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Impact of personal and cultural factors on knowledge sharing in China

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Abstract Knowledge sharing has been the focus of research for more than a decade and it is widely recognized that it can contribute to the success of an organisation. However, in comparison with other countries, relatively little work on this topic has been done in the Chinese context. Knowledge sharing is particularly interesting to study in the Chinese context at the individual level, given the unique social and cultural characteristics of this environment. In this paper, we develop a theoretical model to explain how personal factors would affect people's intention to share their knowledge. The Theory of Reasoned Action and Social Exchange Theory are used in this paper, as are the time dimension of national culture, face, and *guanxi*. A survey methodology is used to test the model. Face and *guanxi* orientation both exert a significant effect on the intention to share knowledge. Theoretical and practical implications, as well as directions for future research, are discussed.

Keywords Knowledge sharing · *Guanxi* orientation · Face saving · Face gaining · Theory of reasoned action · Social exchange theory

It has been widely indicated that managing knowledge effectively is critical to a company's success, especially in those companies that need to be continuously creative in order to maintain their competitive advantage (Dieng, 2000). Knowledge

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sharing could be useful not only in better employing the existing knowledge, but also in creating new knowledge (Mahnke, 1998). Knowledge sharing has been investigated from many perspectives. Reid (2003) proposed that effective knowledge sharing requires a supportive organizational culture. Bock, Zmud, Kim, and Lee (2005) built an integrated model to identify the factors affecting knowledge sharing from multiple viewpoints. Inkpen and Tsang (2005) concentrate on this topic from the social capital and networks perspectives. In China, some research has been conducted that attempts to compare the situation there with that in other countries so as to explain the differences in knowledge sharing. For example, Chow, Deng, and Ho (2000), in a comparison of Chinese and American subjects, found that the degree of collectivism would influence the openness of knowledge sharing. Meanwhile Michailova and Hutchings (2006) compared Chinese and Russian organizations and then proposed that even though both societies score high in terms of collectivism, different motives will also lead to different degrees of knowledge sharing. There has also been a research focus on the effect of Chinese institutional change on knowledge sharing, with the finding that the development of national institutions in response to international institutions has a great impact on knowledge management (Weir & Hutchings, 2005). Furthermore, case studies have been undertaken in the Chinese context to explore knowledge sharing conditions which provide further detail about knowledge sharing in specific organizations (Voelpel & Han, 2005).

In China, more and more companies have realized the importance of knowledge management and so have started to encourage their employees to share their knowledge with each other. However, the list of companies which globally manage knowledge most effectively does not include Chinese companies (McKellar, 2006). This may be partly explained by referring to Chinese culture since it has been found that cultural barriers in knowledge sharing in China such as "concern for face" and "ingroup/outgroup distinctions" prevent people from engaging in knowledge sharing behavior (Voelpel & Han, 2005). Nevertheless, knowledge sharing behavior can be encouraged at the individual level and it is for this reason that we focus on personal factors in knowledge sharing. In addition, it has been suggested that the conditions of knowledge management activity in emerging economies might be different from those in mature economies (Bruton, Dess, & Janney, 2007). Consequently, it is both reasonable and of likely benefit to researchers and practitioners alike that the topic should be investigated in the Chinese context in combination with special attention to cultural factors.

The Theory of Reasoned Action (TRA) was adopted in our paper since it can be used to forecast any kind of behavior. Indeed, many other researchers have adopted TRA to investigate knowledge sharing behaviors (Bock & Kim, 2002). When considering personal factors, it has been suggested that costs and benefits are both important factors affecting knowledge sharing, even though most research focuses only on benefits rather than the inhibiting effects of costs (Kankanhalli, Tan, & Wei, 2005). In addition, rational people will consider the outcomes of an action (such as knowledge sharing) before deciding how to behave. Thus, we also apply social exchange theory (SET) to measure the effect of cost and benefit on attitudes towards knowledge sharing in China.

In this paper, we aim to investigate to what extent the personal factors of cost and benefit affect knowledge sharing between individuals in China. Moreover, we also

want to establish the impact of face and *guanxi* orientation on the propensity to share knowledge since the concepts of face and *guanxi* are important in the Chinese culture (Buckley, Clegg, & Tan, 2006). Overall, we expect that this study will contribute to both the theory and practice of knowledge sharing in the Chinese context, in addition taking Chinese cultural factors into consideration. In the next section, we will review the relevant theoretical literature. Following this, we introduce the research model and develop hypotheses.

Literature review

The theory of reasoned action

The Theory of Reasoned Action (TRA) assumes intention as the main predictor of behavior; it suggests that behavioral intentions could drive individual behavior and intentions could be determined by attitudes and subjective norms (Fishbein & Ajzen, 1975). Attitudes towards a behavior are defined as an individual's general feelings about the behavior. General feelings are composed of salient beliefs including the perceived possibility and judgment of consequences resulting from the behavior. Subjective norm is defined as an individual's perception about how people important to him/her judge the behavior. It could also be influenced by normative beliefs, such as perceived pressures and the motivation to obey.

The TRA has been widely used in social psychology research to explain many kinds of people's behavior. It has also been used in knowledge management research (Bock & Kim, 2002). Clark and Soliman (1999) adapt the TRA in knowledge based systems valuation so as to offer business executives a means of assessing the value of KBS investments. Lin (2007) uses the TRA to examine different motivations to explain knowledge sharing intentions and finds that knowledge self-efficacy and enjoyment in helping others are positively related to knowledge sharing attitudes and intentions. Bock et al. (2005) also found that extrinsic motivators, social–psychological forces and organizational climate factors could influence knowledge sharing intentions.

