THE IMPACT OF NATIONAL CULTURE ON KNOWLEDGE SHARING IN GLOBAL VIRTUAL COLLABORATION: A PRACTICE LENS

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Completed Research Paper

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Abstract

Issues concerning global virtual collaboration have received considerable attention in IS research and practice; however, little research has been conducted on knowledge-sharing activities in global virtual collaboration, which is a key process to achieve collaboration effectiveness. In this paper, we investigate the impact of national culture on knowledge-sharing activities in global virtual collaboration from dynamic and individual perspectives. An exploratory case study was first used to explore how national culture impacts knowledge-sharing activities in global virtual collaboration. The purpose of the case study was to understand qualitatively the phenomenon under investigation and generate a set of hypotheses. In phase two, an online survey was used to test the hypotheses. The goal was to refine and generalize the findings from the first phase. The results emphasize the role of non-value-based cultural dimensions in global virtual collaboration and the importance of investigating national culture from an individual level and in practice.

Keywords: Knowledge sharing, global virtual collaboration, national culture, cross-cultural issues
Introduction

The success of modern organizations depends on effective knowledge and knowledge management, as emphasized by the knowledge-based view of the firm (Grant 1996). As a key process in knowledge management practices (Ford and Chan 2003; Jashapara 2005), knowledge sharing has received considerable attention in IS research (Alavi and Leidner 2001). Recent research has identified a variety of factors that lead to effective knowledge sharing, such as motivation (Constant et al. 1994) and culture (Ford and Chan 2003), but few studies have focused on addressing knowledge-sharing activities in different team settings (Alavi and Tiwana 2002).

A particularly interesting setting for examining knowledge sharing is in global virtual collaborations (GVC). In organizations, GVC is usually found in the form of global virtual teams (GVT). GVT are groups that comprise members located in different countries who rely on technology-supported communication to accomplish one or more organizational tasks (Maznevski and Chudoba 2000). With the globalization of businesses, GVTs have been widely used by multinational organizations to flatten organizational structures and to assemble geographically dispersed workers to work on tasks and problems at the international level (Kayworth and Leidner 2001/2002).

Because GVCs transcend national boundaries, the effect of national culture becomes a critical research issue (Tan et al. 1998). National culture has been identified as a major barrier to knowledge sharing (Gemino et al. 2005-6; Jashapara 2005). Despite its importance, the impact of cultural dimensions in this setting has received limited attention from IS researchers (Karahanna et al. 2002). National culture also moderates ICT impact on team communication (Watson et al. 1994). Many IS scholars argue that managers need to understand cultural differences if they are to successfully deploy information technology in global organizations (Myers and Tan 2002). Olson and Olson (2000) also argue that “possibly the single biggest factor that global teams need to address is culture differences” (p. 169). Thus, it is important to understand the impact of national culture in GVC contexts and to make culture an enriching rather than paralyzing factor to the use of ICT to facilitate and support team activities. The goal of this paper is to examine the impact of national culture on knowledge-sharing activities in GVC.

The rest of the paper is organized as follows. First, extant research is reviewed to identify major constructs for studying national culture impacts on knowledge sharing and to build the theoretical foundations for this study. Second, a case study is used to further refine the constructs, determine empirical indicators, identify relationships between the constructs and develop hypotheses. Finally, we present the results of a survey used to test the hypotheses. A synthesis of both the qualitative and quantitative results is then provided. Finally, the paper concludes by discussing the implications of this work for research and practice.

Conceptual Background and Literature Review

While there is a lot of research on knowledge sharing, on virtual teams and on cross-cultural behavior, there is a paucity of research at the intersection of these three topics. Therefore, this section reviews the three relevant fields separately: knowledge sharing in virtual collaboration, national culture, and national culture impacts on global collaboration. It concludes by discussing theoretical considerations when conducting cross-cultural research, which serves as a guide for data gathering.

Knowledge Sharing in Virtual Collaboration

We first review research on knowledge sharing in virtual settings. Knowledge sharing is defined as the exchange of task-related information, know how and feedback regarding a product or procedure (Cummings 2004). With organizations’ increased use of virtual teams, the study of knowledge sharing in such teams has become an important area of inquiry. Researchers have identified a variety of factors that have an impact on knowledge-sharing effectiveness in virtual teams, such as the degree of virtualness of teams (Griffith et al. 2003), trust (Jarvenpaa and Leidner 1999; Piccoli and Ives 2003), motivation (Wasko and Faraj 2005) and mutual knowledge (Cramton 2001).

A majority of studies emphasize the impact of ICT on knowledge-sharing activities (Bieber et al. 2002; Gemino et al. 2005-6; Malhotra and Majchrzak 2004; Pan and Leidner 2003). In general, this body of literature considers the relationship between the characteristics of ICT and the characteristics of tasks, and argues that a fit between these leads to knowledge-sharing effectiveness. For example, by surveying 263 individuals working in virtual teams, Majchrzak and colleagues (2005) found that when the tasks are non-routine, an individual’s perceived degree of IT
support for communicating contextual information is positively related to knowledge-sharing effectiveness, but when the tasks are routine, partial IT support for contextualization is related to lower levels of knowledge sharing.

In general, the literature on knowledge sharing in virtual teams has focused either on relationships between knowledge sharing tasks and the ICT used to support them or on affective factors that influence knowledge sharing. Few studies have examined the impact on knowledge sharing of social factors such as national culture, which is an important factor in global virtual collaboration. Researchers have argued that since virtual teams are more likely to be involved in multicultural and multilingual functions, constructs such as cultural background and language require more attention (Schiller and Mandviwalla 2007).

**National Culture**

We next briefly review research on national culture in IS research. The term culture is pervasive in discussion and research, but there is no unifying definition for this term. It is described in very different ways in different literatures: as ideas and cognition, symbols and meanings, values and ideologies, rules and norms, behavior patterns, or structures and practices (Alvesson 2002; Kaarst-Brown 2005). These different concepts and aspects of culture reflect the complexity of culture itself. In general, culture has a three-layer structure: at its core are the basic assumptions that represent the cognitive structures or interpretive schemes people use to perceive situations and make sense of them; in the middle layer lie the values and beliefs people use to guide their behaviors; in the outer layer are the artifacts that represent certain cultural meanings (Schein 1985, as cited in Leidner and Kayworth 2006).

Reviewing past cultural research in the IS field, Leidner and Kayworth (2006) pointed out that most research focuses on the value-based aspects of culture, because they are more easily studied than basic assumptions, which are invisible and preconscious, or artifacts, whose underlying cultural meanings can be difficult to decipher.

The most-cited value-based definition of culture in the IS field is that put forth by Geert Hofstede: “the collective programming of the mind which distinguishes one group or category of people from another” (Hofstede 1993 p.89).

