COMPARING ONLINE BEHAVIOR IN KOREA AND THE US
YAHOO! ANSWERS VERSUS NAVER KNOWLEDGE-IN

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Abstract

This study compares online behavior of the leading Q&A online sites in Korea and the United States: Yahoo! Answers(US) and Naver Knowledge-iN (South Korea). We found that Yahoo! Answers users communicate more actively than Naver Knowledge-iN users, while Naver Knowledge-iN users seem more concerned about their social reputations. Among three ties (i.e., "providing answers" tie, co-answering tie and "getting answers" tie) at Q&A sites, "providing answers" ties show a positive influence on the user's quality of answers. Interestingly, co-answering ties show a negative influence on the quality of answers. This implies that while an answerer's successful communications with askers are beneficial, relationships among co-answerers may be competitive. It also seems that in online knowledge sharing, individualistic US users are more sociable than collectivistic Korean users.

Keywords: Online social network; knowledge sharing; Q&A sites; cultural difference; web 2.0

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Introduction

Research on online social networks has been very active since the late 1990s (Ahuja & Carley, 1999; Ahuja, Galletta, & Carley, 2003; Garton, Haythornthwaite, & Wellman, 1997; Thelwall, 2008; Wellman, Haase, Witte, & Hampton, 2001; Wellman et al., 1996) with one of the main research topics being online knowledge sharing (Subramani & Rajagopalan, 2003; Wasko & Faraj, 2000; Wasko & Faraj, 2005). Wikipedia is a successful example of such an online knowledge sharing site (Stvilia, Twidale, Smith, & Gasser, 2008; Wagner & Majchrzak, 2007). Wikipedia exists in many languages; the English language Wikipedia for example boasts 2,772,824 articles (as of March 4, 2009) and 9,107,139 registered users. The Wikipedia in Finnish, for instance, at the same time has 195 849 articles and 105 904 registered users. The Korean Wikipedia, on the other hand, has 91,215 articles and 61,379 registered users. This is quite amazing, because both countries are among the heaviest users of the Internet and both speak a language that is unique and not shared by any other country. On the other hand, South Korea has 49 million inhabitants, while Finland has 5 million. That means that Finland, a country with ten percent the population of Korea, maintains a Wikipedia with twice the number of articles as Korea. Why is it that two countries with comparable levels of technical sophistication and wealth show such vast differences in Wikipedia creation and usage? We think that we can provide some answers to this puzzle by comparing the knowledge acquisition and dissemination behavior between "Western" and 'Eastern" cultures. In particular, we hope to obtain some insights in online knowledge sharing behavior in Western countries such as Finland and the US compared to an Asian country such as Korea.

As we are studying knowledge sharing activities, we are focusing on a different type of knowledge sharing site with more process-oriented behavior, the "Question and Answer (Q&A) site." While Wikipedia provides general knowledge of interest to everyone, Q&A sites, such as Yahoo! Answers and Naver Knowledge-In, provide customized knowledge to an individual asker. At the "Western" Yahoo! Answers and "Eastern" Naver Knowledge-iN, millions of users are asking a question and providing answers to others' questions in various categories of topics (Adamic, Zhang, Bakshy, & Ackerman, 2008;

Harper, Raban, Rafaeli, & Konstan, 2008; Jurczyk & Agichtein, 2007). This is a unique benefit which cannot be provided by Wikipedia. In addition, in a corporate environment, a successful Q&A site is an efficient knowledge sharing platform for employees. Therefore, understanding facilitators of Q&A sites is crucial to online knowledge sharing research. Especially, understanding drivers of core users' knowledge sharing at Q&A sites is critical because most of the contents at Q&A sites are provided by them. As it turns out, the differences in online behavior of answerers and askers between Yahoo!Answers and Naver are quite striking.

From a social network perspective, Q&A sites allow various relationships between askers and answerers (e.g., answering relationship) as well as among answerers (e.g., co-answering relationship), while Wikipedia provides relationships only among contributors (e.g., co-editing relationship). In other words, Q&A sites provide more types of social relationships than Wikipedia. According to the theory of embeddedness (Mark Granovetter, 1985), these social relationships may influence users' answering behaviors in various ways. By analyzing online social network data from two successful Q&A sites (i.e., Yahoo! Answers in the United States and Naver Knowledge-iN in South Korea), we would like to validate online social network' influence on the core users' knowledge sharing behaviors at Q&A sites. In particular, we also would like to explore differences in core users' behavior at these Q&A sites embedded in two different cultures.