Social exchange theory

Social exchange theory (SET) was developed in the late 1950s, with the key proponent being George Homans. Homans (1961) proposed that exchange between people is a fundamental form of behavior and is always based on the principles of cost and benefit. Furthermore, he introduced concepts from psychology, such as expectation and reward. Unlike Homans, Blau (1964) tried to bridge the gap between humans and society. He introduced the concept of social reward to explain the behavior of social exchange. Intrinsic reward, extrinsic reward and the concepts of power and criterion were introduced to help explain broader social phenomena. Unlike economic exchange, social exchange occurs without concrete roles or contracts. Although people's gain is also based on what they give, the feedback is not as certain as economic exchange. Moreover, social exchange includes many social factors which cannot be found in economic exchange, such as social

relationships, institutional context, etc. Hence, the exchange approach in sociology is described as the "economic analysis of noneconomic social situations" (Emerson, 1976).

Knowledge sharing could be regarded as a kind of social exchange (Bock et al., 2005) with people sharing their knowledge and skills with their colleagues and expecting, reciprocally, to receive others' knowledge in return. Much research has been undertaken on SET as a way of investigating personal behavior in knowledge sharing (e.g. Bock et al., 2005; Kankanhalli et al., 2005). Since social exchange is a complicated activity, different research projects have highlighted different aspects of it. Kankanhalli et al. (2005) used cost/benefit analysis according to SET to analyze incentives and inhibitory factors in knowledge sharing. Further, while Chua (2003) emphasized reciprocity in knowledge sharing, Constant, Kiesler, and Sproull (1994) emphasized self interest and context. There are also researchers who have used SET to analyze how knowledge sharing behavior can be rewarded more effectively (Bartol & Srivastava, 2002). Finally, it has been suggested that relationships and personal networks function through social exchange (Weir & Hutchings, 2005).

Costs and benefits

It has been suggested that people are inclined to pursue maximum personal benefit (Molm, 1997), and so we choose benefit and cost as the factors that affect personal attitudes towards sharing knowledge. In this way, we can investigate how people can be motivated to share their knowledge through enhancing their benefits while decreasing costs (e.g. Kankanhalli et al., 2005). Kankanhalli et al. (2005) classified the factors affecting the contribution of knowledge into costs and benefits: Costs involve the effort required to codify knowledge, as well as the loss of knowledge power. Benefits, on the other hand, include the potential enhancement of one's image: The importance of one's image has been recognised for its contribution in gaining others' recognition and building up one's status in organization (Bock et al., 2005). Besides, sense of self-worth embodies a knowledge contributor's self evaluation of their value through knowledge sharing activities; this could also affect their attitude towards knowledge sharing (Bock et al., 2005). Consequently, we have identified image and sense of self-worth as the antecedents of attitudes towards knowledge sharing.

Besides, since Chinese people typically have a high *guanxi* orientation, where *guanxi* is regarded as a basic element of the web of personal relationships (Buckley et al., 2006), so we include anticipated reciprocal relationships in our model. Owing to the different results found with respect to the functions of anticipated extrinsic reward (Bock et al., 2005; Voelpel & Han, 2005), it is important to understand how it functions in the Chinese context.

Cultural factors

Face "'Face' is the respect, pride and dignity of an individual as a consequence of his/her social achievement and the practice of it" (Leung & Chan, 2003). People try to maintain their face to gain recognition and respect before others. Compared to western societies, face is a more salient topic in Chinese society in the context of

social interactions (Redding & Ng, 1982; Ting-Toomey, 1988). The face that a person has depends on his/her personal efforts, such as hard work, usefulness to the society, wealth and reputation. Face could also be embodied by the social relations that a person is involved in. Although face issues are not unique to China, the cultural characteristic of "caring for one's face" is very much a part of the Chinese consciousness. Ho (1976) indicates that the amount of face a person has is constantly changing: During the course of social interaction, one's face could be enhanced or diminished. In such a face-conscious society, both face gaining and face saving are identifiable objectives of life (Chu, 2006b). In research focused on face, some researchers classify several behaviors related to face, Chu (2006b), for instance, proposing three kinds of behavior including: avoiding losing face in advance; retrieving face after the event; and gaining face.

Guanxi orientation Chinese people often focus on social relationship webs, i.e., "*guanxi*", since harmony is of great value in Confucian oriented societies. Thus, the Chinese tend to put more energy in maintaining good relationships with people around them. Besides the meaning of relationships, *guanxi* also has extra meaning of power, social status and resource transmission (Hackley & Dong, 2001). Weir and Hutchings (2005) also proposed that interpersonal networks have an important effect on knowledge sharing when institutional networks are less developed. Although anticipated reciprocal relationships have been suggested to have a significant relationship with intention to share knowledge through attitude toward knowledge sharing, the meaning of *guanxi* orientation is quite different from reciprocity: The former refers to the extent to which people pay attention to *guanxi*, while the latter refers to people's willingness to build good relationships with one other through knowledge sharing. Although *guanxi* is of great importance in China, seldom research has focused on its effect on knowledge sharing intention.

