004a, 2004b; Zwass 2010], community loyalty [Algesheimer et al. 2005; Divakaran 2012; Ellonen et al. 2010; Hagel & Armstrong 1997; Shen et al. 2010], knowledge sharing or innovation [Chang & Chuang 2011; Chen et al. 2013; Heinonen 2011; Hsu et al. 2007; Füller 2006; Füller et al. 2006, 2008; Wu & Fang, 2010], customer experience [Nambisan & Watt 2008; Sheng 2012; Zhou et al. 2011], and brand website interactivity [Voorveld et al. 2010; Wang et al. 2012; Zhao & Lu 2012].

Virtual brand community however occupies a special place among all VCs, since they are dedicated to a specific brand for customers to share experiences with fellow brand owners, and for brand managers to cultivate competitive advantages for that brand and thus grow brand loyalty [Payne et al. 2009; Vargo & Lusch 2004]. In spite of its significance, VBC research is lagging behind its counterparts on VCs [e.g., Chan & Li 2010; Chen et al. 2013; Kim et al. 2008; Laroche et al. 2013; Lin 2008; Sung et al. 2010; Verhagen et al. 2012]. Researchers agree that user-to-user as well as user-to-host interactions should be the main research focus of online communities [e.g., Andersen 2005; Bagozzi & Dholakia 2002; Craig & Zimring 2000; Wu & Fang 2010] and which VCs carry value, benefit or knowledge co-creation functions [Chen et al. 2013; Jeppesen & Molin 2003; Payne et al. 2009; Vargo & Lusch 2004; Zwass 2010]. Nonetheless, customer interactions in VBCs have drawn relatively little research attention besides a few exceptions [Madupu & Cooley 2010; McKenna & Bargh 1999; Nambisan & Baron 2007, 2009; Sung et al. 2010; Zaglia 2013]. Existing VBC studies mostly focus on website interactivity exclusively [e.g., Burgoon et al. 2000; Jee & Lee 2002; Song & Zinkhan 2008; Voorveld et al. 2010; Wang et al. 2012; Zhao & Lu 2012], frequency, time spent, or number of postings made by community users [e.g. Dholakia et al. 2004; Füller et al. 2008; Nambisan & Baron 2007; Wang & Fesenmaier 2004a, 2004b]. Other VBC studies examine customer interaction characteristics, but without taking computer-mediated or human-computer interactions into consideration [e.g. Bagozzi & Dholakia 2002, 2006; Huang & Hsu 2010; Moore et al. 2005; Nambisan & Baron 2009; Wu 2008].

Only very recently, researchers begin to combine the two streams of VBC research by incorporating a more comprehensive list of constructs into study framework [e.g. Wang & Chen 2012; Zaglia 2013; Zhou et al. 2012]. This study contributes to this limited pool of knowledge on VBCs by addressing the needs to better understand why customers participate in VBCs, and how VBCs interactions can be facilitated to enhance community involvement and brand loyalty.

We follow the framework Nambisan and Baron developed in 2009 to conceptualize customer VBC interaction characteristics, including product content, human interactivity and member identity. Their model however omits one dimension, i.e. computer mediated (e.g. website design, convenience of use, etc.) interactions [Hoffman & Novak 1996; Jee & Lee 2002; Voorveld et al. 2010]. Human-computer or computer-mediated interactions however have been acknowledged as crucial VBC characteristics by many researchers [Burgoon et al. 2000; Chan & Li 2010; Chitturi et al. 2008; Jee & Lee 2002; Song & Zinkhan 2008; Voorveld et al. 2010; Wang et al. 2012; Wu & Fang 2010; Zhao & Lu 2012]. Research also indicates that experiential-routed interactions can facilitate enjoyment and social bond formation [Kim et al. 2012; Sheng 2012; Verhagen et al. 2012; Wang & Chen 2012; Zaglia 2013; Zhou et al. 2011; Zhou et al. 2012].

By integrating the abovementioned research streams, we propose an integrated research framework which characterizes customer VBC interactions by three dimensions, namely, product-content interactions, human-computer interactions and interpersonal interactions. Product-content interactions are defined as those related to product use, technology, and market information [Nambisan & Baron 2009]. Human-computer interactions refer to interfaces between users and computer, and users' perception of website and hypertexts [Hoffman & Novak 1996; Jee & Lee 2002; Voorveld et al. 2010; Wang et al. 2012; Zhao & Lu 2012]. Interpersonal interactions are about person-to-person communications among VBC members, and essential for establishing and developing social and community relationships [Dholakia et al. 2004; Preece 2001; Wang & Chen 2012; Zaglia 2013; Zhou et al. 2011; Zhou et al. 2012]. The three dimensions are illustrated in Figure 1.