The majority of research in IS uses Hofstede’s five dimensions of national culture (Hofstede 1993; Hofstede and Bond 1988) as a framework to study the impact of national cultures on technology use and technology-mediated activities (Leidner and Kayworth 2006). This body of research mainly adopts quantitative approaches, works at the level of a single culture (i.e., national culture) and is conducted at the organizational level. For example, in a study of the corporate adoption of IT infrastructure, Png and colleagues (2001) studied the impact on adoption of two of Hofstede’s dimensions: uncertainty avoidance and power distance.

Not all IS researchers take Hofstede’s dimensions without question and the framework has been recently criticized for issues including its assumption of the national uniformity of culture, its implausibility as a systematically causal factor for behavior, its inadequate consideration of the impact of organizational and professional cultures and the methodological problems associated with the long-term vs. short-term orientation dimension (Fang 2003; McSweeney 2002). Among these, the assumption of the national uniformity of culture has received most critiques (Baskerville 2003). For example, some research showed that multiple cultures may exist in a single nation (e.g., 98 different cultures identified in 48 countries in Africa) (O’Leary and Levinson 1991 cited in Baskerville 2003).

Rejecting totalizing statements about what makes a culture, some anthropologists tend to view culture not as a thing in itself, but as a learning device for uncovering meaning in social life (Monaghan and Just 2000). In this way, culture provides us with “a means for perceiving the world around us, for interpreting the meaning of our social lives and framing action into them” (Monaghan and Just 2000, p.38). Hofstede’s definition seems to imply that the contents of individual minds in the same culture are not much different from each other. However, the anthropological view of culture emphasizes the impact or the role of culture in human actions. It argues that the contents of the individual mind are highly divergent and that what culture does is not to impose a uniformity, but rather a set of shared communicative symbols to organize diversity (Monaghan and Just 2000).

While acknowledging the different debates about national culture, it is not the purpose here to argue which conceptualization of culture is best. From the discussion, it is important to know that culture is a broad term that includes not only values and that culture should be studied in human actions. Specifically, this study adopted Terpstra and Sarathy’s (2000) definition of culture, which is described as “the integrated sum total of learned behavioral traits that are shared by members of a society” (p. 90). Terpstra and Sarathy further identify eight categories of national culture (Table 1), which includes not only cultural values, but also assumptions and artifacts (as noted above).
Table 1. Dimensions of National Culture (Terpstra and Sarathy 2000)

<table>
<thead>
<tr>
<th>Dimension</th>
<th>Explanation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Technology and Material Culture</td>
<td>Technology and material culture includes the tools and artifacts in a society. Technology refers to the techniques or methods of making and using those things.</td>
</tr>
<tr>
<td>Language</td>
<td>The language members of a nation speak</td>
</tr>
<tr>
<td>Aesthetics</td>
<td>The ideas in a culture concerning beauty and good taste, as expressed in the arts and the appreciation of color and form.</td>
</tr>
<tr>
<td>Education</td>
<td>The process of transmitting skills, ideas and attitudes, as well as training in particular disciplines</td>
</tr>
<tr>
<td>Religion</td>
<td>The religion(s) a nation holds</td>
</tr>
<tr>
<td>Attitudes and values</td>
<td>The belief held about what is right, important, desirable, etc.</td>
</tr>
<tr>
<td>Social organization</td>
<td>The way people relate to other people. The primary kind of social organization is based on kinship.</td>
</tr>
<tr>
<td>Political life</td>
<td>The political environment around a person</td>
</tr>
</tbody>
</table>

National Culture and Global Virtual Collaboration

We turn finally to research on national culture and collaboration. A lot of research has been done on the impact of national culture on knowledge sharing in a single national cultural context (e.g. Li et al. 2007) or in comparisons of two national contexts (e.g. Michailova and Hutchings 2006) in traditional settings. In general, the research found that national culture does have an impact on knowledge-sharing activities, such as intention to share knowledge and attitudes toward knowledge sharing. By surveying 207 Chinese researchers in a leading IT global research center and a university in Hong Kong, Li et al. (2007) discovered that collectivism, Confucian dynamism and guanxi (i.e., the connections one has in order to secure favors in personal relationships) all had a significant influence on attitudes toward information sharing within the work organization.

To date, only a few empirical investigations have been done on cultural issues in distributed team settings or in computer-mediated communication (e.g. Lowry et al. 2007; Setlock et al. 2007). These studies have focused on the examination of how value-based national cultural dimensions mediate the impact of ICT on factors like majority influence, media choice, communication quality, task and trust. For example, Evaristo (2003) argued that cultural differences between distributed members are related to trust, which exerts its main effect on project performance and moderating effects on other determinants of performance in distributed projects.

To summarize, although a few studies have examined the impact of national culture on knowledge sharing in global virtual collaboration (e.g. Ardichvili et al. 2006; Li 2010), in general, the existing research on this topic is limited. Further, the majority of research on national culture has examined only value-based cultural dimensions. While non-value-based cultural dimensions such as language and material culture have also been found to have an important impact on cross-cultural interaction (Ford and Chan 2003), these have been largely neglected in empirical research in IS. To address these gaps, the impacts of both value-based and non-value-based cultural dimensions on knowledge sharing activities in global virtual collaboration will be explored in this study.

Theoretical Considerations for Conducting Cross-Cultural Research

Existing culture research has been mainly conducted at the level of single cultures, which means “IS research nearly always assumes that an individual living in a particular place and time belongs to a single culture” (Straub et al. 2002). However, a few researchers have argued that an individual’s behavior is influenced by multiple levels of culture, ranging from the group level, through the organizational, professional and national levels to the supranational level, and that all these different levels of cultures influence an individual’s behavior simultaneously (Karahanna et al. 2005; Straub et al. 2002). To account for these diverse effects, researchers have argued that culture must be measured at the individual level. After the individual level data are aggregated, it will be possible to assert whether a certain cultural characteristic is common to a certain culture or not (Straub et al. 2002).

Another theoretical consideration worth mentioning is the understanding of national culture itself. Although most definitions take “national culture” as static and objective, Myers and Tan (2002) question its methodological
weakness and propose that researchers adopt a more dynamic view of national culture, “one that sees culture as contested, temporal and emergent” (p. 30). Nowadays, individuals have many more opportunities to live or work within cultures different from their own, which can lead them to embrace, to different extents, some of the cultural values and basic assumptions shared by a host culture. Based on the above considerations, culture in this research is examined dynamically and in the context of the research subjects so that factors that influence individuals’ perceptions of national cultural dimensions are also examined.

**Study Design**

To answer the research question, this study applies a mixed-method approach, which involves integrating both quantitative and qualitative data collection and analysis in a single study (Creswell et al. 2003). After qualitative and quantitative data are analyzed separately, they need to be correlated with each other, compared and integrated at the final stage to answer the research questions (Onwuegbuzie and Teddlie 2003). The underlying logic of mixing is that neither quantitative nor qualitative methods are sufficient in themselves to capture the trends and details of the phenomenon under investigation; when used in combination, both quantitative and qualitative data yield a more complete analysis and complement each other (Creswell et al. 2003). Specifically, this study adopted a sequential exploratory design approach, in which qualitative data were collected and analyzed first, followed by quantitative data. This type of research is useful for “exploring relationships when study variables are not known, refining and testing an emerging theory, developing new psychological test/assessment instruments based on an initial qualitative analysis and generalizing qualitative findings to a specific population” (Hanson et al. 2005, p.229). Since the phenomenon under investigation is understudied in the literature, an initial qualitative analysis was felt to be helpful.

