Bridging Cultural Discontinuities in Global Virtual Teams: Role of Cultural Intelligence

Completed Research Paper

Anuragini Shirish
Department of Information Systems
Telecom Ecole de Management
Evry Cedex, France
anuragini.shirish@telecom-em.eu

Imed Boughzala
Department of Information Systems
Telecom Ecole de Management
Evry Cedex, France
imed.boughzala@telecom-em.eu

Shirish C. Srivastava
Department of Operations Management and Information Technology
HEC Paris, France
srivastava@hec.fr

Abstract

Prior research on global virtual teams (GVTs) identifies 'cultural discontinuity' as a salient boundary that needs to be bridged for better performance. Grounding the study in organizational discontinuity theory (ODT), we propose cultural intelligence (CQ) as one of the modalities through which cultural discontinuities in GVTs could possibly be bridged. Situating the discussion, in transactional model of stress and coping (TMSC), we develop a CQ nomological network describing the inter-relationships and mechanisms through which different CQ dimensions influence GVT performance. Further, leveraging compensatory adaptation theory (CAT) we hypothesize the significant role of structural adaptation (role structure adaptation), in addition to behavioral adaptation (CQ behavior), in the proposed CQ framework for the GVT context. The theorized model is tested via data collected through a two-wave survey design comprising 128 GVT members in 32 teams. Study provides support to the extended CQ nomological network and makes several valuable theoretical and practical contributions.

Keywords: Cultural intelligence, virtual teams, geographical dispersion, cross-cultural issues, cultural differences, global teams.

Introduction

In today's networked world, global virtual teams (GVTs), characterized by their globally distributed and culturally diverse members, are considered as new organizational units for team collaboration. Because of the diversity of perspectives within such teams, GVTs can have several advantages such as enhanced creativity, when compared to traditional co-located face-to-face teams (e.g. Curseu et al. 2008; Garfield et al. 2001). However, there is limited theoretical and empirical understanding on the mechanisms through which creative project outcomes are impacted in GVTs (Gilson et al., 2015). Despite the assumed benefits of creativity performance in VTs, literature identifies several boundaries or discontinuities such as time, geography, organizations, culture, work practices, and technology that need to be bridged to orchestrate effective GVT performance (see Chuboda et al. 2005; Watson-Manheim et al. 2012). Among the identified discontinuities, prior GVT research recognizes cultural discontinuity as a salient boundary that needs to

be appropriately spanned. Review of extant literature on the role of culture in GVTs, also shows that research on the subject has till now primarily focused on identifying the reasons for cultural discontinuities and the various forms in which they manifest (e.g. Daniel et al. 2004; Ferreira et al. 2012; Gatlin-Watts et al. 2007; Hardin et al. 2007; Massey et al. 2005; Staples and Zhao 2006; Zakaria et al. 2004; Zhang et al. 2007). Studies have also established the negative impacts that cultural discontinuities produce in virtual team contexts (Allan and Lawless 2003; Flaherty 2008; Gudykunst 1995; Malik et al. 2014; Mockaitis et al. 2012; Rosen et al. 2007; Vignovic and Thompson 2010). Yet, there is limited understanding on how cultural discontinuities could be bridged for enhanced GVT performance (Watson-Manheim et al. 2012). Motivated by this significant research gap, the current study extends the cultural intelligence (CQ) literature by proposing the mechanisms through which cultural discontinuities manifesting in GVTs could possibly be bridged for enhancing virtual team performance (specifically creativity performance). Hence, team performance in our study is conceptualized through the two sub-constructs of creative performance outcomes, namely--novelty and usefulness (Fleming et al. 2007; Yong et al. 2014).

CQ is the capability to function effectively in situations characterized by cultural diversity (Ang et al. 2006; Earley and Ang 2003). It comprises four dimensions – *CQ motivation* is the interest and confidence in functioning effectively in culturally diverse settings, *CQ knowledge* is the familiarity about the similarities and differences across cultures, *CQ metacognition* is the sense making and strategizing capability when dealing with culturally diverse experiences, and *CQ behavior* is the ability to display verbal and non-verbal responses in cross cultural settings (Ang and Van Dyne 2008). By bridging the cultural discontinuities, CQ can be instrumental in influencing GVT performance including its creativity performance. In addition, prior studies have called for a nuanced investigation of the inter-relationships amongst different CQ dimensions. In this study, we examine how the four CQ dimensions interact with each other to influence GVT performance in an integrated way. Grounding the work in theories on organizational discontinuity (OD) and cultural intelligence (CQ), and leveraging transaction model of stress and coping (TMSC) for developing the hypotheses, the current study examines how and to what extent the four dimensions of CQ, assist GVTs in bridging their cultural discontinuities, thereby influencing their performance.

Further, leveraging Hong et al.'s (2013) recent work on context specific theorization, we propose that in the GVT context, in addition to behavioral adaptation (CQ behavior), structural adaptation within virtual teams (role structure adaptation) needs to be suitably incorporated within the CQ nomological network. GVTs offer comparatively lesser opportunities to display behavioral adaptation because the interaction amongst virtual team members is largely through virtual means (emails, phone calls and/or video conferencing) and not face-to-face as in traditional teams. Hence, taking cue from the compensatory adaptation theory (CAT) (Kock 2001) we argue for the salience of structural adaptation in the GVT context (see Hong et al. 2013). Hence, the three research questions that we address in this study are:-

RQ 1: In the context of GVTs, does CQ influence team performance?

RQ 2: How do the four dimensions of CQ interplay to influence GVT performance?

RQ 3: Does CAT help contextualize the CQ nomological network for GVT performance?

For testing the theorized model, the study uses data collected via two rounds (waves) of surveys from a sample of 128 team members grouped in 32 GVTs. The research makes three key contributions. First, by theorizing the role of CQ in bridging cultural discontinuities in the GVT context, the study develops a nomological network relating CQ dimensions and GVT performance. Second, by building on the compensatory adaptation argument, the study proposes and tests the role of structural adaptation in the GVT context, thereby extending the CQ framework to the GVT context. Third, the study specifically examines GVT performance in terms of creativity outcomes, namely—novelty and usefulness, thereby establishing a theoretical relationship between team level capabilities and creativity outcomes, which has largely been ignored in the past virtual team literature. Gilson et al (2014) in a recent review article on virtual teams have highlighted the less attention paid to creative performance outcomes in the GVT literature and have suggested it as an important area for future research. On the practical front, the study reinforces the feasibility and importance of having ambidextrous goals for GVTs. Further, several human resource interventions such as the use of CQ measurement and training are shown to be crucial for success in GVT projects. The study provides guidance to GVT leaders about the importance of considering

the salience of role structure adaptation for handling cultural discontinuities to facilitate better virtual team performance.

Theoretical Background

Organizational Discontinuity Theory and Global Virtual Teams

Unlike traditional co-located face-to-face teams, the interaction in virtual teams is largely facilitated through virtual electronic channels such as emails, phone calls and/or video conferencing. Moreover, the virtual team members can be located in different parts the world--across different time zones and cultures. This clearly introduces multifarious interactional discontinuities across virtual team members. To explain these discontinuities or boundaries, Chudoba et al. (2005) proposed a discontinuity framework explicated through virtuality index to assess the negative impacts of the different boundaries manifesting in virtual teams. While explaining the interactional processes in GVTs, Watson-Manheim et al. (2012) expanded on the idea of boundaries to include the process of the boundary crossing activity, which is one of the inevitable consequences of working in GVTs. Consequently, they proposed the organizational discontinuity theory (ODT) for understanding the interactional phenomenon in GVTs. According to ODT, discontinuities and continuities describe the settings in which virtual teams operate. When a GVT encounters a situation in which routine behaviors do not produce the expected action responses, it implies that the prevailing boundaries have created discontinuities in work. But team members may respond and adapt differently to these boundaries, which depends on their perceptions and capabilities (Watson-Manheim et al. 2012). Thus, discontinuities are external stimuli that shake the team's equilibrium leading to the recognition of the anomaly between expectations and the experienced reality. This in turn influences the team's adaptation. The framework identifies culture as one of the salient discontinuities, along with a few others such as time, space, and organizations that need to be appropriately addressed in the virtual team context.

In the present day, many globally distributed organizations are implementing GVTs as they are expected to provide enhanced performance through increased flexibility and responsiveness (Gibson and Gibbs 2006; Majchrzak et al. 2004; Stanko and Gibson 2009). Typically, such global teams consist of team members from different locations with diverse cultural backgrounds (Evaristo 2003; Staples and Zhao 2006). While, one stream of research suggests that the diversity amongst team members tends to increase their performance by bringing together different perspectives (e.g. Joshi and Roh 2009; Kanakahalli et al. 2006; Kirkman et al. 2004; Van Knippenberg and Schippers 2007; Watson et al. 1993), there are other studies that suggest the contrary i.e. a multiplicity in perspectives may actually have a negative influence on performance (e.g. Richard et al. 2014; Vangen and Winchester 2014). Moreover, research has shown that cross-cultural interactions within or outside teams can cause stress, anxiety, miscommunication and even conflict (Mockaitis et al. 2012; Vignovic and Thompson 2010; Flaherty 2008) which in turn can lead to suboptimal performance outcomes (Kanakahalli et al. 2006; Hinds and Bailey, 2003). In the context of GVT collaborations, with minimal direct cues for communication, problems of cross cultural miscommunication are further amplified leading to team performance issues primarily due to insufficient team adaptation (Brett et al. 2006; Earley and Mosakowsky; Evaristo 2003; Dineen 2005; Hinds and Mortensen 2005; Mockaitis et al. 2012; Paul et al.2004; Polzer et al. 2006; Powell et al. 2004). From a research perspective, it will be interesting to examine the mechanisms through which GVTs bridge these inherent cultural discontinuities. CQ can be one of the facilitating mechanisms, which we examine in this study.

