1-2007

National culture and its effects on knowledge communication in online virtual communities

Keng SIAU
Singapore Management University, klsiau@smu.edu.sg

Fiona Fui-hoon NAH
Singapore Management University, fionanah@smu.edu.sg

Min LING

National culture and its effects on knowledge communication in online virtual communities

Keng Siau*, Fiona Fui-Hoon Nah and Min Ling

Department of Management,
University of Nebraska-Lincoln,
Lincoln, NE 68588-0491, USA
Fax: 402-472-5855 E-mail: ksiau@unl.edu
E-mail: fnah@unl.edu E-mail: lovelm@hotmail.com
*Corresponding author

Abstract: Online virtual communities provide a powerful means of knowledge sharing. Despite the prevalence of online virtual communities, there is a paucity of research to investigate the effect of national culture differences on knowledge sharing in online virtual communities. Are there differences between online virtual communities from different national cultures? This research studies the differences in knowledge-sharing activities between US-based and China-based online virtual communities. Hofstede's dimensions of national culture serve as the theoretical foundation for this research.

Keywords: online virtual communities; knowledge acquisition; knowledge dissemination; national culture; electronic business.

Reference to this paper should be made as follows: Siau, K., Nah, F.F-H. and Ling, M. (2007) 'National culture and its effects on knowledge communication in online virtual communities', *Int. J. Electronic Business*, Vol. 5, No. 5, pp.518–532.

Biographical notes: Keng Siau is the EJ Faulkner Professor of Management Information Systems (MIS) at the University of Nebraska, Lincoln (UNL). He is the Director of the UNL-IBM Global Innovation Hub, Editor-in-Chief of the *Journal of Database Management* and Co-Editor-in-Chief of the Advances in Database Research series. He received his PhD from the University of British Columbia (UBC), where he majored in Management Information Systems and minored in Cognitive Psychology. His Master and Bachelor Degrees are in Computer and Information Sciences from the National University of Singapore. He has over 200 academic publications, including more than 90 refereed journal papers and more than 100 refereed conference papers.

Fiona Fui-Hoon Nah is an Associate Professor of MIS at the University of Nebraska-Lincoln. She received her PhD in MIS from the University of British Columbia. Her research interests include human – computer interaction, knowledge management, decision support systems, mobile and ubiquitous commerce and computer-supported collaborative work.

Min Ling received her PhD from the University of Nebraska-Lincoln. Her research interests are personalisation, knowledge management and cultural differences.

1 Introduction

Globalisation and interconnectivity are keys to success in the 21st century where the playing level from across the world is being 'flattened' (Friedman, 2006). To be successful in conducting e-business on the global basis, an understanding of national culture differences and their impact on online knowledge sharing and communication is essential (Chiu et al., 2006; Siau, 1999; Yee et al., 2007).

Online virtual communities are becoming increasingly popular (Gan and Zhu, 2007; Leimeister et al., 2005; Wang and Chen 2004). Bieber et al. (2002) broadly define a virtual community to include any one actively interested in, or associated with, a group formed around a particular domain of interest; dispersed or local, the community requires electronic support to implement a continuous meta-improvement strategy in its services. Rheingold (1993) suggested that people in online virtual communities do everything people do elsewhere, but leave their bodies behind, yet their embodiment is socially and psychologically constructed. As such, it is important to acknowledge the complex psychodynamics of interactions in an online virtual community.

Knowledge-sharing communities have existed in some form throughout history and the sharing of knowledge accelerates value creation (Siau, 2000). Increased realisation of Knowledge Management (KM) as a core competence coupled with recent advances in information technology, such as the internet and world wide web, has kindled keen interest in the subject of knowledge sharing and KM. Knowledge-sharing activities have become more important, perhaps most important, in online virtual communities. An important research question that emerges from the proliferation of online virtual communities is the influence of national culture on knowledge-sharing behaviour in the online virtual environment. Research on national culture and communication is important as it brings about awareness and sensitivity to international audiences by highlighting communication behaviours that reveal cultural differences and by describing various coarse filters for categorising disparate cultures.

Knowledge workers of the interlinked globalised economy are increasingly interacting with clients and coworkers in other parts of the world. These international online interactions require an understanding of the rhetoric and forms of presentation that are culturally specific. It is important to evaluate information based on the rhetorical expectations of the specific culture, regardless of the language in which that information is presented (Amant, 2002).

However, we found very few studies that have directly addressed or examined cultural differences in online virtual communities from the perspective of knowledge sharing. Owing to the increasing popularity of online virtual communities in different countries, the influence of national culture on knowledge-sharing activities in online virtual communities is an important issue in KM that needs further understanding and research.

The objective of this research is to understand the effect of cultural differences in online knowledge-sharing activities of virtual communities and to examine how cultural dimensions affect knowledge-sharing activities in these communities.

