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ABSTRACT

IN-GROUP / OUT-GROUP DYNAMICS AND EFFECTIVENESS IN PARTIALLY DISTRIBUTED TEAMS

**by
Faina Privman**

When organizations collaborate they often do so using partially distributed teams (PDTs). In a Partially Distributed Team there exist at least two distinct sub-groups. In addition, at least one of the sub-groups has two or more members that are geographically co-located. Co-located members can meet face to face; chat in the hallway; have lunch together; and otherwise socialize with one another. On the other hand, remote members must rely on technology to communicate and work together. This distinct characteristic of partially distributed teams makes them especially susceptible to the In-Group / Out Group dynamic (Huang and Ocker, 2006). This dynamic manifests itself when members of a co-located sub-group treat each other with preference or exhibit a more favorable attitude towards each other than they do towards their remote colleagues. We refer to such behaviors as 'Us-vs.-Them' and categorize their occurrences.

After examining why and how Us-vs.-Them occurs in Partially Distributed Teams, we attempt to understand under which conditions it exists and persists, as well as its relationship to effectiveness. We examine conditions of technology, team configuration, employee motivation, and organizational policies that may reduce Us-vs.-Them, and formulate a model for reduction of Us-vs.-Them and increase of effectiveness. We test our model using a survey instrument distributed to 238 industry professionals.

We found support among participant comments confirming the existence of Us-vs.-Them in partially distributed teams and its importance. We also found a strong relationship between Us-vs.-Them and effectiveness. High Us-vs.-Them showed a very high correlation to reduced effectiveness. We found support for the value of technology uniformity between sub-groups as well as technology reliability, for decreasing Us-vs.-Them. And we showed that just as in traditional teams, regular meetings are helpful in partially distributed teams.

Although we discuss informally implemented policies that proved to be valuable in partially distributed teams, we discovered that the more formal policies are the more effective type. Other important findings include: Us-vs.-Them is more prevalent in international teams as well as in teams that are composed of two sub-groups only; and when motivated by flexible schedule, work creativity, and challenging work, participants had higher perceived effectiveness ratings.

Most prior PDT research was conducted using student teams or case studies of one or two industry teams. A contribution of this dissertation research is collection and analysis of a large sample of industry data. Another important contribution is the isolation of Us-vs.-Them as a dependent variable. Understanding under which conditions it exists is important so that managers can identify it and prevent it from escalating.

**IN-GROUP / OUT-GROUP DYNAMICS AND EFFECTIVENESS IN
PARTIALLY DISTRIBUTED TEAMS**

**by
Faina Privman**

**A Dissertation
Submitted to the Faculty of
New Jersey Institute of Technology
in Partial Fulfillment of the Requirements for the Degree of
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Department of Information Systems

August 2009

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APPROVAL PAGE

**IN-GROUP / OUT-GROUP DYNAMICS AND EFFECTIVENESS IN
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To my mom.

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CHAPTER 1

INTRODUCTION

1.1 Objectives

As organizations that are dispersed collaborate, they often form partially distributed teams (PDTs). In Partially distributed teams, some members are collocated while others are geographically distant. Members of the collocated teams often treat one another as a preferential 'Us' vs. treating distant team members as the outsider 'Them'. The research we propose examines factors contributing to reduction of such 'Us-vs.-Them' and an increase in team effectiveness. Because distant team members rely on information communication technologies to work together, our study falls into two of the IS core research areas, as identified by Sidorova, Evangelopoulos, Valacich, and Ramakrishnan (2008). One area is that of IT and organizations, since we examine organizational policies that relate to IT, and another is that of IT and groups, since we focus on group dynamics. An additional relevance to IS of this dissertation is that we targeted mainly IT professionals for participation in the study.

The dissertation is organized into twelve chapters, the first being an overview. The second through fifth chapters consist of a literature review as follows: issues that are faced by partially distributed teams that specifically contribute to in-group / out-group dynamics (chapter 2); measurement of effectiveness in IS literature (chapter 3); the role that technology plays in partially distributed teams (chapter 4); policies that are in place in partially distributed teams (chapter 5); and technological issues that partially distributed teams face (chapter 6).

Research questions derived from the literature as well as a proposed model and hypotheses are discussed in Chapter 7. A pilot study is presented and results are discussed in chapter 8. This is followed by discussion of participants of the full scale dissertation study and validation of measures in chapter 9, research questions and hypotheses testing in chapter 10, and qualitative results in chapter 11. Discussion of results, contributions, limitations, and future research can be found in the final chapter. Appendices include the survey instrument, IRB approvals, and upporting tables.

CHAPTER 2

IN-GROUP / OUT-GROUP IN PARTIALLY DISTRIBUTED TEAMS

2.1 Abstract

This chapter reviews literature that explains and exemplifies the In-group / Out-group dynamics, often observed in Partially Distributed Teams (PDTs). It manifests itself when members of a collocated sub-group treat each other with preference or exhibit a more favorable attitude towards each other than they do towards their remote colleagues. Some examples are denigration and negative stereotyping of distant sub-groups (Flippen, 1999) and giving less consideration to contributions by distant sub-groups (Mackie, Worth, and Asuncion, 1990). Such unfavorable dynamics has been termed “Us-vs.-Them” and will be referred to as such in this thesis. By examining case studies of partially distributed teams as well as controlled experiments, we use a grounded theory approach to come up with a set of occurrences that fit under the Us-vs.-Them umbrella.

2.2 Introduction

In a Partially Distributed Team there exist at least two distinct sub groups. In addition, at least one of the sub groups has two or more members that are geographically co-located. These members can meet face to face; chat in the hallway; have lunch together; and otherwise socialize. This distinct characteristic of partially distributed teams makes them especially susceptible to Us-vs.-Them occurrences (Huang and Ocker, 2006; Bos, Shami, Olson and Nan, 2004). We examine these occurrences in literature and classify them.

Classifying these occurrences and understanding their implication for member relations, and ultimately team effectiveness, is very important. Especially because once

tensions between sub groups begin to develop, the split between them deepens and serious consequences for the work relationships and work performances of virtual teams may follow (Bos et al, 2004; Cramton, 2001; Cramton, 2002). To avoid this vicious cycle, organizational awareness and preparedness can help PDTs leap over common pitfalls, and head to success.

First we discuss the social psychology of the sub-group formation and conflict between sub-groups. Then we look at definitions and dynamics of team structures and theories that explain why partially distributed teams are especially susceptible to such conflict. Next we review experimental studies and their relevant findings, classifying these findings into themes. We continue with case studies literature adding to the themes as appropriate. Finally we conclude with findings and implications for future research.

2.3 Why Partially Distributed Teams

Although this chapter (and dissertation research) focuses on conflict in partially distributed teams, a kick-off discussion to highlight the benefits of such teams is warranted. Partially Distributed teams enable firms to take advantage of expertise around the globe; to continue work around the clock; and to create closer relationships with far-flung customers. In diverse teams such as often represented by PDTs, group-think is often lessened, and problems are solved with increased creativity and speed.

Many of these advantages were also the idea behind Matrix Management in the 70's. Matrix management is defined as laying one or more new forms of departments in organizations on top of an existing form (Burns, 1989). Sy and D'Annunzio (2005) examined the challenges and strategies of matrix organizations from a management

perspective. Table A.1 (Appendix A) lists the matrix organization strengths they identified, along with their applicability to partially distributed teams.

As evident, many parallels can be drawn between the two setups. However, a major difference worth mentioning is that the main objective of matrix management was to increase effectiveness by putting together the most effective group of professionals to deal with a project. On the other hand PDT objectives are often a 24 hour operation, indicating greater efficiency, with an assembly line feel where employees are interchangeable. This atmosphere creates a fertile ground to Us-vs.-Them. Such attitude by management breeds mistrust and other negative reactions among the distributed subgroups that are supposed to work together. The rest of the chapter focuses on examining this PDT reality.

2.4 In-Group (Us) / Out-Group (Them) Literature

Traditionally in organizations it was meaningful to consider people working in the same geographic site as a co-located group. Within such a co-located group, people have the opportunity to communicate in-person, to interact socially, and receive support (Monge, Rothman, Eisenberg, Miller, and Kriste, 1985). This perceptual grouping of organizational workers by geographic site qualifies as a dimension of diversity; defined by Williams and O'Reilly (1998) as an attribute used by people to think that someone else is different. Because location is an apparent attribute and people tend to base their first impression of one another on immediately apparent attributes, it becomes an important social category that divides a team into those who are immediately present and those who are not. In fact spatial proximity was recognized decades ago as a salient

perceptual cue that causes people to view multiple individuals as a cohesive entity (Campbell, 1958).

Co-located teammates therefore have an explicit boundary defined by geography that categorizes them as separate from their distant teammates. In distributed teams, once such a psychological divide by location is established, relations among members between locations generally differ from relations among members in the same location. Relationships among members in the same location benefit from familiarity brought about by close physical proximity (Festinger, Schacter, and Back, 1950), and the positive biases people bestow upon those whom they categorize as in-group members (Brewer and Brown, 1998). Co-located teammates are also likely to meet by themselves in person, apart from the larger team; a condition that Lau and Murnighan (1998) note would further strengthen their status as a distinct sub-group. The interaction and discussion that occurs in these sub-group meetings may cause initial attitudes and stereotypes to become more extreme. Such polarization in turn causes team members to identify even more strongly with their sub group. This imbalance in communication channels (face-to-face vs. electronic media) was shown to result in coalition formation (Pool, 1976). Face-to-face contact has been well established in literature to foster social integration (eg: Lojeski, Reilly, and Dominick 2006; Panteli and Davidson, 2005). Therefore the communication imbalance serves as a catalyst to the development of sub-group identity and further bias towards co-located members and against distant ones. Such biases may then become a potential source for interpersonal conflict or relationship conflict with members of remote sub groups (Jehn, 1995).

Research on “inter-individual / inter-group discontinuity” supports the principle of sub-group identification by showing that relations between groups (or, in this case, sub-groups) tend to be more competitive than relations between individuals. Lau and Murnighan (1998) wrote that sub-groups provide social power and internal support. For dispersed teams, this supports sub-group identification and the argument that more problems may occur when sub-groups, compared to individuals, reside at different sites. Sub-group division intensifies with homogeneity. Members of a homogeneous sub group, compared to members of a heterogeneous one, are viewed as more alike by those outside the sub-group, in keeping with research on the out-group homogeneity effect (Quattrone, 1986). The tendency to perceive out-group members as homogeneous can accompany any intergroup distinction, contributing to intergroup rivalry and conflict.

Conflict is a dimension of the group interaction process, and trust is an emergent state that can be both an input and an outcome of group processes (Marks, Mathieu, and Zaccaro, 2001). Conflict has been defined as disagreements among group members that stem from perceived incompatibilities or differing views and goals (Jehn, 1995). Trust has been defined as a group member’s willingness to be vulnerable to the actions of his or her teammates based on expectations that other members will perform actions that are important to that member (Mayer, Davis, and Schoorman, 1995). Conflict (usually impairing group function) and trust (usually aiding group function) have been shown to be very influential in the performance of distributed teams (Montoya-Weiss, Massey, and Song, 2001).

2.5 Faultlines

A boundary caused by the dimension of distance is one of many boundaries that may affect a team. Such boundaries were termed 'faultlines' by Lau and Murnighan (1998). Lau and Murnighan define faultlines as dividing "a group's members on the basis of one or more attributes (Lau and Murnighan, 1998, 325)." As a result of faultlines, coalitions of informal sub-groups can form which can lead to conflict. Having the conditions for formation of sub groups, however, may not guarantee that sub groups will form. It is the actual formation of the sub groups, as opposed to such potentials that can cause problems. Faultlines are most likely to form at the early stages of team formation. However, if the team is focused on activities that minimize awareness of the diversity of attributes, then the sub-groups may not form. For example, if there are pressing deadlines or external competition, then the focus may be away from the within-team diversity and team cohesion may develop instead (Lau and Murnighan, 1998). If the sub-groups do not form then the faultlines are not activated. When faultlines are not activated they may weaken over time as the team cohesiveness grows stronger. The faultline strength will influence sub-group stability (Lau and Murnighan, 1998). If the faultline is weak, then the sub-groups are less stable and members are more likely to identify with the entire team. On the other hand, if the faultline is strong then over time the sub-group identification may grow and conflict may ensue between the sub groups (Lau and Murnighan, 1998). The concept of faultlines has implications especially for partially distributed teams that are likely to encompass distance related dimensions such as organizational culture, native culture, and language. The challenge, then, is to weaken the faultline so that team cohesiveness can develop and in-group/out-group effects can be minimized.

Polzer, Crisp, Jarenpaa and Kim (2006) demonstrated geographic faultline formation and impairment of team functioning. In their study, students from 10 countries were divided into 45 teams. The study compared three team configurations: a fully distributed team, a team with two distributed sub groups, and a team with three distributed sub groups. In the course of seven weeks, participants engaged in a team building exercise and two tasks with deliverables. The results of a survey administered at the end of the project were analyzed to determine the amount of conflict and trust individual members and groups experienced. The results confirmed that participants experienced less trust and more conflict with their distant colleagues than with collocated members. Supporting the faultline model, the results suggested that teams with two sub groups experienced less trust and more conflict than those with three sub groups. Teams with three sub groups experienced more conflict and less trust than the fully distributed teams. The analysis also revealed that, not surprisingly, participants experienced more trust and less conflict with their collocated colleagues than with distant ones. The concept of faultlines is, therefore, particularly relevant to a study of partially distributed teams and can inform managers of how and why conflict can arise.

2.6 Us-vs.-Them Susceptibility in Partially Distributed Teams

We discussed the social aspect of the Ingroup / Outgroup effect above. We will elaborate on it here - relating the discussions to Information Systems studies. Both, communication channels and geography can often cause one sub-group to perceive the other as 'different'. This follows from lack of face-to-face interaction and lean media communication (lacking facial expressions and other expressive exchanges). In fact, research suggests that computer mediated communication (relied upon for interaction

between sub-groups) is more likely to result in conflict than face to face interaction (available for interaction within sub-groups), due to lack of non-verbal cues, lack of cues about social differences, fewer concerns about social desirability, and decreased concern about others (Hiltz, Turoff, and Johnson, 1989; Weisband, 1992). It follows that there is more likelihood for conflict between sub-groups than within sub-groups, creating the Us-vs.-Them effect. Susceptibility can further be heightened by the cultural differences that often accompany geographic distance (Johansson et al., 1999; Kayworth and Leidner, 2000; Maznevski and Chudoba, 2001; Robey et al., 2000). It has been shown that there are differences among national cultures that can affect social and business interactions (Hofstede, 1980).

Researchers found that subtle cognitive differences due to cultural gaps require time and effort to resolve. Espinosa, Delone, and Lee (2006) found that Asian team members may hesitate to say no to others; to openly bring up potential problems; and to let others know when they are behind schedule. This, of course, is not the norm among western cultures and created problems between the two sub groups they studied. Cultural differences, if they exist between sub groups, can prevent some team members from understanding the needs, language, and societal constraints of a remote sub group. Cultural differences are common in global PDTs. However, even subtler differences among team members from different regions of the same country may be enough to cause a negative impact (Robey et al., 2000). Cultural differences can sometimes be accompanied by language barriers. Natural language differences can obviously cause major miscommunication and misunderstandings. However, even unique technical jargon was found to be a problem between sub groups that consist of cross-functional

specialties (Sauder, 1987). As a result, sub groups based upon perceived similarities and differences form: favoring 'similar' (collocated) team members, vs. the 'different' remote team members (Huang and Ocker, 2006).

Other PDT features, such as long terms ties within an existing sub group hindering relationship building with a newly joined sub-group, can heighten Us-vs.-Them susceptibility. This may happen especially when PDTs are formed as a result of reorganizations. Sometimes these new organizational structures are unwelcome by members of the newly formed team (Bradley, Haines and Vozikis, 2002). Even under good conditions where a PDT may be formed because the 'best expertise' is available in another location, such organizational diversity increases the division between sub groups. For example, each site may be accustomed to different norms and practices that may result in feelings of inequality and subsequently in Us-vs.-Them conduct (Lau and Murnighan, 1998). One type of inequality that may exist between sub-groups in different locations is economic. Pauleen (2003-4) reported that inequality of compensation can result in resentment. Parent company affiliation in joint ventures was also shown to activate divisions between sub-groups (Li and Hambrick, 2005).

When a limited working relationship exists between sub-groups of partially distributed teams they cannot draw on experience with each other when making attributions and are therefore susceptible to attribution errors (Cramton, 2001). In addition to limited working relationships, PDT sub-groups may be put together to work on a short project, where each sub-group has an expertise, or where extra man hours are needed. In these cases attribution errors are more likely to occur because members will be less likely to seek adequate social and contextual information to ground their

attributions. (Cramton, 2001). Lower levels of collective knowledge (Griffith, Sawyer, and Neale, 2003); and conflicting functional expertise (Olson and Olson, 2000) can further complicate this susceptibility. Attribution errors will be explored in the next section as an Us-vs.-Them occurrence.

Technological incompatibilities can make PDTs vulnerable as well. It has been shown that virtual teams may experience conflict when members are unable to resolve differences and compromise on the use of a specific software package or approach (Sarker and Sahay, 2002). Pauleen (2003-4) noted differences in organizational preferences for certain communication systems between sub-groups in different organizations; issues with national communication infrastructure between sub-groups in different countries; and cultural preferences for appropriate communication channels. He reported that such differences sometimes lead to debate about which kind of technology to use and problems getting team members to agree on a common platform. Adjusting to new technologies can cause resentment for the sub-group that is required to do so, as well as delay for the team as a whole, and therefore increase the Us-vs.-Them likelihood.

Among other PDT specific features that make them susceptible to the Us-vs.-Them effect is the limited synchronous availability that often exists, especially in global PDTs. This limited synchronous availability worsens communication difficulties the sub-groups have and further impairs relationship building between sub-groups (Cramton, 1997). It greatly increases reliance on asynchronous communication and therefore increases the likelihood of conflicts that may occur regarding coordination (Benbunan-Fich and Hiltz, 1999). Limited synchronous availability is often the result of large time zone differences. To accommodate this difference, members of one group often have to

extend their day either by starting early or staying late. In fact, researchers found that time differences bring about a substantial burden on the time demands and personal lives of team members. If the extra hours interfere with family time, resentment towards the remote team may start to build up (Egan, 2008). Such resentment will contribute to Us-vs.-Them.

In addition, because sub-groups of PDTs are by definition separated by distance, one may happen to be at a headquarters location, while another at a less prestigious location. Conflict may arise if sub-group members of the latter feel like second class citizens (Carmel, 1999; Huang and Ocker, 2006). It is also common in organizations for employees to have a variety of responsibilities, some of which are locally based. In this case, it is easy for local responsibilities to take precedence over remote responsibilities (Stringfellow, 2003). This situation may render the distant sub-group members feeling like second class citizens as well and increase Us-vs.-Them likelihood. Other scenarios that are along the same lines are the lack of shared goals, strategies, individual capabilities, and task priorities. Discrepancies in these areas have been shown to hinder relationships between virtual team members (Crawston and Kammerer, 1998); therefore if they exist between sub-groups, they may have the same negative effect on whole team cohesion.

Now that we have explored why PDTs are especially susceptible to the Us-vs.-Them effect, we'll review literature findings of this effect in classroom settings as well as in organizational studies, and attempt to group these occurrences into themes.

2.7 PDT Experimental Studies

In a multi-method case study, by Huang and Ocker (2006), to investigate the issues student participants had while working in partially distributed teams; students were assigned to one of twelve teams consisting of five to seven members each. They attended a university that had a Main Campus and branch campuses. Team members were from either the Main Campus or one of the branches, with no team having all members from the same campus. The teams worked on one of two equivalently complex tasks - investigating the state-of-the-art for a product and exploring additional functionality that could improve it. Weekly status reports were prepared by the teams for their sponsors (representatives from participating fortune 100 companies) who provided the teams with feedback. Students also individually maintained a record of their communications with teammates and described their experiences working in a PDT by completing weekly personal reflections, surveys, and evaluating their teammates.

Results of the study showed that for many teams, Us-vs.-Them existed and impacted interaction among team members (Huang and Ocker, 2006). Two important contributing factors to Us-vs.-Them were evident: distribution of power, and information flow. The distribution of power problem was a result of the Main Campus having more prestige, and being the location which the sponsors visited at the beginning of the project. The Main Campus professor was also the client and sponsor contact person with thus adding to the perception of power differences between the main and branch campus. Branch campus members sometimes felt like “second-class citizens” and as a result there was a clear feeling of “Us-vs.-Them”. The information flow problem was a result of main campus members having an advantage that information flowed from the main

campus professor through them to the branch campus. This caused some resentment amongst branch campus members and increased the division between sub-groups.

The researchers report finding that the negative influences of the uneven distribution of power and information flow, decreased trust and increased conflict among the sub groups (Huang and Ocker, 2006). This uneven distribution caused members of some sub-groups to perceive the distant team as having an advantage. In this case, the advantage is related specifically to the fact that PDTs have sub-groups in distinct geographic locations and therefore can be isolated as an Us-vs.-Them cause specific to PDTs (rather than all types of teams). And so, we have our first theme of Us-vs.-Them:

- Perception that the distant sub-group has an advantage

Another finding that supports this theme was reported: some members felt that their distant teammates faced fewer consequences for not maintaining an appropriate work ethic (Huang et al., 2006). Such perception of advantage is an important finding as it is not uncommon for partially distributed teams to form with one or more sub-groups at main branches and one or more sub-groups at satellite locations. Managers need to be aware of how poignant this perception is and take appropriate measures to reduce it.

Moving along from perception to practice, Bos et al. (2004) conducted an experiment, with student subjects that provides further insight into Us-vs.-Them. They used a simulation game in which five players were colocated and five players were 'telecommuting'. The game involved producing and trading shapes with one another. Intentionally, a scarcity of shapes for production and trading was simulated in the game, so that negotiation and decision-making were required. It was therefore a simulation of a collaborative effort of a partially distributed team with one colocated sub group and

some isolated team members. Although the collocated members could discuss and arrange trades face-to-face among themselves, actual trading was done using a web-based system and all communication to and from telecommuters was through the system. A transaction log, of who sold what to whom, provided the primary data source for analysis. The analysis of the data supported the hypothesis that collocated members would collaborate more with other collocated members instead of telecommuters. Although the transactions needed to go through the web messaging system, negotiations among collocated members could quickly and easily be accomplished face-to-face. Therefore, the researchers propose that the bias to trade with co-located members was due to convenience and also that there was social pressure; it was psychologically more difficult to say no to an offer of trade face-to-face than over the system (Bos et al., 2004). This psychological factor can be classified as another Us-vs.-Them theme:

- Increased readiness to contradict, refuse, or slander remote team members.

In fact there was also some evidence of social conflict between collocated members and telecommuters. The researchers observed that in some teams, collocated members identified “difficult” telecommuters that should be avoided (Bos et al., 2004). Such labeling falls in line with the ‘slander’ component of the theme identified above. An interesting finding of this study is that in the first few minutes of trading, telecommuters contacted other telecommuters and co-located sub-group members equally. As trading progressed, however, telecommuters tended to favor other telecommuters over the co-located sub group (Bos et al., 2004). The researchers suggest that this was a result of telecommuters feeling ignored by the co-located sub-group members. Interestingly, this perception of being left out, caused telecommuters to

somewhat form their own ‘virtual’ sub-group. The relevance here is that the feeling of being ignored contributed to Us-vs.-Them and therefore a new theme can be added to our repertoire as follows:

- Perception of communication delay or indifferent treatment.

Although Us-vs.-Them effects were observed in the experiment reported above, the researchers also focused on comparison of effectiveness between the sub-groups and did not find a significant difference in effectiveness. A possible explanation provided was the fact that there was not enough interdependence between sub groups incorporated in the game. In a later experiment, the game was modified to rectify that, and interdependence between remote and local players was increased, so that it was impossible for players to trade only within sub-groups (Bos, Olson, Nan, Shami, Hoch and Johnston, 2006). Such configuration may be more representative of corporate partially distributed teams, as members in each sub-group depend on each others’ skills and deliverables.

Interestingly, a bias still existed, whereby co-located members preferred trading within their sub group. All of the collocated players also were slow to respond to remote players, less likely to supply remote players with shapes, and communicated less by text messaging with remote players as the remote players did with each other (Bos et al., 2006). The researchers confirmed with this study as well that collocated team members felt social pressure to sell their shapes more inexpensively within the sub-group and noted that social inhibitions in face-to-face settings constrain behavior while remoteness lessens such inhibitions. This is a confirmation of a theme we listed above of increased readiness to contradict, refuse, or slander remote team members. And again, it can be

especially critical in partially distributed team settings because of the existence of both remote and local team members.

Another bias that is well documented in literature is that of trust. It has been shown that establishing trust between sub-groups is more difficult than establishing trust within sub-groups. Lack of trust between sub groups can manifest itself in many counter constructive behaviors. One such example is engaging in excessive self protecting actions (Kramer and Tyler, 1996). Once these actions begin, they are sensed by the remote sub group and intensify the problem further. In some studies the source of difficulty in establishing trust is not explored, but lack of trust is simply measured and established. Aubert and Kelsey (2003) conducted a three month field study of 71 students from universities in Montreal and Toronto, formed into partially distributed teams. Each team had six members – three from each university. Trust was measured using a survey, early in the project and at the end of the project. A significant result is that trust between local teammates remained higher than trust between remote teammates, even after frequent interaction.

Other studies explore the origins of this difficulty. Cogburn and Levinson (2003) proposed that difficulty in establishing trust may relate to cultural differences in Partially Distributed Teams. They conducted a study with American and South African students. They observed that differences in communication and academic styles contributed to the low participation rates of South-African team members. The low participation rate, in turn, resulted in low trust. This study exemplifies difficulty in establishing trust and perception of communication delay.

Communication delay in and of itself was shown to influence trust, especially when occurring due to lack of synchronous availability in Partially Distributed Teams. When PDT members work across time zones, the team is especially vulnerable to this effect. Piccoli and Ives (2003) found that inexperienced team members may experience trust decline due to negative association of time dispersion related delay. Other factors in PDTs result in lack of trust as we will see later. For now, we note this important theme as:

- Difficulty establishing trust between sub-groups

Communication delay can not only impede trust development in PDTs, but it can also lead to perception of communication withholding, where dispersed members assume that collocated team members are talking and sharing information that is not shared with them. Such assumptions have been identified as a source of friction by Cramton (2001), who studied mutual knowledge sharing problems in dispersed teams in an experiment with graduate students. Cramton reports that people who collaborate remotely do not share information evenly across sites. A possible explanation is that remote counterparts do not have access to the same information as the local sub-group. Another possible reason is that communication by electronic media requires more effort than local exchanges (Kraut et al., 1990). This finding was corroborated by Sarker and Sahay (2002), who examined culture, technical expertise, communication, coordination, and socialization; and came up with strategies for dealing with these challenges. These studies deal with the following theme:

- Perception of information withholding

So far, by reviewing student studies we came up with following Us-vs.-Them themes:

- Perception of information withholding
- Difficulty establishing trust between sub-groups
- Perception of communication delay or indifferent treatment from distant sub-group.
- Increased readiness to contradict, refuse, or slander remote team members.
- Perception that the distant sub-group has an advantage

Additionally, in the context of discussing PDT susceptibility (See Susceptibility section), two other themes are apparent:

- Weak social integration between sub-groups
- Tendency to develop strong team identity by location

The last two themes are also noticeable in a study of sub-group formation in global virtual teams (Panteli and Davison, 2005). In this study, teams were formed with two collocated sub-groups. It is important to note that participants were only told that they were part of a team where some members were from another location. Forty-seven student participants were formed into 8 teams with the task of performing a case study analysis of the use of a knowledge based system. The teams communicated via a conferencing tool which had asynchronous as well as synchronous capabilities. At the completion of the project team members submitted personal reflections. From analysis of their discussion boards and chats, it was found that sub groups based on geographic proximity formed in every team to some degree. The degree of impact was determined by three factors: when the sub groups emerged, the effect of the sub group division on

work distribution, and communication methods and content. High impact teams had early emergence of sub groups, divided tasks along geographic lines, had little to no whole-team social communication, and had communication that reflected this division such as “us” and “them”. Moderate impact teams, initially attempted to work as a single unit, but later in the project formed sub groups. Low impact teams demonstrated, throughout the project, efforts to work as a single unit and build a cohesive overall team. More social communication took place in low impact teams than in the other teams and the communication was almost exclusively via electronic communication media.

Although we have uncovered many important themes above, student studies have limitations and may differ from corporate results. A study that compared student studies to field studies of group support systems proved that there can be a discrepancy between results of the two approaches (Fjermestad and Hiltz, 1999). One limitation of student studies is the length of the term as a dictator for project length. Another is lack of working history for student teams. Other limitations worth mentioning are lack of organizational structure in a classroom (corporate ladder) and different motivations in the classroom and in the corporation (grade vs. monetary rewards). Students may also differ from work teams in their ability to understand and collaborate with varying cultures. In fact, researchers found that students had a great many misconceptions about other cultures, and so introductory exercises proved helpful. Researchers also report that in student teams there sometimes is an attitude that “it’s just a course” and a discrepancy of attitudes ranging from “just wanting to get the project over with” to being very worried and calculating about the grade (Egan, 2008). Next we look at field studies for confirmation of the themes above and additional insights into “Us-vs.-Them”.

2.8 Field Studies

There is a scarcity of field studies that focus on relations between sub-groups of partially distributed teams, in particular. However, field studies of mostly virtual teams (where team members are fully dispersed) are abundant as well as studies of global teams. Can such virtual team findings and global team findings apply to partially distributed teams? In many cases the answer is yes, as elaborated upon in the next paragraph.

Virtual teams have been defined as geographically, organizationally, and/or time dispersed workers using information and telecommunications technology to facilitate communication and collaboration (Powell et al., 2004; Gilliam and Oppenheim, 2006). The dimension of geographic distribution, however, only requires that the team is not entirely collocated (Jarvenpaa and Leidner, 1999). In cases where the members are not totally dispersed, virtual team research can apply to partially distributed teams. In fact, partially distributed team settings are often found in papers on virtual team research. For example, Pauleed (2003-4) conducted a virtual team action learning program with 7 participants, where a few of the participants' team settings fit the PDT model. Global teams are defined as teams whose members are located in more than one country. Again, where at least one sub-group exists with at least two members, the global team is actually a partially distributed team. Because of the large intersection between partially distributed teams and virtual teams and global teams, we can look to studies of virtual or global teams for Us-vs.-Them themes. This section will attempt to do just that.