The resulting research design involved two phases. In phase one, an exploratory case study approach was used to explore how national culture impacts knowledge-sharing activities in GVC and to explore what sorts of other factors may mediate the impact. The purpose of the case study was to understand qualitatively the phenomenon under investigation and generate a set of hypotheses. In phase two, an online survey was used to test the hypotheses generated in phase one. The goal was to refine and generalize the findings from the first phase. This research chose China as the site of interest to examine the impact of Chinese culture on knowledge sharing in GVC. The U.S. was selected as the comparison country because it has a culture distinct from Chinese culture.

**Phase I: Hypotheses Development Using a Case Study**

In this section, we describe the first phase of the study and how it was used to explore the phenomena of interest and to generate hypotheses. An embedded single-case design was used for the first phase. Case studies are appropriate for the exploration, classification and hypothesis development stages of the scientific knowledge-building process and is useful for asking “how” or “why” questions about a contemporary phenomenon that is not easily separated from its context (Yin 2003). There were two purposes of this case study. The first was to identify specific Chinese cultural dimensions and knowledge sharing activities that were most relevant in this context. The second was to investigate how these dimensions impact Chinese individuals’ knowledge sharing activities with their remote American colleagues. A set of hypotheses regarding the relationship between national culture and knowledge sharing activities were then developed based on the results of the case study using the “theory-building from case study” approach proposed by Eisenhardt (1989).

**Case Description and Data Collection Procedures**

The case study was conducted at a Chinese site of a knowledge-intensive global corporation, which we refer to as the ABC Corporation. ABC was a global manufacturer of high-tech products headquartered in the U.S. but with 80,000 employees distributed worldwide, especially in the service areas of finance, information technology and human resources. The working language is English, even in non-English speaking countries. The site was interested in the study because employees had expressed dissatisfied with cross-cultural collaboration on a survey conducted earlier by the corporation. A Chinese technical support engineering team from the site was selected for this phase of the study. The mission of the team was to deliver innovative IT solutions for the product groups in the organization. To provide these services, the team needed to collaborate closely with other colleagues worldwide, in the U.S. in particular. The team had 21 employees; other than the two American senior managers, all were Chinese. Most of the
Chinese reported engaging in extensive collaborative work with U.S. colleagues. These Chinese team members were the main research subjects of this phase of the study.

Data collection techniques included documentation review, participation observation and informal and formal interviews. One of the authors spent three months at the site as a global team researcher from June 2006 to September 2006, which gave the researcher opportunities to attend the team meetings, observe team members’ daily work style, and interview them formally and informally. According to the research procedure, informal interviews and documentation review were first conducted to select the most relevant dimensions of national culture and knowledge sharing activities. The effects of these dimensions were then examined through follow-up in-depth formal interviews and participation observation that aimed at understanding how the cultural dimensions affected knowledge-sharing activities with global colleagues. All interviews were conducted in Chinese. The average time for each interview was about 40 minutes. After each interview, a simple survey was emailed to the interviewee to collect demographic information and identify basic communication patterns with U.S. colleagues. It was emailed in English and took less than 2 minutes in general to finish.

Data analysis

Interview data were transcribed and translated into English. Field notes from participation observation were also translated into English. The interview data were coded and analyzed using the qualitative data presentation and analysis method described by Miles and Huberman (1994). Content analysis (Krippendorff 2004) was used to discover the patterns in the data that show how national culture impacts knowledge-sharing from the Chinese individuals’ perspectives. More specifically, this included coding the answers in each interview transcript to identify major categories and themes pertaining to each of the questions and the development of cross-case (considering each interview as a subcase) comparison. Initial codes were based on the cultural categories described above, but codes evolved as the analysis progressed.

For example, for the question of “how do language problems impact the knowledge sharing activities”, the researchers content analyzed not only the segments of the transcripts where specific questions regarding language problems were asked, but also searched the whole transcripts to find relevant discussions if there were any. Categories regarding the impact of the language problems were created for each transcript. After all transcripts were finished, the researcher went back to analyze how many respondents actually mentioned the different categories, that is, the frequencies of each category. The analysis of interview data was augmented by participation observations and documentation analysis. This was accomplished by constantly referring to the notes taken during participating in their activities and the research materials provided by the corporation.

Results

This section presents the results of the case study. Initial analysis of the case study data led first to identification of three relevant knowledge-sharing activities in the research context and, three cultural dimensions that seemed most important in this context. Next, the informants’ perception of the impact of each cultural factor on knowledge sharing activities was discussed, and a set of hypotheses about the impacts of national culture on knowledge-sharing activities was developed based on the discussion and literature review.

Relevant Knowledge Sharing Activities and Cultural Dimensions

The first finding from the first phase of the study was identification of important knowledge-sharing activities. When talking about knowledge sharing activities with their remote colleagues, informants most frequently mentioned three activities: use of particular knowledge sharing tools, such as using phone calls or emails to communicate, sharing task-related information/knowledge and sharing social-related information/knowledge. For example, several interviewees mentioned they prefer using emails or instant messaging to communicate even during phone meetings, because it was easier for them to understand what the others had said and clarify points. They also mentioned that it was easier to share task-related knowledge because they were familiar and confident with it. However, they usually felt uncomfortable talking about social topics, mainly because of language barriers.

In virtual settings, knowledge sharing mainly relies on information and communication technologies. These three activities capture the basic elements in virtual knowledge sharing. Further, these activities are very important and have been addressed by other studies focused on knowledge-sharing activities in different organizational settings.
For example, in a multiple-case study of four firms, Buckley et al. (2005) found that knowledge transfer is more effective when technical and social knowledge are transferred together. In another study (Shachaf 2008), cultural diversity was found to be a major factor influencing media selection in global virtual teams. These three dimensions were used to catch knowledge-sharing activities in this research.

Second, we identified three particular dimensions of Chinese culture that informants suggested were most relevant to knowledge-sharing activities, and identified particular indicators that seemed relevant in this setting. The starting point for the case analysis were the dimensions identified in the literature review (e.g. Terpstra and Sarathy 2000; Yuan and Vogel 2006). As well, we drew on results of previous research on distributed work carried out in the corporation and from initial interviews with team members. As stated in Section 2, Terpstra and Sarathy’s (2000) dimensions of national culture were adopted as the theoretical baseline. Three of the eight cultural dimensions were identified as particularly relevant: language, technology and material culture, and attitudes and values. The definition of each dimension and specific indicators are given in Table 2. These dimensions and their effects on knowledge-sharing activities were then explored in further interviews and observations.

