



Exploring online social behavior in crowdsourcing communities: A relationship management perspective



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ABSTRACT

With the popularity of social media, crowdsourcing innovation provides new ways to generate original and useful content. It offers a unique opportunity for online crowds to communicate and collaborate on a variety of topics of mutual interest. This study presents an initial attempt to explore and understand online social behavior in crowdsourcing communities, with the insights from both plural subject theory and commitment–trust theory. In particular, two different types of collective intention (i.e., we-mode collective intention, which refers to acting as a group member, and I-mode collective intention, which refers to acting interdependently to contribute to the group goal) were proposed. The research model was empirically examined with longitudinal data collected from 202 wiki users. Findings indicated that, although both I-mode and we-mode collective intentions significantly predicted online social behavior in wiki communities, we-mode collective intention exerted a greater effect on users' behavior. In addition, relationship-orientated factors (e.g., trust and commitment) only affected we-mode, instead of I-mode, collective intention. This study finally yields several implications for both research and practice.

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1. Introduction

The emergence and popularity of social media has greatly transformed the way people work, collaborate and communicate in many different aspects. In particular, more efficient mass-production methods, such as crowdsourcing, are available along with the boom of Web 2.0. Crowdsourcing can be regarded as a type of participative online activity in which a large group of people, especially from online communities, collaborate on solving a wide variety of problems (Doan, Ramakrishnan, & Halevy, 2011). It is different from traditional outsourcing in that the task or problem is outsourced to an undefined public, rather than a specific group of paid employees. Prior studies have identified some basic characteristics of any crowdsourcing initiative, including a clearly defined crowd, a task with a clear goal, benefits received by the crowd, online task assigned process, Internet-based collaborative activity, and so on (Estellés-Arolas & González-Ladrón-de-Guevara, 2012).

Over the past decade, a number of excellent crowdsourcing communities, such as Wikipedia, Linux and Yahoo! Answers, have appeared on the Internet, and this emerging field is expected to continue growing rapidly (Bayus, 2013). However, the development of crowdsourcing communities also faces some key challenges. For example, how to attract users who have the potential to be contributors is often considered as the first and most important step (Doan et al., 2011).

In the current study, we try to explore what motivates people to participate and contribute in crowdsourcing, with insights from wiki communities. As the pioneer and one of the most successful examples of crowdsourcing, wiki communities such as Wikipedia have attracted millions of people around the world to collaboratively write, organize and modify almost any content involved in the wiki pages. The reason why we claimed wiki-based community as a typical crowdsourcing practice is because its core characteristic lies in the ability to gather a large group of online crowds to achieve a common goal, such as editing or expanding a specific article or a collection of articles. At the same time, collective intelligence would be beneficial to the whole community, while the volunteers also can receive benefits from the crowdsourcing platforms, such as social recognition, self-development, networking and relationship building opportunities. In this regard, people often participate and contribute to wiki communities through

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online social action and mutual cooperation, by sharing their expertise and knowledge.

Previous studies on collective action in the context of wiki communities, such as Wikipedia, have extensively examined individual motivations and decisions based on the intention-based models (e.g., Cho, Chen, & Chung, 2010; Yang & Lai, 2011). It is believed that an individual's intention to engage in collective action is influenced by cognitive, motivational and social-relational factors (Cho et al., 2010; Wang & Wei, 2011). Cyber-psychology is also regarded as an important concept and a useful frame for exploring human interaction with new media (Bagozzi & Lee, 2002; Papadimitriou, 2009). In this study, we believe that mass collaboration occurred on crowdsourcing communities needs to be better understood from a different perspective, which can be expressed as intentional social action. This is because crowdsourcing initiatives have to recruit a crowd of people to engage, collaborate and solve complex issues. It thus cannot be “best characterized by an individual acting in isolation” (Bagozzi, 2007, p. 247). Crowdsourcing projects can be successful only when a group of people jointly express their willingness to contribute and collaborate, either explicitly or implicitly. The decision to participate and contribute to crowdsourcing communities thus represents a social phenomenon that depends on interactions among the participants, instead of an individual's own judgment or intention.

