



Motivation for users' knowledge sharing behavior in virtual brand communities: A psychological ownership perspective

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Abstract:

Purpose

Users' knowledge sharing provides valuable resources for brand community participants, and is therefore critical for the viability of virtual brand communities. Drawing from both self-determination theory and psychological ownership theory, this paper investigates the impact of fulfillment of three basic psychological needs on brand users' knowledge sharing behavior, and examines psychological ownership as a mediator.

Methodology

Survey data consisting of 316 valid responses was collected from users of Huawei Pollen Club Community. Confirmatory factor analysis confirmed the reliability and validity of measures, and hierarchical linear regression and bootstrapping were used to test all hypotheses.

Findings

Fulfillment of the need for autonomy, relatedness, and competence in a virtual brand community boosts users' psychological ownership and has a positive influence on their knowledge sharing behavior. Furthermore, psychological ownership partially mediates the relationships between the fulfillment of psychological needs and knowledge sharing behavior. In addition, we found that when users participate in more offline brand activities, the positive impact of the fulfillment of the need for relatedness on psychological ownership is strengthened, while the positive impact of the fulfillment of the need for autonomy on psychological ownership is weakened.

Originality/value

This paper contributes to the existing literature by exploring the relationships between fulfilling users' three basic psychological needs and their knowledge sharing behavior through the mediating role of psychological ownership. We also provide insight into how offline brand activities interact with the fulfillment of psychological needs in virtual brand communities.

Keywords: Self-determination theory, psychological needs, psychological ownership, knowledge sharing behavior, offline brand activity, brand community

1 Introduction

As geographically unbound communities based on social relationships between brands and consumers (de Valck *et al.*, 2009), virtual brand communities provide online platforms for like-minded brand enthusiasts to share information and experiences. Virtual brand communities have been recognized for their strategic importance in fulfilling consumers' information-seeking needs, promoting consumer engagement, and increasing brand loyalty (Baldus *et al.*, 2015; Kamboj, 2019; Kumar and Nayak, 2019). A growing number of companies are building their virtual brand communities, and investing heavily in customer engagement campaigns (Harmeling *et al.*, 2017). However, many brand communities are facing such problems as insufficient knowledge contribution. The current Web 3.0 era emphasizes two-way interactions between consumers and brands (Beer, D., 2009; Irani *et al.*, 2017), focuses heavily on the value created by online members (Quinton, 2013), and encourages participants to create their content (Hollebeek *et al.*, 2014). To exploit and leverage the value of community users in the long term, companies consequently must pay close attention to users' knowledge sharing behavior.

Academic interest in factors that influence users' knowledge sharing in virtual brand communities is growing (Kang *et al.*, 2017; Liao *et al.*, 2020; Zhang, Zhang, *et al.*, 2017). Among studies exploring the antecedents of users' knowledge sharing behavior, most past studies have emphasized the impact of motivation and external environmental factors (Wang and Clay, 2012; Yoon and Rolland, 2012), but largely neglected the influence of consumers' psychological states. Although research has suggested that relatedness, competence, and autonomy will influence individuals' engagement with organizations or brand communities, the psychological mechanisms of this influence are still unclear (Fotiadis *et al.*, 2019; Hsieh and Chang, 2016; Kim and Drumwright, 2016). And while past research has paid considerable attention to the effect of online interaction, the effect of offline activities on the contribution of knowledge remains to be explored (Ma and Yuen, 2011; Zhang and Liu, 2021). To address these issues, this study investigates the influence of fulfillment of users' psychological needs on knowledge sharing behavior in virtual brand communities. In addition, organizational researchers have long demonstrated that psychological ownership is an important antecedent of employees' organizational citizenship behavior (Pierce and Jussila, 2010). Since virtual brand communities are virtual yet informal organizations, we propose that psychological ownership can be an important factor driving users'

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4 knowledge contributions. Because psychological needs will affect the feeling of psychological
5 ownership, the fulfillment of psychological needs will have an indirect impact on individuals' behavior
6 through psychological ownership (Mayhew *et al.*, 2007). Drawing on psychological ownership theory,
7 we consequently propose that psychological ownership acts as a mediator in the relationship between
8 the fulfillment of users' psychological needs and knowledge sharing behavior, and suggest that offline
9 brand activities can serve as a moderator for this relationship. To test our hypotheses, we collected data
10 from users in Huawei's Pollen Club Community.

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17 This study yielded important theoretical contributions to the knowledge sharing literature. First,
18 this paper investigates antecedents that influence users' knowledge sharing in the context of a virtual
19 brand community, and verifies the impact of the fulfillment of three psychological needs on users'
20 knowledge sharing behavior. These findings based on a behavioral perspective in the context of a brand
21 community fill a gap in past research on user engagement (Fu *et al.*, 2018; Kuem *et al.*, 2020; Loureiro
22 and Kaufmann, 2018; Ye and Cheng, 2019). Second, we combine self-determination theory with
23 psychological ownership theory to examine the mediating role of psychological ownership. The
24 fulfillment of users' basic psychological needs has a positive effect on their sense of psychological
25 ownership, which in turn promotes their knowledge sharing. Third, this paper explores the moderating
26 impact of offline brand activities on the relationship between the fulfillment of psychological needs and
27 users' online behavior, such as knowledge sharing. Our findings suggest that in addition to the impact
28 of online interactions on user behavior, which has often been examined in the literature (Ibrahim *et al.*,
29 2017), offline brand interactions also affect users' desire to share their ideas. Specifically, we find that
30 this moderating effect of offline brand activities varies depending on the psychological need being
31 fulfilled. For example, when users engage in offline brand activities, the effect of the fulfillment of the
32 need for relatedness on psychological ownership is enhanced, while the effect of the fulfillment of the
33 need for autonomy on psychological ownership is diminished, which provides new insights into the role
34 of offline brand events in the functioning of brand communities.

54 **2 Theoretical Background and Literature Review**

56 **2.1 Knowledge sharing**

58 Online users' knowledge sharing refers to the act of posting and sharing innovative content on the
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4 Internet by individual users (Krishnamurthy and Dou, 2008). In virtual brand communities, knowledge
5 sharing is mainly in the form of content contribution, which refers to an exchange behavior that includes
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7 knowledge acquisition and provision, such as through browsing, posting, and commenting (Jang *et al.*,
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9 2008). Knowledge sharing in the form of ideas, suggestions, and experiences is an essential resource
10 that can attract newcomers and sustain a virtual community (Shen *et al.*, 2018). However, since
11 knowledge sharing is a voluntary action on the part of individuals who are willing to exchange
12 knowledge (Gagné, 2009; Kang *et al.*, 2017), how to encourage users to share their knowledge has
13 become a question of widespread interest.
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20 Past studies have widely documented the antecedents of users' knowledge sharing behavior. For
21 instance, the effect of monetary rewards on knowledge contribution has been examined (Liu and Li, 2017).
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23 Acar (2018) indicated that offering sufficient rewards can be effective in encouraging more consumers
24 to share ideas, but that such financial incentives can be counterproductive in some cases, adversely
25 affecting creativity. Scholars have therefore paid more attention to other factors influencing users'
26 knowledge sharing behaviors, including social motivation (Jiang and Wang, 2020) and the norm of
27 reciprocity (Liao *et al.*, 2020), etc. In addition, past research has also verified the effect of individuals'
28 psychological states in enhancing knowledge sharing, including psychological empowerment (Kang *et*
29 *al.*, 2017) and psychological capital (Zhang, Zhang, *et al.*, 2017).
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37 **2.2 Self-determination theory**