A field study confirming the perception that a distant team is having an advantage was conducted by Egan (2008). In his research there was a main location in the U.S and peripheral locations in Europe, China, and India. Members in the peripheral locations

constantly had to make schedule adjustment to meet with the U.S team. These members perceived the U.S team as inflexible (especially to schedule adjustments) and as having many advantages, such as the ability to work from home.

A perception that is related to a distant sub-group having an advantage is that the distant sub-group is not carrying its weight. We have established in the previous section that partially distributed teams suffer from communication imbalance. Meaning it is much easier and smoother, in most cases, to communicate within sub-groups than between sub-groups. Such reduced communication may also lead to reduced awareness of the distant sub group and their contributions. In studying nine global software projects, Herbsleb and Bass (2005) found that it is very difficult to judge the quality and skill of technical staff at remote sites due to the distance between sites and the consequent communication difficulties. Such reduced awareness may contribute to the next theme:

- Perception that distant sub-group is not carrying its weight

Another study that highlighted communication imbalance was performed by (Herbsleb, Mockus, Finholt and Grinter, 2000). They investigated the effects of distance on dependencies and delay. Four sites (one in the UK, one in Germany, and two in India) of a Lucent Technologies team were studied. Modification Requests (MR) and their implementation were analyzed and surveys were administered. The modification requests contained data that revealed whether multiple sites were involved in each task and how long it took to complete, giving information as to the dependencies between sites for a given task and any delay incurred. The results of the analysis showed that when an MR involved multiple sites it took significantly longer to complete than when only one site was involved. Survey results were consistent with the MR analysis. That is,

members of each sub-group reported perceived delays from remote sub-groups when an MR involved multiple sites. This finding supports the theme of perception of communication delay or indifferent treatment by the remote team. And in this study the perception was confirmed with an actual delay measure.

Other differences between inter sub group and intra sub group activities were found. Survey results indicated that participants had a significantly larger personal network within their sub group than between sub groups. Consistent with that, members felt that it was more difficult to find and contact people at remote sites than at the local site (Herbsleb et al., 2000). The researchers suggest that the network of support is greater for each member in his or her collocated sub-group. The problem of knowing who to talk to is common in any team communication. In PDT setups, there may be greater knowledge of who is the expert in an area or at least greater possible access to that person due to being collocated (Armstrong and Cole, 2002; Kiesler and Cummings, 2002). Unfortunately, the extra effort required in seeking assistance from the remote team may deter some members from doing so. The next theme can result from such a situation:

- Reluctance in approaching the distant sub-group for help

Many propositions can be made from the next interesting finding of this study: that although the respondents reported that they received needed help more readily from their local colleagues than from their remote ones, they also reported that they believed they provided equal assistance to their remote and local colleagues (Herbsleb et al., 2000). The researchers suggest that there is insufficient awareness of remote group needs and activities. From previous discussion we can conclude that such unawareness is due to:

- Misunderstandings between sub-groups

An occurrence related to misunderstanding is misattribution. Misattribution, or attribution error, is the default assumption that a person's actions are based on what type of person they are, rather than looking to the environmental or societal factors which may be present. This assumption can lead to false explanations as to the actions of a person or why an event occurred, which then can influence feelings and opinions towards that person. Cramton (2001) reported on misattribution in distributed team work. A scenario that may lead to misattribution is when sub groups in different locations end up with different information because of undetected human and technical transmission errors and because people fail to distribute information to all team members without awareness of the consequences. Another scenario is when remote observers, who use electronic means to communicate, may lack cues and knowledge of environmental factors that collocated members benefit from. This discrepancy in situational knowledge affects the formation of in-groups and out-groups based on geography and thus heightens the Us-vs.-Them effect. Sarker and Sahay (2004) suggest that in distributed work environments there are three challenges to attribution: limited human connection, ineffective communication, and suspicion arising from the inability to verify actions of remote members.

Abel (1990) describes an attribution error that occurred in a partially distributed group of Xerox; where one sub-group was in California and another in Oregon. A simple misunderstanding and failure of video conferencing equipment caused perception of rudeness. Certainly video conferencing has become more reliable since 1990, but for now we can add the theme:

- Attribution errors

Cramton (2001) states that dispersed teams operate under a heavy cognitive load (when cognitive resources are engaged). After all, in addition to the demanding tasks they perform, each additional location adds a level of complexity as information from each location has to be gathered, organized, integrated, and updated. More complexity is inevitable when technical problems need to be solved and communication lags occur. Such cognitive load makes partially distributed teams vulnerable to attribution errors, because when under pressure, people tend to fall back on uncomplicated dispositional attributions rather than taking into account more subtle possibilities (Gilbert and Hixon, 1991). Cramton (2001) concludes from her research that in partially distributed teams, attribution may fault individuals as well as sub-groups as a whole. In fact, the ultimate attribution error is a bias in attribution in favor of one's in-group and against a perceived out-group.

A very uncharitable attribution, of the sub-group as a whole, was observed by Herbsleb and Grinter (1999) in their study of a software development group distributed among Germany and Britain. In this team there was reluctance to share information between the two sub-groups for fear that one site may be closed down with the transfer of all the work to the other sub-group. The researchers noted that when one sub-group claimed that they could not make a certain change, the other interpreted it as an intentional refusal to make the change. Each side was attributing the behaviors of distant group members to malevolence, rather than attempting to understand their position. The misattribution in this study actually related to mistrust of the other team, in particular: one sub-group was unsure of the motives of the other. Such uncertainty of motives may not always result in overt misattribution and therefore it warrants its own theme:

- Uncertainty of motives of distant sub-group

In the aforementioned study, the theme of perception of information withholding was also apparent. Unfortunately, in some situations, it is more than just a perception. Cramton (2001) studied sub-groups where Us-vs.-Them escalated to intentional withholding of information. Herbsleb and Grinter (1999) also confirmed that when people make negative attributions about remote partners, they may tend to withhold information from them. We already noted the perception of information withholding as a theme. Obviously intentional withholding of information is of a more severe nature. And so a new theme, of self protecting actions is:

- Self protecting actions between sub-groups

This theme may be very difficult to measure in a survey instrument, as people may not admit to it. It is natural in organizations, to hoard and protect information when change and possible fear for one's position are introduced. This phenomenon is discussed in many classic IS papers (Keen, 1981; Markus, 1983). So naturally, when one sub-group's position is perceived to be threatened by the remote sub-group, the tendency to withhold information or engage in self protecting actions emerges.

Espinosa et al (2006) classify self protecting actions in global IS projects as an additional expense that can be spared if trust is successfully developed. They interviewed 22 global IS project managers to investigate how geographic dispersion, time separation, language differences, and cultural differences, affect project success; as well as which processes are used to cope with the challenges presented by these global boundaries. Their findings suggest that time separation and cultural differences are the most significant barriers to success. They report that global boundaries (especially geographic

and cultural) make it difficult to develop trust. One of the participants in this study touched on a very sensitive offshoring reality – that local sub-group members perceived offshoring as a potential threat to their own jobs. Certainly such a threat will be a major obstacle to trust formation and a major catalyst to self protecting actions.

Another example of a self protecting action revealed in their study is that members of an Asian sub-group felt that if they are admitting to a problem that they are having, it makes them look bad. This caused further mistrust on the part of the Western sub-group that expected results delivered on a certain date; and consequently Us-vs.-Them was evident. Espinosa et. al (2006) also discussed language barriers in global projects. Language barriers caused problems in many of the projects they studied. Although English was used as the common business language in all projects, the researchers found that non native speakers had trouble understanding subtleties and reading between the lines. As a result, language barriers cause reduced participation for the non-native speakers, less frequent communication, and misunderstandings. The reported reduced participation is an example of a self protecting action (due to fear of being misunderstood, sounding incompetent, etc.). Such lack of participation may subsequently lead to the perception that the distant team is not carrying its weight. So again we see how one Us-vs.-Them occurrence can lead to another.

A more general finding by Espinosa et al (2006) is that cultural and language differences affected people's willingness to communicate difficult issues. This was the case for between sub group communications, as explained by one of the participants: "Within our team, when people don't understand things, they just pick up the phone and call someone and ask questions. However; we don't see it that much with our offshore

partners. They tend to sit on problems and try to figure out problems on their own rather than picking up the phone and calling us.” (p. 358). This is a clear example of the Us-vs.-Them theme of reluctance in approaching the distant team for help.

The field studies discussed above, confirmed Us-vs.-Them themes found in experimental settings; as well as uncovered the following new themes:

- Perception that distant sub-group is not carrying its weight
- Misunderstandings between sub-groups
- Attribution errors
- Reluctance in approaching the distant sub-group for help
- Uncertainty of motives of distant sub-groups
- Self protecting actions between sub-groups

Privman and Hiltz (2008) interviewed PDT members about Us-vs.-Them in the corporate environment. Table A.2 (Appendix A) shows selected quotes that relate to each of the themes identified in this chapter. When further reliability of the above themes is established, they may be used in a survey instrument to establish the existence of Us-vs.-Them in organizations.

2.9 Conclusion

In this chapter we explored the origins of Us-vs.-Them and established that partially distributed teams are especially susceptible to it. We further reviewed experimental studies and field studies that exemplify Us-vs.-Them occurrences and classified these occurrences into themes using a grounded theory approach. The following themes emerged:

- Perception of information withholding
- Difficulty establishing trust between sub-groups
- Perception of communication delay or indifferent treatment from distant sub-groups
- Increased readiness to contradict, refuse, or slander remote sub-group members
- Perception that distant sub-group has an advantage
- Weak social integration between sub-groups
- Tendency to develop strong team identity by location
- Perception that distant sub-group is not carrying its weight
- Misunderstandings between sub-groups
- Attribution errors
- Reluctance in approaching the distant sub-group for help
- Uncertainty of motives of distant sub-group
- Self protecting actions between sub-groups

These themes can drive survey and interview questions to determine if Us-vs.-Them exists. We have shown that Us-vs.-Them can get worse and worse if not dealt with. Therefore the ability to detect its early signs and mitigate it can be very beneficial.

CHAPTER 3

EFFECTIVENESS

3.1 Introduction

Us-vs.-Them occurs in Partially Distributed Teams. But how does it impact results? This is a very important question for result oriented managers. In this chapter we review literature that focuses on effectiveness in virtual and global teams. There is evidence in literature that despite Us-vs.-Them salience in partially distributed teams, team members adjust and report perceived success. We examine adjustments that partially distributed team members make in order to overcome Us-vs.-Them and become effective.

A relationship was established in the literature by Forsyth (1999) who wrote that group cohesion has been shown to increase stability, satisfaction, and efficient communication. Since stability, satisfaction, and efficient communication increase process effectiveness and Us-vs.-Them reduces group cohesion. It follows logically that Us-vs.-Them will have a negative effect on effectiveness. However there is also evidence in the literature that when work needs to get done, it does. It has been shown that team members over time appropriate a set of behaviors that outweigh Us-vs.-Them and lead to successful outcomes. This set of behaviors is very important to identify so that management can ensure that they are adopted early in the PDT experience.

We begin by presenting definitions of effectiveness found in Information Systems literature. We also review empirical measures used for effectiveness or success that are relevant to partially distributed teams. Next we examine recommendations for effective distributed team behaviors. Then we discuss findings that corroborate the appropriations

of these behaviors, and conclude with a set of recommendations to counteract Us-vs.-Them.

3.2 Measuring Effectiveness

This section will define effectiveness as used by IS researchers and review some empirical examples for measuring it. The research literature suggests that IS project performance consists of two dimensions. These are process performance and product performance (Espinosa, Delone, and Lee, 2006). Process performance refers to how well the information systems process has been undertaken. It is measured by on-time / on-budget completion, team satisfaction, team morale, etc. Product performance refers to the performance of the information system. It includes system quality, functionality, impact, etc. This dissertation research will focus mainly on process performance and more specifically on the relationship between Us-vs.-Them and process performance.

The reason that we will mainly focus on process performance is because we will administer surveys to partially distributed team members at a given point in time. Some projects will be new while other will be close to completion. Team members on newer projects may not yet be able to assess the use or impact of the resulting system. We will base our measures on those used by Espinosa, Delone, and Lee (2006). They included on-time completion, within-budget completion, system costs/effort, quality, and project team satisfaction.

IS research studies use various measures of effectiveness, based on context. Lojeski, Reilly, and Dominick (2006) measured project success using team member ratings on 3 project outcomes: on-time delivery, on-budget delivery, and customer satisfaction. Lurey and Rasingini (2001) established two separate measures of team

effectiveness. The first related to the team's ability to perform their assignments. The second measured their level of satisfaction while working in the virtual team. Other effectiveness measures for virtual team work were decision quality, number of ideas generated by decision making teams, and time to reach a decision. These measures were mainly used to compare face-to-face teams to virtual teams as discussed by Powell et al (2004). Bos et al. (2004) measured effectiveness based on results of a trading game. Teams that ended up making more mutually beneficial trades were deemed more effective. DeLuca and Valacich (2006) worked with industry team to redesign their processes and evaluated and measured effectiveness based on a team's implementation of the redesign within six months.

Some corporations have their own measures of employee satisfaction and evaluation procedures that are part of the yearly performance review process. Chudoba, Wynn, Lu, and Watson-Manheim (2003) used such measures in their study of global Intel Corporation teams. Sometimes user input indicates effectiveness. Kirkman, Rosen, Tesluk, and Gibson (2006) assessed effectiveness of virtual teams (before and after training) based on input from customers of the systems that these team supported.

In classroom settings, course deliverables are often used to measure effectiveness. These deliverables often include reflection documents that can be coded (Huang and Ocker, 2006; Sarker and Sahay, 2001). Some student studies are performed with collaboration of industry professionals. Deliverables of the student teams are then evaluated by these professionals for effectiveness and possible use in their organizations. This provides an additional expert measure (Huang and Ocker, 2006; Sarker and Sahay, 2001).

Transcripts of student team communication can also be coded for expressions of satisfaction or dissatisfaction. Of course communication by phone or other peripheral means will be excluded in these cases. Learning effectiveness is important in student projects as well. This is because student projects are designed to practice what is taught in a university course. Edwards and Sridhar (2002) determined the effectiveness of the virtual team in their study partially based on how the students felt about the learning process in virtual teams compared to previous experience with traditional team projects. In qualitative studies it is possible to code discussions, interview replies, and written data (such as logs, reports, etc.) for the mention of effectiveness measures. For example, Espinosa et al (2006) reported the number of interviews in which each success measure was mentioned. Interview questions can also be worded to measure effectiveness. The qualitative interviews used in our study that preceded this dissertation research included summary questions about overall satisfaction of the participant with the team (Privman and Hiltz, 2008). In quantitative studies a Likert scale, anchored by “Strongly Agree” and “Strongly Disagree” is often used to measure the respondent’s perception of team performance components (Stringfellow, 2003).

As evident here, effectiveness measures vary in virtual team literature and are context based. This dissertation research uses a semantic differential scale to measure effectiveness, drawing on questions from prior research papers. The rest of this chapter will focus on recommendations by researchers for improving effectiveness.

3.3 Effectiveness Recommendations

The goal of every team in industry is to be productive. Challenges of geographic, temporal, and cultural discontinuities have provided opportunities for researchers to

propose strategies to overcoming them, thereby increasing productivity. Lings, Lundell, Agerfalk and Fitzgerald (2006) performed an analysis of the literature to identify such strategies for distributed software development teams. Those that apply to partially distributed team work are summarized below.

- Offering language courses.
- Arranging travel for face to face meetings.
- Thoroughly documenting project goals and agreements to reduce misunderstandings.
- Using liaisons, who would travel between sites and mediate conflict, to bridge cultural distances.
- Sending developers to work at the client site and bridge the gap between the developers, located at another site, and the client.
- Training in cultural issues.
- Teleconferencing.
- Holding face-to-face kick-off meetings at the beginning of the project to improve informal team communication.
- Implementing a distributed hierarchical leadership configuration, with an overall project leader and local project leaders at each site.
- Holding regular synchronous meetings and status reports.
- Maintaining a project home web site with team member information, schedules, status reports, etc.
- Allowing local teams to use the tools that they are most accustomed to using but having one common configuration management tool used to coordinate project activities.

Lings et al.'s (2006) article gives us a glimpse into strategies found effective by researchers for overcoming the geographic distance faultline. It focuses on the important domain of software development but many findings can be extended to other IT work.

Watson-Manheim, Chudoba, and Crowston (2002) also researched discontinuities in virtual teams. In an analysis of 75 peer-reviewed articles, authored from 1986 to 2001, they discovered that most studies addressing discontinuities focused on temporal and geographic dispersions. Watson-Manheim et. al (2002) introduce the concept of “continuities.” Continuities are the factors that are in place that can bridge the discontinuities, i.e. overcome them. In the context of our discussion, we can say, for example, that geographic distribution provides a discontinuity but that frequent communication may act as a continuity to counteract it. Examples of continuities Watson-Manheim et. al discuss are:

- Common task.
- Common beliefs and values.
- Common media.
- Common work practices.

Some researchers recommend management intervention to establish effective practices. For example, Powell et. al (2004) suggest that consistent training among all team members improves team performance. Incorporating training into the team’s life cycle is a management function. Other researchers show that effective practices are adopted over time by members of effective teams. For example Sarker and Sahay (2002) found that effective teams reclaim time by organizing work around time differences. The good news is that team members do not need to start from square one when joining a new distributed team. A recurring theme in literature is that experience level with distributed work makes for better team work. Pauleen (2003-4) suggests that comfort with technology and asynchronous communication helps. We will revisit this suggestion in the

research questions chapter. Next we review studies, exemplifying adaptations by PDT members, and relate them to Us-vs.-Them.

3.4 Us-vs.-Them and then What?

Studies corroborate the notion that effective partially distributed teams adopt certain behaviors, whether with direction from management or by necessity, to counteract Us-vs.-Them sentiments and achieve the team goal. Some examples are illustrated here with relation to Us-vs.-Them susceptibility as discussed in the previous chapter.

We discussed how technology incompatibility can render Partially Distributed Teams susceptible to Us-vs.-Them. However, Maznevski and Chudoba (2001) write that irrespective of their access to various technologies, effective virtual teams appear to be able to adapt to technology and match it to the communication requirements of the task at hand. For example, although synchronous meetings are recommended for ambiguous tasks while electronic communication is suited for more structured ones (Majchrzak et al., 2000); virtual teams with no access to synchronous meetings are found to be able to overcome these limitations and to adapt technology to accomplish ambiguous tasks (Hollinghead et al., 1993)

We also noted that Partially Distributed Teams working across temporal and cultural boundaries are especially susceptible to Us-vs.-Them. Interestingly, Espinosa Delone and Lee (2006) found through interviews of global team members that despite global boundaries, participants rated 21 out of 22 projects as successful. Although several of them noted that budgets and timelines had to be adjusted. Using time separation effectively was reported to lead to great success. Making conscious choices about timing and mode of interaction was reported as important as well. Cultural

differences were reported as salient in early stages mostly. Interviewees reported taking measures to mitigate them. Prior global experience was very important for avoiding assumptions, etc. Interviewees also reported revising quality assurance processes, implementing rigorous task monitoring procedures and increasing project management discipline.

Espinosa et al (2006) suggest that an aggressive push to meet corporate expectations inspire project managers to implement effective coping mechanisms to overcome global barriers. Facilitating more frequent communication, flexible hours; reducing the need for synchronous communication (more documentation, tighter controls, etc.), common collaboration platform (tools, technologies). Processes to raise cultural awareness, presence awareness (who is where when), task awareness (what was done when), and local context. Espinosa et al. only studied a few companies and recognize that their results may be limited by the idiosyncrasies of these companies. They call for a wider range of testing. This dissertation research will aim to do that.

The push to meet corporate expectations is difficult to measure in controlled experiments. However, controlled experiments are usually shorter in duration than corporate projects and there is a push to complete the task at hand quickly. In the shape game experiment described in chapter 2, Bos et al. (2004) expected that collocation would provide an advantage that would result in increased team effectiveness. However, there was no difference in effectiveness of the collocated group and telecommuters. The researchers suggested that it may be the ability of the telecommuters to concentrate and avoid interruptions that strengthened their ability to perform effectively and overcome the disadvantages of being isolates (Bos et al., 2004). Although the telecommuters in this

study were a fully virtual team rather than a partially distributed team, this calls for further studies about the efficiency of assigning tasks to members of partially distributed teams. Perhaps for certain directed tasks that need to be accomplished quickly and require two people it is better to have members working together across sub-groups. We will discuss this in more detail in the research questions section.

The question of who works with whom, was brought up by Panteli and Davison (2005) who made the point that when co-located sub-groups work together face-to-face, isolation on an individual basis is alleviated but isolation on a team basis exists. While when the whole team works using computer mediated communication only, isolation by individuals may be felt. Their study links the Us-vs.-Them themes of weak social integration between sub groups and tendency to develop strong team identity by location to performance. This study was discussed in chapter 2 in more detail but highlights relevant to this chapter will be discussed here.

Panteli and Davison conducted a study of the formation of sub-groups in global virtual teams. Student participants from the UK and Hong Kong were assigned to teams and told only that some members were from their location, while others were from the other location. The researchers measured how quickly sub groups would emerge based on how geographic proximity would eschew computer mediated communication, work distribution, and communication content. They categorized the geographic impact as high, medium, and low. A team with high categorization had early emergence of sub-groups, divided tasks along geographic lines, had little to no social discourse, and had communication that reflected this division (e.g., “we” and “you” peppered the electronic conversation). Teams for which the sub group formation had moderate impact on

interactions formed sub groups later in the teams' lives. Initially there were attempts to work as a single unit but as challenges arose sub groups emerged. Two teams, however, demonstrated throughout the project efforts to work as a single unit and build a cohesive overall team. More social communication took place in these teams than in the other teams and the communication was almost exclusively via electronic communication media. Asynchronous communication was valued and used most frequently to overcome the time difference in these low-impact teams.

What is most relevant to this discussion is that the researchers noted that although all teams with low impact sub groups were able to work more collaboratively than teams with higher impact sub groups, all teams were "cooperative." (Panteli and Davison, 2005). Another relevant finding is the suggestion that geographic faultline activation and eventual strength can be affected by the efforts of team members from the start to build a cohesive single team. It can be suggested, then, that to avoid faultline activation and strengthening, social interaction should be encouraged and a common, electronic communication media be predominately used even within collocated sub groups. However, Panteli and Davison (2005) suggest that there is a downside to building a cohesive overall team and mitigating the effects of emerging geographically based sub group formation. When the impact is high there tends to be more face-to-face collaboration within a sub group which can alleviate a sense of isolation members might feel at the local level; on the other hand, such members are likely to feel more isolated at the team level (Panteli and Davison, 2005).

The isolation on a team level versus isolation on an individual level is important to study and relate to both Us-vs.-Them and performance. This observation by Panteli

and Davison challenges recommendations by other researchers (ex, Polzer et. al, 2006), to encourage a reliance on electronic communication by all team members in order to counteract the division that local face-to-face meetings create. Privman and Hiltz (2008) interviewed professionals working in partially distributed teams. Isolation on a sub-group level was reported by several participants. These participants spoke of large teleconference meetings where leaders from each sub-group reported on proceedings in a show and tell format. Participants felt that these meetings encouraged sub-group identification; they further recommended letting individuals across sub-groups work together directly.

The next study we examine, that gives us an insight into the relationship of Us-vs.-Them and performance is by Aubert and Kelsey (2003). The researchers examined the relationship of the antecedents of trust, the formation of trust, and performance. They conducted a three month field study of 71 students from universities in Montreal and Toronto. Each PDT had six members – three from each university. The collocated sub groups were self-selected and then randomly paired with sub groups from the other university. Questionnaires which assessed trust of other members were administered at the beginning of the project and then again after the project completion. For each questionnaire, measures were taken for trust of local teammates and trust of distant teammates. Data analysis showed that the trust between local teammates remained higher than the trust between remote teammates, even after frequent interaction. In fact, the difference increased as the trust between collocated teammates increased over time, while the trust in remote teammates did not significantly change.

Relevant to this section is their finding that quality outcomes can be achieved without trust formation as there was not a significant association between level of trust and effective performance. The authors note that this study, "...revised our understanding of the role of trust in facilitating effective performance and points to the importance of improving our understanding of the complex relationship that exists between effort exerted, ability, trust, and final performance levels (Aubert and Kelsey, 2003, 605)." Lack of trust between sub-groups is a major theme of Us-vs.-Them, and so this study is a good example of the complex relationship between Us-vs.-Them and performance that this dissertation research will attempt to analyze.

3.5 Summary

Understanding how Us-vs.-Them affects team performance is a complex undertaking because of the vast variety of team settings and project types. Cramton (2002) states that performance depends on the degree to which each team members' knowledge and cooperation are needed for project success. Some teams are able to isolate individuals or sub-groups, yet accomplish their task. However, members of these teams will move on to the next assignment ignorant of the structural factors and processes that created a fertile ground for Us-vs.-Them and will be vulnerable to repeat their mistakes. Fortunately research in this area can help managers and team members learn from the mistakes of other and become better prepared. Table A.3 (Appendix A) summarizes the studies reviewed in this chapter relating them to Us-vs.-Them themes.

3.6 Conclusion

In this chapter we examined measures of effectiveness and recommendation by researchers to increase effectiveness. The recommendations that we discussed are listed below. Implementing all of them can get very expensive, therefore we listed the five that were recommended most often (as per this literature review) at the top of the list.

- Encouraging social interaction
- Increasing project management discipline
- Establishing common beliefs and values
- Training in cultural issues
- Implementing rigorous task monitoring procedures
- Adapting technology to accomplish ambiguous tasks
- Allowing local teams to use the tools that they are most accustomed to using but having one common configuration management tool to coordinate project activities
- Arranging travel for face to face meetings
- Common media especially collaboration platform
- Common task
- Common work practices
- Holding face-to-face kick-off meetings at the beginning of the project to improve informal team communication
- Holding regular synchronous meetings and status reports
- Implementing a distributed hierarchical leadership configuration, with an overall project leader and local project leaders at each site
- Maintaining a project home web site with team member information, schedules, status reports, etc.

- Making conscious choices about timing and mode of interaction
- Offering language courses
- Organizing work around time differences
- Prior Experience
- Processes to raise task awareness (what was done when)
- Reducing the need for synchronous communication (more documentation, tighter controls, etc.)
- Revising quality assurance processes
- Sending developers to work at the client site and bridge the gap between the developers, located at another site, and the client
- Thoroughly documenting project goals and agreements to reduce misunderstandings
- Using liaisons, who would travel between sites and mediate conflict, to bridge cultural distances

We related each effectiveness recommendation to Us-vs.-Them themes as identified in the previous chapter. We also showed that there is not always a correlation between Us-vs.-Them and effectiveness in partially distributed teams. There is a strong suggestion, in fact, that enough positional motivation (the need to keep one's job and therefore get the project completed with quality results) can moderate Us-vs.-Them – resulting in effective outcomes.

CHAPTER 4

PARTIALLY DISTRIBUTED TEAMS - SETTINGS

4.1 Abstract

Partially distributed teams come in all shapes and sizes. They also come together for many different reasons and purposes. Members of partially distributed teams can be from many different places and cultures as well as have various experiences and motivations. In this chapter we will examine a subset of the settings described in Partially Distributed Team literature and summarize authors' recommendations for effective work under the circumstances of these settings. Such recommendations can be useful for new leaders of partially distributed teams. We focus on recommendations that may reduce Us-vs.-Them and increase perceived effectiveness.

4.2 Introduction

Partially distributed teams include intact work groups as well as ad hoc teams brought together for a limited time to handle special projects. They can be spread across many locations or just two locations. The various settings of PDTs can affect the relationships between team members. Maintaining good relations and trust is very important, as seen in the previous chapters. Many researchers explored improving relationships (especially trust) under various settings. Cultural differences can greatly affect communication and collaboration as emphasized in previous chapters. This dissertation research will focus on IT related work, where partially distributed teams are often culturally diverse. We will begin by reviewing literature related to cultural distance in such teams. Temporal distance often accompanies cultural distance. We will continue by examining

implications of temporal distance in partially distributed teams. We will then explore the various motivations of team members to join and succeed in partially distributed teams.

4.3 Cultural Distance

Partially Distributed Teams are often composed of members from various cultures. Sometimes cultural differences are between sub-groups which effects Us-vs.-Them. The effects of culture have been studied on trust in virtual teams (Jarvenpaa et al., 1998) and performance (Herbsleb, Mockus, Finholt, and Grinter, 2001; Herbsleb and Moitra, 2001). Conflicts arise because cultures differ on such critical things as the need for structure, observance of hierarchy, time perceptions, and communication practices. This suggests a few of the issues that dispersed teams may face, which will be looked at next.

McDonough et al. (1999) studied the effects of cultural and geographic distributedness on communication in virtual teams. He administered questionnaires to 22 new product managers and team leaders in ten companies. The questionnaires solicited data about the respondent's company's Global New Product Teams (GNPT) and the media used to communicate within those teams. Overall performance, satisfaction, process and product quality were used to measure team performance. The questionnaire also solicited usage data for a list of communications technologies that included phone calls, FAX, email, teleconference, face-to-face meetings, traditional mail, company databases, and videoconference.

Interview results suggested that cultural business practices and geographic dispersion affect team communication. In particular, the business practices identified that had such effect were: "1) problem-solving approaches; 2) communication mode to leaders and across functional boundaries; 3) decision-making processes" (McDonough

III, Kahn and Griffin, 1999, 378). The researchers identified the differences in these practices as emanating from different national cultures. That is, the differences in how teams approach solving problems; the norms for communication from team members to leaders; and the norms for how decisions are made were found to differ by culture with implications for structuring team communications. For example, while the U.S. teams preferred a trial-and-error approach to problem-solving during which they would try possible solutions one at a time, the French teams preferred to analyze all possible solutions before settling on one to implement.

This difference, according to the researchers, resulted in different information needs: at any given time, the U.S. teams would need only the information relevant to the solution being attempted, while the French teams would need larger amounts of data at one time to analyze simultaneously many possible solutions. Differences in communication modes from team members to leaders could be seen between the American teams, in which communication flowed freely in all directions, and the Japanese teams who would rarely, if ever, question a superior and would only communicate in a formal manner with them. Finally, decision-making practices differed by national culture. The Japanese engaged in consensus decision-making and the Americans would often have decisions made by fewer people, often without the knowledge of the rest of the team. Thus, cultural differences influence the volume and content of information needed, and therefore communication needs. This study uncovers relevant barriers to effective communication brought about by cultural characteristics.

