Motivations of Wikipedia content contributors

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ABSTRACT

Rapidly developing web technologies have increased the prevalence of user-generated Internet content. Of the many websites with user-generated content on the Internet, one of the most renowned is Wikipedia, which is the largest multilingual free-content encyclopedia written by users collaboratively. Nevertheless, although contributing to Wikipedia takes time and knowledge, contributors are rarely compensated. As a result, there is a need to understand why individuals share their knowledge in Wikipedia. The aim of this study was to evaluate the effects of both conventional and self concept-based motivation on individual willingness to share knowledge in Wikipedia. After performing an online questionnaire survey, SEM was applied to assess the proposed model and hypotheses. The analytical results showed that internal self-concept motivation is the key motivation for knowledge sharing on Wikipedia.

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1. Introduction

Rapidly developing web technologies have increased the prevalence of user-generated content on the Internet. User-generated content provides a new way to create, manipulate, and consume information online (Nov, 2007). For instance, Wikipedia, one of the most renowned user-generated content applications and the largest multilingual free-content encyclopedia in the world, is written by users collaboratively. Wikipedians (i.e., individuals who write and edit Wikipedia) are generally allowed to edit Wikipedia content by sharing their knowledge in relevant entries. Accordingly, anyone with Internet access can search and browse Wikipedia entries for free. Compared to conventional websites, in which content is provided by the vendor, the emergence of user-generated content has indeed changed conventional views of how information is created, shared, and used.

Wikipedia has attracted growing academic attention due to its popularity and unconventional operating mechanisms (Royal & Kapila, 2009). Of these rising issues about Wikipedia, the content reliability is a widely discussed topic in prior research (Korfiatis, Poulos, & Bokos, 2006; Waters, 2007). Although the completeness and accuracy of Wikipedia content is important, content reliability is not the focus of this study. This study analyzed the motivation to engage in knowledge sharing in Wikipedia. Notably, because Wikipedians participate in editing Wikipedia content by sharing their knowledge about a specific entry, they may lose the ownership and associated benefits of their knowledge (Gray, 2001). Addition-

ally, although knowledge sharing in Wikipedia takes time and effort, Wikipedians rarely obtain equivalent returns. Thus, important issues are the profiles and motivations of individuals who are likely to participate in knowledge sharing in Wikipedia.

Recently, an increasing number of studies have been done on individuals' participation behavior in Wikipedia. For instance, Pfeil, Zaphiris, and Ang (2006) compared the influence of cultural differences between several national Wikipedians. Nov (2007) compared the motivations associated with high and low levels of contribution to Wikipedia. Amichai-Hamburger, Lamdan, Madiel, and Hayat (2008) focused on the personal characteristics of Wikipedia participants. Although all of these studies provide insight into the characteristics and contribution behavior of Wikipedians, little empirical, quantitative data has been compiled to determine what motivates individuals to share knowledge in Wikipedia. Even the empirical study by Nov (2007) reported only a simple correlation coefficient between the motivations of contributors and the time they spent contributing to Wikipedia. His study did not construct an integrated motivation model and could not really answer what is the most influencing motivation factor on the knowledge sharing behavior in Wikipedia.

Considering the content of Wikipedia, this study assumed that individual participation in Wikipedia can be considered knowledge sharing behavior since individuals generally engage by contributing what they know to relevant entries. Studies of knowledge sharing typically apply motivational theory to interpret individual knowledge-sharing behavior. Many prior studies confirm that motivation has a key role in knowledge sharing intention and behavior (Bock, Zmud, Kim, & Lee, 2005; Cabrera, Collins, & Salgado, 2006; Constant, Sproull, & Kiesler, 1996; Hall, 2001). However, Leonard, Beauvais, and Scholl (1999) argued that conventional motivational theory

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cannot fully explain the diversity of observed behaviors. Therefore, Leonard et al. (1999) suggested that self-concept-based motivation should be included in the measure of motivation. Thus, both conventional and self-concept-based motivations are adopted and measured in this study to explore their possible effects on individual knowledge-sharing behavior in Wikipedia.

