Abstract

Effective knowledge sharing among members has rapidly become a competitive necessity for organizations. Thus it is essential for organizations to take steps to increase members’ willingness to share knowledge, leading to desirable knowledge sharing behaviors. This study explores possible factors affecting users’ intention to share knowledge in the context of system analysis. In addition to innovative climate, system analyst and user’s interaction involvement, which is viewed as an important interpersonal communication competence, is proposed and further investigated, taking into consideration the links between innovative climate, interaction involvement and user intention to share knowledge. Based on data collected from 182 student analysts and 182 users, the results indicate that system analysts demonstrated higher levels of interaction involvement than users, where interaction involvement was measured by responsiveness, perpectiveness, and attentiveness. In addition, innovative climate positively and directly influences users’ intention to share knowledge, while quite surprisingly, user’s interaction involvement negatively affects his/her intention to share knowledge.

1. Introduction

Since knowledge is considered to be the most important resource in any organization (Wernerfelt, [1]), many systems have been applied to identify, create, represent, store and distribute knowledge from individual to individual. Examples of such systems are electronic databases, network systems, knowledge management systems, blogs and virtual communities. However, the initiatives proved far from satisfactory, and more socio-cognitive approaches have been adopted to motivate individuals to share knowledge (Chow & Chan, [2]). Considering that effective knowledge sharing is a competitive necessity, it is essential for organizations to take action to increase the individual’s willingness to share knowledge with other members, leading subsequently to expected behaviors.

Because intention has been treated as an important and central construct in widely accepted theories including the theory of reasoned action (TRA), theory of planned behavior (TPB), decomposed TPB (DTPB), technology acceptance model (TAM), and the unified theory of acceptance and use of technology (UTAUT), theoretical prediction of knowledge sharing intention and its corresponding behavior has been examined. For example, Kuo and Young [3] proposed that individuals’ knowledge sharing intentions can directly affect their actual knowledge sharing practices. The antecedents of intention embraced by the theories have also been studied. Ryu, Ho and Han [4], for example, reported that an individual’s intention to share knowledge is positively influenced by attitudes, subjective norms and perceived behavioral control. Hsu and Lin [5] showed that community identification and attitude toward blog usage significantly influenced a blog participant’s intention to use blogs to share knowledge. Kolekofski and Heminger [6] showed that a user’s beliefs and attitudes affected his or her intention to share knowledge in an organizational setting. Although these antecedents jointly explain most of the variance in intention to share knowledge, other determinants remain unknown and need to be identified.

In the information systems (IS) field, system design and implementation is a continuous knowledge-intensive process in which most knowledge gathering interaction between systems analysts and users is observed (Huang & Huang, [7]; Huang & Huang, [8]). During the development of any information system, experienced designers recognize that the user may not understand the true nature of the information system requirements (Walz, Elam & Curtis, [9]). Systems analysts interact with
users to identify relevant system requirements, trying their best to comprehend the users’ tasks. In this regard, the users’ intention to share their knowledge is critical for systems analysts so they can produce a set of feasible solutions. Therefore, the studies have focused on the intention of users, rather than on the systems analysts, during the process of requirement identification and system design. Organizations need to create an appropriate culture and climate to foster positive interactions and enhance participants’ intention to share knowledge.

It is well recognized that user involvement in systems development plays an important role in improving the quality of IS (Robey & Farrow, [10]; Baroudi, Olson & Ives, [11]). Tait and Vessey [12] summarized prior research on the effect of user involvement on system success and reported that user involvement has a positive influence on the successful introduction of an information system into an organization. However, in some cases, user involvement is inappropriate and may not be important for improving the quality of systems that are highly structured and well-defined, systems that require considerable technical expertise, or systems that are invisible or unimportant to users (Ives & Olson, [13]).

Although user involvement is crucial to systems analysis, users seldom treat their input function as a priority compared with other tasks at hand. In other words, they do not get very involved in providing information about system requirements. In addition, opportunities for user involvement are often limited and controlled by the systems analysts (Doll & Torkzadeh, [14]), who play an important role in eliciting appropriate requirements from end-users. Nevertheless, very few IS studies have investigated the influence of systems analyst involvement (Jones & Harrison, [15]).