2 Literature review

2.1 Online virtual community

Advances in networked communication and the availability of the internet have enabled the establishment of online virtual communities. According to Rheingold (1993), an online virtual community refers to a group of people who have in all likelihood never met face-to-face, but who enjoy spending time in cyberspace with one another debating politics, discussing their hobbies, conducting business, spilling their guts, or just flirting and playing games with one another.

It is important to understand and acknowledge the complex psychodynamics of interactions in an online virtual community. According to Wellman et al. (1996), the only social characteristic that people learn about each other online is a Net address, which provides very little information. Many online ties are between persons who have never met face-to-face and who are weakly tied. These people may be socially and physically distant, and may not be bounded by densely knit work or community structures.

Online virtual communities are parts of our society and, as such, should be part of the ongoing changes and evolution of society. In other words, online virtual communities, though virtual, are not totally disassociated with traditional societies. Nevertheless, even if we believe that an online virtual community is nothing more than a group of people using the same news-group, or meeting around a collection of homepages, or communicating through a mailing list, we can not easily predict how these simple technical systems will influence the way society is structured and how that structure will change (Schuler, 1996).

Most researchers (Wellman et al., 1996; Bakardjieva, 2003) adopt the perspective that online virtual communities offer different functions and values than traditional face-to-face communities. Wellman et al. (1996) argued that online virtual communities, at times, even provided better social relationship building opportunity. Bakardjieva (2003) pointed out that online virtual communities could satisfy people's various daily needs.

Differences in national culture may affect communication, collaboration, and cooperation in online virtual communities (Churchill and Bly, 2000). These differences may affect interaction and knowledge sharing in online virtual communities. Despite the importance of online virtual communities as a means of knowledge sharing, not many researchers have investigated the effects of national culture on knowledge-sharing activities in online virtual communities. Some research studies have focused on the investigation of resource sharing (Boczkowski, 1999; Wachter et al., 2000; Bieber et al., 2002), including sharing of education resources (Wachter et al., 2000), in online virtual communities. Kodama (2001) described the development of online virtual communities in medical and education fields with multimedia IT. Boczkowski (1999) further analysed the sharing of resources at the national level.

2.2 Knowledge, knowledge management and knowledge sharing

Knowledge is possessed in the mind of an individual: it is personalised information related to facts, procedures, concepts, interpretations, ideas, observations, and judgements (which may or may not be unique, useful, accurate, or structurable) (Alavi and Leidner, 1999). Nonaka (1994) and Huber (1991) defined knowledge as

justified personal beliefs that increase an individual's capacity to take effective actions. Kogut and Zander (1992) distinguished between two categories of knowledge that they termed information and know-how. According to them, information can be transmitted without loss of integrity when the syntactical rules required for deciphering it are known. Information includes facts, axiomatic propositions and symbols. Know-how, like procedural knowledge, is a description of knowing how to do something.

KM is often seen as a problem of capturing, organising, and retrieving information, evoking notions of data mining, text clustering, databases, and documents. Newman (1996) defined KM as the collection of processes that govern the creation, dissemination, and utilisation of knowledge. Alavi and Leidner (1999) provided a more elaborate definition of KM as a systemic and organisationally specified process for acquiring, organising, and communicating both tacit and explicit knowledge of employees so that others can utilise it to be more effective and productive. Skyrme (1996) viewed KM as comprising of the following categories: knowledge creation, knowledge accumulation, knowledge dissemination, knowledge sharing, and knowledge use. Nah et al. (2002, 2005) developed a research model in e-commerce that consists of three components: knowledge acquisition, knowledge dissemination, and knowledge sharing.

One of the key themes in KM is the transfer of knowledge between those who have it and those who do not. The acts of simply finding requisite knowledge and then transferring it to those who need it can be considered cross-purposes to one another (Hansen, 1999). Some research suggests that learning and sharing is enhanced when people interact in specific contexts where they are confronted with unique sources of information, experience different constraints, and have access to particular tools to solve problems (Brown and Duguid, 1991; Tyre and von Hippel, 1997; von Hippel and Tyre, 1995). Kletter (2001) described five characteristics of successful knowledge-sharing communities:

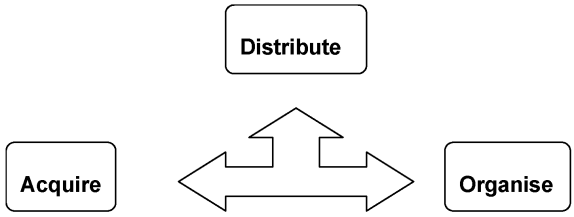
- interactive: members play dual roles, both contributing and receiving knowledge
- distributed: knowledge is distributed among members and shared through a central platform
- segmented: communities can be broadly focused or narrowly targeted, but must be organised around a central mission
- regulated: member activity is measurable and is sensitive to incentives
- self-reinforcing: community value begets more value.