4.4 Temporal Distance

Working in different time zones presents a coordination and control problem depending on the amount of overlap between individuals, if any (Carmel and Agarwal, 2001). Work that is not co-located may have the benefits of synchronous communication if the individuals are located within a single time zone, a temporal distance of zero or as close to a single time zone apart as possible. If people are six time zones apart, they only have a two-hour overlap during an eight-hour workday. This shortfall or lack of overlap requires some other means be used to facilitate communication; including individuals and or teams adjusting their working hours to create an overlap. Such adjustments may affect the temporal patterns of a particular culture, for example in cultures that have well-established family times.

Carmel and Agarwal state that negative effects of distance affect communication, which in turn affects coordination. It is argued that such things as email, voice mail, online discussions, and other similar tools do not supply the communication effectiveness provided by impromptu meetings. Therefore any type of distance between individuals or groups loses the spontaneous support of communication.

If two people needed to resolve a misunderstanding or a small problem, using Face-to-Face communication the problem often can be dealt with quickly. If they are in the same time zone, but not co-located, having to speak on the telephone increases the communication difficulty because there is some coordination required, but since they have an over-lapping day, this coordination can usually be accomplished; therefore, they can synchronously deal with the problem at hand.

The issue is one of the “contactability” of a person; what effort is involved in making this contact? For example, if one person is in New York and the other person is in Germany, they can communicate without one or the other staying late or coming in early because part of their day overlaps. It may not be easy to coordinate, but it can be done by knowing when the workdays overlap. For those who do not have over-lapping days, such as when the second person is in India, having a time zone difference of 11 hours from the US, then either adjustments must be made to the work day to allow synchronous communication, or problems must be dealt with in some asynchronous manner, such as e-mail or telephone messages. If the inherent contactability of the people is low, it requires a greater effort to make that contact. Low contactability implies that back and forth discussions could take days.

Research shows that temporally separated team members adopt social and task structures to circumvent the problem and accomplish quality results (Powell, 2004). What team norms facilitate such ‘reclaiming of time?’ What adaptive processes and structural work arrangements are best suited for incorporating time differences into the team’s social structure? These are interesting research questions that are beyond the scope of this dissertation work.

4.5 Model of Distance in Virtual Teams

Lojeski, Reilly, and Dominick (2006) discuss factors that may influence perceptions of distance in virtual teams. Some were discussed in studies we summarized above. Lojeski et al depicted spatial distance; temporal distance; relational distance (organization affiliations); cultural distance; social distance; relationship history; task interdependence; face-to-face interaction; team size; multi-tasking; and technical skills of the member

perceiving distance. Each of these factors is proposed to influence a team member's perception of the virtual distance between him/herself and other team members. The authors then propose and test a model in which Virtual Distance® is shown to influence, directly and indirectly, innovation and success in virtual teams. (See figure 4.1).

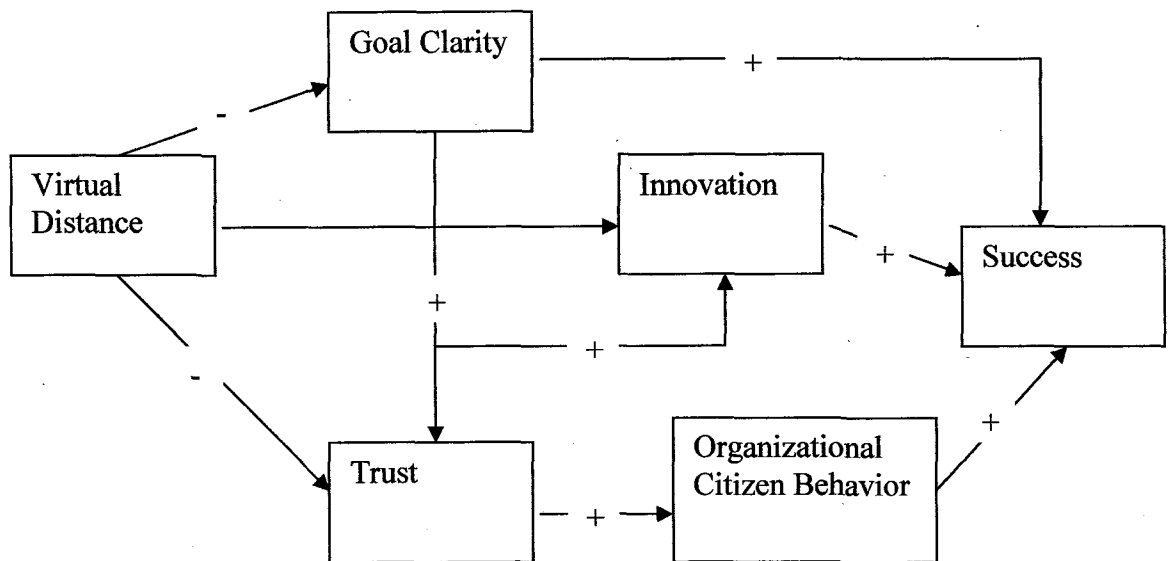


Figure 4.1 Model of Influence of Virtual Distance.

Source: Lojeski et al., 2006, 5 Lojeski, K. S., Reilly, R. and Dominick, P. (2006) The Role of Virtual Distance in Innovation and Success In 39th Hawaii International Conference on System Sciences Hawaii, pp. 5.

The construct of goal clarity refers to the ability of a team to create and maintain a shared vision and commitment to team goals. Organizational Citizen Behavior is a construct that encompasses voluntary behaviors directed towards the good of the organization. Innovation and success are the dependent variables in this model. Innovation is proposed to be possible only when team members are able to share creative ideas to solve problems and to reach goals (Lojeski et al., 2006). Success is operationalized by the perception of team success based on on-time delivery, within

budget delivery, and customer satisfaction (Lojeski et al., 2006). All paths were shown to be significant except for the path between innovation and success.

The model was tested by surveying 115 professionals. This study is notable for its explicit definition of factors of cultural and temporal discontinuities that can influence the overall perception of distance and affect success factors for virtual teams. One limitation was that most of the projects were from financial institutions. Also, the sample size was small. However, the authors acknowledge these limitations and propose to overcome them in future studies.

4.6 Organizational Distance

Organizational distance is the idea that people who are responsible for different aspects of the project are far apart organizationally. The practice of having different groups responsible for different aspects of the project often distances the customers from the developers, because the customers do not work directly with the developers. Developers may be distant from testers, with the distance embedded in management layers, resulting in information being filtered by the interpretations of the intervening layers.

Poltrack and Grudin (1994) published a paper discussing the results of two participant-observer studies in which the investigators joined the interface teams of each of the projects in order to study the obstacles to interface design. Their findings have general applicability to the idea of organizational distance. In the first study, a designer who had originally supported the product at a distant site led the project. While supporting the product he customized the product for the customer, and so had a thorough understanding of the customer's needs. He hand-picked developers, assigned them tasks, and reviewed their work daily. Reports showed that the product was a success.

In the second study, a development group was to take a successful client-specific application and create a more generic product. This effort was unsuccessful with blame on organizational procedures that slowed development. The team was described by the researchers as badly formed (multiple layers existed between users and developers) and lacking cooperation and understanding of the product users. According to Poltrock and Grudin, the driver in the successful case was close user contact, coupled with close communication within the development groups.

From the preceding it is seen that organizational structure, in part, affects the success or failure of a project. In global development, especially, this can mean communication is routed through a formal structure composed of layers of managers and there is also a reduction of informal or lateral communication, which is due in part to the difficulty of overcoming physical and temporal distance. Therefore organizational distance is an important factor in Partially Distributed Teams.

4.7 Communication Goals

Organizational distance is often related to communication goals. For example, in some settings sub-groups do not need to closely coordinate their activities; they may be able to work independently of one another and simply 'share' results. The degree to which sub-groups need to communicate can intuitively affect Us-vs.-Them and effectiveness and needs to be established in a survey instrument measuring these two factors.

Turoff, White, Plotnick, and Hiltz (2008) write that collaboration is often confused in literature with terms such as coordination and cooperation. Their work focuses on emergency and disaster handling where true collaboration among sub-groups

is essential. This of course is not the case in most IT partially distributed teams. Turoff et al (2008) describe a scale of group communication commitment as follows:

1. Competitive – no trust in passed information
2. Informative – honest information exchanged on what is being done by each party
3. Coordination – mutual scheduling of what tasks each party is doing when
4. Cooperation – mutual agreement on what tasks each party is going to do
5. Collaboration – mutual agreement to work together on the same tasks

Most team work that would satisfy the requirement for our research will have to fall in categories two through five (informative, coordination, cooperation, and collaboration). These categories are more representative of corporate partially distributed teams, as members in each sub-group depend on each others' skills and deliverables.

The set of 'Shape Trading' experiments by Bos et al. (2004, 2005) supports the notion that different communication needs along the scale may influence 'Us-vs.-Them' and effectiveness in partially distributed teams. In the first experiment (Bos et al., 2004), there was very little interdependence between sub-groups needed to accomplish the task at hand and although the researchers determined that 'Us-vs.-Them' existed, they recognized a limitation in the fact that the two sub-groups split up and worked independently. In a later experiment, interdependence between sub-groups was increased, thus requiring a communication higher on the scale (Bos et al., 2006).

The scale of communication described here relates to organizational goals and motivations for forming partially distributed teams. More motivational variables are discussed in the following section.

4.8 Motivation

There is evidence in literature that motivation plays a role in Us-vs.-Them and effectiveness. Lau and Mornighan (1998) state that, faultlines are most likely to form at the early stages of team formation. However, if the team is focused on activities that minimize awareness of the diversity of attributes, then the sub groups may not form. For example, if there are pressing deadlines or external competition, then the focus may be away from the within-team diversity and team cohesion may develop instead. Leaders of partially distributed teams who were interviewed by Pauleen (2003-4) discussed motivation. Many felt that by understanding what motivated members of their teams allowed them to build better relationships with them. In chapter 3 we saw that enough job / course related motivation can counteract Us-vs.-Them – resulting in effective outcomes. This dissertation research will measure motivation and its relation to Us-vs.-Them and effectiveness.

Partially distributed teams are geographically dispersed. This can be very convenient for geographically restricted individuals. For example, in the case of two-career families, one spouse's career is frequently limited geographically by the other spouse's position. These individuals may rejuvenate their careers by seeking out companies that have adopted partially distributed teams. The ultimate result is a win-win situation; the organization gains highly valued employees, and the employees find the flexibility they need to accommodate both their professional and their personal lives (Townsend and DeMarie, 1996).

Many people may need a geographically convenient job. Many prefer reduced commuting time and for many (like people with disabilities) a long commute is not an

option. Partially distributed teams that have sub-groups in several locations allow more flexibility to such employees. Further, employees that move for personal reasons but are valuable to the company may continue to work in their original team in a partially distributed setup. This enables corporations to save the retraining cost that is associated with new hires.

Although under the above circumstances, employees have extra incentives to stay with a team and produce quality results, in general organizational team members are motivated by financial compensation and other career rewards. Other career rewards may include gaining new technology knowledge to become more marketable, or making a good impression on a manager to ensure further career opportunities, and of course promotions. Lurey and Raisinghani (2001) discuss intrinsic reward and satisfaction that one feels from his or her job as strong motivators. They also write that virtual team members who are challenged by the project work will feel more motivated. This is especially important for IT work, as technology is constantly changing and employees must remain on the leading edge to become marketable. As mentioned earlier, there is a strong suggestion, that enough employee motivation to satisfy corporate demand and do a good job can counteract Us-vs.-Them – resulting in effective outcomes.

A more subtle employee motivation to effectively perform the PDT work is the exposure that the work entails. This, however, can sometimes work against PDTs. It is common in organizations for employees to have a variety of responsibilities, some of which are locally based. In this case, it is easy for local responsibilities to take precedence over remote responsibilities (Stringfellow, 2003). This situation may render the distant sub-group members feeling like second class citizens as well and increase Us-

vs.-Them likelihood. This factor will be explored in our survey. It is very important since managers need to understand that it is natural to tend to the immediate local responsibilities first and they need to allocate enough time and resources for effective PDT work.

Company loyalty is another motivator for employees, discussed by Lojeski et. al (2006). They use the term 'Organizational Citizen Behavior' as a construct that encompasses voluntary behaviors directed towards the good of the organization, in their model of influence of virtual distance. The following are the motivations we discussed that will be explored via our survey instrument:

- Financial compensation and other career rewards.
- Project exposure and responsibility versus other (local) projects and responsibilities.
- Challenge by project work or technology learning (perception of increasing marketability).
- Intrinsic reward and job satisfaction
- Reduced commute.
- Geographically desirable location.
- Company loyalty.

Employees are motivated by monetary compensation while students are motivated by grades and / or completion of a degree program. Student studies confirm that motivation plays a role in project effectiveness and overcoming Us-vs.-Them (Chen et al, 2008).

4.9 Conclusion

The settings of partially distributed teams are varied. Cultural, temporal, and organizational distances, as well as organizational and personal motivations have been discussed in this chapter. Cultural differences that may impact effectiveness were found by McDonough et al (1999) to be:

- Problem-solving approaches
- Communication mode to leaders
- Decision-making processes
- Language comprehension
- Technology incompatibility in different countries

These differences were shown in chapter 2 to increase the likelihood of Us-vs.-Them. Culture is not a focus of this dissertation research and therefore only a small subset of cultural studies was reviewed here.

Temporal issues that may impact effectiveness were described via a model developed by Espinosa and Carmel (2003) that (via simplification) quantifies delay, clarification, and rework in global software development teams. Synchronous, Asynchronous, and Education techniques that Espinosa and Carmel recommend for increasing effectiveness, were discussed. We showed that later studies confirmed these findings and recommendations.

We discussed the concept of ‘contactability’ as described by Carmel and Agrawal (2001). Contactability in the context of temporally separated partially distributed teams and its affect on Us-vs.-Them and performance relates to the number of time zones that separate sub-groups. The fewer time zones between sub-groups the easier it is for them

to communicate. We propose, as part of this dissertation research that contactability can also relate to how quickly one usually gets a response from distant group members (unrelated to the time zone). This proposition will be further explored in the research questions chapter.

We have also shown that organizational distance between sub-groups affects the success or failure of a project. In a study by Poltrock and Grudin (1994) the imposition of structure (resulting in distancing) on communication was blamed for the failure of a project. This is relevant to this dissertation research, as it presents a contradiction to most recommendations by researchers. Most researchers recommend that structures for communication should be imposed in partially distributed teams. Such recommendations will be further explored in the policies chapter and the contradiction uncovered here will be discussed in the research questions chapter.

We concluded the discussion of distances in partially distributed teams by reviewing a model of virtual team distances by Lojeski et al (2006). The model incorporated spatial distance; temporal distance; relational distance (organization affiliations); cultural distance; social distance; relationship history; task interdependence; face-to-face interaction; team size; multi-tasking; and technical skills of members. Finally we explored possible motivations (organizational and personal) that play a part in partially distributed teams' Us-vs.-Them and effectiveness. Organizational motivations may increase the risk of Us-vs.-Them. They include reorganizations, local expertise, and cost savings. Personal motivations may increase effectiveness. They include geographic work preferences, compensation and other career rewards.

This chapter presented a partial view of the many settings in partially distributed teams. By collecting demographic information as well as configuration information (how many members are where), this dissertation research will collect data about various partially distributed team settings. Although most of this data will not be used to answer the immediate research questions; it will be interesting to analyze for future research potential.

CHAPTER 5

PARTIALLY DISTRIBUTED TEAMS - POLICIES

5.1 Abstract

There is strong evidence in the literature that due to the distributed nature of virtual teams, management by observation is simply not possible, and that increased discipline, control, and training are required in a virtual setting. Clear definitions of process, availability policies, norms, and expectations are among the policies recommended for effective virtual team work (Armstrong and Cole, 2002; Espinosa and Carmel, 2003; Pare and Dube, 1999). Role clarity was also found to be very important in partially distributed teams (Privman and Hiltz, 2008).

Pauleen (2003-4) found that none of the participants in his research had organizational policies to support virtual teams. He only had 7 participants, but this finding is consistent with other studies showing that less than 20% of organizations have policies regarding virtual teams. Even less evidence exists regarding policies for partially distributed teams in particular.

Policies that are especially scarce relate to training. Although, in numerous studies, researchers suggested that training will be helpful. Some examples are: in a paper that focuses on team performance, Powell, Piccoli, and Ives (2004) suggest that consistent training among all team members improves team performance; Zigurs (2002) recommends training for virtual team leaders; Cramton (2002) recommends educating PDT members about the pitfalls of the failure to share situational information and the tendency to make assumptions about remote partners and locations. This chapter reviews

policies, including training, that may affect Us-vs.-Them and effectiveness in Partially Distributed Teams.

5.2 Introduction

Imposing structure on team process, by providing interaction, documentation, procedure, and timeline guidelines, has long been an integral part of traditional team project management. In virtual teams, however, the environment is less structured. People often don't see each other; don't know each other; have different schedules; and may have different work habits and ethics. In partially distributed teams these characteristics may differ between sub-groups. In such cases, as seen in chapter 2, Us-vs.-Them is more likely to occur. Because of the Us-vs.-Them susceptibility in these teams, it is important to understand which policies must be in place in order to reduce its risk and increase team effectiveness.

An important note regarding policies is that setting them should be done with care so that fairness is perceived. For example, Cascio and Shurygailo (2002) stress that leaders should take care to acknowledge accomplishments of remote employees as much as those of local ones. Pauleen (2003-4) also advocates equal policies such as financial resources, security, and compensation.

In this chapter we will attempt to categorize policies that are recommended in virtual team literature. This dissertation research is focused on Us-vs.-Them in partially distributed teams and therefore we will examine which of these policies may increase or decrease Us-vs.-Them and how. This dissertation research is also measuring effectiveness in partially distributed teams and so we will attempt to relate policies to effectiveness.

We will first categorize the policies recommended by virtual team researchers and discuss how each policy can potentially influence Us-vs.-Them and effectiveness. Then we will review a few case studies that show some of the policies in practice. We will continue by discussing organizational training policies. We'll conclude this chapter by discussing our research direction.

5.3 Types of Policies

A good place to begin examining effective policies for partially distributed teams is global team literature, which can provide insight into the boundary of time separation and policies that are helpful for dealing with it. After reviewing prior studies of global virtual teams and interviewing professionals, Espinosa and Carmel (2003) identified three practices used by virtual software development teams to overcome the challenges of time separation: asynchronous, synchronous, and education. Policies related to asynchronous techniques and synchronous techniques will be discussed next.

Asynchronous techniques include organizing work in what the researchers call “bunch-and-batch” so that a large portion of tasks is completed before deliverables are sent to remote sites, and creating formal structures for messages and activities so as to reduce the need for communication for clarification (Espinosa and Carmel, 2003). Creating formal structures for messages and activities provides interaction guidelines. Such interaction guidelines can help with cultural interaction discrepancies that often cause problems in partially distributed teams, as seen in chapter 2. Researchers found that imposing such structure on the team process, by providing interaction guidelines, moderates the effect of conflict management behavior on the performance of global virtual student teams (Montoya-Weiss, Massey, and Song 2001)

Asynchronous techniques maximize the use of asynchronous technologies to communicate to distributed members during non overlapping work hours. Policies related to such techniques can potentially reduce Us-vs.-Them because if implemented well, asynchronous techniques can eliminate the perception of delay between sub-groups. Asynchronous techniques can also increase effectiveness, because time will be used more efficiently using asynchronous policies. Such policies will reduce the need for back and forth messaging for clarification which can cause much waste when temporal separation exists.

Synchronous techniques are those that increase the ability for distributed members to communicate effectively in real time. For example, policies about work hours may be instituted. These may include altering the work day schedule so that there is more overlapping time. Such policies may also regulate when to do what, such as focus on non interdependent tasks during non overlapping time (Espinosa and Carmel, 2003).

Altering work hours is not likely to reduce Us-vs.-Them, because as we have seen in chapter 2, when one sub-group feels that their family time is impacted by the PDT arrangement they may resent the distant sub-group. Therefore these policies should be implemented carefully with much consideration for fairness. If implemented correctly, though, such policies can increase effectiveness by reducing delay and increasing availability. Policies that alter office hours are meant to increase availability (see table A.4). We will discuss more availability policies later in this chapter.

Focusing on non interdependent tasks during non overlapping time is related to Bunch-and-batch and therefore impacts Us-vs.-Them as well as effectiveness. Both policies deal with 'When to do what' or 'programming' the tasks by imposing a structure

/ schedule on them. Espinosa, Delone, and Lee (2006) recommend that coordination of repetitive and routine aspects of the tasks can be programmed using mechanisms like tools, schedules, plans, project controls, and specifications (Espinosa et al., 2006). We label such activities as ‘Task Programming’ policies in table A.4.

The policies discussed so far originated from global team literature. However, since they help standardize interaction between sub-groups, such policies should be helpful in any partially distributed team. Another good source for examining effective policies is leadership research literature. After all, leaders often establish processes and take responsibility for outcomes. Availability policies are recommended for leaders of virtual teams as well. Cascio and Shurygailo (2002) stress that when workers are distributed, managers must be sure to make themselves available by pager or some other means during work hours. Having access to managers regardless of location will help reduce the perception that a distant team (collocated with a leader) has an advantage, and thereby reduce Us-vs.-Them. The leader’s availability will enable him / her to quickly answer questions and eliminate delay, and thereby increase effectiveness.

Researchers suggest that effective virtual team leaders set clear goals and provide continuous performance feedback (Kayworth and Leidner, 2000). Team leaders should monitor the effectiveness of communication processes across locations as a regular part of their job. Operating processes should collectively be examined, especially when problems arise (Cramton, 2002). We can label such continuous performance feedback as ‘monitoring’ policies. Monitoring and improvement of performance can, by definition, improve effectiveness. Feedback implies that problems are discussed when they arise. Therefore one can argue that problems related to Us-vs.-Them will surface as well, with

the chance to be improved. And so, we label monitoring policies as having impact on both Us-vs.-Them and effectiveness.

Kayworth and Leidner further recommend policies to make happen what can more easily and naturally happen in a collocated team. One example is to explicitly make clear the time zone used for posted meeting times. They also recommend that norms and rules of communication are established. These recommendations can be considered ‘Courtesy Policies’. These are important in partially distributed teams to reduce misunderstandings and perception of indifferent treatment by the distant sub-group and thereby reduce Us-vs.-Them. Other courtesy policies, especially those that establish communication norms, can improve effectiveness (Cramton, 2002). One example is a policy on responding to requests within a certain amount of time. We discussed in chapter 3, that members of partially distributed teams often have local responsibilities as well. We also mentioned that it is easy for PDT members to let local responsibilities take precedence over PDT work. Imposing timeliness on responses to PDT members will help alleviate this phenomenon; reduce delay; and improve effectiveness. Thus, we label Courtesy Policies as improving Us-vs.-Them and effectiveness in table A.5 (appendix A).

Another area that warrants policies in partially distributed teams is documentation. It helps to set ‘keeping-track’ policies, so that all sub-groups have access to the same information. Researchers recommend that project goals and agreements be thoroughly documented to reduce misunderstandings. Perhaps written reports are more important in a distributed team because of the distances that provide opportunities for misunderstandings (Lings et al., 2006). Reduction in misunderstandings can improve effectiveness. We have seen in chapter 2, that when information is not evenly distributed

it can lead to Us-vs.-Them. Therefore documentation policies that increase access to information (for example keeping meeting minutes) can reduce Us-vs.-Them.

These policies can also be grouped into three major categories: Formal communication (such as regularly scheduled whole group meetings); Organizational transparency and trust (such as status updating); and communication expectation (such as documenting project agreements). Table A.5 in appendix A summarizes our policy classifications.

5.4 Informal Policies

In the semi structured interviews that preceded this study, we have uncovered that many teams have policies of an informal nature. Participants reported that some behaviors are simply ‘expected’, such as a reasonable response time to an inquiry. As one participant noted:

“Is setting up a response max time needed? No. It’s common sense. If you have to get to that level, you are compensating for people not being reasonable.”

Here are some other ‘informal’ policies that were mentioned by participants:

“There are no formal policies in this project but there are general things that are understood and expected. It is expected to respond within the same day. It is not in writing. It is etiquette.”

“The expectation is 24 hours max to respond to email.”

“Usually we send email to each other and if it is marked urgent we know it’s important.”

Participants reported comfort with such informal policies. Such policies are not generally mentioned in research papers. We propose that they are a form of adaptation of effective partially distributed teams, and may be as effective as formal policies.

5.5 An investigation of current training practices

Rosen, Furst, and Blackburn (2006) investigated current practices and future needs of training for virtual teams. Training in organizations today was found to be mostly inadequate. Future needs were rated by survey responders. Leadership training especially in leading meetings, coaching, and mentoring virtually was found to be very important. Technology related training priorities were identified as the ability to use certain communication technologies and select the necessary technologies to fit the team's task. Other training priorities identified were: establishment of trust and conflict management, cultural sensitivity and communication, and team building skills. Rosen et. al (2006) recommend that replication and extensions of their investigation into virtual team training practices be pursued. One of their limitations is the pool of respondents. They were all human resource professionals who belong to a certain professional organization. Rosen et. al (2006) suggest that general managers may have a different perception of training than do human resource professionals. Our research draws on a larger pool of general managers and partially distributed team members.

5.6 Training Recommendations

As mentioned above, various studies recommended training as a good practice, though training was not their focus. Espinosa and Carmel (2003) discussed effective synchronous techniques in temporally dispersed teams (techniques to increase the ability for distributed members to communicate effectively in real time). One of their recommendations to achieve better communication was to assign liaisons who are trained at the distant site and then return to their home site to bridge the communication gaps. In

addition, they wrote that training team members to understand the issues of time separation is an education technique used by successful temporally distributed teams.

Training on diversity awareness in distributed teams is recommended by Sarker and Sahay (2002). They state that when differences in temporal expectations are bound up with cultural distance among virtual team members in different nations and/or organizations, in particular, teams will benefit from training exercises that surface these differences and encourage explicit discussion and agreement. Kaiser et al. (2000) found that training in distributed teams improves performance. They recommend training in communication and technology. Early and uniform training has been found to foster cohesiveness, trust, team work, satisfaction, and higher perceived decision quality (Tan, Wei, and Huang, 2000).

Townsend and DeMarie (1996) wrote that although enormous strides have been made in communication software, virtual team members will need specialized training - not only in how to use the technology, but also in how to effectively communicate in a distance. Many of the traditional cues of social interaction are lost in even the best communication systems. Virtual team members must be taught how to maintain effective communication within the constraints of their environment. Townsend and DeMarie, suggest training team members to use considerably more linguistic precision in their communication, since they will be unable to modify speech with shoulder shrugs or descriptive gestures. They also recommend that virtual team members are taught common culture values and social protocols.

5.7 Conclusion

It is evident in the preceding literature review that policies are necessary in partially distributed team work. In fact, although one intuitively may think that team members may not like to follow too many policies, there is minimal evidence to this effect in the literature we reviewed. Therefore one may conclude that the establishment of policies far outweighs any negative impacts they may have. We reviewed literature discussing policies to deal with temporal, cultural, process, and geographic discontinuities in partially distributed teams.

We have also established that training needs to be viewed as an important policy in partially distributed team work. There are well established practices of partially distributed team work that can provide a theoretical foundation for training. Particularly because partially distributed teams are often composed of diverse sub-groups, learning to understand the team diversity and to work together is an important part of on-going training that must take place for success. Team building has been shown to strengthen collaborative learning activities. Studies that embedded training into various stages of student virtual team work, have proven to be very successful. These findings need to be extended into industry partially distributed teams training.

CHAPTER 6

PARTIALLY DISTRIBUTED TEAMS - TECHNOLOGY

6.1 Abstract

A central challenge to distributed team work is technology. Technology is always improving and therefore it is of constant interest to researchers. Research can help shape new technology for communicating in partially distributed teams. A key to effective use of technology in partially distributed team work is identifying the most appropriate technology for a given task (Daft and Lengel 1986). In partially distributed teams, sub-groups often rely on technology to communicate with one another while face to face communication occurs within each sub-group. This chapter will review recommendations on how to handle such uneven communication channels. Another area of interest to partially distributed team research is relationship building between sub-groups. Travel to meet face to face is often suggested to improve relationships; however alternative solutions such as video conferencing will be discussed. Avoiding travel can improve effectiveness by reducing time and cost. One aspect of technology that this dissertation research will focus on is IM and other 'immediate' chatting systems or semi-synchronous systems. There is much evidence that such systems may reduce Us-vs.-Them in partially distributed teams. We will discuss some of the reasons.

6.2 Introduction

There are some encouraging findings related to technology in partially distributed teams, such as that the reliance on technology to communicate between sub-groups can actually benefit the team as a whole. For example written communication reduces

misunderstandings when language barriers exist, and members tend to send more information asynchronously than would be conveyed in real-time interaction (McDonough III et al, 1999). The latter is only beneficial if measures are taken to avoid information overload (Hilts and Turoff, 1985).

Additional benefits were found by Benbunan-Fich and Hiltz (1999a, 1999b, 2001) who conducted a field experiment comparing FTF and virtual (asynchronous, online) teams. They found that virtual team discussions were broader than exchanges in unsupported FTF meetings. As a result of richer discussions, virtual groups were able to submit more complete reports, which were better and longer than the ones submitted by manual groups. The Virtual groups' reports were also better and members reported better perceived learning. An additional advantage can be derived via anonymous participation, which may prove useful in situations where ideas or criticism need to be brought out without fear of individual repercussion. Effective use of anonymous group feedback can significantly improve team decision-making processes (Townsend and DeMarie, 1996).

Another encouraging finding is that electronic communication was found to be instrumental in building successful team relationships. This is relevant to partially distributed teams that can not afford to travel to each other's location, yet are experiencing the Us-vs.-Them problem. Sivunen (2006) notes that electronic medium can promote the effectiveness of positive feedback in building team identification. The feedback is public and therefore can enhance the entire team's identification and it is transcribed so it can be referred to at later times which, according to Sivunen, can also promote team identification. Lings et al (2006) reported that video conferencing might

be a good, cost-effective alternative to face-to-face meetings for building team relationships.

These are just some examples of how partially distributed teams may actually benefit by communicating via technology rather than face-to-face. Next we will summarize an interesting technology theory; then we will review recommendations by researchers about technology choices; finally we will focus on IM since it is of special interest to this dissertation research.

6.3 Media Naturalness Theory

As an alternative to media richness theory (Daft and Lengel, 1986), DeRosa, Hantula, Krock, and D'Arcy (2004) propose media naturalness theory which takes into account evolutionary, innate influences, and learned influences for media preference. According to this theory, face-to-face is at the midpoint of a scale of richness of communication and is preferred by people because it is perceived as being the most natural. There are three principles of the theory.