To achieve these goals, we have the following research questions.

1. *How do the properties of core users' online social networks affect their performance at Q&A sites?*
2. *Are there any differences in core users' behavior across different Q&A sites?*

This research helps academics understand the motivating roles of social networks at Q&A sites, especially in different cultural contexts. For practitioners, this paper can provide valuable guidelines for launching new Q&A sites, or improve operations of existing Q&A sites.

This paper is organized as follows. First, we review the theoretical background of the research. Second, the research model and hypotheses are introduced. Next, we explain the research methodology. Afterward, the results of the data analysis are provided. Finally, we discuss the implications and limitations of the research and suggest ideas for future research directions.

Theoretical Backgrounds and Hypotheses

Knowledge Sharing and Social Networks

Previous research on knowledge sharing from a social network perspective can be categorized into two groups: The "strong-ties group" vs. the "weak-ties group". Strength of ties represents the intensity of the relationship (e.g., frequency of interaction, emotional closeness) between individuals or units (Rindfleisch & Moorman, 2001; Brian Uzzi & Lancaster, 2003). The "strong-ties group" claims that strong ties are likely to lead to active knowledge sharing among people (Hansen, 1999; Reagans & McEvily, 2003) because it helps the formation of trust (D. Krackhardt, 1990), decreases the communication cost (B. Uzzi, 1997), and provides social motivations to be cooperative (M. S. Granovetter, 1973). On the other hand, the "weak-ties group" focus more on the overall network properties of weak ties rather than the weakness of ties. Weak ties need less effort to maintain and have more chances to occur than strong ties. Therefore, weak ties allow a person to develop and keep relationships with many people (i.e., a large network) (Burt, 1983; Friedkin, 1982; Lin, Ensel, & Vaughn, 1981). Through this large network, people can access various new ideas or resources that they may not get from their close friends. It means that the real value of weak ties does not come from the weakness of ties, but from the size of the weak-tie network (i.e., overall structure of the network). The influence from the quality of relationships (e.g., strength of ties) is referred as "relational embeddedness" and the influence from the structure of the overall social network (e.g., size of network) is referred as "structural embeddedness (M. Granovetter, 1992)." Most studies about knowledge sharing belong to the strong-ties group. On the other hand, studies about "online" knowledge sharing emphasize weak ties (Table 1) because it is usually assumed that online relationships are weak ties (Cummings, Butler, & Kraut, 2002). However, we think that online relationships can be

"strong" ties. For example, a core answerer in the inline skating category may have frequent interactions with some askers and recognize them by their IDs. These relationships are surely different from the weak ties the user has with other non-frequent users. Therefore, we consider the influence of both "strong" online ties and "weak" online ties in this study.

[Insert Table 1 here]

Q&A sites: Yahoo! Answers and Naver Knowledge-iN

Q&A sites are online communities where users ask questions and answer others' questions. In this paper, we focus on two successful Q&A sites: Yahoo! Answers in the United States and Naver Knowledge-iN in South Korea.

[Insert Table 2 here]

In these sites, an asker posts a question in a category and other users post answers for this question. When the asker selects the best answer, this question is closed and moved to the resolved questions database. To motivate a user's participation, Q&A sites provide "knowledge points" to the user according to her answering and asking performance. These points do not have any monetary value, but as in an online game, the user's level (or avatar (Shen, Radakrishnan, & Georganas, 2002)) will be upgraded as she gets more points. In addition, a significant contributor's ID is decorated with special icons such as "Hall of Famer" or "Top Contributor" so that she will be recognized by other users whenever she posts.

Three Kinds of Ties

[Insert Figure 1 here]

From a user's perspective, there are three kinds of ties at Q&A sites (Figure 1). First, a user can answer a certain question asked by Asker A (i.e., answering tie from a focal user to Asker A). Second, another user (Answerer B) can also answer the question asked by Asker A. In other words, the focal user and Answerer B answer the same question. (i.e., co-answering tie between the focal user and Answerer B). Lastly, the focal user can ask a question instead of answering. If this question is answered by Answerer C,

there is a "getting answers" tie from Answerer C to the focal user. Each of these three kinds of ties around the focal user is expected to affect her knowledge sharing performance. To validate this claim, the research model is composed of six research hypotheses about the average strength of ties and the size of each of the three ties.