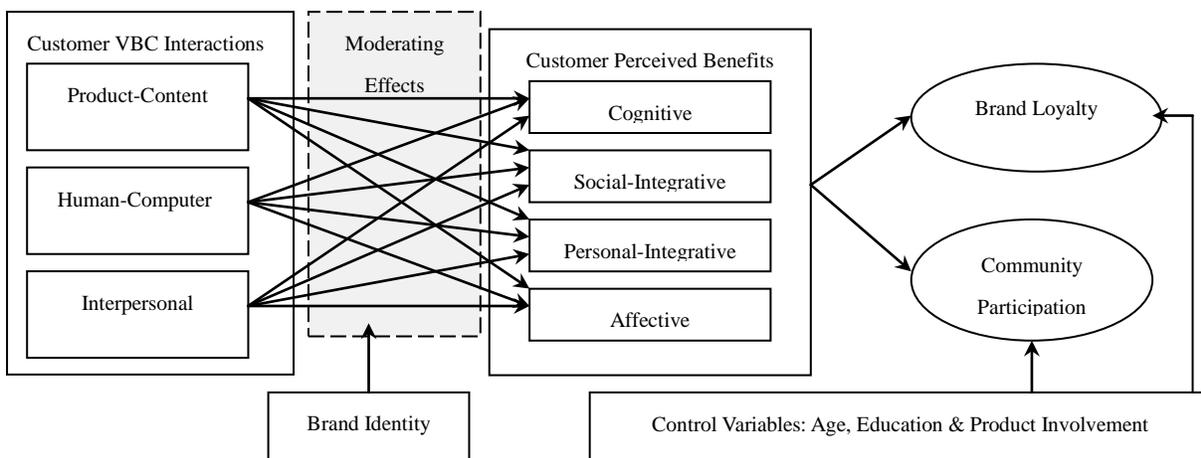


Figure 1: An Integrated Framework of Managing VBC Interactions for Benefit Co-Creation

On the other hand, context plays an influential role in facilitating social interactions, including virtual ones, so contextual information should be taken into account in this conceptual framework. China, as one of the largest emerging economies, has the fastest growing online communities. Chinese customers in VBCs behave differently from those in countries of different cultural backgrounds. One important distinction of Chinese customers is their endorsement of collectivism, or tendency to let one's collective goals supersede personal ones [Triandis 1989], and this endorsement is likely to influence social and online interactions. To address this cultural issue, we designate our study to investigate customer VBC interactions in China. It should be noted here that it is common for Chinese customers to remain anonymous in VBC communications, as privacy compromise or identity disclosure may have serious consequences [White 2004]. However, VC customers usually have to reveal their stable member identity (usually unique in each community) to be qualified for participation. This stable identity provides sufficient information, as "true" identity to certain extent, for our study. As recording VBC members' actual identity is impractical in China, the member identity dimension of Nambisan-Baron 2009 model is excluded from this study. Instead, the human-computer interaction dimension is added, due to its importance as aforementioned. Although many studies have investigated motivational factors of community participation [e.g. Chen et al. 2013; Dholakia et

al. 2004; Hoffman & Novak 1996; Kastner & Stangl 2012; Wang & Fesenmaier 2004a; 2004b; Zwass 2010], findings vary depending on context [Foster et al. 2010; Ouwersloot & Odekerken-Schröder 2008; Wang & Fesenmaier 2004a, 2004b]. Our study attempts to fill this particular gap by providing evidence from a specific VBC in China.

Furthermore, VBC members should be able to draw benefits from participation in order to sustain their involvement [Gwinner et al. 1998; Hennig-Thurau et al. 2002]. Although firm-level benefits from VBCs are well documented [Laroche et al. 2013; Nambisan & Baron 2009; Zaglia 2013; Zwass 2010], customer-level benefits have received far less research attention. It is still debatable whether customer interactions in VBCs lead to any customers' perceived brand benefits and/or brand loyalty. A better understanding of customer perceived benefits is essential for brand managers to better design and manage customer experiences, if they wish to maximize attraction and retain members in their VBCs.

Besides, the role of customers has changed gradually from *passive recipients* to *value co-producers* and *co-creators* [Payne et al. 2009; Nambisan & Baron 2009; Vargo & Lusch 2004], highlighting the necessity for practitioners and researchers to better understand the value or benefit co-creation process. Studies of open-source community [e.g. Hertel et al. 2003] and community of practice [e.g. Wagner et al. 2009; Wasko & Faraj 2005] suggest that only a few customer benefits can be derived or co-created, and their applicability to VBCs require further investigation [Nambisan & Baron 2009]. VC is considered a space for members to exchange knowledge, establish identity (e.g. self-efficacy), develop community of practice (including norms, values & relationships), sustain social network practices, and so on [Ardichvili 2008; Handley et al. 2006; Liu et al. 2012; Wagner et al. 2009]; thus, VC interactions can be seen as situated learning to some extent [Chiu et al. 2006; Handley et al. 2006]. More recently, VC researchers begin to examine customer perceived benefits (including cognitive, social-integrative, personal-integrative and affective benefits) by applying the use and gratifications (U&G) theory [Chen et al. 2013; Nambisan & Baron 2007, 2009; Sangwan 2009].

In accordance with this line of research, cognitive benefits are defined as acquisition of product knowledge such as usage, technology, and market related information [Nambisan & Baron 2009]. Social-integrative benefits can be derived from identification with the community and community members, and through establishing social and relational ties with entities involved, social identity and sense of belongingness can be accentuated [Nambisan & Baron 2007, 2009; Handley et al. 2006; Tajfel & Turner 1979]. Personal-integrative benefits are related to achievement, self-efficacy, and gains in status and reputation, and can be attained through product knowledge exhibition and application of problem-solving skills in VBCs [Katz et al. 1974; Nambisan & Baron 2007, 2009]. Affective benefits refer to aesthetic or pleasurable experience and enjoyment resulted from community participation [Nambisan & Baron 2007, 2009; Katz et al. 1974; Zhou et al. 2011]. The four customer perceived benefits are shown in Figure 1.

2.2 Conceptual Model and Hypotheses

Since product-content interaction includes discussion topics regarding product usage, brand knowledge, technology and market information, increases in such interaction should lead to more opportunities for customers to gain, or perceive to gain, higher cognitive benefits [Hertel et al. 2003; Nambisan & Baron 2009]. According to the situated learning theory, customers in VBCs can acquire not only knowledge (cognitive benefits) but also identity or sense of belongingness within that social network, i.e. social-integrative benefits [Dholakia et al. 2004; Handley et al. 2006]. More product-content interactions should also result in higher personal-integrative benefits, because they can be seen as a two-way knowledge sharing process, developing the customers' competencies [Nonaka & Takeuchi 1995] and boosting perceived personal-integrative benefits. At the same time, product-content interactions should produce affective benefits, as VBCs bring customers of different backgrounds together, and generate in-depth discussions and often solutions to problems, which have tendency to satisfy curiosity and stimulate enjoyment [Handley et al. 2006; Nambisan & Baron 2009]. Thus, our first group of hypothesis is stated as:

H1a: Product-content VBC interactions have positive effects on perceived cognitive benefits.