Hypothesis development and research model

To develop a comprehensive model of personal and cultural factors affecting the intention to share knowledge, the Theory of Reasoned Action (TRA) (Fishbein & Ajzen, 1975) was adopted as our basic theoretical frame. It is believed that "attitude toward a certain behavior is determined by a set of salient beliefs about certain outcomes caused by the behaviors and the corresponding evaluation on the outcomes" (Kankanhalli et al., 2005). Because we aim to investigate the personal factors related to the intended behavior of knowledge sharing, the evaluation of outcomes is classified into the costs and benefits that a person expects to experience/receive after sharing knowledge (Thompson, 1999). Moreover, since our research focuses on the Chinese context, we include a number of factors that are important in this context including mianzi (face) and *guanxi* since factors specific to the Chinese culture are expected to exert an important influence on individual behavior (Figure 1).

Previous research suggests that knowledge sharing could be hindered if people are afraid that a loss of knowledge will cause them to lose their individual

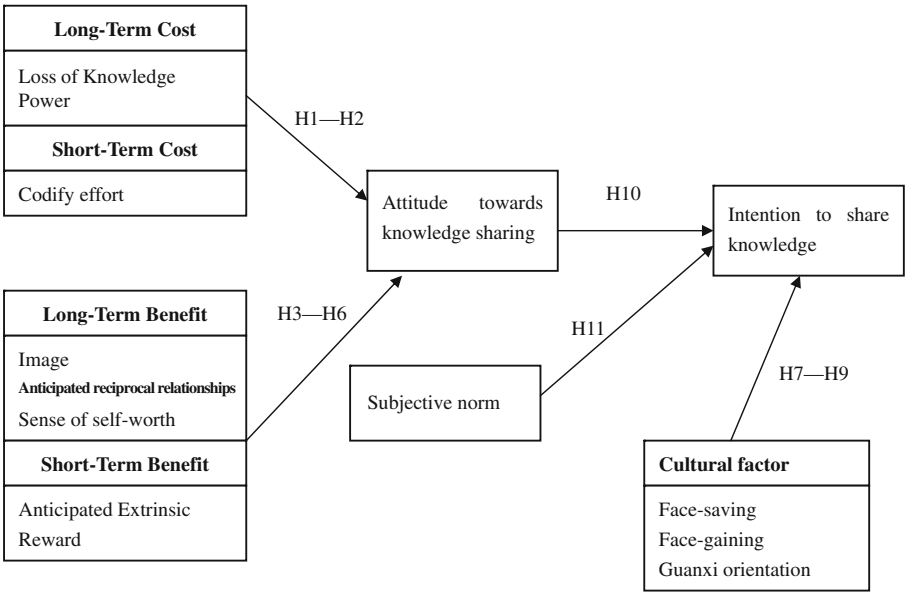

Figure 1 Research model

competitive advantage (Kankanhalli et al., 2005). People gain their precious knowledge little by little from their working experience, even from failures and frustration; this precious knowledge enables them to exceed the performance of their colleagues, gain better pay and more opportunities in their career. Consequently, people would rather retain the knowledge than share it. So, although knowledge sharing could bring them benefits, they hold onto their knowledge if they think this could benefit them more (Davenport & Prusak, 1998). This leads to our first hypothesis:

Hypothesis 1 Loss of knowledge power has a negative impact on knowledge sharing attitudes.

The object of codification is to format knowledge in a certain style that makes it easier to be found and to be understood by other members in the organization (Davenport & Prusak, 1998). Codification offers a good basis for knowledge sharing. But it is uncertain whether people are willing to spend much time on codification because the benefit of doing so may not seem obvious to them compared to other tasks that could bring them greater benefit. After all, a company pays more attention to its employees' efficiency in achieving tasks than other things. So, codification was modeled as a barrier to knowledge sharing in previous research (Husted & Michailova, 2002; Kankanhalli et al., 2005).

Hypothesis 2 The greater the effort required to codify knowledge, the more negative the attitude toward knowledge sharing.

It has been found that people need to establish their status as experts in an organization. One of the ways to establish this status is to share their professional

knowledge with their colleagues (Ardichvili, Maurer, Li, Wentling, & Stuedemann, 2006). When people share useful knowledge, it will cause them to gain colleagues' respect, enhancing their personal image in the company (Constant et al., 1994). A good reputation and personal image is believed to help people to have a better career life. Thus, we hypothesize that:

Hypothesis 3 Image would have a positive relationship with the attitude towards knowledge sharing.

Anticipated reciprocal relationship was suggested as an important aspect of benefit in social exchange (Chua, 2003) and it is also believed to be a critical factor in knowledge sharing: People share their knowledge with their colleagues as they develop relationships with them and anticipate receiving their knowledge in the future. Reciprocity is based on the social relationships which engender obligation between employees, according to SET (Blau, 1964). What is more, relationships in social exchange constitute an important factor affecting attitudes in an uncertain cooperative organizational context. Previous work also indicated that anticipated reciprocal relationships (Constant et al., 1994) have a positive impact on attitude towards knowledge sharing (Bock et al., 2005).

Hypothesis 4 Reciprocity has a positive relationship with the attitude towards knowledge sharing.

It has been indicated that feedback is an important facilitator of knowledge sharing, since the usefulness of the knowledge shared can enhance their feeling of self-worth. Similar to the concept of self-esteem, people will increase perceived control power and confidence in dealing with a task and being in control of their environment (Constant et al., 1994). People will also be more willing to share knowledge when they find that their knowledge is meaningful to people around them (Cabrera & Cabrera, 2002). Finally, the positive relationship between the attitude towards knowledge sharing and sense of self-worth has been supported in other research (Bock et al., 2005). Thus, we hypothesize that:

Hypothesis 5 Sense of self-worth has a positive relationship with the attitude towards knowledge sharing.