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39 Self-determination theory (SDT) concerns individuals' motivations for performing specific
40 behaviors (Deci and Ryan, 1985). Self-determination theory proposes that there are three basic
41 psychological needs: the need for autonomy, relatedness, and competence (Ryan and Deci, 2000).
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43 Autonomy indicates the extent to which an individual's behavior depends entirely on his or her inner
44 will (Deci and Ryan, 2000). Relatedness refers to the sense of intimacy and belonging that an individual
45 develops through gaining the approval, attention, and understanding of others. Competence refers to an
46 individual's feeling that their abilities match the activity they are doing and the belief that they can
47 accomplish that activity, and is similar to a sense of self-efficacy.
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55 Self-determination theory suggests that fulfillment of these three psychological needs will increase
56 employees' intrinsic motivation to work (Ryan and Deci, 2000). According to value co-creation theory,
57 consumers can create value together with a brand and can thus be seen as employees of the brand
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(Galvagno and Dalli, 2014; Merz *et al.*, 2018). Fulfillment of the three psychological needs, therefore, leads to stronger intrinsic motivation (Kuem *et al.*, 2020) and may increase consumers' brand commitment (Kaur *et al.*, 2020). In virtual communities, users can satisfy these three psychological needs through various types of engagement. For example, fully empowering users to freely view, edit, and post content meeting their interests will satisfy the need for autonomy (Kelley and Alden, 2016). The need for relatedness will be satisfied when users interact with other users in their community (Tsai and Pai, 2014). In addition, users can gain a sense of competence from helping others within the community (Hsieh and Chang, 2016). When these three basic needs are fulfilled, online users become more satisfied with their communities and gain a greater sense of well-being (Ryan and Deci, 2000).

2.3 Psychological ownership

Psychological ownership is a psychological state in which individuals feel that they possess the ownership of an object, regardless of whether they legally own it (Pierce *et al.*, 1991). Psychological ownership has the following three characteristics: (i) A feeling of possession, which refers to a sense of possessing or owning a particular object; (ii) a reflection of the relationship between the individual and the object, where the object is ultimately perceived as an extended part of the user; (iii) a complex psychological state that includes both cognitive and affective components.

Scholars have identified four main sources of psychological ownership: self-efficacy, spatial belonging, responsibility motivation, and self-identity (Avey *et al.*, 2009; Pierce and Jussila, 2010). Individuals need to gauge whether they can achieve their goals, and a sense of efficacy increases with the judgment of one's own ability (Dawkins *et al.*, 2017). Second, individuals require a spatial domain for activities, and their need for a sense of belonging can be satisfied by "owning a place" (Jussila *et al.*, 2010). Individuals require external arousal and responsibility incentives to gain a sense of ownership (Avey *et al.*, 2009). Furthermore, people must know enough about themselves and identify with others to gain a sense of ownership (Pierce and Jussila, 2010). Concerning the impact of psychological ownership, past research has shown that psychological ownership motivates individuals to engage with social media, interact with brands, and increase their intention to share word of mouth (Karahanna *et al.*, 2015; Kim *et al.*, 2016; Kumar, 2019). Psychological ownership is therefore closely connected with social media engagement.

2.4 Offline activities

Offline activities, such as the organization of brand and product-related events, have long been used by marketers to communicate and enhance customer relationships (Gabrielli and Baghi, 2016; Torres, 2020). Offline activities organized by administrators of virtual communities will strengthen the connection among virtual community members. An offline activity typically has the following features: (1) Authenticity: in contrast to the anonymity in virtual brand communities, offline activities are conducted after verification of members' identities and facilitate in-person contact (Shen, 2018). (2) Precision: Offline activities are designed according to the characteristics of the target group, and members of the target group are guided to offline activities after screening. (3) Interest-based: Offline activities are mainly attended by users from virtual brand communities, who are typically attracted through their interests and have a certain level of brand experience and brand loyalty. Scholars often consider offline activities to be complementary to online activities (Rangaswamy and Van Bruggen, 2005). Past research has found that users' offline activities have a positive impact on their online engagement, such as by inspiring their interest or evoking emotions (Mirlohi Falavarjani *et al.*, 2019, 2021).

3 Research Framework and Hypothesis

3.1 Effect of the fulfillment of psychological needs on psychological ownership

Autonomy implies that individuals have the freedom and flexibility to perform their work, and contributes to an increased sense of psychological ownership (Pierce and Cummings, 2009). The fulfillment of the need for autonomy is also linked with the achievement of the goal of self-control. When individuals fulfill their need for control, they can exercise it as an integral part of themselves and attain a sense of belonging with their goal (Furby, 1991). Research has revealed that psychological ownership mediates the relationship between autonomy and organizational commitment (Mayhew *et al.*, 2007). We, therefore, argue that when online users' need for control of their behavior in virtual brand communities is satisfied, they are more likely to acquire a sense of psychological ownership of those communities. We accordingly propose the following hypothesis:

H1a: The fulfillment of the need for autonomy exerts a positive influence on psychological ownership.

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4 Through interacting with other users in virtual brand communities, online users strengthen their
5 online relationships, promote interpersonal trust, and foster brand loyalty (Kuchmaner *et al.*, 2019;
6 Ting *et al.*, 2020). In addition, interactions directly increase brand engagement and brand knowledge
7 (Cheung *et al.*, 2020). Normally, when individuals learn more about others and get closer to them, they
8 will perceive others as part of them (Pierce, 1991). Similarly, when people associate with or feel
9 familiar with something, they feel that they dominate that thing (Pierce *et al.*, 2003). Hence, we argue
10 that when the need for relatedness is met, the bond between the member and the brand leads to a sense
11 of belonging to the virtual brand community. On the basis of this thinking, we propose the following
12 hypothesis.

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21 ***H1b: The fulfillment of the need for relatedness exerts a positive influence on psychological***
22 ***ownership.***

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25 Pierce and Cummings (2009) state that being able to control one's actions and achieve goals by
26 owning them brings a feeling of efficiency and pleasure. It is reasonable to expect that completing
27 specific tasks in a virtual brand community can generate a sense of self-efficacy and self-fulfillment.
28 For instance, users can provide responses to others' questions in brand communities. Moreover, time
29 and effort invested in completing community tasks increases one's self-investment in brand
30 communities, resulting in psychological ownership (Pierce *et al.*, 2003). The positive effect of self-
31 efficacy on psychological ownership has been documented in the literature (Karahanna and Xu, 2015).
32 In summary, we hypothesize that the fulfillment of the need for competence leads to an increase in
33 psychological ownership.

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42 ***H1c: The fulfillment of the need for competence exerts a positive influence on psychological***
43 ***ownership.***

44 45 46 **3.2 Effect of psychological ownership on users' knowledge sharing behavior**

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49 Van Dyne *et al.* (2004) affirmed a positive relationship between psychological ownership and job
50 satisfaction. According to past research (Avey *et al.*, 2009; Mayhew *et al.*, 2007; Pierce and Jussila,
51 2010), the sense of ownership of an organization is positively associated with individuals' efficiency,
52 self-identity, commitment, and sense of belonging. For these reasons, individuals will actively
53 contribute to such an organization with more time and efforts (Pierce *et al.*, 2003). Avey *et al.* (2009)
54 also indicated that individuals with a feeling of psychological ownership will develop a sense of the
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4 dominance over the object and will spontaneously work for the survival and development of the
5 organization based on an endowment effect. When the psychological ownership of community members
6 is satisfied, community members will feel responsible for protecting or strengthening the community in
7 return, which will trigger their contribution to the community, which may take the form of maintaining
8 the community's activities and performing knowledge sharing (Zhang and Xu, 2019). We consequently
9 propose the following hypothesis:

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15 ***H2: Psychological ownership has a positive influence on users' knowledge sharing behavior.***

16 17 18 **3.3 The mediating role of psychological ownership**

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20 As a psychological state describing the association between an individual and an object,
21 psychological ownership is mostly used to explore the mechanism of individual psychological needs
22 and contribution behavior (Dawkins *et al.*, 2017). Tsai and Pai (2014) note that when the basic
23 psychological needs of online users are met, online users will develop positive emotions such as
24 community identity and community satisfaction, which will ultimately promote willingness to
25 participate. The mediating effect of psychological ownership has been demonstrated in organizational
26 science (Park *et al.*, 2013) and scholars have also tested the mediating effect of psychological ownership
27 in the context of virtual brand communities (Kumar, 2019; Kwon, 2020; Lee and Suh, 2015). We,
28 therefore, argue that psychological ownership links the fulfillment of users' psychological needs and
29 their knowledge sharing behavior, and propose the following hypothesis.