In this regard, it may be more appropriate to examine the crowdsourcing phenomenon by incorporating plural subjects-based conceptual schemes, rather than the commonly studied singular subject-referent intention models (Bagozzi & Dholakia, 2006). This study presents a preliminary attempt to address this issue, and examines collective intention based on the “I” and “we” dichotomy. By adapting and extending current research on plural subject theory and commitment–trust theory, this study aims to understand the antecedents of I-mode and we-mode collective intentions, as well as their impacts on online social behavior. Although some studies have examined we-intention in online social networks (e.g., Cheung, Chiu, & Lee, 2011), as far as we know, this is also the first empirical work dealing with collective intention from both I-mode and we-mode perspectives.

The rest of this paper is organized as follows. The next section addresses the theoretical background and research hypotheses. This is followed by a detailed description of research methodology in Section 3 and data analysis results in Section 4. This study concludes with the discussion of the findings, and implications for both research and practice.

2. Theoretical background and hypotheses development

Recently, collective behavior on social media platforms has attracted increasing attentions from both academia and industry (Cheung & Lee, 2010; Kong, Kwok, & Fang, 2012; Turel & Zhang, 2011). Although social media-supported innovation and collaboration require the collective efforts and interdependence among two or more people (Li, Chau, & Lou, 2005), and the decision making is collectively shared and mutually made in nature (Bagozzi, 2007), previous studies still placed a great emphasis on personal intention in the form of “I predict that I would use the system” (Turel & Zhang, 2011). Only recently, a few studies have started to consider the concept of “we” in collective intention development (e.g., Cheung & Lee, 2010; Cheung et al., 2011; Shen, Cheung, & Lee, 2013). However, it is obvious that even if the intentions are interdependent and interrelated, the participants do not always regard themselves as members of a focal group. In view of two different types of collective intention (i.e., we-mode collective intention, which refers to acting as a group member, and I-mode collective intention, which refers to acting interdependently to contribute

to the group goal), a research model is developed, as depicted in Fig. 1, based on plural subject theory and commitment–trust theory. A description of the model and its research variables, as well as justifications for the research hypotheses will be addressed.

2.1. Plural subject theory

Gilbert (1989) was the first to propose the plural subject theory, which includes a view of ontological holism about groups, and defines social collectives in terms of common knowledge of expressed willingness to participate in joint actions. In particular, social collectives are characterized by two essential features. First, the participants share a commitment to certain goals, beliefs, intentions or actions. Second, such commitment is a common knowledge among them (Sheehy, 2002). A plural subject thus is formed when the participants jointly commit to achieve a goal or perform an action together. Compared to the conceptual schemes commonly used for examining singular action, plural subject theory represents an understanding of persons as social individuals in a central sense of collective beliefs and acting together. In this regard, for decision making in relation to two or more people and involving mutual, shared or joint processes, plural subject theory may be a more appropriate approach for examining the underlying decision-making processes (Bagozzi, 2007).

The conceptualization and specification of group and social decision making, based on the plural subject theory, bring about the idea of collection or joint intentions. Different from the concept of personal intention, which is defined as “a person's motivation in the sense of his or her conscious plan to exert effort to carry out a behavior” (Eagly & Chaiken, 1993), collective intention can be regarded as “pool of wills” where “individual wills” of all group members are combined together to form a “group will” simultaneously and interdependently (Bagozzi, 2000; Gilbert, 1996). The concept of collective intention was interpreted and expressed in two forms in the literature, which are I-mode and we-mode collective intentions respectively (Tuomela, 2006). In the we-mode sense, the participants intend and function as group members, and the action is conceived as the group acting or experiencing as a unit (Bagozzi & Lee, 2002). In this regard, a we-mode collective intention is often expressible by “we will perform an action jointly” (Tuomela, 2005). This contrasts with I-mode collective intention where individuals in a social group intend and act as private persons to perform an action contributing to the achievement of a group goal. It is also important to realize that the I-mode collective intention is conceptually different from the more commonly studied personal intention because the former refers to a joint action, which one cannot perform alone (Bagozzi & Lee, 2002). In this regard, the decisions and actions in the I-mode sense, to some extent, are simultaneous and interdependent. In the current study, we present an attempt to re-specify behavioral intentions used in prior research, and empirically examine the I-mode and we-mode collective intentions in crowdsourcing communities. Following prior studies on the relationship between intentions and actual behavior (Ajzen & Fishbein, 1980), both I-mode and