The media naturalness principle, states that the further away media communication is from the elements that characterize face-to-face communication (synchronicity, body language, speech), the more effort is required to communicate and the more uncertainty occurs. The innate schema similarity principle states that because of a common evolutionary history, people from different cultures should still have the same electronic communication behavior. This is good news for partially distributed teams that often encompass diverse cultures.

The learned schema diversity principle states that people have individual differences and acquire communication schemas through environmental learning

(DeRosa et al., 2004). Thus, as people gain experience using an electronic medium, the schemas that are learned can have influence, although the innate schema would still be present. This is also good news for partially distributed teams because it means that when people find themselves in a situation where they have to communicate via new means with distant team members, they will learn to do so with time. One implication for organizations, as noted by DeRosa et al. is that when choosing virtual team members, it can be important to choose those who have experience with the medium and therefore may be more comfortable with the lack of face-to-face interaction. Alternatively, time must be given for members to adapt to the technology so that they learn a schema for communicating with it comfortably.

Speaking of experience and comfort with technology, there is evidence that virtual team members are affected more by the newness of the technology being used than by the newness of the team structure itself (Hollingshead et al., 1993). Conversely, members' technology experience mediates the process by which external norms are internalized and adopted by team members (Sarker et al., 2001)

6.4 Technology Choices

A general consensus among researchers is that technology use should not be restricted; nor should uniformity of technology use between sub-groups be imposed. Researchers encourage teams to use a variety of communication media based on task requirements (Maznevski and Chudoba, 2001). They also suggest that local teams use the tools that they are most accustomed to. On the other hand, that there be but one common configuration management tool used to coordinate project activities (Lings et al., 2006).

Huang and Ocker (2006) found that when restricted to using email and instant messaging for their meetings with distant teammates, students found those media to be insufficient to accomplish their goals. The result was often a communication breakdown that led to conflict. However, some teams were able to overcome the limitations of provided collaborative media by incorporating other media (eg. teleconferencing) to their repertoire of communication channels (Huang and Ocker, 2006).

Pauleen and Yoong (2001) conducted a field study of facilitators of virtual teams to uncover what boundary issues they found important and how those issues influenced technology choices. The researchers found a critical issue for the facilitators was that of relationship building and management. Their study focused on the experiences the facilitators reported having in the context of attempting to build relationships using information communication technologies despite the impediments of various boundaries.

Facilitators often chose from available technologies with which they were most familiar, although other media was used as well. The selection of familiar technology lends a hand to letting local sub-groups use technology they are comfortable with. While email was used as a basis for communication, telephone, a richer medium, was often the choice for relationship building. This supports early media richness theories. In addition, the researchers found that facilitators thought Internet-based synchronous chat was advantageous for facilitating 'informal' interactions traditionally found in face-to-face teams, thus enhancing the relationship-building attempts (Pauleen and Yoong, 2001).

It was also recognized that there are different communication needs for different tasks and that cultural differences and level of relationship building required may also influence the media choice. For example, less relationship building would be needed in a

team that is intra-organizational. Various sub groups, perhaps departments in an intra-organizational virtual team, may have different preferences for technologies. It is even possible that not all technologies used by sub groups are available in common. The implication is that when planning the team building process and choosing the communication channels to support it, facilitators need to consider the preferences and styles of the team members. This study corroborated technology choice findings as described here and also brings up again boundaries in partially distributed teams.

It is also suggested that managers encourage a reliance on electronic communication that can include all team members. Otherwise, colocated sub groups rely increasingly on face-to-face meetings, which of course, cannot include distributed team members – a situation that can heighten Us-vs.-Them (Polzer et al, 2006). This view is challenged by the notion that team members restricted to electronic communication may feel isolated on a team level (Panteli and Davison, 2005).

6.5 Technology and Performance

Technology problems (e.g. files are not delivered due to size limits; data are stored in improper format) are often reported in virtual teams (Rosen et. al, 2007). In partially distributed teams these situations may occur when different technologies are used in different sub-groups. This can hinder performance, since time and energy must be used to overcome these problems. As seen in chapter 2, Us-vs.-Them can also be heightened in cases where technology problems cause miscommunication or lead to misattribution. One example is video conferencing. There is evidence in literature that video conferencing might be a good, cost-effective alternative to face-to-face meetings for building team relationships (Lings et al, 2006). However, problems with the technology

have been demonstrated to cause Us-vs.-Them (Abel, 1990). Problems with video conference setups may explain the discrepancy found by researchers between their perceived benefits and actual use (Pauleen et al. 2001; Privman et al. 2008).

The relationship between performance and communication media use was analyzed by McDonough III et al.(1999). Phone use (enabling fast and rich communication) was found to be positively associated with performance, while greater use of videoconferencing was found to be negatively associated. McDonough et al propose that the results may be due to the poor quality of the media. One might speculate that as videoconferencing technologies improve, the results might be different. In fact, this potential was expressed by participants in a later study (Pauleen and Yoong, 2001) of facilitators of virtual teams. Some facilitators believed that video conferencing might be a good, cost-effective alternative to face-to-face meetings for building team relationships. However, it should be noted that these participants only reported their belief in video conferencing potential, not that they actually had it available to use. In 2008, Privman and Hiltz had similar results. They interviewed 14 professionals working in partially distributed teams. Only 2 of the interviewees used video conferencing, while 9 believed that it would be helpful.

These findings suggest that efforts to improve video conferencing technologies are warranted. These findings also support the media naturalness theory. According to the theory the more effort needs to be exerted in using a technology the more uncertainty occurs. Therefore efforts to overcome problems with a certain medium may negatively affect its use. A conclusion can also be made that members of partially distributed teams who experience less technology problems will also experience less Us-vs.-Them and

increased effectiveness. Corporations should therefore ensure sufficient technology support such as help desks and training.

6.6 Focus on IM

There was very little evidence in literature to the ineffectiveness of IM. The only negative IM remarks were related to interruptions. The software engineering process requires periods of uninterrupted time and other periods of interaction (Perlow, 1999). Perlow studied interruptions and their value to individuals. Multiple people mentioned, indeed, that work was often interrupted by constant IM and that they had to set the do not disturb status. Findings about IM's positive effects are much more prevalent, though, and will be discussed next.

Instant Messaging, as implied by its name, is immediate and spontaneous. Just like walking over to a colleagues' desk to check for availability and initiate a conversation, through IM one may check a colleagues' availability and initiate an electronic conversation. The IM interface is a simple window that facilitates back and forth discussion, with a very informal look and feel. Of course in temporally dispersed teams the option to use IM correlates to synchronous availability of sub-group members.

When synchronous overlap exists, however, research findings support the advantages IM provides. For example, Carmel and Agarwal (2001) state that distance negatively affects communication. They argue that such things as email, voice mail, online discussions, and other similar tools do not supply the communication effectiveness provided by impromptu meetings so that any type of distance between individuals or groups loses the spontaneous support of communication. It is proposed in our research

that teams using IM when possible may reclaim some of the spontaneity lost by distance and thereby reduce Us-vs.-Them.

Espinosa et. al (2006) discuss the importance of presence awareness in geographically dispersed teams (who is where / when). They suggest that managers implement presence awareness to increase effectiveness of partially distributed teams. Proper IM use can facilitate such awareness. Dennis et. al (2008) write that quick feedback that resembles conversation (as exists in IM) improves shared focus and therefore convergence on shared meaning.

Chat capabilities are similar to IM in terms of immediacy, and have been found to be useful in partially distributed work as well. Beranek (2005), in a study related to trust training, notes that several teams, when reaching a point in the task where a decision had to be made immediately on a course of action, made use of the chat room feature of the system. She notes that the 'chat room' option seemed to be a replacement for meeting face-to-face. Pauleen and Yoong (2001) also found that facilitators thought Internet-based synchronous chat was advantageous for facilitating 'informal' interactions traditionally found in face-to-face teams, thus enhancing the relationship-building attempts.

Cho et. al (2005) examined how Instant Messaging systems help employees of an organization improve their relationships with co-workers and found that IM is suitable for this purpose. Privman and Hiltz (2008), in interviewees with PDT professionals, found that IM was viewed as a favorable and informal means of communication. It was also perceived as fostering relationships. It was overwhelmingly praised by those who use it. Here are some examples:

"I made the most use of technology by installing an IM package. So that they can see: I'm on-line! I'm available! And so that they can say: 'Hey – you've got a minute?' Instead of wondering: let me give his number a call – maybe he is there?"

"To me IM is the preferred method. I have chats over the IM with my co-worker in London. We've developed a friendship."

Rosen, Furst, and Blackburn (2007) conducted interviews and surveys with virtual team leaders and virtual team members over seven years. Their respondents indicated the need for "chat rooms" to facilitate informal communications around tangential team issues, but also to strengthen social bonds among distantly located teammates. They noted that informal communications provided a valuable opportunity for team members to become familiar with each other on both a professional and personal level.

Some scholars worry that IM will increase interruptions in the workplace, however, Garrett and Danzinger (2008), found that this is not necessarily the case. In fact, their study suggests that workers are developing effective strategies for using IM technologies. They analyzed responses to a survey by nine hundred workers in the U.S. and concluded that IM promotes frequent communications and reduces interruptions. They posit that this occurs because workers use IM technologies to quickly postpone irrelevant interruptions and to integrate social communication into the work flow.

Garrett and Danzinger describe how IM reduces interruptions by allowing users to quickly get answers to work related questions with minimal disruption such as the kind of disruption that ensues when one colleague has to seek out another in order to receive information (physically, or via extended emails or phone calls). They found that questions needing a quick answer can be quickly resolved via IM, while more intricate collaborations can be scheduled quickly for an opportune time.

Garrett and Danzinger suggest that work related IM enhances employees' interaction with colleagues by offering rapid and efficient information exchange. Their discussion of facilitating spontaneity and social exchanges supports findings by Rosen et. al (2007) and Privman et. al (2008) that link IM to social development and efficiency in distributed team work.

Interestingly Garrett and Danzinger found evidence that IM coupled with richer communication modalities does not provide the same benefits and could be problematic for both workers and organizations. Their conclusions that are relevant to our investigation of IM are: IM users reported lower levels of disruptive interruption than non users; IM users did not have decreased levels of work communication; and IM users engaged in more frequent computer-mediated work communication, as well as computer mediated personal communication, than non-users.

Subtle status checks and presence awareness are some of the benefits of IM cited by Garrett et. al (2008). These benefits are consistent with recommendations by Espinosa et. al (2006) for improving globally distributed team work. Other IM features cited as important by Garrett et. al are: ease of use, high profile new message announcements, and near synchronous interaction style

6.7 Conclusion

In this chapter we have shown that reliance on technology does not necessarily hurt relationship building and effectiveness in partially distributed teams. In fact, there may be benefits to technology in some cases, such as when language barriers exist and when anonymity is properly used.

We reviewed media choice recommendations by researchers. There is a general agreement that local sub-groups should use media that they are comfortable with while the team as a whole should use a common collaboration tool. Also restrictions on media use are discouraged. This is consistent with the media naturalness theory which implies that each sub-group has already developed a communication schema based on existing media.

We showed that there is a relationship between technology reliability and team performance using video conferencing as an example. Finally, we proposed that IM may reduce Us-vs.-Them in partially distributed teams because it has been shown to improve relationships between distant members; it is close to face-to-face interaction due to immediacy and presence awareness; and it is simple to use (satisfying media naturalness theory criteria).

CHAPTER 7

RESEARCH QUESTIONS, MODEL, AND HYPOTHESES

7.1 Overview

Despite the research done to date; many researchers call for further studies of larger samples of partially distributed teams operating in a business context (Espinosa et al, 2006; Stringfellow, 2003). As we have seen in this thesis, most studies in the field use student teams or focus on one or two industry teams (that may have their own idiosyncrasies). Based on this void, we propose to study a large sample of industry partially distributed team members with Us-vs.-Them as one of the dependent variables. Isolating Us-vs.-Them and understanding under which conditions it exists is important so that managers can identify it and prevent it from escalating. The second dependent variable that we intend to measure is effectiveness. Many studies indicate that Us-vs.-Them negatively impacts effectiveness while others report effectiveness despite Us-vs.-Them (Aubert and Kelsey, 2003, Bos. Et al, 2006)). Some studies even report that task related conflict (that may result from Us-vs.-Them) may benefit teams (Eisenhardt, Kajwajy, and Bourgeois, 1997). We hope to further the understanding of the relationship between Us-vs.-Them and partially distributed team effectiveness. The question guiding this research therefore is: Does Us-vs.-Them negatively impact effectiveness in PDTs and, if so, under which circumstances is the impact lessened? From this guiding question and the literature review we developed specific research questions that we discuss in this chapter along with the hypotheses proposed to answer them. We begin by presenting our research model.

7.2 Research Model

We base our model (depicted in figure 7.1) on three major findings discussed in the literature review. The first major finding is that motivation plays a big role in effectiveness of partially distributed teams. Some researchers mentioned motivation as a factor increasing effectiveness, but none studied it in detail. A more detailed study of motivation and its effects can help managers to identify types of motivations that are most beneficial for team performance, and to hire and retain motivated team members.

The second finding is technology related. IM and other semi-synchronous communication methods are increasingly reported to play an important role in organizational communication. Their prevalence is consistent with the media naturalness theory and other important factors identified by researchers such as that of presence awareness and immediacy. We believe that these technologies can reduce Us-vs.-Them and improve partially distributed team effectiveness. Our survey instrument compares their use and effect to that of other communication technologies. Video technology is recommended by researchers as a good alternative to face-to-face communication. We test this assertion, keeping in mind that the reliability of the technology used may play a big role in the results. Technology reliability is established in literature as central to effective distributed team work (Cramton, 2001; Kirkman et. al, 2006).

The third finding is related to policies. We reviewed literature that stresses the importance of policies in partially distributed teams. We also uncovered through interviews that in many PDTs informal policies exist. We compare formal and informal policies using our survey instrument and assess their impact on Us-vs.-Them and effectiveness.

Our model of influence of Partial Distributed Team Distance is adapted from the model of Influence of Virtual Distance (Lojeski et al., 2006). It is a static model, as information is being collected at one point in time. The model is depicted below along with an explanation of its components. The next section is dedicated to the research questions underlying this model.

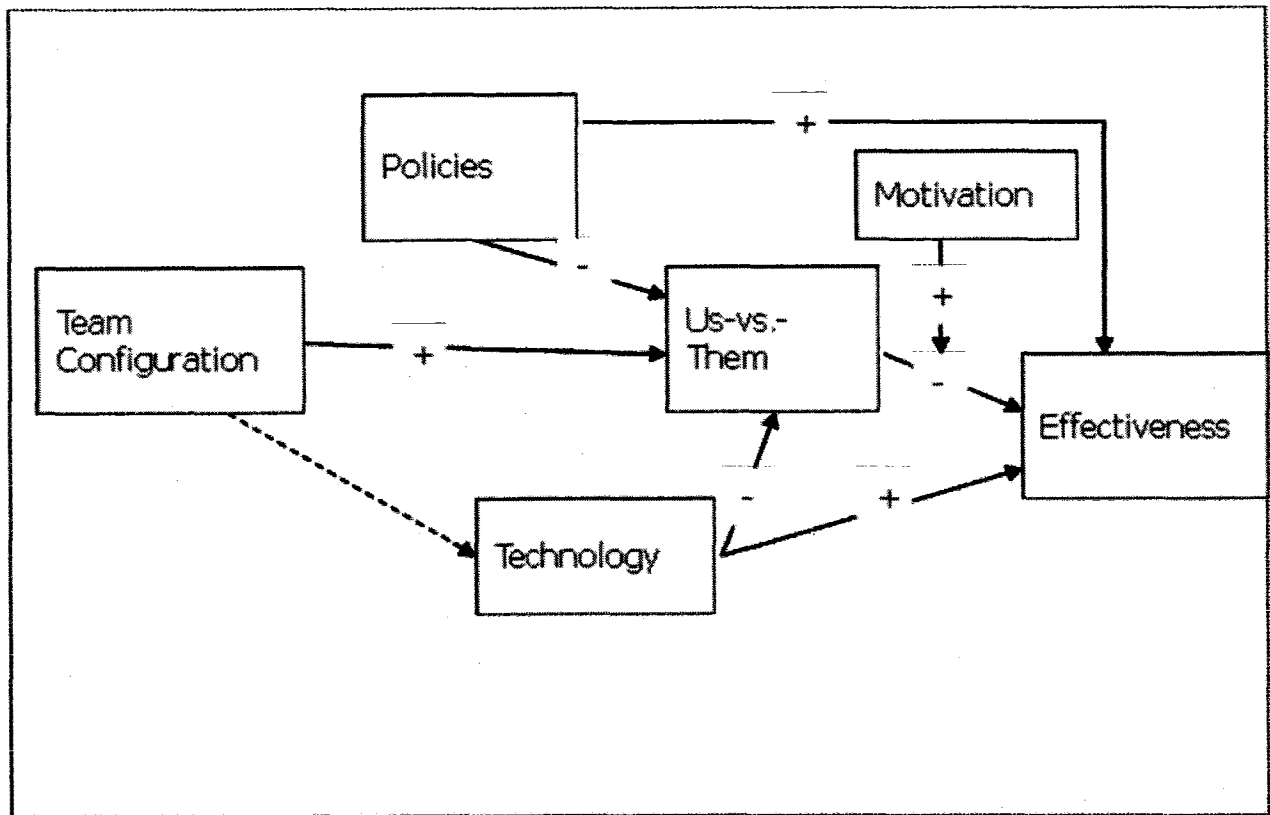


Figure 7.1 Initial Model of Influence of Partially Distributed Team Distance.

Team configuration refers to how many sub-groups there are, as well as their size. Components of sub-group distance are described below. These components influence the degree to which technology is relied upon. For example if the geographical distance is very small between two sub-groups, members can travel to see each other often. Their reliance on technology is very different than for teams where distant members never meet. Sub-Group distance data and team configuration data will be used to explore our

first research question and for future research. It will also be instrumental for testing whether our hypotheses hold under certain conditions.

Because we do not restrict the research to a particular configuration of sub-groups, we may see outliers where various sub-group distances are either especially salient or especially minor. Sub-Group distance and team configuration may affect Us-vs.-Them as well. Components of sub-group distance are described in Table 7.1.

Table 7.1 Components of Sub-Group Distance

Cultural	Customs; Language; Work Ethics.
Temporal	Work Ethics (urgency, lateness tolerance, etc.); Time-Zone; Schedule.
Geographic	Distance; Travel Time; Distribution of Sub-Group Members.
Organizational	Similarity of Organization Culture; Communication Channels (through leader, direct, etc.)
Functional	(Differences in) the functions of each sub-group and their work integration.

Technology underlies our research and model because it facilitates communication between Sub-Groups. There are many components to technology; some are briefly described below in Table 7.2. Our hypotheses focus on semi-synchronous communication methods as well as video use, technology reliance, reliability, uniformity, and training.

Table 7.2 Analytical Dimensions of Technology Use in PDTs

Mode	Synchronous, Asynchronous, Semi-Synchronous.
Type	Email, Voice-Teleconference, Video-Teleconference, IM, Document Sharing, Project Management.
Reliance	How often and for what.
Reliability	Dependability and Support.
Uniformity	Does each Sub-Group use the same technology?
Training	Availability and extent.

Many policies exist in corporations today. We focus on those that relate to communication, coordination, and training. The policies we measure are listed below. They are categorized (in parentheses) as formal communication policies, organizational transparency policies, or communication expectations policies.

- Procedures for coordinating work (Communication)
- Project Milestones and Delivery Schedule management (Communication)
- Status Updating (Organizational transparency)
- Management of project documents (Organizational transparency)
- Regularly scheduled whole-team meetings (Communication)
- Working extended hours in order to meet with remote team members (Communication expectations)
- Returning phone calls, email, etc. within a set amount of time (Communication expectations)

We are interested in the source of each policy. Some policies are mandated by management and some are adapted by team members themselves. This dissertation research will explore motivations related to career development, gain, convenience, and company loyalty. A detailed explanation is provided in sections 7.5 and 7.6.

7.3 RQ 1 – Team Configuration

What aspects of team configuration and sub-group distance have the most impact on Us-vs.-Them?

What aspects of team configuration and sub-group distance have the most impact on choice of technology?

Components of Sub-Group distance are: Temporal, Geographic, and organizational. Components of team configuration are number and size of sub-groups. The degree of technology use and technology choices will be influenced by all of these variables. In order to relate team configuration and sub-group distance to technology use, we'll have to first develop classifications for team size (such as "small", "medium", and "large"), team distribution, based on number of sub-groups (such as "many", "some", "few"), and various measures of distance (such as temporal, geographic, cultural). We cannot list specific hypotheses at this time because we do not restrict our research to a particular set of configurations and we cannot predict the pool of partially distributed teams that we will end up with. Thus, our analysis will be exploratory.

7.4 RQ 2 – Communication Technology

How do various media and their adaptation impact Us-vs.-Them and Effectiveness in partially distributed teams?

From the technology section we saw that a technology mix is often used by successful virtual teams. We focus on between sub-group technologies and their impact on Us-vs.-Them and effectiveness. We begin with two general hypotheses about technology uniformity and reliability.

H2a: PDTs where sub-groups use the same communication technologies for between-group interaction will experience less Us-vs.-Them than PDTs where sub-groups do not use the same communication technologies.

H2b: PDTs with reliable well supported technologies will experience less Us-vs.-Them than PDTs with less reliable technologies.

Research findings suggest that video technologies can be a good alternative to face to face communication in virtual teams. Video technologies, however, tend to be difficult to set up and use and may require extra training. In addition, there is more room for technology failures when using video technologies which may lead to ineffective communication and increased Us-vs.-Them (Cramton, 2001). The lack of reliability may also reduce training transfer and therefore effectiveness (Kirkman et. al, 2006). These factors need to be kept in mind when video technologies are studied. Therefore, the next two hypotheses will only be tested when reliability is established.

H2c: PDTs using reliable video technologies will experience less Us-vs.-Them than PDTs not using reliable video technologies.

H2d: PDTs using reliable video technologies will be more effective than PDTs not using reliable video technologies.

We discussed the benefits of IM and other semi-synchronous technologies. These benefits include presence awareness, immediacy, and informality. These benefits are tied in to research findings of reduced Us-vs.-Them and increased effectiveness. We present two hypotheses to test this relationship:

H2e: PDTs using IM and other semi-synchronous communication methods will experience less Us-vs.-Them than PDTs not using these methods.

H2f: PDTs using IM and other semi-synchronous communication methods will be more effective than PDTs not using these methods.

The next hypothesis we present relates to the dotted line in our model between sub-group distance and technology. As discussed in the beginning of the chapter, different distances require different degrees of reliance on technology. The following

hypothesis is related to distance and technology reliance since the more PDT sub-groups meet face-to-face, the less they rely on technology (at least for relationship building). It has been shown to hold in virtual teams and in traditional teams. We will test it for partially distributed teams.

H2g: PDTs that meet regularly as a team will be more effective than those who do not.

In addition, we will examine geographic distance variables (such as time zone differences and travel time) as well as non-geographic distance variables (such as organizational distance) and relate them to technology type and frequency of use, with recommendations for further research.

7.5 RQ 3 - Policies

What types of formal and informal policies exist for partially distributed teams? And what is their impact on Us-vs.-Them and effectiveness?

Research shows that formal policies are helpful for both Us-vs.-Them and effectiveness improvement. Through semi structured interviews we found that many policies are informal by nature. This goes along with Powell et al.'s (2004) theory that social work structures develop by themselves in distributed groups. We hypothesize that such informal policies can be just as important as formal policies in reducing Us-vs.-Them and improving effectiveness:

H3a: Enacting informal policies in PDTs will reduce Us-vs.-Them.

H3b: Enacting informal policies in PDTs will increase effectiveness.

Literature support for policies is overwhelming. Some examples of 'ineffective policies', however, are mandating availability (especially at off hours), forcing the use of

certain technologies, and policies that increase organizational distance. Because the latter set is minor, however, we hypothesize in favor of formal policies.

H3c: Formal policies in PDTs will reduce Us-vs.-Them.

H3d: Formal policies in PDTs will increase effectiveness.

The next set of hypotheses refers to communication and coordination. They will be related to the level of communication needs between the sub-groups according to a communication scale (Turoff et. al, 2008), as follows:

1. Competitive – no trust in passed information
2. Informative – honest information exchanged on what is being done by each party
3. Coordination – mutual scheduling of what tasks each party is doing when
4. Cooperation – mutual agreement on what tasks each party is going to do.
5. Collaboration – mutual agreement to work together on the same tasks.

We have discussed conflicting results relating to who should communicate with whom: Bos et al. (2004) describe an experiment where telecommuters felt ignored by co-located members and therefore formed their own virtual sub-group. This finding suggests that when co-located members meet in person among themselves, distant group members feel isolated or ignored and this contributes to Us-vs.-Them. To alleviate this problem some researchers recommend exclusive reliance on electronic communication (Polzer et. al, 2006). Others disagree and recommend that local teams meet face to face to avoid feelings of isolation on an individual-level (Pantelli and Davison, 2005).

The two recommendations are seemingly contradictory. However, they may each have merit at different levels of the communication scale. The first recommendation that encourages reliance on electronic communication to avoid sub-group level isolation

seems appropriate at levels 3 4 and 5 of the scale. At lower levels, much of the work is accomplished 'offline' by each sub-group and therefore discouraging within-sub-group face-to-face meetings is simply counterproductive. We therefore hypothesize the following:

H3e: PDTs at the coordination, cooperation, or collaboration levels of the communication scale with frequent face-to-face within sub-group meetings will experience more Us-vs.-Them than same level PDTs relying mainly on electronic communication.

H3f: PDTs at the coordination, cooperation, or collaboration levels of the communication scale relying mainly on electronic communication will be more effective than same level PDTs with frequent face-to-face within sub-group meetings.

H3g: PDTs at the competitive or informative levels of the communication scale where sub-groups frequently meet face-to-face will be more effective than same level PDTs relying mainly on electronic communication.

Related to 'Who works with whom', Privman and Hiltz (2008) interviewed professionals working in partially distributed teams. Many of them recommended letting individuals across sub-groups work together directly. This recommendation was made following descriptions of large conference calls where each sub-group meets in a local conference room. Participants complained that such conference calls turn into a 'show and tell' by sub-group leaders about accomplishments of their respective sub-groups. Several participants reported that this set-up contributed to Us-vs.-Them. They further explained that it would be more productive for them to work with individuals from the remote sub-group directly rather than through a sub-group leader. These opinions seem

particularly relevant to the collaboration level of the scale where sub-groups actually work together on each task. Although we do not present a hypothesis about these findings, we will measure where each PDT is on the communication scale and explore association with whole-team meetings.

Another set of policies found to be very important is related to training. Studies show that training is very effective (Lings et. al 2006; Powell, 2004). However in organizations today, virtual team training is very scarce (Rosen et. al, 2006). Because we will administer our survey to a large population, though, we are hoping to be able to test some general training hypotheses as follows:

H3h: PDTs where members received ICT training will be more effective than PDTs where members did not.

H3i: PDTs where members received ICT training will experience less Us-vs.-Them than PDTs where members did not.

H3j: PDTs where members received team communication training will be more effective than PDTs where members did not.

H3k: PDTs where members received team communication training will experience less Us-vs.-Them than PDTs where members did not.

H3l: PDTs where members participated in team building activities will experience less Us-vs.-Them than PDTs where members did not.

The last policy related hypothesis we test relates to the distribution of responsibilities of sub-groups. Members of a partially distributed team often have other (sometimes local to them) job responsibilities, which can present a problem in how much priority they assign the PDT work (Stringfellow, 2003). Remote members may feel

more motivated in their local work because the exposure is more immediate (for example, the manager may be on-site). This attitude may spark Us-vs.-Them. Because our survey participant may not know the details of remote sub-group responsibilities (such as if the other projects are local or PDT structured), we present the following general hypothesis:

H3m: PDTs where members do not have other project responsibilities will experience less Us-vs.-Them than PDTs where members have other project responsibilities.

7.6 RQ 4 – Us-vs.-Them and Effectiveness

Does Us-vs.-Them negatively impact effectiveness in PDTs and, if so, under which circumstances is the impact lessened?

This research question is essential to the dissertation research. It establishes the relationship of Us-vs.-Them and effectiveness. We expect that a relationship exists whereby as Us-vs.-Them increases, effectiveness decreases:

H4a: Perceived team effectiveness will be lower in teams with high Us-vs.-Them than in teams with low Us-vs.-Them.

We also expect certain variables to moderate this effect. One such moderating variable is motivation:

H4b: In teams with highly motivated members the negative impact of Us-vs.-Them on effectiveness will be weakened.

In chapter 4, we explored possible motivations for professionals to work in partially distributed teams. We focus on the following motivators:

- Flexible Schedule
- Challenging Work

- Professional Development
- Ability to creatively use skills
- Financial and other Compensation
- Company Loyalty
- Reduced commute / Desirable location
- Being required to work on the project

In addition, certain dimensions or characteristics of Us-vs.-Them should be more harmful to team effectiveness than others. We will test this proposition as well.

7.7 Motivation and Effectiveness

What motivators have the most impact on effectiveness?

For those motivators with the most positive relationship to effectiveness, we will calculate a combined motivation score for each participant, based on the number of these motivators he / she reported and the strength of each. We will subtract from this score the strength of the negative motivation choice (being required to work on the project) and test the relationship of this score to effectiveness. In our model motivation is a moderating variable; therefore we will not test direct hypotheses of its relationship to effectiveness. However, we posit that motivation will increase effectiveness and we will attempt to relate the different motivators, as discussed above, to effectiveness and report on their relative impact.

7.8 Summary

In this chapter we grouped hypotheses into motivation, technology, and policy categories. Table 7.3 summarizes these hypotheses and their impact on Us-vs.-Them and Effectiveness as appropriate.

Table 7.3 Summary of Hypotheses and their impact

Category	Summary	Us-vs.-Them	Effectiveness	Hypotheses
Technology	Same ICT for Sub-Groups	Yes		H2a
Technology	Reliable / supported ICT	Yes		H2b
Technology	Video Use	Yes	Yes	H2c H2d
Technology	Semi Synchronous Technology Use	Yes	Yes	H2e H2f
Technology	Whole team meetings		Yes	H2g
Policies	Informal Policies	Yes	Yes	H3a H3b
Policies	Formal Policies	Yes	Yes	H3c H3d
Policies	Electronic communication is relied upon BETWEEN and WITHIN sub-groups who work on the coordination, cooperation, or collaboration levels	Yes	Yes	H3e H3f
Policies	Competitive or informative Sub-Groups frequently meeting face-to-face		Yes	H3g
Policies	ICT training	Yes	Yes	H3h H3i
Policies	Team Communication training	Yes	Yes	H3j H3k
Policies	Team Building	Yes		H3l
Policies	Minimal other Responsibilities	Yes		H3m

The hypotheses discussed here were briefly examined in a pilot study we conducted which will be discussed in more detail next.