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39 ***H3: Psychological ownership mediates the relationship between the fulfillment of users'***
40 ***psychological needs and their knowledge sharing behavior.***

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43 Self-determination theory suggests that individuals who have satisfied their need for autonomy
44 show stronger initiative and are often intrinsically motivated (Deci and Ryan, 2013). Similarly, when
45 individuals are in an environment that supports autonomy, they are more motivated (Ryan and Deci,
46 2000). In a virtual brand community, the freedom to post and view content is a prerequisite for further
47 knowledge sharing among online users, and will eventually evolve into a sense of belonging to the
48 community. When users see themselves as part of the community, they tend to actively engage in
49 behavior that benefits the community (de la Peña *et al.*, 2018). We thus propose the following hypothesis.

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60 ***H3a: Psychological ownership mediates the relationship between the fulfillment of the need for***
autonomy and knowledge sharing behavior.

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4 The fulfillment of the need for relatedness additionally leads to familiarity between community
5 members and engagement in prosocial activities (Pavey *et al.*, 2011), and closer relationships between
6 members typically lead to social media brand engagement (Osei-Frimpong *et al.*, 2019). We, therefore,
7 propose the following hypothesis.
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11 ***H3b: Psychological ownership mediates the relationship between the fulfillment of the need for***
12 ***relatedness and knowledge sharing behavior.***
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15 In addition, members with a higher sense of self-efficacy (those who have satisfied their need for
16 competence) believe that they can help others through knowledge sharing. Users can derive pleasure
17 from helping others and thereby gain a greater sense of ownership. The sense of ownership of the
18 community in turn ultimately facilitates further knowledge sharing and the dissemination of successful
19 experience. Based on the foregoing analysis, we propose the following hypothesis.
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25 ***H3c: Psychological ownership mediates the relationship between the fulfillment of the need for***
26 ***competence and knowledge sharing behavior.***
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31 **3.4 Moderating role of offline brand activities**

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33 Offline brand activities provide an important platform for customer interaction and help users gain
34 a better understanding of the brand. Offline activities often require more effort and time than online
35 activities, however. We propose that offline brand activities have a moderating effect on the relationship
36 between the fulfillment of basic psychological needs and psychological ownership.
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40 Existing research has revealed that the anonymity of cyberspace allows people to express
41 themselves freely (Lee and Suh, 2015), and the freedom of expression in online speech satisfies the
42 psychological need for autonomy to a certain extent. In contrast, offline activities are considered more
43 authentic, and typically require the verification of members' identities. There are certain constraints on
44 the behavior of members who participate in offline brand activities. Although brand users may fulfill
45 their need for autonomy by participating in offline activities, as a consequence of the feeling of being
46 constrained in offline activities, their psychological ownership of the brand may be even weaker than
47 when they participate in online activities. The constraints in offline activities may thus weaken the
48 positive effect of the fulfillment of the need for autonomy on psychological ownership.
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58 ***H4a: Offline brand activities negatively moderate the influence of the fulfillment of the need for***
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4 ***autonomy on psychological ownership.***

5 Offline activities increase interaction among users and foster community members' face-to-face
6 communication. Furthermore, consumers' desires for face-to-face interactions and for physical
7 experience will strengthen their relationships (Stokburger-Sauer, 2010). In an offline context, members
8 are more likely to adopt group values and develop a sense of belonging to the organization (Van Dyne
9 *et al.*, 2004). As stated in Section 2.3, a sense of belonging and relatedness may influence an individual's
10 psychological ownership. The face-to-face interactions and direct experience provided by offline brand
11 activities will consequently strengthen the positive impact of the fulfillment of the need for relatedness
12 on psychological ownership. Based on these considerations, we propose the following hypothesis.

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21 ***H4b: Offline brand activities positively moderate the influence of the fulfillment of the need for***
22 ***relatedness on psychological ownership.***

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25 The purpose of offline brand activities is to attract more users' participation. Since complex tasks
26 are not conducive to the effective use of offline brand activities, event planners will design activities
27 with tasks that are easy to complete, which will encourage participation. The physical experience of
28 consumers' co-creation with a brand promotes their self-efficacy and establishes brand engagement
29 (Hsieh and Chang, 2016). Moreover, fulfillment of the need for competence is likely to lead to a sense
30 of identification and belonging with the brand and community, which will further translate into users'
31 psychological ownership of the brand. We, therefore, propose the following hypothesis.

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39 ***H4c: Offline brand activities positively moderate the influence of fulfillment of the need for***
40 ***competence on psychological ownership.***

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42 The above hypotheses are summarized in the research framework shown in Figure 1.
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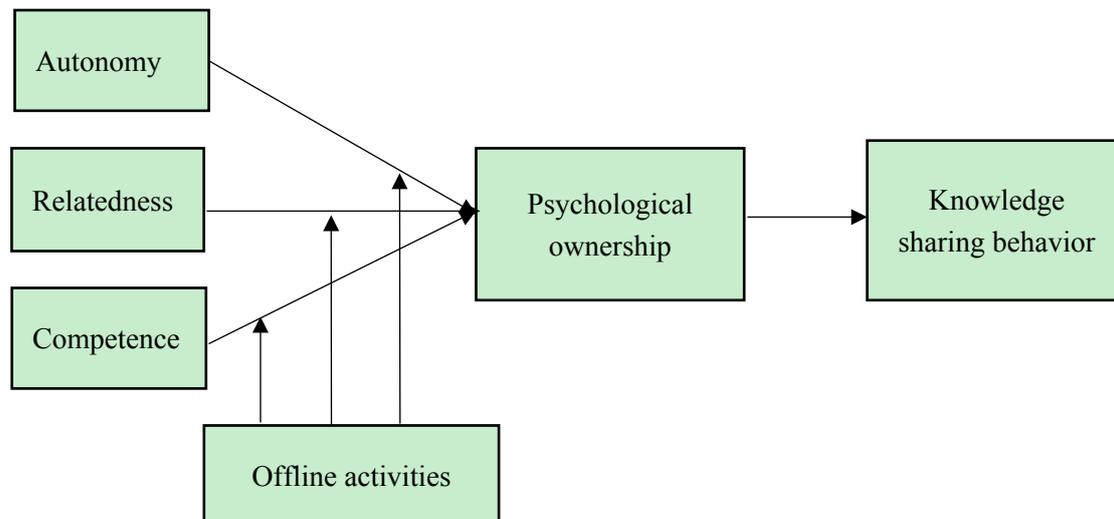


Figure 1 Research framework

4 Research Design and Empirical Analysis

4.1 Data collection

The data for this study were collected using a Web-based survey of members of the Huawei Pollen Club Community. After first designing a questionnaire on Sojump (www.sojump.com), we then posted URL web links and QR code image links, and questionnaire instructions in the Huawei Pollen Club Community and Huawei brand fan groups on Weibo. To identify an interviewee's membership and involvement in the Huawei Pollen Club Community, the screening question "Are you a Huawei Pollen Club user?" was placed at the beginning of the questionnaire. In addition, the optional question "What is your username in the Huawei Pollen Club?" was placed in the second part of the questionnaire to ensure the authenticity of users' community membership. Questionnaires that were not fully completed or contained usernames that could not be found in the Huawei Pollen Club Community were discarded. After 2 months of questionnaire collection, the 316 valid questionnaires were used as a data set in the subsequent analysis, and the recovery rate was 72.0%.