The aim of this study was to evaluate how motivation affects individual knowledge sharing behavior in Wikipedia. The primary research issues were the following: whether conventional and self-concept-based motivations adequately explain individual knowledge sharing behavior in Wikipedia, whether individual motivation for sharing differs from that in general virtual communities, and the factors that motivate Wikipedians to contribute knowledge.

2. Literature review and hypotheses development

Research on knowledge sharing in the organizational context has mounted steadily in recent decades. Many empirical studies have highlighted the various factors that affect individual intention to share knowledge (e.g., Bock & Kim, 2002; Bock et al., 2005; Kankanhalli, Tan, & Wei, 2005). Of these factors, motivation theory was a widely discussed perspective in prior knowledge sharing research. Many recent knowledge sharing studies have also applied this perspective to explore individual sharing behavior in the virtual community context (e.g., Hsu, Ju, Yen, & Chang, 2007; Wasko & Faraj, 2000, 2005). Most studies assume that the key motivation for knowledge sharing is the anticipation of receiving intrinsic or extrinsic benefits in the future. Accordingly, intrinsic motivation and extrinsic motivation are two frequently adopted indicators of knowledge sharing intention and behavior (e.g., Hsu et al., 2007; Lin, 2007; Wasko & Faraj, 2005).

Intrinsic motivation refers to the internal satisfaction received from the process of performing behaviors (Deci, 1975). Intrinsically motivated individuals engage in a behavior for enjoyment rather than to obtain an extrinsic outcome or reward. Restated, individuals may gain satisfaction from the process of performing a behavior such as sharing knowledge. Kankanhalli et al. (2005) showed that individuals would share knowledge in organizations in order to gain intrinsic benefits. Lin (2007) also observed that intrinsic motivation of organization members is positively related to knowledge sharing intention. Additionally, Wasko and Faraj (2000) found that individuals who enjoy sharing knowledge are likely to be the most active contributors of valuable knowledge to a virtual community. This study posits that, since Wikipedia participation is voluntary, contributors are motivated by their enjoyment of editing Wikipedia. Therefore, individuals who have intrinsic motivation are likely to share knowledge in Wikipedia frequently; thus, the first hypothesis is the following.

Hypothesis 1. Intrinsic motivation positively affects individual knowledge sharing behavior in Wikipedia.

Extrinsic motivation, however, is a goal-oriented motivation that refers to performing an activity in anticipation of obtaining a return such as pay or reputation (Deci, 1975; Leonard et al., 1999). Gray (2001) indicated that, once individuals share their knowledge, ownership and benefits based on that knowledge disappear. Individuals may choose not to share their knowledge if they perceive that their knowledge is valuable (Bock & Kim, 2002). Therefore, the expectation of obtaining extrinsic returns such as pay and promotion may inspire some individuals to engage in knowledge sharing (Leonard et al., 1999). Kankanhalli et al. (2005) demonstrated that instrumental rewards lead individuals to share knowledge within organizations. Wasko and Faraj (2005) also proposed that individuals contribute knowledge frequently within virtual communities in order to enhance their rep-

utations. That is, both tangible and intangible extrinsic returns influence individual intention to share knowledge (Hall, 2001). Since Wikipedia is a free-content Internet encyclopedia written collaboratively by users, participants do not receive monetary return. Nevertheless, Wikipedia has an award system that encourages contributors. The most common reward given to individual Wikipedia contributors is Barnstar. After completing specific tasks or joining specific projects, Wikipedians can gain a particular Barnstar image with a brief illustration in their "user pages". Although Barnstar is not a monetary reward, it enhances the online reputation, image, or status of Wikipedia contributors. Thus, extrinsic motivation may also influence individual sharing behavior in Wikipedia. This leads to the second hypothesis in this study.

Hypothesis 2. Extrinsic motivation positively affects individual knowledge sharing behavior in Wikipedia.

