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Cultural Issues in Globally Distributed Information Systems Development: A Survey and Analysis

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ABSTRACT

Global information technology offshore outsourcing and globally distributed information systems development have become increasingly prevalent and diversified, thus demand great academic efforts to address a wide variety of issues. Although some studies have begun to synthesize relevant theoretical and empirical research of the complex phenomena, there is a lack of synthesized efforts to provide an in-depth discourse of cultural issues in globally distributed information systems development. This research provides a preliminary review and analysis on how culture is conceptualized and how cultural issues are investigated in the published literature on offshore outsourcing and globally distributed information systems development. Our findings show that national level of cultural influences is the dominant level being studied, although the socio-cultural context of globally distributed information systems development is complex and multi-leveled in nature. While some common cultural dimensional models are still widely used, several studies adopt the emergent and dynamic view of culture to investigate the cross-cultural information systems development work.

Keywords

Globally Distributed Information Systems Development, Offshore Outsourcing, Culture, Global Virtual Teams

INTRODUCTION

The practices of globally distributed information systems development (GDISD) and IT offshore outsourcing have continuously grown to become significant global phenomena (Sahay et al., 2003, Cameral and Tjia, 2005). Globally distributed information systems development refers to software and information systems development work that involves the collaborations between two or more organizations, or between one organization and its subsidiaries, which occurs across national boundaries (Huang and Trauth, 2006). While IT offshore outsourcing practices consist of both IT development related work and IT enabled services, globally distributed information systems development refers specifically to IT development related work (Niederman et al., 2006).

Researchers and practitioners have approached and investigated the phenomena of IT offshore outsourcing and globally distributed information systems development from multiple perspectives, across different levels of analysis. Some efforts have been made to synthesize those relevant empirical studies and theoretical developments, aiming at providing a general understanding of the phenomena, identifying some research gaps, and proposing corresponding research agendas in future. These efforts include the work by Kakabadse and Kakabadse (2000), Lacity and Willcocks (2001), Walsham (2001), Lee et al. (2003), Kishore et al. (2003), Sahay et al. (2003), Dibbern et al. (2004), Carmel and Tjia (2005), Hirschheim et al. (2005), ACM Report (2006), and Niederman et al. (2006).

Among the existing literature, the organizational level of analysis is the dominant level of study, and the majority of research focuses on IT offshore outsourcing related organizational decision-making such as whether or not to outsource, what, where, and how to outsource, how to manage the risk and control the globally distributed projects, and how to manage the outsourcing relationships. However, there is a lack of studies on how exactly globally distributed information systems development work is carried out in practice and how the surrounding socio-cultural factors may influence the dynamics of such practices (Walsham, 2002; Sahay et al., 2003).

Several studies have shown that culture is a critical influential factor in globally distributed information systems development and has impacts on a variety of issues – managing outsourcing relationships (Sahay et al., 2003; Krishna et al., 2004),

managing conflicts (Damian and Zowghi, 2003), building trust (Zolin et al., 2004), preference of software development methods (Borchers, 2003), preference of computer supported collaborative technologies (Massey et al., 2001), knowledge transfer and management (Nicholson and Sahay 2004), and the process and performance of globally distributed teamwork (Carmel, 1999; Earley and Gibson, 2002; Olson and Olson, 2003). While those studies provide some insights about whether culture is a tangible or intangible factor and how culture may influence globally distributed information systems development, there seems to be a paucity of research that provides an in-depth discourse of cultural issues in globally distributed information systems development.

The objective of this paper is to provide a preliminary systematical review and analysis on how culture is conceptualized and how cultural issues are investigated in the published literatures on globally distributed information systems development. This paper begins with a brief overview of the theoretical backgrounds, followed by a description of research methods. The paper proceeds by presenting and discussing the research findings, and concludes by addressing research limitations and future research directions.