Table 2. National Cultural Dimensions Used in the Research

<table>
<thead>
<tr>
<th>Dimensions</th>
<th>Definitions</th>
<th>Indicators in this research</th>
</tr>
</thead>
<tbody>
<tr>
<td>Language</td>
<td>The native language one speaks</td>
<td>Chinese vs. English</td>
</tr>
<tr>
<td>Technology and material culture</td>
<td>The techniques or methods of making and using technology tools and artifacts</td>
<td>Quality of technology infrastructure (power, phone, cable, etc) that GVT rely on to communicate (Riopelle et al. 2003)</td>
</tr>
<tr>
<td>Attitudes and values</td>
<td>The belief one holds to help determine what is right, important, desirable, etc.</td>
<td>Concern about face</td>
</tr>
</tbody>
</table>

Discussion and Hypothesis Development: The Impact of National Culture on Knowledge-Sharing Activities

In this section, we discuss the findings from the full case study, using data from the interviews and observations to formulate a set of hypotheses about the impacts of national culture on knowledge-sharing activities.

Language. It is not surprising to find that language is the primary factor that impacts knowledge-sharing activities between Chinese and U.S. coworkers, since it is the most obvious cultural difference. Language problems influence knowledge-sharing in two ways. First, it affects task-related knowledge sharing. Some members complained about not being able to use English to fully express their ideas:

*In Chinese, I can fully express what I think. But in English I can only express 70% of what I want. For example, during a meeting, I have seven points to make, but I only know how to express four of them in English. So I just skip the rest. It is a knowledge loss, right?*

More interviewees expressed concern for the limitations of using English to exchange social knowledge:

*Sharing technical knowledge isn’t a very big problem for me. Since we are both doing the same thing, he [the U.S. colleague] will understand me even if I am not using the correct grammar and sentence. But it is really difficult for me to make social conversation with them. I don’t know how to make jokes with them. By the way, I am pretty good at it in Chinese. I don’t know how to create a relaxed meeting environment. It makes the meeting very dry and boring, which indeed impacts our communication.*

Because of this language problem, the team members prefer text communications, through email and IM tools, which help them understand and express their opinions clearly. As one member said,

*I prefer having meeting minutes to help me understand better the key points we talked about in the meeting.*

This observation regarding language difference is consistent with the research of Ford and Chan (2003). Studying the impact of national culture on knowledge-sharing in a multicultural setting, Ford and Chan found that language differences in terms of individuals’ proficiency in different languages can create knowledge blocks that prevent knowledge from flowing effectively within an organization. So in this study, English competence is examined.

First, from the case study, we can see that competence with English affected individuals’ selection of knowledge-sharing tools. As several members mentioned, they preferred reading and writing English to speaking it because that
way they had more time to organize their thinking in English before communicating with American colleagues. On occasions that required speaking, such as in meetings, they usually felt more difficulty in grasping others’ ideas and expressing themselves clearly.

Previous research on language differences also reflects this observation. In an exploratory investigation of communication in global product development teams, McDonough et al. (1999) found that language differences create a need for written-asynchronous communication because it allows interacting parties to take more time to interpret and process the information exchanged. In a longitudinal study of six global virtual teams, Sosa et al. (2002) proposed that language difference increases the probability of using written-asynchronous communication media (such as e-mail) rather than verbal-synchronous communication media (such as the telephone).

Second, English competence was also found to affect participation in knowledge-sharing communications, especially when using verbal-synchronous communication tools. As the interviewees mentioned, their English listening skills sometimes prevented them from understanding others well. They could not recapture the context easily once they got lost during telephone meetings. They sometimes could not use English to express the full ideas they would have otherwise in Chinese. Another important factor the interviewees mentioned was that the limitations of using English to exchange social knowledge made their meetings dry and boring, which in turn had an impact on the communication. All these had a significant negative impact on their communications with the American colleagues.

This observation is supported by research demonstrating how language differences shape communication (Barner-Rasmussen and Bor 2005). Harzing and Feely (2008) used socio-linguistic theory to demonstrate how a language barrier creates communication misunderstandings in HP-subsidiary relationships. Using a sample of 308 dyadic relationships between Finnish and Chinese subsidiaries and their headquarters and sister units, Barner-Rasmussen and Bjorkman (2005) found that the intensity (frequency and perceived importance) of inter-unit communication was related to fluency in the language in which the inter-unit communication took place.

As a result, the following hypotheses are proposed:

- **H1a**: Individuals’ competence in the language of communication affects their preference to use different types of knowledge-sharing tools in global virtual collaboration. The greater one’s competence in the language of communication, the more one prefers to use voice-based communication tools.

- **H1b**: Individuals’ competence in the language of communication affects the effectiveness of their participation in task-related communication in global virtual collaboration. The greater one’s competence in the language of communication, the more effective is one’s participation in task-related communication.

- **H1c**: Individuals’ competence in the language of communication affects the effectiveness of their participation in social-related communication in global virtual collaboration. The greater one’s competence in the language of communication, the more effective is one’s participation in social-related communication.

**Technology and Material Culture: Technology Infrastructure.** Based on initial interviews, we had expected an effect from differences in the technology and material culture of the two countries. While this might be true in general, in the case study though, technology infrastructure was reported to have no effect on knowledge-sharing activities. Most interviewees thought there were no differences in the technology infrastructures between their work site and the U.S. site. One member said,

> I think our technology infrastructure is good. We have almost everything they have. And we’re located at the relatively developed part of China. We don’t have a big difference, except that they have internet-connected PDA or pocket PC, which we don’t have yet. Other things, like laptops and the network at home are all good. Our network speed might be slightly slower than theirs, but I don’t think there’s a big difference.

Another interviewee even said:

> There is really no difference. We really have very good quality here. You can even get rid of this item from your research. Totally no difference.

There are two possible reasons for this observation. The first is that the Chinese site is located in the eastern China, which is relatively rich and has built a reliable technology infrastructure. The other reason is that, in this
organization, the major international sites mirror the size of the U.S. sites with their large campuses of multiple buildings and the architecture/basic technology used is standard from building to building. However, without these two specifications, the results might not be the same. Thus, we believed that technology infrastructure may still be related to knowledge sharing in other settings in global virtual collaboration.