Cultural Intelligence Theory and Global Virtual Teams

Cultural intelligence (CQ) as a concept is based on the multi-loci theory of intelligence, which proposes that intelligence is located in various mental and behavioral capabilities facilitating goal directed adaptive behavior (see Sternberg and Detterman 1986; Sternberg and Salter 1982). CQ is defined as the capability to deal effectively with situations characterized by cultural diversity (Ang et al. 2006). It has been conceptualized as a multidimensional and malleable construct with cognitive, motivational, metacognitive, and behavioral aspects integrated within it (Erez et al. 2013; Ang and Van Dyne 2008). It comprises four dimensions – *CQ motivation* is the interest and confidence in functioning effectively in culturally diverse settings, *CQ knowledge* is the familiarity about how cultures are similar and different,

CQ metacognition is the sense making and strategizing capability when dealing with culturally diverse experiences, and *CQ behavior* is the ability to display verbal and non-verbal responses in cross cultural settings (Ang and Van Dyne 2008). In addition to examining CQ at the individual level, prior research has conceptualized CQ as a team level capability to identify, calibrate and manage cultural risks (Adair et al. 2013; Scholz 2012; Magnusson et al. 2014). Further, CQ has also examined as a firm level construct (Ang and Inkpen, 2008).

CQ is malleable and therefore can be acquired by adequate training, interactions and experiences and it is more than just the knowledge about different cultures. Further CQ is not specific to a particular culture and does not emphasize on mastering an individual culture but it focuses on developing an overall repertoire of understanding, skills, and behaviors for making sense of the barrage of cultures that may be encountered in global work settings such as GVTs (Livermore 2010). Studies about intercultural encounters, particularly research on team capabilities for intercultural effectiveness are limited and rather unsystematic, leaving an important gap in our understanding as to why some teams are more effective than others in culturally diverse situations (see Ang et al. 2007; Ang and Van Dyne 2008). In the virtual team literature as well, there are rather a negligible number of studies that propose or test possible solutions to better deal with cultural discontinuities (Watson-Manheim et al. 2012). To the best of our knowledge, no study has yet explored the influence of the four CQ dimensions on virtual team performance. Prior research has shown that CQ, in general, predicts performance in multicultural settings. But this proposition has not yet been examined in the GVT context, which could pose unique contextual challenges requiring theoretical rethinking about its applicability.

The four dimensions of CQ are said to be qualitatively different facets of the overall capability to function and manage effectively in culturally diverse settings (Earley and Ang, 2003). But CQ has generally been represented as an aggregate multidimensional construct comprising the different CQ dimensions. Thus, CQ motivation, CQ cognition, CQ metacognition, and CQ behavior are different capabilities that together form the overall CQ (Ang et al. 2007). However, psychological theories (such as TMSC) provide us several reasons to investigate the interrelationships amongst the different dimensions of CQ. Thus, in addition to examining the influence of CQ on team performance in GVTs, it is imperative to examine the nomological network surrounding CQ especially in the specific context of GVTs, which is different from face-to-face interactions (see Ang et al. 2011; Van Dyne et al. 2010). Past literature has not examined the inter-relationships amongst CQ construct dimensions. Moreover, only few studies investigate the dimensionality view of the construct and recent calls have been made to consider this perspective (e.g. Malik et al. 2014). Further, CQ research in the context of teams is rather limited. Answering to these calls, we use the CQ theory to conceptualize a CQ nomological network that provides a prescriptive approach to addressing the cultural discontinuities affecting GVT performance. A holistic understanding of how CQ can contribute to team performance in a GVT can guide multinational organizations that are dependent on successful GVT collaborations. Further, despite its importance, there is a lack of contextual theory-building efforts using cross-disciplinary lens in the virtual team context (see Hong et al. 2013; Schiller et al. 2007).

Theory and Hypotheses

Although the current study is predicated on gaps in organizational discontinuity theory (ODT) and cultural intelligence (CQ) theory, for developing the hypotheses we situate our discussion in transaction model of stress and coping (TMSC) and compensatory adaptation theory (CAT). In this section, we explain the basic tenets of TMSC and CAT and concurrently leverage them for proposing a set of hypotheses relating the key constructs for developing a nomological network surrounding CQ for the GVT context. The overall theoretical model which is described in this section is presented in Figure 1.

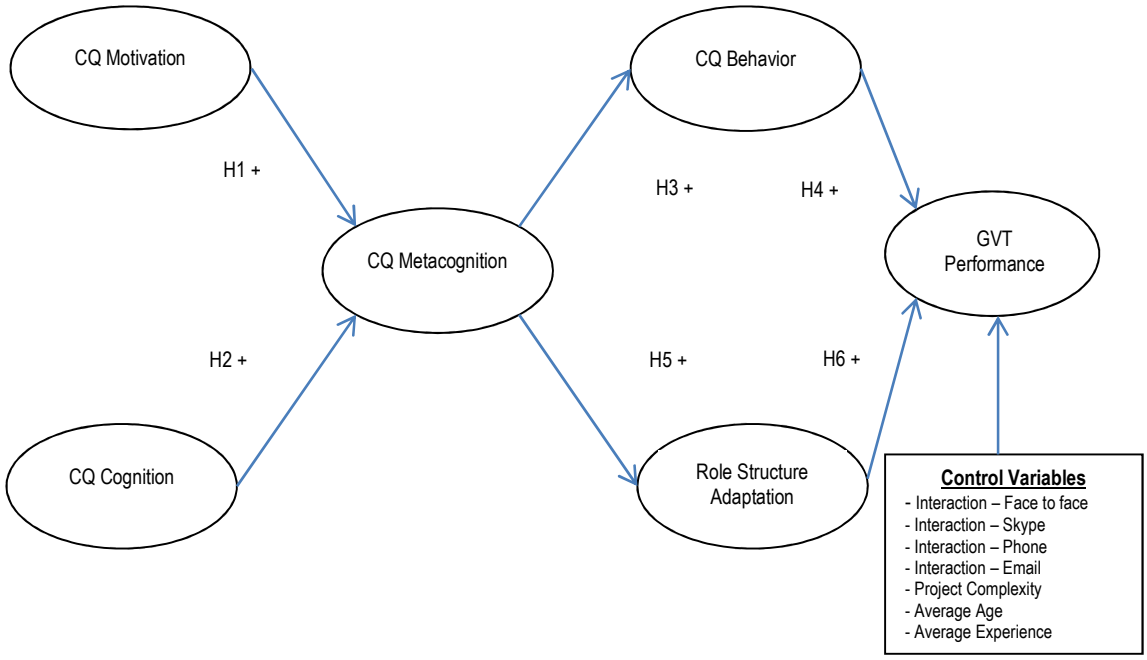

Figure 1. Global Virtual Teams: Bridging Cultural Discontinuity through Cultural Intelligence

Leveraging Transactional Model of Stress and Coping (TMSC)

In this research, we utilize Lazarus and Folkman's transactional model of stress and coping (TMSC; 1984) as the theoretical framework for explaining the mechanisms through which cultural discontinuities are addressed by the different dimensions of CQ, thereby influencing performance outcomes. According to TMSC, when encountered with stress creators (which are demands made by the internal needs or external environment), individuals adopt coping strategies to restore the balance in two distinct stages (Lazarus and Cohen 1977). In the first stage, individuals appraise the stress creators to assess their potential consequences. This is termed as the primary appraisal. In the second stage, individuals weigh the stress creators against the resources available with them to devise a stress mitigation strategy for dealing with the situation. This is termed as the secondary appraisal (Cohen 1984; Lazarus and Folkman 1984).

Based on TMSC, Pearsall et al. (2009) developed a theoretical model for examining the differential effects of various environmental demands on different team level outcomes. The challenge–hindrance framework classifies environmental stressors as either challenges or hindrances. Stressors that are considered by employees as challenging or potentially rewarding will exhibit positive effects on attitudes and performance, while stressors that are perceived as hindrances will exhibit negative effects. In the GVT context, if team members see their cross-cultural interactions as challenges or opportunities they will try to draw upon their CQ resources to deal effectively in such situations by better planning their cross-cultural interactions.

Hence, in the context of GVTs, team members experience cultural discontinuities as stress creators and need to strategize to deal with them. But, as aforementioned, even before GVT members plan and strategize their cross cultural interactions, they need to be sufficiently motivated to assess the potential consequences of such a situation on their performance outcomes. For undertaking such an assessment of a cross-cultural situation, GVT members need to have the requisite drive and motivation to understand the encountered cross-cultural environment. Hence, the ability of the GVT members to plan their cross-

cultural interactions (i.e. CQ metacognition) will be influenced by the drive they have for being effective in such interactions (i.e. CQ motivation). Thus, we hypothesize:

H1: CQ motivation is positively associated with CQ metacognition.

The primary appraisal is the judgment about the significance of the event as stressful, positive, controllable, challenging, or irrelevant. Faced with the cultural stressors, the second appraisal follows, which is an assessment of the coping resources, options and efforts (Cohen 1984; Lazarus and Folkman 1984). In the GVT context, coping resources are conceptualized as prior cross-cultural knowledge of team members, captured by the cognitive dimension of CQ (Livermore 2010). It includes within its ambit, knowledge about the differences in cultural systems, norms, and values. Cultural systems are the ways in which societies organize themselves to meet the basic needs of their members such as family systems, religious systems and language conventions that facilitate interactions. Cultural norms and values refer to the ways in which cultures approach issues related to time, authority, and relationships. Team members' work behaviors are invariably shaped by their respective cultural systems, values, and norms. An understanding of how cultures differ in terms of work norms, habits, and behaviors is the basis to act intelligently in cross cultural settings (Van Dyne et al. 2010). The extant literature on culture and virtual teams clearly recognizes the importance of possessing cross-cultural knowledge for dealing effectively with conflicts so as to achieve an optimal performance.