THEORETICAL BACKGROUNDS

The Socio-cultural Context of Globally Distributed Information Systems Development

Researchers have argued that globally distributed information systems development is situated within a complex and multi-levelled socio-cultural context, which may range from national (societal), regional, organizational, or professional (functional) levels, to team level (Dafoulas and Macaulay 2001; Karahanna et al., 2005). Different cultural factors at different levels coexist, interact with each other, and together produce different work environments and dynamics (Straub et al., 2002). The relative influences of culture from different levels on global information systems development work may vary depending on the specific context of problem under investigation (Karahanna et al., 2005; Huang and Trauth, 2006). A variety of studies have shown that it should not be assumed that national culture differences are the only or dominant influential factors, regional, organizational, and professional culture may also play important roles in globally distributed information systems development (Nicholson and Sahay, 2001, 2004; Eischen, 2003; Pauleen, 2003; Kaiser and Hawk, 2004).

Conceptualizations of Culture

The concept of culture is by no means free of controversy. Both the conceptualizations of culture and the cultural research are complex in nature. In general, there are two different conceptualizations of culture: the dimensional view and the emergent view.

The dimensional view of culture depicts culture as shared values, attitudes, and norms by a group of people, which are relatively stable and influence how people behave (Avison and Myers, 1995). Based on the shared, stabilized, and predictive assumptions about culture, researchers attempt to define and generalize the patterns of different cultures into several dimensions, which usually use a given nation as the boundary condition. While the development of cultural dimensions is an inductive research process, the applications of those cultural dimensions are usually deductive. To some extent, defined cultural dimensions provide a framework to compare and measure the cultural differences of one country from another. Researchers who adopt a dimensional view of culture usually take an etic approach to investigate culture and cultural related phenomena (Pike, 1967; Avison and Myers, 1995). Surveys and questionnaires are the typically used methods in this type of cultural research.

A variety of cultural dimensional models exist at the national level of cultural analysis. Vinken et al. (2004) provide a general review and comparison of those models. In information systems related research, what have been widely applied are models developed by Hall and Hall (1990), Trompenaars and Hampden-Turner (1998), and Hofstede (1984, 2001).

The emergent view of culture depicts culture as historically situated, emergent and contested, which is negotiated and constantly interpreted and re-interpreted in social relations and interactions (Myers and Tan, 2002). Based on the social constructivist assumption of culture, researchers usually reject the notion of culture as a set of predefined variables peculiar to a certain society (Avison and Myers, 1995; Goodall, 2002). Studies adopting the emergent view of culture usually have no predefined cultural variables. Researchers who adopt this view usually take an emic approach to explore culture and cultural related phenomena (Pike, 1967; Avison and Myers, 1995). Ethnography, interpretative case study, and grounded theory are commonly used methods in this type of cultural research.

One example of emergent view of culture is the work by Walsham (2002). Instead of adopting a dimensional view of culture, Walsham (2002) applied structuration theory as an analytical tool to analyze two case studies of cross-culture software production and use. He demonstrated how structuration theory could be used to reveal the dynamic nature of culture, the cross-cultural conflicts and the detailed work patterns.

RESEARCH METHOD

Based on the previous review of the relevant theoretical backgrounds, we surveyed the published literature on cultural issues in globally distributed information systems development from the following dimensions: 1). what is the research topic? 2). what is the unit(s) of analysis the research topic focuses on? 3). what is the level(s) of the cultural influences the research draws on? 4). what is cultural model/theory adopted by the research? 5). what is the research method used in the research?

The preliminary literature survey included recent published (1996-2006) literature from journals (ISR, MISQ, JMIS, JGIM, I&M, I&O, CACM, IEEE Transactions), conferences (ICIS, AMCIS, IFIP, HICSS), and other resources on offshore outsourcing, globally distributed information systems development, and global virtual teams. Those journals were selected because first they are widely recognized top-tier journals (at least in the U.S.) and second they are indexed in three major digital databases, ABI-Inform, ACM and IEEE.

Three criteria were used to select relevant papers for analysis. First, the relevance of the research topic – the research topic should concern with information systems development work that are arranged across national borders to highlight the “cross-cultural” perspective. Second, the empirical type of research – only empirical type of research was included to examine how culture is conceptualized and how cultural model/theory is applied or grounded in a variety of empirical studies. Third, the relevance to culture – culture should be a major theme, or culture factor is considered and involved in the research, or culture influence is discussed in the findings or implications in the selected papers. Those papers, in which culture is merely mentioned or implied, will not fulfill this criterion even though their research topics may be highly relevant to globally distributed information systems development in general.