Although the influence of intrinsic and extrinsic motivation has been studied extensively, Leonard et al. (1999) argued that conventional motivation theory have limited ability to explain the diversity of behaviors. For example, individuals may share knowledge in an online community, but not share knowledge in the others, even if their expectancies in terms of intrinsic and extrinsic motivation are similar. Further, individual personality differences may also affect the expectancy and the instrumentality of information used (Rynes & Lawler, 1983). Thus, Leonard et al. (1999) suggested that, in addition to the traditional measures of motivation (e.g., intrinsic motivation, extrinsic motivation), self-concept-based motivations should also be examined.

From the self-concept perspective, each individual has a set of perceptions about her/his traits, competencies, and values, namely, perceived self and another set of traits, competencies, and values that one would like to possess, namely, an ideal self (Rogers, 1959). The ideal self can derived from both external and internal sources, and individuals behave in ways that can make their perceived self congruent with the ideal self (Leonard et al., 1999). Based on the self-concept perspective, Leonard et al. (1999) suggested two self-concept-based motivation types: external self-concept motivation and internal self-concept motivation.

External self-concept motivation is the primary motivation for individuals to adopt an activity that is congruent with the expectations of a reference group (Leonard et al., 1999). In this case, individuals are motivated to do things that yield positive feedback from a reference group and a feeling of belonging to the group, as suggested by social identity theory (Tajfel, 1981). Restated, individuals driven by external self-concept motivation associate group success with their competencies and capabilities (Leonard et al., 1999). Nahapiet and Ghoshal (1998) asserted that the extent of identification with an organization influences individual motivation to exchange knowledge. Chiu, Hsu, and Wang (2006) also reported a positive association between identification and individual knowledge sharing activity in virtual communities. Since sharing knowledge leads to growth of Wikipedia, individuals may receive affirmative feedback by sharing knowledge in Wikipedia. Thus, external self-concept increases the individual willingness to share knowledge in Wikipedia; this leads to the following Hypothesis 3.

Hypothesis 3 External self-concept motivation positively affects individual knowledge sharing behavior in Wikipedia.

Internal self-concept motivation refers to the force that drives individuals to pursue an activity that meets their inherent standards (Leonard et al., 1999). According to the concept of self-efficacy, when individuals determine that behaviors meet their internal standards and then receive positive feedback from performing the behavior, they feel confident in their competencies (Bandura, 1986). Previous research showed that self-efficacy

positively correlates with knowledge contribution to an organization (Cabrera et al., 2006; Kankanhalli et al., 2005). Lin (2007) further suggested that employees with high self-efficacy tend to have strong intention to share knowledge within an organization. Hsu et al. (2007) also empirically demonstrated that self-efficacy is essential for inducing individuals to participate and share knowledge in virtual communities. Sharing knowledge increases the confidence of contributors in the knowledge they possess. Thus, internal self-concept encourages individuals to share knowledge in Wikipedia; this leads to the following hypothesis.

Hypothesis 4. Internal self-concept motivation positively affects individual knowledge sharing behavior in Wikipedia.

3. Research design and methodology

3.1. Instrument design

Fig. 1 shows the research model developed according to the above literature. Based on the proposed research model, an online questionnaire survey was conducted. The questionnaire included both conventional and self-concept-based motivation measures as well as knowledge sharing behavior measures. Specifically, the items for measuring intrinsic motivation and extrinsic motivation were mainly adapted from previous studies and modified for use in the knowledge sharing context. Three items were used to assess intrinsic and extrinsic motivation. Items for assessing external self-concept motivation and internal self-concept motivation were adapted from the MSI scales developed by Barbuto and Scholl (1998) with minor modifications to fit this research context. External self-concept motivation and internal self-concept motivation each contained three items. Further, knowledge sharing behavior was measured on a two-item scale adapted from Kankanhalli et al. (2005). Respondents were asked to indicate how strongly they disagreed or agreed with statements presented in the questionnaire on a five-point Likert-type scale ranging from 1 for "strongly disagree" to 5 for "strongly agree." Demographic data such as gender and education level were also collected in this study.