According to SET, people will seek to attain maximum benefits for themselves. It has been suggested that explicit monetary reward could effectively motivate people to share their knowledge (Husted & Michailova, 2002). However, some researchers indicate that explicit rewards may have a negative effect on the attitude toward knowledge sharing, since: (1) Task related rewards might decrease the intrinsic motivator, such as sense of self-worth, and thus weaken the enthusiasm for knowledge sharing (Eisenberger & Cameron, 1996); (2) Extrinsic rewards cannot function for long (Kelman, 1958); (3) No reward could also be looked upon as a kind of punishment so that it has a negative impact on attitude towards knowledge sharing (Kohn, 1993). Nevertheless, in the Chinese context, it has been found (Kankanhalli et al., 2005) that organizational rewards do encourage knowledge sharing, thus we propose that:

Hypothesis 6 Anticipated Extrinsic Reward has a positive relationship with attitude towards knowledge sharing.

It has been suggested that face includes three components: sociality, cognition and motivation. Furthermore, the formation of face is based on society and culture (Zhou & Ho, 2005). The loss and gain of face could not be discussed without considering the social context. Because the amount of face could be enhanced or reduced, people need to develop skills to maintain their face. Since knowledge sharing is a kind of social activity, it should be affected to some extent by face. Hwang, Francesco, and Kessler (2003) proposed that people would behave differently when they are concerned about losing and gaining face. They also found that people who want to gain face will choose formal communication channels while people who wish to avoid losing face will choose to communicate with others informally.

It has also been proposed (Ardichvili et al., 2006) that the desire to save face is a barrier to knowledge sharing. People will feel that they lose face if they expose their defects in public. The perception of losing face may make people feel embarrassment and disrespected by others. Since people attach importance to their own face, they will try their best to protect it from being lost or damaged. In order to avoid losing face, people will restrict their behavior as much as possible (Chu, 2006a), even to the extent of avoiding contact with others (Chu, 2006b). Thus, during the knowledge sharing process, if employees are afraid of sharing knowledge that they believe might be "wrong" or "incorrect", thereby displaying their ignorance in such a way that would make them feel a loss of face, they would probably not want to participate in knowledge sharing activities at all. So, we hypothesize that:

Hypothesis 7 Face saving inclination has a negative relationship with the intention to share knowledge.

Not losing face does not mean gaining face, because face could only be gained through others' recognition and admiration. Face gaining has been illustrated by several researchers. Hu (1944) suggested that face gaining includes offering help to others. Chu (2006b) suggested that one important way in which one can gain face is through self expression, showing one's merits, especially merits that accord with the expectations of others. Thus, employees who are inclined to gain face would be more likely to demonstrate their ability and share their knowledge. Thus, we hypothesize:

Hypothesis 8 Face gaining inclination has a positive relationship with the intention to share knowledge.

Since most Chinese people attach considerable importance to harmony, they are inclined to take relationships with the people around them very seriously. *Guanxi* orientation has played a critical role in Chinese people's life. It has also been found that social ties, including trust and rapport, would have a positive relationship on knowledge sharing. It has also been proposed that *guanxi* would promote

knowledge transfer between the two firms (Kotlarsky & Oshri, 2005). So, we hypothesize that:

Hypothesis 9 *Guanxi* orientation has a positive relationship with the intention to share knowledge.

The TRA suggests that there are two antecedents of the intention to perform a behavior. One is the attitude towards the behavior, i.e., measuring the extent to which people evaluate the behavior; the other is the subjective norm, measuring the extent to which others influence one's performance of the behavior (Ajzen & Fishbein, 1980). According to this theory, an individual's intention to perform a behavior is affected by his/her attitude toward the behavior and subjective norm. Thus, individuals may be more inclined to engage in a certain behavior if their attitudes towards the behavior are positive. We extend the TRA into the knowledge sharing context and expect that people intend to share their knowledge if they have positive attitudes towards knowledge sharing behavior. Moreover, with respect to subjective norms, if an individual employee feels that his colleagues and managers expect him to share his knowledge with them and if he would like to do so, then he also has the intention to share his knowledge. This leads to the last two hypotheses:

Hypothesis 10 People's attitude towards knowledge sharing would have a positive relation with their intention to share knowledge.

Hypothesis 11 People's subjective norm regarding knowledge sharing would have a positive relation with their intention to share knowledge.

Research methodology and data analysis

Measurement and data collection

Before formal data collection, we conducted a pretest on 19 randomly selected MBA students. The feedback received from them showed that the questionnaire was adequate and it was not necessary to modify the scale items and questions. The formal study population is also comprised of second year MBA students from a university located in eastern China. All respondents are full time employees working in a variety of different organizations. A total of 200 individuals were invited to participate voluntarily in this research. One hundred and fifty-nine valid responses were returned, a response rate of 79.5%. The reason for the high response rate is we distributed the questionnaires in cooperation with a professor, who encouraged his students to complete the questionnaires. Table 1 shows the respondents' information such as industry type and other demographic indicators.

Except for items in the culture section, all the items were originally developed in English, so we translated the instrument into Chinese and then performed a back-translation to ensure equivalence of meaning between the English and Chinese versions. Most of the items in the survey instrument were developed and validated

Table 1 Demographic information of respondents.