CHAPTER 8

PILOT STUDY

8.1 Introduction

We conducted a pilot study in Summer '08 in preparation for the full scale field study. The pilot measured impact of motivation, technology, policies, and training on Us-vs.-Them and Effectiveness in partially distributed teams. Thirty three professionals participated in the pilot study yielding thirty valid observations. Results confirmed the relationship between Us-vs.-Them and Effectiveness – when Us-vs.-Them increases, effectiveness decreases. Results also indicated a possible moderating effect of motivation on effectiveness – the drop in effectiveness was lessened when higher levels of motivation existed. Some preliminary results about policies and technology as per research questions, showed loose support for some of our propositions. Although the sample size was not large enough to draw statistically solid conclusions, the trends observed were instrumental in refining the set of hypotheses and survey instrument for the full scale study. Methodology and results will be discussed in this chapter.

8.2 Pilot Study Design and Participants

Measures for the initial survey instrument were taken from existing IS literature when possible. See appendix B for a detailed discussion of the origin of questions on the original pilot instrument. In order to improve face validity we conducted a pre-test of the instrument with five industry professionals. We asked them to fill out the survey on paper in our presence, keeping in mind the following: Does it accurately measure Us-vs.-

Them and Effectiveness? Is it clearly worded? Is it easy to complete? Should items be added / deleted? Any other improvement suggestions?

Input from the pre-test resulted in combining some of the measures; re-wording questions; and streamlining the survey instrument. The final instrument used in the pilot study is enclosed in appendix D. We used the Survey Monkey on-line software to develop the survey and collect responses. We recruited participants by asking sixteen former colleagues, who currently work at various corporations, to circulate the following email:

Dear Colleagues,

My former associate and friend is a Doctoral Candidate at the New Jersey Institute of Technology.

Her dissertation research investigates effective practices in partially distributed team work. If you have experience working in a team where some (but not all) members are geographically distributed, she would highly value your input – via filling out the following survey: web.njit.edu/~fp3

Your responses will be completely anonymous (no identifying information is collected about you or your company) and used only for research purposes.

Please contact her directly at fp3@njit.edu with any questions regarding this research project and/or any of the results.

Thank you very much in advance for your participation.

Signature of sender

Thirteen of the professionals we've contacted confirmed participation which resulted in 33 survey participants yielding 30 usable results. Of the participants, 22 were

males and 8 were females. Since we targeted IT professionals, this ratio is not unusual. The distribution of years of distributed team work experience was normal with 44% reporting 1-3 years of experience and 35% reporting 4-10 years. Close to 60% of participants were from the telecommunications and financial industries with 80% of respondents located in the east coast of the US. 40% of respondents were team members, 25% were team leaders, and 35% were sub-group leaders. Almost 40% were members of software development teams and another 20% were involved in other IT work.

8.3 Analysis of Variables and Results

The Statistical Analysis Software (SAS) was used for all statistical procedures reported here; MS-EXCEL was utilized for simple data manipulations. Reliability analysis (Cronbach's Alpha) was performed on the dependent variable measurement of Us-vs.Them and Effectiveness. Validity analysis using factorization was also performed. These will be discussed next.

Us-vs.-Them was measured using a 7 point semantic differential scale with 18 items. Thirteen items were taken from previous studies (Jarvenpaa et al.1999; Ocker et al., In Progress) and the rest are Us-vs.-Them themes that we have identified in our literature review. An exploratory factor analysis revealed the three factors of Conflict, Lack of Trust, and Unawareness. Feedback from factor analysis resulted in elimination of five items, and re-wording of three others.

Effectiveness was measured using a 7 point semantic differential scale with 11 items. These items were taken from previous studies (Edwards et al., 2002; Espinosa et al., 2006; Ocker et al., In Progress; Stringfellow, 2003). Before exploring effectiveness factors we remove the 'Creativity' item, as it was skipped by all but one respondent. We

also had to exclude two more respondents who skipped the effectiveness section entirely. This can be because we asked: "Compared to your previous experience, please rate the following:" Perhaps these respondents did not have previous experience. We modified the section heading for the full scale study by asking participants to simply rate their experience.

Coordination and Communication distributed differently than the rest of the items. We already deal with the coordination and communication as problems in the 'Us-vs.-Them' sections, so for the pilot analysis we ignore them when adding up effectiveness scores. Communication and coordination between sub-groups need to be related to the degree of need for them. We dedicated a section in the full scale study to solicit the degree of need for communication between sub-groups.

8.4 Qualitative Results

The qualitative section of the pilot survey consisted of three questions which asked respondents to suggest improvements to the survey as well as state the most poignant PDT problems observed by them. We list selected responses for each question next. The first being: "Based on your experience what is the greatest challenge for a PDT?"

"The greatest challenge is: having to wait to continue working on a project because other team members, either at same or distant location, aren't yet finished with their task and/or passed on information I need to continue working."

"Having the same information level and targets on projects. Our sub groups are in different countries with a time zone difference of 6 hours. This plus the cultural differences are challenges for a successful cooperation."

“Everyone in the team, including all sub-groups, must agree on the priority of the project. Very often we see the same project as high priority when the team in India has higher priority items in their project queue.”

“Understand the challenges of the remote team or in other words to be in their shoes.”

“Building teamwork, especially at a location where team leader is not based. Training new members, especially when expertise is centered at a different location; managing remote employees to ensure they are producing results.”

It is apparent that people feel strongly about time zone differences and cultural issues. These are mentioned several times among our small sample size. Maintaining communication in the face of distance is also a recurring concern. Another theme mentioned several times is co-location with a leader. Apparently, being co-located with a leader is seen as a big advantage. The team building, motivation, and trust concerns above reflect issues that we’ve seen in our literature review.

Below are sample responses to the second question: “Is there something that is important to the success of partially distributed teams that we neglected to ask about?”

“Where executive sponsorship / leadership is located relative to the team lead.”

“Perhaps, about the effectiveness of communication (which could be lower, e.g., due to insufficient language proficiency or cultural differences); also, ask for suggestions to improve team effectiveness which were not listed yet...”

“No, I would just stress the importance of regularly scheduled calls or meetings so that people who are working in remote areas feel connected.”

Co-location with a leader is again mentioned. It is certainly emerging as an important issue. Cultural issues and language barrier are mentioned again as well. A new suggestion is to distinguish between teams that span more than one corporation and teams from the same corporation. This is a legitimate suggestion as well. These issues can be distinguished in the full scale study with an additional question.

The third question asked for suggestions on survey improvement. Participants made some good suggestions for semantic improvements that will lead to some rewording in the full scale instrument. Interestingly, some felt that this topic requires further qualitative research rather than quantitative research. However, as we see in the next section the breadth that quantitative research allows, does address our research questions.

8.5 Us-vs.-Them and then What?

The main relationship that we are focusing on is that of Us-vs.-Them and Partially Distributed Team Effectiveness. Now that we've established measures for Us-vs.-Them and effectiveness we can begin to answer the following questions:

Does Us-vs.-Them have a negative impact on effectiveness? If so, which conditions moderate this effect?

The first question is easily answered with the following graph (figure 8.5). It shows that as Us-vs.-Them increases, effectiveness tends to decrease. The rest of this chapter will be dedicated to answering the second question using our model variables: motivation; technology; and policies (including training).

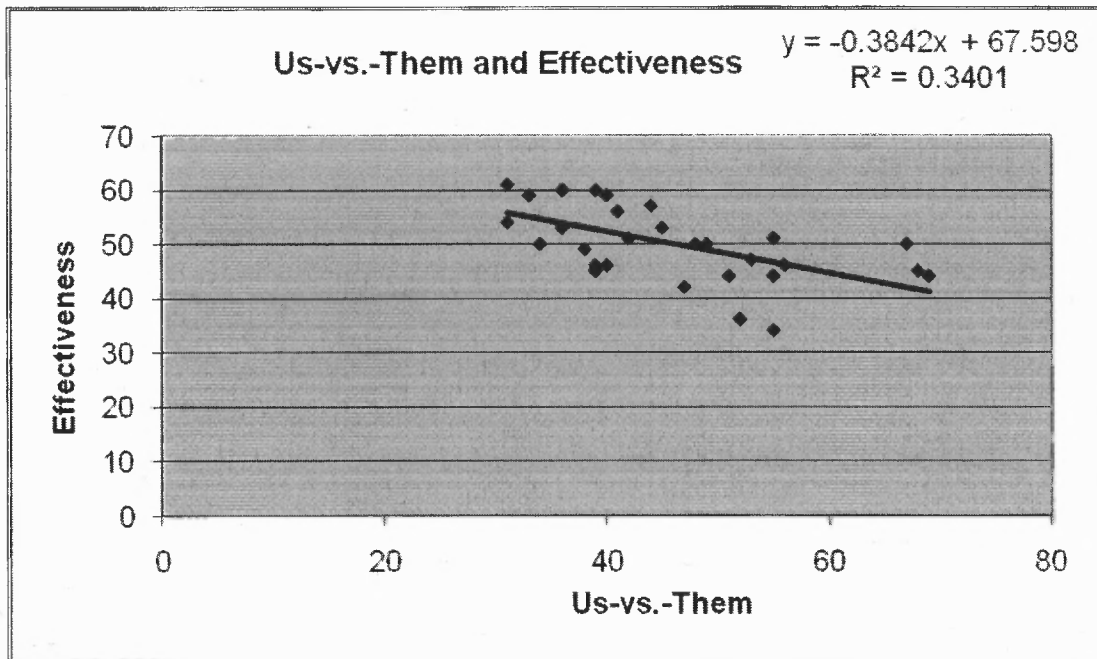


Figure 8.5 Relating Us-vs.-Them to Effectiveness

8.6 Motivation

We asked participants to check off what motivates them to work in their current position. The motivators selected most often were: Professional Development, Ability to creatively use skills, and Helping one's company to achieve important goals.

Before a discussion of individual motivators, we used the number of motivators selected as a 'motivation score'. There were 10 motivators on the survey to choose from. Scores were normally distributed, with a range of 1 to 8 and Median Score = 4. All participants with a motivation score below 4 were ranked as 'Low' and the rest as 'High'. The relationship between Us-vs.-Them and Effectiveness was examined separately for low and high motivation scores. There is some suggestion that high motivation moderates the drop in effectiveness as Us-vs.-Them increases, although the change is very small and needs to be further examined in our full scale study.

There was no correlation between the amount of local (vs. PDT project) responsibilities of PDT members and team effectiveness. Participants of the pre-test had a little trouble with this section when they had to decide the percentage of time spent on the project by remote sub-groups. We will simplify this section of the survey to simply ask if they do or do not have local responsibilities that interfere with responsibilities for the PDT project in question. We should not dismiss the hypothesis related to local responsibilities based on pilot results because (i) There is evidence in literature to support it (ii) It was skipped by several participants which may indicate unclear wording (iii) This section was difficult for pre-testers (iv) Local responsibilities were mentioned in the qualitative section of the survey as a hindrance to PDT work.

8.7 Technology

In the account of results presented here, statistical tests of significance are not used. Because of the small sample size, little if anything would be significant. The pattern of results is reported to see if they are tending in the direction of the hypotheses, or not. Our first technology related hypothesis was that video technologies will be helpful to PDTs. This hypothesis was difficult to test because only seven respondents reported ANY video technology use (video conferencing or PC based software with Webcam). Below Table 8.8 shows the means for effectiveness and Us-vs.-Them overall along with a breakdown for participants using video technology and those not using it.

Table 8.8 Video Technology Mean Comparison

Means	Effectiveness	Us-vs.-Them
All	50.067	45.63333
Video	51.714	48.14286
No Video	49.565	44.86957

The results suggest that Us-vs.-Them actually increases when video technology is used (contrary to expectations) and effectiveness slightly increases. There is evidence in literature that technology reliability can play a big role in how it is used (Kirkman et al., 2006). We added a question about technology reliability on the full-scale survey.

Our next hypothesis predicted that PDTs using IM and other semi-synchronous communication methods will experience less Us-vs.-Them than PDTs not using these methods. Only 10 respondents reported fairly frequent IM use (>4 on our scale). The mean Us-vs.-Them though, is smaller than the overall Us-vs.-Them mean; while their effectiveness mean is slightly higher. These results indicate that a larger sample is needed in order to accurately test this hypothesis.

Table 8.9 IM Mean Comparison

Means	Effectiveness	Us-vs.-Them
All	50.067	45.63333
IM Use	50.3	40.2
No IM	49.95	48.35

8.8 Policies

To test the effect of policies on Us-vs.-Them and effectiveness, we compared the mean effectiveness score overall to the mean effectiveness score for teams implementing each policy. Similarly we compared the mean Us-vs.-Them score overall to the mean Us-vs.-Them score for teams implementing each policy. Table 8.10 displays each policy examined and whether it increased effectiveness or decreased Us-vs.-Them. It is evident that there are benefits to policies (Us-vs.-Them decrease and Effectiveness increase). The policies in the table are listed according to impact on Us-vs.-Them and effectiveness. Interestingly, there are no policies that reduce Us-vs.-Them without increasing effectiveness, or increase effectiveness without reducing Us-vs.-Them.

Table 8.10 Us-vs.-Them and Effectiveness where Policy Exists

Policy Type	Policy	Us-vs.-Them Decrease	Effectiveness Increase
Formal	Always adding a 'dial-in' so that remote team members do not feel left out	Yes	Yes
Formal	Procedures for coordinating work	Yes	Yes
Formal	Regularly scheduled whole-team audio tele-conference	Yes	Yes
Informal	Regularly scheduled whole-team f2f	Yes	Yes
Formal	Regularly scheduled whole-team meetings video-conf	Yes	Yes
Formal	Status Updating	Yes	Yes
Formal	Project Milestones and Delivery Schedule management	Yes	Yes
Informal	Regularly scheduled whole-team meetings via video-conference	Yes	Yes
Informal	Working extended hours in order to meet with remote team members	Yes	Yes
Informal	Management of project documents and memos	Yes	Yes
Informal	Always adding a 'dial-in' component to face-to-face meetings so that remote team members do not feel left out	Yes	Yes
Formal	Management of project documents and memos	Yes	Yes
Informal	Returning phone calls, email, etc. within a set amount of time	Yes	Yes
Informal	Regularly scheduled whole-team audio tele-conference	No	No
Informal	Procedures for coordinating work	No	No
Formal	Regularly scheduled whole-team f2f	No	No
Informal	Status Updating	No	No
Informal	Project Milestones and Delivery Schedule management	No	No

The first hypothesis that relates to policies (PDTs with informal policies will experience less Us-vs.-Them than teams with formal policies only) could not be tested because there were no teams with formal policies only. All respondents reported a combination of formal and informal policies. This hypothesis needs to be modified for the full scale study to refer to informal policies only rather than relate them to formal policies. The second hypothesis (PDTs with formal or informal policies will be more

effective and experience less Us-vs.-Them than PDTs without policies) is supported according to our observations.

In addition we've discussed conflicting results relating to who should communicate with whom. Findings suggest that when co-located members meet in person among themselves, distant group members feel isolated or ignored and this contributes to Us-vs.-Them (Bos et al. 2004). Our hypothesis (PDTs with frequent face to face meetings within sub-groups will experience more Us-vs.-Them than PDTs with limited face to face meetings within sub-groups) seems to have some evidence. The mean Us-vs.-Them score for teams where sub-groups meet face-to-face frequently is (46.7). It is higher than the mean for teams where sub-groups rarely meet face-to-face (44.7) and higher than the overall Us-vs.-Them mean (45.6).

There is no support for our next hypothesis (PDTs with frequent face-to-face interaction within co-located sub-groups will be more effective than PDTs with limited face-to-face interaction). This hypothesis was a result of a contradictory recommendation by researchers. (Polzer et. al, 2006) recommend that PDTs rely on electronic communication as much as possible; while (Pantelli and Davison, 2005) suggest that face to face meetings within sub-groups should be encouraged to avoid feelings of isolation by individuals. Our results show a mean Effectiveness score = 48.2 for teams where sub-groups often meet face-to-face and a mean Effectiveness score = 51.7 for teams where sub-groups do not. Our findings support Polzer et al.'s recommendations.

Another unexpected result relates to direct communication between individual members of distant sub-groups. Through interviews early in our research we observed an increase of Us-vs.-Them where individuals were not given the opportunity to work

directly with remote team members. Participants who expressed such problems complained that communication is mostly channeled through a leader. According to our results the mean Us-vs.-Them score for teams where direct work between sub-group members occurs is higher than the overall Us-vs.-Them mean (**47.1** vs. **45.6**); similarly the mean effectiveness score for teams where direct work between sub-group members occurs is lower than the overall effectiveness mean (**46.8** vs. **50**).

It is possible that teams where individuals from respective sub-groups do not work together directly are more effective because they do not need to collaborate. In the full scale study we need to relate the need for team members to collaborate to communication patterns for more insightful results. We will add a question about the need for collaboration among teams based on a Guttman-type scale (Turoff et. al, 2008) to indicate whether sub-groups exchange honest information on what is being done by each; mutually schedule tasks of what each sub-group is doing when; agree on what tasks each sub-group is going to do; or mutually agree to work together on the same tasks.

8.9 Training

Training has been found to be scarce by researchers and indeed, most participants reported no training at all or very minimal training. According to our findings team communication training reduced the Us-vs.-Them mean from **45.6** to **35**; communication technology training reduced the Us-vs.-Them mean to **40.8**; and team building activities reduced it to **42.5**. We saw favorable effectiveness outcomes as well, in teams receiving training. The overall effectiveness mean of **50** increased to **60.5** when team communication training was reported; it increased to **57** when communication technology training was reported; and to **51.7** when team building occurred.

The last hypothesis we proposed (PDTs that meet regularly as a team will be more effective than those who do not) is based on findings in virtual teams and traditional teams. We wanted to test if it is true for Partially Distributed Teams as well. It appears so from a quick look at the means. Teams reporting regular face to face meetings had an Us-vs.-Them mean of **42.3** (lower than the overall Us-vs.-Them mean of **45.6**) and an effectiveness mean of **52.8** (higher than the overall Effectiveness mean of **50**).

8.10 Conclusion

Pilot findings proved very instrumental in supporting our general propositions about the relationship between Us-vs.-Them and effectiveness. The positive influence of semi-synchronous ICTs on Us-vs.-Them was also confirmed, as well as the benefits of policy establishments. The pilot instrument helped us to refine measurement of the Us-vs.-Them and effectiveness constructs for Partially Distributed Teams. Based on the pilot results and our literature review, we can better establish of a set of hypotheses for our model. These hypotheses can be found in the research questions chapter. Next we present a plan to test them in our full scale study.

CHAPTER 9

RESULTS AND MEASURE VALIDATION

9.1 Introduction

In this chapter we discuss how we recruited our study participants. We profile participants based on gender, age, position with respect to the team (sub-group leader, team leader, or member), years of partially distributed team experience, and their motivation for working on the project. We profile the teams represented in the study based on the number of years the team has been in existence (tenure), team size, the number of sub-groups that make up the team (distribution), and whether or not the team includes an international sub-group. Because almost half of our participants are from one company, while the rest are from a variety of companies and organizations, we proceed to test for significant differences between the two sets that may prevent us from combining the resulting data sets for analysis purposes. We conclude this chapter by discussing the differences we found, as well as possible explanations for these differences.

9.2 Participant Groups

Two hundred and thirty eight professionals participated in our study. One hundred and sixteen of the participants were mainly from research and development organizations of a telecommunication company referred to as Company-A, that gave us permission to recruit participants via mass-email to several departments. An initial email to one department yielded a low response rate (2% = 20 participants). In order to increase participation rate, we've sent out reminder emails, and visited several sites to encourage participation. Another tactic that was proven very effective was asking individual

managers to send email to their teams, encouraging them to participate. Here is an example of one such email (our original email is included as a forwarded message here):

From: Manager-A
 Sent: Wednesday, February 25, 2009 2:26 PM
 To: 'manager-group@company-a.com'
 Cc: 'Robin Privman'
 Subject: FW: Your input requested

Group Members,

Robin is a member of our department. (I hired her years ago). She is trying to wrap up her Ph.D. degree but she needs input on this anonymous survey.

Please take the time to fill out the survey. It does not need to pertain to your current assignment. Think about any project that fits the below description.

Thanks in advance for helping out, and the charities will thank you as well!

Manager-A

-----Original Message-----

From: Robin Privman [mailto:robin1@Company-A.com]
 Sent: Tuesday, February 10, 2009 8:34 AM
 To: dept-A@Company-A.com
 Subject: Your input requested

Greetings Colleagues,

I am a member of Manager-B's group and I am also currently a Doctoral Candidate at NJIT, where I am researching partially distributed team work.

If you have experience working in a team where some (but not all) members are geographically distributed, I would highly value your input. Please take 15 minutes to fill out a survey at:

http://www.surveymonkey.com/s.aspx?sm=tg_2fpoWUBEiInnXVuT4z9Kw_3d

Your responses will be completely anonymous and used only for research purposes. Participation is completely voluntary and I will donate \$3 to a charity (you select from a list upon completion of each survey).

Please contact me with any questions regarding this research and/or any of the results.

Thank you very much in advance for your participation.

Robin Privman

The remaining 122 participants were recruited from the Linked-In professional network, from the Meet-Up social network, and from a group of Emergency Response workers through means discussed next.

We used a snowball sampling approach to recruit participants who belong to the Linked-In professional network. We started with the author's professional network on Linked-In, asking them to participate in the study and to forward an invitation to their professional network with an encouragement to keep forwarding the survey through the network. The following letter was sent to about 20 initial Linked-In contacts:

Dear Linked-In friend,

For my dissertation research I am investigating partially distributed team work practices. A partially distributed team is a team where some members are geographically distributed.

If you work (or worked in the past) on a project with team members in a different geographic location (a different building in the same state, a different state, or a different country), please take 15 minutes to fill out a survey about your experience.

No identifying information about your project, or your company is collected. Results are used for research purposes only.

For each completed survey \$3 will be donated to a charity you select (at survey completion).

To participate please click on: <http://web.njit.edu/~fp3>

I would greatly appreciate it if you also forward an invitation to your contacts (through linked-in or elsewhere) - you can use a write-up as below.

Thank you very much in advance for your time,
Robin Privman

____ Sample write up for forwarding this invitation:

Dear Colleagues / Friends,

This request was referred to me through a member of my personal network.

She is investigating effective practices in partially distributed team work for her dissertation research.

If you work (or worked in the past) on a project with team members in a different geographic location (a different building in the same state, a different state, or a different country), please take 15 minutes to fill out a survey about your experience.

No identifying information about your project, or your company is collected. Results are used for research purposes only.

For each completed survey \$3 will be donated to the Juvenile Diabetes Foundation.

To participate please click on: <http://web.njit.edu/~fp3>

Please write to fp3@njit.edu with any questions regarding this research project and/or any of the results. Please forward to other members of your network as appropriate.

Thank you very much in advance for your participation.

Your Name

About 50 responses resulted from this invitation. It is difficult to calculate response rate because with snowball sampling, it is not possible to tell how many individuals had received the message. Unfortunately, it seems that most contacts did not forward the invitation on, but rather simply filled it out. In fact, only two notes were received about some forwarding. Here they are (with names withheld):

Hi Robin,

I forwarded your note (replacing "Your Name...." with "Forwarder1-name") to my connections. I hope you get enough responders very quickly.

Hope all is well.
Best,
Forwarder1-name

Hey Robin,

I just sent this off to about 30-40 people in my address book. Let me know if you have a good hit rate :)

Forwarder2-name

The author joined the software engineering group on the Linked-In network. This group consists of 4,100 members. She posted a discussion thread on the bulletin board of the group, as follows:

Subject: Input on SE in Distributed Teams

Hi,

I am a Doctoral Candidate at the New Jersey Institute of Technology, where I am researching Partially Distributed Team work.

A Partially Distributed Team consists of sub-groups that are geographically distributed (in different buildings, different states, or different countries)

If you have experience working in such a setting, please take a few minutes to fill out a survey at: <http://web.njit.edu/~fp3>

As an incentive for your participation, I will donate \$3 to a charity (you select from a list at survey completion).

Thank you very much in advance for your time,
Robin Privman

About 15 responses resulted from this invitation. Here is a comment from one of the participants: *"I took your survey; it was well thought-out. I hope you will send aggregated results to participants."*

The author joined the IT Software Development Outsourcing and Offshoring group on the Linked-In network. This group consists of 3,500 members. She posted a discussion thread on the bulletin board of the group, as follows:

Subject: Your opinion on global teamwork

Hi,

I am a Doctoral Candidate at the New Jersey Institute of Technology, where I am researching Partially Distributed Team work.

A Partially Distributed Team consists of sub-groups that are geographically distributed (in different buildings, different states, or different countries). Global Teams are of special interest.

If you have experience working in this setting, please take 10 minutes to fill out a survey at: <http://web.njit.edu/~fp3>

No identifying information about you, your project, or your company is collected.

As an incentive for your participation, I will donate \$3 to a charity (you select from a list at survey completion).

Thank you very much in advance for your time,
Robin Privman

Less than 15 responses resulted from this posting. Here is a comment from one participant:

Hi Robin,

I have taken your survey, thanks for creating such a nice survey, and exploring this topic. I would like to get a copy of your conclusion and survey results.

Wishing you all the very best in your career.

Best Regards,
Name-of-Participant

The author participated in a mentoring program for H.S students interested in Information Systems careers. At a meeting she mentioned the survey to the program

coordinator. He offered to forward it on to a group of Web-Design professionals on meetup.com. Again, about 15 responses resulted from this invitation.

The author contacted pilot study participants and other personal connections encouraging them to fill out the survey until a count of over 100 was reached for this mixed-lot group.

Murray Turoff, a dissertation committee member, has forwarded the survey to a group of Emergency Response professionals. So far, nine professionals have participated; we expect and welcome more responses for future research purposes. Responses from these professionals will be examined separately as well, due to the specialized teams they represent.

9.3 Participant Comparison

As evident from the discussion above, a variety of professionals participated in our study. For simplicity, we will divide these professionals into two groups. Group 1 will consist of subjects from Company-A; group 2 will constitute the rest of the participants and will be referred to as the Mixed-Lot group. We analyze demographic and configuration differences using a Chi-Square test, as described below. When appropriate we separately discuss the sub-group of nine emergency response workers that have participated in our study. The split points we use for the contingency tables described below are as per guidelines described by Rosenthal and Rosnow (1984); they recommend splitting the data close to a 50/50 distribution (p. 538).

Participants specified up to five sub-groups that make up their team. Almost 41% of the teams consisted of only 2 sub-groups; 30% of the teams had 3 sub-groups; 16% of the teams had 4; and the remaining 13% had 5. This dimension indicates the level of

distribution by categorizing teams with 2 sub-groups as low-distribution teams; and teams with 3 or more sub-groups as high-distribution teams. No significant differences were found between the two participant groups. The Emergency Response participants, however, tended to have a larger number of sub-groups (8 out of 9 teams were highly distributed).

Table 9.1 Team Distribution Levels

	Low-Distribution	High-Distribution
Company-A	36.52%	63.48%
Mixed-Lot	44.63%	55.37%
Total	40.68%	59.32%

Participants indicated approximately how many years the team has been in existence. About 38% of the teams have been in existence for less than 2 years; another 33% for 2 to 4 years; and close to 29% for over 5 years. Although the data was evenly distributed between these three ranges, we categorize teams that have been in existence for over 2 years as long tenure teams. After all, 2 years is a long time to establish working relationships. Team tenure was not found to be significantly different between the two groups and the emergency response participants reported similarly distributed tenure.

Table 9.2 Tenure of teams

	Shorter Tenure	Longer Tenure
Company-A	40.00%	60.00%
Mixed-Lot	36.36%	63.64
Total	38.14%	61.86%

Participants selected from a list of age ranges. Less than 8% of our participants were under 30 years old; another 49% were between 30 and 45 years old; while 43%

were over 45. For the purpose of comparison between Company-A and the Mixed-Lot, we looked at participants under 45 and 45 and over. This dimension proved to be significantly different between the two groups, with participants from Company-A being older on the average. Interestingly, the emergency response participant age distribution was closer to that of Company-A.

Table 9.3 Age of participants

	Age: Under 45	Age: 45+
Company-A	46.96%	53.04%
Mixed-Lot	61.98%	38.02%
Total	56.78%	43.22

The dimension of team size classifies those groups with less than 15 members as small and those with 15 or more members as large. Team sizes ranged from 3 to over 100, with most teams having less than 30 members. No significant difference was found between team sizes of Company-A and the mixed-lot, while the emergency response teams tended to be larger.

Table 9.4 Group Sizes

	Smaller Groups < 15 Members	Larger Groups ≥ 15 members
Company-A	53.04%	46.96%
Mixed-Lot	42.98%	57.02%
Total	47.88%	52.12%

Participants indicated their years of PDT work experience. We classified participants as somewhat experienced (with 5 or less years of experience) or very experienced (with more than 5 years of experience) in distributed team work. About half of our participants were very experienced. Out of those with less experience, 13% had less than 2 years of experience and 34% had 2 to 5 years. 7 out of our 9 emergency

response participants reported more than 5 years of experience. No significant difference was found between Company-A and the mixed-lot in experience level.

Table 9.5 Participant Experience

	Experienced	Very experienced
Company-A	50.43%	49.57%
Mixed-Lot	43.80%	56.20%
Total	47.03%	52.97%

We classified teams as international if at least one of the sub-groups is outside the U.S. and as domestic otherwise. There was a significant difference between the two groups in this category, while the emergency response subset was consistent with the mixed-lot.

Table 9.6 Team locality

	International	Domestic
Company-A	30.43%	69.57%
Mixed-Lot	52.07%	47.93%
Total	41.53%	58.47%

No Significant difference was found between the groups in the gender distributions.

Table 9.7 Gender of participants

	Males	Females
Company-A	62.61%	37.39%
Mixed-Lot	66.94%	33.06%
Total	64.83%	35.17%

The next dimension classifies participants as having leadership positions (team or sub-group leader) or team-member positions. About half of our participants were team members; 31% were team leaders; and 21% were sub-group leaders. No significant

difference was found between groups, while the emergency response participants were mostly in leadership positions.