H1b: Product-content VBC interactions have positive effects on perceived social-integrative benefits.

H1d: Product-content VBC interactions have positive effects on perceived personal-integrative benefits.

H1d: Product-content VBC interactions have positive effects on perceived affective benefits.

Our second proposition is on impacts of human-computer VBC interactions on customers' perceived benefits. Human-computer interactions are about website experience or usability, i.e. experiences in navigating within online community environment [Chitturi et al. 2008; Mathwick & Rigdon 2004; Nambisan & Baron 2007]. A better website experience amounts to ease of participation in VBC discussions, and more opportunities to acquire knowledge and product related information; thus increase in perceived cognitive benefits [Fiore et al. 2005;

Nambisan & Watt 2008]. Such computer-mediated communications also reinforce social ties and engender senses of belonging, so should result in more perceived social-integrative benefits [Boneva et al. 2006; Bryant et al. 2006]. Well-designed website and hyperlinks attract customers to frequent the site more often and stay longer per visit, i.e. developing loyalty to that VBC and hopefully the brand. With such frequent interactions, customers become more knowledgeable in the brand and related products, gaining better reputation and higher status within the community; thus deriving more personal-integrative benefits from the interaction [Novak et al. 2000; Voorveld et al. 2010]. Lastly, effective website layouts should entail pleasant and enjoyable VBC experiences, and more affective benefits [Song & Zinkhan 2008; Flore et al. 2005]. Thus, the second hypothesis is stated as:

H2: Human-computer VBC interactions have positive effects on perceived (a) cognitive (b) social-integrative (c) personal-integrative and (d) affective benefits.

The third premise states that more interpersonal VBC interactions should give rise to more customer perceived benefits. Since VBCs are always product and brand related, more interpersonal interactions help develop effective information exchange channels, encourage discussions of product-related problems, and reduce time and efforts needed to find solutions, facilitate learning, resulting in more cognitive benefits [Chang & Chuang 2011; Nambisan & Baron 2009]. Interpersonal interactions are also expected to positively associate with social-integrative benefits. Social capital theory suggests that frequent interpersonal interactions allow customers to build and strengthen social networks and relationships, and promote sense of belongingness to the VBC [Chang & Chuang 2011; Choi & Kim 2004; Nambisan & Baron 2009]; thus leading to more personal-integrative benefits. Interactions with other VBC members are important ways to showcase one's knowledge, establish reputation, develop trust, and engender self-efficacy, i.e. more personal-integrative benefits [Burgooon et al. 2000]. Interpersonal VBC interactions can bring about affective benefits, i.e. fun, enjoyment, and "aha" moments [Nambisan & Baron 2009].

It is worth mentioning here that when Nambisan and Baron conceptualized their 2009 model, they assume human interactivity (i.e. interpersonal VBC interactions) has no impact on personal-integrative benefits. However, this might not be applicable in our case. As VBCs are highly interactive, members are likely to gain identity related benefits through interpersonal interactions, and acquire sense of achievement by earning recognition, respect, reputation and status in VBCs [e.g. Dholakia et al. 2004; Handley et al. 2006; Jeppesen & Frederiksen 2006; Kastner & Stangl 2012; Wang & Chen 2012]. Hence, we propose a link between interpersonal VBC interactions and personal-integrative benefits, and state the third hypothesis as:

H3: Interpersonal VBC interactions have positive effects on perceived (a) cognitive (b) social-integrative (c) personal-integrative and (d) affective benefits.

Relationship marketing research suggests that more customer-level perceived benefits foster positive customer-brand relationship [Hennig-Thurau et al. 2002; Gwinner et al. 1998]. Motivational research shows that online community participation include purposive value, entertainment value, social enhancement [Algesheimer et al. 2005; Dholakia et al. 2004; Foster et al. 2010; Ouwersloot & Odekerken-Schröder 2008; Wang & Fesenmaier 2004a, 2004b], e.g. functional, social, psychological and hedonic needs are key antecedents of VC participation [Wang & Fesenmaier 2004b]. Research also indicates that good brand community experiences lead to positive attitude towards the company and its products, and foster brand loyalty [Algesheimer et al. 2005; Muniz & O'Guinn 2001], e.g. participation in Jeep community events enhances brand loyalty [McAlexander et al. 2002]. As VBC is often owned and operated by a specific company, the linkage between VBC and the host is clearly visible to participating customers, making it easy for customers to attribute perceived benefits directly to the company and associated products [Settle & Golden, 1974]. In other words, active participation in VBC increases customers' commitment, emotional ties and identification with the brand [Algesheimer et al. 2005]. In their 2009 study, Nambisan and Baron conclude that customer perceived benefits of VBC involvement positively influence community participation. Hence, the next two propositions address the roles of customers' perceived benefits in shaping future VBC participation and brand loyalty, as presented in Figure 1.

H4: Perceived (a) cognitive (b) social-integrative (c) personal-integrative and (d) affective benefits positively correlate with community participation.

H5: Perceived (a) cognitive (b) social-integrative (c) personal-integrative and (d) affective benefits positively correlate with brand loyalty.

The importance of identity has long been recognized by researchers studying organizational identity [e.g.