In the GVT context, secondary appraisal address what the team members can do about the situation. For this they need to have the ability to strategize and plan their interactions i.e. CQ metacognition. CQ metacognition is a higher-order capability to think about interactional processes, anticipate cultural preferences of others and adjust mental models during and after intercultural experiences (Ang et al. 2007). Hence, after undertaking the primary appraisal of the encountered cross-cultural situation, GVT members would assess if they have sufficient resources for planning and strategizing for effective cross-cultural interactions in GVTs. As already discussed, one of the key resources for planning cross-cultural interactions is the knowledge about the similarities and differences across cultures (i.e. CQ cognition). Hence, the ability of the GVT members to plan their cross-cultural interactions (CQ metacognition) will be influenced by the knowledge or cognition they have about different cultures. Hence, we hypothesize:

H2: CQ cognition is positively associated with CQ metacognition.

Following the line of arguments for the two prior hypotheses based on TMSC, we posit that the metacognitive dimension of CQ is triggered during the secondary appraisal stage so as to develop a suitable strategy to overcome the cultural discontinuities or stressors in the GVT context. After assessing the coping potential, GVT members need to plan their actual coping efforts. In cross-cultural interactions, coping efforts are the adaptive behaviors that need to be undertaken to bridge the cultural discontinuity thereby mitigating the impact of cultural stressors. CQ behavior is the dimension that signifies the overt display of communication behavior and is chosen as an appropriate coping mechanism by the GVT members based on their motivation, knowledge and strategizing capabilities (Livermore et al. 2010). CQ behavior is also categorized as the action dimension of the CQ construct without which cultural intelligence cannot be displayed (Ang et al. 2007).

The CQ behavior dimension covers the behavioral flexibility that team members have in changing their communicative behaviors across different cross-cultural settings. Broadly this construct also assesses if team members are adaptive in their communication style and if they can negotiate differently as and when the cultural situation demands (Livemore 2010). The behavioral dimension of CQ symbolizes a broad repertoire of communicative behaviors that includes verbal and non-verbal behaviors such as exhibiting culturally appropriate words, tone, gestures, and facial expressions (Gudykunstet al. 1988). Verbal communication includes the volume and rate of speech, and the level of enthusiasm. On the other hand, non-verbal communication indicates the use of facial expressions, gestures and also ways of dressing (Livermore 2010). In the context of GVTs, the behavioral flexibility to adapt to cross-cultural situations certainly depends on the ability of the team members to strategize and plan their encounters. Moreover, in a recent paper, CQ metacognition is described as the lynchpin between understanding and how individuals use knowledge to display it in cross cultural settings (Van Dyne et al. 2010). Hence, we hypothesize:

H3: CQ metacognition is positively associated with CQ behavior.

Prior literature has shown that CQ behavior affects performance outcomes (for a review see Ng et al. 2012). The relationship between CQ behavior and performance can also be argued using TMSC. Coping efforts are displayed through appropriate communicative actions that are displayed through verbal and non-verbal behaviors. In the context of GVTs, team members with high behavioral CQ will have the possibility to use their behavioral ability to cope with the cultural stressors in an appropriate way, thereby bridging the cultural discontinuity. Overall display of cultural intelligence will lead the GVT members with higher CQ behavior to achieve stability in a better way as compared to members with lower behavioral CQ. This would also imply smoother interactions with lesser time spent on resolving cultural differences and more on the actual task at hand. Such bridging of cultural discontinuities would lead to a better flow of information among team members by improving the quality of their communication with each other. This in turn is expected to influence the team performance positively.

Higher behavioral CQ implies avoiding communication ambiguity through the appropriate use of verbal and non-verbal behaviors. For the specific context of team outcome variables related to creativity i.e. novelty and usefulness, we posit that in the GVT context, team members from different parts of the globe will have diverse and useful perspectives. But to integrate these myriad ideas and have a coherent team performance, it is imperative for team members to display culturally intelligent behavior for communicating better. Thus, display of culturally intelligent behavior by GVT members is expected to result in novel and useful team performance outcomes. Further, it is expected that when CQ behavior elicits positive feedback, the team's CQ motivation is enhanced and the cycle continues. This also indirectly contributes to better problem solving, leading to better resolution of discontinuities in GVTs. Therefore, we hypothesize:

H4: CQ behavior is positively associated with virtual team performance.

Leveraging Compensatory Adaptation Theory (CAT)

CQ behavior as a construct is generally relevant for face-to-face interactions, where the displayed verbal and non-verbal behaviors can be observed by the interacting team members. The co-located team members can then take the displayed behavioral cues into consideration while interacting with other team members from different cultures. But what happens in the context of GVTs where interactions amongst team members are through virtual electronic media, such as phone, emails, and/or video conferencing?

In has been long concluded that in contrast to face-to-face communication, communication through electronic media is not as rich and natural (Daft and Lengel 1986; Graetz et al. 1998; Short et al. 1976; Warkentin et al. 1997). For example, electronic media lacks synchronicity and the ability to convey tone, voice, and facial expressions. This should lead to decreased communication effectiveness and outcomes quality in collaborative tasks. However, empirical findings do not conclusively prove this assertion. On the contrary, research has shown that even with electronic means of communication, the level of performance outcomes is the same or in some cases even greater than face-to-face communication. To provide alternative explanations, compensatory adaptation theory (CAT) was introduced (Kock 2001). Partially inspired by human evolutionary theory, CAT states that team members using virtual means compensate for the perceived lack of naturalness of a communication medium through increased cognitive efforts and often produce expected or more than the expected performance outcomes. The compensatory adaptation principle thus explains that individuals who use electronic communication media tend to compensate for the cognitive obstacles through other means (Kock, 2007). Despite, the importance of CAT, the processes through which compensatory adaptation takes place has not been examined in detail in the virtual team context.

Prior research has generally measured compensatory adaptation by using proxy measures such as the extent of communication fluency (number of words conveyed per minute) through a communication medium. If the communication fluency was less, it was concluded that compensatory adaptation occurred, which lead to positive performance outcomes. In this study, we propose an alternate perspective of measuring compensatory adaptation that may be applicable to the specific GVT setting. By doing this, we also address the calls for context specific theorization (see Hong et al. 2013; Schiller and Mandiwalla 2007).

As aforementioned, the ability to strategize in cross-cultural setting (CQ metacognition) leads to cross-cultural adaptation thereby bridging the cultural discontinuity. Evolutionary psychology literature

classifies adaptation as behavioral and structural. In the cross-cultural context of GVTs, behavioral adaptation refers to the adaptation of team members in terms of visible verbal and non-verbal behaviors referred to as behavioral CQ in the previous section. In case of co-located face-to-face multicultural teams possibly behavioral adaptation will play a salient role. But in the case of cross-cultural GVTs, where the communication medium does not provide sufficient richness to clearly observe the verbal and non-verbal behaviors, structural adaptation might also need to be considered as a compensatory adaptation mechanism. In the context of GVTs, structural adaptation refers to the role structures implying the ways in which GVT members complement and supplement the work related roles of other team members in a cross-cultural setting. Thus, structural adaptation, which is a compensatory adaptation mechanism (in addition to behavioral adaptation or CQ behavior), emanates due to lack of naturalness in the media in a virtual team setting for dealing effectively with cultural discontinuities posed by the virtual environment. Hence we hypothesize:

H5: CQ metacognition is positively associated with role structure adaption.

Grounding the discussion in CAT, it is argued that in the context of GVTs, because of the use of electronic communication media, there will be lesser opportunities to display verbal and non-verbal behaviors. Thus, the role of behavioral adaptation through the behavioral CQ dimension may be limited. To compensate for the lack of media naturalness, in the case of GVTs, other means of adaptation may be activated so as to cope up with the cultural stressors through reflective thinking. This is especially necessary to obviate situations of communication ambiguity. In case of face-to-face communication the use of non-verbal communication is often used to tone down the reception of a verbal statement that may otherwise be considered as too direct and unpleasant. For example, stating something like "you are wrong, Nancy" with a smile and mild tone in a face-to-face meeting versus sending an email text stating the same can be received differently by the receiver.

Although in the previous sections it is hypothesized that behavioral adaptation would be displayed through behavioral CQ dimension, it is also proposed that due to virtual context of work, certain behaviors especially non-verbal behaviors are less likely to be communicated. However, as described in CAT, teams may develop compensatory mechanisms to adapt to this communication ambiguity. It is envisaged that compensatory adaptation may take the form of adapting to roles and work practices of the other members in the virtual team by changing one's ways of working/routines so as to compensate for the lack of media naturalness. Such compensatory adaptation is termed as role structure adaption and is measured based on the how easily the member is able to change his role so as to fulfill the task requirement given the high interdependency coupled with communication ambiguity in view of the prevailing cultural discontinuities. Role structure is defined as reactive and non-scripted adjustments to team's systems and members' roles (Lepine 2003). The term adjustment in this definition means those critical patterns of behavior or activity performed by the team members that are captured by the team's role structure (Lepine 2003). Explaining such process can help provide insights into the black box through which team inputs influence team outcomes. How effective the team members collectively adapt to each other's roles will influence team outcomes after an unanticipated change in the task context such as a novel cultural situation that is expected to arise in a GVT context (Hutchin and Klausen 1996; Lepine 2003).