[Insert Figure 2 here]

Research hypotheses in Figure 2 are suggested based on the following arguments. First, "answering ties" with many askers make the focal user familiar with the Q&A site's group norms, feel integrated with the site, and build up a sense of belonging to the site (O'Hara, Beehr, & Colarelli, 1994; Wasko & Faraj, 2005). This group identification makes the user care about the site's success and motivates cooperative behavior, such as knowledge sharing (Brewer & Kramer, 1986; Brewer & Schneider, 1990; Janssen & Huang, 2007; Kramer & Brewer, 1984; Kramer & Goldman, 1995). On the other hand, repeated "answering ties" with certain askers may make a user willing to spend some time and effort to help them (Mark S. Granovetter, 1982; Reagans & McEvily, 2003). In addition, strong ties constitute a base of trust (David Krackhardt, 1992; Levin & Cross, 2004; Tsai & Ghoshal, 1998), which gives the user the confidence that the knowledge shared will not be misused (McEvily, Perrone, & Zaheer, 2003). The willingness to help and trust in the askers can also lead to active knowledge sharing. Based on these arguments, we have the following hypotheses:

Hypothesis 1: The more askers a user has answering ties with, the better the quality of his or her answers will be.

Hypothesis 2: The more frequently a user interacts with askers, the better the quality of his or her answers will be.

Second, if a user answers the same question jointly with other co-answerers, he will notice that other users are also helping the asker and feel a kind of fellow feeling or homophily (McPherson, Smith-Lovin, & Cook, 2001) with shared interests. This can be a positive motivation for knowledge sharing. Therefore,

if a user has many co-answerers, the quality of his answers will be better. In a similar vein, if a user frequently interacts with a certain co-answerer, he may recognize the co-answerer and develop interpersonal relationship using other communication channels, such as an e-mail. Through this personal relationship, he can develop emotional closeness with the co-answerer and learn from the co-answerer. Emotional attachment to other co-answerers is expected to strengthen the user's positive attitude toward knowledge sharing, and learning from the other co-answerers is expected to enhance the user's expertise to provide right answers. Therefore, the user's average strength of co-answering ties may positively influence the quality of shared knowledge.

On the contrary, co-answerers can be regarded as competitors because only one answer is selected as the best answer among all the answers provided by answerers. Having many co-answerers means that there is a little chance of being the best answerer. Moving to another category which does not have many answerers could be a better choice for getting more knowledge points. In addition, if there are many co-answerers, a user may feel less responsible for answering questions because there are many other users who can answer (Chidambaram & Tung, 2005; Harkins & Szymanski, 1989). In a similar way, if a user frequently comes across with certain co-answerers, she will recognize that there are other active or competent answerers and may feel that her contribution is not necessary. Therefore, if she finds a question answered by certain co-answerers, she may skip that question even though the question is not closed yet. Based on these conflicting arguments, we have the following hypotheses. The latter two hypotheses are alternative hypotheses for the former two expecting the opposite effects:

Hypothesis 3a: The more co-answerers a user has, the better the quality of his or her answers will be.

Hypothesis 4a: The more frequently a user interacts with co-answerers, the better the quality of his or her answers will be.

Hypothesis 3b: The fewer co-answerers a user has, the better the quality of his or her answers will be.

Hypothesis 4b: The less frequently a user interacts with co-answerers, the better the quality of his or her answers will be.

Last, if a user gets answers for his questions at a Q&A site, he may realize that the site is useful and start to contribute (i.e., share knowledge) to keep this site alive (Lawler & Yoon, 1996). Also, once a user gets some help from other users, he may feel responsible to reciprocate by contributing his own knowledge (Gouldner, 1960). Besides, the knowledge from others can improve the user's expertise so that the quality of the user's answers will be enhanced. To sum up, many helpful relationships with other users can motivate a user to actively contribute his knowledge in return. In addition, if a user gets help from the same answerers frequently, he can recognize those answerers. This recognition of benevolent other users can lead to the user's emotional attachment to them and motivate the user to reciprocate their help with his contribution. Based on these arguments, we have the following hypotheses:

Hypothesis 5: The more answerers a user has for his or her questions, the better the quality of his or her answers will be.

Hypothesis 6: The more frequently a user gets answers from other users, the better the quality of his or her answers will be.

Research Methodology

The sample consists of the top 100 contributors each of Yahoo! Answers and Naver Knowledge-iN. Some of Yahoo! Answers users hide their questions and answers list, so they are excluded from the sample and the next top contributors are included. Therefore, the total sample size is 200 (i.e., 100 for each site). Using a web crawler, we collected questions and answers of each of 200 contributors. At first, we analyzed the descriptive properties of these datasets and compared them across Yahoo! Answers and Naver Knowledge-iN. Then we conducted a regression analysis to verify our research hypotheses.