After reviewing studies related to involvement, Ives and Olson [13] summarized that participants may be involved in system- or non-system-specific activities or events to which they can respond relatively objectively. Therefore, the construct of involvement has a wide range of dimensions and varies from research topic to research topic. Because good interview skills and strategies to encourage user participation require a higher level of involvement by systems analysts, systems analysts should be actively involved in soliciting rather than passively waiting for user requirements. Software designers are historically valued in terms of both technical and communication skills; thus, organizations should pay attention to helping them develop communication skills in more depth (Walz, Elam, & Curtis, [9]).

Participant involvement in interpersonal communication, which is similar to the concept of interaction involvement (Cegala, [16]), is critical to identifying effective system requirements. Thus, the study described herein aimed to help fill the research gap by focusing on the interaction involvement of both systems analysts and users, rather than that of users only.

The main argument of this study is that an innovative climate influences interaction involvement, and that the antecedents of intention, including innovative climate and interaction involvement as perceived by both users and systems analysts, lead to different levels of user intention to share knowledge. Hence, the following questions can be posed. What is the relationship between innovative climate and the user’s intention to share knowledge? What is the relationship between interaction involvement, as perceived by users and systems analysts, and the user’s intention to share knowledge? What is the relationship between innovative climate and interaction involvement as perceived by users and systems analysts?

This study thus emphasizes both antecedents and their relationships rather than merely the possible antecedents of intention, in an attempt to clarify how they affect the user’s intention to share knowledge. It is believed that the findings will not only augment the theory of knowledge management but also provide insight into the causal chain of an individual’s intention to share knowledge.

2. Literature review

Much IS development research has focused on the effectiveness of participant involvement resulting from acquisition of appropriate system requirements and leading to IS success. Less effort has been devoted to examining the effects of interaction involvement, particularly of interpersonal communication. Yet the link between climate and interaction involvement mandates that the intention to share knowledge plays an important role in knowledge management. Thus, we investigated possible antecedents of intention to share knowledge, including innovative climate and interaction involvement.

2.1. Innovative climate

The organizational climate consists of a set of attributes perceived about a particular organization, and it is based on the interactions between organization members (Hellriegel & Slocum, Jr., [17]; Downey, Hellriegel & Slocum, Jr., [18]). Organizational climate is known to be a critical driver of knowledge sharing (Constant, Kiesler &
Hypothesis 1: Innovative climate is positively related to the user’s intention to share knowledge.

2.2. Interaction involvement

Involvement has been defined as a person’s perceived relevance of the object based on inherent needs, values and interests (Engle & Blackwell, [25]). Barki and Hartwick [26] further stated that involvement refers to an individual’s subjective psychological state reflecting the importance and personal relevance of a topic, product or job. In the IS field, most studies investigate user involvement, which is defined as a series of behaviors performed by potential users in the system development process (Barki & Hartwick, [26]; Ives & Olson, [13]; Tait & Vessey, [12]). However, user involvement represents only one side of the equation. The other side of the equation is involvement of the systems analysts. Because a participant’s perception of his or her involvement in an IS project has been found to influence the performance of the system (Doll & Torkzadeh, [14]), the involvement of both the systems analysts and the users is critical to the quality of the project.

As the study is limited to the context of systems analysis, the unique character of short-term interaction between the systems analyst and the user must be taken into consideration. Only when systems analysts get involved more deeply are they more likely to comprehend the system requirements, to evaluate the data provided by users, and to provide quick and appropriate feedback. Thus, the study focused on the involvement that is fundamental to interpersonal communication, so-called interaction involvement (Cegala, [16]; Cegala, Savage, Brunner, & Conrad, [27]), which requires participants’ conscious attention to both internal and external matters in any interpersonal communication event. In fact, interaction involvement is regarded as an indicator of competence in interpersonal communication (Cegala, [16]), which is critical to systems analysis.