Role structure adaptation has been shown to have a bearing in different team settings and is particularly important for teams that must integrate information to make a series of decisions over a defined span of time. GVTs are mostly formed to address specific problems, their task outcomes are usually time bound. Hence, in the context of GVTs when dealing with boundary crossing activities for coping with cultural discontinuities, in addition to behavioral adaptation, structural adaptation also becomes salient. Similar to the discussion on the role of CQ behavior on team performance, we argue that structural adaptation will also facilitate cross-cultural team members to understand the team role structures guiding their interactions for team creativity performance comprising novelty and usefulness. As aforementioned, through this compensatory adaptation, which is dependent more on the work processes/routines rather than the display of cross-cultural behaviors, team members should be able to better assign meanings to the actions of different members as well as better plan one's action for any future cross cultural interactions This will result in improved communication, thereby reducing the communicational ambiguities due to cultural discontinuities in the GVTs. Hence, we hypothesize:

H6: Role structure adaptation is positively associated with virtual team performance.

Methodology

Instrument and Data Collection

Two-wave survey method was adopted for collecting data and testing the research hypotheses. The respondents were MBA participants in a joint academic program between two business schools – one in Europe and the other in India. The participants from both the schools, signed up for a graded semester long collaborative academic program, where the objective was to work on a joint business related study project on a topic having insights and implications for both Europe and India. Overall 128 participants, based on their preference and past academic performance, were selected to participate in the collaborative academic program – 64 from the European school and 64 from the Indian school. Based on their areas of study interests, the participants were matched and grouped into a total of 32 project teams comprising 4 members per cross-cultural team (2 from the European school and 2 from the Indian school).

Subsequent to the formation of the project teams, members interacted through virtual means (skype, phone calls, and emails) to finalize their respective project topics. After the project topics were finalized, the European team members visited the Indian business school for a week; where in addition to participating in other coursework they had the opportunity to meet up with their Indian team counterparts – face-to-face – to initiate work on their chosen study project. Subsequently, upon their return to Europe, all team members (European and Indian) worked jointly on their respective study projects for a period of 4 months. During this period, the European and Indian members interacted only through virtual means. Subsequently, the teams submitted their project reports to a jury comprising 5 independent members who assessed the performance of each project team on two dimensions – novelty and usefulness.

The research data was collected from each of the team members in two waves – first, at the start of the semester long study project, and second, at the end of the study project. The two data collection periods were separated by about 4 months–the duration of the project. The data on CQ variables and demographics were collected during the first wave, and the data on role structure adaptation and extent of interaction with foreign team members through different channels were collected during the second wave. The data was aggregated to the team level for analysis. Similarly, the assessment provided by the 5 jury members for each of the study project team was aggregated and averaged to assess team performance on two dimensions – novelty and usefulness. The data collected from the two waves was analyzed in conjunction with team creativity performance data collected from the independent jury members. Such a data collection design minimized the possibility of common method bias. Validated constructs from prior studies where psychometric properties have already been established, were adapted and used in this study e.g. for different dimensions of CQ (Ang et al. 2007), role structure adaptation (Lepine 2003), and team performance in terms of novelty and usefulness (based on Oldham and Cummings 1996; Sawyer 2006; Yong et al. 2014). Sample items under each category are provided in Appendix 1. All constructs have been modeled with reflective indicators. The CQ scale by Ang et al. (2007) has recently been extended by Van Dyne et al (2012) to go deeper into each of the CQ dimensions and classify the sub-dimensions. Because our study, focuses on establishing the nomological network surrounding the four CQ dimensions and team creativity performance, we continued to use the validated and tested original CQ scale. However future studies can use the new scale if the research context so requires. Because the dependent performance variables may be influenced by factors other than those in the hypothesized model, we incorporated suitable controls in the research model for the two team performance variables (novelty and usefulness) to better understand the variance explained by the research variables. Control variables of three different types were included to account for alternative explanations, namely: (1) extent of interaction with the foreign team members – face to face, skype, phone, and emails; (2) project characteristics – project complexity; (3) team member characteristics – average work experience and age.

Data Analysis, Results, and Discussion

Among the 128 respondents, the average age of the respondents was 29.98 years, with a standard deviation of 1.29, and the average work experience was 6.01 years with a standard deviation of 1.37 (Appendix 2). For data analysis, we used Partial Least Squares (PLS), a latent structural equation modeling technique, as implemented in SmartPLS 2.0, which utilizes a component-based path modeling

application (Ringle et al. 2005). PLS avoids the two major problems of inadmissible solutions and factor indeterminacy and thus is appropriate for analyzing complex models with latent variables (Fornell and Bookstein 1982; Pavlou and Gefen 2005; Wold 1985). Various information systems (IS) studies have employed PLS and found it to be an effective method for data analysis (e.g. Teo et al. 2008; Chandra et al. 2012).

Measurement Model

Following the recommended two-stage analytical procedure (Anderson and Gerbing 1988; Hair et al. 1998), the first stage of data analysis evaluates the measurement properties of the constructs, while the second stage examines the structural relationships. To assess the measurement model, we tested three types of validity: content validity, convergent validity, and discriminant validity. Content validity assesses whether the chosen measures appropriately capture the full domain of the construct (Straub et al. 2004). We examined content validity by checking for consistency between the measurement items and the existing literature. This was done at the stage of designing the questionnaire.

Convergent validity checks that the indicators for a construct are more correlated with one another than with the indicators of another construct (Petter et al. 2007). We tested two separate models, one with novelty performance as the final dependent variable (DV) and the other with usefulness performance as the final DV. Factor analysis shows that there is a strong correlation between each of the items and their corresponding construct. This demonstrates convergent validity. We further tested convergent validity by examining the composite reliability (CR) and average variance extracted (AVE: the ratio of the construct variance to the total variance among indicators) for the indicators (Hair et al. 1998). 0.70 is the suggested CR threshold for reliable measurement (Chin, 1998). As can be seen in Appendix 2, the CR values ranged from 0.88 to 0.98. For the AVE, against the recommended threshold of 0.50 (Fornell and Larcker, 1981), ranged from 0.60 to 0.91. In addition, the high Cronbach alpha values, ranging from 0.82 to 0.98, confirm the reliability of the scales for all the constructs.

We verified the discriminant validity of the various constructs by checking the square root of the average variance extracted, as recommended by Fornell and Larcker (1981). The values of the square root of the AVEs (shown on the diagonal in Appendix 3) are all greater than the corresponding interconstruct correlations (the off-diagonal entries in Appendix 3), exhibiting satisfactory discriminant validity. We also checked the cross-loadings of the items on other constructs, which are quite low indicating discriminant validity (Appendix 4). We found that the observed statistical power for both the dependent variables to be above the minimum recommended value of 0.8 (Cohen 1988). Hence we conclude that the model has appreciable statistical power for reliable results (Gefen et al. 2011).

Structural Model

Table 1 presents results of the different structural models with novelty and usefulness as the final team performance variables. The model also incorporated CQ metacognition, CQ behavior, and role structure adaptation as intermediate variables as shown in the hypothesized nomological network in Figure 1.

CQ motivation is significantly related to CQ metacognition (β=0.46, t=6.28, p<0.01), supporting H1. Similarly, CQ cognition has a significant relationship with CQ metacognition (β=0.29, t=4.11, p<0.01), thereby providing support to H2. Further, from the results we observe that CQ metacognition is significantly related to both CQ behavior (β=0.32, t=5.60, p<0.01) and role structure adaptation (β=0.51, t=6.73, p<0.01), thereby supporting H3 and H5.

For testing the relationships of CQ behavior and role structure adaptation with the final team performance variables of novelty and usefulness, we first controlled for (1) extent of interaction with the foreign team members – face to face, skype, phone, and emails; (2) project complexity; (3) team members' average work experience and age. From the results in Table 1, we observe that the extent of interaction amongst team members is significant for novelty performance – face-to-face (β=-0.24, t=3.17, p<0.01) and phone (β=-0.21, t=3.08, p<0.01) but not for usefulness performance. In contrast, project complexity has significant positive relationships with both novelty (β=0.39, t=3.84, p<0.01) as well as usefulness performance (β=0.30, t=2.36, p<0.05). Average age has a significant relationship with usefulness performance (β=0.25, t=2.31, p<0.05).

Further, we observe that CQ behavior does not have significant relationships with either novelty performance (β=0.02, t=0.26, ns) or usefulness performance (β=-0.15, t=1.40, ns). Thus, H4 is not supported. On the contrary, role structure adaptation has significant relationships with both novelty performance (β=0.51, t=6.92, p<0.01) and usefulness performance (β=0.41, t=3.69, p<0.01), thereby supporting H6. Together these two results are insightful as they provide evidence for the fact that in the specific context of virtual teams, the CQ model needs to incorporate structural adaptation variable (role structure adaptation) in addition to behavioral adaptation variable (CQ behavior). This is expected because of the specific context of GVTs, where the team members have lesser opportunities for displaying their culturally adapted verbal and non-verbal behaviors through electronic communication media. The measures of the CQ behavior scale buttresses the above reasoning (See Appendix 1). In case of co-located face-to-face multicultural teams, behavioral adaptation is expected to play the key role. But in the case of cross-cultural GVTs, where the communication medium does not provide sufficient richness to clearly observe the verbal and non-verbal behaviors, structural adaptation might also need to be considered as a compensatory adaptation mechanism. This result provides contextualized extension to the CQ model for the GVT context.