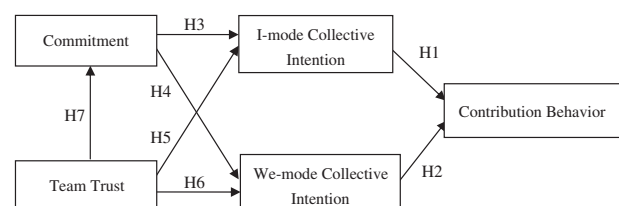


Fig. 1. Research model.

we-mode collective intentions are hypothesized to affect users' actual contribution behavior in Wiki communities. Therefore,

H1: I-mode collective intention is positively related to contribution behavior in wiki communities.

H2: We-mode collective intention is positively related to contribution behavior in wiki communities.

2.2. Commitment–trust theory

The commitment–trust theory is an important paradigm in relationship marketing research, and was originally developed by Morgan and Hunt (1994) to examine the long-term relationship exchange. This theory was later widely used and applied to different research contexts, such as inter-organizational relationship (Geyskens, Steenkamp, Scheer, & Kumar, 1996), buyer–seller relationship (Doney & Cannon, 1997), member–member relationship (Costa, 2003), and user–website relationship (Li, Browne, & Wetherbe, 2006). At the core of this theory, commitment and trust are regarded as essential to successful relationship building and maintenance. In addition, trust is also considered as a major determinant of relationship commitment.

Commitment–trust theory also explains the joint impacts of commitment and trust on cooperation. It is believed that relationship commitment and trust “lead directly to cooperative behaviors that are conducive to relationship marketing success” (Morgan & Hunt, 1994, p.22). In this regard, an individual committed to and trusting the relationship tends to cooperate and work together with the exchange partners because of his/her desire to make the relationship work and the confidence in the ability, benevolence and integrity of the partners. As crowdsourcing projects always require collaboration and cooperation among its users, and online interactions and cyber relationships form the basis of user participation, commitment–trust theory thus is an appropriate framework to understand users' online social behavior in crowdsourcing communities. In this study, relationship commitment is defined as the degree to which a committed individual is willing to exert maximum efforts at maintaining an ongoing relationship within the wiki communities. Team trust, on the other hand, refers to the willingness to rely on other co-workers in whom one has confidence. Commitment and trust are used in this study as the theoretical basis for exploring collective and cooperative behavior in wiki communities.

The association between relationship commitment and behavioral intention has been extensively examined in prior studies (e.g., Li et al., 2006). In particular, commitment is regarded as the central to relationship marketing, and if an individual is committed to an enduring relationship or to a team, he/she will be more likely to cooperate with other partners in order to maintain and enhance a valued relationship (Morgan & Hunt, 1994). In the current study, if wiki contributors commit themselves to the relationship with a wiki community which they expect to develop and maintain in the future, they may consider working together and acting as a unit to help the community grow, and thus build a we-mode collective intention. In addition, as the benefits of being in a relationship with the wiki community are inseparable from simultaneous participation of other partners, highly committed individuals thus are often strongly dependent on the peers (Li et al., 2006). In this regard, if one has a strong sense of commitment to the wiki community, he/she may act and contribute based on the co-workers' simultaneous behavior, i.e., I-mode collective intention. This is because the collective task and the associated benefits cannot be obtained without such interdependent behavior. Based on the discussion above, we have the following hypotheses.