Table 9.8 Participant positions

	Leaders	Members
Company-A	47.83%	52.17%
Mixed-Lot	57.02%	42.98%
Total	52.54%	47.46%

Participants rated on a scale from 1 to 7 (1=Not At All, 7=To a Great Extent) seven motivational items. These items are listed in table 9.9, as well as the mean rating for Company-A and for the Mixed-Lot. In order to compare the two participant sets, we used a t-test to check for significant differences in each motivational item. Only the item: “Financial and Other Compensation” was found to be significantly different for the two participant sets.

Table 9.9 Motivation

Motivation	Mixed-Lot Mean	Company-A Mean	All Mean	Pr > t
Helping my company	5.69	5.72	5.71	.85
Flexible schedule	4.87	4.94	4.91	.79
Challenging Work	5.74	5.68	5.71	.56
Creatively use my skills	5.79	5.60	5.70	.29
Location	5.13	5.40	5.27	.28
Professional Development	5.58	5.33	5.45	.20
Financial Compensation	5.60	5.03	5.31	.0054

9.4 Comparison of Dependent Variables

Finally we compared Effectiveness and Us-vs.-Them (our dependent variables) for the two participant groups. Table 9.10 shows the means and Wilcoxon Probabilities.

Company-A participants reported significantly lower levels of Us-vs.-Them and higher levels of effectiveness.

Table 9.10 Dependent Variable Comparison

Variable	Company-A	Mixed-Lot	Pr < Z
Trust/Integrity	5.73	7.58	0.003**
Conflict	3.39	4.45	0.011**
Awareness	2.89	3.65	0.015**
Total Us-vs.-Them	3.72	4.82	0.005**
Effectiveness	33.37	32.42	0.053**

9.5 Discussion of Participant Findings

In the preceding sections we described how we recruited participants and classified the resulting team data based on sub-group distribution, team tenure, size, and locality (Domestic / International). We also classified participants based on age, gender, experience, and their position with respect to the team. We compared participants from Company-A and participants from the Mixed-lot and found significant differences in the ages of the groups, the international presence of teams from these groups, the financial motivation of participants, as well as Us-vs.-Them and Effectiveness scores. Table 9.9 summarized our motivation findings; Table 9.10 summarized dependent variable results and Table 9.11 summarizes the rest of our findings.

Table 9.11 Significance of differences between Company-A and Mixed-lot

Dimension	Criteria	Significance
Experience	Less than 2 years / Two years or more	0.88
International	At least one sub-group is based outside the US	0.00074**
Leadership	Leader: team or sub-group leader	0.16
Participant Age	Under 45, 45+	0.003**
Participant Gender	Male / Female	0.49
Team Distribution	Lower: 2 sub-groups / Higher: > 2 sub-groups	0.46
Team Size	Smaller: <15 members / Larger: >=15 members	0.12
Team Tenure	Shorter: 2 years or less / Longer: Over 2 years	0.90

The dimensions with significant differences are not entirely surprising. The age dimension can be explained in that Company-A is an established corporation that has not been hiring much over the past 10 years and therefore many of the participants from this company may be long term employees. On the other hand, our other recruitment methods could have yielded participants of a younger age group for the following reasons:

- The Linked-In network is where people are looking for career contacts and advancement. Intuitively, on-line members of such a network may be younger (older professionals may have established connections and therefore no need to join such an online forum; older professionals may not be seeking career advancement as vigorously as younger ones)
- The author's professional and personal network consists of younger individuals.
- The Meetup network is a social network where members of special interest groups discuss their special interests and plan in-person meetings. Members of such a network may be on the younger side (older individuals may have established friendships based on similar interests and may not seek the social meetings this network arranges, due to family obligations).

The significant difference between Company-A and the mixed-lot on the proportion of international sub-groups is also not very surprising. The mass-email that recruited participants in Company-A was sent mainly to research and development departments that traditionally do not participate in offshoring. On the other hand the mixed-lot could have resulted in more international participants for the following reasons:

- The author's professional and personal contacts are multi-cultural.
- The Linked-In and Meetup networks consist of global members.
- We recruited from the Linked-In IT Software Development Outsourcing and Offshoring group.

The significant difference between Company-A and the Mixed-Lot in motivation of financial compensation can be partially explained by the fact that we surveyed research oriented departments in Company-A. There are several other reasons that we can speculate on, however, since we do not have hypotheses related to motivation in our research, it is not necessary. We'll keep this finding in mind when examining the moderating effect of motivation later.

The significant differences in Us-vs.-Them and effectiveness between the two participant groups might be due to the fact that many of the participants from Company-A personally knew (or knew of) the researcher and could have been more cautious when reporting problems.

Because of our diverse methods of participant recruitment, some of the differences between the two resulting groups can be explained. The diversity of our recruitment methods was originally a result of low response rate when using each source alone (which we believe to be due to a lack of offering a direct reward for participation). However, it can be seen as a strength of our study as well, as it provided us with a diverse set of professionals who offered their experience and opinion for the sake of research, rather than for the sake of monetary gain.

Out of 17 comparisons between participant groups we found differences in 5 areas. In one of the areas: Motivation of Financial Compensation, the means were actually not very far apart (5.03 and 5.60). Age was indicated as a range and therefore the true difference in ages cannot be measured. Based our findings we conclude that it is appropriate to combine data from Company-A and the mixed-lot for analysis with

caution, always checking if separate analysis yields different results. Next we discuss descriptive statistics and scale validity.

9.6 Initial Examination of Results

We were especially careful to screen for bogus results via this anonymous survey due to lack of accountability by responders. We also had to screen for incomplete responses due to interruptions during the on-line time of filling out the survey. The techniques described in Hair et al. (2006) with respect to preliminary examination of the data in preparation for multi-variate analysis were followed. This included the following steps: graphical examination of the data and profiling to illustrate the shape of the distribution, bivariate profiling to detect group differences as described in the previous chapter. In addition, we iteratively examined results for missing data. When occasional responses were skipped responses, the data was marked with special missing value indicators, so that methods for fixing that data can later be applied. The exact method selected will depend on the results of the missing data analysis and specific cases of constructs. Outliers are data points that appear as distinctly different from the data collected in other observations. All input from a participant reporting several outlier values were deleted. All analysis reported here was performed on the 238 remaining observations.

Participants were given ten technologies to rate on a scale from 1 (Never) to 7 (To a Great Extent), on use for between sub-group communication. The technologies are listed here in the order of frequency of use by our participants:

Email

Phone (Mobile, Landline, or Broadband)

Audio-Teleconference Calls

System for archival and /or document sharing

System for collaboration such as: viewing each other's schedules, setting up meetings, recording meeting minutes, tracking progress, etc.

Teleconference with Desktop Sharing

Instant Messaging

In-Person meetings

Video conferencing / Webcam

Social Networking

Email was used by most teams to a great extent. In fact the median rating for email was 7 and only 8 participants rated it as less than 6; 25 more rated email use as 6, and the rest as 7 (to a great extent). Virtually all participants reported some phone use, with only 16 reporting very low use, the median phone use value was 7 as well, with 73% of participants rating it as a 6 or 7. IM was not used at all by about 34% of the participants; another 16% reported some use; and the remaining 50% reported frequent use. The use of archival and document sharing systems and the use of collaboration systems were similar. Archival and document sharing systems were used frequently (rated 5, 6, or 7) 56% of the time, and collaboration systems were used frequently 52% of the time.

The use of video conferencing was very scarce with only 27 responders (11%) reporting frequent use (rated 5, 6, or 7); another 25 (10.5%) reporting some use (rated 3 or 4); and 34 teams (14%) reporting very limited use (rated 2). 64% of participants reported that they do not use video conferencing at all. Audio conferencing on the other hand was very prevalent with a median selection of 7, used frequently by 82% of the

participants and not in use by only 13. Conference calls with desktop sharing were used by about 50% of the participants.

45 participants (19%) reported frequent in-person meetings with remote subgroup members; another 26% reported some in-person meetings; 25% reported very rare meetings; and over 28% reported none at all. Only 9 participants indicated some social networking use. Further univariate statistics are discussed alongside the hypotheses that are associated with them. In addition, appendix E includes tables that describe the distributions of variables that are not explicitly presented in the main document. Next we discuss validation of measures.

9.7 Reliability and Validity of Scales

Reflective constructs are those for which the measures each are reflective of the entire construct. Using SAS (Statistical Analysis Software) we calculated the reliability measures (Cronbach's Alpha) for such constructs and performed factor analysis (principal component analysis with varimax rotation when needed). We began with exploratory factor analysis with data from Company-A and proceeded to analyze the full set accordingly with the results. We considered adequate Chronbach's Alpha results as 0.7 or above. We considered factor loading of 0.6 or above adequate (Bernard, 2000). Our effectiveness construct is reflective. Results indicate reliability as shown in table 9.12. Effectiveness was measured with six 7-point semantic differential items adapted from (Edwards et al., 2002; Espinosa et al., 2006; Ocker et al., 2008; Stringfellow, 2003). Perceived performance and satisfaction with the team and project experience were measured.

Table 9.12 Effectiveness Reliability and Factor Analysis

Effectiveness Company-A Cronbach's Alpha = 0.94 Mixed-Lot Cronbach's Alpha = 0.90	Company-A Factor-1	Mixed-Lot Factor-1
Efficiency	0.88	0.85
Quality	0.86	0.78
Schedule	0.85	0.71
Project Experience	0.90	0.80
Team Experience	0.87	0.87
Effectiveness	0.94	0.92

Formative constructs are those for which the measures each reflect a part of the meaning of the construct and in total the measures define the constructs. For formative constructs, then, the items only measure a part of the construct and together the items measure the construct as a whole. With formative constructs, each measure is needed to capture the definition of the construct. Factor analysis is not appropriate for formative constructs (MacKenzie, Podsakoff, and Jarvis, 2005; Petter, 2007).

We consider Us-vs.-Them a formative construct because it consists of different variations of between sub-group behaviors and perceptions. Us-vs.-Them was measured with ten 7-point semantic differential scale items adapted from (Jarvenpaa et al.1999; Ocker et al., 2008) and additional Us-vs.-Them themes that we have identified in our literature review. Based on pilot study findings we divided Us-vs.-Them into three constructs (conflict, trust and integrity, and awareness) and checked the reliability for each individually. Each of the three constructs is reflective within itself. Based on the results (shown in table 9.13) there was no need to reduce the scale. In order to come up with a composite Us-vs.-Them score, we added up the response averages of each construct.

Table 9.13 Us-vs.-Them Reliability and Factor Analysis

Us vs. Them - Survey Items and Factor Loading	Awareness Alpha = 0.81	Conflict Alpha = 0.79	Trust/Integrity Alpha = 0.89
I am aware of their activities and availability	0.92		
I am aware of their information and expertise	0.92		
Much disagreement exists		0.79	
They blame my sub-group for their mistakes		0.88	
They compete with my sub-group in unproductive ways		0.85	
There is mutual respect			0.90
I feel comfortable approaching them for help			0.81
There is good team spirit			0.85
They give my work the priority I need			0.72
Overall, they are trustworthy and show a great deal of integrity			0.87

9.8 Dependent Variable Distribution

Now that we've validated the scales measuring our dependent variables we can begin answering the following important questions: Do the groups think they are effective? What aspects of effectiveness are perceived as strongest and weakest? What is the extent of us vs. them? On which questions or components are the most problems perceived? Is Us-vs.-Them a serious problem or not?

Most participants reported that their teams are effective to a large extent. Table 9.14 shows the distribution of answers. The evidence of ineffectiveness is calculated by the percentage of responses below 6 because during pre-testing we have observed that answers of 6 and seven were checked off when participants expressed certainty of effectiveness while answers below 6 indicated at least a small degree of problems.

According to these results, partially distributed team members are most unhappy with the project experience, however the quality of results aspect is least affected.

Table 9.14 Distribution of Effectiveness

	Efficiency	Quality of results	Adherence to schedule	Project experience satisfaction	Team experience satisfaction	Team effectiveness	Average overall
1=Low	2	0	1	5	5	1	0
2	2	1	4	6	6	3	3
3	12	9	17	15	15	12	7
4	31	20	22	30	29	30	33
5	70	53	59	62	54	56	51
6	68	82	78	74	73	80	95
7=High	53	73	54	46	56	56	49
	238	238	235	238	238	238	238
Evidence of Ineffectiveness	49%	35%	44%	50%	46%	43%	39%

Just as many participants reported reasonable effectiveness, they also reported low Us-vs.-Them. However, as evident in tables 9.14 through 9.16, Us-vs.-Them does exist and is therefore not a problem to be dismissed. Table 9.14 shows the distribution of the Awareness and Trust / Integrity survey responses. Evidence of Us-vs.-Them is the percentage of the time when a response below 6 was given because we have observed during pre-testing that when participants did not select the two highest ratings, they indicated that some problems existed (the same rationale of evidence percentage is used in tables 9.15 and 9.16). Results indicate that PDT members perceive most problems with unawareness of remote teammate's activities and availability as well as not receiving the priority they need for their work.

Table 9.15 Distribution of Us-vs.-Them Awareness and Trust/Integrity

	Aware Activities / Availability	Aware of Information/ Expertise	Mutual respect	Comfortable approaching for help	Good team spirit	Priority/ I need	Trustworthy / have integrity
1=Not at All	3	2	0	3	5	2	2
2	8	6	3	6	12	14	2
3	19	9	10	11	8	22	9
4	35	25	14	15	26	39	20
5	57	57	36	22	35	42	38
6	74	88	82	75	79	78	91
7=To a Great Extent	42	51	93	106	73	41	76
Total	238	238	238	238	238	238	238
Us.-vs.- Them Evidence	51%	42%	26%	24%	36%	50%	30%

The conflict items of the scale are reversed and so evidence of Us-vs.-Them is calculated by taking the percentage of responses above 2. In this category PDT members were most concerned with disagreements between sub-groups.

Table 9.16 Distribution of Us-vs.-Them Conflict

	Disagreement exists	Blame for mistakes	Unproductive competition
1=Not At All	53	105	110
2	89	72	64
3	36	26	20
4	27	17	15
5	18	9	9
6	13	8	18
7=To a Great Extent	2	1	2
Total	238	238	238
Evidence of Us.-vs.-Them	40%	26%	27%

On the component level of Us-vs.-Them, participants reported most problems with unawareness, as shown in table 9.17.

Table 9.17 Distribution of Us-vs.-Them Components

Reported Problems	Awareness	Trust/Integrity	Conflict	All
1=Not At All	34	63	76	30
2	78	93	81	85
3	59	47	47	61
4	45	21	15	41
5	13	12	11	13
6	7	1	8	6
7=To a Great Extent	2	1	0	2
Total	238	238	238	238
Evidence of Us.-vs.-Them	53%	34%	34%	52%

Our dependent variables were not normally distributed (with a Kolmogorov-Smirnov p value <0.01 for effectiveness, Us-vs.-Them overall, and each Us-vs.-Them component) and transformation attempts did not successfully yield normal distributions. This was the case for both Company-A and Mixed-Lot results. For this reason, mostly non-parametric tests were performed for hypotheses testing (Kruskal-Wallis, Wilcoxon, and Spearman Rank correlation).

9.9 Conclusion

In this chapter we described how we recruited participants and compared them. We showed that the participant groups have many similar characteristics while having some key differences as well. This makes them interesting to study as a combined group as well as individually. We also discussed our measures and validation of scales. We showed some initial descriptive findings and distributions which explain the statistical procedures we select for hypotheses testing. We will continue with descriptive statistics of data relevant to our research questions in the next chapter as we discuss hypotheses testing.

CHAPTER 10

RESEARCH QUESTIONS AND HYPOTHESES

10.1 Introduction

This dissertation focuses on the following research questions: *(1a) What aspects of team configuration and sub-group distance have the most impact on Us-vs.-Them? (1b) What aspects of team configuration and sub-group distance have the most impact on the choice of technology? (2) How do various media and their adaptation impact Us-vs.-Them and Effectiveness in Partially distributed Teams? (3) What types of formal and informal policies exist for partially distributed teams and what is their impact on Us-vs.-Them and effectiveness? (4) Does Us-vs.-Them negatively impact effectiveness in PDTs and, if so, under which circumstances is the impact lessened? (5) What motivators have the most impact on effectiveness?*

In this chapter we elaborate on the data and methodology that we used to answer these questions. Mostly the data indicated that our propositions and hypotheses were on the right track, although statistical significance was not always achieved. In the following sections we go through each research question in the dissertation, summarizing the background for the question; presenting the hypotheses that relate to it; and describing our testing methodology and results. Because this is an exploratory field study with limited sample size, rather than an experiment, we will use the .10 level of significance as providing “moderate support” for the hypotheses (Abell, Braselton, and Rafter, 1999) and the .05 level as providing “strong Support”.

10.2 Research Question 1 - Team Configuration

- (a) What aspects of team configuration and sub-group distance have the most impact on choice of technology?
- (b) What aspects of team configuration and sub-group distance have the most impact on Us-vs.-Them?

In order to explore these questions we used the variables: Team-Distribution, Team-Size, and International Presence. We compared the technology choices for these teams and their Us-vs.-Them results. In order to streamline our analysis, we excluded email because virtually all participants reported using email all the time. We also excluded systems for archival and /or document sharing and systems for collaboration such as: viewing each other's schedules, setting up meetings, recording meeting minutes, tracking progress, etc., because these can be influenced by company policies or the extent of team communication commitment rather than by team configuration. Table 10.5 shows the distribution of the remaining technologies, as used by teams of various distributions, sizes, and international presence. Chi square results that indicated significant differences are bolded in the table.

Table 10.5 Team configurations and technology choices

		Frequently Used				Sometimes Used	
		IM	Audio-Conference	Desktop Sharing	Phone	F2F Meetings	Video
Team Distribution	Low	34%	61%	35%	71%	73%	34%
	High	60%	84%	57%	75%	70%	38%
Team Size	Small	42%	74%	49%	76%	67%	20%
	Large	56%	75%	48%	71%	75%	51%
International Presence	No	46%	72%	43%	73%	67%	33%
	Yes	54%	76%	55%	73%	75%	40%

Team distribution seems to be the most salient aspect to impact technology. Highly distributed teams show increased use of each of the technologies we examined excluding in-person meetings. Similarly Us-vs.-Them results are presented in table 10.6. Teams with international presence show increased Us-vs.-Them with a difference that is significant at the 0.1 level. Teams with only two sub-groups (low distribution teams) show increased Us-vs.-Them as well at the 0.1 significance level.

Table 10.6 Team Configuration and Us-vs.-Them

		Low Us-vs.-Them	High Us-vs.-Them	P > Chi-Sq
Team Distribution	Low	46%	54%	0.13
	High	56%	44%	
Team Size	Small	53%	47%	0.68
	Large	50%	50%	
International Presence	No	57%	43%	0.08
	Yes	45%	55%	

10.3 Research Question 2 - Technology

How do various media and their adaptation impact Us-vs.-Them and Effectiveness in Partially distributed Teams?

This research question leads to hypotheses that involve technology uniformity, reliability, video, and semi-synchronous communication use. In virtual team research it has been shown that conflict may arise when members are unable to resolve differences and compromise on the use of a specific software package or approach (Pauleen, 2004; Sarker and Sahay, 2002). Technology incompatibilities in different countries were shown to cause problems for international teams (McDonough et. al, 1999). We propose that in partially distributed teams technology uniformity between sub-groups will reduce Us-vs.-Them.

Technology reliability was established in the literature as central to effective virtual team work (Cramton, 2001; Kirkman et. al, 2006), reducing misattributions and increasing training transfer. We propose that reliability will reduce Us-vs.-Them and increase effectiveness. Lack of reliability was linked to Us-vs.-Them when video technology proved unreliable (Abel, 1990). However, there is evidence in the literature that video conferencing might be a good, cost-effective alternative to face-to-face meetings for building team relationships (Lings et al, 2006). Most literature claims about video technology merits, however, are not empirically based (Pauleen et al. 2001; Privman et al. 2008). We test video technology credence; by hypothesizing that when teams can rely on it, Us-vs.-Them will decrease and effectiveness will increase.

IM possesses properties that were found to facilitate team cohesiveness, such as presence awareness (Espinosa et. al, 2006), quick feedback (Dennis et. al, 2008), shared focus (Beranek, 2005), and informality that improves relationship building between team members (Pauleen and Yoong, 2001, Cho et. al, 2005). We therefore posited that increased IM use in teams will reduce Us-vs.-Them and improve effectiveness. When teams meet regularly in virtual groups and in traditional groups, effectiveness increases. Based on these results, we believed that Partially Distributed Teams will benefit from regular meetings as well. Next, we describe how we tested our hypotheses that related to these claims.

H2a: PDTs where sub-groups use the same communication technologies for between-group interaction will experience less Us-vs.-Them than PDTs where sub-groups do not use the same communication technologies.

Participants rated technology uniformity between sub-groups very highly for the most part. Close to 80% of participants reported high uniformity (scale levels 5, 6, and 7). Table 10.7 shows means and significance probabilities for technology uniformity and Us-vs.-Them categories. Results show weak support for the Mixed-Lot participants and overall.

Table 10.7 Means and Wilcoxon Probabilities by Technology Uniformity

Technology Uniformity				
Total				
Total	Us-vs.-Them Awareness Pr > Z: 0.17	Us-vs.-Them Conflict Pr > Z: 0.08*	Us-vs.-Them Trust/Integrity Pr > Z: 0.09*	Us-vs.-Them Total Pr > Z: 0.08*
Uniform	3.25	3.81	6.55	4.20
Varied	3.42	4.40	7.16	4.60
Company-A				
	Pr > Z: 0.40	Pr > Z: 0.22	Pr > Z: 0.13*	Pr > Z: 0.25
Uniform	2.90	3.31	5.57	3.67
Varied	2.88	3.72	6.32	3.94
Mixed-Lot				
	Pr > Z: 0.11*	Pr > Z: 0.09*	Pr > Z: 0.19	Pr > Z: 0.07*
Uniform	3.58	4.29	7.47	4.71
Varied	3.96	5.08	8.00	5.27

H2b: PDTs with reliable well supported technologies will experience less Us-vs.-Them than PDTs with less reliable technologies.

As with technology uniformity, most teams (74%) reported that their technologies are reliable and well supported. The median rating for both reliability and support was 6 and the means were very high as well (5.9 for reliability and 5.8 for support). Reliability of the technology and its support were also very much correlated (Chronbach's Alpha = 0.93) and therefore we added their scores for a composite Reliability and Support Score. Table 10.8 shows the means and Wilcoxon Test results for each Us-vs.-Them category.

According to our findings, technology reliability and support have a high impact on Us-vs.-Them reduction. Results for the two participant groups were similar.

Table 10.8 Means and Wilcoxon Probabilities by Technology Reliability and Support

Reliability and Support	Us-vs.-Them Awareness	Us-vs.-Them Conflict	Us-vs.-Them Trust/Integrity	Us-vs.-Them Total
	Pr > Z: 0.0045	Pr > Z: 0.0037	Pr > Z: 0.0032	Pr > Z: 0.0002
High	3.05	3.56	6.09	3.93
Low	3.96	5.02	8.35	5.33

H2c: PDTs using reliable video technologies will experience less Us-vs.-Them than PDTs not using video technologies.

H2d: PDTs using reliable video technologies will be more effective than PDTs not using video technologies.

We considered any amount of video use and a high reliability rating, when testing these hypotheses. We did not find support for H2c, as evident in table 10.9. We repeated the Wilcoxon test for hypothesis H2d and found that reliable video was more promising for effectiveness improvement. The mean effectiveness score for teams reporting reliable video use was 33.9 vs. 32.4 for the rest of the teams (significant at the 0.1 level). Results were similar for the two participant groups.

Table 10.9 Us-vs.-Them Means and Wilcoxon Probabilities by Reliable Video Use

Reliable Video Use N=238	Us-vs.-Them Awareness		Us-vs.-Them Conflict		Us-vs.-Them Trust/Integrity		Us-vs.-Them Total	
	Mean	Pr > Z	Mean	Pr > Z	Mean	Pr > Z	Mean	Pr > Z
Some	3.00	0.2490	4.11	0.3902	6.43	0.3774	4.15	0.4593
None	3.41		3.86		6.79		4.35	

H2e: PDTs using semi-synchronous communication methods will experience less Us-vs.-Them than PDTs not using these methods.

H2f: PDTs using semi-synchronous communication methods will be more effective than PDTs not using these methods.

Of the 156 participants that reported IM use, 118 rated their use as reasonably frequent to frequent. We consider them as semi-synchronous communication users. Table 10.10 shows how their Us-vs.-Them scores compared to the rest of the participants. We reject hypothesis H2e based on these findings. In fact, notice that the mean Us-vs.-Them Conflict score for frequent IM users is higher than the mean IM score for the other group. As with Us-vs.-Them, we did not find improvements in effectiveness for frequent IM users (Mean for users: **33.26**; Mean for non-users: **32.53**). Results were similar for both participant groups.

Table 10.10 Us-vs.-Them Means and Wilcoxon Probabilities by IM Use

IM Use N=238	Us-vs.-Them Awareness		Us-vs.-Them Conflict		Us-vs.-Them Trust/Integrity		Us-vs.-Them Total	
	Mean	Pr > Z	Mean	Pr > Z	Mean	Pr > Z	Mean	Pr > Z
Frequent	3.20	0.3180	4.16	0.1577	6.47	0.3379	4.28	0.4375
Low/None	3.36		3.72		6.88		4.30	

H2g: PDTs that meet regularly as a team will be more effective than those who do not.

In order to test this hypothesis, we considered frequency of meetings at the median level or above as high (58% of responses). The results of the Wilcoxon test supported this hypothesis. The mean effectiveness score for participants who reported regular meetings was 34.12, while the mean for the remaining participants was 31.25, with $Pr > Z = 0.0005$. This hypothesis was supported for both participant groups.

10.4 Research Question 3 - Policies

What types of formal and informal policies exist for partially distributed teams? And what is their impact on Us-vs.-Them and effectiveness?

Research shows that formal policies are helpful for both Us-vs.-Them and effectiveness improvement. Through semi structured interviews we found that many policies are informal by nature. This goes along with Powell et al.'s (2004) theory that social work structures develop by themselves in distributed groups. We suggest that such informal policies can be just as important as formal policies in reducing Us-vs.-Them and improving effectiveness.

We have discussed conflicting results relating to who should communicate with whom. To deal with unequal communication channels some researchers recommend exclusive reliance on electronic communication (Polzer et. al, 2006). Others disagree and recommend that local teams meet face to face to avoid feelings of individual-level isolation (Pantelli and Davison, 2005). The two recommendations are seemingly contradictory. However, they may each have merit at different levels of team communication commitments.

Another set of policies found to be very important is related to training. Studies show that training is very effective (Lings et. al 2006; Powell, 2004), but very scarce for virtual teams (Rosen et. al, 2006). We test the merit of training for Partially Distributed Teams. The last policy we focus on relates to the distribution of responsibilities of sub-groups. Members of a partially distributed team often have other (sometimes local to them) job responsibilities, which can present a problem in how much priority they assign the PDT work (Stringfellow, 2003). Remote members may feel more motivated in their

local work because the exposure is more immediate. This attitude may spark Us-vs.-Them. We describe related hypotheses and their testing next.

H3a: Enacting informal policies in PDTs will reduce Us-vs.-Them.

H3b: Enacting informal policies in PDTs will increase effectiveness.

H3c: Formal policies in PDTs will reduce Us-vs.-Them.

H3d: Formal policies in PDTs will increase effectiveness.

Participants had seven policies to categorize as mandated by the company (Formal), informally practiced, or not practiced at all. There were about twice as many informal policies as formal ones among participating groups. We counted how many formal and how many informal policies each participant reported, in order to test our hypotheses. Table 10.11 shows the resulting distributions. Informal policies are pretty normally distributed with most participants reporting 3 to 5 informal policies; while most participants reported 0 to 2 formal policies.

Table 10.11 Number of policies

Formal Informal	0	1	2	3	4	5	6	7	Total
0	1.68%	0.00%	0.00%	0.00%	0.84%	0.42%	0.00%	2.10%	5.04%
1	0.84%	0.00%	0.00%	0.84%	1.26%	0.84%	0.42%		4.20%
2	0.84%	1.26%	0.00%	1.68%	2.52%	0.84%			7.14%
3	2.52%	2.94%	5.04%	7.56%	4.62%				22.69%
4	5.04%	4.20%	7.14%	7.14%					23.53%
5	5.46%	5.46%	7.14%						18.07%
6	7.14%	2.94%							10.08%
7	9.24%								9.24%
Total	32.77%	16.81%	19.33%	17.23%	9.24%	2.10%	0.42%	2.10%	100%

Because Formal and Informal Policies were a mutually exclusive selection, we cannot test their effect separately. If we test the effect of 0 informal policies, for example, the result we see can be due to the many formal policies in the team. Therefore

we must classify policies as mostly formal, and mostly informal. Based on the distributions in table 10.11, we classified team descriptions as having mostly formal policies when 4 or more formal policies were reported; we classified team descriptions as having mostly informal policies when 5 or more informal policies were reported; and the rest as having very few policies or none. Support in the Mixed-Lot participant group was stronger for these hypotheses as summarized in table 10.12.

Table 10.12 Kruskal-Wallis Test for Policies

Variable	Policies	Mean	N	H	Pr > Chi-Sq	
					Total	Mixed-Lot
Trust/ Integrity	None/Few	7.47	116		0.124*	0.017**
	Mostly Informal	6.16	89	<u>H3a</u>		
	Mostly formal	5.30	33	<u>H3c</u>		
Conflict	None/Few	4.24	116		0.900	0.546
	Mostly Informal	3.69	89	<u>H3a</u>		
	Mostly formal	3.55	33	<u>H3c</u>		
Awareness	None/Few	3.53	116		0.024**	0.007**
	Mostly Informal	3.36	89	<u>H3a</u>		
	Mostly formal	2.24	33	<u>H3c</u>		
Total Us-vs.-Them	None/Few	4.67	116		0.068*	0.008**
	Mostly Informal	4.14	89	<u>H3a</u>		
	Mostly formal	3.36	33	<u>H3c</u>		
Effectiveness	Mostly formal	35.21	33	<u>H3d</u>	0.008**	0.011**
	Mostly Informal	33.58	89	<u>H3b</u>		
	None/Few	31.70	116			

Note that for each Us-vs.-Them category (Trust/Integrity, Conflict, and Awareness) the highest mean (signifying the most Us-vs.-Them problems) belongs to the teams with fewer policies. Teams with Informal policies consistently show lower Us-vs.-Them means than those with few policies and teams with mostly formal policies show the lowest Us-vs.-Them means.

Kruskal-Wallis testing indicates that the awareness component of Us-vs.-Them as well as the total Us-vs.-Them are significantly reduced and therefore we accept H3a and

H3c. We also accept H3b and H3d because the effectiveness means are highest for mostly formal policies followed by mostly informal policies and the differences are significant at the .01 level.