Table 1. Results - Structural Models with Novelty and Usefulness Performance

	Interactional Strategizing		Behavioral Adaptation		Structural Adaptation		Team Performance		Team Performance	
	CQ Metacognition		CQ Behavior		Role Structure Adaptation		Novelty		Usefulness	
Control Variables	β	t	β	t	β	t	β	t	β	t
Interaction- Face-to-face							-0.24**	3.17	-0.16	1.84
Interaction- Skype							-0.15	1.56	-0.19	1.76
Interaction- Email							-0.05	1.00	0.12	1.41
Interaction- Phone							-0.21**	3.08	0.04	0.55
Project Complexity							0.39**	3.84	0.30*	2.36
Average Age							0.20	1.89	0.25*	2.31
Average Experience							-0.21	1.82	-0.05	0.40
Research Variables										
CQ Motivation	0.46**	6.28								
CQ Cognition	0.29**	4.11								
CQ Metacognition			0.32**	5.60	0.51**	6.73				
CQ Behavior							0.02	0.26	-0 .15	1.40
Role Structure Adaptation							0.51**	6.92	0.41**	3.69
R^2	0.35		0.13		0.26		0.51		0.33	

Notes: *p<0.05, **p<0.01, N=128 participants aggregated in 32 GVTs

Implications

Our research is one of the first that attempts to use cultural intelligence (CQ) framework as the mechanism for bridging the cultural discontinuities in global virtual teams (GVTs). Through, a systematic application of transaction model for stress and coping (TMSC) and compensatory adaptation theory (CAT), the current research proposes and tests a model for bridging cultural discontinuities in the GVT context to improve their performance. The research has significant implications for research and practice.

Implications for Research

First, the study using organizational discontinuity theory (ODT) as the overarching theoretical framework identifies the need for bridging cultural discontinuities in GVTs. Situating the discussion in CQ literature, the study proposes CQ as one of the plausible mechanisms through which the cultural discontinuities in GVTs could be spanned for better team performance. CQ has generally been conceptualized as an aggregated multidimensional construct that includes the four dimensions (CQ motivation, CQ cognition, CQ metacognition, and CQ behavior) at the same level of conceptualization (Ang et al. 2007). Past literature has not examined the inter-relationships amongst CQ construct dimensions. Moreover, only few

studies investigate the dimensionality view of the construct and recent calls have been made to consider this perspective (e.g. Malik et al. 2014). Answering to these calls, by leveraging TMSC and CAT, the study theorizes and tests a CQ nomological network for facilitating GVT performance. The application of CQ in the specific context of GVTs might be different from face-to-face interactions (see Ang et al. 2011; Van Dyne et al. 2010). Further, CQ research in the context of teams is rather limited. Though prior CQ research recognizes the need to examine the relationships between the different CQ dimensions, our study is one of the first to formulate a theoretically driven CQ nomological network for better explaining the applicability of the CQ theory specifically to the GVT context. This we believe is a significant contribution to both CQ as well as GVT literature.

Second, answering to the numerous calls by researchers to undertake context specific theorization (see Alvesson and Kärreman 2007; Hong et al. 2013; Johns 2006; Joshi and Roh, 2009), in this research, by building on the compensatory adaptation argument proposed by CAT, the study theorizes and tests the role of structural adaptation in the GVT context, thereby extending the CQ framework. This contextualization of CQ framework to the specific perspective of GVTs can be instrumental in stimulating further research on the role of CQ in GVTs. Developing role structure adaptation of the team can also be viewed *in situ intercultural competence* that may be specific to the GVT context and could be developed through training or identified in individuals at the selection stage. This research addresses calls made to identify and develop such *in situ* intercultural competence that can affect job-performance outcomes in the organizational context (Leung et al., 2014). The theoretically driven framework presented in this study (Figure 1) can be used as a point of departure for other similar studies in other contexts.

Third, the study specifically examines GVT performance in terms of project creativity outcomes, namely—novelty and usefulness performance. The study establishes a theoretical relationship between team level capabilities and creativity outcomes, which has largely been ignored in the past virtual team literature. Given the fact that GVTs have the potential for facilitating collaboration amongst team members with different perspectives from across the globe, the study can prove to be an impetus to look at creativity performance as one of the key objectives that could be achieved through multicultural GVTs. Further research on this subject is definitely warranted.

Implications for Practice

First, the results from the study reiterate the need for GVT managers to acknowledge the multifarious discontinuities that can exist amongst team members. For better GVT performance, there is a need to focus on the modalities and mechanisms to bridge these discontinuities. Specifically, the study provides evidence for bridging the cultural discontinuities. CQ can be one of the compositional factors or mechanisms that can be leveraged to facilitate better team performance.

Second, the study proposes a framework linking different CQ dimensions and role structure adaptation with GVT performance. Managers can leverage this framework to plan their specific strategy for bridging the cultural discontinuities for better performance.

Third, as highlighted in the study, CQ is a malleable construct that can help bridge cultural discontinuities. Hence, performance driven human resource interventions such as the use of CQ measurement and training in GVT projects can be planned. Depending on the specific requirement, this can be done both prior to implementation as well as during the ongoing stages of GVT projects. In addition, the study provides guidance to GVT leaders on the importance of considering the salience of role structure adaptation for handling cultural discontinuities in facilitating better team performance. Research shows that companies involved in training their teams for multicultural cultural competence should not only rely on training the individuals to have knowledge of the different "others" but should also encourage examination of the individuals' own values, beliefs, and biases so as to create an awareness regarding their own social cultural identities (Chao et al., 2011; Pitner & Sakamoto, 2005). Cultural intelligence training programs would cater to both these aspects and hence is recommended as a one of the effective ways to improve cultural competence (Leaung et al., 2014).

Conclusions, Limitations, and Directions for Future Research

The current study, contextualized to the GVT context, provides a theoretically driven nomological network linking the cultural intelligence (CQ) sub-constructs and tests their relationships with the two creative performance outcomes of novelty and usefulness. Despite the valuable research and practical implications emerging from this research, the study has limited generalizability. Hence, it is suggested that future studies test the theorized model through a diverse range of populations from different cultural backgrounds so as to enhance the generalizability of findings. Further, it is also suggested that in addition to creativity performance, future research can examine other performance measures applicable to GVTs. The current study is limited in terms of implications which are applicable only for creativity performance related measures. In addition, future research also needs to leverage alternative theoretical lenses to conceptualize and test the mediating and moderating roles of CQ behavior that could possibly help explain its non-significant impact on performance outcomes as observed in the current study. Future studies on the subject can also incorporate additional control variables e.g. prior experience of living in different countries. Further, a qualitative study on the subject can help churn out the unique situational variables and nuances that can enhance the theoretical explanation and richness of the current quantitative study.

Appendices

Appendix 1. Sample Scale Items for Key Constructs

Likert Range (1=Strongly disagree and 7=Strongly agree)	Survey Phase/ Wave	No. of items/Type	Sample Items
CQ Motivation	1st phase	5 items, Team Member Rated	"I enjoy interacting with people from different countries" "I am sure I can deal with stresses of adjusting to a culture that is new to me"
CQ Cognition	1st phase	6 items, Team Member Rated	"I know the legal and economic systems of other cultures" "I know the rules for expressing non-verbal behavior in other cultures"
CQ Metacognition	1st phase	4 items, Team Member Rated	"I am conscious of the cultural knowledge I apply to cross-cultural interactions" "I adjust my cultural knowledge as I interact with people from a culture that is unfamiliar to me"
CQ Behavior	1st phase	5 items, Team Member Rated	"I change my verbal behavior when a cross cultural interaction requires it" "I vary my non-verbal behavior when a cross cultural situation requires it" "I alter my facial expressions when a cross cultural interaction requires it"
Role Structure Adaptation	2nd phase	9 items, Team Member Rated	"I adapt myself to the working style of my team members" "I relearned how to perform my part of the team's task" "I settle into smooth patterns of communicating with my team members"
Novelty Performance	2nd phase	5 items, Jury Member Rated	"The ideas and concepts proposed in this study are novel" "Overall, this is a very original project"
Usefulness Performance	2nd phase	4 items, Jury Member Rated	"The ideas and approach used in this project are relevant to the study of Indo/ EU business issues" "The project has valuable practical implications"

Appendix 2. Descriptives, AVE and CR

	Mean	Standard Deviation	Average Variance Extracted	Composite Reliability	Cronbachs Alpha
CQMO	5.99	0.43	0.60	0.88	0.83
CQCO	3.86	0.55	0.61	0.90	0.88
CQMC	5.68	0.41	0.65	0.88	0.82
CQBE	5.11	0.60	0.62	0.89	0.88
ROSA	5.38	0.59	0.69	0.95	0.94
PERN	4.35	0.62	0.91	0.98	0.98
PERU	4.98	0.67	0.91	0.98	0.95
COMP	4.56	0.57	0.66	0.90	0.81
AEXP	6.01	1.37	1.00	1.00	1.00
AAGE	29.98	1.29	1.00	1.00	1.00
INFF	264.42	131.67	1.00	1.00	1.00
INSK	260.07	232.06	1.00	1.00	1.00
INPH	44.98	60.26	1.00	1.00	1.00
INEM	39.73	19.39	1.00	1.00	1.00

Key: CQMO-CQ Motivation, CQCO- CQ Cognition, CQMC- CQ Metacognition, CQBE- CQ Behavior, ROSA-Role Structure Adaptation, PERN-Novelty Performance, COMP-Complexity, AWEX-Average Work Experience, AAGE-Average Age, INFF-Face-to-Face Interaction, INSK-Skype Interaction, INPH-Phone Interaction, INEM-Email Interaction
Note: Work experience in measured in number of years and Interaction in number of hours