Measurement

For every posting, we gathered information about title, asker, answerer, timestamp, selection (i.e., selected as the best answer or not), and content. Based on these online data, all measures in this paper are objectively calculated.

Network Measures

Network measures are calculated from the three kinds of ties at Q&A sites. First, an "answering" tie exists between a focal user and an asker when the asker chooses the focal user's answer as the best answer. This is a direct relationship between the answerer and the asker. Second, a "co-answering" tie exists between a focal user and another user when both of them answer the same question. This is an indirect relationship between users by answering the same question. Last, a "getting answers" tie exists between a focal user and an answerer when the focal user chooses the answerer's answer as the best answer. This is another direct relationship between the answerer and the asker, but the direction is the opposite of an "answering" tie. For each of these three ties, we calculate structural and relational embeddedness using degree centrality (Freeman, 1979) and average strength of ties (Marsden & Campbell, 1984). Degree centrality in an answering network is the total number of askers the focal user has successfully helped (i.e., provided the best answers). If a user posted 30 best answers to the questions of 5 askers, degree centrality in an answering network is 5 because the user built the relationship with those 5 askers. So, degree centrality shows how many askers a focal user has successful relationships with. However, it does not show how frequent (or strong) the relationship between the focal user and the askers is. Average strength of ties covers this. In the previous example, the user posted 30 best answers to the questions of 5 askers. In other words, in average, the focal user had 6 successful interactions with each asker. This is a quite high number and the focal user and the askers may recognize each other. This "strong" tie may have unique influence on the focal user's knowledge sharing performance. In the same way, degree centrality and average strength of ties are calculated for the other two ties (i.e., "co-answering" ties, "getting answers" ties).

Dependent Variable

The quality of the answers is calculated by an individual user's rate of best answers over total answers. For example, if a user has 50 best answers out of 100 answers, the quality of her answers is 0.5. Even though another user has the same number of best answers (i.e., 50 best answers), if his total number of answers is 1000, the quality of his answers is only 0.05, which is far beyond the former user's quality of answers. To verify a causal relationship between network measures and the quality of answers, network measures are calculated for the earlier half of a user's lifecycle (i.e., from the first posting time to (the first posting time + the last posting time)/2) and quality of the answers is calculated for the later half of the user's lifecycle.

Control Variable

We controlled the influence of social reputation. When a user is publicly awarded or recognized as a "Hall of Famer" or "Top Contributor," she may feel more responsibility to contribute and put more effort into her answers. This can influence the answering performance of users regardless of the properties of the users' social networks. Therefore, we added social reputation as a control variable to focus on the effects of social networks.

Results

Descriptive Findings and Differences across Yahoo! Answers and Naver Knowledge-iN

Through January 2008, 1,826,075 questions and 24,517,045 answers had been gathered at Yahoo! Answers and 868,887 questions and 1,736,218 answers at Naver Knowledge-iN. Considering the gap between the launching dates of the two sites (October 2002 and December 2005), Yahoo! Answers is expanding very fast. At first, we discuss common characteristics of the two Q&A sites. Then differences between the two sites are explored.

First, at both sites, top contributors are biased toward answering and spend little time asking. In other words, top contributors are not top askers. The ratios of questions to answers per user are 0.53% at

Yahoo! Answers and 0.40% at Naver Knowledge-iN (Table 3). Therefore, top contributors participate in Q&A sites to help others, not to get help from others.

[Insert Table 3 here]

Second, questioning and answering relationships among the top contributors are very rare at both sites. This is mainly because there are few questions from the top contributors. In addition, top contributors do not seem to differentiate between other top contributors' answers and normal users' answers. Among the top contributors of Yahoo! Answers, for 7,933 questions, 20,469 answers were given and 1,358 answers were chosen as the best answers (The rate of selection: 6.6%). Among the top contributors of Naver Knowledge-iN, for 2,824 questions, 2,086 answers were given and 1,716 answers were chosen as the best answers (The rate of selection: 82.3%). Therefore, the rates of selection among top contributors are similar to the rates of selection by normal users (i.e., 7.8% at Yahoo! Answers and 83.3% at Naver Knowledge-iN). They may communicate by other communication channels such as e-mail or online memo, but they do not show many direct questioning and answering relationships among themselves.