For example, Herbsleb and Mockus (2003) studied communication issues of globally distributed software development among UK, Germany, and India. They approached the problem from the perspective of “across-site” instead of the perspective of “across-culture”, in which case the cultural influence was only implied but never explicitly discussed. Therefore, although the research topic of this paper is highly relevant, it is not included in the literature survey analysis because it does not fulfill the criterion of cultural relevance.

As previously suggested, each paper was coded according to its research topic, unit(s) of analysis, research method, level(s) of cultural influences, and cultural model/theory. The detailed analysis of the relevant literature is included in the Appendix A. What should be noted is the difference between the “naïve view” and “no predefined culture model/theory” when “cultural model/theory” is analyzed. “No predefined cultural model/theory” is associated with the emergent view of culture and the interpretative and grounded research approach. Usually, there are thick descriptions of cultural influences in the findings and discussions of the paper. For example, findings from the grounded action research by Pauleen (2003) on a globally distributed team illustrate the connection between the culture influences and the use of communication channels. In addition, the author emphasized that traditional cultural models – such as Hofstede and Hall – can not fully explain the choice of communication channels, indicating that team culture may be seen as emergent and negotiated in the work processes (Pauleen, 2003). On the contrary, the “naïve view” of cultural model/theory takes it for granted that as far as the participating members are from different countries, there are cultural differences, and cross-cultural influences exist. It does not take into considerations of what the cultural differences are or how different cultures may have different influential effects. For example, Paul et al (2004b) conducted an empirical investigation of conflict management of global virtual teams using group support system, including both heterogeneous (mixed US and Indian team members) and homogenous teams (all US members or all Indian members). Their first research hypothesis is “heterogeneous synchronous virtual teams will have lower level of collaborative conflict management style than will homogenous synchronous virtual teams”, which only treats national cultural difference as a binary measure of heterogeneous vs. homogenous. Therefore, the relevant cultural model/theory is depicted as a “naïve view” in this paper.

FINDINGS

Appendix A shows the detailed analysis of each selected article, which includes 34 papers from a variety of publication outlets. Because the studies by Edwards and Sridhar (2003, 2005), Hinds and Mortensen (2002, 2005), and Paul et al (2004a, 2004b) appear twice in different outlets, the selected paper collection is 31 after removing the duplication. Table 1 shows the summary of the analysis.

Unit(s) of Analysis (Research Topic) Total: 31		Level(s) of cultural influences		Cultural model/theory			
		National	Not predefined and across levels	Hofstede	Naive	Not predefined	Others
Inter-organizational and organizational	12	3	9	2	3	7	0
Across levels	2	1	1	0	0	2	0
Team	17	13	4	7	6	4	1 ⁱ

Table 1: Summary of Literature Survey Analysis

Twelve papers focus on the inter-organizational/organizational unit of analysis, seventeen papers focus on the team unit of analysis, and two papers are across the organizational and team unit of analysis. At different units of analysis, the research topics are different. At the inter-organizational/organizational unit of analysis, research topics are mainly concerned with how culture factor may influence outsourcing decision-making and relationships. At the team unit of analysis, the research topics include how culture factors may influence media selection, trust development, conflict management, knowledge transferring, team performances, etc.

Among the selected papers, national level of cultural influences is the dominant cultural perspective being studied (17 papers, 54.8%). Nine studies adopt Hofstede's cultural model, nine studies depict naïve view, and thirteen studies take the emergent view of culture with no predefined cultural model/theory. While the applications of Hofstede's model are very common (29.0%), there is a good amount of papers (41.9%) take different stands and attempt to gain in-depth understandings of cultural related phenomena. However, the percentage of papers with a naïve view towards cultural differences is also highly noticeable (29.0%). The naïve view of cultural influences treats cultural difference as a binary concept, thus may be unable to provide useful insights about how culture is relevant, and extend and deepen our understandings of cultural challenges in globally distributed information systems development.

At the inter-organizational/organizational unit of analysis, case study is the most often used method. Some of them are longitudinal and interpretative in nature (Nicholson and Sahay 2001, 2004; Walsham 2002), and incorporate multiple data resources in the studies. At the team unit of analysis, on the other hand, quasi experiment using students is the most often used approach (with the exceptions of Maznevski and Chudoba 2000; Pauleen 2003). Most of these quasi experiments are short-termed (ranging from 90 minutes to four months) and mainly use surveys as data collection methods.