Ashforth & Mael 1989; Dutton et al. 1994], social identity [e.g. Bagozzi & Dholakia 2006; Dholakia et al. 2004; Lam et al. 2010], community identity [e.g. Laroche et al. 2013; Nambisan & Baron 2009], consumer-company identity [e.g. Ahearne et al. 2005; Bhattacharya & Sen 2003], consumer identity [e.g. Chernev et al. 2011; Koles & Nagy 2012], customer-brand identification [e.g. Divakaran 2012; Lam et al. 2012], and brand identity [e.g. Hughes & Ahearne 2010; Ellonen et al. 2010]. Nevertheless, very few of these studies were conducted in the context of VCs or VBCs, and even less have examined complementary effects of brand identity, customer VBC interactions and perceived benefits [e.g. Dholakia et al. 2004; Nambisan & Baron 2009; Shen & Chiou 2009].

Since brand identity signifies consumer's psychological associations with the brand [Hughes & Ahearne 2010; Lam et al. 2010], it follows that such associations should become stronger when brand identity is salient. Also, intrinsic goals of enhancing self esteem, status and reputation should motivate members' willingness to communicate with others in VBCs [Belk 1988; Brown et al. 2005; Currás-Pérez et al. 2009; Escalas & Bettman, 2005; Fournier 1998; Plott & Zeiler 2007]. Social identity theory implies that when customers strongly identify with a brand, their personal significance (identity) becomes intertwined with the brand's success and failure [Tajfel & Turner 1979]. VBCs are designated places for customers to "gather" and explore common (thus salient) interests in brands [Nambisan & Baron 2009]. Salient brand identity should motivate VBC members to consider the brand as a way to manifest their desires to identify with the group or community, i.e. symbolic benefits of community participation [Lam et al. 2010; Tajfel & Turner 1979].

Customers with strong brand identity often show more "brand" citizenship behavior, like promoting the brand and supporting brand related activities, and are more willing to share brand knowledge with others, i.e. more community participation [Ahearne et al. 2005; Hughes & Ahearne 2010; McAlexander et al. 2002]. In other words, loyal customers tend to enhance the brand's value and functionality, as well as derive more benefits from interpersonal VBC interactions [Hughes & Ahearne 2010]. Seasoned VBC users often develop effective strategies, such as posting threads, to further enhance benefits of interpersonal interactions in VBCs. Therefore, salient brand identity should accentuate the amount of perceived benefits members derived from interpersonal VBC interactions. On the contrary, when brand identity is less salient, the link from interpersonal interactions to perceived benefits should be weaker.

It should be emphasized that the above arguments are applicable to interpersonal or *person-to-person* communications, and should be irrelevant to *human-to-computer* interactions, at least not yet. Thus, we expect brand identity to have *zero* or negligible moderating effects on the relationship between human-computer interactions and perceived benefits.

As for product-content interactions, customers with strong brand identity usually have superior brand knowledge, so are often more confident about their own evaluation of the brand and do not have any need to seek brand related or product-content information in VBCs, i.e. less perceived benefits [Bhattacharya & Sen 2003; del Río et al. 2001]. Thus, strong brand identity should attenuate the links between product-content VBC interactions and perceived benefits. On the contrary, customers with weaker brand identity often have less brand knowledge for sharing in VBCs. Instead, they may go to VBCs to seek product information for specific buying decisions or improve general brand knowledge. Such actions then strengthen customers' perceived utilities (benefits) of product related engagement in VBCs [del Río et al. 2001]. In other words, the less customers identify with the brand (less salient brand identity), the stronger the relationship between product-content VBC interactions and perceived benefits should be [Ellemers & Rink 2005; Meyer et al. 2006]. Hence, our last two hypotheses in relation the moderating role of brand identity are stated as:

- H6: Brand identity positively moderates the relationship between interpersonal VBC interactions and perceived (a) cognitive (b) social-integrative (c) personal-integrative and (d) affective benefits.*
- H7: Brand identity negatively moderates the relationship between product-content VBC interactions and perceived (a) cognitive (b) social-integrative (c) personal-integrative and (d) affective benefits.*

In sum, this research seeks to advance the knowledge on customer interactions in VBCs and customer-level perceived benefits of VBC participation. The integrated framework illustrated in Figure 1 includes three dimensions of customer VBC interactions conceptualized as antecedents leading to four types of customer perceived benefits, community participation and brand loyalty, with brand identity as moderating variable. Our study could provide valuable information for brand managers to more effectively manage VBCs in order to facilitate customer interactions, improve virtual experiences and enhance brand values [Laroche et al. 2013; Payne et al. 2009; Vargo & Lusch 2004; Zwass 2010].

3. Research Methodology

3.1 Sample and Data Collection

Responses were collected through a web-based questionnaire survey in Chinese, translated from English and validated by standard translation and back-translation procedures [Brislin 1980]. Potential respondents were recruited from an online Apple community, Mcfans (www.mcfans.com.cn) in China. This research platform was chosen for two reasons: Apple products are adored by many Chinese customers, and Mcfans is the first online communication platform in China for Apple fans to exchange ideas and experiences about the brand. Mcfans has around 0.16 million members, with 3 million postings since founded in 2006. The VBC has four major discussion categories and 24 sub-discussion boards with sufficient amount of content and member interactions for analysis. Invitation letters with a questionnaire link were sent to potential participants, or left at offline members' homepages. In total, 992 Mcfans members were contacted, with 214 responses and 207 valid completed surveys (response rate = 20.87%). Respondents' profiles are presented in Table 1.

Respondents were asked to provide their unique Mcfans community ID number, which allowed us to identify respondents and non-respondents and retrieve members' community involvement data. Independent sample *t*-test revealed no significant difference between the two groups' length of tenure and number of postings. All respondents were then divided into "early" and "late" groups, according to community tenure, and the two groups were compared in terms of number of postings, age and education. Again, no significant difference was found. Hence, non-response bias did not appear to be a serious problem in our data [Armstrong & Overton 1977]. Moreover, we checked all IP addresses used to access the questionnaire, to ensure there was no repetition, i.e. no repeated responses by the same member.