However, there are considerable differences between Yahoo! Answers and Naver Knowledge-iN and all the differences are proved significant by one-way ANOVA test (Table 4). The average rates of selection are 7.8% at Yahoo! Answers and 83.3% at Naver Knowledge-iN. It seems that top contributors of Yahoo! Answers are not much concerned about the rate of selection, while top contributors of Naver Knowledge-iN are much concerned about it. At Yahoo! Answers, users answer any questions they have opinions on, even though their answers might overlap with other answers or not provide unique contributions. However, at Naver Knowledge-iN, if questions are correctly answered once, other users rarely post more answers to those questions. The average number of answers per question (12.43 at Yahoo! Answers and 2.00 at Naver Knowledge-iN) also shows that users of Yahoo! Answers answer more frequently than users of Naver Knowledge-iN. Instead, the average length of answers is 190 bytes at Yahoo! Answers and 799 bytes at Naver Knowledge-iN. For instance, users of Yahoo! Answers usually describe their opinion in a couple of sentences off the top of their heads, but users of Naver Knowledge-iN frequently search

and refer to other external sources to complement their answers in order to be more accurate. In other words, it seems that top contributors of Yahoo! Answers answer more frequently, while top contributors of Naver Knowledge-iN put more effort into answering each question.

[Insert Table 4 here]

For each site, correlations among the variables are explored (Table 5). We checked for multicollinearity because there are relatively high correlations among some of the variables (e.g., centrality of answering ties and centrality of co-answering ties at Naver, centrality of answering ties and quality of answers at Yahoo). The variance inflation factor (VIF) values for all of the variables are less than 2.04, which shows that multicollinearity is not a serious issue in our study

[Insert Table 5 here]

Regression Results and Hypothesis Testing

Table 6 reports the effects of the properties of online networks on the quality of answers at each Q&A site.

[Insert Table 6 here]

First, the centrality of answering ties significantly influences the quality of answers at both Yahoo! Answers and Naver Knowledge-iN. However, the average strength of answering ties does not have a significant effect at either site. Therefore, for answering ties, structural embeddedness is supported (Hypothesis 1), but relational embeddedness is not supported (Hypothesis 2).

Second, the centrality of co-answering ties negatively influences the quality of answers at both sites. The effect of the average strength of co-answering ties is also negatively significant, but only at Naver Knowledge-iN. Therefore, co-answering ties' structural embeddedness is supported (Hypothesis 3b) and relational embeddedness is partially supported (Hypothesis 4b). Contrary to the effect of answering ties, the effect of co-answering ties on the quality of answers seems negative.

Last, getting answers ties show no significant influence on the quality of knowledge at either site. Therefore, no hypothesis for getting answers ties is supported (Hypothesis 5 and 6). Insignificant effect of getting answers ties implies that top contributors of Q&A sites help other users because of enjoyment in helping, social reputation, etc., and not because of willingness to reciprocate.

Limitations and Directions for Future Research

We acknowledge that this study has some limitations. First, we could not include some of the top 100 contributors of Yahoo! Answers within the sample because they have hidden their Q&A list. (This functionality is available only at Yahoo! Answers.) We had to replace them with the next top contributors to have the same number of contributors at both sites. Additionally, we could not gather all the answers of some of the top contributors because their numbers of answers exceeded the maximum number of postings accessible by general users (i.e., 30,000). We excluded those seven contributors from the sample and conducted a regression analysis again, but the result was similar. Consequently, we report the original result with 100 contributors for each site. Second, our data analysis includes questioning and answering relationships among users only and does not include other interactions using private communication channels such as e-mail or online memo. Even though they seem to communicate with each other through these private communication channels, we could not utilize those data due to privacy concerns. With the users' agreements and Q&A sites' cooperation, they may be analyzed together in the future. Third, since our samples were drawn only from the top contributors of two Q&A sites, the results of the study may not be generalizable to normal contributors or sites of different nationalities. To overcome this limitation, comparing the top contributors' group and the normal (or infrequent) contributors' group would be an interesting topic for future research. Lastly, this research did not cover a comprehensive list of potential factors that may influence the quality of answers at Q&A sites because it focused on online social networks among users. For instance, latent variables such as group identification or self-efficacy (Bock, Zmud, Kim, & Lee, 2005; Kankanhalli et al., 2005) may also influence a contributor's quality of answers.

An online survey to capture the top contributors' subjective data could be considered to extend the current study.

Discussion

In this paper, we explored the top contributors' behaviors of two successful Q&A sites, Yahoo! Answers and Naver Knowledge-iN, and compared the differences in their behaviors between the two sites. Using a regression analysis, we also verified the effects of online social networks on the quality of answers at the two sites.