Cegala [16] developed the Interaction Involvement Scale (IIS) to measure individuals’ interaction involvement, which comprises three related factors: responsiveness, perceptiveness and attentiveness. Responsiveness indicates certainty about how to respond in social situations, whereas perceptiveness refers to general sensitivity to the meaning of others’ behavior. Attentiveness describes the degree to which individuals pay heed to the interlocutors.

Involvement varies in degree from one participant to another. Ives and Olson [13] classified degree of involvement into six levels: “no involvement”,...
“symbolic involvement”, “involvement by advice”, “involvement by weak control”, “involvement by doing” and “involvement by strong control.” Higher-level involvement leads to more successful system implementation. Ives and Olson also recognized that various levels of involvement in a system development project, such as that of primary users or that of secondary users, will have different effects on the project outcome. Thus, this study proposed that systems analysts and users not only demonstrate different levels of interaction involvement but also contribute to different aspects of the outcome. Because systems analysts play an active role in interviewing the users, their level of interaction involvement is likely to be much higher than that of the users.

2.3. Involvement and intention

The relationship between involvement and intention has been investigated in a number of fields. For instance, psychology research has shown that a high level of involvement increases a person’s motivation to handle issue-relevant information and to act in accordance with his or her attitudes (Leippe & Elkin, [28]; Sivacek & Carno, [29]). In the marketing field, a high level of involvement has been shown to lead to greater interest in gathering extensive product information and better recall of the information shown in advertisements (Gardner, Mitchell & Russo, [30]; Zaichowsky, [31]; Laurent & Kapferer, [32]). In addition, highly involved consumers, in contrast to less involved consumers, demonstrate a higher degree of the purchasing intention by reading on-line consumer reviews (Park, Lee, & Han, [33]). Organizational behavior studies have revealed that the level of job involvement has a direct effect on the level of individual motivation (Lawler & Hall, [34]).

In the IS field, differences in the level of involvement have been shown to cause significant differences in expectations of success (Kahai, Solieri & Felo, [35]). When the information system is important and personally relevant to both users and systems analysts, they are both more likely to be involved in system development (Barki & Hartwick, [26]; Robey & Farrow, [10]) and to try their best to clarify information needs and explain task procedures. Therefore, both the users’ and the systems analysts’ perception of their own interaction involvement is predicted to affect the intention to share knowledge. These findings suggest the following hypothesis:

Hypothesis 2: The level of perceived interaction involvement is positively related to the user’s intention to share knowledge.

Because each interaction involves a systems analyst and a user, Hypothesis 2 is expanded as follows:

Hypothesis 2a: The system analyst’s perceived level of interaction involvement is positively related to the user’s intention to share knowledge.

Hypothesis 2b: The user’s perceived level of interaction involvement is positively related to the user’s intention to share knowledge.

2.4. Climate and involvement

The relationship between organizational climate and employees’ involvement has been clarified, but few studies in the IS field have investigated the link between climate and participant involvement. White and Ruh [36] posited that employee involvement is affected by organizational culture and further ascertained that organizational climate is an

Figure 1. Conceptual model.
important precursor to employee involvement. Shadur, Kienzle and Rodwell [37] proposed that an innovative organizational climate is positively related to perceptions of participation in decision making, teamwork and communication. This notion is similar to the concept of interaction involvement formulated in our study. Accordingly, Hypothesis 3 is as follows:

Hypothesis 3: Innovative climate is positively associated with participants’ interaction involvement.

Because the systems analyst and user play different roles as participants, Hypothesis 3 is expanded as follows:

Hypothesis 3a: Innovative climate is positively associated with the system analyst’s interaction involvement.

Hypothesis 3b: Innovative climate is positively associated with the user’s interaction involvement.