4.2 Variable measurement

The questionnaire was divided into two parts. The first part dealt with measures of all constructs in

the theoretical framework, and the second part determined the respondent's demographic profile. The question "How many times have you participated in any offline activities organized by Huawei?" was used to assess respondents' participation in offline activities. To ensure the reliability and validity of all variables in this study, all variables were measured with existing international scales and then adjusted in light of the specific context of the Huawei Pollen Club Community. We used 7-point Likert scales (1 = totally disagree and 7 = totally agree) to assess participants' responses to all items in the survey. The specific measurement questions are shown below in Table 1.

Table 1 Constructs, measurement items, and sources

Construct	Measurement items	Source
Autonomy	In this virtual community, I am free to do what I want to do The posts or photos I share in the community express the real me	Kim and Drumwright (2016); Tsai <i>et al.</i> (2012); Tsai and Pai (2014)
Relatedness	The Pollen Club makes me feel cared for I feel very close to the Pollen Club	
Competence	The Pollen Club makes me feel competent and efficient Pollen Club makes me feel incompetent and inadequate (R)	
Psychological ownership	I consider the Pollen Club to be a brand community where I belong I think Huawei is a brand that belongs to me The Pollen Club is a part of my life I feel like I own a part of the Pollen Club	Kuchmaner <i>et al.</i> (2019)
Knowledge sharing behavior	I am willing to provide useful information, opinions, and experiences to other users in the community I have a great passion for posting and replying frequently to other users in the brand community	Kumar (2019)

4.3 Descriptive statistics

Demographic information concerning all respondents is displayed in Table 2. Among the respondents, 74.7% were male and 25.3% were female; 67.7% were in the 18-25 age group; 83.2% were university undergraduates or specialists; 42.4% had a monthly income of less than RMB 2,000, and 44.9% had purchased 5 or more Huawei products. In addition, 82.8% of the respondents had been involved in the community for more than one year, which was one criterion of having a certain level of community involvement.

Table 2 Respondent demographic information (N=316)

Item	Responses	Frequency	Percentage
Gender	Male	236	74.7%
	Female	80	25.3%

	Under 18 years old	12	3.8%
	18~25	214	67.7%
	26~30	42	13.3%
Age	31~40	37	11.7%
	41~50	9	2.8%
	51~60	1	0.3%
	Over 60	1	0.3%
	Lower secondary and below	8	2.5%
	High School	30	9.5%
Education	Undergraduate & specialist	263	83.2%
	Masters	12	3.8%
	PhD and above	3	0.9%
	Under 2,000 RMB	134	42.4%
	2,001-4,000 RMB	32	10.1%
Income	4,001-6,000 RMB	61	19.3%
	6,001-8,000 RMB	35	11.1%
	8,001-10,000 RMB	28	8.9%
	10,000 RMB or more	26	8.2%
	1	28	8.9%
	2	59	18.7%
Products purchased	3	57	18.0%
	4	30	9.5%
	5 and above	142	44.9%
	Never	82	25.9%
	Once	73	23.1%
Offline brand activities	Twice	43	13.6%
	Three times	54	17.1%
	Four times or more	64	20.2%
	Under 6 months	22	7.0%
Tenure (length of membership in the community)	6 months - 1 year	34	10.8%
	1 year - 2 years	76	24.1%
	2 years - 5 years	135	42.7%
	More than 5 years	49	15.5%

4.4 Reliability and validity Analysis

We used SPSS 21.0 and AMOS 24.0 software to perform reliability and validity analysis based on confirmatory factor analysis. The results of reliability and validity analysis of the variables are shown in Table 3.

Table 3 Reliability and validity analysis (N=316)

Variable	Indicator	Factor loading	Cronbach's alpha	CR	AVE
Autonomy	A01	0.746	0.773	0.776	0.638
	A02	0.845			
Relatedness	R01	0.946	0.945	0.945	0.897
	R02	0.947			
Competence	C01	0.971	0.873	0.882	0.791
	C02	0.798			
Psychological ownership	P01	0.837	0.901	0.904	0.703
	P02	0.713			
	P03	0.901			
	P04	0.888			
Knowledge sharing behavior	S01	0.763	0.735	0.760	0.615
	S02	0.802			

The results in Table 3 show that the Cronbach's alpha coefficient values and CR values for each combination of reliability and validity were all greater than the recommended level of 0.7, indicating that all variables had good reliability. Factor loading values of all variables were also greater than 0.7 and their AVE values were greater than 0.5, indicating that all variables had good convergent validity.

The results of the goodness-of-fit statistics of the model and data were assessed by confirmatory factor analysis (CFA). The results showed that CMIN/DF had a value of 3.116 and RMSEA had a value of 0.081, indicating a good model fit. In the case of other indicators, CFI had a value of 0.954, IFI had a value of 0.954, TLI had a value of 0.928, and NFI had a value of 0.934. All these values were greater than 0.9, indicating that the measurement model fit the data well.

Table 4 displays the descriptive statistics and correlation coefficient results for all variables. We used the AVE comparison method to verify the discriminant validity of each variable. The results in Table 4 show that the square root of the AVE was greater than the correlation coefficients between the variables, indicating that the discriminant validity of the measurement model was good.

Table 4 Descriptive statistics and correlation coefficients (N=316)

Variables	Mean	Standard deviation	1	2	3	4	5	6
1. Autonomy	5.492	1.386	0.799					
2. Relatedness	5.680	1.234	0.686**	0.947				
3. Competence	5.481	1.276	0.663**	0.751**	0.890			
4. Psychological ownership	5.605	1.377	0.675**	0.759**	0.687**	0.839		
5. Knowledge sharing	5.731	1.249	0.645**	0.664**	0.577**	0.698**	0.784	
6. Offline activities	1.825	1.492	0.090**	0.141*	0.125*	0.177**	0.121*	0.839

Note: Diagonal values (bolded) are square roots of AVE for the corresponding variables; * represents $p < 0.05$, ** represents $p < 0.01$, *** represents $p < 0.001$, same below

4.5 Hypothesis Testing

Regression analysis was performed using SPSS to test main effects; detailed results are shown below in Table 5.