Users on both the US and the Korean Q&A site exhibit some common characteristics. Online Q&A data from Yahoo! Answers and Naver Knowledge-iN shows that the users at Q&A sites are not homogeneous. There are some core contributors who focus on answering other users' questions. Their voluntary behaviors are not based on expected reciprocity because they rarely ask questions. They just enjoy helping others or being recognized as experts by other users (Constant, Sproull, & Kiesler, 1996; Kankanhalli, Tan, & Kwok-Kee, 2005; Wasko & Faraj, 2005). To identify and motivate these voluntary contributors is critical at Q&A sites because they create most of the contents. However, askers also matter because they trigger answerers' contributions by posting questions and appreciate their contributions by choosing the best answers. So, keeping the proper number of active askers and guiding them to ask proper questions and to choose right answers as the best answers are also imperative. Practitioners may need separate strategies to take care of these two groups individually.

In addition, the main relationships at Q&A sites are questioning and answering relationships between askers and answerers. There are few direct interactions among top contributors. This is a unique characteristic of Q&A sites. In other online or offline communities, core members frequently interact with each other, as well as interacting with other peripheral members (Borgatti & Everett, 2000). However, at Q&A sites, top contributors have many direct interactions with askers, but few direct interactions among themselves. This may indicate competitive relationships among

co-answerers; they rarely interact with each other and perhaps are competing in order to become the best answerer. Considering the successful collaborations among contributors at Wikipedia, Q&A sites should facilitate positive interactions among contributors. For example, Q&A sites could hold offline gatherings of top contributors, like Wikimania (http://wikimania2008.wikimedia.org/wiki/Main_Page), or provide online chat rooms to support real-time communications among contributors while they are posting their answers.

The two Q&A sites also show marked differences in top contributors' behaviors. Western top contributors of Yahoo! Answers ask and answer questions more frequently, while Korean top contributors of Naver Knowledge-iN seem to be more concerned about being the best answerers and put more effort into answering each question. Cultural differences (Li, Li, & Lin, 2008) between the United States and Korea may be one of the plausible reasons. Korean people have a more collective culture than the US people (G. Hofstede, 1984), and they are more concerned about social reputation or losing face in public (Kim & Nam, 1998). This may also apply to online sites. Thus, Korean people may put more effort in answering each question so that they do not lose face by providing faulty or low-quality answers. To the contrary, the US people seem to be more comfortable expressing and discussing their different opinions in public (Barker, 1997; G. J. Hofstede, 2005).

Another plausible reason is the existence of alternative knowledge sharing sites. In the United States, Wikipedia has been very popular since its launch in 2001, while, as has been shown in the introduction, Wikipedia is not very popular in Korea. Serious answerers in the United States may therefore contribute to Wikipedia instead of Yahoo! Answers because Yahoo! Answers seems more discussion-oriented (Adamic et al., 2008). On the other hand, in Korea, Naver Knowledge-iN is the dominant site for any kind of online knowledge sharing. This might again reflect a deep cultural difference, because an individual answerer in Naver can build up a reputation as a "hall of famer", while contributing to Wikipedia does not build up an individual's reputation. Rather, Wikipedia

recognizes “Today’s featured article”, which very much recognizes the achievements of a group. This is in contradiction to general wisdom that would assign a collectivist culture to Eastern countries like Korea, while individualistic behavior is more expected in Western countries such as the US (G. Hofstede, 1984). It seems, however, that in knowledge sharing processes this behavior might be reverted between East and West.

Lastly, different user policies are also worth mentioning. While Naver Knowledge-iN limits the maximum number of postings for any users (e.g., the maximum number of answers per day is 10, 30, or 50 according to the user’s knowledge level) (Naver), Yahoo! Answers puts no limit if a user reaches a certain level (e.g., level 5) (Answers). This may make users of Naver Knowledge-iN put more effort into each answer. To improve the quality of answers, Yahoo! Answers may consider limiting the maximum number of postings even for the high-level users.

Regression analysis of Q&A data also provides interesting implications to researchers by verifying the different effects of the three types of relationships at Q&A sites. While the number of answering ties with askers (i.e., degree centrality) shows a positive influence on the quality of answers, average strength of answering ties does not show a significant effect. It implies that what matters at Q&A sites for a core contributor is interactions with general askers, not personal interactions with individual askers. Successful interactions with these general askers may lead to users’ commitment to overall Q&A sites.