The next set of hypotheses refers to communication and coordination. They will be related to the level of communication needs between the sub-groups according to a communication scale (Turoff et. al, 2008), as follows:

1. Competitive – no trust in passed information
2. Informative – honest information exchanged on what is being done by each party
3. Coordination – mutual scheduling of what tasks each party is doing when
4. Cooperation – mutual agreement on what tasks each party is going to do
5. Collaboration – mutual agreement to work together on the same tasks

Our communication scale level measurement is a Guttman-type scale to determine whether sub-groups exchange honest information on what is being done by each; mutually schedule tasks of what each sub-group is doing when; agree on what tasks each sub-group is going to do; and / or mutually work together on the same tasks. We expected that most teams in our study end up with some level of collaboration (working together on the same task) or at least cooperation (agreeing on who is going to do what) or coordination (mutually schedule tasks). In order to validate the scale items and proceed to use it as an ordinal scale we followed two procedures described by Bernard (2005) for Guttman scale coefficient of reproducibility computation. The first uses the common formula which calculates the percentage of unambiguous responses. Using this formula the coefficient of reproducibility was 0.7, below the expected 0.9 threshold. However, when using the conservative formula which calculates the percentage of

corrections that would need to be made, we came up with a coefficient of reproducibility of 0.9, which is the accepted threshold.

We measured the scale level with the following survey items:

1. We often work together to negotiate who does what
2. We often work together to schedule tasks
3. We often work together to complete a task
4. Tasks are assigned by leaders
5. I have learned things from working with them
6. I am aware of their activities and availability
7. I am aware of their information and expertise

Additional survey questions that related to communication needs were also used as follows:

8. There is mutual respect (Informative)
9. I feel comfortable approaching them for help (Informative)
10. There is good team spirit (Informative)
11. They give my work the priority I need (Informative)

Table 10.13 shows the factor analysis of the items above. We expected that most items will load on the same factor because in a Guttman type scale, such as this one, a higher level selection implies the lower level selections. The item “Tasks are assigned by leaders” does not seem to follow the scale pattern and therefore we exclude it from our analysis.

Table 10.13 Communication Needs Factor Analysis

Item	Factor 1	Factor 2	Factor 3
We often work together to negotiate who does what	0.49089	0.67857	-0.30741
We often work together to schedule tasks	0.61506	0.58714	-0.15143
We often work together to complete a task	0.66939	0.46015	0.09811
Tasks are assigned by leaders	0.10335	0.05819	0.78565
I have learned things from working with them	0.61529	-0.02203	0.27117
I am aware of their activities and availability	0.70829	0.06875	0.32458
I am aware of their information and expertise	0.76459	-0.08315	0.29524
There is mutual respect	0.79791	-0.25565	-0.22876
I feel comfortable approaching them for help	0.78706	-0.34444	-0.13065
There is good team spirit	0.77509	-0.29831	-0.23688
They give my work the priority I need	0.61529	-0.44456	-0.09158

Table 10.14 shows the selection distributions for these items. We consider selections 5 through 7 as support for the associated level of the scale when testing the hypotheses discussed below.

Table 10.14 Scale Selections

Item	Not at All							To a Great Extent	
	1	2	3	4	5	6	7		
We often work together to negotiate who does what	11	18	24	30	49	49	40		
We often work together to schedule tasks	6	13	22	34	60	56	30		
We often work together to complete a task	7	10	12	29	61	63	52		
Tasks are assigned by leaders	8	7	17	30	48	67	47		
I have learned things from working with them	2	2	10	23	40	76	62		
I am aware of their activities and availability	3	8	19	35	57	74	42		
I am aware of their information and expertise	2	6	9	25	55	88	50		
There is mutual respect	0	3	9	14	34	79	91		
I feel comfortable approaching them for help	3	6	11	15	22	74	106		
There is good team spirit	5	12	8	26	33	76	73		
They give my work the priority I need	2	14	22	39	42	77	40		

H3e: PDTs at the coordination, cooperation, or collaboration levels of the communication scale with frequent face-to-face within sub-group meetings will experience more Us-vs.-Them than same level PDTs relying mainly on electronic communication.

H3f: PDTs at the coordination, cooperation, or collaboration levels of the communication scale relying mainly on electronic communication will be more effective than same level PDTs with frequent face-to-face within sub-group meetings.

In order to test hypotheses H3e and H3f, we looked at each participant's communication scale level and selected those with Coordination, Cooperation, and Collaboration. We then categorized this population by the frequency of meetings within local sub-group, as specified by each participant (At Least Twice a Week, Weekly, Twice a Month, Monthly, Very Rarely, and Never). Table E.6 in Appendix E shows the distributions of meeting frequencies reported. We consider sub-groups who meet at least twice a month as meeting frequently. Table 10.15 shows the Wilcoxon Probabilities of comparison of the two meeting frequencies. There was no support evident for these hypotheses overall and within either participant group.

Table 10.15 Means by Within Subgroup Meeting Frequency

Variable	Local Subgroup Meeting Frequency	Mean	Pr > Z
Total Us-vs.-Them	High	3.90	0.25
	Low	4.10	
Trust/Integrity	High	6.29	0.49
	Low	5.85	
Conflict	High	4.10	0.19
	Low	2.64	
Awareness	High	2.87	0.17
	Low	3.13	
Effectiveness	High	33.54	0.39
	Low	33.89	

H3g: PDTs at the competitive or informative levels of the communication scale where sub-groups frequently meet face-to-face will be more effective than same level PDTs relying mainly on electronic communication.

As above we considered teams that reported meeting at least twice a month as High Frequency and those meeting less often as Low Frequency. The mean Effectiveness Scores were **30.69** and **31.21** for the respective frequencies. No significance was found using Wilcoxon testing ($Pr < Z = 0.35$ overall; $Pr > Z = 0.47$ Company-A; $Pr > Z = 0.33$ Mixed-Lot) and therefore we reject H3g.

H3h: PDTs where members received ICT training will be more effective than PDTs where members did not.

H3i: PDTs where members received ICT training will experience less Us-vs.-Them than PDTs where members did not.

H3j: PDTs where members received team communication training will be more effective than PDTs where members did not.

H3k: PDTs where members received team communication training will experience less Us-vs.-Them than PDTs where members did not.

H3l: PDTs where members participated in team building activities will experience less Us-vs.-Them than PDTs where members did not.

Training and Team Building selections were well correlated with a Cronbach's Alpha = 0.78. Factor analysis revealed one factor with Communication Training and Technology Training loadings of 0.88 and 0.86 respectively, and Team Building loading of 0.73. About half of the participants reported no training at all (scale selection 1) and

the rest were somewhat evenly distributed between scale selection 2 and 7 with fewer values in the higher range. Team building had a similar distribution with fewer participants reporting no team building. Table 10.16 summarizes the distributions.

Table 10.16 Training and Team Building Responses

Selection	Communication Training		Technology Training		Team Building	
	Count	%	Count	%	Count	%
1 (None)	115	48.32%	105	44.12%	89	37.39%
2	34	14.29%	33	13.87%	35	14.71%
3	22	9.24%	24	10.08%	21	8.82%
4	20	8.40%	24	10.08%	21	8.82%
5	17	7.14%	21	8.82%	29	12.18%
6	14	5.88%	17	7.14%	20	8.40%
7 (A Great Extent)	14	5.88%	13	5.46%	19	7.98%

We classified training and team building as None (selection 1), Some (selections 2, 3, and 4), and a Great Deal (selections 5, 6, and 7). None of the training related hypotheses were supported for Total Us-vs.-Them reduction, as reported in table 10.17, although each was partially supported (for Awareness and Trust/Integrity increase); the two participant groups did not differ in these results. Hypotheses related to Effectiveness increase (H3h and H3j) were supported at the .05 significance level for the two participant groups combined as well as for the Mixed-Lot group. However, they were not supported for Company-A participants.

Table 10.17 Kruskal-Wallis Test for Training

Pr>Chi-Sq	Us vs. Them				Effectiveness
Training Type	Awareness	Conflict	Trust/ Integrity	Total	
Communication	0.0118**	0.9984	0.0255**	0.1385	0.0206**
Technology	0.1386	0.4518	0.0280**	0.1169	0.0380**
Team Building	0.0380**	0.6189	0.1343	0.2077	0.0084**

H3m: PDTs where members do not have other project responsibilities will experience less Us-vs.-Them than PDTs where members have other project responsibilities.

In order to test this hypothesis we first examined the distribution of local responsibilities as reported by participants. Over 60% of the teams had a high degree of local responsibilities as shown in table 10.18. We split the data into a high and low degree of local responsibility and used the Wilcoxon non parametric procedure to test for significance. We did not find significant differences and therefore we reject this hypothesis.

Table 10.18 Other Project Responsibilities

Selection	Overall	Company-A	Mixed-Lot
1	18	7	11
2	17	6	11
3	13	8	5
4	27	10	17
5	33	14	19
6	53	28	25
7	69	40	29

10.5 Research Question 4 – Us-vs.-Them and Effectiveness

Does Us-vs.-Them negatively impact effectiveness in PDTs and, if so, under which circumstances is the impact lessened?

This research question is essential to the dissertation research. It established the relationship of Us-vs.-Them and effectiveness. We expect that a relationship exists whereby as Us-vs.-Them increases, effectiveness decreases. Because there was evidence in the literature that partially distributed teams can be effective despite Us-vs.-Them sentiments (Espinosa et al., 2006) and that motivation increases effectiveness (Lojeski et.

al, 2006; Lurey and Raisinghani, 2001), we argued that the impact of Us-vs.-Them may be decreased when team members are motivated to do effective work. Hypotheses' testing is discussed next.

H4a: Perceived team effectiveness will be lower in teams with high Us-vs.-Them than in teams with low Us-vs.-Them.

In order to test this important hypothesis we measured the correlation of Us-vs.-Them and Effectiveness. Results strongly supported this hypothesis. The Spearman Rank correlation coefficients and significance levels are shown in the second column of table 10.19. Trust and Integrity seem to be most related to effectiveness reduction, followed by lack of awareness, and then conflict.

H4b: In teams with highly motivated members the negative impact of Us-vs.-Them on effectiveness will be weakened.

Participants rated the following motivators (on a scale from 1 to 7):

- Flexible Schedule
- Challenging Work
- Professional Development
- Ability to creatively use skills
- Financial and other Compensation
- Company Loyalty
- Reduced commute / Desirable location
- Being required to work on a project

In order to determine how to rate motivation we examined the positive motivators for correlation. Factor analysis revealed two factors as follows:

Factor 1: Flexible Schedule, Location, and Financial Compensation

Factor 2: Challenging work, Professional Development, Creativity, Company Loyalty

Interestingly, the first factor is family “needs” related, while the other is more intrinsic. We averaged the score for each of the motivation groups, added up the averages, and the negative motivator (reversed) to come up with a composite motivation score. We used this score to examine the moderation effect (proposed by this hypothesis) of motivation on the relationship between Us-vs.-Them and Effectiveness.

We used guidelines described by Barron and Kenny (1986) to test for moderation, although we could not follow their procedural method as our data is not normally distributed. They write that a moderator is a variable one that affects the direction and/or strength of the relation between an independent and a dependent variable. As evident in table 10.19 the relationship between Us-vs.-Them is very strong and it is not weakened (nor does it change direction) based on motivation; therefore we reject H4b. We also checked for moderation by the motivator that impacts effectiveness most (Challenging Work as per table 10.19) and again results did not indicate a moderating effect. These findings were similar for Company-A and the Mixed-Lot participants.

Table 10.19 Us-vs.-Them and Effectiveness

Us.-vs.-Them	Effectiveness	Effectiveness under	
		High Motivation	Challenging Work
Conflict	-0.45098 <.0001**	-0.53459	-0.49697
Awareness	-0.50174 <.0001**	-0.53727	-0.51046
Trust / Integrity	-0.63121 <.0001**	-0.64421	-0.64782
Total Us.-vs.-Them	-0.63509 <.0001**	-0.69918	-0.66453

10.6 Research Question 5 – Motivation and Effectiveness

What motivators have the most impact on effectiveness?

In order to answer this research question we calculated the Spearman Correlation of each motivator with effectiveness. Table 10.20 shows the results in the order of impact. Challenging work appears to have the strongest impact on effectiveness, while the desire to help one's company to achieve important goals, has the lowest impact. As expected, the negative motivator tends to reduce effectiveness, but the relationship is not significant.

Table 10.20 Correlation of Motivators to Effectiveness

Motivator	Spearman Coefficient	Prob > r
Challenging work	0.24597	0.0001
Creatively use my skills	0.19987	0.0019
Flexible schedule	0.15390	0.0175
Location	0.12156	0.0611
Financial Compensation	0.10485	0.1066
Professional Development	0.07796	0.2308
Help my company achieve goals	0.05700	0.3813
I was told to work on this project	-0.02654	0.6838

10.7 PLS Model Assessment

We constructed a PLS model using SmartPLS v2.0.M3 (Ringle, Wende, and Will, 2007) containing those variables for which hypotheses were either supported or partially supported. Note that standard measures of reliability available in SmartPLS (AVE and Composite Reliability) are not appropriate for formative constructs such as ours (Chin, 1998), and therefore are not reported here. Figure 10.1 shows the resulting model and its path coefficients; Figure 10.2 shows the model and its t-statistics after bootstrapping with 500 sample observations. A t-value of over 1.65 translates to $p < 0.05$. This result is

achieved between technology and effectiveness; technology and Us-vs.-Them; policies and effectiveness; and Us-vs.-Them and Effectiveness. A t-value of over 1.29 translates to $p < 0.1$. This result is achieved between policies and effectiveness. Viewing our supported hypotheses in this manner, gives us an indicator of the collective impact of desired technology features and policies in partially distributed teams. These results indicate that the impact of policies and technology is stronger on Us-vs.-Them than it is on Effectiveness directly (There is an indirect effect through Us-vs.-Them reduction). Results also show that Formal Policies as well as regular meetings have the most impact on Us-vs.-Them reduction.

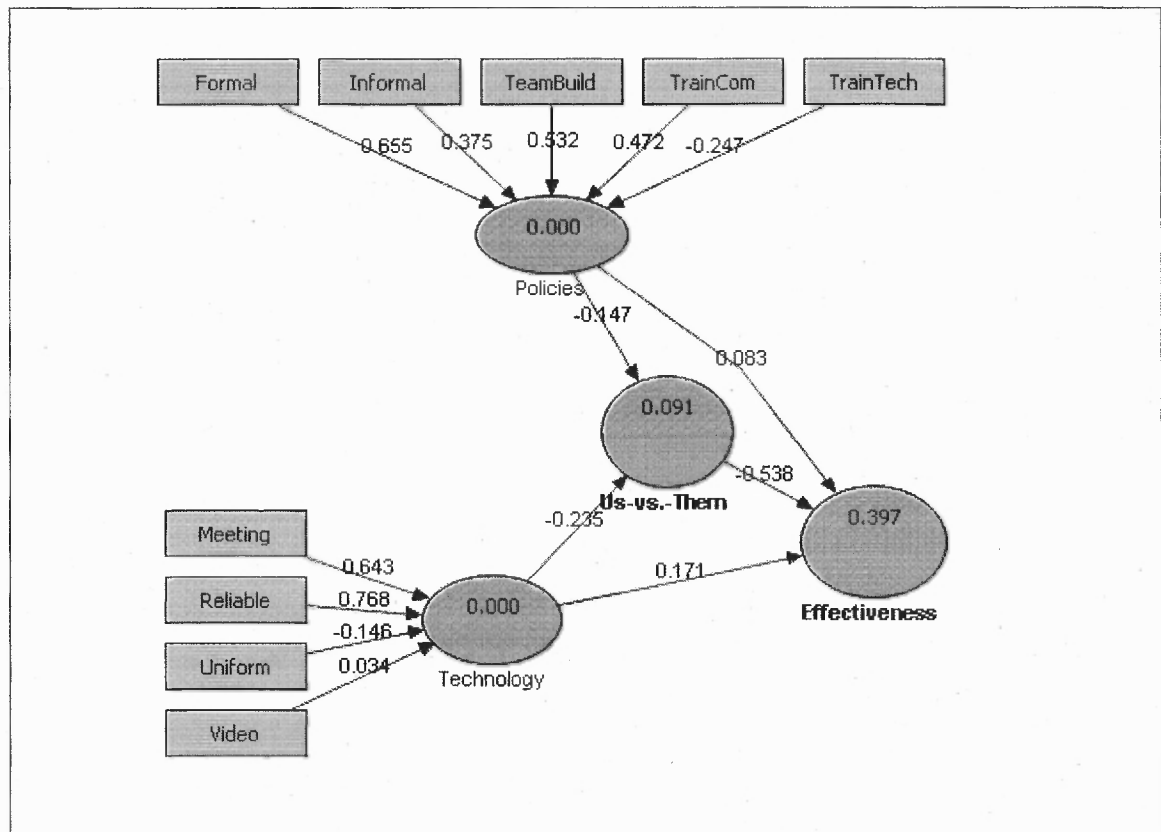


Figure 10.1 PLS Model with Path Coefficients

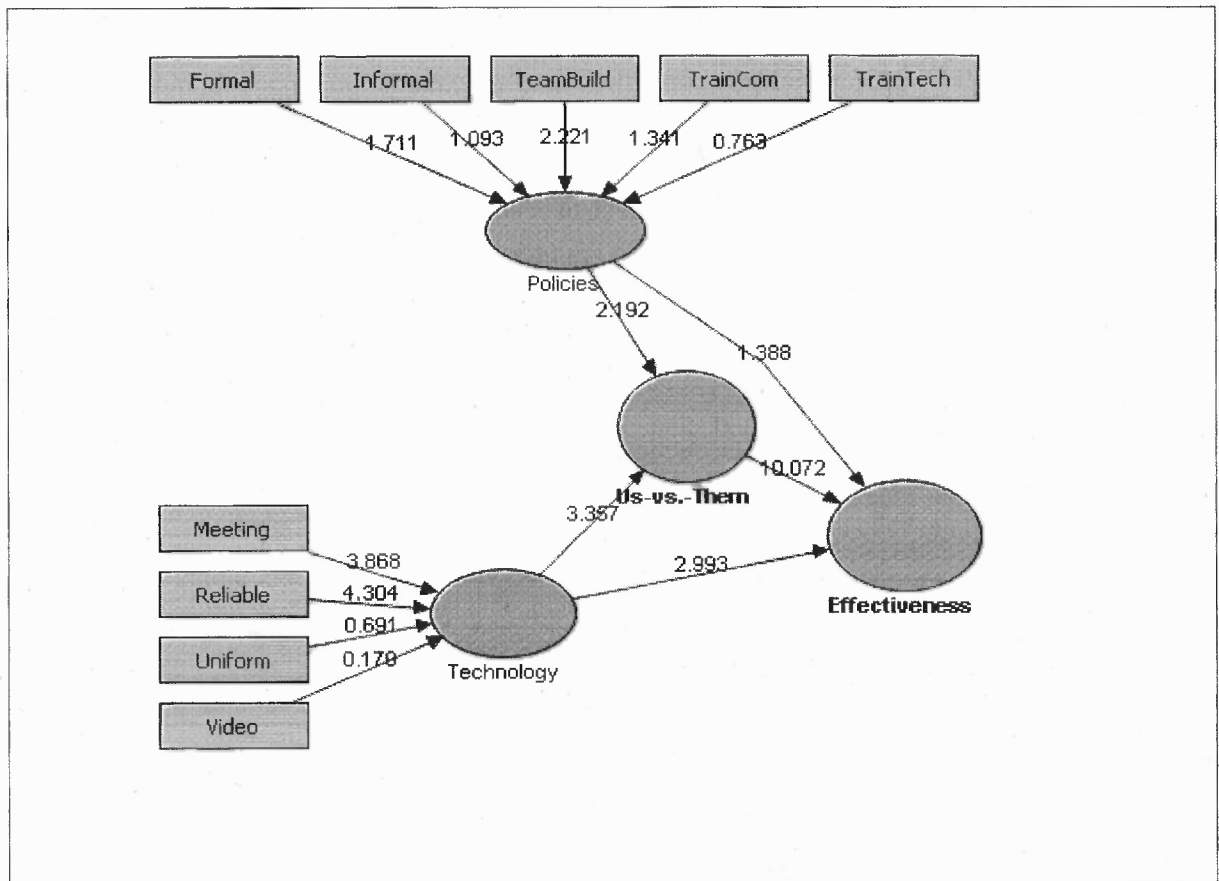


Figure 10.2 PLS Model with T-Statistics

Next we show the T-Statistics for Company-A and the Mixed-Lot separately. There was a variance in support of hypotheses as seen in the analysis earlier in the chapter. However, since each hypothesis, when supported overall was at least partially supported for each participant group, the same paths were included in each PLS model depicted below.

In Company-A a stronger relationship between Us-vs.-Them and Effectiveness is evident and regular meetings play a big role in Us-vs.-Them reduction. In the Mixed-Lot, on the other hand, there is suggestion of direct influence of policies and technology on effectiveness. In the Mixed-Lot, reliability is the most salient technology component,

while team building and formal policies contribute to a strong reduction of Us-vs.-Them.

These interesting differences warrant further research.

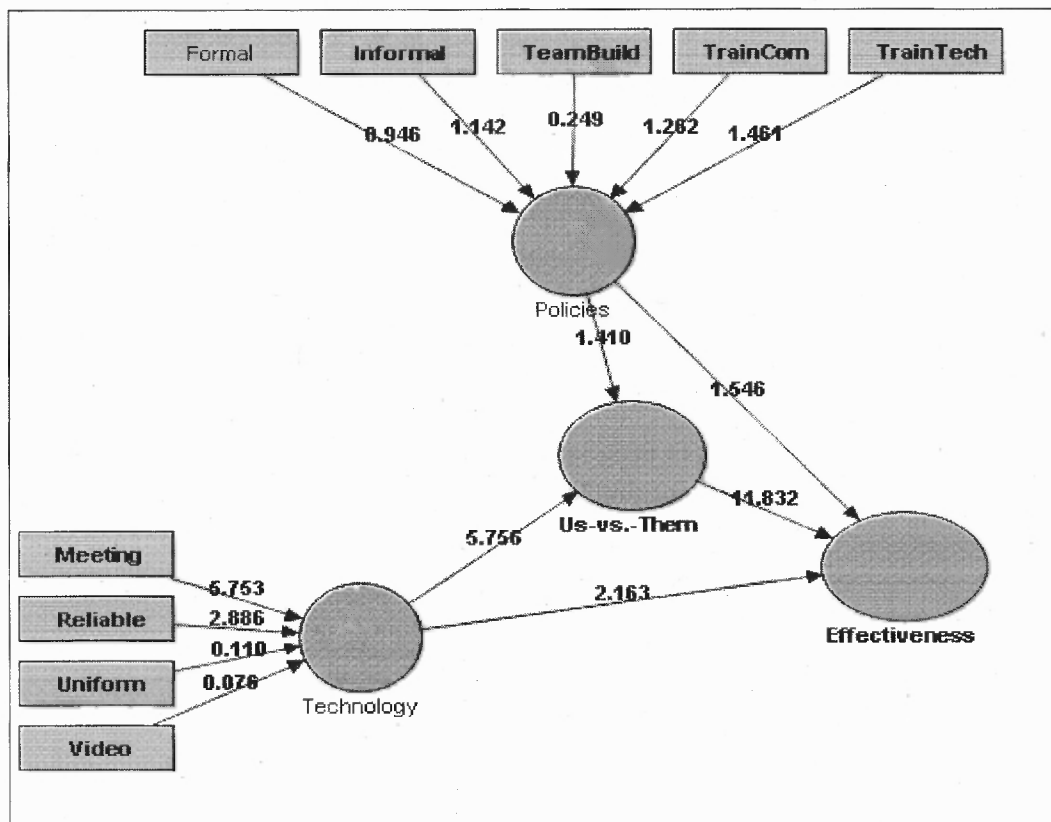


Figure 10.3 Company-A PLS Model with T-Statistics

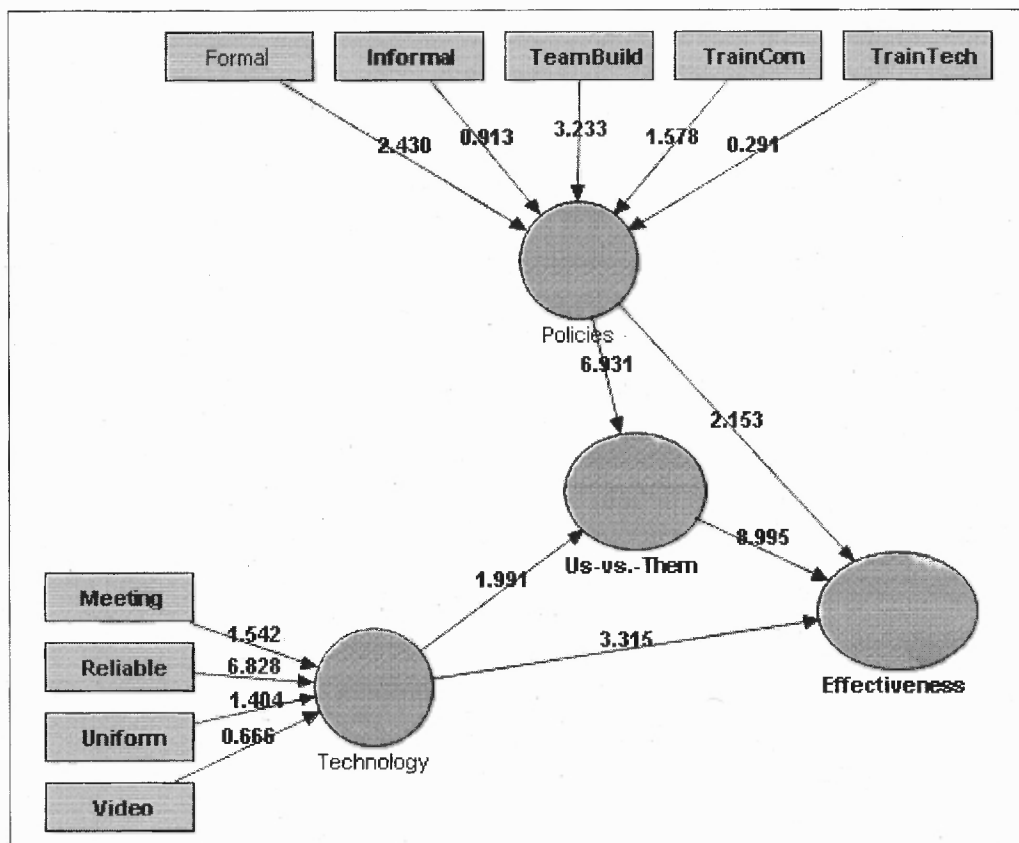


Figure 10.4 Mixed-Lot PLS Model with T-Statistics

10.8 Conclusion

We had 22 hypotheses related to research questions 2, 3, and 4. Exactly half (11) of them were supported. Four were supported at the 0.1 level and seven at the 0.05 level. 4 more were partially supported – meaning they were supported for at least one of the Us-vs.-Them factors (Awareness; Conflict; Trust/Integrity) or for one of the two major participant groups. Results are summarized in Table 10.21. The hypotheses supported at the 0.1 level are marked with a *; the rest were supported at the 0.05 level.

Table 10.21 Summary of Hypotheses Testing Results

Hypothesis	Result
H2a: <i>PDTs where sub-groups use the same communication technologies for between-group interaction will experience less Us-vs.-Them</i>	Supported*
H2b: <i>PDTs with reliable well supported technologies will experience less Us-vs.-Them</i>	Supported
H2c: <i>PDTs using reliable video technologies will experience less Us-vs.-Them</i>	Not Supported
H2d: <i>PDTs using reliable video technologies will be more effective</i>	Supported*
H2e: <i>PDTs using semi-synchronous communication methods will experience less Us-vs.-Them</i>	Not Supported
H2f: <i>PDTs using semi-synchronous communication methods will be more effective</i>	Not Supported
H2g: <i>PDTs that meet regularly as a team will be more effective</i>	Supported
H3a: <i>Enacting informal policies in PDTs will reduce Us-vs.-Them</i>	Supported*
H3b: <i>Enacting informal policies in PDTs will increase effectiveness</i>	Supported
H3c: <i>Formal policies in PDTs will reduce Us-vs.-Them</i>	Supported*
H3d: <i>Formal policies in PDTs will increase effectiveness</i>	Supported
H3e: <i>PDTs at the coordination, cooperation, or collaboration levels of the communication scale with frequent face-to-face within sub-group meetings will experience more Us-vs.-Them</i>	Not Supported
H3f: <i>PDTs at the coordination, cooperation, or collaboration levels of the communication scale relying mainly on electronic communication will be more effective</i>	Not Supported
H3g: <i>PDTs at the competitive or informative levels of the communication scale where sub-groups frequently meet face-to-face will be more effective</i>	Not Supported
H3h: <i>PDTs where members received ICT training will be more effective</i>	Supported
H3i: <i>PDTs where members received ICT training will experience less Us-vs.-Them</i>	Supported for Trust/Integrity
H3j: <i>PDTs where members received team communication training will be more effective</i>	Supported
H3k: <i>PDTs where members received team communication training will experience less Us-vs.-Them</i>	Supported for Awareness and Trust/Integrity
H3l: <i>PDTs where members participated in team building activities will experience less Us-vs.-Them</i>	Supported for Awareness

<u>H3m:</u> <i>PDTs where members do not have other project responsibilities will experience less Us-vs.-Them</i>	Not Supported
<u>H4a:</u> <i>Perceived team effectiveness will be lower in teams with high Us-vs.-Them than in teams with low Us-vs.-Them</i>	Supported
<u>H4b:</u> <i>In teams with highly motivated members the negative impact of Us-vs.-Them on effectiveness will be weakened</i>	Not Supported

CHAPTER 11

QUALITATIVE ANALYSIS

11.1 Introduction

In our survey instrument we asked participants to answer the following open ended question: “Based on your experience what is the greatest challenge (such as current economic conditions) for a Partially Distributed Team?” Coding was carried out manually. We scanned the responses keeping in mind their relation to Us-vs.-Them susceptibility factors, as presented in chapter 2. Themes emerged that matched the following susceptibility factors:

- Uneven communication channels
- Conflicting goals and responsibilities
- Cultural and language barriers
- Organizational culture differences
- Difference in location prestige
- Unawareness of activities and availability

We also kept in mind direct Us-vs.-Them evidence we identified in chapter 2, such as reduced trust between sub-groups, and incorporated these comments into an ‘Us-vs.-Them’ theme.