Although little research has empirically studied the impact of technology infrastructure on knowledge-sharing activities, a few studies have touched on the relationship between the quality of the technology infrastructure and communication qualitatively, to some extent. For example, in a case study of six global virtual teams, Riopelle and colleagues (2003) demonstrated how the reliability of electrical power and telephone circuitry in different countries impacts communication quality. Hence, the following hypotheses regarding the impact of the quality of technology infrastructure on knowledge-sharing activities are proposed:

\[ H2a: \text{The quality of the technology infrastructure affects the effectiveness of participation in task-related communication in global virtual collaboration. The higher the quality is, the more effective the participation in task-related communication is.} \]

\[ H2b: \text{The quality of technology infrastructure affects the effectiveness of participation in social-related communication in global virtual collaboration. The higher the quality is, the more effective the participation in social-related communication is.} \]

Attitudes and Values: Concern about Face. One commonly mentioned “attitude and value” factor in the interviews was the concern about face. Several members mentioned that concern about face is a typical cultural phenomenon in China. Indeed, concern about face is very deep rooted and influential in Chinese culture (Yuan and Vogel 2006). It derives from a collectivist culture’s need for group affiliation (Chow et al. 2000). Because of its importance in Chinese national cultural values, it was chosen here as the indicator of attitudes and values. In the case study though, it was surprising to find that the perceived degree of concern about face was diverse among Chinese members. Some members perceived themselves as concerned very much about their or others’ face, so in order to preserve face, they did not ask many questions, whereas others perceived themselves as less concerned about face, so they were actively involved in the discussions. For example, one member mentioned,

“I think concern about face depends on the individual and is related to individual characteristics. For me, I’ll ask directly if I have questions regarding a project. You either explain it to me now, or we set up another time to discuss it.”

Those who care more about face are more likely to behave in a way mentioned by the following member:

“You might observe that in formal meetings, they [the members] don’t talk actively. One reason is the language barrier and the other is because of concern about face. Because they think if the questions they raise are not mature enough, others will laugh at them. So, in this situation, they usually don’t talk, or they think too much before talking.”

Thus, despite differences in perceived importance of face, the perceived degree of concern about face affects participation in knowledge-sharing communications. Another consequence from concern about face is that members who expressed more concern preferred using asynchronous tools to communicate, because this allowed them more time to organize their thinking in English before communicating with American colleagues. In that way, they protected their face to some extent. Some other members mentioned a correlation between their English competence and their degree of concern about face. They mentioned that they did not participate actively in meetings because they did not want to lose face by speaking English badly.

Some cross-culture studies, especially those that include Chinese culture, have touched qualitatively on the relationship between concern about face and knowledge-sharing activities in different organizational settings. These findings support the above observation. From an in-depth case study of Siemens ShareNet in China, Voelpel and Han (2005) concluded that “concern about face” is one of the two cultural dimensions that negatively influence Chinese employees’ knowledge-sharing behavior. They further pointed out that employees who are highly sensitive to “face saving” and feel bad about their English abilities are reluctant to share knowledge actively. In an interview of six Chinese software programmers, Yuan and Vogel (2006) reported both negative and positive influences of concern about face on knowledge-sharing activities. Using 159 MBA students as the survey sample, Huang et al. (2008) found that face-saving is negatively related to the intention to share knowledge.

Hence, the following hypotheses are proposed:
H3a: The degree of concern about face affects the preference for the use of different types of knowledge-sharing tools in global virtual collaboration. The greater one’s concern about face, the more s/he prefers to use text-based synchronous tools one would like use.

H3b: The degree of concern about face affects the effectiveness of participation in task-related communication in global virtual collaboration. The greater one’s concern about face, the less effective is one’s participation in task-related communication.

H3c: The degree of concern about face affects the effectiveness of participation in social-related communication in global virtual collaboration. The greater one’s concern about face, the less effective is one’s participation in social-related communication.

Antecedents to Concern about Face. Because of the apparent importance of concern about face and its differences across individuals, this factor was explored further. The very different understandings of the degree of concern about face from different individuals indicate that they were most likely influenced by other factors. Two antecedents were found from the case study to be associated with the degree of concern about face: personality and the degree of adaptation to the organizational culture.

First, very different degrees of perceived concern about face from different individuals indicate that this factor might be affected by individual characteristics. One personality dimension from the five-factor model (John and Srivastava 1999), extraversion, seemed to be extremely relevant to this study. Extraverts are described as assertive, active, talkative, upbeat, energetic and optimistic. Indeed, the word “shy” often appeared together with “concern about face” during interviews. Some interviewees mentioned they were straight and open and did not care much about what others said, so they cared less about face.

Personality and national culture are two topics studied extensively, but little research has empirically investigated the relationship between them. Most research in this field is descriptive and qualitative. Fink et al. (2006) illustrated the important role of personality traits in perceived cultural values in cross-cultural interaction, using small cases as examples. In a re-analysis of published data, Hofstede and McCrae (2004) found that personality scores from 33 countries were significantly and substantially correlated with culture dimension scores. The authors call for more research on the joint influence of personality and culture on a host of outcomes. Hence,

H4a: Extraversion is associated the degree of concern about face in global virtual collaboration. The more extraverted one is, the less one will be concerned about face.

Second, the results of the case study also revealed the important role of organizational culture in shaping individual’s perception of the degree of concern about face. As one said,

I have changed a lot since I entered ABC. This corporate environment needs you to be open, to be aggressive and to be direct. So you either change to adapt to it, or you leave.

So we can expect that team members who are more adapted to the corporate culture are more likely to behave in an open and direct way, as corporate culture advocates. Thus, they are more likely to be less concerned about face. Little research has explored the impact of organizational culture on national culture in individuals’ activities, but some researchers have realized that the existing culture research has been mainly conducted at the level of a single culture and call for more studies on the joint effects of different levels of culture (Karahanna et al. 2005; Straub et al. 2002). Hence, we propose:

H4b: The degree of adaptation to organizational culture is associated with the degree of concern about face in global virtual communication. The more adapted one is to an organization, the less one will be concerned for face.

In summary, 10 hypotheses were proposed to reflect the relationships between national cultural dimensions, their antecedents and knowledge sharing activities. In the next stage of the study, a quantitative analysis of survey data was used to evaluate the hypotheses generated from the case study.

Phase II: Evaluating the Hypotheses Using a Survey

In this section, we report on the design and results from phase II of our study. In this phase, an online survey was conducted to test the hypotheses developed in phase I. A survey questionnaire was constructed based on the empirical indicators identified from the case study. Most of the measures for the constructs in the research model
were adapted from measures validated in prior studies, with minor wording changes to accommodate the context of global virtual collaboration\(^1\). Specifically: (1) *English competence* was assessed with a pre-validated instrument developed by Clement and Baker (2001), which evaluates self-evaluation of English competence, self-confidence in English and English use anxiety; (2) *Degree of concern about face* was measured with an instrument developed by Ting-Toomey and Oetzel (2001); (3) *The quality of technology infrastructure* was measured by three factors generated from the case study and the literature (Riopelle et al. 2003). Three factors were specifically relevant in the context of global virtual collaboration: reliability of electrical power, telephone circuit quality and the quality of Internet connections; (4) *Extraversion* was measured using the Mini-IPIP scales developed by Donnellan and colleagues (2006); (5) Items for *adaptation to organizational culture* was drawn from Gao and Gudykunst (1990); (6) Items for *participation effectiveness in task/social-related communication* were adapted from Davison (1997) and Robey et al. (1989); (7) *Preferred use of knowledge sharing tools* were assessed in three categories: written-asynchronous tools (such as email and discussion forums), written-synchronous tools (such as instant messaging) and voice-synchronous tools (such as phone conferences and video conferences). This classification was based on the literature (e.g. Riopelle et al. 2003; Sosa et al. 2002). The questionnaire was written in Chinese and a back-translation process was used to establish translation equivalence (Mullen 1995). The questionnaire was refined through a pre-test using 33 senior students at a major university in China who had experience virtually interacting with students at American colleges, which resulted in a 52-item questionnaire with good reliability and validity.