On the other hands, co-answering relationships with other answerers show a negative influence on the quality of answers. These indirect relationships among answerers do not seem to build a group solidarity or fellow feeling. Instead, these relationships make users realize that their chances of being selected as the best answerers are low and also make users feel less responsible or willing to answer questions because they know that there are other answerers who can answer these questions. This is a unique finding of this study because these negative roles of social relationships are rarely explored in the knowledge management literature. Lastly, getting answers ties do not significantly

influence the quality of answers. Compared with the large volume of answering ties, relatively small numbers of getting answers ties do not seem to have any impact on the quality of answers. This indicates that top contributors of Q&A sites answer questions because they enjoy helping others or being recognized by other users, not because they feel responsible to reciprocate other users' previous help. They may regard Q&A sites as the places to help other users, not the place to exchange knowledge among each other.

Besides the theoretical implications, these findings also provide practical guidelines to improve the quality of answers at Q&A sites. To strengthen the positive influence of answering ties, Q&A sites may notify users of new answers from the previous best answerers for their questions, or new questions from the previous askers who chose the users' answers as the best answers. This may lead to more active relationships between askers and answerers. Yahoo! Answers recently added a similar functionality and we believe that this is the right choice for the site. Additionally, Q&A sites should try to convert the negative effect of co-answering relationships into a positive one by changing competitive relationships among answerers to collaborative or cooperative relationships. As previously described, providing more chances for online or offline gatherings of answerers will be beneficial to the quality of answers because these gatherings will facilitate knowledge sharing among top contributors. Q&A sites may also consider a collaborative answering environment, which new Q&A sites, such as WikiAnswers (http://wiki.answers.com/), are trying to provide to integrate advantages of both Wikipedia and Q&A sites.

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Tables and Figures

Table 1

Yahoo! Answers and Naver Knowledge-iN

	Yahoo! Answers	Naver Knowledge-iN
URL	http://answers.yahoo.com	http://kin.naver.com
Launching Date	December, 2005	October, 2002
Market Share in host country	74.05% (as of March 19, 2008, by Hitwise.com) [40]	86.02% (as of May 07, 2008, by Rankey.com)

Table 2

Difference between Q&A sites and Wikipedia

	Properties of Knowledge Shared	Properties of Social Networks
Q&A sites	Individual Knowledge (+) Customized Knowledge (-) Redundant Knowledge	Nodes: answerer, asker Ties: ask, answer, co-answer, vote, object, etc.
Wikipedia	Collective Knowledge (+) Quality (+) Format/Style	Nodes: contributor Ties: co-edit, talk (article/personal)

Table 3

Q&A Sites' Statistics of Activities (1)

	Avg. # of Answers per User	Avg. # of Questions per User	Avg. Ratio of Q/A per User
Yahoo	14,838	79	0.53%
Naver	7,011	28	0.40%

Table 4

Q&A Sites' Statistics of Activities (2)

	Avg. Rate of Selection	Avg. Length of Answers	Avg. # of Answers per Question
Yahoo	7.8%	190 (bytes)	12.43
Naver	83.3%	799 (bytes)	2.00

Table 5

Correlations at Q&A sites

(Lower Diagonal: Yahoo! Answers, Upper Diagonal: Naver Knowledge-iN)

	1	2	3	4	5	6	7
1. Centrality of Answering Ties		0.577**	0.259**	0.102	-0.082	0.097	0.040
2. Centrality of Co-Answering Ties	0.124		0.156	-0.323**	-0.083	0.237*	-0.451**
3. Centrality of Getting Answers Ties	0.068	0.356**		-0.056	-0.065	0.254*	-0.099
4. Avg. Strength of Answering Ties	0.451**	-0.210*	-0.064		0.136	-0.098	0.053
5. Avg. Strength of Co-Answering Ties	0.047	0.248*	0.287**	0.157		-0.209*	0.053
6. Avg. Strength of Getting Answers Ties	0.149	0.184	0.478**	-0.032	0.260**		-0.129
7. Quality of Answers	0.517**	-0.407**	-0.073	0.343**	-0.005	0.058	

Table 6

Regression of the Quality of Answers on Network Measures at Q&A sites

(1. Coefficients are standardized. 2. **: $p < 0.01$, *: $p < 0.05$)