Measure	Items	Frequency	Percent
Gender	Female	40	25.16
	Male	119	74.84
Age	20–30	82	51.57
	30–40	73	45.91
	40–50	4	2.52
Industry	Manufacturing	46	28.93
	Finance	23	14.47
	Service	15	9.43
	Transportations	8	5.03
	Commerce	25	15.72
	Education	12	7.55
	Government	11	6.92
	Others	19	11.95
Position	Employee	60	37.74
	Director of the department	57	35.85
	Senior manager	34	21.38
	Others	8	5.03
Org size	50 or below	24	15.09
	51–100	19	11.95
	101–500	42	26.42
	501–1,000	16	10.06
	1,001 or more	58	36.48

previously by other researchers. The source of the items is listed in the Appendix, where all questions are listed. Some of the face-related questions are from others' research work, whereas other questions were developed by us. Furthermore, card sorting was used to separate the questions into face saving and face gaining.

Based on the survey results, we also conducted a series of follow-up interviews with respondents from the original volunteer population in order to have a deeper understanding of the topic. Five persons were randomly chosen to provide supplementary information. These interviews were conducted by telephone, each call lasting four to ten minutes.

Analysis

PLS Graph Version 3.00 was used as it supports both confirmatory and exploratory research (Gefen, 2000). Besides, it requires a smaller sample size than other structural equation modeling techniques.

Measurement model According to two-stage analytical procedures (Hair et al., 1998), the measurement model and structural relationships were examined. In order to validate the measurement model, we assessed content validity, convergent validity and discriminant validity. Content validity was assessed by reviewing the extant literature and pilot-testing the instrument. We examined composite reliability and the average variance extracted (AVE) to assess convergent validity. Table 2 below shows our composite reliability values, ranging from 0.794 to 0.932 and AVE scores ranging from 0.563 to 0.816; all scores are above the acceptability level. In addition,

Table 2 Results of confirmatory factor analysis.

Measures	Items	Cronbach's alpha	Composite reliability	Average variance extracted
Loss of knowledge power (LKP)	4	0.884	0.921	0.743
Codify effort (CE)	2	0.708	0.872	0.773
Image (IMA)	5	0.856	0.900	0.645
Anticipated reciprocal relationships (ARR)	4	0.885	0.922	0.747
Sense of self-worth (SSW)	5	0.882	0.914	0.681
Anticipated extrinsic rewards (AER)	2	0.781	0.899	0.816
Face gaining (FG)	2	0.757	0.889	0.800
Face saving (FS)	3	0.646	0.794	0.563
Guanxi orientation (GXO)	6	0.906	0.932	0.698
Subjective norm (SN)	6	0.894	0.916	0.649
Attitudes towards knowledge sharing (ATI)	5	0.637	0.903	0.652
Intention to share knowledge (INT)	4	0.961	0.912	0.723

all the weights and loadings of the measures are also above the acceptable level. Finally, following Tsang (2002), we measured the square root of the AVE for each construct to assess discriminant validity (see Table 3). These square roots were greater than the correlations between constructs, which confirms discriminant validity.

Structural model After examining the measurement model, we tested the proposed hypotheses with PLS. The results of the analysis are shown in Figure 2. We will discuss the results as follows: the antecedents of cost and benefit to attitude towards knowledge sharing (H1, 2, 3, 4, 5 and 6); antecedents of cultural factors to intention to share knowledge (H7, 8 and 9), and the TRA constructs (H10 and 11). We listed standardized coefficients in Table 4 to show our hypothesis test results.

Considering cost first, loss of knowledge power had a significant negative relationship with attitude towards knowledge sharing while codification effort had no significant relationship with attitude. This suggested that H1 was supported but H2 was not supported. For benefit, H3, H5 and H6 were all supported which

Table 3 Correlations results.

	LKP	CE	ATTI	IMA	ARR	SSW	AER	SN	GXO	INT	FG	FS
LKP	*0.862*											
CE	0.084	*0.879*										
ATTI	−0.408	0.073	*0.807*									
IMA	−0.241	0.124	0.551	*0.803*								
ARR	−0.239	0.107	0.500	0.727	*0.864*							
SSW	−0.132	0.095	0.497	0.612	0.647	*0.825*						
AER	−0.099	0.040	0.361	0.422	0.292	0.341	*0.903*					
SN	−0.128	0.127	0.639	0.540	0.483	0.422	0.238	*0.806*				
GXO	−0.147	0.090	0.266	0.356	0.549	0.398	0.039	0.370	*0.835*			
INT	−0.372	0.103	0.496	0.574	0.502	0.581	0.253	0.446	0.576	*0.850*		
FG	0.122	0.089	0.028	0.156	0.160	0.155	0.202	0.134	0.351	0.287	*0.894*	
FS	0.342	0.223	−0.315	−0.192	−0.228	−0.198	0.020	−0.175	−0.068	−0205	0.337	*0.750*

The italicized numbers in the diagonal row are square roots of the average variance extracted.