A recent study by Gupta and Govindarajan (2000) provided insights into the process of building a knowledge-sharing environment. They presented the main elements of the KM process as knowledge creation, knowledge acquisition, knowledge retention, knowledge identification, knowledge outflow, knowledge transmission and knowledge inflow.

Existing KM literature focuses on how to manage organisational knowledge and how to enhance collaboration and sharing within organisations. Schwartz et al. (2000) developed the Acquisition, Organisation and Distribution (AOD) Model for KM (see Figure 1). The AOD model views internet-based KM as dealing with three distinct tenets: Acquire, Organise and Distribute.

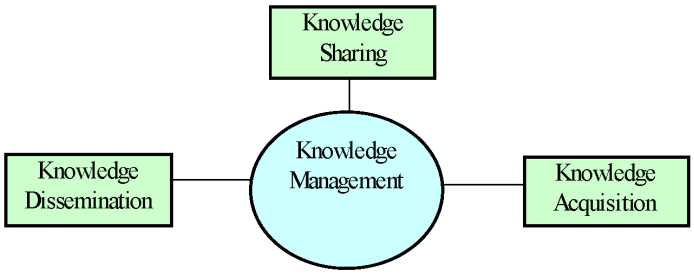
- *Acquisition*: collecting knowledge and storing that knowledge in an organisational memory
- *Organisation*: structuring, indexing, and formatting the acquired knowledge
- *Distribution*: providing relevant knowledge to the person who needs it at the right time.

Figure 1 Three tenets of internet-based knowledge management



Nah et al. (2002, 2005) developed a research model for e-commerce that comprises three components: knowledge acquisition, knowledge dissemination, and knowledge sharing (see Figure 2). Knowledge dissemination refers to delivering knowledge to potential customers whereas knowledge acquisition refers to the acquisition of customer knowledge. Knowledge sharing enables the KM participants to provide online knowledge to other peer participants. It should be noted that their model was built for the e-commerce context. Thus, the use of the terms, knowledge acquisition and knowledge dissemination, in Nah et al. (2002, 2005) differs in meaning and context from the use of these terms in our research.

Figure 2 e-commerce knowledge management model



Other researchers studied how culture affects Information Systems (IS) development and application. For example, Raman and Watson's (1994) study examined IS development problems from three perspectives of culture: national culture, organisational culture, and MIS culture. Although several studies have addressed knowledge sharing and exchange in online virtual communities, they have ignored national culture. Wasko and Faraj (2000) examined knowledge sharing and exchange in three online virtual communities, specifically focusing on the reasons people participate in such activities. Ruppel and Harrington (2001) explored factors affecting the implementation of intranets, which are the technology upon which many KM systems are built. Their study found that intranet implementation is facilitated by a culture that emphasises an atmosphere of trust and concern for other people (ethical culture), flexibility and

innovation (developmental culture), and policies, procedures, and information management (hierarchical culture). Yet knowledge sharing in online virtual communities of different cultures is an important area that remains under-studied (Chiu et al., 2006).

2.3 National culture

Culture can be viewed at various levels: national, regional, religious, generation, social class, and organisational or corporate culture (Hofstede and Hofstede, 2004), or even industry culture (Kaye and Little, 1996). National culture and corporate culture are the most widely studied levels of culture. However, in most cross-cultural research, culture is associated with nationality.

Past research on national culture differences have focused on the discovery of culture dimensions. Bond's (1988) Chinese Culture Connection (CCC) study revealed four factors derived from the Chinese culture: integration, Confucian work dynamism, human-heartedness, and moral discipline. Another well-known cross-cultural researcher, Schwartz (1992) surveyed 56 value preferences in 25 countries and found ten motivationally distinct value types: power, achievement, tradition, hedonism, self-direction, universalism, security, stimulation, benevolence, and conformity types. In his follow-up work, he identified two fundamental dimensions of culture variations: *openness to change* (includes self-direction and stimulation value types) *vs. conservation* (includes security, conformity and tradition value types), and *self-enhancement* (includes hedonism, power and achievement value types) *vs. self-transcendence* (includes universalism and benevolence value types).

Trompenaar (1994) classified national culture into three dimensions: how people relate to each other, people's attitudes towards time, and people's attitudes towards their environment.