Table 1: Profile of Respondents in the Study

Characteristic	Categories	Frequency	Ratio
Gender	Male	193	93.24%
	Female	14	6.76%
Age (in years)	Below 18	3	1.45%
	18-24	56	27.05%
	25-30	81	39.13%
	31-35	40	19.32%
	36-40	20	9.66%
	Above 40	7	3.38%
Education	Junior school & lower	0	.00%
	High school/polytechnic school	14	6.76%
	Bachelor/Junior college	154	74.40%
	Master's & higher	39	18.84%
Employment Industry	Computer/Telecom industry/Software	46	22.22%
	Finance/Bonds/Investment band/VC funds	9	4.35%
	Service industry [hotel, restaurants, etc.]	9	4.35%
	Manufacturing industry	17	8.21%
	Education/Training/Research/School	13	6.28%
	Non-profit Government /Government	5	2.42%
	Students	34	16.43%
	Others	74	35.75%
Total		207	100%

3.2 Measurements and Control Variables

Existing scales were adopted to measure the research constructs in the framework presented in Figure 1. In-depth interviews with five experts and 50 experienced Mcfans community members were conducted, and question wording was adjusted accordingly. Pre-tests were then carried out and further refinement made to tailor each questionnaire item for the study context.

Other than one Venn-diagram item assessing brand identity using an 8-point graphical scale (1 = *not at all* to 8 = *very much*), all items in the final questionnaire were measured by 7-point Likert scale (1 = *strongly disagree* to 7 = *strongly agree*). Table 2 presents all the question items, with confirmatory factor analysis results and respective references.

Table 2: Confirmatory Factor Analysis (CFA), Composite Reliability Coefficient (CR) and Average Variance Extracted (AVE)

Variables	Items	Loading	T	CR	AVE	References
Product-content interactions	1. My interactions contained large amount of information about product usage (e.g., product features, functions, updates, etc.).	.86	26.73	.841	.640	Nambisan & Baron 2009
	2. My interactions contained large amount of information about product technology (e.g., standards, extension & new applications, etc.).	.82	23.43			
	3. My interactions contained large amount of information about product market (e.g., market trend, competing products, complementary products, pricing, etc.).	.72	13.09			
Human-computer interactions	4. I am always in control of my navigation and can browse different contents or links in the community very conveniently	.80	14.56	.791	.563	Jee & Lee 2002; Voorveld et al. 2010
	5. I think the design of the community (color, structure, layout, etc.) is very friendly	.60	6.63			
	6. The community provides different ways to communicate with others (e.g. symbols, expressions, attachments, modules, videos, etc.).	.83	18.99			
Interpersonal interactions	7. I always post new threads in the community and will get response quickly from others.	.89	50.47	.924	.803	Preece 2001; Hoffman & Novak 1996
	8. I always actively take part in community discussions and offer help and/or solutions, when possible.	.93	88.31			
	9. There are plenty of two-way communications for sharing experiences, feeling, questions, etc., with other members in the community.	.87	36.92			
Cognitive benefits	10. My knowledge about product and usage is enhanced and expanded.	.89	32.86	.921	.796	Nambisan & Baron 2007, 2009
	11. Possible solutions to specific product and/or usage related problems can always be obtained.	.90	50.41			
	12. My knowledge about advances in products and product-related technology is enhanced and expanded.	.88	38.11			
Social-integrative benefits	13. My personal (social) network is strengthened and expanded	.79	15.77	.910	.773	Nambisan & Baron 2009
	14. The strength of my affiliation with the community is enhanced	.93	66.97			
	15. My sense of belongingness to this community is strengthened	.92	60.06			
Personal-integrative benefits	16. My status (reputation) as a product expert in the community is built and enhanced	.94	71.77	.949	.861	Nambisan & Baron 2009
	17. My product-related credibility (authority) in the community is recognized and strengthened	.96	97.42			
	18. My self-efficacy and satisfaction derived from influencing product usage (designs) are enhanced	.88	33.71			
Affective benefits	19. Some enjoyable and relaxing time are spent in the community	.93	69.16	.945	.813	Franke & Shah 2003; Hertel et al. 2003; Nambisan & Baron 2009
	20. Both fun and pleasure are derived in the community	.93	67.09			
	21. Participating in the community entertains and stimulates my mind	.93	76.35			
	22. Enjoyment is derived from problem solving, idea generation, etc	.81	22.20			
Brand Loyalty	23. I will actively look for this brand in my future purchase.	.91	45.96	.950	.830	Chaudhuri & Holbrook 2001; Brakus et
	24. This brand will be my first choice in the future	.95	109.26			
	25. I intend to buy other products of this brand.	.94	73.49			

Variables	Items	Loading	T	CR	AVE	References
	26. I will recommend this brand to others.	.83	17.20			al. 2009
Brand identity	27. "The way I am" fits in with what I perceive of Apple brand.	.91	45.72	.940	.810	Bagozzi & Dholakia 2006; Currás-Pérez et al. 2009; del Río et al. 2001
	28. Apple is a brand totally in line with my lifestyle.	.92	33.05			
	29. The image I have of Apple overlaps with my self-image.	.88	39.33			
	30. The degree of overlap between my personal identity and the brand's identity*	.89	40.10			
Product involvement	Purchasing Apple products:			.960	.840	Nambisan & Baron 2009
	31. is unimportant/ important	.93	54.62			
	32. is irrelevant/ relevant	.94	39.65			
	33. means a lot to me/ mean nothing to me	.87	24.56			
	34. matters to me/ doesn't matter to me	.94	54.14			
35. is of no concern to me/ of concern to me	.90	36.76				

Notes: *Brand identity (item #30) was measured by the 8-point graphical scale (1 = *not at all* to 8 = *very much*). All other items were presented with 7-point Likert scale (1 = *strongly disagree* to 7 = *strongly agree*).