With the belief that both innovative climate and interaction involvement influence the participants’ willingness to share knowledge, the proposed study further focused on the user’s intention to share knowledge and treated innovative climate and interaction involvement as antecedents. Figure 1 depicts the complete conceptual model. Note that the model explores three antecedents of the user’s intention to share knowledge by recognizing that knowledge sharing involves collective action at its core. As such, interaction involvement perceived by both the user and systems analyst were taken as independent variables in the study to measure the effect of interaction involvement on the user’s intention to share knowledge. In addition to the direct effects of the systems analyst’s interaction involvement, the user’s interaction involvement and innovative climate, the indirect effect of innovative climate was also measured.

3. Research method

3.1. Subjects and procedure

One hundred and ninety college seniors majoring in IS from four sections of the same course, Information Systems Analysis and Design, were recruited. One section was taught one semester earlier than the other three sections. As a major course requirement, student analysts were required to identify IS requirements in various real business cases. Each section was taught by the same instructor, using the same teaching materials and under the same learning conditions. The course has been offered for the past 2 consecutive years.

To investigate interaction in terms of collaboration between systems analysts and users in the context of systems analysis, questionnaires were administered to 190 student systems analysts and their 190 respective users. Student analysts were aware that they were involved in projects for which output of the systems analysis would be measured, but they were blinded to the research hypotheses.

Each student analyst was assigned a real business case, and during the semester each student analysts communicated with a user from the business firm to ascertain the system requirements. The main task was either website design or IS planning. Students’ project reports consisted of the system requirements for their respective firms. After the projects had been completed, the student analysts and the users were asked for their perception of the innovative climate, interaction involvement and intention to share knowledge during the interaction.

In our study, most of the real business cases are offered by small-size companies, which are willing to collaborate with student analysts for better understanding their information system requirements. In fact, these companies are in need of IS outsourcing. After the interviews, the company received a free copy of system analysis report detailing the IS suggestions and cost evaluation. The companies were benefited by such collaboration. For instance, although no real system was going to be developed immediately afterwards, the company could refer to the systems analysis report for further IS implementation. When companies become more knowledgeable, it will be much easier for them to choose and identify qualified outsourcing vendors and further to make better deals. Besides, the companies may consider hiring the student analysts or collaborating with them in the subsequent system implementation course scheduled for the second half of their senior year to carry out the implementation. These students were not only familiar with the actual system planning but also well-trained in program coding. They all have the abilities to act as specialists for IS implementation projects.

The data were collected by means of a survey, and the research model shown in Figure 1 was tested by using the data pertaining to innovative climate, interaction involvement perceived by the systems analysts and users, and users’ intention to share knowledge, and the hypotheses were examined through structural equation modeling using the collected data.
3.2. Measurement and data collection

The independent variables in this study were innovative climate and interaction involvement as perceived by the systems analysts and users. The dependent variable was the user’s intention to share knowledge. Measurement of each construct is further described as follows:

**Innovative climate.** According to Bock, Zmud, Kim and Lee’s [24] definition of organizational climate, three aspects were identified. They are innovativeness, fairness, and affiliation. Among them, innovativeness is most relevant to our study. Therefore, we adopted Bock, Zmud, Kim and Lee’s definition of innovativeness, and called it innovative climate, because the innovativeness refers to an aspect of climate. It is defined as the degree of perception that change and creativity are actively encouraged. We also used Bock, Zmud, Kim and Lee’s measurement items of innovativeness to measure innovative climate. There are totally three items which focused mainly on measuring the innovative climate perceived by the users and the students who played the role of systems analysts. Cronbach’s $\alpha$ for this three-item measure was .65.

**Interaction involvement.** Interaction involvement was assessed by means of 18 items adopted from Cegala’s Interaction Involvement Scale (Cegala, [16]). These items reflect three aspects of an individual’s communicative competence during the interpersonal communication process: attentiveness, perceptiveness and responsiveness. While attentiveness (6 items) focuses on hearing and observing, perceptiveness (4 items) indicates being aware of message meanings (Cegala, [16]). Responsiveness (8 items) refers to a person’s certainty about how to respond to others during a conversation (Cegala, Savage, Brunner, & Conrad, [27]). Cronbach’s $\alpha$ for the three factors was .725, .729 and .861, respectively.