Appendix 3. Latent Variable Correlations

	CQMO	CQCO	CQMC	CQBE	ROSA	PERN	PERU	COMP	AEXP	AAGE	INFF	INSK	INPH
CQMO	**0.77**												
CQCO	0.17	**0.78**											
CQMC	0.51	0.37	**0.81**										
CQBE	0.22	0.55	0.34	**0.79**									
ROSA	0.34	0.23	0.50	0.22	**0.83**								
PERN	0.35	-0.25	0.25	-0.07	0.48	**0.95**							
PERU	0.25	-0.06	0.17	-0.12	0.38	0.76	**0.95**						
COMP	0.24	0.06	0.14	-0.11	0.41	0.46	0.30	**0.81**					
AEXP	-0.31	0.13	-0.08	0.25	0.01	-0.18	0.00	-0.47	**1.00**				
AAGE	-0.23	-0.03	-0.29	0.14	-0.06	0.02	0.14	-0.31	0.70	**1.00**			
INFF	0.09	0.16	0.31	0.05	0.33	-0.09	-0.05	0.35	-0.23	-0.33	**1.00**		
INSK	0.10	0.18	0.32	0.11	0.30	0.01	-0.08	0.49	-0.28	-0.38	0.47	**1.00**	
INPH	-0.04	0.48	0.31	0.35	0.29	-0.13	0.03	0.06	0.17	0.15	0.26	0.25	**1.00**
INEM	-0.02	-0.15	-0.05	-0.15	-0.04	0.00	0.04	0.26	-0.39	-0.51	0.23	0.04	-0.26

Key: CQMO-CQ Motivation, CQCO- CQ Cognition, CQMC- CQ Metacognition, CQBE- CQ Behavior, ROSA-Role Structure Adaptation, PERN-Novelty Performance, PERU-Usefulness Performance, COMP-Complexity, AWEX-Average Work Experience, AAGE-Average Age, INFF-Face-to-Face Interaction, INSK-Skype Interaction, INPH-Phone Interaction, INEM-Email Interaction
The first figure in each column (shaded and bold) is the square root of AVE for the corresponding construct and off-diagonal elements are correlations

Appendix 4. Loadings and Crossloadings – Novelty as DV

	CQMO	CQCO	CQMC	CQBE	VTAD	PERN	COMP	AEXP	AAGE	INFF	INSK	INPH	INEM
CQMO1	0.88	0.19	0.47	0.23	0.31	0.29	0.14	-0.20	-0.22	0.07	0.14	0.01	-0.03
CQMO2	0.81	0.18	0.48	0.20	0.35	0.44	0.23	-0.10	-0.08	0.08	0.20	-0.03	-0.11
CQMO3	0.88	0.04	0.41	0.16	0.35	0.35	0.19	-0.26	-0.13	0.00	-0.03	-0.14	-0.03
CQMO4	0.69	0.07	0.30	0.16	0.30	0.18	0.36	-0.48	-0.38	0.13	0.11	0.03	0.19

CQMO5	0.54	0.20	0.27	0.13	-0.07	-0.06	-0.01	-0.28	-0.13	0.07	-0.09	-0.02	-0.02
CQCO1	0.17	0.79	0.16	0.38	0.07	-0.18	0.14	-0.11	0.00	0.10	0.19	0.50	-0.11
CQCO2	0.18	0.80	0.36	0.49	0.19	-0.25	-0.09	0.18	0.06	0.08	-0.01	0.43	-0.26
CQCO3	-0.04	0.71	0.08	0.24	0.12	-0.35	0.02	0.15	-0.05	0.22	0.10	0.36	0.01
CQCO4	0.05	0.72	0.21	0.23	0.15	-0.34	-0.02	0.01	-0.26	0.25	0.10	0.30	0.16
CQCO5	0.14	0.80	0.36	0.45	0.08	-0.09	0.25	-0.02	-0.04	0.10	0.27	0.31	-0.10
CQCO6	0.17	0.84	0.34	0.55	0.39	-0.15	0.00	0.30	0.04	0.10	0.19	0.41	-0.20
CQMC1	0.51	0.34	0.88	0.31	0.52	0.36	0.16	-0.06	-0.20	0.27	0.34	0.31	0.00
CQMC2	0.49	0.40	0.90	0.31	0.47	0.13	0.07	-0.03	-0.22	0.30	0.31	0.26	-0.12
CQMC3	0.39	0.14	0.85	0.26	0.36	0.19	0.17	-0.19	-0.47	0.35	0.31	0.20	0.15
CQMC4	0.15	0.32	0.56	0.07	0.20	0.04	0.06	0.00	0.00	0.01	-0.10	0.23	-0.26
CQBE1	0.20	0.33	0.10	0.68	0.24	0.18	0.20	-0.06	0.06	0.05	0.25	0.16	-0.21
CQBE2	0.24	0.28	0.07	0.71	0.01	0.07	-0.16	0.24	0.23	-0.14	-0.08	0.00	-0.22
CQBE3	0.29	0.46	0.31	0.87	0.17	-0.04	-0.10	0.12	0.01	0.03	0.14	0.22	-0.14
CQBE4	0.06	0.47	0.33	0.86	0.28	-0.15	-0.15	0.31	0.22	0.08	0.01	0.46	-0.08
CQBE5	0.25	0.53	0.21	0.85	0.11	0.03	0.01	0.22	0.12	0.01	0.16	0.19	-0.16
ROSA1	0.18	0.22	0.40	0.20	0.83	0.38	0.20	0.12	0.12	0.31	0.17	0.21	-0.04
ROSA2	0.16	0.29	0.39	0.48	0.71	0.38	0.26	0.15	0.24	0.22	0.25	0.43	-0.26
ROSA3	0.22	0.13	0.33	0.02	0.84	0.31	0.21	-0.02	0.00	0.23	0.22	0.28	-0.08
ROSA4	0.36	0.27	0.53	0.12	0.91	0.37	0.33	-0.02	-0.18	0.34	0.24	0.28	-0.10
ROSA5	0.30	0.17	0.48	0.06	0.86	0.50	0.29	0.07	-0.05	0.26	0.31	0.28	-0.01
ROSA6	0.31	0.11	0.45	0.06	0.87	0.42	0.36	-0.05	-0.19	0.23	0.21	0.12	0.09
ROSA7	0.31	0.25	0.44	0.15	0.85	0.32	0.44	-0.03	-0.17	0.32	0.22	0.11	0.13
ROSA8	0.40	0.24	0.45	0.29	0.83	0.33	0.44	-0.10	-0.20	0.33	0.36	0.35	0.09
ROSA9	0.33	0.07	0.26	0.33	0.75	0.51	0.56	-0.05	0.04	0.20	0.24	0.14	-0.17
PERN1	0.34	-0.32	0.23	-0.02	0.50	0.93	0.42	-0.13	0.09	0.07	0.01	-0.16	0.01
PERN2	0.23	-0.26	0.19	-0.04	0.38	0.95	0.37	-0.07	0.17	-0.16	-0.03	-0.02	-0.07
PERN3	0.40	-0.20	0.26	-0.05	0.48	0.96	0.42	-0.22	0.02	-0.10	-0.02	-0.16	-0.03
PERN4	0.35	-0.18	0.28	-0.05	0.44	0.96	0.49	-0.22	-0.07	-0.15	0.06	-0.13	0.01
PERN5	0.32	-0.24	0.21	-0.07	0.45	0.97	0.48	-0.19	-0.08	-0.09	0.04	-0.16	0.08
COMP1	0.09	0.15	0.08	0.15	0.39	0.17	0.76	-0.37	-0.22	0.44	0.43	0.10	0.28
COMP2	0.18	0.13	0.20	0.00	0.48	0.34	0.75	-0.13	-0.11	0.15	0.36	0.08	0.03
COMP3	0.33	0.06	0.16	-0.27	0.24	0.36	0.84	-0.42	-0.34	0.34	0.43	0.13	0.14
COMP4	0.23	0.20	0.17	0.13	0.29	0.36	0.82	-0.45	-0.24	0.24	0.48	0.16	0.14
COMP5	0.11	-0.16	0.00	-0.21	0.34	0.49	0.88	-0.50	-0.32	0.32	0.33	-0.12	0.42
AWEX	-0.31	0.13	-0.08	0.24	0.01	-0.18	-0.47	1.00	0.70	-0.23	-0.28	0.17	-0.39
AAGE	-0.23	-0.03	-0.29	0.15	-0.06	0.02	-0.31	0.70	1.00	-0.33	-0.38	0.15	-0.51
INFF	0.09	0.16	0.31	0.04	0.33	-0.09	0.35	-0.23	-0.33	1.00	0.47	0.26	0.23

INSK	0.10	0.18	0.32	0.12	0.30	0.01	0.49	-0.28	-0.38	0.47	1.00	0.25	0.04
INPH	-0.04	0.48	0.31	0.33	0.29	-0.13	0.06	0.17	0.15	0.26	0.25	1.00	-0.26
INEM	-0.02	-0.15	-0.05	-0.16	-0.04	0.00	0.26	-0.39	-0.51	0.23	0.04	-0.26	1.00

Key: CQMO-CQ Motivation, CQCO- CQ Cognition, CQMC- CQ Metacognition, CQBE- CQ Behavior, ROSA-Role Structure Adaptation, PERN-Novelty Performance, COMP-Complexity, AWEX-Average Work Experience, AAGE-Average Age, INFF-Face-to-Face Interaction, INSK-Skype Interaction, INPH-Phone Interaction, INEM-Email Interaction

References

Adair, W.L., Hideg, I., and Spence, R.J. 2013. "The Culturally Intelligent Team The Impact of Team Cultural Intelligence and Cultural Heterogeneity on Team Shared Values.," *Journal of Cross-Cultural Psychology* (44:6), pp 941-962.

Allan, J., and Lawless, N. 2003. "Stress Caused by On-line Collaboration in E-learning: A Developing Model," *Education+ Training* (45:8), pp 564-572.