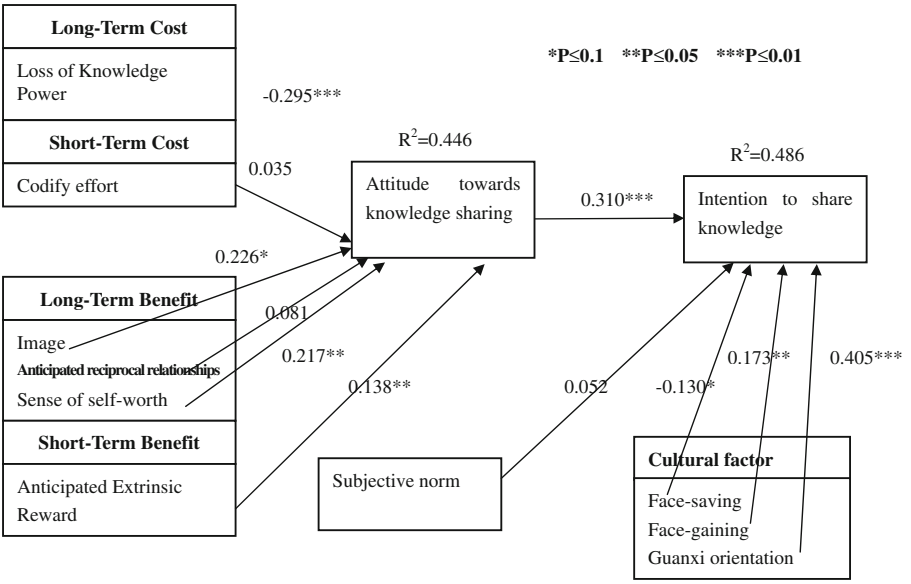

Figure 2 Results of PLS analysis

suggests that image, sense of self-worth and anticipated extrinsic reward had a significant positive relationship with attitude towards knowledge sharing. However, we found no significant relationship between anticipated reciprocal relationship and attitudes, that is to say, H4 was not supported.

All the cultural factors had a significant relationship with the intention to share knowledge, supporting H7, H8 and H9. Among these factors, we found that the factor of relationship orientation was the most important one since it has the strongest relationship toward the intention. What is more, we also found that face saving had a negative effect on intention while face gaining had a positive effect on intention.

Table 4 Results of hypothesis tests.

Factor	Standardized coefficient	*t* values	Hypothesis test
Loss of knowledge power	−0.295***	4.797	H1 was supported
Codification effort	0.035	0.431	H2 was not supported
Image	0.226*	1.837	H3 was supported
Anticipated reciprocal relationships	0.081	0.592	H4 was not supported
Sense of self worth	0.217**	2.570	H5 was supported
Anticipated extrinsic reward	0.138**	2.000	H6 was supported
Face-saving	−0.130*	1.690	H7 was supported
Face-gaining	0.173**	2.280	H8 was supported
Relationship orientation	0.405***	4.035	H9 was supported
Attitude towards knowledge sharing	0.310***	2.828	H10 was supported
Subjective norm	0.052	0.624	H11 was not supported

*p<0.10; **p<0.05; ***p<0.01

Finally, attitude towards knowledge sharing had a significant relationship with the intention to share knowledge, which is in accordance with the previous research. H10 was supported. However, we found no significant relationship between subjective norm and intention. That is to say, H11 was not supported. The results of our hypothesis test are shown in Table 4 below.

Although there are many personal factors related to benefit and cost affecting attitudes towards knowledge sharing, the R^2 change shows that cultural factors may explain far more R^2 than the attitudes, shown in Figure 3 and Table 5. In the three models, we removed related factors and analyzed the effect size f^2, taking R^2 into account (Mathieson & Peacock, 2001). The two kinds of factors both have significant effects on intention to share knowledge. Regarding the effect size f^2, statistics of 0.02, 0.15, and 0.35 are considered small, medium and large effects (Cohen, 1988). Then we can see from Table 5 that the factor of attitude has a medium to large effect on intention to share knowledge while cultural factors have a large effect on the intention to share knowledge.

Discussion

Our research intent has been to investigate personal and cultural factors which have an effect on the intention to share knowledge in Chinese context. First, we investigated individual factors, such as benefit and cost of knowledge sharing. Second, we combined these individual factors with the TRA research model so as to predict their impact on the intention to share knowledge. Third, we also introduced cultural factors and found that they exert a significant effect on the intention to share knowledge in Chinese context. Finally, we have compared the relative impact of different factors so as to identify additional explanations for our findings.

Based on our finding, we find that loss of knowledge power is an important factor which has a negative effect on the attitude towards knowledge sharing. This suggests that many employees have realized that knowledge power is critical and are unwilling to share their experience and core knowledge with others. We also found that "codify effort" could not be regarded as a negative influence on the attitude to share knowledge since the relationship between them is not significant. We then confirmed from our survey population (we conducted a series of follow-up interviews with respondents from the original volunteer population) that codifying knowledge is already a formal requirement of their supervisors and managers. They further confirmed that, although such knowledge codification takes time and effort, they would usually undertake these actions in obedience to this requirement. We suggest that this is the main reason why "codify effort" does not negatively affect the

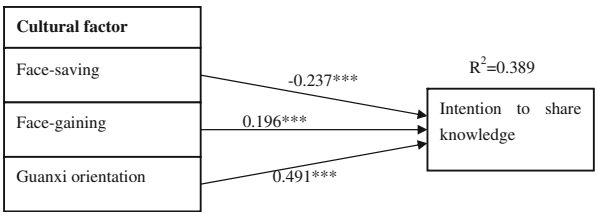

Figure 3 Part of the model

Table 5 Comparison of the effects of attitude and subjective norms with cultural factors.