3.2. Data collection

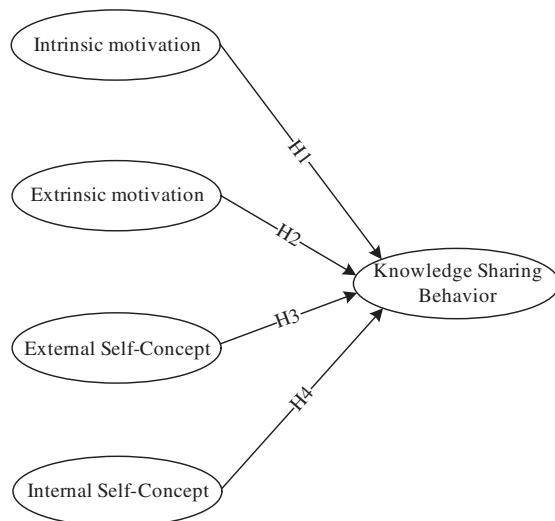The study sample was drawn from the English version of Wikipedia, which currently contains roughly 2.7 million entries and is the largest of all Wikipedias. Two thousand members with Wikipedia user pages were selected randomly as study subjects and were sent invitational e-mails. Subjects were asked to click the hyperlink in the invitational e-mail to access the online survey questionnaire. Of the 2000 Wikipedia members selected, 1157 e-mails were undelivered because the e-mail addresses were invalid or because they had indicated that they did not wish to receive e-mail from other users. Thus, 843 members with valid e-mail address were invited to participate in this study. A follow-up reminder was sent after 2 weeks. Finally, after 4 weeks, 235 responses were received. Of these, 16 questionnaires were incomplete, which left only 219 valid questionnaires. The response rate was about 26%. Twenty-nine (13.2%) participants were female, and 190 (86.8%) were male. The average age of the respondents was 26.1 years. The first 30% of all questionnaires received were compared with the last 30% of questionnaires received. The statistical analysis indicated that the two groups did not significantly differ in terms of motivation sources, sharing frequency, or demographics. Therefore, we concluded that the respondents were a representative sample of the 843 Wikipedia members with valid e-mail addresses.

4. Results

4.1. Reliabilities and validation

Since all samples in this study were collected simultaneously, and all samples used the same self-reported instrument, common method bias test was applied. The Harmon's one-factor test was conducted (Podsakoff & Organ, 1986). As Table 1 shows, five factors with eigenvalues above 1 were extracted, which together accounted for 71.5% of the variance. The first factor accounted for 28.7% of the variance. Since no single factor emerged, and since no single general factor accounted for most of the variance in the study, common method variance was deemed inconsequential.

The reliability of the proposed model was measured using composite reliability (CR). In reliability analysis, an acceptable CR value must exceed 0.7 (Fornell & Larcker, 1981). As Table 1 shows, the CR value for each construct was well above the acceptable value; thus, the reliability of the model was confirmed.

Discriminant and convergent validity were measured by average variance extracted (AVE). Fornell and Larcker (1981) suggested that the AVE value of each construct should exceed the squared correlation among other constructs in the proposed model to confirm discriminant validity. Convergent validity is also considered adequate when the AVE value of each construct exceeds 0.5 (Fornell & Larcker, 1981). As Tables 1 and 2 show, the AVE values for all study constructs were well above the threshold, and the square root of AVE value in the diagonal for each construct exceeded the correlation coefficients in the corresponding rows and columns. Thus, both discriminant and convergent validity were acceptable in this study.

4.2. Correlation analysis

Before testing the overall proposed model, this study first examined the mean scores for motivation sources and their relationships with self-reported knowledge sharing behavior in terms of relative frequency in Wikipedia. As Table 3 shows, intrinsic motivation had the highest mean of all motivation sources, and was followed by internal self-concept-based motivation, extrinsic motivation and external self-concept-based motivation. This implies that Wikipedians already had very high intrinsic motivation and relatively high internal self-concept-based motivation but weak external self-concept-based motivation. This finding is also consistent with Nov (2007). Pearson correlation analysis was

Fig. 1. Research model.

Table 1
Composite reliability and average variance extracted.