To control the variation of the impact of organization cultures, we chose organizations with cultures similar to that of ABC, which is described by the interviewees as open, direct and confrontational. The final population was targeted with the following specifications: (1) Chinese individuals who worked in an American company but were located in China and (2) who had had virtual working experiences with American colleagues. A snowball sampling technique was used to collect data (Fink 1995). One of the researchers first talked with friends in China, in order to understand their working environment and to locate possible companies. Then an invitation email was sent to four of them, who were asked to forward the email to colleagues who met the above criteria. In total, 83 invitation emails were sent out and 75 respondents completed the online survey, with a response rate of 90.4%. Out of the 75 responses, 12 with large numbers of missing values were eliminated from further analysis. As a result, the final sample consisted of 63 valid responses. Most subjects were between 23-35 years old (92.1%) and 52.4% of the sample were female. Most of them (95.2%) had never been to the U.S. for more than half a year, meaning that they are most influenced by Chinese culture.

**Analysis and Results**

Partial least square (PLS) technique was used to test the research model (Chin 1998a) as it enables researchers to assess the measurement model and the structural model simultaneously (Gefen et al. 2000). Chin (1998b) recommends that the sample size in PLS be determined by the larger of the following two values: (1) 10 times the greatest number of formative indicators in a construct, which was 3 in this study; or (2) 10 times the greatest number of structural paths going into a construct, which was 3 too in this study. The sample size of 63 exceeded the recommended minimum number of 30 and so was sufficient to estimate the research model in this study.

**Estimation of Measurement Model**

The measurement model was assessed in terms of reliability and validity. The reliability of items was assessed by examining each item’s loading on its respective construct. Usually, the item loading should exceed .70. However, .50 is also acceptable for research in early stages (Moore and Benbasat 1991). The cross-loadings of the items (due to space limit, the cross-loading table is not provided here) show that most loadings are greater than .70. A few loadings are around 0.60, which was considered acceptable for this stage of research.

From the cross-loadings, discriminant validity can also be examined. Discriminant validity requires that measurement items load more highly on the construct they intend to measure than on any other constructs. In general, all the items met the requirement of discriminant validity. The composite reliability of the constructs was also examined. Similar to Cronbach's alpha, the suggested minimum acceptable values for composite reliability are .70 (Fornell and Larcker 1981). As shown in Table 3, all constructs met this guideline.

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\(^1\) Due to space limitations, the measurement items for each construct are available from the first author.
To further assess the convergent and discriminant validities of the instrument, the scores of the average variance extracted (AVE) were examined. A rule of thumb suggests that the AVE should be no less than .50 to ensure convergent validity. From Table 3, we can see that the AVEs for the constructs range from 0.521-0.817, which are all greater than .50. For discriminant validity the square root of the AVEs should be greater than the correlations among the constructs, which indicates that the variance shared between the construct and its indicators is more than the variance it shares with other constructs (Ko et al. 2005). The statistical results are shown in Table 3. The bolded numbers are the square roots of the AVEs. Off-diagonal numbers are the correlations among constructs. All bolded numbers are greater than the off-diagonal ones, indicating satisfactory discriminant validity for the constructs. In summary, the measurement model was found to be satisfactory.

<table>
<thead>
<tr>
<th>Composite Reliability</th>
<th>AVE</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
<th>8</th>
<th>9</th>
</tr>
</thead>
<tbody>
<tr>
<td>Adaptation to Org. culture</td>
<td>0.894</td>
<td>0.631</td>
<td><strong>0.794</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>Concern about face</td>
<td>0.865</td>
<td>0.682</td>
<td>0.164</td>
<td><strong>0.826</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Extraversion</td>
<td>0.799</td>
<td>0.521</td>
<td>0.047</td>
<td>-0.167</td>
<td><strong>0.722</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>English Use Anxiety</td>
<td>0.947</td>
<td>0.817</td>
<td>0.095</td>
<td>-0.022</td>
<td>0.198</td>
<td><strong>0.904</strong></td>
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<td></td>
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<td></td>
</tr>
<tr>
<td>English Self Confidence</td>
<td>0.941</td>
<td>0.730</td>
<td>0.322</td>
<td>0.009</td>
<td>0.229</td>
<td>0.610</td>
<td><strong>0.854</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Quality of Tech. Infra.</td>
<td>0.936</td>
<td>0.786</td>
<td>0.244</td>
<td>0.094</td>
<td>0.197</td>
<td>0.069</td>
<td>0.085</td>
<td><strong>0.887</strong></td>
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<td></td>
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<tr>
<td>English Self-Evaluation</td>
<td>0.926</td>
<td>0.758</td>
<td>0.284</td>
<td>0.005</td>
<td>0.308</td>
<td>0.582</td>
<td>0.838</td>
<td>0.048</td>
<td><strong>0.871</strong></td>
<td></td>
</tr>
<tr>
<td>Participation Effectiveness in Social-Related Comm.</td>
<td>0.869</td>
<td>0.689</td>
<td>0.067</td>
<td>0.208</td>
<td>0.318</td>
<td>0.326</td>
<td>0.248</td>
<td>0.333</td>
<td>0.261</td>
<td><strong>0.830</strong></td>
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<tr>
<td>Participation Effectiveness in Task-Related Comm.</td>
<td>0.854</td>
<td>0.668</td>
<td>0.240</td>
<td>0.058</td>
<td>0.274</td>
<td>0.350</td>
<td>0.252</td>
<td>0.128</td>
<td>0.379</td>
<td>0.492</td>
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</table>

**Estimation of the Structural Model**

After establishing the reliability and validity of the measurement model, the proposed hypotheses were tested with PLS by assessing the path coefficients. Given the exploratory nature of this survey, we followed the precedent of previous studies (e.g. Bock et al. 2005; Ko et al. 2005) and assessed the statistical significance at the .10 level. The results of the analysis are depicted in Figure 1.

H1a, H1b and H1c tested the impact of perceived English competence on individuals’ preferences for written vs. voice communication tools and on participation effectiveness in task-related and social-related communication. The results show that H1b and H1c are supported, while H1a is not. The results did not show a strong relationship between perceived English competence and the preference for different knowledge-sharing tools, suggesting that individuals’ English competence would not be likely to influence his/her choice of written-based or voice-based communication tools. However, the results suggest that perceived English language competence has a strong positive relationship with participation effectiveness in both task-related and social-related communication.