	Model 0	Model 1	Model 2
Factors of attitudes and subjective norm	√		√
Cultural factors	√	√	
R^2	0.486	0.389	0.275
f^2		0.16	0.29
F		24.80	42.92
Significance level		<0.0001	<0.0001

Model 0 Full model with all the factors, *Model 1* Factors of attitudes and subjective norm removed from full model, *Model 2* Cultural factors removed from full model
√ Indicates that factors labeled are included in the model

attitude towards the willingness to share knowledge. Some respondents indicated that the experience they documented could help new employees to avoid making mistakes and enhance their working efficiency. Some respondents noted that they would withhold knowledge that they did not want to share openly, since the knowledge that could be shared is tacit, which is inclined to be ignored. Just like one respondent has said: "most of the time, unless I take the initiative to share, nobody will notice I know such things." Given this additional information, we could see that codification effort is much easier to overcome as long as managers' demand it, since most employees choose to obey and think the effort required to share knowledge is not be a serious barrier. Where self interest is concerned, the loss of knowledge power is more important and hence hard to overcome. This finding is also confirmed by Li and Scullion (2006) showing that the belief "knowledge is power" tends to make Chinese people "hoard knowledge rather than share it".

Of the benefit factors, we find that image, sense of self worth and anticipated extrinsic reward have a significant effect on attitude while anticipated reciprocal relationships do not. One of the respondent's replies is instructive here: "work and personal relationships are independent: the more professional an employee is, the better he should deal with the conflicts of business and personal relationships". We can see that employees may make their relationships smoother through sharing their knowledge, but they will not share their knowledge just for the sake of getting along better with each other, so sharing knowledge is mainly conducted so as to enable more effective working, not for relationship maintenance. Also, employees tend to balance the costs and benefits when they share their knowledge, based on SET, since people will behave in such a way as to maximize their benefits and minimize their costs. Consequently, when employees find that they could still maintain good relationships with colleagues without sharing their precious knowledge, they will tend not to share. Another explanation is that most organizations have not encouraged their employees to develop the habit of knowledge sharing. Employees tend to share their knowledge unconsciously, not taking anticipated reciprocal relationships into account.

In accordance with the TRA, attitudes are found to have a positive effect on knowledge sharing intention. However, we did not find a significant relationship between subjective norm and intentions. The application of the TRA to the knowledge sharing context has been tested in previous research, with subjective norms and knowledge sharing intentions found to be significant (Bock et al., 2005; Ryu, Ho, & Han, 2003). However, it is also worthy of mention that subjective norms constitute a

robust factor because it reflects the strong social pressures in a Confucian society (Lee & Green, 1991). There are some possible explanations for these conditions. Although employees feel that the people around them hope to share their knowledge, the knowledge sharing culture is not so strong as to make them feel obliged to share. In addition, since knowledge sharing is a self-initiated behavior, if a knowledge holder does not want to share, the people around him/her may not realize that he has such knowledge. For this reason, the impact of subjective norm would be quite limited.

Attitude has a medium to large effect on the intention to share knowledge while cultural factors have a large effect. In the Chinese context, knowledge sharing intentions are thus more affected by cultural factors including face and *guanxi* than by personal attitude. This phenomenon may be due to the high social orientation of Chinese culture. Research has shown that Chinese people tend to be socially oriented. This characteristic could be embodied as being sensitive to others' opinions and a strong inclination to social conformity (Yang, 2005). Thus, people would more likely behave in a way that is based on others' requirements, not their own. This is an important point for practical implications which we discuss later.

We also find that *guanxi* orientation played an important role in knowledge sharing intention. Chinese people's *guanxi* orientation is quite high: They are inclined to maintain a good relationship with persons around them. Quite often, they will treat their colleagues in a friendly way and hope to create a harmonious atmosphere. This character makes them feel ready to share their knowledge and skills to help others since this could help facilitate a smooth relationship. It should be noted that those knowledge items which are shared are not critical items, the loss of which might threaten their knowledge power. Also, although they may want to acquire some critical knowledge items from others, in order to maintain a good relationship they will not ask people who may know it so as to avoid the embarrassment it would cause. In our study, we confirmed once more that face saving has a negative effect on the intention to share knowledge while face gaining has a positive effect. Thus, we could conclude that the factor of face has multiple effects on knowledge sharing intention.

Implications, limitations and future research

Implications for theory

From a theoretical perspective, our study contributes to the literature in four ways. First, our study combined SET and TRA to investigate knowledge sharing intentions in the Chinese context. We classified antecedents of attitudes into costs and benefits so as to offer a more clear and intensive vision. Second, our study integrated Chinese cultural factors such as face and *guanxi* into our research model. This extends the research in a different cultural domain, and, more importantly, offers a new point of view in studying knowledge sharing which could be studied further. Third, this study also contributes to theory since we found that face has a compound effect on knowledge sharing intentions. Although past research proposed the function of face towards knowledge sharing, this study provides the first empirical evidence to support the bi-polar nature of face behavior. We consider face behavior in the knowledge sharing context and classify related behavior into face saving (negative)

and face gaining (positive). Finally, the research shows that the TRA might not explain knowledge sharing intentions very well in the Chinese context since the effect of subject norms is not significant.

Implications for practice

Based on what we found, we offer some suggestions for management. Since the loss of knowledge power has such a significantly negative relationship with attitude, managers should pay particular attention to this point. We suggest that managers should communicate more with their employees and find out how to compensate their loss if the knowledge is shared. What is critical here is the understanding that the knowledge "lost" by the individual is of great value to the whole organization. What is more, managers could also endeavor to cultivate employees' high commitment towards the organization so as to encourage employees them to contribute their knowledge as a form of organizational citizenship behavior. Based on our finding that image and sense of self-worth have a greater effect on attitude than anticipated extrinsic reward, we suggest that practicing managers should primarily rely on non-material rewards to motivate knowledge sharing.