DISCUSSIONS

Our findings indicate that research on cultural issues in globally distributed information systems development is quite limited. From the perspective of international and cross-cultural management, Miroshnik (2002) argued for the importance of acknowledging cultural diversity and avoiding cultural blindness. We believe that in offshore outsourcing and globally distributed information systems development research, this is also a premise. We are not arguing from a naïve point of view that everything has to do with culture. On the contrary, the establishment of cultural relevance is about visibility (whether or not it is relevant) and sensitivity (how it is relevant), which to a great degree depends on the cultural assumptions and conceptualizations, cultural models/theories, and the research approaches. Walsham (2002) pointed out that we should move beyond questioning whether or not culture is relevant to how it is relevant.

Myers and Tan (2002) pointed out that most research on global information systems only focuses on the national level of cultural influences (Straub et al., 2002). They also criticized that many cross-cultural information systems studies often treat culture as a static concept and use existing predefined cultural dimensions and quantitative methodologies, which may not be capable of providing an in-depth understanding of the complex phenomena. Therefore, several IS scholars call for better theorizing of culture and the involvement of multiple research methodologies (Myers and Tan, 2002; Straub et al., 2002; Walsham, 2002; Weisinger and Trauth, 2002).

There are several papers surveyed in this research approaching the problem spaces with no predefined cultural models and adopting interpretative methods, the findings of which show the dynamics of different cultural influences. For example, the interpretative case study by Damian and Zowghi (2003) on globally distributed requirements negotiations across Australia and the U.S. indicates that conflicts in common understanding of requirements could be attributed to the differences in both

ⁱ One paper applies both cultural models of Hofstede and Hall. Therefore, it is coded twice.

functional and national cultures. Schachaf and Hara (2006) studied the factors influencing the media selections in global virtual teams and pointed out that both the organizational culture (whether it is more hierarchical or not) and the national culture (cultural preference of different communication technologies) play roles in the media selections.

Research findings of this study confirm the assertion that national level of cultural influence is dominant. Agreeing with Myers and Tan (2002) and Walsham (2002), we believe that one of the future research agendas is to recognize the complexity of the socio-cultural context and view culture as an emergent concept. While some alternative theories and approaches have been proposed and developed, they have not been extensively applied and evaluated (Straub et al., 2002; Walsham, 2002; Weisinger and Trauth, 2002). Therefore, another future research agenda is to build on, extend and integrate those efforts. We argue that while the established cultural models are valuable, the applications of these models should not be mechanistic. Segalla et al. (2000) suggested that complex problems need sophisticated tools. They proposed to examine the sensitivity of the research instruments and provide some situational interpretations for the statistic results.

CONCLUSIONS

Motivated by the importance of investigating cultural issues in globally distributed information systems development, this study surveyed the published literature on offshore outsourcing and globally distributed information systems development, to examine how culture is conceptualized and how cultural issues are investigated in these studies. Our findings show that national level of cultural influences is the dominant level being studied. While some common cultural dimensional models are still widely used, some studies adopt the emergent and dynamic view of culture to investigate cross-cultural information systems development work. However, there are a certain number of studies viewing cultural differences naively, which fail to provide insights about *how* cultural contexts affect the globally distributed information systems development work.

It should be noted that cross-cultural information systems research is interdisciplinary in nature. One limitation of this study is the limited scope of literature resources, which mainly draw from information systems related journals and conferences. Future research should incorporate a wide variety of publications in different disciplines such as international business, organizational management and cross-cultural communication.