	Yahoo! Answers			Naver Knowledge-iN		
Variables	Model 1	Model 2	Model 3	Model 1	Model 2	Model 3
Social Reputation	.357	.113	.117	.309	.235	.233
Centrality of Answering Ties		.530**	.559**		.450	.601**
Centrality of Co-Answering Ties		-.490**	-.527**		-.675	-.866**
Centrality of Getting Answers Ties		.085	.059		-.092	-.131
Avg. Strength of Co-Answering Ties			.113			.066
Avg. Strength of Answering Ties			-.068			-.309**
Avg. Strength of Getting Answers Ties			.001			.065
Adj. R^2	.119	.496	.492	.095	.404	.478
Sig. F Change	.000	.000	.531	.002	.000	.007
# of cases	100	100	100	100	100	100

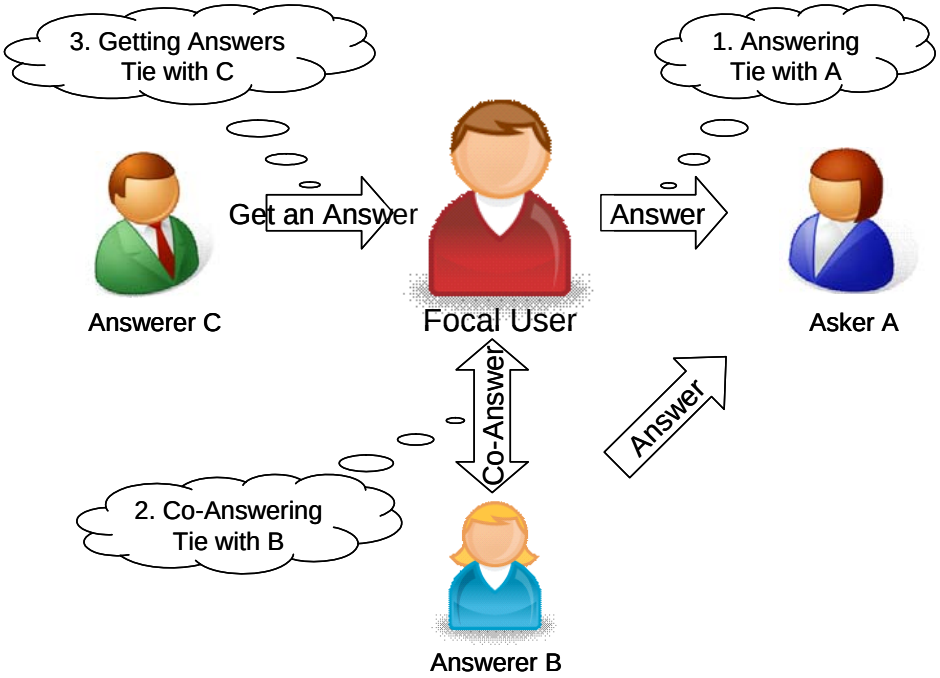

Fig. 1. Three Kinds of Ties

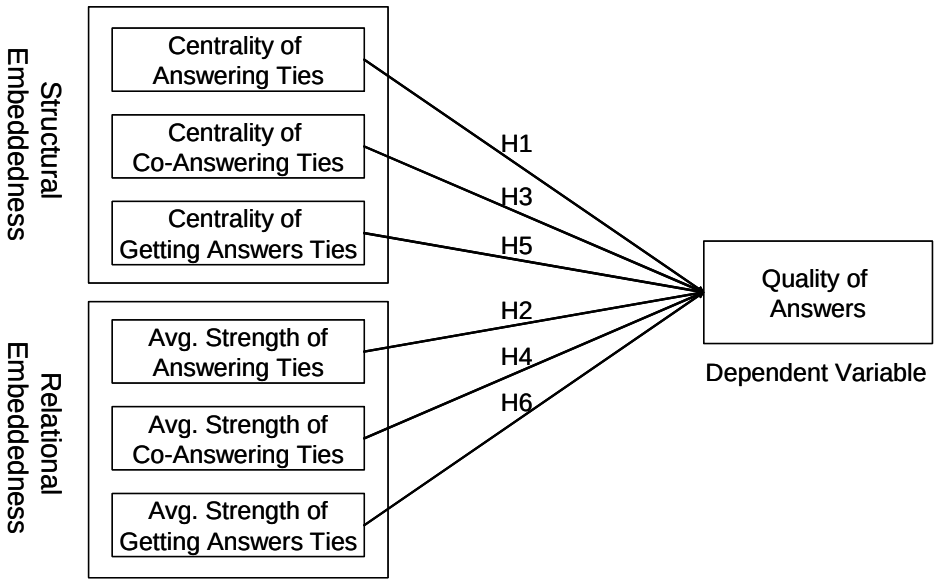

Fig. 2. Research Model