Community participation was measured by the each member's total number of postings made in Mcfans [Nambisan & Baron 2009]. In addition, respondents were asked to give a subjective evaluation of their community participation ("I participate in the community very actively"), in a 5-point scale (1 = *strongly disagree* to 5 = *strongly agree*). A significant correlation, $r = .87$ ($p < .01$), was found between total number of postings and subjective evaluation.

Several control variables were included, i.e. age, gender, education, and product involvement. Specifically, product involvement refers to perceived product importance based on customer's inherent need, interest and value [Zaichkowsky 1985]; thus different involvement levels may result in different degrees of customer interactions and benefit-related consequences. Men being more enthusiastic about products and technology, and young customers being keen on new gadgets, both may have more frequent VBC interactions and higher perceived benefits [Nambisan & Baron 2009; Sangwan 2009; Wang & Fesenmaier 2004a]. Educational background may affect extent of product knowledge, ways of voicing opinions, degrees of VBC interactions and perceived benefits [Sangwan 2009].

Internal consistency was checked using two indicators [Fornell & Larcker 1981]. The first one, composite reliability (CR) coefficient, ranged from .791 to .963 (Table 2), exceeding the recommended minimum of .7. The second indicator, average variance extracted (AVE), defined as the amount of variance captured by a latent variable relative to random measurement error, ranged from .563 to .861, exceeding recommended minimum of .5 level [Bagozzi & Yi 1988]. Thus, measures in the model were concluded to have good internal consistency.

Construct validity was tested by conducting a confirmatory factor analysis which revealed good discriminant and convergent validities [Fornell & Larcker 1981]. Table 2 includes standardized factor loadings of all items which are above recommended cut-off point of .6 and statistically significant, indicating strong evidence of convergent validity. Discriminant validity was assessed by the square root of AVE of each construct (Table 3) which was higher than correlations with any other constructs in the model [Fornell & Larcker 1981]. Hence, the constructs were demonstrated to be conceptually and empirically distinct from each other.

A two-step approach of applying structural equation modeling (SEM) was adopted in testing the hypotheses [Anderson & Gerbing 1988]. Partial least squares (PLS) variance analysis was chosen because it is a nonparametric structural equation modeling technique, can circumvent SEM's necessity for multivariate normal data [Chin et al. 2003], can model latent constructs using small to medium size sample, and has been applied extensively in information systems, operation management, strategic management, service management, marketing and VC research [e.g. Nambisan & Baron, 2007]. Furthermore, PLS was found to be superior to traditional techniques such as analysis of variance and moderated multiple regression in testing moderating effects [Chin et al. 2003]. Given the exploratory nature of this study and concerns about predictive power of the model, we decided to use PLS-Graph 3.0

Software for model development and analysis.

Table 3: Correlation Matrix with Square Root of AVE

	Sqrt (AVE)	1	2	3	4	5	6	7	8	9	10
1. Product-content interactions	.800										
2. Human-Computer Interactions	.343**	.750									
3. Interpersonal interactions	.216**	.565**	.896								
4. Cognitive Benefits	.555**	.235**	.197**	.892							
5. Social-integrative benefits	.308**	.474**	.467**	.480**	.879						
6. Personal-integrative benefits	.367**	.346**	.371**	.597**	.652**	.928					
7. Affective benefits	.368**	.460**	.415**	.563**	.690**	.602**	.902				
8. Brand Loyalty	.265**	.100	.182**	.493**	.333**	.374**	.372**	.909			
9. Brand identity	.269**	.161*	.230**	.411**	.254**	.326**	.326**	.680**	.902		
10. Community Participation	-.068	.149*	.308**	.027**	.276**	.113	.194**	.119	.120*	--	

Notes: ** $p < .01$; * $p < .05$; where Square Root of AVEs are the diagonal

4. Results

Table 4 shows that *R*-Square values related to cognitive benefits, social-integrative benefits, personal-integrative benefits and affective benefits were .4276, .3411, .2776 and .3432, respectively (under Main-effect Model).

Table 4: Structural Equation Modeling Analysis, with PLS-Based Technique

Path coefficient / Significance	Main-effect model								Interaction-effect model							
	(a)		(b)		(c)		(d)		(a)		(b)		(c)		(d)	
	Cognitive benefits	Social-integrative benefits	Personal-integrative benefits	Affective benefits	Cognitive benefits	Social-integrative benefits	Personal-integrative benefits	Affective benefits	Cognitive benefits	Social-integrative benefits	Personal-integrative benefits	Affective benefits	Cognitive benefits	Social-integrative benefits	Personal-integrative benefits	Affective benefits
	β	<i>T</i>	β	<i>T</i>	β	<i>T</i>	β	<i>T</i>	β	<i>T</i>	β	<i>T</i>	β	<i>T</i>	β	<i>T</i>
H1 Product-content interactions	.52	7.37	.15	1.88	.25	2.98	.21	2.67	.412	7.47	.06	.76	.12	1.57	.14	2.42
H2 Human-computer interactions	.01	.10	.22	2.62	.12	1.75	.29	3.60	.02	.33	.33	4.90	.15	1.83	.30	3.73
H3 Interpersonal interactions	.05	.65	.31	4.71	.21	2.16	.16	2.04	.06	1.13	.23	3.05	.22	2.88	.16	2.12
Brand identity	.25	3.05	.11	1.25	.18	2.12	.18	2.09	.30	4.59	.19	2.86	.26	3.75	.25	3.34
H7 Product-content interactions X Brand identity									-.11	-1.67	-.05	-.48	-.15	-1.97	-.01	-.07
Brand identity X Human-computer interactions									-.07	-.67	-.09	-.80	.02	.15	-.10	-.83
H6 Interpersonal interactions X Brand identity									.20	2.02	.25	2.35	.31	2.52	.21	1.89
<i>R</i> -square	.4276		.3411		.2776		.3432		.4920		.4190		.3820		.4018	
<i>R</i> -square Change									.0644		.0779		.1045		.0586	