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Appendix A: Literature Survey

Resource	Research Topic	Unit(s) of Analysis	Research Method	Level(s) of Cultural Influences	Cultural Model/Theory	Relevant Findings
Kern 1997	IT outsourcing relationship	Inter-organization	Case study: interview	No predefined level	Naïve view	Conflicts may occur due to cultural differences between organizations. The mutual adaptation to culture tends to occur over time.
Heeks et al 2001	Outsourcing relationships management	Organization/ Inter-organization	Case study: interview, participatory observation, documentations	No predefined level	No predefined cultural model/theory	The rooted local cultural values may underpin some synching strategies.
Beulen and Ribbers 2002	Outsourcing relationships management	Organization/ Inter-organization	Case study: interview	National level	Hofstede's model	The existing culture is very difficult to change; some managerial practices help to overcome the problems related to high power distance.
Hidding 1998	The effect of national cultures on adoption of IS development methods	Organization	Surveys	National level	Hofstede's model	Four hypotheses are proposed regarding four dimensions of Hofstede's model.
Coward 2003	Outsourcing decision-making of small and medium sized companies	Organization	Structured interview	No predefined level	Naïve view	Culture is a secondary influential factor but plays a strong role in the outcomes of the outsourcing project and in influencing whether to continue business with the provider.
Akmanligi l and Palvia 2004	Global information systems development strategies and the factors that impact their selection.	Organization	Multiple case study: Semi-structured questionnaire and interview	National level	No predefined cultural model/theory	Cultural factor is treated as an influential factor in the research framework. However, its relation to the decision-making on strategy selection is not discussed in the findings.
Nicholson and Sahay 2001	The challenges of culture and organizational politics on the process of distributed development	Organization/ Inter-organization	Longitudinal case study: semi-structured interview, participatory observation, documentations	No predefined level	Structuration theory	Indian culture is somehow submissive and not very assertive; within the UK company, there are sub-cultural conflicts (formal-informal); the cultural influences are bi-directional; Indian software engineers who have been trained by rigorous method have impacts on the client company.
Walsham 2002	Develop a theoretical base to analyze cross-	Organization/ Inter-organization	Multiple case study:	No predefined level	Structuration theory	Culture of the Indian company (emphasis on productivity and strict deadline of India) vs. culture of the Jamaican company (emphasis

	cultural IS work					on working close to user and loose timeline) – this caused conflicts between these two groups.
Aman and Nicholson 2003	Outsourcing relationships management	Organization/ Inter-organization	Multiple case studies: interview, participatory observation, documentations	No predefined level	No predefined cultural model/theory	Malaysia team wanted specific instruction; sometimes it may cause delay; if contradicts existed, the Malaysia team usually would not express their opinions.
Nicholson and Sahay 2004	Knowledge transfer in offshoring software development	Organization	Longitudinal case study: interview, participatory observation, documentations	No predefined level	Structuration theory	The barriers of knowledge sharing in offshore software development are related to the embeddedness of knowledge in the local cultural contexts.
Prikladnic ki et al 2004	Challenges of global information systems development	Organization	Exploratory case study: interview and documentations	No predefined level	No predefined cultural model/theory	Cultural differences between both the dispersed individuals and the sites caused communication and language problems.
Alborz et al 2004	How configuration affect to the quality of IT outsourcing relationships.	Organization/ Inter-organization	Interviews	No predefined level	Naïve view	Cultural fit is one configuration factor that affects the IT outsourcing relationship.
Damian and Zowghi 2003	Investigate the interplay between conflict and culture in distributed teams	Organization/ Team	Case study: interview and participatory observation Grounded theory method	Across national, organizational, and functional	No predefined cultural model/theory	Conflicts can be attributed to differences in both functional and national cultures; trust was more important to the Australian teams (high context) than to the American teams; some cases indicated stereotypical attitudes between Australians and their American counterparts even though their cultural distance is very small according to Hofstede's model.
Baba et al 2004	Knowledge sharing in global virtual teams	Organization/ Team	Longitudinal ethnography: participatory observation, interview, documentations	National level	No predefined cultural model/theory	Interactions between French and American people reflected the long-standing macro-level tensions between France and the US around American 'cultural imperialism'. French and American culturally grounded beliefs about business models and practices contradicted and rejected certain aspects of knowledge held by the 'other'.
Jarvenpaa and Leidner 1999	Trust in global virtual teams	Team	Quasi experiment (student teams): email archive and surveys	National level	Hofstede's model	The insignificance of culture in predicting perceived levels of trust as well as the lack of individual information exchange.
Kayworth	Identify specific	Team	Quasi experiment	National level	Hofstede's	Over half of the virtual teams observed that