Scale dimensions	Item	Factor loading	Composite reliability	Average variance extracted	Mean	Minimum Maximum
Intrinsic motivation (Int)	Int1	0.882	0.922	0.799	4.4612	1
	Int2	0.912				5
	Int3	0.866				
Extrinsic motivation (Ext)	Ext1	0.841	0.887	0.723	2.9924	1
	Ext2	0.864				5
	Ext3	0.831				
External self-concept motivation (ESC)	ESC1	0.686	0.844	0.644	2.7580	1
	ESC2	0.838				5
	ESC3	0.845				
Internal self-concept motivation (ISC)	ISC1	0.743	0.816	0.597	3.6362	1.33
	ISC2	0.755				5
	ISC3	0.654				
Knowledge-sharing behavior (KSB)	KSB1	0.926	0.926	0.861	3.6895	1
	KSB2	0.934				5

Table 2
Correlations and square root of AVE values.

	Int	Ext	ESC	ISC	KSB
Int	**0.89**				
Ext	0.21[*]	**0.85**			
ESC	0.13	0.47[*]	**0.80**		
ISC	0.33[*]	0.49[*]	0.48[*]	**0.77**	
KSB	0.09	0.24[*]	0.21[*]	0.37[*]	**0.93**

Diagonal values in bold are square root of AVE and others (off-diagonal) are correlations between variables.
[*] Significant at 0.05 level.

Table 3
Motivation levels and correlation with sharing behavior.

Motivation	Mean	Correlation coefficient
Intrinsic motivation	4.46[*]	0.102
Extrinsic motivation	2.99	0.276[*]
External self-concept motivation	2.76[*]	0.214[*]
Internal self-concept motivation	3.64[*]	0.393[*]

[*] Significant at 0.05 level; The means were tested with the median 3.

further used to test the relationship between the motivation sources and the knowledge sharing behavior of subjects. The analytical results showed that, except for intrinsic motivation, all motivations significantly correlated with individual knowledge-sharing behavior. A possible explanation for the insignificant correlation is that the subjects already had high intrinsic motivation, so changes were difficult to distinguish.

4.3. Structural equation modeling

The proposed model was tested by Structure Equation Modeling (SEM), which is a powerful statistical research technique for testing causal relationships between constructs with multiple measurement items (Joreskog & Sorbom, 1996). Since SEM has no single index to test significance, Hair, Black, Babin, Anderson, and Tatham (2006) suggested using multiple fit indices to assess goodness-of-fit. They suggested that fit indices should include chi-square statistics, absolute fit index, goodness-of-fit index and badness-of-fit index. Thus, the following eight indices were used in this study: chi-square statistics, goodness-of-fit index (GFI), adjusted goodness-of-fit index (AGFI), comparative fit index (CFI), normed incremental fit index (NFI), non-normed fit index (NNFI), root mean square error of approximation (RMSEA), and root means square residual (RMSR).

Hair et al. (2006) suggested that GFI, AGFI, CFI, NFI, and NNFI are best if they are above 0.90 and are marginally acceptable if they are above 0.80. For acceptable RMSR and RMSEA, both should be below 0.08, and the ratio of chi-square to degree of freedom should be below 5 (Browne & Cudeck, 1993; Hair et al., 2006). As Fig. 2 shows, the indices in the proposed model were all at acceptable levels, which indicated that the structural model had a good fit to the data.

4.4. Hypotheses testing

As Fig. 2 shows, Hypothesis 4 was supported in this study. The analytical results revealed a positive association between internal self-concept motivation and knowledge-sharing behavior. As posited, individuals gain confidence in their capabilities by sharing knowledge in Wikipedia, as the concept of self-efficacy asserts. That is, individual knowledge self-efficacy is positively associated with sharing behavior in Wikipedia. The analytical results extended previous research on organizational knowledge sharing (Cabrera et al., 2006; Kankanhalli et al., 2005; Lin, 2007), which suggests that individual knowledge self-efficacy is the most important predictor of knowledge sharing intention and behavior. Individuals driven by internal self-concept motivation would feel confident to show their competencies at such an encyclopedia on Internet and gain achievement, thus they would behave to share knowledge frequently in Wikipedia.