H3: Commitment is positively related to I-mode collective intention to contribute in wiki communities.

H4: Commitment is positively related to we-mode collective intention to contribute in wiki communities.

Trust is also regarded as the basis for effective cooperation to occur (Deutsch, 1960). Prior studies have consistently found that mutual social trust would lead to collective action in the group context (Tuomela & Tuomela, 2005; Wasko, Faraj, & Teigland, 2004). In particular, if an individual perceives that the other party is trustworthy enough to be relied on, and will not take any unexpected actions that may result in negative outcomes, he/she will be more likely to cooperate and collaborate with the partners for mutual benefits (Yang, Lee, & Kurnia, 2009). In this regard, the confidence in other wiki contributors' competence, integrity and benevolence, including their future behaviors in the wiki community will facilitate coordinated and joint efforts, and enhance one's we-mode collective intention to act together and contribute as a team member with other partners. In addition, trust also advances the willingness to rely on the actions and decisions of the other party (Morgan & Hunt, 1994). If one has a high trust perception of other contributors in the wiki community, he/she will be more likely to act interdependently to contribute to the wiki community, and thus the I-mode collective intention will be greatly enhanced by the co-workers' simultaneous contribution behaviors. Therefore,

H5: Team trust is positively related to I-mode collective intention to contribute in wiki communities.

H6: Team trust is positively related to we-mode collective intention to contribute in wiki communities.

Commitment–trust theory further demonstrates that trust is a major determinant of relationship commitment (Morgan & Hunt, 1994). This is because if a trusting relationship is well-established, and along with the reduced uncertainty between the exchange partners, people tend to have a strong desire to commit themselves to such highly-valued relationships (Li et al., 2006; Wang, Shen, & Sun, 2013). In this regard, prior studies also have consistently proven a positive relationship between trust and commitment (e.g., Li et al., 2006; Wang & Chen, 2012; Wu, Chen, & Chung, 2010). Following the literature, we hypothesize that if one has a strong perception of trust towards other contributors in the wiki community, he/she will be more likely to develop a commitment to the relationship with the partners and the community as a whole. Therefore,

H7: Team trust is positively related to commitment towards the wiki communities.

3. Research methodology

This study aims to investigate the effects of trust and commitment on collective intention to contribute in wiki communities. A number of research hypotheses have been proposed and need to be empirically tested. As such, a quantitative survey research strategy appears appropriate in conducting this study. Details about data collection methods, measures and demographic characteristics will be reported in the following sections.

3.1. Data collection

Survey data were collected from two most famous wiki communities in Mainland China – Baidu Baike and Hudong Baike.

A web-based online survey was used, and invitation message containing the objective of this study and a link directed to the online questionnaire was randomly distributed to the registered users. All participation in this study was voluntary, yet motivated by a lucky draw. In order to control the data quality, a screening question was employed to identify the respondents who have prior experience with creating or editing wiki pages. They were further asked to write down their nicknames and the nicknames of their collaborators in the wiki community. It would help the respondents to clearly recognize the group of people with whom they develop communal relationships and collective intention. Another email invitation has been sent to the successful respondents one month later to collect data regarding their actual contribution behaviors. Finally, a total of 202 valid responses were received.

3.2. Measurement

Most of the measures were adapted and extended using multi-item scales from prior studies, with minor changes in the wording to fit the specific investigation context of wiki community (see Appendix A). In particular, three items adapted from Wasko and Faraj (2005) and Mowday, Steers, and Porter (1979) were used to measure commitment, and five items from Jarvenpaa, Knoll, and Leidner (1998) were adapted to the measurement of team trust. We also adapted the items of we-mode collective intention from Bagozzi and Dholakia (2006), and items of contribution behavior from Limayem, Hirt, and Cheung (2007). The measures for I-mode collective intention were developed following literature review and consultation with actual wiki contributors. The face validity of the questionnaire was first assessed by a panel of survey experts, and the statistic validity was further examined and reported in the following data analysis section. Measurements for all constructs were phrased on a seven-point Likert scales, anchored from “1 = strongly disagree” and “7 = strongly agree”.