Traditional parametric tests are inappropriate since PLS analysis does not involve any distributional assumptions, so a bootstrapping method of sampling with replacement was applied to compute standard errors based on 500 bootstrapping runs. The path coefficients (β 's, Table 4) indicate that product-content interactions significantly affected cognitive ($\beta = .52, T = 7.3$), social-integrative ($\beta = .15, T = 1.88$), personal-integrative ($\beta = .25, T = 2.98$), and affective ($\beta = .21, T = 2.67$) benefits, supporting Hypotheses 1a, 1b, 1c, and 1d.

Human-computer interactions also had significant impacts on social-integrative ($\beta = .22, T = 2.62$), personal-integrative ($\beta = .12, T = 1.75$), and affective ($\beta = .29, T = 3.60$) benefits, confirming Hypotheses 2b, 2c, and 2d. Impacts of human-computer interactions on perceived cognitive benefits was not significant ($\beta = .01, T = .10$); thus Hypothesis 2a not supported. Interpersonal interactions were shown to significantly influence social-integrative ($\beta = .31, T = 4.71$), personal-integrative ($\beta = .21, T = 2.16$) and affective ($\beta = .16, T = 2.04$) benefits, indicating that Hypotheses 3b, 3c, and 3d were supported, but Hypothesis 3a was not.

Community participation was found to be influenced significantly by cognitive ($\beta = .18, T = 2.35$), social-integrative ($\beta = .33, T = 3.61$), personal-integrative ($\beta = .12, T = 1.71$) and affective ($\beta = .15, T = 1.89$) benefits, confirming Hypotheses 4a, 4b, 4c, and 4d. However, only cognitive benefits showed statistically significant impact on brand loyalty ($\beta = .41, T = 4.53$), supporting Hypothesis 5a only. In addition, a positive and significant effect of product involvement on brand loyalty ($\beta = .13, T = 1.69$) was found.

In the second step of our analysis, an interaction-effect model was developed by including the moderating variable (i.e. the interaction terms in Table 4) in addition to the main effects [Anderson & Gerbing 1988]. As in regression analysis, predictor and moderator variables were multiplied to create the interaction terms, while indicators were standardized prior to multiplication [Chin et al. 2003]. Table 4 reports the R^2 values of cognitive (.4920), social-integrative (.4190), personal-integrative (.3820) and affective (.4018) benefits. The R^2 of the interaction-effect model were compared with those in the main-effect model to assess the overall effect size, f^2 , of the interactions, using the following equation [Cohen 1988]:

$$f^2 = \left[\frac{R^2(\text{Interaction-effect-model}) - R^2(\text{Main-effect-model})}{1 - R^2(\text{Main-effect-model})} \right]$$

The overall effect sizes (f^2) of cognitive (.11), social-integrative (.12), personal-integrative (.14) and affective (.09) benefits are all within the suggested range of .02 to .15 [Cohen 1988], confirming the moderating effects of brand identity [Chin et al. 2003]. The analysis also revealed positive and significant interaction effects between brand identity and interpersonal interaction on cognitive ($\beta = .20, T = 2.02$), social-integrative ($\beta = .25, T = 2.35$), personal-integrative ($\beta = .31, T = 2.52$) and affective ($\beta = .21, T = 1.89$) benefits, supporting Hypotheses 6a, 6b, 6c and 6d. Brand identity was found to be negatively moderated the relationship between product-content interaction and cognitive ($\beta = -.11, T = 1.67$) and personal-integrative ($\beta = -.15, T = 1.97$) benefits, i.e. Hypotheses 7a and 7c were confirmed. As expected, brand identity did not show any moderating effects on the relationships between human-computer interactions and perceived benefits.

To provide complementary evidence for the moderating effects of brand identity, moderated multiple regression analysis was conducted to test the research hypotheses [Cohen & Cohen 1983]. The R^2 increase for the interaction models was statistically significant when compared with the main-effect models without any interaction terms. The R^2 increases were .058, 0.065, 0.107 and 0.046 (all p 's < 0.01), when cognitive, social-integrative, personal-integrative, and affective benefits were regarded as the dependent variable respectively. We then examined the significance of the interaction terms and found similar patterns in significance level, direction, and effect size [Tabachnick & Fidell 1996].

5. Discussion, Implications and Conclusion

5.1 Discussion

Our findings support most of our hypotheses, and are consistent in general with existing literature on VBC, but with a few exceptions. First of all, our study reveals that product-content interactions have significantly positive effects on cognitive, social-integrative and affective benefits (Hypotheses 1a, 1b, & 1d), which is similar to Nambisan and Baron's 2009 results. But we also find a significantly impact of product-content interactions on personal-integrative benefits (Hypothesis 1c), which has not been revealed in previous research. Nambisan and Baron argue that moderating effects of certain customer characteristics may render product-content interactions incapable of enhancing personal-integrative benefits for customers with poor product knowledge or low self-esteem. However, Mcfans members seem to have acquired capabilities of discussing and solving product-related problems, which strengthens competence and expert status; hence generating more personal-integrative benefits. Our findings

also show that product-content interactions have the biggest impact on cognitive benefits (Hypothesis 1a; $\beta = .52$), whereas Nambisan and Baron's 2009 results show hedonic benefits to be the strongest. This discrepancy may be related to how online communities have changed over the years and particularly in China, where consumers have tendency to search for product knowledge online; hence, product-content interactions in VBCs accentuate cognitive benefits.