One of the most influential works in national culture is the study by Hofstede. Hofstede studied national culture using IBM employees in more than 50 countries. Hofstede and Hofstede (2004) study showed that the values of employees differ based on their nationality, age, and education more than their membership in organisations. Hofstede (1980) also identified four dimensions that can be used to distinguish among different national cultures: individualism vs. collectivism; masculinity vs. femininity; power distance (from small/low to large/high); and uncertainty avoidance (from weak/low to strong/high). A fifth dimension, long-term vs. short-term orientation, was added in his 1991 study. These five dimensions are defined as follows:

- *Individualism* refers to a loosely knit social framework in which people look after their own interests and those of their immediate family. Its opposite is *collectivism*, which is characterised by a tight social framework in which people expect others who are in groups of which they are a part of to look after them and protect them when they are in trouble.
- *Power Distance* refers to the degree of inequality among people that the population of a culture considers normal. A high power distance society accepts wide differences in power in organisations where employees show a great deal of respect for those in authority.

- *Uncertainty Avoidance* is the degree to which people in a culture feel uncomfortable with uncertainty and ambiguity. In a society with high uncertainty avoidance, people feel threatened by uncertainty and ambiguity, and mechanisms are created to provide security and to reduce risk.
- *Masculinity* is the degree to which values like assertiveness, performance, success and competitions prevail among people of a culture. Masculinity societies emphasise assertiveness and the acquisition of money and material things, while *femininity* societies emphasise relationships, concern for others, and the overall quality for life.
- *Long-term Orientation*, which is said to be the Confucian dynamism, refers to values like persistence, thrift, preserving status-based relationships and deferred gratifications. Its counterpart, *short-term orientation*, involves more inclination towards consumption or saving face by keeping up.

To our knowledge, the influence of national culture on knowledge sharing in the online virtual environment has not been examined in past IS research, even though Wasko and Faraj (2000) acknowledged that culture does play a role in KM, and Jarvenpaa and Staples (2000) examined the influence of organisational culture on KM/sharing. Nevertheless, the subject of national culture has begun to appear on IS research agendas (Raman and Watson, 1994). Understanding and respecting cultural differences in professional communication is important (Evia, 2004).

Wasko and Faraj (2000) examined knowledge sharing and exchange in three electronic communities, specifically focusing on possible reasons why people participate in such knowledge-sharing or exchange mechanisms. While the reasons proposed for participation in sharing include social acceptance, a desire to help others, or 'doing the right thing' appear to be valid, the study skirts the issue of national culture with regard to knowledge sharing and exchange, and does not specifically examine it.

Thus, although Waski and Faraj (2000) have addressed knowledge sharing and exchange in electronic communities, they have ignored national culture differences. On the other hand, Jarvenpaa and Staples (2000) examined organisational and information culture, but not national culture. Raman and Watson (1994) worked primarily with national culture and IS development and implementation problems, but did not address KM. Therefore, an examination of KM and national culture together might shed some light on a heretofore under or little studied area.

Wasko and Faraj (2000) took the perspective that knowledge is an object that begins as embedded knowledge inside a human's mind. If the knowledge relates to the organisation, Wasko and Faraj insist that the knowledge then belongs to the organisation rather than the individual. In this view, the first (and usually formidable) task facing those who manage knowledge is to separate this embedded knowledge from the persons holding it and codify it so that it can be stored in the knowledge base and disseminated when needed to those who need it. Of course, there are many problems with actually doing this in practice. For one, many people (i.e., engineers, computer programmers, or other domain experts) often see their expertise as belonging to themselves, since they were gained through years of hard work and experience, and likely thought of as a primary reason they have a job. From this perspective, giving up their knowledge would make their positions within the organisation less secure in the long term, thus decreasing their willingness to share knowledge.

3 Theoretical foundation and hypotheses

There are two main factors in our research:

- knowledge acquisition and dissemination
- five national culture dimensions.

In the context of online virtual communities, knowledge acquisition refers to the posting of messages to acquire or to seek others' knowledge. Knowledge dissemination, on the other hand, is the posting of messages in response to requests for knowledge (i.e., messages in response to knowledge acquisition messages). In this research, we only focus on messages that are related to acquisition and dissemination of knowledge. Hofstede's theory on national culture has been validated by many empirical studies (Søndergaard, 1994) and will be used as the theoretical foundation for this research.

While Hofstede's studies concentrated on the effects of national culture on organisations, the focus of our research is on the effects of national culture on knowledge acquisition and dissemination in online virtual communities. More specifically, the objective of this research is to identify communication behavioural differences of knowledge sharing in two different online virtual community environments from national cultural perspectives. For this research, we focused on differences in knowledge sharing patterns between US-based and China-based online virtual communities. Knowledge acquisition is defined as the posting of messages to seek others' knowledge. Knowledge dissemination is the posting of messages in response to requests for knowledge or posting of messages with the aim to share/disseminate knowledge. Based on Hofstede's data on indexes of national cultural dimensions (Hofstede and Hofstede, 2004), the indexes for China and USA on the five dimensions are shown in Table 1.

Table 1 Differences in national culture between China and USA

	IDV	*UAI*	*PDI*	*MAS*	*LTO*
China	20	30	80	66	118
USA	91	46	40	62	29

IDV: Individualism; UAI: Uncertainty Avoidance; PDI: Power Distance;
MAS: Masculinity; LTO: Long-term Orientation.