3.3. Demographic analysis

Among the respondents, 69.8% were male and 30.2% were female. Nearly half of the respondents (45.54%) were aged between 21 and 25, and approximately 73.76% of them had education beyond college level. On average, 65.84% of the respondents have less than one-year contribution experience in the surveyed wiki community. Table 1 describes the demographic profile of the respondents.

Table 1
Demographic profile.

Characteristics	Frequency (N = 202)	Percentage (%)
<i>Gender</i>		
Male	141	69.80
Female	61	30.20
<i>Age</i>		
≤20	55	27.23
21–25	92	45.54
≥25	55	27.23
<i>Education level</i>		
High school or below	53	26.24
College	40	19.80
Undergraduate or above	109	53.96
<i>Experience with Wiki community</i>		
<6 months	100	49.50
6–12 months	33	16.34
>1 year	69	34.16

4. Data analysis and results

SmartPLS Version 2.0 was used for data analysis. Partial Least Squares (Wold, 1989) is a second-generation structural equation modeling technique that utilizes a component-based approach to estimation, and has extensively been used in social science research to analyze quantitative data (Jöreskog & Sörbom, 1993). PLS is able to estimate the measurement model and the structural model simultaneously in one operation. In addition, we have chosen PLS because it has less stringent sample size and indicator distribution requirements than traditional SEM approaches (Chin, 1998). Following the two-step analytical procedures (Hair, Anderson, Tatham, & Black, 1998), the measurement model was first examined to evaluate reliability and validity of measures, and then the structural model was tested to assess the relationships among theoretical constructs.

4.1. Measurement model

The measurement model was examined in terms of convergent validity and discriminant validity. Convergent validity can be assessed by examining the composite reliability and the average variance extracted (Hair et al., 1998). In particular, composite reliability refers to the internal consistency of the indicators measuring a given factor and average variance extracted indicates the amount of variance captured by a construct as compared to the variance caused by the measurement error. A composite reliability of 0.70 or above and an average variance extracted of more than 0.50 are deemed acceptable (Fornell & Larcker, 1981). As shown in Table 2, all measures exceed the recommended thresholds.

Discriminant validity represents the extent to which measures of a given construct differ from measures of other constructs. To demonstrate adequate discriminant validity of the constructs, the square root of the average variance extracted for each construct should be greater than the correlations between that construct and all other constructs (Fornell & Larcker, 1981). In addition, the measurement items should load highly on their theoretically assigned factor and not highly on other factors (Gefen & Straub, 2005). Table 3 presents the correlation matrix of the constructs and the square roots of the average variance extracted, and Table 4 shows the confirmatory factor analysis results. Finally, our results suggest that the discriminant validity is satisfactory at the construct level.

4.2. Structural model

The results of the PLS model are depicted in Fig. 2, which presents the overall explanatory power (R^2), predictive relevance (Q^2) and the estimated path coefficients (all significant paths are indicated with asterisks). The test of significance of all paths was performed using the bootstrapping technique. Overall, the model accounts for 17.9% of the variance in contribution behavior, 38% of the variance in we-intention, and 16.3% of the variance in commitment. Predictive relevance of the model can be assessed by Stone–Geisser Criterion using the blindfolding procedure (Fornell & Cha, 1994). Construct cross-validated redundancy is used as a measure of Q^2 and its value should be above 0. In this study, the values of Q^2 range from 0.01 to 0.31, confirming the predictive relevance.

The results also indicate that both I-mode and we-mode collective intentions significantly affect contribution behavior in wiki communities, with path coefficients at 0.267 and 0.357 respectively. Team trust and relationship commitment have been found to exert statistically significant effects on we-mode collective intention, with path coefficients at 0.206 and 0.504 respectively.

Table 2
Reliability and convergent validity.