Surprisingly, although previous studies suggest that individuals may gain internal enjoyment through knowledge sharing, intrinsic motivation did not significantly affect knowledge sharing behavior in this study. The literature indicates that enjoyment is gained in the process of sharing knowledge, i.e., social interaction may be the primary source individual satisfaction. Users in a general virtual community may derive satisfaction from knowledge sharing when they interact with other participants about posted topics. However, unlike other general virtual communities, social interaction in Wikipedia is infrequent. Although some Wikipedia-related communities existing on the Internet enable individuals to interact with each other, individuals who participate in sharing knowledge in Wikipedia may not also join the same community. Moreover, the discussions in these communities tend to focus on technical issues or contentious content. Thus, individuals often spend considerable effort sharing knowledge in which they are interested but have little interaction with other users who are also engaged in editing the same article. Restated, individuals are more likely to gain self-based achievement rather than enjoyment in the process of sharing knowledge in Wikipedia. Further, all Wikipedians who participated in this study already had very high (mean = 4.46) intrinsic motivation. Therefore, it may be not possible for a user who has higher intrinsic motivation than other users to gain intrinsic satisfaction by contributing more knowledge than other users. That is, intrinsic
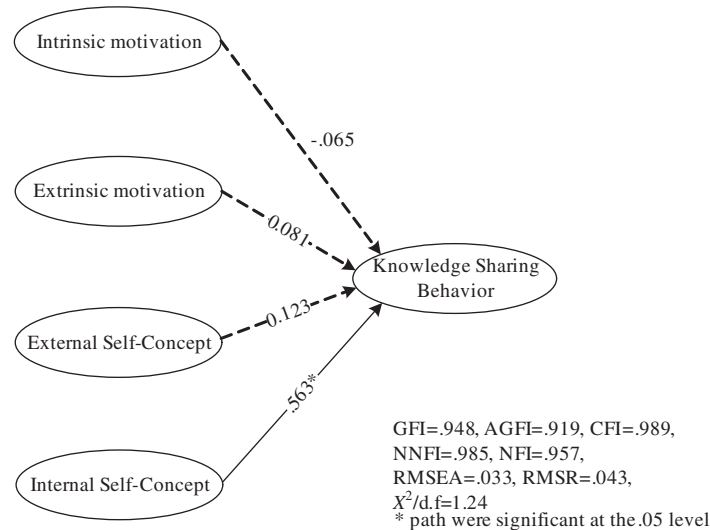
GFI=.948, AGFI=.919, CFI=.989,
NNFI=.985, NFI=.957,
RMSEA=.033, RMSR=.043,
X^2/d.f=1.24
* path were significant at the .05 level

Fig. 2. Structural equation modeling results.

motivation may not significantly increase knowledge sharing in Wikipedia. Thus, Hypothesis 1 was unsupported. Intrinsic motivation revealed no significant impact on individual knowledge sharing behavior in Wikipedia.

Hypothesis 2 was also unsupported in this study. Although prior research on general virtual communities (Hsu et al., 2007; Wasko & Faraj, 2005), indicates that extrinsic motivation is positively associated with knowledge-sharing behavior, this study revealed no significant association between extrinsic motivation and individual knowledge sharing behavior in Wikipedia. No external rewards are received for sharing knowledge in Wikipedia. Even the reputation, image or respect gained in Wikipedia, such as a Barnstar award on a user page, is incomparable to a physical reward. Most Wikipedia browsers are not even aware of Barnstar and do not attribute the item annotation to the efforts of a particular Wikipedian. Therefore, extrinsic motivation is an insufficient motivation for actually sharing knowledge in Wikipedia.

Finally, external self-concept motivation did not significantly affect knowledge-sharing behavior. One explanation for this analytical result is that individuals do not have strong relationships with reference groups. Individuals typically have an account or are even anonymous to engage in sharing knowledge in Wikipedia; hence, virtual identity is not strongly linked to physical identity. Moreover, obtaining enough feedback from a reference group for sharing behavior is difficult because social interaction between Wikipedia users is lower than that in the general virtual community. Consequently, Wikipedia contributors are not clearly identified, and they rarely obtain positive feedback from reference groups in the virtual and real worlds. Thus, Hypothesis 3 was unsupported.