As shown in Table 1, there are substantial differences in national cultures between USA and China. Particularly, USA and China are very different in terms of individualism, power distance, and long-term orientation. Do these differences also appear in online virtual communities? As a new medium of interaction, will the online virtual communities alleviate some of these differences?

One of the strengths of online virtual communities is the ability to share knowledge worldwide. Nevertheless, the participation of many cultures in online virtual communities can be a challenge. The aim of this study is to advance understanding on the influence of national culture in knowledge sharing of online virtual communities. In this research, we examine knowledge communication (both knowledge acquisition and knowledge dissemination) in US-based and China-based online virtual communities.

National culture influences a person's actions either by supplying the values towards which the actions are oriented or by shaping a repertoire of strategies of action in which certain patterns of action are facilitated while others are discouraged (Erez and Earley, 1993). In organisational management literatures, several studies have reported differences in knowledge-seeking behaviours between Western and Asian managers (Smith et al., 1994, 1996; Chow et al., 2000). Particularly, Chow et al. (2000) analysed how the nature of the knowledge available for sharing, along with the knowledge owner's relationship to the potential recipient, interacts with national culture to affect people's openness in sharing private knowledge.

Based on the above discussion, knowledge sharing (knowledge acquisition and knowledge dissemination) behaviours are expected to be different between US-based and China-based online virtual communities owing to differences in their culture attributes. Therefore, we hypothesise that:

Hypothesis 1: There is a difference between US-based and China-based online virtual communities in knowledge acquisition behaviours.

Hypothesis 2: There is a difference between US-based and China-based online virtual communities in knowledge dissemination behaviours.

4 Research methodology and procedure

In this research, we selected two cultures that are quite distinct according to Hofstede (1980), and Hofstede and Hofstede (2004) studies – the USA and China. An added advantage of selecting USA and China is that the China-based online virtual communities use Chinese as the medium for communication whereas the participants in US-based online virtual communities communicate in English. If the two online virtual communities in both groups were to use English as the medium of communication, the national culture differences might have been alleviated. The use of Chinese on China-based online virtual communities helps to preserve the Chinese culture during knowledge communication. Language is not just a medium of communication, but it is also an integrated part of national culture.

There are two phases in our research. In the first phase, we focused on two main factors:

- knowledge acquisition vs. dissemination
- national culture.

We use knowledge acquisition and dissemination to analyse how knowledge sharing activities of online virtual communities are affected by national culture. In the second phase, we further analysed the results based on three different categories of online virtual communities – Science, Life and Hobbies.

The data collection process involved extracting messages posted on online virtual communities of two countries – the USA and China. Eighteen equivalent online virtual communities from the US-based and China-based Yahoo online virtual environment were chosen as the sample for our study. These 18 online virtual communities were chosen because:

- they have a high frequency of knowledge-sharing activities in both the US-based (www.yahoo.com) and China-based (www.yahoo.com.cn) Yahoo online virtual communities
- there are corresponding online virtual communities in both the US-based and China-based Yahoo sites.

The other communities (i.e., those who were not chosen) either do not have a counterpart in the Yahoo online virtual community of the other country (USA/China) or have a low frequency of message postings (i.e., an unpopular online virtual community). The sample for this study comprises the 100 most recent message postings at the time of data collection in the 18 US-based and China-based Yahoo online virtual communities. For each message, we determined whether the purpose was to acquire or disseminate knowledge (or neither). For example, knowledge acquisition message: "How would I make a loop in a shell script that use the bash shell?"; Knowledge dissemination: "Solve the problem by double-clicking on a breakdown within the mapping, selecting Transformations/Set Options/Debug/Port #/Reset All".

Two independent coders coded the messages according to whether the intention was acquisition or dissemination of knowledge (or neither). The coding proceeded as follows: First, the two coders coded 8 of the 18 online clubs (44%) independently. The inter-rater reliability between the two coders was 94%. The disagreements were resolved through consensus. Because of the high level of reliability in the coding (0.94) and the daunting task of coding 3600 messages, the rest of the data set (i.e., messages from the other ten online virtual communities) were split into two groups and coded separately by the two coders.

5 Research results and discussions

We categorised 18 online virtual communities into three groups as follows:

- *Science*: Astronomy, Program, Math, Software.
- *Life*: Hair Beauty, Health Care, Parenting, Religion, Pets, Stock.
- *Hobbies*: Movie, Music, Basketball, Outdoors, Reading, Game, Travel, Collecting.

The total number of knowledge-related messages (i.e., those that contain knowledge content) was 1771 (49%) of 3600 ($18 \times 100 \times 2$) message postings, of which 815 are from the China-based online virtual communities and 956 are from the US-based online virtual communities. Table 2 shows the number of knowledge acquisition and dissemination messages extracted from the 18 online virtual communities.