and Leidner 2000	issues and challenges faced by virtual teams		(student virtual teams): open-ended questionnaire		model	cultural differences significantly affected their ability to communicate ideas and coordinate project – linguistic problem and different senses of time or urgency.
Maznevsk i and Chudoba 2000	Understand the dynamics and effectiveness of global virtual teams	Team	Case study: interviews, observations, communication logs, questionnaires, and documentations	No predefined level	No predefined cultural model/theory	Team member background (professional) and context (cultural) affected preferences and requirements for media choice, both directly and indirectly.
Dubé and Paré 2001	Challenges of global virtual teams	Team	Interview with 18 GVT leaders	National level	Naïve view	Cultural diversity represents an enormous challenge but also offers potential richness.
Qureshi and Zigurs 2001	Technological sophistication vs. how tool is used	Team	Multiple case studies	National level	Naïve view	Culture is not the enormous barrier if focusing on tasks and goals.
Massey et al 2001	Culture, communication styles and the perceptions of task-technology fit	Team	Quasi experiments (student teams): surveys	National level	Hofstede's model Hall's model	Culture moderated the perceptions of fit between communication tasks and a technology.
Hinds and Mortensen 2002	Conflict in distributed teams	Team	Web-based surveys	National level	Naïve view	Cultural heterogeneity was not significantly correlated with affective conflict, or task conflict.
Borchers 2003	Whether or not cultural factors may impact software engineering work	Team	Observations	National Level	Hofstede's model	Cultural differences had a large impact on software engineering work and Hofstede's model provided some explanations.
Edwards and Sridhar 2003, 2005	Factors that may affect the quality of requirement definition by virtual teams	Team	Quasi experiments (student teams): surveys	National level	Naïve view	The difference in time, culture and size of the teams did not have any significant correlation with any of the outcome measures.
Evaristo 2003	Issues associated with managing projects across cultures	Team	Case studies	National level	Hofstede's model	“Cultural differences” is a precursor of trust; cultural difference will affect the immediate trust; the higher the heterogeneity are, the harder to build trust.
Sarker 2003	Knowledge transfer in virtual teams	Team	Quasi experiments (student teams): surveys	National level	Hofstede's model	In a virtual IS development project, individuals from more collectivist cultures will be more intended to transfer knowledge.

Pauleen 2003	Investigate key issues arose as the distributed teams operate across multiple boundaries	Team	Grounded action research: interview, informal discussion, participatory observation, and documentations	No predefined level	No predefined cultural model/theory	Cultural differences influence the use of communication channels. However, traditional models of culture (Hofstede and Hall) can not fully explain the choice of communication channels, which indicates that team culture should be seen as emergent and negotiated based on a range of contextual elements.
Paul et al 2004a, 2004b	Conflict management styles and virtual teams	Team	Quasi experiments (student teams): surveys	National level	Naïve view	No general conclusion can be made that the heterogeneity of the virtual team influenced the team conflict management style.
Audy et al 2004	Identify the sources of problems in distributed requirement analysis	Team	Quasi experiments (student teams): observations and documentations	National level	Hofstede's model	Brazil students (collectivist) emphasized on relationships while American students (individualist) emphasized on task. It affected the mutual expectations.
Zolin et al 2004	Trust and virtual teams	Team	Case study (student teams): surveys, observations, documentations	National level	Naïve view	Cultural diversity was associated with lower perceived trustworthiness. And this effect is stronger later in the project. However, the statistical significance of this finding is low.
Oshri et al 2005	Identify activities and mechanisms that support the build-up of human-related factors before, during, and after F2F meetings.	Team	In depth case study of globally distributed teams (between India and Germany, between Switzerland and the U.S.): interviews, documentations and observations	No predefined level	No predefined cultural model/theory	Before F2F – increasing awareness of communication styles rooted in cultural differences; During F2F – discussing differences in organizational and national culture; after F2F – ensuring routine communications and wide-open communication channels
Schachaf and Hara 2006	What factors affect the media selections in global virtual teams	Team	Interviews with GVT members in a Fortune 500 corporation in the computer industry	No predefined level	Behavioral complexity theory of media selection; but no predefined cultural model/theory	At the organizational level – when vertical or horizontal organizational differences are significant, team members are more likely to initiate (upward) communication via formal and asynchronous channels; at the national level – cultural preference and technology penetration rates affect the channel that one selects to communicate with someone in another country.