4.5. Alternative model testing

Table 2 shows the correlations between these four motivations. Although factor analysis revealed the four factors in Table 1, internal self-concept motivation might be arguably a separate category (i.e.,

subset) of intrinsic motivation, and external self-concept motivation might be a category of extrinsic motivation. To test whether self-concept-based motivations are simply a subset of conventional motivation or of other important independent concepts, this study tested other models. This study examined six models of motivations for sharing knowledge. Model 1, the original full model, incorporated all conventional and self-concept-based motivations, i.e., intrinsic motivation, extrinsic motivation, internal self-concept-based motivation and external self-concept-based motivation. Model 2 incorporated only conventional motivations, i.e., intrinsic motivation, and extrinsic motivation. Model 3 incorporated only self-concept-based motivations, i.e., internal self-concept-based motivation and external self-concept-based motivation. Model 4 incorporated intrinsic motivation and internal self-concept-based motivation. Model 5 incorporated extrinsic motivation and external self-concept-based motivation. Finally, after testing the above Models 2–5, the dominant independent variables were extrinsic motivation (significant indicator in Models 2 and 5) and internal self-concept-based motivation (significant indicator in Models 3 and 4). These variables were then incorporated into Model 6 for further testing. Table 4 shows the statistical test results for Models 1–6. As summarized in Table 5, models 1–6 all had indices well above the minimum acceptable level.

Table 5
Goodness-of-fit statistics for models 1–6.

Model	GFI	AGFI	CFI	NFI	NNFI	Goodness-of-fit		
						RMSEA	RMSR	X^2/d.f
Model 1	0.948	0.919	0.989	0.957	0.985	0.033	0.043	1.24
Model 2	0.986	0.970	1.000	0.986	1.010	0.035	0.014	0.72
Model 3	0.977	0.951	0.995	0.973	0.992	0.032	0.038	1.22
Model 4	0.969	0.933	0.987	0.968	0.979	0.055	0.037	1.66
Model 5	0.973	0.943	0.991	0.972	0.985	0.043	0.043	1.40
Model 6	0.977	0.950	0.995	0.976	0.992	0.032	0.029	1.23

Table 4
Statistical test results for models 1–6.

Independent Variables	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6
Intrinsic motivation	−0.065	0.101		−0.058		
Extrinsic motivation	0.081	0.343[*]			0.315[*]	0.048
External self-concept motivation	0.123		−0.082		0.103	
Internal self-concept motivation	0.563[*]		0.567[*]	0.517[*]		0.481[*]

[*] Significant at 0.05 level.

As Table 4 shows, when only considering the influences of conventional motivation (Model 2), extrinsic motivation revealed a significant association with individual knowledge-sharing behavior. Restated, if only considering conventional motivations, subjects may share more knowledge in Wikipedia to obtain probable extrinsic returns since they have already felt intrinsic returns, i.e., the enjoyment of engaging with Wikipedia.

Models 4 and 5 also revealed interesting analytical results. Table 4 shows that, of the factors that influence intrinsic motivation and internal self-concept-based motivation (Model 4), self-concept-based motivation plays a dominant role in individual knowledge sharing behavior in Wikipedia. Restated, perceived self-based achievement may be more important than deriving enjoyment in this case. Conversely, given the influence of extrinsic and external self-concept-based motivation (Model 5), only extrinsic motivation significantly influenced individual knowledge-sharing behavior, which implies that Wikipedians consider perceived extrinsic returns more important than gaining possible feedback from reference groups.