We use the chi-square test to examine the hypotheses. For both hypotheses, the results are statistically significant at $\alpha = 0.05$. We reject the null hypotheses and conclude that there are differences between US-based and China-based online virtual communities in knowledge acquisition and dissemination.

Table 2 Coding results

Categories (*total messages*)		*Knowledge acquisition*		*Knowledge dissemination*	
		China	*USA*	*China*	*USA*
Science (400)	Astronomy	10	7	19	41
	Program	22	38	30	43
	Math	23	25	21	55
	Software	22	50	13	36
Life (600)	Hair beauty	2	24	39	24
	Healthcare	40	1	26	79
	Parenting	27	8	61	28
	Religion	5	4	64	20
	Pets	11	9	16	24
	Stock	40	3	43	61
Hobbies (800)	Movie	9	8	12	25
	Music	4	1	14	13
	Basketball	5	3	10	48
	Outdoor	10	14	33	48
	Reading	6	4	35	42
	Game	3	8	33	49
	Travel	22	16	25	56
	Collecting	20	10	40	31
Total (*1800*)		*281*	*233*	*534*	*723*

The results show that the China-based online virtual communities have a significantly higher number of knowledge acquisition messages than the US-based online virtual communities. On the other hand, the US-based online virtual communities have a significantly higher number of knowledge dissemination messages than the China-based online virtual communities.

As a further analysis, we computed the number of dissemination messages per (or corresponding to each) knowledge acquisition message. The ratio of Knowledge Dissemination/Knowledge Acquisition is shown in Table 3.

Table 3 Ratio of dissemination/acquisition messages

Categories	*Dissemination/acquisition*	
	China	*USA*
Science (400)	1.08	1.46
Life (600)	1.99	4.82
Hobbies (800)	2.56	4.88

As can be seen from Table 3, participants in US-based online virtual communities posted more knowledge dissemination messages per knowledge acquisition message than participants in the China-based online virtual communities. A content analysis of the knowledge dissemination messages also revealed that messages were generally shorter in China-based online virtual communities than those in US-based online virtual communities.

This finding is interesting and somewhat surprising. First, the result is somewhat contrary to the expectation predicted from an individualism and collectivism perspective. Based on Hofstede's data, USA has a much more individualistic culture than China. In a collectivistic culture such as China, people are integrated into strong cohesive groups and usually put the interest of the group above their own interest, whereas in a high individualism culture such the US culture, people are more independent and liberal. An individualistic culture such as the US culture is one where ties between people are loose and they base their self-understanding on their own actions, which are usually taken independently of what others think (Earley, 1994). According to the characteristics of individualism and collectivism, we expect a high ratio of dissemination/acquisition in collectivistic culture and a low ratio of dissemination/acquisition in an individualistic culture. The results of our research, however, show the contrary. US-based online virtual communities have higher dissemination/acquisition ratios than China-based online virtual communities on all three categories (i.e., Science, Life and Hobbies). Thus, our research results seem to suggest that the effect of national culture may be alleviated in online virtual communities.

According to Wellman et al. (1996), the social characteristic that people of online virtual communities learn about each other online is a Net address or a nickname, which provides virtually no personal information. Most online ties are between persons who have never met face-to-face and who are weakly tied, socially and physically distant, and not bound into densely knit work or community structures. The 'virtualness' of these communities may have alleviated the effect of national cultures. Participants in the US-based and China-based online virtual communities may not perceive the need to observe cultural norms in the online virtual communities. This interesting phenomenon warrants further research.

6 Conclusions and future research

The playing field across the interconnected world has been levelled, and international competition and collaboration are intensified. Online virtual communities will be increasingly important and will become an integrated part of business activities and our working life. One of the key benefits of virtual communities is knowledge exchange and communication. As most virtual communities are open to the world, the impact of national culture on communication behaviours in online virtual communities becomes an important subject for investigation. A comprehensive understanding of differences in cultural behaviours is necessary to achieve effective and efficient intercultural communication in online virtual communities.

This research looks at the effect of national culture differences on communication behaviours (knowledge acquisition and dissemination) in online virtual communities. Our research results show that the participants in China-based online virtual communities are less inclined to disseminate knowledge when compared with participants in US-based online virtual communities.

As one of the first research to investigate the effect of national culture in online virtual communities, this research raises more questions than it provides answers. Our research shows that China-based and US-based online virtual communities differ in knowledge acquisition and knowledge dissemination behaviours. Further research is needed to answer the question of what specific factors cause the observed differences and

how to alleviate the differences between different groups in online virtual communities. Future research can also extend this study by studying virtual communities from more nations than those covered in our analysis. Future research can also integrate case studies to provide a more in-depth analysis of online virtual teams consisting of members from different cultures. Alternative theoretical foundations, other than Hofstede's theory, can also be explored to help us understand and explain the differences between different national cultures in online virtual communities.