**Intention to share knowledge.** Bock, Zmud, Kim and Lee [24] developed a scale to assess the intention to share knowledge. The items focused mainly on measuring the degree to which a user is willing to share tacit knowledge (3 items) and explicit knowledge (2 items). Cronbach’s $\alpha$ for this five-item measure was .818.

All respondents, including both users and systems analysts, were asked to evaluate the significance of the measurement items using a Likert scale of 1-7, where 7 represented “strongly agree,” and 1 represented “strongly disagree.”

4. Results

4.1. Data analysis

Of the 190 students attending the class, 182 completed questionnaires as systems analysts, and their respective users also completed questionnaires, for a total of 364 completed questionnaires. The response rate was 95.7%. Correlation between the proposed variables was tested by means of Pearson’s correlation coefficient, and differences in those variables between systems analysts and users were tested by paired-samples t-test.

<table>
<thead>
<tr>
<th>Table 1. Correlation Between Variables</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Intention to share knowledge</td>
</tr>
<tr>
<td>2. Innovative climate</td>
</tr>
<tr>
<td>3. Attentiveness</td>
</tr>
<tr>
<td>4. Responsiveness</td>
</tr>
<tr>
<td>5. Perceptiveness</td>
</tr>
</tbody>
</table>

Note. *p< .05. **p<.01. ***p<.001.

<table>
<thead>
<tr>
<th>Table 2. Results of Paired-Samples t-Test</th>
</tr>
</thead>
<tbody>
<tr>
<td>t-value</td>
</tr>
<tr>
<td>1. Intention to share knowledge</td>
</tr>
<tr>
<td>2. Innovative climate</td>
</tr>
<tr>
<td>3. Attentiveness</td>
</tr>
<tr>
<td>4. Responsiveness</td>
</tr>
<tr>
<td>5. Perceptiveness</td>
</tr>
</tbody>
</table>

Note. *p< .05. **p<.01. ***p<.001.

3801
Table 1 shows Pearson correlation coefficients for the study variables. Innovative climate was not significantly related to interaction involvement, i.e., to attentiveness, responsiveness or perceptiveness ($r=-.022$, $r=-.062$; $r=-.081$; $p>.05$), whereas innovative climate was positively related to intention to share knowledge, which was negatively related to attentiveness, responsiveness and perceptiveness.

As shown in Table 2, all variables differed significantly between users and systems analysts except innovative climate. In other words, there was no difference in the perceived innovative climates between users and systems analysts during their interactions. In addition, in comparison to systems analysts, users demonstrated higher level of intention to share knowledge and a lower level of interaction involvement, i.e., attentiveness, responsiveness and perceptiveness. Therefore, as systems analysts play an active role in interviewing the users, their level of interaction involvement is proved to be significantly higher than that of the users.

4.2. Structure model

By maximum likelihood estimation using AMOS, the proposed model was assessed with the 182 records of interaction, each of which was treated as a unit of analysis and consisted of data from one systems analyst and one user. All calculations were based on the covariance matrix of the variables. Five common model-fit measures were used to assess the model’s overall goodness of fit: the ratio of $\chi^2$ to degrees of freedom (d.f.), goodness-of-fit (GFI), adjusted goodness-of-fit index (AGFI), comparative fit index (CFI), and root mean square error of approximation (RMSEA).

The results indicated that the proposed model ($\chi^2$ (30, $N=182$) = 2.643; GFI=.935, AGFI=.873, CFI=0.956, RMSEA=.095) had a much better fit than the recommended values ($\chi^2$ (30, $N=182$) $<3$; GFI $>.90$, AGFI $>.80$, CFI $>.90$, RMSEA $<.80$). Therefore, we used it to examine our hypotheses.

