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ABSTRACT

Global software development has been found to be a difficult undertaking, in particular, when members of a single team are not co-located. Studies have looked at the impact of different cultural backgrounds, communication structures and temporal distance on the team's effectiveness. This research proposes to examine the impact of culturally based perceptions of time. A survey is proposed to carry out this examination. The survey will be used to examine time-based attitudes and behavior in globally dispersed teams. These time-based attitudes and behavior will examined to determine if cultural time differences affect team coordination, team communication which will then be compared to measures of team satisfaction and team effectiveness. A model of the impact of the temporal cultural differences and their effect on team performance is presented and the proposed research for testing this model is described.

Keywords

Cultural Differences, Temporal Perception, Global Software Development Teams, Coordination, Communication.

INTRODUCTION

Outsourcing is a common business practice today. Companies outsource to be competitive in today's global economy by taking advantage of lowered employee costs and being closer to markets they want to expand. Unfortunately, there continue to be reports of problems with outsourcing. Herbsleb and Moitra 2001, suggests that global software development requires close cooperation of people with different cultural backgrounds and that cultures differ on such critical things such as the need for structure, hierarchy, time and communication. Dispersed teams result in increased layers of communication. Curtis, Krasner and Iscoe 1988 found that more communication layers reduced the probability of communication. Globally dispersed teams are affected by time zone differences or "temporal distances." Carmel and Agarwal 2001 note that while work within a time-zone band facilitates synchronous communication, work across time-zone bands causes communication problems. The purpose of this work is to investigate the impact of cultural differences, specifically the differences in time orientation on the performance and satisfaction of global virtual software development teams. The next section presents studies of global virtual teams that document the difficulties encountered, in particular, in the coordination and communication behavior in these teams. It is followed by a section, which describes cultural differences that have been found in terms of time perspectives. Since this is a poorly studied area, work on western-based time perceptions is presented in the next section. The literature support from these sections is then summarized to generate a description of the research being proposed and the research questions that are postulated. A final section summarizes the expected results from this work.

ISSUES IN GLOBAL TEAMS

Poltrock and Grudin 1994 performed case studies on two virtual teams. They found in each case, distance created barriers to communication. Curtis et al. 1988 found that organizations impose a structure on formal communication that influences its' frequency and quality. In the context of global development this may mean that all communication from site to site is routed through managers. This decreases the normal informal communication that occurs on a same site project which would not be routed through managers. Poltrock suggest this results in increased organizational distance in communication, i.e., that people responsible for different aspect of the interface, or project, are further apart, organizationally. Jarvenpaa and Leidner 1999 looked at communication and trust in Virtual Teams and using the work of O'Hara-Devereaux and Johansen in 1994 showed that there is a dark side to the concept of virtual teams; " such dysfunctions as low individual commitment, role overload, role ambiguity, absenteeism, and social loafing may be exaggerated in a virtual context." Handy 1995 raised a similar concern: "How do you manage people whom you do not see!" Cramton and Webber 2005 examined geographic dispersion, team processes and effectiveness in software development teams. Using Sociotechnical Systems Theory they found that the social structure links individuals with technology and with each other. They also found that informal communication channels exist when people are co-located. This informal communication can fill-in details of experience

related to exceptions, mistakes and effects of previous decisions. Geographical dispersion effectively eliminates opportunities for informal communication. Geographical Dispersion further introduces differences due to local holidays, customary practices, local history, (including individual, team, and organization). Cramton 2001 found that dispersed teams were not skilled in the communication of these differences and in fact frequently failed to share information about these differences which Cramton suggests could damage coordination and interpersonal relationships. Cramton concludes that:

1. Geographically dispersed teams have less effective work processes than collocated teams.

2. There is a significant negative relationship with perceived performance.

TIME-BASED DIFFERENCES IN CULTURE

That there are cultural differences in time is a generally accepted concept but much of it is stereotypical images with little research to substantiate or negate the stereotypes. One such study that looked at differences is House, Hanges, Javidan, Dorfman and Gupta 2004 which is known as the Globe Study. This study looked at culture, leadership and organization in 62 different societies around the world. They grouped the societies into 10 clusters and used these clustering's in their analysis of a variety of cultural dimensions, one of them being Future Orientation. Cultures with Low Future Orientation or high present orientation are able to enjoy the moment, be spontaneous, free of future anxieties, maybe incapable or unwilling to plan a sequence to accomplish a desired goal and may not recognize signals that current behavior will negatively impact the realization of those goals. High Future Orientation is described as having a capability and willingness to imagine future possibilities, develop future goals and strategies for reaching those goals. They summarize it by saying that the future oriented has the capacity to maintain control and so enrich their lives while present oriented look to simplify their lives and rely more on others. Carmel et al. 2001 found such cultural differences affecting team satisfaction when Korean customers accused an Indian outsourcing company of becoming "too American" in that they were focusing too much on documentation and deadlines. Another time-based difference from the Globe study is some cultures tend to be more clock-based (scheduled start and end times) while others tend to be event-based (time organized around an event). Clock based time is common to North America and Northern European/Anglo cultures while event-based time is common to Latin America, Native American and Southern European cultures. Globalization is bringing clock- and event-based cultures into more contact with each other creating a possibility of clashes because of their different temporal bases.