References

Alavi, M. and Leidner, D.E. (1999) 'Knowledge management systems: issues, challenges and benefits', *Communications of AIS*, Vol. 1, Article 7, pp.1–37.

Amant, K.S. (2002) 'Integrating intercultural online learning experiences into the computer classroom', *Technical Communication Quarterly*, Vol. 11, No. 3, pp.289–315.

Bakardjieva, M. (2003) 'Virtual togetherness: an everyday-life perspective', *Media, Culture and Societ*y, Vol. 25, No. 3, pp.291–313.

Bieber, M., Engelbart, D., Furuta, R., Hiltz, S.R., Noll, J., Preece, J., Stohr, A.E., Turoff, M. and van de Walle, B. (2002) 'Toward virtual community knowledge evolution', *Journal of Management Information Systems*, Vol. 18, No. 4, pp.11–36.

Boczkowski, P.J. (1999) 'Mutual shaping of users and technologies in a national virtual community', *Journal of Communication*, Vol. 49, No. 2, pp.86–108.

Bond, M.H. (1988) 'Finding universal dimensions of individual variations in multicultural studies of values: the Rokeach and Chinese value surveys', *Journal of Personality and Social Psychology*, Vol. 55, pp.1009–1015.

Brown, J.S. and Duguid, P. (1991) 'Organizational learning and communities of practice: toward a unified view of working, learning and innovation', *Organization Science*, Vol. 2, pp.40–57.

Chiu, C.M., Hsu, M.H. and Wang, E.T.G. (2006) 'Understanding knowledge sharing in virtual communities: an integration of social capital and social cognitive theories', *Decision Support Systems*, Vol. 42, No. 3, pp.1872–1888.

Chow, C.W., Deng, F.J. and Ho, J.L. (2000) 'The openness of knowledge sharing within organizations: a comparative study of the United States and the People's Republic of China', *Journal of Management Accounting Research*, Vol. 12, pp.65–95.

Churchill, E.F. and Bly, S. (2000) 'Culture vultures: considering culture and communication in virtual environments', *SIGGroup Bulletin*, Vol. 21, No. 1, pp.6–11.

Earley, P.C. (1994) 'Self or group? Cultural effects of training on self-efficacy and performance', *Administrative Science Quarterly*, Vol. 39, No. 1, pp.89–117.

Erez, M. and Earley, C. (1993) *Culture, Self-Identity and Work*, Oxford University Press, New York, NY.

Evia, C. (2004) 'Quality over quantity: a two-step model for reinforcing user feedback in transnational web-based systems through participatory design', *IEEE Transactions on Professional Communication*, Vol. 47, No. 1, pp.71–74.

Friedman, T. (2006) *The World is Flat (Updated and Expanded): A Brief History of the Twenty-First Century*, Straus and Giroux, Farrar.

Gan, Y.C. and Zhu, Z.T. (2007) 'A learning framework for knowledge building and collective wisdom advancement in virtual learning communities', *Educational Technology and Society*, Vol. 10, No. 1, pp.206–226.

Gupta, A.K. and Govindarajan, V. (2000) 'Knowledge management's social dimension: lessons from Nucor steel', *Sloan Management Review*, Vol. 42, No. 1, pp.71–80.

Hansen, M. (1999) 'The search-transfer problem: the role of weak ties in sharing knowledge across organization subunits', *Administrative Science Quarterly*, Vol. 44, No. 1, pp.82–111.

Hofstede, G. (1980) *Culture's Consequences: International Differences in Work-Related Values*, Sage, Beverly Hills, CA.

Hofstede, G. and Hofstede, G.J. (2004) *Cultures and Organizations: Software of the Mind*, 2nd ed., McGraw-Hill, New York, NY.

Huber, G. (1991) 'Organizational learning: the contributing processes and the literatures', *Organization Science*, Vol. 2, No. 1, pp.88–115.

Jarvenpaa, S.L. and Staples, D.S. (2000) 'The use of collaborative electronic media for information sharing: an exploratory study of determinants', *Journal of Strategic Information Systems*, Vol. 9, pp.129–154.

Kaye, G.R. and Little, S. (1996) 'Global business and cross-cultural information systems: technical and institutional dimension of diffusion', *Information Technology and People*, Vol. 9, No. 3, pp.30–54.

Kletter, D. (2001) 'Sharing knowledge', *Executive Excellence*, Vol. 18, No. 6, June, p.15.

Kogut, B. and Zander, U. (1992) 'Knowledge of the firm, combinative capabilities and the replication of technology', *Organization Science*, Vol. 3, No. 3, pp.383–397.