Table 5 Model test results 1

	Psychological ownership			Knowledge sharing behavior		
	(1)	(2)	(3)	(4)	(5)	(6)
Gender	-0.125 (0.161)	-0.176* (0.099)	-0.165* (0.098)	-0.265* (0.142)	-0.188* (0.102)	-0.234** (0.096)
Age	0.107 (0.086)	0.057 (0.053)	0.050 (0.053)	0.008 (0.076)	-0.057 (0.055)	-0.057 (0.051)
Education	0.092 (0.135)	0.093 (0.083)	0.088 (0.082)	-0.032 (0.119)	-0.088 (0.086)	-0.083 (0.080)
Income	-0.042 (0.048)	-0.040 (0.029)	-0.040 (0.029)	-0.071* (0.042)	-0.045 (0.030)	-0.055* (0.028)
Items purchased	0.070 (0.057)	0.035 (0.035)	0.033 (0.035)	0.101** (0.050)	0.057 (0.036)	0.048 (0.034)
Tenure	-0.048 (0.073)	0.016 (0.045)	0.008 (0.045)	-0.100 (0.065)	-0.071 (0.047)	-0.050 (0.043)
Offline brand activities	0.114** (0.047)	0.029 (0.029)	0.222* (0.131)	0.075* (0.042)	0.005 (0.030)	0.006 (0.028)
Autonomy		0.208*** (0.049)	0.442*** (0.117)			0.216*** (0.048)
Relatedness		0.470***	0.130			0.193***

		(0.057)	(0.136)		(0.061)	
Competence	0.185***		0.410***		0.011	
		(0.055)	(0.128)		(0.054)	
Autonomy* offline brand activities			-0.066**			
			(0.031)			
Relatedness* offline brand activities			0.098***			
			(0.036)			
Competence* offline brand activities			-0.069			
			(0.064)			
Psychological ownership				0.613***	0.308***	
			0.130		(0.036)	(0.055)
Constant	4.881***	0.410	-0.154	6.058***	3.064***	2.465***
	(0.557)	(0.393)	(0.561)	(0.491)	(0.394)	(0.378)
Observations	316	316	316	316	316	316
R ²	0.043	0.648	0.661	0.051	0.511	0.587
Adjusted R ²	0.022	0.636	0.647	0.029	0.498	0.572
Residual std. error	1.193	0.728	0.717	1.051	0.756	0.698
F Statistic	1.994*	56.139**	45.328***	2.360**	40.103***	39.207***

Note: Standard errors in parentheses.

The results of the test of Model 2 show that there was the fulfillment of the need for autonomy had a significant positive effect on psychological ownership ($\beta = 0.208$, $p < 0.001$), which supported Hypothesis 1a. Furthermore, the positive effect of the fulfillment of the need for relatedness ($\beta = 0.470$, $p < 0.001$) and the need for competence ($\beta = 0.185$, $p < 0.001$) on psychological ownership were also significant and supported Hypothesis 1b and Hypothesis 1c. The fulfillment of users' basic psychological needs was therefore shown to have a positive effect on psychological ownership. Furthermore, psychological ownership had a significant positive influence on knowledge sharing behavior ($\beta = 0.613$, $p < 0.001$), which supported Hypothesis 2.

Mediating effect. In this study, we tested the mediating effect of psychological ownership based on the analytical steps proposed by Zhao *et al.* (2010) and Preacher and Hayes (2004). 5000 bootstrap samples were selected to test the significance of the mediating effect at 95% confidence intervals; the results are as shown in Table 6 below.

Table 6 Mediating effect of psychological ownership

Path	Indirect effect	Direct effect	Total effect	Conclusion
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1. Autonomy →				
Psychological ownership →	0.274	0.285	0.559	Partial mediation
Knowledge sharing behavior	[0.192,0.360]	[0.172,0.402]	[0.471,0.649].	
2. Relatedness →				
Psychological ownership →	0.299	0.299	0.598	Partial mediation
knowledge sharing behavior	[0.187,0.430]	0.150,0.437	[0.520,0.676].	
3. Competence →				
Psychological ownership →	0.347	0.173	0.520	Partial mediation
Knowledge sharing behavior	[0.256,0.441]	[0.065,0.289]	[0.428,0.610]	

In path 1, the confidence interval was (0.192, 0.360), which did not contain 0. The mediating effect was significant and the coefficient was 0.274. The interval after controlling for the mediator was (0.172, 0.402), which still did not contain 0. Psychological ownership was therefore seen to play a partial mediating role in the influence of fulfillment of the need for autonomy on knowledge sharing behavior, which supported Hypothesis 3a. In path 2, the confidence interval for the test was (0.187, 0.430), which did not contain 0. The mediating effect was significant and the coefficient was 0.299. After controlling for the mediator, the interval was (0.150, 0.437), which still did not contain 0. Psychological ownership consequently was seen to play a partial mediating role in the effect of the fulfillment of the need for relatedness on knowledge sharing behavior, which supported Hypothesis 3b. In path 3, as the confidence interval of (0.256, 0.441) did not contain 0, the mediating effect was significant and the effect value was 0.347. After controlling for the mediator, the interval of (0.065, 0.289) still did not contain 0. Psychological ownership thus played a partial mediating role in the effect of the fulfillment of the need for competence on knowledge sharing behavior, which supported Hypothesis 3c. In summary, Hypothesis 3 regarding the mediating effects of psychological ownership was fully supported.

Moderating effect. The results from Model 3 showed that the interaction term between the fulfillment of the need for autonomy and offline brand activity was negative and significant ($\beta = -0.066$, $p < 0.01$), which supported Hypothesis 4a. The interaction term between the fulfillment of the need for relatedness and offline brand activity was positive and significant ($\beta = 0.098$, $p < 0.001$), which supported H4b. Lastly, the interaction term between the fulfillment of the need for competence and offline brand activity was not significant ($\beta = -0.069$, $p > 0.05$), which did not support Hypothesis 4c. Hypothesis 4 was therefore partially supported. In particular, it was found that offline brand activities negatively moderated the relationship between the fulfillment of the need for autonomy and psychological ownership, but positively moderated the relationship between the fulfillment of the need for relatedness and psychological ownership.

5 Discussion

5.1 Theoretical implications

This study made several theoretical contributions. First, this paper contributed to the literature on online consumer engagement by exploring antecedents that influence users' knowledge sharing behavior in virtual brand communities. Based on self-determination theory and psychological ownership theory, this paper empirically confirmed that fulfilling users' three basic psychological needs increases knowledge sharing behavior. Previous studies on users' behavioral motivations chiefly looked at internal motivations, external motivations, and external environmental factors (Wang and Clay, 2012; Yoon and Rolland, 2012), or focused mainly on participation behavior (Kwon, 2020; Tsai and Pai, 2014), but failed to investigate the impact of the fulfillment of basic psychological needs in the context of knowledge sharing. Our empirical study found that the fulfillment of the three psychological needs for autonomy, relatedness, and competence had a positive influence on users' knowledge sharing. This study's findings help to explain the antecedents of users' knowledge sharing behavior in virtual brand communities, rather than antecedents connected with motivational and external environmental factors. These findings thus fill a gap in past research on user engagement behavior based on behavioral perspectives (Fu *et al.*, 2018; Kuem *et al.*, 2020; Loureiro and Kaufmann, 2018; Ye and Cheng, 2019).

Second, this paper extends the research on psychological ownership theory by establishing psychological ownership as a mediator for the relationship between users' fulfillment of basic psychological needs and their knowledge sharing behavior. As mentioned above, our findings concerning main effects were consistent with those of previous studies, which found positive effects of user interaction, identification, social connection, and perceived ease of use on user engagement behavior (Naqvi *et al.*, 2019; Naqvi, Jiang and Naqvi, 2020; Yushi *et al.*, 2018). Enriching the past literature, we explored psychological ownership as a mediator. While past studies on user behavior based on user attitudes and psychology often took user trust and user loyalty as mediators (Naqvi, Jiang, Miao, *et al.*, 2020), this study confirmed the mediating role of psychological ownership between fulfillment of three basic psychological needs and knowledge sharing behavior.