Constructs	Cronbach's alpha	CR	AVE	Items	Loading	T-statistics
Commitment (COMM)	0.806	0.885	0.719	COMM1	0.845	24.436
				COMM2	0.840	22.713
				COMM3	0.857	39.907
Team Trust (TRUS)	0.938	0.953	0.802	TRUS1	0.894	46.739
				TRUS2	0.913	54.091
				TRUS3	0.887	45.654
				TRUS4	0.905	53.271
				TRUS5	0.879	38.664
I-mode Collective Intention (I-CI)	0.820	0.917	0.847	I-CI1	0.908	34.112
				I-CI2	0.932	43.192
We-mode Collective Intention (WE-CI)	0.890	0.932	0.820	WE-CI1	0.920	53.413
				WE-CI2	0.946	101.972
				WE-CI3	0.849	29.882
Contribution Behavior (CB)	0.884	0.945	0.896	CB1	0.940	92.984
				CB2	0.953	120.373

Table 3
Discriminant validity.

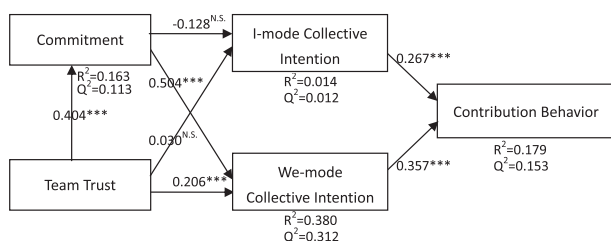
	Commitment	Team trust	I-mode collective intention	We-mode collective intention	Contribution behavior
COMM	0.848				
TRUS	0.40	0.896			
I-CI	−0.12	−0.02	0.920		
WE-CI	0.59	0.41	−0.10	0.906	
CB	0.18	0.20	0.23	0.33	0.947

Note: The numbers in bold in the diagonal row are square roots of the average variance extracted.

Table 4
Item loadings and cross-loadings.

	Commitment	Team trust	I-mode collective intention	We-mode collective intention	Contribution behavior
COMM1	0.84	0.28	−0.07	0.42	0.15
COMM2	0.84	0.32	−0.18	0.47	0.05
COMM3	0.86	0.41	−0.05	0.57	0.26
TRUS1	0.34	0.89	0.00	0.36	0.19
TRUS2	0.34	0.91	−0.02	0.30	0.15
TRUS3	0.38	0.89	−0.03	0.38	0.16
TRUS4	0.38	0.91	−0.06	0.39	0.17
TRUS5	0.37	0.88	0.00	0.39	0.23
I-CI1	−0.10	−0.01	0.91	−0.11	0.19
I-CI2	−0.11	−0.03	0.93	−0.08	0.23
WE-CI1	0.53	0.39	−0.09	0.92	0.33
WE-CI2	0.57	0.40	−0.10	0.95	0.33
WE-CI3	0.49	0.31	−0.09	0.85	0.23
CB1	0.17	0.16	0.17	0.32	0.94
CB2	0.18	0.22	0.27	0.30	0.95

Note: The numbers in bold represent items that load on that specific factor.



Note: ^{N.S.} : non-significant; * $p < 0.05$; ** $p < 0.01$; *** $p < 0.001$

Fig. 2. Results of PLS analysis.

However, relationship-oriented factors have no significant effects on I-mode collective intention. This may be caused by the fact that open collaboration in the free online encyclopedia actually represents a loosening relationship, which may not necessarily lead to high interdependence among the knowledge contributors. In this regard, enterprise wiki for working team collaboration may be more effective, and some other factors such as task or goal interdependence should play a greater role. As we hypothesized, team trust posits a significant effect commitment, with a path coefficient at 0.404.

5. Discussion and implications

This study represents an empirical attempt to understand online social behavior in crowdsourcing communities. Based on the plural subject theory and commitment–trust theory, a research model is developed and empirically tested by using longitudinal data of 202 respondents from Mainland China. The findings of this study provided some additional insights to crowdsourcing behavior, as compared to other studies. In particular, this study regards contribution in wiki communities as an online social behavior, and differentiates collective intentions from traditional individual intentions. Additionally, two important forms of collective intentions are identified in this study and some interesting findings, which have not been covered by previous research, are emerging. Both I-mode and we-mode collective intentions significantly predicted online contribution behavior, while trust and commitment affect we-intention only.