Leimeister, J., Ebner, W. and Krcmar, H. (2005) 'Design, implementation and evaluation of trust-supporting components in virtual communities for patients', *Journal of Management Information Systems*, Vol. 21, No. 4, pp.101–135.

Nah, F., Siau, K. and Tian, Y. (2005) 'Knowledge management mechanisms of financial service sites', *Communications of the ACM*, Vol. 48, No. 6, pp.117–123.

Nah, F., Siau, K., Tian, Y. and Ling, M. (2002) 'Knowledge management mechanisms in E-commerce: a study of online retailing and auction sites', *Journal of Computer Information Systems*, Vol. 42, No. 5, pp.119–128.

Newman, B. (1996) *The Knowledge Management Forum*, online, Available: http://www.km-forum.org/htm.

Nonaka, I. (1994) 'A dynamic theory of organizational knowledge creation', *Organization Science*, Vol. 5, No. 1, pp.14–37.

Raman, K.S. and Watson, R.T. (1994) 'National culture, IS and organizational implications', in Deans, P.C. and Karwan, K.R. (Eds.): *Global Information Systems and Technology: Focus on the Organization and its Functional Areas*, Idea Group Publishing, Harrisburg, PA, pp.493–513.

Rheingold, H. (1993) *The Virtual Community*, Addison-Wesley, New York.

Ruppel, C.P. and Harrington, S.J. (2001) 'Sharing knowledge through intranets: a study of organizational culture and intranet implementation', *IEEE Transactions on Professional Communication*, Vol. 44, No. 1, pp.37–52.

Schuler, D. (1996) *New Community Networks ? Wired for Change*, Addison-Wesley, New York.

Schwartz, D.G., Divitini, M. and Brasethvik, T. (2000) *Internet-based Organizational Memory and Knowledge Management*, Idea Group Publishing, PA.

Schwartz, S.H. (1992) 'The universal content and structure of values: theoretical advances and empirical tests in 20 countries', in Zanna, M. (Ed.): *Advances in Experimental Social Psychology*, Academic Press, New York, Vol. 25, pp.01–65.

Siau, K. (1999) 'Internet, world wide web and creativity', *Journal of Creative Behavior*, Vol. 33, No. 3, pp.191–201.

Siau, K. (2000) 'Knowledge discovery as an aid to organizational creativity', *Journal of Creative Behavior*, Vol. 34, No. 4, pp.248–258.

Skyrme, D.J. (1996) *The Knowledge Management Forum*, online, Available: http://www.km-forum.org/htm.

Smith, P.B., Peterson, M.F. and Misumi, J. (1994) 'Event management and work team effectiveness in Japan, Britain and USA', *Journal of Occupational and Organizational Psychology*, Vol. 67, No. 1, pp.33–43.

Smith, P.B., Peterson, M.F. and Wang, Z.M. (1996) 'The manager as mediator of alternative meanings: a pilot study from China, the USA and UK', *Journal of International Business Studies*, Vol. 27, No. 1, pp.115–129.

Søndergaard, M. (1994) 'Research note: Hofstede's consequences: a study of review, citations and replications', *Organizational Studies*, Vol. 15, No. 3, pp.447–456.

Trompenaars, F. (1994) *Riding the Waves of Culture: Understanding Diversity in Global Business*, McGraw-Hill, New York, NY.

Tyre, M.J. and von Hippel, E. (1997) 'The situated nature of adaptive learning in organizations', *Organization Science*, Vol. 8, No. 1, pp.71–83.

von Hippel, E. and Tyre, M. (1995) 'How learning by doing is done: problem identification in novel process equipment', *Research Policy*, Vol. 24, pp.01–12.

Wachter, R.M., Gupta, J.N.D. and Quaddus, M.A. (2000) 'IT takes a village: virtual communities in support of education', *International Journal of Information Management*, Vol. 20, No. 6, pp.473–489.

Wang, Y. and Chen, C. (2004) 'An automated tool for managing interactions in virtual communities – using social network analysis approach', *Journal of Organizational Computing and Electronic Commerce*, Vol. 14, No. 1, pp.01–26.

Wasko, M.M. and Faraj, J. (2000) 'It is what one does: why people participate and help others in electronic communities of practice', *Journal of Strategic Information Systems*, Vol. 9, pp.155–173.

Wellman, B., Salaff, J., Dimitrova, D., Garton, L., Gulia, M. and Haythornthwaite, C. (1996) 'Computer networks as social networks: collaborative work, telework and virtual community', *Annual Review of Sociology*, Vol. 22, No. 1, pp.213–238.

Yee, N., Bailenson, J.N., Urbanek, M., Chang, F. and Merget, D. (2007) 'The unbearable likeness of being digital: the persistence of nonverbal social norms in online virtual environments', *Cyberpsychology and Behavior*, Vol. 10, No. 1, pp.115–121.