Managers should also endeavor to create and maintain a harmonious atmosphere in the work place. Fostering a knowledge sharing culture based on good relationships would be useful. The issue of face is also challenging for managers. Since face saving and gaining have opposite effects on knowledge sharing intention, managers should seek to discover how they can augment the positive effects of face gaining while diminishing the negative effects of face saving. For example, managers may consider giving employees more non-material incentives that stimulate face gaining through sharing knowledge, while at the same time encouraging activities such as brainstorming and writing a working diary to foster a knowledge sharing culture in the company that will reduce the propensity to focus on face saving behaviors.

Limitations and future research

Our study also has limitations. In this research, we have considered knowledge sharing that occurs between colleagues at the same level, but knowledge sharing between supervisors and subordinates is also important and worthy of attention. Besides, since we introduced the particular Chinese concepts of face and *guanxi* into our research model, it may not be appropriate to generalize our results to other societal contexts that are not characterised by attention to face saving/gaining and/or *guanxi*, though this is an area for future research to consider, i.e., to what extent are these Chinese concepts also valid in other societies. Also, while the concept of face has a wide range of meanings, our research only examined one aspect in conjunction with knowledge sharing: Future research could usefully explore the interaction of face and knowledge sharing more deeply. Finally, our research does not measure actual knowledge sharing behavior.

Notwithstanding the above limitations, we strongly believe that this is a fertile area for future research. In particular, we encourage research on supervisor to subordinate knowledge sharing. More research could also be done to investigate how

to resolve the barrier to knowledge sharing that is caused by a loss of knowledge power. Furthermore, it would be interesting to probe more deeply into the roles that face and *guanxi* play in the sharing of tacit as opposed to explicit knowledge.

Appendix

Loss of knowledge power: (Kankanhalli et al., 2005)

1. Sharing my knowledge makes me lose my unique value in the organization.
2. Sharing my knowledge makes me lose my power base in the organization.
3. Sharing my knowledge makes me lose my knowledge that makes me stand out with respect to others.
4. Sharing my knowledge makes me lose my knowledge that no one else has.

Codification effort: (Kankanhalli et al., 2005)

1. I do not have the time to codify my knowledge.
2. It is laborious to codify my knowledge.
3. The effort is high for me to codify my knowledge.
4. I am worried that if I share my knowledge, I will have to spend additional time answering follow up questions.

Image: (Kankanhalli et al., 2005)

1. Sharing my knowledge improves my image within the organization.
2. People in the organization who share their knowledge have more prestige than those who do not.
3. Sharing my knowledge improves others recognition of me.
4. When I share my knowledge, the people I work with respect me.
5. When I share my knowledge, my superiors praise me.

Anticipated reciprocal relationships: (Bock et al., 2005)

1. My knowledge sharing would strengthen the ties between existing members in the organization and myself.
2. My knowledge sharing would get me well acquainted with new members in the organization.
3. My knowledge sharing would expand the scope of my association with other members in the organization.
4. My knowledge sharing would draw smooth cooperation from outstanding members in the future.
5. My knowledge sharing would create strong relationships with members who have common interests in the organization.

Anticipated extrinsic rewards: (Bock et al., 2005)

1. I will receive monetary rewards in return for my knowledge sharing.
2. I will receive additional points for promotion in return for my knowledge sharing.

Sense of self-worth: (Bock et al., 2005)

1. My knowledge sharing would help other members in the organization solve problems.
2. My knowledge sharing would create new business opportunities for the organization.
3. My knowledge sharing would improve work processes in the organization.
4. My knowledge sharing would increase productivity in the organization.
5. My knowledge sharing would help the organization achieve its performance objectives.

Attitude toward Knowledge Sharing: (Bock et al., 2005)

1. My knowledge sharing with other organizational members is good.
2. My knowledge sharing with other organizational members is harmful.
3. My knowledge sharing with other organizational members is an enjoyable experience.
4. My knowledge sharing with other organizational members is valuable to me.
5. My knowledge sharing with other organizational members is a wise move.

Subjective Norm: (Bock et al., 2005)
Normative beliefs on knowledge sharing

1. My CEO thinks that 1 should share my knowledge with other members in the organization.
2. My boss thinks that 1 should share my knowledge with other members in the organization.
3. My colleagues think 1 should share my knowledge with other members in the organization.

Motivation to comply (MTC)

1. Generally speaking, I try to follow the CEO's policy and intention.
2. Generally speaking, I accept and carry out my boss's decision even though it is different from mine.
3. Generally speaking, I respect and put in practice my colleague's decision.

Intention to share knowledge: (Ryu et al., 2003)

1. I will make an effort to share knowledge with my colleagues.
2. I intend to share knowledge with my colleagues when they ask.
3. I will share knowledge with my colleagues.

Face saving: (Cheung et al., 2001)

1. I pay a lot of attention to how others see me.
2. I am usually very particular about the way I dress because I do not want others to look down on me.
3. I feel a loss of face when others turn down my favor.

Face gaining:

1. Sharing knowledge with my colleagues will make me gain face.
2. I would like to share my knowledge in public, because it will make me gain face.

***Guanxi* Orientation: (Zuo, 2002)**

1. We expect that our friends will help us in our social life.
2. Chinese society is composed of a kind of personal *guanxi* net.
3. I enjoy life that includes human concern and kindness.
4. Personal *guanxi* is an important resource in career development.
5. People should get on with each other harmoniously.
6. I will try to build a good relationship with my colleagues and supervisors.

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