These above analytical results also showed that, conceptually, self-concept-based motivation may not be a subset of conventional motivation. Instead, internal self-concept-based motivation is a better predictor of individual knowledge sharing behavior in Wikipedia. The analyzes of the influences of internal self-concept-based motivation and external self-concept-based motivation (Model 3) revealed that only internal self-concept-based motivation significantly affected individual knowledge-sharing behavior. In summary, internal self-concept-based motivation is the dominant variable in Models 3 and 4; extrinsic motivation is the dominant variable in Models 2 and 5. However, analysis of the influences of internal self-concept-based motivation and extrinsic motivation (Model 6) revealed that internal self-concept-based motivation is the real key variable in individual knowledge-sharing behavior, which is consistent with the full model. Restated, model 6 is the parsimonious model given the knowledge sharing behavior in Wikipedia.

5. Conclusions

The aim of this study was to examine the knowledge sharing behavior of Wikipedians from a motivational perspective. Both conventional and self-concept-based motivation were adopted and measured in this study. After performing an online questionnaire survey, SEM was applied to assess the proposed model and hypotheses. The analytical results implied that, compared to the influence of conventional motivation, self-concept-based motivation has a greater influence on individual knowledge-sharing behavior. Specifically, compared to other motivational sources analyzed in this study, internal self-concept-based motivation is the most important motivation for sharing knowledge in Wikipedia. However, external self-concept motivation is not significantly related to knowledge sharing intention, probably due to the difficulty establishing strong links with reference groups in the real world as well as the lack of social interaction in Wikipedia. Second, due to the relatively limited interaction in Wikipedia as compared to that in the general virtual community, intrinsic motivation also has an insignificant impact on individual willingness to share knowledge in Wikipedia. Nov (2007) indicated that personal enjoyment was the main motivation for knowledge sharing but only considered the ranking of correlation coefficients between motivation and contribution levels. Conversely, after testing the overall model, this study found that, although Wikipedians may initially engage in Wikipedia simply for pleasure, intrinsic motivation is rarely the dominant motivation for knowledge sharing in Wikipedia.

We note that the above conclusions must be interpreted in light of the limitations of this study. First of all, although Wikipedia is a multilingual encyclopedia published in over 200 languages, this study only surveyed the English version of Wikipedia. However, different languages may obtain different compositions of participants, and different countries and cultures may reveal various participant behavior (Ishii & Ogasahara, 2007). Future research may examine Wikipedia in other languages such as German, Chinese, and Japanese to further confirm the impact of motivation on knowledge sharing behavior in other countries and cultures. Second, due to the difficulty acquiring actual data for sharing by Wikipedians, this study only examined self-reported sharing behavior in terms of frequency, which may limit the generalization of our findings. Further, the quality or length of the contributions is another interesting issue related to sharing behavior. Frequent Wikipedia users may contribute knowledge by making minor changes to Wikipedia entries. Conversely, some users who contribute infrequently may provide extremely rich content. Therefore, future studies may examine aspects such as cost or quality of contribution to further explore individual sharing behavior in Wikipedia. Finally, because this study only focused on individual motivation, the effects of some variables such as personal characteristics may have been overlooked. Future research can extend this study model by incorporating such variables into the analysis of knowledge sharing behavior.

Acknowledgements

Appendix A

Intrinsic motivation
Int1: I enjoy sharing my knowledge with others.
Int2: Sharing my knowledge with others gives me pleasure.
Int3: It feels good to help someone else by sharing my knowledge.
Extrinsic motivation
Ext1: Sharing my knowledge through Wikipedia improves my image.
Ext2: I earn respect from others by participating in the Wikipedia.
Ext3: I feel that sharing knowledge in the Wikipedia improves my professional status.
External self-concept-based motivation
ESC1: It is important to me that others approve of my behavior.
ESC2: I share the specific knowledge if public recognition is attached to it.
ESC3: I give my best effort to share knowledge when I know that it will be seen by the most influential people.
Internal self-concept-based motivation
ISC1: I try to make sure that my decisions are consistent with my personal standards of behavior.
ISC2: I consider myself a self-motivated person.
ISC3: I like to share knowledge which gives me a sense of personal achievement.
Knowledge sharing behavior
KSB1: I often use Wikipedia to contribute my knowledge.
KSB2: I regularly use Wikipedia to contribute my knowledge.

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