Alvesson, M., and Kärreman, D. 2007. "Constructing Mystery: Empirical Matters in Theory Development," *Academy of Management Review* (32:4), pp 1265-1281.

Anderson, J.C., and Gerbing, D.W. 1988. "Structural Equation Modeling In Practice: A Review and Recommended Two-Step Approach," *Psychological bulletin* (103:3), pp 411-423.

Ang, S., and Inkpen, A.C. 2008. "Cultural Intelligence and Offshore Outsourcing Success: A Framework of Firm-Level Intercultural Capability," *Decision Sciences* (39:3), pp 337-358.

Ang, S., and Van Dyne, L. 2008. "Conceptualization Of Cultural Intelligence: Definition, Distinctiveness, and Nomological Network," in: *Handbook of Cultural Intelligence: Theory, Measurement, and Applications*, M. E. Sharpe, New York, pp. 3-15.

Ang, S., Van Dyne, L., and Koh, C. 2006."Personality Correlates of the Four-Factor Model of Cultural Intelligence," *Group & Organization Management* (31:1), pp 100-123.

Ang, S., Van Dyne, L., Koh, C., Ng, K.Y., Templer, K.J., Tay, C., and Chandrasekar, N.A. 2007. "Cultural Intelligence: Its Measurement and Effects on Cultural Judgment and Decision Making, Cultural Adaptation and Task Performance," *Management and Organization Review* (3:3), pp 335-371.

Ang, S., Van Dyne, L., and Tan, M.L. 2011. "Cultural Intelligence," in: *Cambridge Handbook of Intelligence,* R.J. Sternberg and S.B. Kaufman (eds.), Cambridge University Press, Cambridge, UK, pp. 582-602.

Brett, J., Behfar, K., and Kern, M.C. 2006. "Managing Multicultural Teams," *Harvard Business Review* (84:11), pp 84-91.

Chin, W.W. 1998. "The Partial Least Squares Approach for Structural Equation Modelling," in: *Modern Methods For Business Research.,* G.A. Marcoulides (ed.), Lawrence Erlbaum Associates, Hillsdale, New Jersey.

Chandra, S., Srivastava, S. C., and Theng, Y. 2012. "Cognitive Absorption and Trust for Workplace Collaboration in Virtual Worlds: An Information Processing Decision Making Perspective," *Journal of the Association for Information Systems* (13:10), pp. 797-835.

Chao, M. M., Okazaki, S., & Hong, Y. Y. 2011. "The quest for multicultural competence: Challenges and lessons learned from clinical and organizational research", *Social and Personality Psychology Compass*, (5:5),pp. 263-274.

Chudoba, K.M., Wynn, E., Lu, M., and Watson-Manheim, M.B. 2005. "How Virtual Are We? Measuring Virtuality and Understanding Its Impact in a Global Organization," *Information Systems Journal* (15:4), pp 279-306.

Cohen, J. 1988. *Statistical Power Analysis for the Behavioral Sciences* (2nd ed.). Hillsdale, NJ: Erlbaum.

Curseu, P.L., Schalk, R., and Wessel, I. 2008. "How Do Virtual Teams Process Information? A Literature Review and Implications For Management. ," *Journal of Managerial Psychology,* (23:6), pp 628-652.

Daft, R.L., and Lengel, R.H. 1986."Organizational Information Requirements, Media Richness and Structural Design.," *Management science* (32:5), pp 554-571.

Daniel, S., Agarwal, R., and J. Stewart, K. 2013. "The Effects of Diversity in Global, Distributed Collectives:A Study of Open Source Project Success," *Information Systems Research* (24:2), pp 312-333.

Dineen, B.R. 2005. "TeamXchange: A Team Project Experience Involving Virtual Teams and Fluid Team Membership," *Journal of Management Education* (29:4), pp 593-616.

Earley, C.P., and Mosakowski, E. 2000 "Creating Hybrid Team Cultures: An Empirical Test of Transnational Team Functioning," *The Academy of Management Journal* (43:1), pp 26-49.

Earley, P.C., and Ang, S. 2003. *Cultural Intelligence: Individual Interactions across Cultures* Stanford University Press, Palo Alto, CA.

Erez, M., Lisak, A., Harush, R., Glikson, E., Nouri, R., and Shokef, E. 2013. "Going Global: Developing Management Students' Cultural Intelligence and Global Identity in Virtual Culturally Diverse Teams.," *Academy of Management Learning & Education* (12:3), pp 330-355.

Evaristo, R. 2003. "The Management of Distributed Projects across Cultures," *Journal of Global Information Management* (11:4), pp 58-70.

Ferreira, P.G.S., Lima, E.P.d., and da Costa, S.E.G. 2012."Perception of Virtual Team's Performance: A Multinational Exercise," *International Journal of Production Economics* (140:1), pp 416-430.

Fleming, L., Mingo, S., and Chen, D. 2007. "Collaborative Brokerage, Generative Creativity, and Creative success," *Administrative Science Quarterly* (52:2), pp 443-475

Flaherty, J.E. 2008. "The Effects of Cultural Intelligence on Team Member Acceptance and Integration In Multinational Teams," in: *Handbook of Cultural Intelligence: Theory, Measurement, and Applications,* S. Ang and L. Van Dyne (eds.), M.E. Sharpe, Armonk, New York, pp. 192-205.

Fornell, C., and Bookstein, F.L. 1982. "Two Structural Equation Models: LISREL and PLS Applied to Consumer Exit-Voice Theory," *Journal of Marketing Research* (19:4), pp 440-452.

Fornell, C., and Larcker, D.F. 1981. "Evaluating structural equation models with unobservable variables and measurement error," *Journal of marketing research* (18:1), pp 39-50. Garfield, M.J., Taylor, N.J., Dennis, A.R., and Satzinger, J.W. 2001. "Research Report: Modifying Paradigms--Individual Differences, Creativity Techniques, and Exposure to Ideas in Group Idea Generation," *Information Systems Research* (12:3), p 322.

Gatlin-Watts, R., Carson, M., Horton, J., Maxwell, L., and Maltby, N. 2007. "A Guide to Global Virtual Teaming," *Team Performance Management* (13:1/2) 2007, pp 47-52.

Gefen, D., Rigdon, E.E., and Straub, D. 2011. "An Update and Extension to SEM Guidelines for Administrative and Social Science Research," *MIS Quarterly* (35:2), pp A1-A7.

Gibson, C.B., and Gibbs, J.L. 2006. "Unpacking the Concept of Virtuality: The Effects of Geographic Dispersion, Electronic Dependence, Dynamic Structure, and National Diversity on Team Innovation," *Administrative Science Quarterly* (51:3), pp 451-495.

Gilson, L. L., Maynard, M. T., Young, N. C. J., Vartiainen, M., and Hakonen, M. (2015). "Virtual Teams Research 10 Years, 10 Themes, and 10 Opportunities," *Journal of Management*, (41:5),pp 1313-1337

Graetz, K., Boyle, E.S., Kimble, C.E., Thompson, P., and Garloch, J.L. 1998. "Information Sharing in Face-To-Face, Teleconferencing, and Electronic Chat Groups.," *Small Group Research* (29:6), pp 714-743.

Gudykunst, W.B., Ting-Toomey, S., and Chua, E. 1988. *Culture and Interpersonal Communication,* Sage Publications, Inc, Thousand Oaks, CA, US.

Gudykunst, W.D. 1995. "Anxiety/Uncertainty management (AUM) theory: Current Status.," in: *Intercultural communication theory. International and intercultural communication Annual,* R.L. Wiseman (ed.), Sage Publications, Inc, Thousand Oaks, CA, US, pp. 8-58.

Hair, J.F., Anderson, R.E., Tatham, R.L., and Black, W.C. 1998. *Multivariate Data Analysis with Readings*. Prentice-Hall, Englewood Cliffs, NJ.

Hardin, A.M., Fuller, M.A., and Davison, R.M. 2007. "I Know I Can, But Can We?: Culture and Efficacy Beliefs in Global Virtual Teams," *Small Group Research* (38:1), pp 130-155.

Hinds, P.J., and Bailey, D.E. 2003. "Conflict in Distributed Teams," *Organization Science* (14:6), pp 615-632.

Hinds, P.J., and Mortensen, M. 2005. "Understanding Conflict in Geographically Distributed Teams: The Moderating Effects of Shared Identity, Shared Context, and Spontaneous Communication," *Organization Science* (16:3), pp 290–307.

Hong, W., Chan, F.K.Y., Thong, J.Y.L., Chasalow, L.C., and Dhillon, G. 2013. "A Framework and Guidelines for Context-Specific Theorizing in Information Systems Research" *Information Systems Research* (25:1), pp 111-136.

Johns, G. 2006. "The Essential Impact of Context on Organizational Behavior," *Academy of Management Review* (31:2), pp 386-408.

Joshi, A., and Roh, H. 2009. "The Role of Context in Work Team Diversity Research: A Meta-Analytic Review.," *Academy of Management Journal* (52:3), pp 599-627.

Kankanhalli, A., Tan, B.C.Y., and Wei, K.-K. 2006. "Conflict and Performance in Global Virtual Teams," *Journal of Management Information Systems* (23:3), pp 237-274.

Kirkman, B.L., Rosen, B., Tesluk, P.E., and Gibson, C.B. 2004. "The Impact of Team Empowerment on Virtual Team Performance: The Moderating Role of Face-to-Face Interaction," *Academy of Management Journal* (47:2), pp 175-192.

Kock, N. 2001. "Compensatory Adaptation To A Lean Medium: An Action Research Investigation Of Electronic Communication In Process Improvement Groups," *IEEE Transactions on Professional Communication,* (44:4), pp 267-285.