The measurement model is confirmed with adequate convergent and discriminant validity of all the measures. The structural model explains 17.9% of the variance in contribution behavior and 38% of the variance in we-intention to contribute in wiki communities. This section will discuss the limitations and future research of this study, and highlights the implications for both research and practice.

5.1. Limitations and future research

Before highlighting the implications, the limitations of this study will be first discussed. First of all, this study was conducted on two famous wiki communities in Mainland China, and therefore, other forms of crowdsourcing communities have not been considered. In addition, China represents a predominantly collectivist cultural context, where people tend to think and act in terms of “we” rather than “me”. As such, the generalization of the findings should be made with caution. Future research investigating

online social behavior in other crowdsourcing communities and in other cultural contexts is highly recommended. Second, it is also notable that the research model explains only 17.9% of the variance in actual behavior. This suggests that except for collective intentions, there may be some other important variables in predicting contribution behavior. Intention-behavior gap has been recognized in the literature (Bagozzi, 2007), and intentions need to be adjusted over time prior to taking an action. It is thus important to consider the intervening and psychological steps that between collective intention and behavior. For example, institutional variables, such as the existence of censorship may affect the actual contribution behavior in China (Yang & Liu, 2014). Habit is another variable which has been found as an important psychological step before action initiation (Limayem et al., 2007). Third, we develop a research model from the relationship management perspective to explain both I-mode and we-mode collective intentions involved in wiki-based knowledge contribution. Two key variables (i.e., trust and commitment) in the literature have been included in the model, but both of them have no significant effect on I-mode collective intention (although they explained a large proportion of the variance in we-mode collective intention). In this regard, future studies should pay a special attention to the factors that account for the variance in I-mode collective intention. As we mentioned above, social interdependence among the participants as well as the interdependence in their decisions and actions may represent the core features of I-mode collective intention, and in this regard, interdependence theory (Johnson, 2003) may contribute a lot to this field of research.

5.2. Implications for research

Social media-based crowdsourcing initiatives provide new ways to generate original content, and help to organize online crowds to collaboratively work on the projects they are passionate about. While this phenomenon is generally taken to be a promising step towards greater cooperation and team performance, empirical studies on this topic are still rare. The first, and perhaps most important, question is what motivates a crowd of people to contribute and collaborate.

Compared to other forms of outsourcing, the social and participatory nature of crowdsourcing is obvious and underestimated in the literature. In this regard, plural subjects-based research perspective represents an effective approach to explain user behavior in this area. Although some recent studies have examined the participation we-intention in online social networks, such as Facebook (Cheung & Lee, 2010), the concept of collective intention is not yet fully understood. In this study, we have presented an initial attempt to examine collective intention from both I-mode and we-mode perspectives. A longitudinal field survey was employed, and the results showed that both types of collective intention significantly predicted online social and collective behavior in contributing to wiki communities. This study thus contributes to our current understanding of the emerging phenomenon of crowdsourcing on the one hand, and invokes academic discussion on the group and social aspects of decision making on the other hand.

This study also extends the existing theories of relationship management, and contributes to the literature on the role of relational factors (e.g., commitment and trust) in crowdsourcing participation. Our results showed that relationship-building is the basis for we-mode collective intention development, and both commitment and trust exerted significant effects on it. This finding echoes with previous studies claiming the joint impacts of relationship commitment and trust in cooperation and collaboration. However, it is also notable that the two relationship-oriented factors exerted no statistically significant effect on I-mode collective intention. The results indicated that weak-tie online relationships

cannot lead to high interdependence among the diverse online individuals.