H2a, H2b and H2c tested the impact of concern about face on individuals’ preferences for written vs. voice communication tools and on participation effectiveness in task-related and social-related communication. In general, none of the hypotheses was supported by the data. There is no evidence that expressed concern about face has an impact on individuals’ preferences for communication tools or participation effectiveness in task-related communication. However, contrary to what was proposed in H2c, the perceived degree of concern about face was found to have a positive significant impact on participation effectiveness in social-related communication.

The results support both hypotheses for the quality of technology infrastructure (H3a and H3b), which predict the impact of the quality of technology infrastructure on participation effectiveness in task-related and social-related communication. The quality of technology infrastructure was found to have a significant positive relationship with participation effectiveness in both task-related and social-related communication.

Mixed results were found for H4a and H4b. The results show that only H4a was supported as predicted, which suggests the more extraverted one is, the less one is concerned about face. Significant positive relationships were found with adaptation to organization culture and perceived degree of concern about face, which was contrary to what was proposed in H4b, so H4b was not supported.
In general, the results suggest the following interesting findings: (1) neither of the hypotheses regarding the impact of cultural dimensions on preference for written-based vs. voice-based communication tools was supported; (2) consistent with the findings from the case study, language was found to be the strongest factor that influences knowledge-sharing activities; (3) except for extraversion, all the hypotheses involving concern about face were either not supported by significant coefficients, or were supported but with a reversed relationship; and (4) the results were mixed for participation effectiveness in task-related vs. social-related communication.

Discussions: Synthesis of Qualitative and Quantitative Findings

In this section, we further discuss the findings noted above based on a synthesis of the qualitative findings from phase I and the quantitative findings from phase II of the study. We discuss in turn the preference for written communications tools, the importance of non-value based cultural dimensions, the impact of concern about face and the relation between task and social communications. Finally, we discuss how to understand the impact of national culture in human behavior by introducing a new concept called culture-in-practice.

Preference for Written-Based vs. Voice-Based Communication Tools in Global Virtual Collaboration

First, we discuss our findings regarding preference for different knowledge sharing tools. The selection of different knowledge sharing tools is important in GVC. The lack of paralinguistic and visual cues of daily interaction under such circumstances (especially with different cultural backgrounds) affects peoples’ perceptions of which tools make collaboration easier. This research investigates the impact of two cultural dimensions (language and concern about face) on individuals’ preferences for different communication tools in GVC, but the results showed no evidence for an effect, which indicates there are other factors that play a more important role in influencing individuals’ preferences for different tools. A possible factor is time zone difference, which characterizes GVC.

In global virtual collaboration, participants often work in different time zones. Olson and Olson (2000) pointed out that time zone differences have two effects: (1) the more time zones the participants cross, the fewer overlapping work hours they have; and (2) during the overlap, the participants at various sites are at different points in their circadian rhythms. The results of the case study also reflect this observation. Since there is a 15-hour difference between the Chinese and American sites, there are few overlapping working hours. So it was difficult for them to just pick up the phone and make a call. As a result, they preferred to use asynchronous communication tools, such as email, to communicate. This allowed them to do other work while waiting for a reply. The interviewees also
mentioned that sometimes they had to compromise by working late into night or very early in the morning in order to attend a virtual meeting. But during those times, they felt either tired already or still sleepy. Asynchronous communication allowed them to have a normal working schedule. In general, temporal dispersion amplifies spatial separation and makes synchronous interaction less common and more difficult (O’Leary and Cummings 2007).

So, in global virtual collaboration, although all kinds of communication tools are made available to the participants, they still cannot neglect the barrier caused by time zone differences. Actually, time zone difference might be the most important factor influencing their selection of different tools, which explains why H1a and H2a were not supported. Because time zone difference is a constant variable in this research setting, it was not investigated in the survey. Future research should have a research design that can examine this variable, e.g., by comparing east-west and north-south collaborations.

Non-Value-Based Cultural Dimensions vs. Value-Based Cultural Dimensions

Second, we consider the relation between non-value-based and value-based cultural dimensions. Two non-value-based cultural dimensions (language and quality of technology infrastructure) and one value-based cultural factor (concern about face) were investigated in this study. Consistent with the findings from the case study, language was found to be the strongest factor that influences knowledge-sharing activities. Furthermore, the results revealed that language and quality of technology infrastructure both have stronger path coefficients on participation effectiveness in task-related knowledge sharing than that on concern about face. The same pattern was evident in their impact on participation effectiveness in social-related knowledge sharing. These results emphasize the importance of non-value-based cultural dimensions in knowledge-sharing activities.

It is not difficult to understand this result. Working language proficiency and a good quality of technology infrastructure are prerequisites for communication using ICTs, given the difficulties global virtual collaboration face by the lack of face-to-face interactions. What is interesting here is that, compared with non-value-based cultural dimensions, concern about face, usually seen as a very important cultural value in Chinese society, has such low coefficients on task-related knowledge-sharing activities. One simple explanation might be that there are other levels of culture that are more relevant in this research setting. For example, cultural factors from the organizational level might play a more important role here. This explanation is consistent with the argument made by Karahan and colleagues (2005) about the relative influence of the different levels of culture on individual behavior. They propose that, for behaviors that include a strong social component or include terminal and moral values, supranational and national cultures might have a predominant effect; for behaviors with a strong task component or for those involving competence values or practices, organizational and professional cultures may dominate.

This observation brings an important question to current IS research on cross-cultural issues, which is dominated by value-based cultural dimensions as noted in section 2. This research does not argue that non-value-based cultural dimensions are more important than value-based ones in understanding individuals’ activities. Rather, it wishes to draw researchers’ attention to non-value based cultural dimensions and call for more research on understanding national culture in a comprehensive way.

Concern about Face

Third, we consider the impact of the value-based cultural factor explored, namely concern about face. As expected, there was a significant negative impact of extraversion on concern about face. However, none of the hypotheses regarding the impact of concern about face on knowledge-sharing activities was supported. Furthermore, contrary to hypothesis H2c, concern about face was found to have a reverse relationship with participation effectiveness in social-related communication. While it might be difficult to understand at a first glance, a plausible explanation does exist for such observations, which relies on a deeper examination of the concept of “concern about face” itself.

Face is “the respect, pride and dignity of an individual as a consequence of his or her social achievement” (Leung and Chan 2003 p.1575). People try to enhance their face or avoid losing it to gain respect and recognition from others (Cheung et al. 2001). Therefore, there are usually two behaviors related to concern about face: face-gaining behavior and face-saving behavior. Saving face does not necessarily mean gaining face, because face can only be gained through others’ recognition and admiration (Huang et al. 2008). Hwang et al. (2003) proposed that people behave differently towards face-saving and face-gaining. By surveying 159 MBA students in a major university in China, Huang and colleagues (2008) found that face-saving behavior has a negative relationship with the intention to
share knowledge, while face-gaining behavior has a positive relationship with the intention to share knowledge. Chu (2006) argued that if people intend to save face, they will restrict their behavior as much as possible or even avoid contact with others, but to gain face, people will engage in self-expression and actively show their merits.