None of the standardized path coefficients of innovative climate, shown in Figure 2, were statistically significant, disconfirming Hypotheses 3a and 3b ($\beta=-.09$, $\beta=-.06$, $p>.05$), except for the path running from innovative climate to user’s intention to share knowledge, thereby supporting Hypotheses 1 empirically. In addition, the relationship between the systems analyst’s interaction involvement and the user’s intention to share knowledge was not significant, disconfirming Hypothesis 2a ($\beta=.09$, $p>.05$). Although the user’s interaction involvement was significantly related to the user’s intention to share knowledge, the effect was negative rather than positive. Therefore, Hypothesis 2b was not supported.

In summary, whereas innovative climate had a strong positive effect on the user’s intention to share knowledge, the user’s interaction involvement had a negative effect. The $R^2$ value indicates that 41% of the variance in the users’ intention to share knowledge was explained by innovative climate and the users’ interaction involvement in the model.

5. Conclusion

5.1. Data analysis

The study described herein empirically examined how the interaction involvement of participants of
different roles (analyst and user) affects the user’s intention to share knowledge. The systems analysts, in comparison to the users, demonstrated higher levels of interaction involvement, including responsiveness, perceptiveness and attentiveness. Additionally, innovative climate positively influences the user’s intention to share knowledge. Yet, surprisingly, user’s interaction involvement negatively affects his/her knowledge sharing intention, while the relationship between systems analyst’s interaction involvement and user’s intention to share knowledge is not confirmed. It is indeed puzzling that more interaction involvement leads to lower degree of user’s knowledge sharing intention. However, it is likely that exhibiting more interaction involvement is perhaps a good strategy to avoid actual knowledge sharing. If a user resists to participating in requirement specification during systems analysis, then good communication skills may effectively lead to more interaction involvement, but not necessarily the actual sharing intention. That is to say, if a user doesn't want to share knowledge, having him/her talk will not solve the problem, since he/she might just share what he/she really wants to share, but maybe not his/her knowledge.

In addition, contrary to our expectation, innovative climate affects neither system analyst’s interaction involvement nor user’s. A possible explanation is that the effect of innovative climate is by nature long term effect which cannot easily be observed in a short run.

In conclusion, a very important practical implication of our findings is the possibility of increasing the user’s intention to share knowledge by enhancing the innovative climate during interactions between systems analysts and users. The findings of this study contribute to theory building concerning the effect of innovative climate and interaction involvement on knowledge sharing. By identifying a possible antecedent, innovative climate, and answering the how’s and why’s of the relationships between innovative climate, interaction involvement and intention to share knowledge, results of the study contribute substantially to development of the theory.

5.2. Limitation and future research

A few limitations should be noted. First, the study focused on the relationships between innovative climate, interaction involvement and intention to share knowledge, but the relationships between other climates and other involvements should be considered to fill the gap in the published research. Second, the research results may be linked to the context being investigated. Therefore, to confirm applicability of the findings to other contexts, the research model will need to be tested in various settings. Third, system analysts’ intention to share knowledge may be of interest for further understanding of whether the knowledge sharing intention on one side (for example, analyst) affects that of the other side (for example, user). When this potential interaction is investigated and the contexts of study categorized, a general conclusion can be drawn with greater confidence.

In addition, the interactions between users and student analysts are nearly similar to the short-term IS outsourcing cases. In fact, most students are quite well trained in information system development and would be engaging in IS outsourcing projects right after graduation. Hence, their lack of experience is the only concern. Although the context is not exactly a real case, studying numerous interaction cases during system analysis phase probably is only as closely as this study can get. Nevertheless, to apply the research findings in understanding system analysis, one does need to keep in mind this research limitation.

Finally, innovative climate was the only variable found to positively affect user’s intention to share knowledge, and it was not shown to affect participants’ (both analyst and user) interaction involvement. This could be due to the definition of involvement in the study. Future research may refine or expand the construct of involvement. Interaction involvement could be the tipping point for a series of future studies in identifying antecedents of intention to share knowledge.

Acknowledgments

This research is partially supported by National Science Council in Taiwan under project number NSC 99-2410-H-004-135. The authors wish to thank Professor Joshi, Professor Nissen, Dr. Cooper and three anonymous reviewers for their helpful feedback and suggestions.

References