Kock, N. 2007. "Media Naturalness and Compensatory Encoding: The Burden of Electronic Media Obstacles Is On Senders," *Decision Support Systems* (44:1), pp 175-187.

Lazarus, R., and Cohen, J.B. 1977. "Environmental Stress," in: *Human Behavior and the Environment: Current theory and research,* Altman and J.F. Wohlwill (eds.), Plenum, New York, pp. 89-127.

Lazarus, R.S., and Folkman, S. 1984. *Stress, Appraisal, and Coping* Springer, New York.

Lepine, J.A. 2003. "Team Adaptation and Postchange Performance: Effects of Team Composition in Terms of Members' Cognitive Ability and Personality " *Journal of Applied Psychology* (88:1) 2003, pp 27-39.

Leung, K., Ang, S., and Tan, M.L. 2014. "Intercultural Competence," The Annual Review of *Organizational Psychology and Organizational Behavior* (1) pp 489–519.

Livermore, D. 2010. *Leading with Cultural Intelligence: The New Secret to Success* American Management Association, New York.

Magnusson, P., Schuster, A., and Taras, V. 2014. "A Process-Based Explanation of the Psychic Distance Paradox: Evidence from Global Virtual Teams," *Management International Review* (54), pp 283–306.

Malik, A.R., Cooper-Thomas, H.D., and Zikic, J. 2014. "The Neglected Role Of Cultural Intelligence In Recent Immigrant Newcomers' Socialization," *International Journal of Cross Cultural Management* (14:2) pp 195-213.

Majchrzak, A., Malhotra, A., Stamps, J., and Lipnack, J. 2004. "Can Absence Make a Team Grow Stronger?," *Harvard Business Review* (82:5) pp 131-137.

Massey, A.P., Montoya-Weiss, M.M., Hung, C., and Ramesh, V. 2001. "Cultural Perceptions of Task-Technology Fit," in: *Communications of the ACM*, pp. 83-84.

Mockaitis, A.I., Rose, E.L., and Zettinig, P. 2012. "The Power Of Individual Cultural Values In Global Virtual Teams," *International Journal of Cross Cultural Management* (12:2), pp 193-210.

Ng, K.-Y., Van Dyne, L., Ang, S., and Ryan, A.M.W. 2012. "Cultural Intelligence: A Review, Reflections, And Recommendations For Future Research " in: *Conducting Multinational Research Projects in Organizational Psychology.,* A.M. Ryan, F.T.L. Leong and Oswald. F (eds.), American Psychological Association, Washington, DC.

Oldham, G.R., and Cummings, A. 1996. "Employee Creativity: Personal And Contextual Factors At Work," *Academy of Management Journal* (39:3), pp 607-634.

Paul, S., Seetharaman, P., Samarah, I., and Mykytyn, P.P. 2004."Impact of Heterogeneity and Collaborative Conflict Management Style on the Performance of Synchronous Global Virtual Teams," *Information & Management* (41), pp 303-321.

Pavlou, P.A., and Gefen, D. 2005. "Psychological Contract Violation in Online Marketplaces: Antecedents, Consequences, and Moderating Role," *Information Systems Research* (16:4), pp 372-399.

Pearsall, M.J., Ellis, A.P.J., and Stein, J., H. 2009. "Coping with Challenge and Hindrance Stressors in Teams: Behavioral, Cognitive, and Affective Outcomes," *Organizational Behavior and Human Decision Processes* (109), pp 18-28.

Petter, S., Straub, D., and Rai, A. 2007. "Specifying Formative Constructs in Information Systems Research " *MIS Quartely* (31:4), pp 623-656.

Pitner, R.O., and Sakamoto, I. 2005. "The Role of Critical Consciousness in Multicultural Practice: Examining How its Strength Becomes its Limitation," *American Journal of Orthopsychiatry*. (75:4), pp 684-695.

Polzer, J.T., Crisp, C.B., Jarvenpaa, S.L., and Kim, J.W. 2006."Extending the Faultline Model to Geographically Dispersed Teams: How Colocated Subgroups Can Impair Group Functioning," *Academy of Management Journal* (49:4), pp 679-692.

Powell, A., Galvin, J., and Piccoli, G., S 2004."Antecedents to Team Member Commitment from Near and Far: A Comparison between Collocated and Virtual Teams," *Information Technology & People* (19:4), pp 299-322.

Richard, O.C., Barnett, T., Dwyer, S., and Chadwick, K. 2004. "Cultural Diversity in Management, Firm Performance, and the Moderating Role of Entrepreneurial Orientation Dimensions," *Academy of Management Journal,* (47:2), pp 255-266.

Ringle, C.M., Wende, S., and Will, A. 2005. *SmartPLS 2.0 (beta)* SmartPLS, Hamburg.

Rosen, B., Furst, S., and Blackburn, R. 2007. "Overcoming Barriers to Knowledge Sharing in Virtual Teams," *Organizational Dynamics* (36:3), pp 259–273.

Sawyer, R.K. 2006. *Explaining Creativity: The Science of Human Innovation* Oxford University Press, New York, NY.

Schiller, S.Z., and Mandviwalla, M. 2007. "Virtual Team Research an Analysis of Theory Use and a Framework for Theory Appropriation," *Small Group Research* (38:1), pp 12-59.

Scholz, T.M. 2012. "Talent Management in the Video Game Industry: The Role of Cultural Diversity and Cultural Intelligence," *Thunderbird International Business Review* (54:6), pp 845-858.

Short, J., Williams, E., and Christie, B. 1976. *The Social Psychology of Telecommunications.* John Wiley & Sons, London.

Stanko, T.L., and Gibson, C.B. 2009. "Virtuality Here and Now: The Role of Cultural Elements in Virtual Teams.," in: *Cambridge Handbook of Culture, Organization, and Work,* R.S. Bhagat and R.M. Steers (eds.), Cambridge University Press, Cambridge, UK, pp. 272-304.

Staples, D., and Zhao, L. 2006. "The Effects of Cultural Diversity in Virtual Teams versus Face-to-Face Teams," *Group Decision & Negotiation* (15:4), pp 389-406.

Sternberg, R.J., and Detterman, D.K. 1986. *What is intelligence? Contemporary Viewpoints on its Nature and Definition.* Ablex, Norwood, NJ.

Sternberg, R.J., and Salter, W. 1982. "Conceptions of Intelligence.," in: *Handbook of Human Intelligence,* R.J. Sternberg (ed.), Cambridge University Press., New York, pp. 3-28.

Straub, D., Boudreau, M.C, and Gefen, D. 2004. "Validation Guidelines for IS Positivist Research," *Communications of the Association for Information Systems* (13:1), 63.

Teo, T.S., Srivastava, S.C., and Jiang, L. 2008. "Trust and Electronic Government Success: An Empirical Study," *Journal of Management Information Systems* (25:3), pp. 99-132.

Van Dyne, L., Ang, S., and Livermore, D. 2010."Cultural Intelligence: A Pathway for Leading in a Rapidly Globalizing World," in: *Leading across differences: Cases and perspectives,* K.M. Hannum, B. McFeeters and L. Booysen (eds.), CQ: Pfeiffer. San Francisco, pp. 131-138.

Van Dyne, L., Ang, S., Ng, K. Y., Rockstuhl, T., Tan, M. L., and Koh, C. 2012. "Sub Dimensions of the Four Factor Model of Cultural Intelligence: Expanding the Conceptualization and Measurement of Cultural Intelligence," *Social and Personality Psychology Compass*, (6:4),pp. 295-313.

Van Knippenberg, D., and Schippers, M.C. 2007. "Work Group Diversity," *Annual Review of Psychology*. (58), pp. 515-541.

Vangen, S., and Winchester, N. 2014. "Managing Cultural Diversity in Collaborations: A Focus on Management Tensions," *Public Management Review* (16:5), pp. 686-707.

Vignovic, J.A., and Thompson, L.F. 2010. "Computer-Mediated Cross-Cultural Collaboration: Attributing Communication Errors to the Person versus the Situation," *Journal of Applied Psychology* (95), pp. 265-276.

Warkentin, M.E., Sayeed, L., and Hightower, R. 1997. "Virtual Teams versus Face-to-Face Teams: An Exploratory Study of a Web-based Conference System," *Decision Sciences* (24:4), pp. 975-996.

Watson, W.E., Kumar, K., and Michaelsen, L.K. 1993. "Cultural Diversity's Impact on Interaction Process and Performance: Comparing Homogeneous and Diverse Task Groups.," *Academy of Management Journal* (36:3), pp. 590-602.

Watson-Manheim, M.B., Chudoba, K.M., and Crowston, K. 2012."Perceived Discontinuities and Constructed Continuities in Virtual Work.," *Information Systems Journal.* (22:1), pp 29-52.

Wold, H. 1985. "Partial Least Squares," in: *Encyclopedia of Statistical Sciences,* S. Kotz and L.J. Norman (eds.), Wiley, New York, pp. 581-591.

Yong, K., Sauer, S.J., and Mannix, E.A. 2014"Conflict and Creativity in Interdisciplinary Teams," *Small Group Research* (45:3), pp. 266-289.

Zakaria, N., Amelinckx, A., and Wilemon, D. 2004. "Working Together Apart? Building a Knowledge-Sharing Culture for Global Virtual Teams," *Creativity and Innovation Management* (13:1), pp. 15-29.

Zhang, D., Lowry, P.B., Zhou, L., and Fu, X. 2007."The Impact of Individualism Collectivism, Social Presence, and Group Diversity on Group Decision Making under Majority Influence," *Journal of Management Information Systems* (23:4), pp. 53-80.