Return to the discussion of the results of this research, a possible explanation for the results regarding the impact of concern about face is that people, at least in the surveyed sample, cared more about face-gaining than face-saving. In other words, people’s concern about “face” led to more face-gaining behaviors than face-saving behaviors, which might be the case in a competitive environment such as a multinational company in China. In such companies, people need to be recognized in order to gain various opportunities, such as salary raises and promotions. Therefore, the more people care about face, the more they would like to gain face, so they participate more effectively in social-related communication, because that is how they can express themselves to others. Similarly, a face-gaining inclination can also explain why people who are more adapted to organizational culture tend to be more concerned about face. In this study, the ABC corporation promoted an open, direct and competitive culture. Under the influence of this type of organizational culture, people are more likely to be concerned about face-gaining, so that the more they are adapted to the organizational culture, the more they will be concerned about face.

**Task-Related Communication vs. Social-Related Communication in Global Virtual Collaboration**

Finally, we consider the relation between task-related and social-related communication. In this study, three dimensions were investigated for their impact on participation effectiveness in task-related and social-related communication: the quality of the technology infrastructure, language and concern about face. The findings show that both language and the quality of the technology infrastructure have significant positive impacts on participation effectiveness in both task-related and social-related communication. Concern about face only showed a significant (but reverse as proposed) impact on participation effectiveness in social-related communication. Combined with the findings from the case study, we can observe that in general, national cultural dimensions have stronger impact on social-related communication than on task-related communication.

These results can be explained by the different communication requirements for social-related versus task-related knowledge sharing. The interviewees mentioned differences between sharing social-related and task-related knowledge. They pointed out that social-related knowledge is more context-based and it often comes with more idioms, faster talking speeds and the use of different conversational tones. Consequently, sharing social knowledge has a higher requirement for language and the quality of technology infrastructure. In global virtual collaboration, people with more proficient language skills and better technology infrastructure support are able and willing to participate in both task- and social-related communication because they can better understand what others say and keep the conversation going smoothly.

**The Impact of National Culture in Practice**

Based on the above analysis, the results suggest that, in practice, individuals’ understandings of national cultural values are not always consistent with each other, as assumed by most cultural research in the IS field. Rather, their understandings are influenced not only by other levels of culture, such as organizational culture and professional culture, as suggested by Straub et al. (2002), but also by contextual factors such as the leadership styles the superiors have. Thus, a Chinese technical support engineer working at an American company in China might have a different understanding of concerns about face on the part of those who work at a local Chinese company, since they are also simultaneously influenced by different organizational cultures and are exposed to different leadership styles.

Therefore, the results of this study suggest that it is not proper to assume that individuals with the same national culture will behave in the same way. Instead, national culture should be studied within the specific context of the participants. In different contexts, people, even within the same national culture, may enact different understandings of cultural values, which in turn influence their daily behaviors. We term this phenomenon culture-in-practice\(^2\) to distinguish it from culture itself. Culture-in-practice is different from culture in the sense that culture consists of “physical” aspects (i.e., the integrated sum total of learned behavioral traits), while culture-in-practice is the “use” of culture (i.e., what people actually “do” with culture in their daily activities). When people are influenced by national

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\(^2\) This term was inspired by the distinction between technology and technology-in-practice made by Olikowski (2000)
culture, as in cross-cultural collaboration, they draw on the espoused culture values, their knowledge, previous experiences and expectations about the culture, which are influenced by the contexts in which they live and work, and the norms that inform their practices. In this way, the “use” of national culture to guide individuals’ behaviors becomes structured by these factors.

Limitations

Before discussing the implications of this research, it is necessary to point out its limitations. The first limitation is the relatively small sample size in the second phase. Although the sample size is enough for the PLS analysis in this study as we explained earlier, some researchers have also pointed out that PLS does not have adequate power to detect small or medium effect at small sample sizes (Goodhue et al. 2006). An increase to the sample size should be made for future research.

Perhaps the main limitation is the sampling strategy. As noted earlier, a nonprobability sampling technique, snowball sampling, was used, for two main reasons. The first is that the organizations surveyed in the second phase had to have an organizational culture similar to that of the organization investigated in the first phase. This consideration limited the researchers from just publishing the survey online and inviting any Chinese who had virtual working experiences with the Americans to participate. Second, it was very difficult for the researchers to get permission and support from organizations to survey their employees. Faced with these two theoretical and practical considerations, the researchers decided to adopt the snowball sampling technique. Although this technique was convenient and appropriate for current research, it was vulnerable to selection bias. All the other participants in this survey were referred by the four contacts of the researchers, who themselves also finished the survey. The referral process was beyond the researchers’ control. Future research should consider using probability sampling techniques (such as stratified random sampling) to retest the model.

Conclusion and Implications

This study investigates the impact of national culture on individuals’ knowledge-sharing activities in global virtual collaboration, in the context of Chinese culture. The results show that, essentially, the impact of culture is emergent in practice. Unlike the commonly held static view of national culture, it can be seen here that individuals’ understandings of national culture, especially cultural values, are influenced by many other contextual factors, such as organizational culture, individual personality and leadership style. As a result, individuals may exhibit different reactions to the same culture, which, in turn, affects their activities (such as knowledge-sharing in this case).

This research contributes to cross-cultural IS research by studying national culture from dynamic and individual perspectives. Researchers have argued that the concept of “national culture” that dominates the IS research is too simplistic (Myers and Tan 2002). People from the same country can score quite differently on cultural dimensions; therefore, the assumption of homogeneity in culture is not appropriate, especially when national culture is to be integrated into IS models that reflect individual behaviors (McCoy et al. 2005). Researchers also have argued that an individual’s behavior is influenced by different levels of culture, so culture should be measured at the individual level (Straub et al. 2002). They further suggest that each cultural study in IS research should have to establish the salient cultures in each individual’s background and include them in the inquiry. However, existing cultural research has mainly been conducted at the single cultural level. Although the focus of this research is national culture, organizational culture was also identified as an important factor in individuals’ knowledge-sharing activities, shaping individuals’ perceptions of cultural values. This study empirically supports the argument that different levels of cultures can simultaneously influence an individual’s activities and culture should be measured from an individual perspective.

As to practical implications, this study provides important insights, particularly for international businesses that currently have, or seek to, establish subsidiary operations in China. Previous research has found that, though managers have realized the importance of culture, they find it is difficult or even impossible to “articulate the culture-knowledge relationship in ways that lead to action” (Long and Fahey 2000). This study explores the relationships between national culture and knowledge-sharing activities in global virtual collaboration. The results can help practitioners understand the role of national cultural dimensions in individuals’ knowledge-sharing activities and selection of different ICT and thereby develop some mechanisms to increase and improve knowledge-sharing in global virtual collaborations.
References


Global, International, and Cultural Issues in IS