Third, we examined the moderating role of offline brand activities in the relationship between the fulfillment of users' psychological needs and psychological ownership. Although past studies paid

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4 attention to the impact of online interactions on users' knowledge sharing behavior, they neglected the
5 moderating role of offline activities (Ma and Yuen, 2011; Zhang and Liu, 2021). Our results indicated
6 that users' participation in offline brand activities enhances the positive impact of the fulfillment of the
7 need for relatedness on psychological ownership, which sheds light on the crucial role of relationships
8 among users. The finding that offline activities had a negative moderating effect on the relationship
9 between the fulfillment of the need for autonomy and psychological ownership suggests that the effect
10 of the fulfillment of the need for autonomy on psychological ownership is not static, but is instead
11 subject to change.
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21 **5.2 Managerial Implication**

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23 This study offers several practical implications for the management of virtual brand communities.
24 First, brand community managers should pay attention to the psychological states and attitudes of
25 community members. Cultivating members' sense of identity and belonging will enhance their
26 psychological ownership of the brand, which will, in turn, lead to greater user contributions. Furthermore,
27 in accordance with our findings concerning the mediating role of psychological ownership, the managers
28 of virtual brand communities can track and measure users' psychological ownership to gain a more
29 comprehensive understanding of users' emotions and the linkage between users and the brand
30 community.
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39 Second, this paper provides practical suggestions on how to influence users' sense of psychological
40 ownership and knowledge sharing behavior by fulfilling their three basic psychological needs. For
41 example, to meet the need of autonomy, we recommend the reasonable reduction of restrictions on
42 community posting and permission restrictions on content browsing between sections. With regard to
43 the fulfillment of the need for relatedness, it is suggested that online community administrators seek to
44 enhance user interaction, optimize the management of fan groups, and appropriately assemble groups
45 of fans from the same city or university to increase opportunities for communication among members.
46 Continuous interactions with fellow members will encourage individuals to build strong relationships
47 with their online communities (Naqvi, Jiang, Miao, *et al.*, 2020). Brand community managers should
48 increase the social functions of their websites, which will transform their communities into places where
49 brand fans can build up close relationships with peer users. As identification and internalization increase
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the intention to use social media, it is recommended that measures be taken to meet users' emotional needs (Yushi *et al.*, 2018). An atmosphere in which users and brands can grow together will prompt members to gain a stronger community identity and brand recognition, which in turn will more effectively increase users' brand commitment. **Enhancing consumers' achievement motivation encourages their content creation behavior** (Chen *et al.*, 2020), and such incentives as rewards and answer ratings can be used to increase users' sense of competence and self-efficacy (Zhang, Liu, *et al.*, 2017).

Third, due to the different impacts of offline activities, when designing offline activities, managers need to create a better customer experience to increase user satisfaction and willingness to use social media (Naqvi *et al.*, 2021). The moderating effect of offline activities suggests that the design of offline activities should pay close attention to users' experiences and take the autonomy of community members into account. Activities designed and conducted by community members based on the principle of full autonomy will not only facilitate interaction between users, and between users and the brand, but also create a harmonious atmosphere in an offline community.

5.3 Research limitations and future research

This study has two limitations that call for further research. The first limitation involves our data. Although the brand community we selected is a typical virtual brand community in China, our findings require to be validated in other brand communities. Future studies could generalize these findings to other brand communities with varied characteristics of communities (e.g., firm-hosted vs. consumer-hosted communities) and products (e.g, product involvement). The second limitation is that the current study was a cross-sectional study, and collected only static data. Since psychological ownership is a dynamic attribute, future research may collect longitudinal data to examine the dynamics of psychological ownership.

References

- Acar, O.A. (2018), "Harnessing the creative potential of consumers: money, participation, and creativity in idea crowdsourcing," *Marketing Letters*, Vol. 29 No. 2, pp. 177-188.
- Avey, J.B., Avolio, B.J., Crossley, C.D. and Luthans, F. (2009), "Psychological ownership: Theoretical extensions, measurement and relation to work outcomes," *Journal of Organizational Behavior*, Vol. 30 No. 2, pp. 173-191.

- 1
2
3 Baldus, B.J., Voorhees, C. and Calantone, R. (2015), "Online brand community engagement: Scale
4 development and validation," *Journal of Business Research*, Vol. 68 No. 5, pp. 978-985.
- 5
6 Beer, D. (2009), "Power through the algorithm? Participatory web cultures and the technological
7 unconscious," *New Media and Society*, Vol. 11 No. 6, pp. 985-1002.
- 8
9 Chen, L., Yuan, L. and Zhu, Z. (2020), "Empirical study of consumer participation motivation in value
10 cocreation within cultural and creative virtual brand communities," *Asia Pacific Journal of Marketing
11 and Logistics*, Vol. 33 No. 7, pp. 1630-1647.
- 12
13 Cheung, M.L., Pires, G. and Rosenberger, P.J. (2020), "The influence of perceived social media marketing
14 elements on consumer-brand engagement and brand knowledge," *Asia Pacific Journal of Marketing
15 and Logistics*, Vol. 32 No. 3, pp. 695-720.
- 16
17 Dawkins, S., Tian, A.W., Newman, A. and Martin, A. (2017), "Psychological ownership: A review and
18 research agenda: Psychological Ownership: A Review," *Journal of Organizational Behavior*, Vol. 38
19 No. 2, pp. 163-183.
- 20
21 Deci, E.L. and Ryan, R.M. (1985), "The general causality orientations scale: Self-determination in
22 personality," *Journal of Research in Personality*, Vol. 19 No. 2, pp. 109-134.
- 23
24 Deci, E.L. and Ryan, R.M. (2000), "The 'what' and 'why' of goal pursuits: Human needs and the self-
25 determination of behavior," *Psychological Inquiry*, Vol. 11 No. 4, pp. 227-268.
- 26
27 Deci, E.L. and Ryan, R.M. (2013), "Intrinsic motivation and self-determination in human behavior," *Springer
28 Science & Business Media*.
- 29
30 Fotiadis, A., Abdulrahman, K. and Spyridou, A. (2019), "The mediating roles of psychological autonomy,
31 competence and relatedness on work-life balance and well-being," *Frontiers in Psychology*, Vol. 10, p.
32 1267.
- 33
34 Fu, J., Ko, P.-C., Lu, C. and Lee, W.-L. (2018), "Brand engagement and co-creation in the online
35 environments-based on the self-determination theory," *Proceedings of the 2018 International
36 Conference on E-Business and Mobile Commerce-ICEMC'18*, presented at the the 2018 International
37 Conference, pp. 11-16.
- 38
39 Furby, L. (1991), "Understanding the psychology of possession and ownership: A personal memoir and an
40 appraisal of our progress," *Journal of Social Behavior & Personality*, Vol. 6 No. 6, pp. 457-463.
- 41
42 Gabrielli, V. and Baghi, I. (2016), "Online brand community within the integrated marketing communication
43 system: When chocolate becomes seductive like a person," *Journal of Marketing Communications*, Vol.
44 22 No. 4, pp. 385-402.
- 45
46 Gagné, M. (2009), "A model of knowledge-sharing motivation," *Human Resource Management*, Vol. 48 No.
47 4, pp. 571-589.
- 48
49 Galvagno, M. and Dalli, D. (2014), "Theory of value co-creation: A systematic literature review," *Managing
50 Service Quality*, Vol. 24 No. 6, pp. 643-683.
- 51
52 Harmeling, C.M., Moffett, J.W., Arnold, M.J. and Carlson, B.D. (2017), "Toward a theory of customer
53 engagement marketing," *Journal of the Academy of Marketing Science*, Vol. 45 No. 3, pp. 312-335.
- 54
55 Hollebeek, L.D., Glynn, M.S. and Brodie, R.J. (2014), "Consumer brand engagement in social media:
56 conceptualization, scale development and validation," *Journal of Interactive Marketing*, Vol. 28 No. 2,
57 pp. 149-165.
- 58
59 Hsieh, S.H. and Chang, A. (2016), "The psychological mechanism of brand co-creation engagement," *Journal
60 of Interactive Marketing*, Vol. 33, pp. 13-26.
- Ibrahim, N.F., Wang, X. and Bourne, H. (2017), "Exploring the effect of user engagement in online brand
communities: Evidence from Twitter," *Computers in Human Behavior*, Vol. 72, pp. 321-338.