5.3. Implications for practice

Apart from the theoretical contributions, this study also provides some useful insights for practitioners. It is obvious that mass collaboration and peer production employed on the Internet today greatly changes the way people work together, and creates huge business opportunities. This study thus represents one of the few studies that attempt to investigate online social behaviors in crowdsourcing communities. The plural subjects-based conceptual scheme has been proven as a useful perspective to look at this context. More specifically, both I-mode and we-mode collective intentions have exerted statistically significant effects on users' contribution behavior in wiki communities. It is thus important for crowdsourcing community managers to increase users' participation intentions in two different ways. First, the managers may consider helping to establish various interest groups to facilitate community users' intentions to collectively participate in the online crowdsourcing innovation. If an individual feels that there is a group of people who have common interests and goals, he or she will be more likely to work with the peers together. Second, it is also necessary to make the tasks and goals more interdependent in crowdsourcing communities. According to the findings of this study, if an individual's intention to contribute is greatly influenced by his/her partners, the actual joint action will be made to happen. In this regard, the proper design of tasks, goals and rewarding mechanisms may let the participants act in a more interdependent way.

Another important implication rests on the findings that social relationship factors effectively promote users' we-intentions to work together. Trust and commitment are proven as the two most important determinants of we-mode collective intention. Although prior studies have demonstrated that relationship quality developed between individuals and virtual community as a whole predicts website loyalty (Li et al., 2006) and knowledge contribution (Wasko et al., 2004), the implication of this study is also different in that community managers should help to build explicit or implicit groups first, and a good relationship would further lead to an individual's we-intention to act as a member of such groups. In addition, frequent interaction among group members and a satisfactory relationship with the crowdsourcing community will definitely increase users' trust and relationship commitment.

6. Conclusions

With the rise and proliferation of social media, newly emerging mass-production methods, such as crowdsourcing has greatly changed the way people cooperate and collaborate. However, attracting and retaining a necessary number of contributors is often regarded as the first and the most important prerequisite for the success of crowdsourcing. By integrating plural subject theory and commitment-trust theory, this study presents an initial attempt to explore and understand what motivates people to participate in crowdsourcing initiatives, with insights from wiki communities. The results identified two different types of collective intentions, both of which exerted significant effects on users' contribution behavior. Another interesting finding is that relationship-orientated factors only affected we-mode, instead of I-mode, collective intention. This study also provides some managerial insights on how to encourage participation in crowdsourcing. Future research should continue to enrich this line of research by considering other forms of crowdsourcing communities, such as Dell IdeaStorm, Netflix Prize and Amazon's Mechanical Turk.

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Appendix A. Survey items

Commitment (adapted from Mowday et al. (1979) and Wasko and Faraj (2005))

COMM1: I really care about the fate of this wiki community.
 COMM2: I would feel a loss if the wiki community were no longer available.
 COMM3: I am willing to put in a great deal of effort beyond normally expected in order to help this wiki community be successful.

Team trust (adapted from Jarvenpaa et al. (1998))

TRUS1: Overall, the people in this wiki community are very trustworthy.
 TRUS2: The people in this wiki community are friendly.
 TRUS3: Members of this wiki community are very capable of performing their tasks.
 TRUS4: Members of this wiki community show a great deal of integrity.
 TRUS5: We are usually considerate of one another's feelings in this wiki community.

I-mode collective intention (self-developed)

I-CI1: If others do not contribute to wiki community, I predict I will not contribute my knowledge as well.
 I-CI2: Assuming others do not contribute to wiki community, I will stop my knowledge contribution in this wiki community.

We-mode collective intention (adapted from Bagozzi and Dholakia (2006))

WE-CI1: We intend to contribute our knowledge to this wiki community together in the next month.
 WE-CI2: I intend that we contribute our knowledge to this wiki community together in the next month.
 WE-CI3: We share a common intention to contribute our knowledge to this wiki community together in the next month.

Contribution behavior (adapted from Limayem et al. (2007))

CB1: In the past month, how often did you contribute knowledge to this wiki community?
 CB2: In the past month, how many hours did you contribute knowledge to this wiki community?

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