Human-computer interactions show significant impacts on social-integrative and affective benefits (Hypotheses 2b & 2d), as in previous research [Bryant et al. 2006; Song & Zinkhan 2008], but the effects on cognitive and personal-integrative benefits are not significant, unlike the previous findings [Fiore et al. 2005]. The Mcfans' website has relatively poor design in technically complex layout, which can be verified by the small amount of human-computer interactions reported in our data. This could make VBC interactions too difficult for some Mcfans members to navigate and comprehend, reducing opportunities to find knowledge (cognitive benefits) or develop competencies (personal-integrative benefits). Thus, VBC managers should seek to improve website design to ensure the site is user-friendly, feature suitable functionality to encourage patronage, facilitate learning and status recognition.

Interpersonal VBC interactions show significant impacts on social-integrative and affective benefits (Hypotheses 3b & 3d), but not on cognitive benefits, concurring with Nambisan and Baron's 2009 results. Not surprisingly, interpersonal interactions in Mcfans significantly enhance personal-integrative benefits (Hypothesis 3c). The harmonious and respectful ambiance of Mcfans provides members a friendly platform to showcase themselves, win respect and recognition from peers, and enjoy the communal experience. In addition, the largest influence of interpersonal interactions is on social-integrative benefits (Hypothesis 3b; $\beta = .31$), which again deviates from Nambisan and Baron's results (with largest impacts on hedonic benefits). Social capital theory denotes that interpersonal interactions can provide huge potentials for individuals to build social network and relationship [Chang & Chuang 2011; Choi & Kim 2004]; thus explains how interpersonal interactions work on the social aspects in Mcfans.

Moreover, all four types of customer perceived benefits have significant impacts on community participation (Hypotheses 4a, 4b, 4c, & 4d), as in Nambisan and Baron's study. However, relative weights of perceived benefits are different in the two studies. Our findings indicate that social-integrative benefits have the most impact on community participation (Hypothesis 4b; $\beta = .33$); whereas cognitive benefits are most influential in Nambisan and Baron's 2009 study. On the other hand, the study reveals that only cognitive benefits have significant impacts on brand loyalty (Hypothesis 5a; $\beta = .41$). We also confirm the positive moderating effect of brand identity on the relationship between interpersonal VBC interactions and all four perceived benefits (Hypotheses 6a, 6b, 6c, & 6d), and the negative moderating role of brand identity on product-content interactions and cognitive as well as personal-integrative benefits (Hypotheses 7a & 7c).

5.2 Theoretical and Practical Implications

We introduce an integrated theoretical framework to conceptualize customers' VBC interactions and perceived benefits and propose that study context needs to be considered when conducting future VBC research. The proposed integrated framework is a response to the call for integrating organization and marketing perspectives to develop a better understanding of customer involvement in business activities [Dietz et al. 2004; Schneider et al. 2005]. To the best of our knowledge, this study is one of the first to integrate customer interactions, perceived benefits, community participation and brand loyalty in the context of VBCs, and the first to empirically examine the complicated relationships involved. Management of virtual communities will not be effective without thorough understanding of VBC interactions, which go beyond user participation and involvement. Our study moves this body of literature forward by examining the relative importance of multiple dimensions of customer VBC interactions on multiple aspects of perceived benefits and revealing a number of potential future research directions, e.g. on community regulations and control mechanisms [Jean et al. 2010; Nambisan & Baron 2009]. Moreover, the study expands the brand identity literature to the context of VBCs, by investigating the moderating role of brand identity in relation to customer VBC interactions and perceived benefits. By revealing differential moderating roles of brand identity, we complement a few existing studies that suggest brand identity has disruptive effects in practices [Chernev et al. 2011; Ellemers & Rink 2005; Meyer et al. 2006]. Lastly, our study contributes to the VBC literature by providing empirical evidence from a VBC in China, an essential first step to validate generalizability of existing knowledge of VBCs, as an important benchmark for future VBC research in the global marketplace.

From managerial perspectives, our study highlights areas brand managers could pay special attention to facilitate customer interactions in VBCs, in order to retain and attract profitable customers. For instance, managers can strengthen social networking through various marketing communications channels to enhance interpersonal VBC interactions, which are shown to have significant effects on social-integrative, personal-integrative and affective benefits. Also, the research could help managers to better forecast, monitor, and design communications

programs to make the most of opportunities offered by VBCs. Practitioners however need to be cautious with accentuating brand identity, given its differential moderating roles as discussed.

5.3 Study Limitations and Conclusion

Given our data were collected from Apple's VBC, dedicated to high-end technology-advanced products, cautions should be exercised if generalizing our findings to other VBCs, as different products and communities entail different kinds of customer interactions. Further research is needed to extend both the study and the framework to different contexts.

Secondly, one potential limitation may be related to the issue of common method variance. To address the problem, we have applied Harman's one-factor test and found that eleven factors explained 69.27% of the variance with no single factor explaining more than 20% of the variance, implying this problem does not seem to be significant. However, a better design would be to measure explanatory and response variables separately. Furthermore, the cross-sectional nature of this study also calls for prudence if inferring causal interpretations of the findings.

In conclusion, the study provides several new theoretical and practical insights that enhance the understanding of customer interactions in VBCs and factors that shape customer VBC experiences. The research framework proposed underscores the needs to consider multiple dimensions of customer interactions and perceived benefits of VBCs. As more and more company resources are invested in VBC-based initiatives, better knowledge of VBCs is vital to ensure that the right kinds of interactions are properly motivated to generate the most benefits for customers and the brand.

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