- 1
2
3 Irani, Z., Sharif, A.M., Papadopoulos, T. and Love, P.E.D. (2017), "Social media and Web 2.0 for knowledge
4 sharing in product design," *Production Planning & Control*, Vol. 28 No. 13, pp. 1047-1065.
- 5
6 Jang, H., Olfman, L., Ko, I., Koh, J. and Kim, K. (2008), "The Influence of on-line brand community
7 characteristics on community commitment and brand loyalty," *International Journal of Electronic
8 Commerce*, Vol. 12 No. 3, pp. 57-80.
- 9
10 Jiang, J. and Wang, Y. (2020), "A theoretical and empirical investigation of feedback in ideation contests,"
11 *Production and Operations Management*, Vol. 29 No. 2, pp. 481-500.
- 12
13 Jussila, I., Tarkiainen, A., Sarstedt, M. and Hair, J.F. (2015), "Individual psychological ownership: Concepts,
14 evidence, and implications for research in marketing," *Journal of Marketing Theory and Practice*, Vol.
15 23 No. 2, pp. 121-139.
- 16
17 Kamboj, S. (2019), "Applying uses and gratifications theory to understand customer participation in social
18 media brand communities: Perspective of media technology," *Asia Pacific Journal of Marketing and
19 Logistics*, Vol. 32 No. 1, pp. 205-231.
- 20
21 Kang, Y.J., Lee, J.Y. and Kim, H.-W. (2017), "A psychological empowerment approach to online knowledge
22 sharing," *Computers in Human Behavior*, Vol. 74, pp. 175-187.
- 23
24 Karahanna, E., Xu, S.X. and Zhang, N. (Andy). (2015), "Psychological ownership motivation and use of
25 social media," *Journal of Marketing Theory and Practice*, Vol. 23 No. 2, pp. 185-207.
- 26
27 Kaur, H., Paruthi, M., Islam, J. and Hollebeek, L.D. (2020), "The role of brand community identification and
28 reward on consumer brand engagement and brand loyalty in virtual brand communities," *Telematics
29 and Informatics*, Vol. 46 No. 10, pp. 13-21.
- 30
31 Kelley, J.B. and Alden, D.L. (2016), "Online brand community: Through the eyes of self-determination
32 theory," *Internet Research*, Vol. 26 No. 4, pp. 790-808.
- 33
34 Kim, E. and Drumwright, M. (2016), "Engaging consumers and building relationships in social media: How
35 social relatedness influences intrinsic vs. extrinsic consumer motivation," *Computers in Human
36 Behavior*, Vol. 63, pp. 970-979.
- 37
38 Kim, S., Kim, S.-G., Jeon, Y., Jun, S. and Kim, J. (2016), "Appropriate or remix? The effects of social
39 recognition and psychological ownership on intention to share in online communities," *Human-
40 Computer Interaction*, Vol. 31 No. 2, pp. 97-132.
- 41
42 Krishnamurthy, S. and Dou, W. (2008), "Note from special issue editors: Advertising with user-generated
43 content: A framework and research agenda," *Journal of Interactive Advertising*, Vol. 8 No. 2, pp. 1-4.
- 44
45 Kuchmaner, C.A., Wiggins, J. and Grimm, P.E. (2019), "The role of network embeddedness and
46 psychological ownership in consumer responses to brand transgressions," *Journal of Interactive
47 Marketing*, Vol. 47, pp. 129-143.
- 48
49 Kuem, J., Khansa, L. and Kim, S.S. (2020), "Prominence and engagement: Different mechanisms regulating
50 continuance and contribution in online communities," *Journal of Management Information Systems*,
51 Vol. 37 No. 1, pp. 162-190.
- 52
53 Kumar, J. (2019), "How psychological ownership stimulates participation in online brand communities? The
54 moderating role of member type," *Journal of Business Research*, Vol. 105, pp. 243-257.
- 55
56 Kumar, J. and Nayak, J.K. (2019), "Understanding the participation of passive members in online brand
57 communities through the lens of psychological ownership theory," *Electronic Commerce Research and
58 Applications*, Vol. 36, p. 100859.
- 59
60 Kwon, S. (2020), "Understanding user participation from the perspective of psychological ownership: The
moderating role of social distance," *Computers in Human Behavior*, Vol. 105, p. 106207.
- Lee, J. and Suh, A. (2015), "How do virtual community members develop psychological ownership and what

- are the effects of psychological ownership in virtual communities?," *Computers in Human Behavior*, Vol. 45, pp. 382-391.
- Liao, J., Dong, X. and Guo, Y. (2020), "Examining knowledge contribution in firm- versus consumer-hosted virtual brand community," *Electronic Commerce Research and Applications*, Vol. 41, p. 100963.
- Liu, H. and Li, G. (2017), "To gain or not to lose? The effect of monetary reward on motivation and knowledge contribution," *Journal of Knowledge Management*, Vol. 21 No. 2, pp. 397-415.
- Loureiro, S.M.C. and Kaufmann, H.R. (2018), "The role of online brand community engagement on positive or negative self-expression word-of-mouth," *Cogent Business & Management*, Vol. 5 No. 1, pp. 1-25.
- Ma, W.W.K. and Yuen, A.H.K. (2011), "Understanding online knowledge sharing: An interpersonal relationship perspective," *Computers & Education*, Vol. 56 No. 1, pp. 210-219.
- Mayhew, M.G., Gardner, J., Ashkanasy, N.M. and Bramble, T. (2007), "A study of the antecedents and consequences of psychological ownership in organizational settings," *The Journal of Social Psychology*, Vol. 147 No. 5, pp. 477-500.
- Merz, M.A., Zarantonello, L. and Grappi, S. (2018), "How valuable are your customers in the brand value co-creation process? The development of a customer co-creation Value (CCCV) scale," *Journal of Business Research*, Vol. 82, pp. 79-89.
- Mirlohi Falavarjani, S.A., Jovanovic, J., Fani, H., Ghorbani, A.A., Noorian, Z. and Bagheri, E. (2021), "On the causal relation between real world activities and emotional expressions of social media users," *Journal of the Association for Information Science and Technology*, Vol. 72 No. 6, pp. 723-743.
- Mirlohi Falavarjani, S.A., Zarrinkalam, F., Jovanovic, J., Bagheri, E. and Ghorbani, A.A. (2019), "The reflection of offline activities on users' online social behavior: An observational study," *Information Processing & Management*, Vol. 56 No. 6, p. 102070.
- Naqvi, M., Li, S., Jiang, Y. and Naqvi, M.H.A. (2019), "The rise of social networking sites: An empirical investigation applying demographic differences and the technology acceptance model," *Asia Pacific Journal of Marketing and Logistics*, Vol. 32 No. 1, pp. 232-252.
- Naqvi, M.H., Guoyan, S. and Naqvi, M.H.A. (2021), "Measuring the influence of Web features in the online gamification environment: A multimediation approach," *Wireless Communications and Mobile Computing*, Vol. 2021, p. e3213981.
- Naqvi, M.H.A., Jiang, Y., Miao, M. and Naqvi, M.H. (2020), "The effect of social influence, trust, and entertainment value on social media use: Evidence from Pakistan," edited by *Cogent Business & Management*, Vol. 7 No. 1, p. 1723825.
- Naqvi, M.H.A., Jiang, Y. and Naqvi, M. (2020), "Generating customer engagement in electronic-brand communities: A stimulus-organism-response perspective," *Asia Pacific Journal of Marketing and Logistics*, Vol. 33 No. 7, pp. 1535-1555.
- Osei-Frimpong, K., McLean, G. and Famiyeh, S. (2019), "Social media brand engagement practices: Examining the role of consumer brand knowledge, social pressure, social relatedness, and brand trust," *Information Technology & People*, Vol. 33 No. 4, pp. 1235-1254.
- Park, C.H., Song, J.H., Yoon, S.W. and Kim, J. (2013), "A missing link: Psychological ownership as a mediator between transformational leadership and organizational citizenship behavior," *Human Resource Development International*, Vol. 16 No. 5, pp. 558-574.
- Pavey, L., Greitemeyer, T. and Sparks, P. (2011), "Highlighting relatedness promotes prosocial motives and behavior," *Personality and Social Psychology Bulletin*, Vol. 37 No. 7, pp. 905-917.
- de la Peña, A., Amezcuca, B. and Sepúlveda, C. (2018), "Cause-brand community: Toward consumer citizenship," *Journal of Nonprofit & Public Sector Marketing*, Vol. 30 No. 1, pp. 1-36.