HUMAN TIME PERCEPTION DIFFERENCES

Bluedorn and Denhardt 1988 work was concerned with the notion of monochronic and polychronic or the preference between doing one thing at a time verses two or more things simultaneously. Those with polychronic orientation exhibit certain characteristics such as tendency to emphasize relationships rather than tasks and being concerned about long-term relationships with family, friends and business relations. Monochronic oriented people tend to emphasize promptness, privacy, and have short-term relationships with people. Organizations and cultures also display this trait and results in those organizations and cultures that are more polychronic tending to be more externally focused and have longer time horizons. Supervision and coordination is an obvious potential area of conflict between mono and polychronic individuals or organizations. A highly polychronic boss may schedule many tasks to be done by monochromic subordinates. Alternatively, it may influence how a person judges. Zerubavel 1981 indicates that temporal orientations have associated with them a normative property which implies a value judgment is being made based on one's own orientation. An understanding of these differences and also one's own orientation could reduce conflict and misunderstandings especially when an individual's actions are judged by a person who has the opposite orientation.

RESEARCH QUESTIONS

In the literature review in the previous sections, I have shown that virtual teams have been found to perform less effectively and that some of this performance can be attributed to communication and coordination difficulties. Some of these difficulties are directly related to what is referred to as time distance, that is, how distant in time zones one portion of a team is from another portion. It has also been shown that some of these difficulties are directly related to cultural differences that lead to differences in understanding the needs, language, implications, etc. of one part of the team by another. The literature review also noted that individuals have been found to have different perspectives and orientations towards the concept of time leading to different behaviors associated with time-related decisions, e.g., how hard someone will work to meet a well-defined deadline. It has also been demonstrated that individuals have perspectives of time that are a result of the influences of culture and of the various groups and organizations they belong to. It has not been shown if the temporal cultural differences affect virtual team coordination and communication although anecdotal evidence exists that suggests this. Therefore this research will;

    a.   attempt to identify and formalize a set of temporal cultural perspectives different cultures might have.

    b.   attempt to measure these cultural differences.

    c.   attempt to identify and measure temporal organizational perspectives that would have a mitigating effect on temporal cultural perspectives.

    d.   attempt to uncover a relationship between temporal cultural perspectives and virtual team coordination and communication efficacy.

    e.   attempt to build a correlation model showing the impact of temporal cultural differences that eventually affects virtual team performance as moderated via team communication and coordination efficacy.

In conjunction with the above proposed research, my key research questions are:

1. Do cultural time differences affect team coordination?

2. Do cultural time differences affect team communication?

3. Does this impact on coordination and communication affect team performance?

To do this work, I have developed the following set of time constructs, see appendix A for definitions and representative survey questions: (1) Lateness, (2) Punctuality, (3) Future Orientation, (4) Polychronicity, and (5) Organizational Time Orientation. The relationship between these constructs and communication efficacy will be examined with non-significant correlations being discarded. The resulting temporal constructs will be used to test the simplified correlation model shown below.

The above model represents the research hypotheses drawn from the research questions presented. In the proposed, additional intervening and modulating variables such as trust, time distance, team diversity, team maturity and task type will be used to develop the model. The contribution of this research will both be in the operationalization and validation of the cultural time perspective variables and in the teasing out of the effect differences in these variables might have on the communication and coordination efficacy, and thus, on team performance and satisfaction.
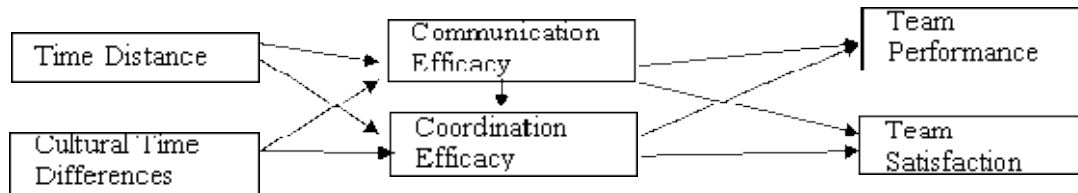

Figure 1 Correlation Model

APPENDIX

1. Lateness Acceptability – *a measure of an individual's perception of how socially acceptable it is to arrive late in various scenarios.* EX: It is never okay to be more than a few minutes late for a meeting at work unless you have a good excuse.

2. Punctuality – *a behavioral measure of how precise an individual is in performing an activity to meet an externally designated clock or event time.* EX: I would rather be early than late for something

3. Future Orientation – *a measure of how oriented a person is towards planning for tomorrow as opposed to focusing on current activities.* EX: I believe that the accepted norm in this society should be to: solve current problems/plan for the future.

4. Polychronicity –*a measure of how oriented a person is towards doing multiple things at the same time.* EX: I like to juggle several activities at the same time.

5. Organizational Time Orientation –*a measure of how c*losely allied the team members are with the socio-temporal culture of the organization and the temporal structures of the organization* EX: My vacations are scheduled to meet my organization's needs.

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