- Pierce, J.L. (1991), "Employee ownership: A conceptual model of process and effects," *Academy of Management Review*, Vol. 16 No. 1, pp. 121-144.
- Pierce, J.L. and Anne Cummings. (2009), "Psychological ownership within the job design context: Revision of the job characteristics model," *Journal of Organizational Behavior*, Vol. 30 No. 4, pp. 477-496.
- Pierce, J.L. and Jussila, I. (2010), "Collective psychological ownership within the job design context: Revision of the job characteristics model," *Journal of Organizational Behavior*, Vol. 31, pp. 810-834.
- Pierce, J.L., Kostova, T. and Dirks, K.T. (2003), "The state of psychological ownership: Integrating and extending a century of research," *Review of General Psychology*, Vol. 7 No. 1, pp. 84-107.
- Pierce, J.L., Rubenfeld, S.A. and Morgan, S. (1991), "Employee ownership: A conceptual model of process and effects," *Academy of Management Review*, Vol. 16 No. 1, pp. 121-144.
- Preacher, K.J. and Hayes, A.F. (2004), "SPSS and SAS procedures for estimating indirect effects in simple mediation models," *Behavior Research Methods, Instruments, & Computers*, Vol. 36 No. 4, pp. 717-731.
- Quinton, S. (2013), "The community brand paradigm: A response to brand management's dilemma in the digital era," *Journal of Marketing Management*, Vol. 29 No. 7-8, pp. 912-932.
- Rangaswamy, A. and Van Bruggen, G.H. (2005), "Opportunities and challenges in multichannel marketing: An introduction to the special issue," *Journal of Interactive Marketing*, Vol. 19 No. 2, pp. 5-11.
- Ryan, R.M. and Deci, E.L. (2000), "Self-determination theory and the facilitation of intrinsic motivation, social development, and well-being," *American Psychologist*, Vol. 55 No. 1, pp. 68-78.
- Shen, X.-L. (2018), "Person-environment fit, commitment, and customer contribution in online brand community: A nonlinear model," *Journal of Business Research*, Vol. 85 No. 10, pp. 117-126.
- Shen, X.-L., Li, Y.-J., Sun, Y. and Zhou, Y. (2018), "Person-environment fit, commitment, and customer contribution in online brand community: A nonlinear model," *Journal of Business Research*, Vol. 85, pp. 117-126.
- Stokburger-Sauer, N. (2010), "Brand community: Drivers and outcomes," *Psychology & Marketing*, Vol. 27 No. 4, pp. 347-368.
- Ting, D.H., Abbasi, A.Z. and Ahmed, S. (2020), "Examining the mediating role of social interactivity between customer engagement and brand loyalty," *Asia Pacific Journal of Marketing and Logistics*, Vol. 33 No. 5, pp. 1139-1158.
- Torres, E.N. (2020), "Online-to-offline interactions and online community life cycles: A longitudinal study of shared leisure activities," *Leisure Sciences*, Vol. 42 No. 1, pp. 32-50.
- Tsai, H.-T., Huang, H.-C. and Chiu, Y.-L. (2012), "Brand community participation in Taiwan: Examining the roles of individual-, group-, and relationship-level antecedents," *Journal of Business Research*, Vol. 65, pp. 676-684.
- Tsai, H.-T. and Pai, P. (2014), "Why do newcomers participate in virtual communities? An integration of self-determination and relationship management theories," *Decision Support Systems*, Vol. 57, pp. 178-187.
- de Valck, K., van Bruggen, G.H. and Wierenga, B. (2009), "Virtual communities: A marketing perspective," *Decision Support Systems*, Vol. 47 No. 3, pp. 185-203.
- Van Dyne, Linn and Pierce, J.L. (2004), "Psychological ownership and feelings of possession: Three field studies predicting employee attitudes and organizational citizenship behavior," *Journal of Organizational Behavior*, Vol. 25 No. 4, pp. 439-459.
- Wang, X. and Clay, P.F. (2012), "Beyond adoption intention: Online communities and member motivation to contribute longitudinally," *Journal of Organizational Computing and Electronic Commerce*, Vol. 22

No. 3, pp. 215-236.

- Ye, C. and Cheng, Y. (2019), "Research on the impact model of online community experience value on user participation in innovation," Proceedings of the 2nd International Symposium on Social Science and Management Innovation (SSMI 2019), available at: <https://doi.org/10.2991/ssmi-19.2019.89>.
- Yoon, C. and Rolland, E. (2012), "Knowledge-sharing in virtual communities: Familiarity, anonymity and self-determination theory," Behavior & Information Technology, Vol. 31 No. 11, pp. 1133-1143.
- Yushi, J., Naqvi, M.H.A. and Naqvi, M.H. (2018), "Using social influence processes and psychological factors to measure pervasive adoption of social networking sites: Evidence from Pakistan," Emerging Markets Finance and Trade, Vol. 54 No. 15, pp. 3485-3499.
- Zhang, D., Zhang, F., Lin, M. and Du, H.S. (2017), "Knowledge sharing among innovative customers in a virtual innovation community: The roles of psychological capital, material reward and reciprocal relationship," Online Information Review, Vol. 41 No. 5, pp. 691-709.
- Zhang, H. and Xu, H. (2019), "Impact of destination psychological ownership on residents' 'place citizenship behavior'," Journal of Destination Marketing & Management, Vol. 14, p. 100391.
- Zhang, X. and Liu, S. (2021), "Understanding relationship commitment and continuous knowledge sharing in online health communities: A social exchange perspective," Journal of Knowledge Management, Vol. ahead-of-print No. ahead-of-print, available at: <https://doi.org/10.1108/JKM-12-2020-0883>.
- Zhang, X., Liu, S., Deng, Z. and Chen, X. (2017), "Knowledge sharing motivations in online health communities: A comparative study of health professionals and normal users," Computers in Human Behavior, Vol. 75, pp. 797-810.
- Zhao, X., Lynch, and J.G. (2010), "Reconsidering Baron and Kenny: Myths and truths about mediation analysis," Journal of Consumer Research, Vol. 37 No. 8, pp. 197-206.