In addition, the following themes were found in the comments:

Leadership and project management

Economic and budget pressures

Recommendations for PDT improvement

We begin the chapter by reviewing Us-vs.-Them susceptibility factors and discussing the participant comments that matched them. We then discuss other themes that have emerged – those not related to Us-vs.-Them susceptibility, including leadership, economic and budget pressures, and recommendations for improvement. We conclude by summarizing and totaling all of our coding categories.

11.2 Challenges and Us-vs.-Them Susceptibility

Uneven communication channels in partially distributed teams are a major contributor to Us-vs.-Them. Face-to-face communication (used within sub-groups) fosters relationship building and accountability (Bos et. al, 2006); while electronic communication (used between sub-groups) can lead to decreased concern about others (Hiltz et. al, 1989). This was a major theme among participant comments. It included comments about reduced cohesiveness, difficulty building relationships, communication problems, and coordination difficulties.

Theme: Uneven communication channels

Number of comments: 30

Selected comments:

“Ad hoc local discussions may become quite critical, and present tremendous learning opportunities for the team. Unless the discussion is interrupted and taken to a conference call, the remote team has no chance to engage in that learning. Even attempts to structure follow-up learning opportunities, via regularly scheduled team discussions, fall short, because much of the learning is in the discovery process, not the final answer.”

“Building teamwork frequently requires face-to-face contact, so that distributed members develop the trust among one another and so that the effectiveness of technology solutions (IM, email, teleconference) are maximized.”

“‘Person to person’ / ‘face to face’ communications and the ability to share information at all levels: facial expressions, notes, discussions, handwritten sheets, graphics, are not possible with present communication capabilities.”

“Not being able to interact face to face with distributed team members. Not knowing their subtle nuances. Teleconferencing takes the personal aspect out of working with a team.”

“The ability to read body language. You have to really pay attention to someone's tone of voice. In some cases, this takes longer to create a bond.”

The next susceptibility factor that emerged as a theme is conflicting goals and responsibilities. Discrepancies in goals have been shown to hinder relationships between virtual team members (Crawston and Kammerer, 1998) and were a major theme in the interviews we conducted at the start of our research. Conflicting responsibilities often come about when employees work on a variety of projects. Projects that are remote, often are given a lower priority (Stringfellow, 2003) resulting in Us-vs.-Them. Below are some examples that our participants discussed.

Theme: Conflicting Goals and Responsibilities

Number of comments: 17

Selected comments:

“Getting the other sub-groups to give your project a higher priority”

“The biggest challenge is competing objectives. My "project" is marketing a drug and each sub-team is a separate company of a joint venture. Each company has its own priorities.”

“Coordinating schedules among members with busy schedules and other project responsibilities”

“Setting goals properly and assuring that work load is properly balanced.”

Cultural differences and language barriers contribute to the Us-vs.-Them divide (Espinosa and Delone, 2006). We found comments to that effect.

Theme: Cultural differences and Language Barriers

Number of comments: 13

Selected comments:

“Communication across technologies and cultures - we had both hardware and software engineers on the project and spoke 5 different native languages. Making sure what was said/written was interpreted correctly was the biggest challenge because we often did not realize the multiple meanings that could be extracted from the content.”

“Navigating cultural differences is a challenge.”

“For international work, understanding cultural implications (like ‘yes’ meaning ‘I understand’, versus ‘I agree and will get it done’).”

Aside from national culture, organizational culture differences often manifest themselves in different norms and practices and increase Us-vs.-Them likelihood (Bradley et. al, 2002).

Theme: Organizational Culture Differences

Number of comments: 7

Selected comments:

“The team in India mainly consists of junior developers that are inexperienced. There is little accountability for the quality.”

“Many of offshore teams need to understand the big picture of the business process first before maintaining and supporting any applications.”

Intuitively, when lower levels of collective knowledge and awareness exist in partially distributed teams, it can lead to attribution errors (Cramton, 2001) and delays in seeking help from remote teammates (Herbsleb et al, 2000).

Theme: Unawareness of activities and availability

Number of comments: 9

Selected comments:

“Our sub group is in Canada. The challenge is knowing the team members and their roles and who to go to in getting something done.”

“Being aware of what the other team is working on, what are their positions on topics and what are their information sources.”

“Getting independent views shared effectively.”

When members of one sub-group feel like second class citizens, a fertile ground for Us-vs.-Them often exists. Such feelings can be a result of parent company affiliation in joint ventures (Li and Hambrick, 2005), headquarters location vs. satellite location, or proximity to leadership or clients (Carmel, 1999; Huang and Ocker, 2006).

Theme: Difference in location prestige

Number of comments: 6

Selected comments:

“A major challenge relates specifically to a partially distributed team where the team leader is the supervisor: the need to spend a roughly equal amount of time with distant team members as I do with local members. I had to ensure that I picked up the phone and called remote team members on a regular basis, even initiating “water cooler” conversations just to ‘catch up’.”

“Keeping people who aren't in the main sub-group on task and informed is a challenge. We often don't know what they are doing and they often don't know what they should be doing.”

Limited synchronous availability, when it exists between sub-groups, worsens communication difficulties the sub-groups have and further impairs relationship building between sub-groups (Cramton, 1997), making them susceptible to Us-vs.-Them.

Theme: Limited synchronous availability

Number of comments: 13

Selected comments:

“The problem is keeping on top of the assigned tasks in relation of their deadlines by overcoming the time difference and differences in holiday and vacation schedules.”

“Communication problems - time differences with India as well as problems with understanding each other during conference calls.”

“Time zone as related to morning and evening meetings, timely responses to deliverables due to time zone, timely responses to inquiries.”

11.3 Additional Challenges

The themes we presented in the previous section matched Us-vs.-Them susceptibility factors. Beyond susceptibility to Us-vs.-Them, there were also comments that pointed

specifically to Us-vs.-Them, such as reduced trust between sub-groups. We coded such comments as Us-vs.-Them.

Theme: Us-vs.-Them

Number of comments: 13

Selected comments:

“Building and maintaining an ‘in group’ mentality with remote team members.”

“As the team starts, trust that others will do what you need them to do when you need it”

“The Indian subgroup does not respond readily to other sub group members unless the other side prompts them.”

“There can be political animosity and adverse feelings.”

“Making friendships and making team work with people that you didn't meet in person.

In general the human based factors are the most challenging in such situations, not the technical differences.”

The timing of our survey unfortunately coincides with difficult economic conditions. In order to gauge the impact of the current economy on PDT work, we wrote in the phrase “such as current economic conditions” in our open ended question. We coded comments from participants who chose to talk about this problem as a theme.

Theme: Current Economic Conditions

Number of comments: 18

Selected comments:

“In current economic condition, communication cost is one of the issues. So, cheaper (chatting and internet phone) ways of communicating is preferred over more reliable and effective methods (teleconferencing and video). I would like to point out that a

combination of two cheaper methods is also highly effective, like chatting/internet phone with desktop sharing.”

“With downsizing occurring in the firm determining who the subordinate team leaders and members are. In a number of cases these have been diminished significantly and responsibilities and relationships have to be redeveloped.”

“We should have face to face meetings more regularly, but travel is very limited and not allowed for this type of thing at this time.”

“Current Economic conditions have definitely affected the teams, as a matter of fact the team’s future ,even the company’s future is uncertain to a great extent.”

Several participants used the open ended question to provide advice for good PDT practices. The following is an example where one veteran PDT member shares his “best” PDT experience:

“The most effective distributed team I was a part of had strong values, where everyone honors their word. Though this may seem counter intuitive, and disastrous from a management perspective (Who dropped the ball? and no one answers) this is actually (at least in my experience) a very effective way to get things done. The primary principles were:

1. The team takes ownership of the product. Every person is as responsible as the next.
2. Managers were never just managers; they were senior developers who understand the insides of the product, who were doubling up in a managerial capacity.
3. There is no sub-group manager/lead. This used to keep the team close knitted and directly connected.

4. Schedules were managed by a product management organization; deadlines were clear to all (there were no "made-up"/"team-buffer" deadlines), which leads to cleaner scoping.
5. Simple tools were used (e.g. Bugzilla) to manage work queues and record all reasoning why something was done the way it was done. Developers are free to pick up work items from the team's queue without any intervention.
6. All communication was open and transparent. This enables to keep the team on the same page. Design and reviews are open to all members. No code gets checked in without being reviewed (reviewer is the first available person in the team)."

Additional comments were made regarding challenges to project management and leadership of partially distributed teams. We do not examine leadership, in a systematic way in our research but we coded them as the next theme presented here.

Theme: Leadership / Project Management

Number of comments: 10

Selected comments:

"Keeping track of every member of the team and ensuring that they are actually working."

"Work allocation based on the client location and expertise of the groups."

Some of the comments suggested that there are no challenges specific to partially distributed teams. We don't elaborate on them because we focus on challenges in our research. Here is an interesting comment, though, with a positive outlook on communication technologies capabilities:

“Given all the methods for communicating with team members, I don't think the challenges of working with a partially distributed team are any different from working with a team in general.”

Other comments were too short and general to classify into themes, but they support the point that a challenge exists, such as:

“Maintaining efficiency and providing good services to the clients we serve.”

“Loneliness. I'm the only one on the West Coast.”

A subset of our participants were emergency response professionals. Some referred specifically to their line of PDT work. Here is an example:

“I believe that the greatest challenge remains communications. Even with the wide availability of technology there remains an issue with effectively communicating information to geographically distributed locations. This is a problem we experience during everyday life and even more so in time sensitive situations such as emergency response. With each of our team member's busy schedules, time zone differences, and the requirement to meet varying priorities based upon our work environment, we often have long periods where we do not effectively share information and coordinate complex issues.”

11.4 Conclusion

The comments we received were very insightful. A good number of comments supported our literature review themes of Us-vs.-Them susceptibility, and several comments gave direct evidence of Us-vs.-Them sentiments. Additional comments referred to the current economic conditions; some were advice on effectiveness improvement; while a few

maintained that no special challenges exist in PDTs. Table 11.1 summarizes our findings.

Table 11.1 PDT Challenges

What is the greatest challenge (such as current economic conditions) for a Partially Distributed Team?	
Theme	Comments
Uneven communication channels	30
Current economic conditions	18
Conflicting goals and responsibilities	17
Cultural differences and language barriers	13
Limited synchronous availability	13
Us-vs.-Them	13
Leadership / Project Management	10
Lower level of awareness	9
Organizational culture differences	7
Difference in location prestige	6
None specific to PDTs	3

CHAPTER 12

DISCUSSION OF RESULTS

12.1 Findings

Although we did not find support for all our proposed hypotheses, we did uncover several very important patterns in partially distributed team work. The most salient of these findings is the strength of the relationship between Us-vs.-Them and effectiveness. All three Us-vs.-Them categories (reduced awareness, conflict, and reduced trust / integrity between sub-groups), showed very high correlation to reduced effectiveness. Most of the variables studied, in fact, when reducing Us-vs.-Them, also increased effectiveness. The exceptions were training in communication, technology training, and video use. These findings warrant further research as to the possible moderating effects of these variables.

We found support for the value of technology uniformity between sub-groups as well as technology reliability and support. And we showed that just as in traditional teams and in fully virtual teams there is value in regular meetings in partially distributed teams. Although we discussed informally implemented policies that proved to be valuable in partially distributed teams, we discovered that the more formal policies are the more effective type. We also found support among participant comments confirming the existence of Us-vs.-Them in partially distributed teams and its importance.

Other important findings include:

- Us-vs.-Them is more prevalent in international teams
- Us-vs.-Them is more prevalent in teams composed of two sub-groups only.
- When motivated by flexible schedule, work creativity, and challenging work, participants had higher perceived effectiveness ratings.

12.2 Implications for Managers

Our results are useful to managers of partially distributed teams. Because we showed that Us-vs.-Them reduces effectiveness, managers can benefit from Us-vs.-Them awareness. Based on our findings, the most salient Us-vs.-Them attributes are not getting the priority needed by the remote team and being unaware of remote members' activities and availability. Managers need to engage in activities that deal with these two problems. They can get some direction from our results that show that policies and team building activities are very useful, as well as frequent meetings (face to face or via CMC) and an investment in reliable and well supported technology. Our results also show evidence in reduction of satisfaction with the project experience in partially distributed teams. Based on these results, managers should monitor such project experience to ensure overall team effectiveness.

12.3 Contributions

Most prior PDT research has been conducted using student teams or case studies of one or two industry teams. A contribution of this dissertation research is collection and analysis of a large sample of industry PDT data. Another important contribution is the isolation of Us-vs.-Them as a dependent variable, classification of its components, and most notable problems. Understanding under which conditions it exists is important so that managers can identify and reduce it. We have established that there is a strong relationship between Us-vs.-Them and effectiveness in PDTs, which makes Us-vs.-Them especially important to study and understand. We have also identified the areas of

effectiveness that are perceived as weakest in PDTs and identified other important implications for managers.

Our research provides a better understanding of informal policies that exist in partially distributed teams and how they compare to formal policies in their effect on Us-vs.-Them and effectiveness. Informal policies were found to affect success; however formal policies while less prevalent, have a larger impact on Us-vs.-Them reduction and effectiveness increase. In addition to policies, we provide insight into different types of motivations that increase effectiveness in partially distributed teams.

The measurement and comparison of the use of various communication technologies, has been studied for virtual teams and student PDTs. We added to these findings by studying technology use in industry PDTs. We also related technology use to Us-vs.-Them. Additional contributions are collection of demographic data and data on partially distributed team settings to facilitate future research; and development of an instrument to measure Us-vs.-Them in Partially Distributed Teams.

12.4 Limitations

It is important to state the limitations of this study. The first is that the research is not team based. In order to reach a wide array of partially distributed teams we asked individuals that belong to such teams to fill out surveys based on their opinions, however their opinions cannot be compared to others who may be on the same team. A related limitation is that results cannot be verified. When a researcher conducts a case study of teams in a company, project results, transcripts, and related records may be available for verification and triangulation of results. We relied exclusively on self reported input.

Another limitation is the scope of the survey itself. Because we conducted the study in a corporation, we were limited to a 15 minute survey timeframe. We recruited from several departments in the cooperation which are involved in the software development life cycle and analytics, thereby introducing a limitation in terms of team tasks. Also, since the corporation is U.S based, we mainly studied partially distributed teams where the reporting member is U.S based. Thus results represent the opinions of the U.S team members mostly. Our mixed-lot participants were mainly recruited through convenience sampling which again resulted in U.S based participants.

An additional bias that may have been introduced is that of social desirability because questions are asked about conflict in the work force. Although we guaranteed anonymity, participants may have felt apprehensive about expressing negative opinions about co-workers or management. In addition, the measures of 'Us-vs.-Them' are preliminary. They had only been tested on a small pilot group of 33 subjects.

A limitation that we would rectify had we had the chance to repeat this study is that we did not offer direct compensation to participants; instead we donated funds to charity for each completed survey. We believe that it slowed down our recruitment process and ultimately reduced our sample size.

12.5 Future Research

Future research, beyond the dissertation, will be done to expand on the dissertation findings. In this research we focused on issues that are applicable to a broad set of partially distributed teams. Future research to relate sub-group sizes, geographical distribution, task of the team, and organizational distance to Us-vs.-Them and effectiveness is warranted. It is planned to survey PDT members in an additional

company to enlarge the data base, before conducting these new analyses. Further research into cultural diversity of sub-groups and its effect can also be very beneficial. Time-Zone specific studies, Non-US member viewpoints, as well as language barrier effects can also be studied. Some of these studies may help us explain the hypotheses that we did not find support for.

A series of studies using student partially distributed teams is being conducted by researchers at Penn State University and New Jersey Institute of Technology. These studies were the inspiration for this dissertation research and many of the survey questions were based on survey questions being used there. An interesting research study will be a comparison between the student team results and the industry team results.

If the opportunity becomes available a longitudinal case study of several Partially Distributed Teams to see how the variables identified in this research interplay over time would be very valuable.

APPENDIX A

SUPPORTING TABLES

Table A.1 to A.4 summarize material discussed in chapters 2 through 5. They are referenced accordingly.

Table A.1 Common Strengths of Matrix Organizations and PDTs

Matrix Organization Advantage	PDT Parallel
Leverages functional economies of scale while remaining small and task-focused.	Products have faster wider reach when teams around the world work together. Follow the sun approaches allow for faster distribution and increased support.
Focuses employees on multiple business goals.	Specific employee skills can be effectively applied in several projects, regardless of his / her geographic location. Often employees are assigned to more than one PDT at a time.
Facilitates innovative solutions to complex, technical problems.	The diversity of PDT members and their access to a multitude of resources facilitates innovation.
Improves employees' companywide focus through increased responsibility and decision-making.	Lack of a traditional management structure in PDTs may increase responsibility and decision making.
Allows for quick and easy transfer of resources.	In PDTs transfer of resources is often just a click away.
Increases information flow through the creation of lateral communication channels.	People, who normally would not communicate with one another, do so in PDTs. This increases organizational information flow.
Enhances personal communication skills.	PDT members learn to communicate via technology adaptation and to communicate with diverse team members. This enhances their personal communication skills.

Table A.2 Themes and Examples from Semi-Structured Interviews

Us-Vs.-Them Theme	Example
Perception that distant sub-group is not carrying its weight	<i>What if a sub group does not pull their weight? I've seen it on other projects.</i>
Misunderstandings between sub-groups	<i>Misunderstanding communication sometimes. For example, we understand that something needs to be done and the other team expects something different.</i>
Attribution errors	<i>Another problem is that people do a lot at a time, and sometimes the other team does not have the same priorities to work as what we need.</i>
Reluctance in approaching the distant sub-group for help	<i>Things seem to drag out more. I had a lot of instances where I'm sitting there doing the work and if I could just get up from my desk and ask a question I'd have better direction. But I don't always feel like calling because I don't know if the person is there or the other team might be occupied so I do what I think I should be doing and it turns out that it's not what was meant to happen and so time was wasted and frustration on both sides ensues.</i>
Uncertainty of motives of distant sub-group	<i>We've had quite a lot of uncertainty because we were acquired by the other group. But we never knew what their vision was. We were always worried about what they were thinking and what they were going to do with our department; their intentions.</i>
Perception of information withholding	<i>People who are located together can move along, and accidentally not bring to speed everyone else.</i>
Difficulty establishing trust between sub-groups	<i>Putting a face to the voice is important: they are humans too and they have lives. It is also good for knowing their limitations and building of trust.</i>
Perception of communication delay or indifferent treatment from distant sub-group	<i>It was unfair when people in B who relied heavily on people in team A took credit for themselves. It think that if they would be co located there would be a personal relationship and also they would see how hard we work so they would be more likely to acknowledge us.</i>
Increased readiness to contradict, refuse, or slander remote sub-group members	<i>A Major conflict is between my co-worker in London and my co-worker in NY. They have a tendency to assign blame. They both say: your component is down – try that and that. They try to shift work back and forth. It's not that work does not get done it's just that it's not very pleasant between the two of them.</i>
Perception that distant sub-group has an advantage	<i>The manager excluded some people from some decisions. Decisions were made to do things a certain way. Not the right way. It's related to distance because you couldn't get people together. Decisions were made without the</i>

	<i>people in the other team.</i>
Weak social integration between sub-groups	<i>There is definitely an Us-vs.-Them because the NY team goes out to lunch and we are actually good friends.</i>
Tendency to develop strong team identity by location	<i>The two sub-groups came together after an acquisition. There was an issue where they've identified with their original organization, which was reinforced by distance so there were overall problems.</i>
Self protecting actions between sub-groups	<i>There could be better communication. For example, if I want to see a certain database. There is no set up by which I can see it. So I need to make a request and they have to get it for me and it takes time. On both ends we are not sharing data well.</i>

Table A.3 Themes, Possible Causes, and Effectiveness

Us-Vs.-Them Theme	Possible Causes	Suggestions for improvements
Perception that distant team is not carrying its weight. (Herbsleb and Bass, 2005)	Lack of information Perception that distant team has an advantage	<ul style="list-style-type: none"> -Holding regular synchronous meetings and status reports (Lings, Lundell, Agerfalk and Fitzgerald, 2006) -Maintaining a project home web site with team member information, schedules, status reports, etc. (Lings, Lundell, Agerfalk and Fitzgerald, 2006) -Common work practices (Watson-Manheim, Chudoba, and Crowston, 2002) -Processes to raise task awareness (what was done when) (Espinosa Delone and Lee, 2006) -Increasing project management discipline (Espinosa Delone and Lee, 2006) -Implementing rigorous task monitoring procedures (Espinosa Delone and Lee, 2006) -Revising quality assurance processes (Espinosa Delone and Lee, 2006)
Misunderstandings between sub groups (Herbsleb et al., 2000).	Miscommunication Lack of information	<ul style="list-style-type: none"> -Offering language courses (Lings, Lundell, Agerfalk and Fitzgerald, 2006) -Arranging travel for face to face meetings (Lings, Lundell, Agerfalk and Fitzgerald, 2006) -Thoroughly documenting project goals and agreements to reduce misunderstandings (Lings, Lundell, Agerfalk and Fitzgerald, 2006) -Using liaisons, who would travel between sites and mediate conflict, to bridge cultural distances (Lings, Lundell, Agerfalk and Fitzgerald, 2006) -Sending developers to work at the client site and bridge the gap between the developers, located at another site, and the client (Lings, Lundell, Agerfalk and Fitzgerald,

		2006) -Training in cultural issues (Lings, Lundell, Agerfalk and Fitzgerald, 2006) -Holding regular synchronous meetings and status reports (Lings, Lundell, Agerfalk and Fitzgerald, 2006) -Common media (Watson-Manheim, Chudoba, and Crowston, 2002) -Common work practices (Watson-Manheim, Chudoba, and Crowston, 2002) -Adapt technology use to accomplish ambiguous tasks (Maznevski and Chudoba, 2001)
Attribution errors (Cramton, 2001) (Herbsleb and Grinter, 1999)	Lack of information	-Offering language courses (Lings, Lundell, Agerfalk and Fitzgerald, 2006) -Arranging travel for face to face meetings (Lings, Lundell, Agerfalk and Fitzgerald, 2006) -Using liaisons, who would travel between sites and mediate conflict, to bridge cultural distances. (Lings, Lundell, Agerfalk and Fitzgerald, 2006) -Sending developers to work at the client site and bridge the gap between the developers, located at another site, and the client. (Lings, Lundell, Agerfalk and Fitzgerald, 2006) -Training in cultural issues (Lings, Lundell, Agerfalk and Fitzgerald, 2006) -Holding face-to-face kick-off meetings at the beginning of the project to improve informal team communication. (Lings, Lundell, Agerfalk and Fitzgerald, 2006) -Maintaining a project home web site with team member information, schedules, status reports, etc. (Lings, Lundell, Agerfalk and Fitzgerald, 2006) -Prior Experience (Pauleen 2003-4) -Making conscious choices about timing and mode of interaction (Espinosa Delone and Lee, 2006)
Reluctance in approaching the distant team for help (Armstrong and Cole, 2002)	Fear of losing position Mistrust	-Common work practices (Watson-Manheim, Chudoba, and Crowston, 2002) -Encouraging social interaction (Panteli and Davison, 2005) -Reducing the need for synchronous communication with more documentation, tighter controls, etc. (Espinosa Delone and Lee, 2006) -Increasing project management discipline (Espinosa Delone and Lee, 2006)
Uncertainty of motives of distant team	Mistrust Fear of losing position	-Common beliefs and values (Watson-Manheim, Chudoba, and Crowston, 2002) -Training in cultural issues (Lings, Lundell, Agerfalk and Fitzgerald, 2006)

(Herbsleb and Grinter, 1999)		-Encouraging social interaction (Panteli and Davison, 2005)
Perception of information withholding (Sarker and Sahay 2002)	Mistrust Fear of losing position	-Maintaining a project home web site with team member information, schedules, status reports, etc. (Lings, Lundell, Agerfalk and Fitzgerald, 2006) -Adapting technology to accomplish ambiguous tasks (Maznevski and Chudoba, 2001)
Difficulty establishing trust between sub groups (Piccoli and Ives, 2003)	Lack of information Lack of social context	-Encouraging social interaction (Panteli and Davison, 2005)
Perception of communication delay or indifferent treatment (Bos et al., 2004)	Misunderstandings Temporal differences Differences in work ethics.	-Holding regular synchronous meetings and status reports (Lings, Lundell, Agerfalk and Fitzgerald, 2006) -Organizing work around time differences. -Reducing the need for synchronous with more communication, documentation, tighter controls, etc. (Espinosa Delone and Lee, 2006) -Making conscious choices about timing and mode of interaction (Espinosa Delone and Lee, 2006)
Increased readiness to contradict, refuse, or slander remote team members (Bos et al., 2004).	Lack of social integration	-Encouraging social interaction (Panteli and Davison, 2005)
Perception of distant team having an advantage (Huang and Ocker, 2006)	Lack of information	-Implementing a distributed hierarchical leadership configuration, with an overall project leader and local project leaders at each site (Lings, Lundell, Agerfalk and Fitzgerald, 2006) -Allowing local teams to use the tools that they are most accustomed to using but having one common configuration management tool used to coordinate project activities (Lings, Lundell, Agerfalk and Fitzgerald, 2006) -Common media especially collaboration platform (Watson-Manheim, Chudoba, and Crowston, 2002) -Increasing project management discipline (Espinosa Delone and Lee, 2006) -Implementing rigorous task monitoring procedures (Espinosa Delone and Lee, 2006)

<p>Weak social integration between sub groups</p> <p>(Lojeski et al., 2006; Panteli and Davison, 2005)</p>	<p>Lack of social integration</p> <p>Lack of information</p>	<p>-Holding face-to-face kick-off meetings at the beginning of the project to improve informal team communication (Lings, Lundell, Agerfalk and Fitzgerald, 2006)</p> <p>-Common beliefs and values (Watson-Manheim, Chudoba, and Crowston, 2002)</p> <p>-Encouraging social interaction (Panteli and Davison, 2005)</p>
<p>Tendency to develop strong team identity by location</p> <p>(Lau and Murnighan, 1998)</p>	<p>Lack of social integration</p> <p>Lack of information</p>	<p>-Holding face-to-face kick-off meetings at the beginning of the project to improve informal team communication. (Lings, Lundell, Agerfalk and Fitzgerald, 2006)</p> <p>-Common task (Watson-Manheim, Chudoba, and Crowston, 2002)</p> <p>-Common beliefs and values (Watson-Manheim, Chudoba, and Crowston, 2002)</p> <p>-Encouraging social interaction (Panteli and Davison, 2005)</p>
<p>Self protecting actions between sub groups</p> <p>(Cramton, 2001; Herbsleb and Grinter, 1999)</p>	<p>Mistrust</p> <p>Fear of losing position</p>	<p>-Encouraging social interaction (Panteli and Davison, 2005)</p> <p>-Common collaboration platform (tools, technologies) (Watson-Manheim, Chudoba, and Crowston, 2002)</p> <p>-Increasing project management discipline (Espinosa Delone and Lee, 2006)</p> <p>-Implementing rigorous task monitoring procedures (Espinosa Delone and Lee, 2006)</p>

Table A.4 Types of Policies

Authors	Policy	Category	Type	Impact
Cascio and Shurygailo (2002)	Members must be sure to make themselves available by pager or some other means during work hours	Expectations	Availability	Effectiveness
Espinosa and Carmel (2003)	Alter office hours	Expectations	Availability	Effectiveness
Kayworth and Leidner (2000)	Explicitly make clear the time zone used for posted meeting times	Formal	Courtesy	Us-vs.-Them Effectiveness
(Cramton, 2002)	Team leaders should pay careful attention to communication norms	Transparency	Courtesy	Us-vs.-Them Effectiveness
Lings, Lundell, Agerfalk, and Fitzgerald (2006).	Project goals and agreements should be thoroughly documented to reduce misunderstandings	Expectations	Documentation	Us-vs.-Them Effectiveness
Rosen, Furst, and Blackburn (2007)	A spreadsheet or other document with each team member's knowledge profile and areas of expertise	Transparency	Documentation	Us-vs.-Them Effectiveness
Malhotra, Majchrzak, and Rosen (2007)	Require team members to regularly post their work outputs in the team repository and electronically link it to action item lists and project timelines	Formal	Documentation	Us-vs.-Them Effectiveness
(Montoya-Weiss, Massey, and Song 2001)	Imposing structure on the team process, by providing interaction guidelines	Expectation	Interaction Guidelines	Us-vs.-Them Effectiveness
Malhotra, Majchrzak, and Rosen (2007)	Team norms for use of communication technology	Expectation	Interaction Guidelines	Us-vs.-Them Effectiveness
Espinosa and Carmel	Create formal structures for messages and activities	Formal	Interaction Guidelines	Us-vs.-Them Effectiveness

(2003)				
(Cramton, 2002)	Operating processes should collectively be examined, especially when problems arise	Transparency	Monitoring	Us-vs.-Them Effectiveness
Kayworth and Leidner 2000)	Set clear goals and provide continuous performance feedback	Transparency	Monitoring	Us-vs.-Them Effectiveness
(Espinosa, Delone, and Lee, 2006)	Coordination of repetitive and routine aspects of the tasks	Transparency	Task Programming	Us-vs.-Them Effectiveness
Espinosa and Carmel (2003)	Bunch-and-batch (Complete large portion of the task before sending to a remote site)	Expectation	Task Programming	Us-vs.-Them Effectiveness
Espinosa and Carmel (2003)	Focus on non interdependent tasks during non overlapping time	Expectation	Task Programming	Us-vs.-Them Effectiveness

APPENDIX B

ORIGIN OF SURVEY INSTRUMENT QUESTIONS

Motivation

Based on our literature review, we can ask the following questions about motivation:

The benefits of working on this project are (check all that applies):

- ☐ Financial compensation and other career rewards
- ☐ Helping my company to achieve important goals
- ☐ Exposure that will help my career
- ☐ Challenging work
- ☐ Leading Edge Technology learning
- ☐ Reduced commute
- ☐ Ability to stay in current geographically desirable location

The following motivators were adapted from a study of faculty motivators for teaching online by Hiltz, Kim, and Shea (2007):

- ☐ Flexible schedule
- ☐ Challenge / Creativity / Professional Development
- ☐ Diverse Community
- ☐ Challenge of Technology
- ☐ Time / Location Flexibility
- ☐ Better interaction quality
- ☐ Easier record keeping / Project management
- ☐ Self Scheduling: Anytime / Anywhere
- ☐ Learn new technology

The following motivation questions were adapted from Lurey and Rasinghani (2001):

	Strongly Agree						Strongly Disagree
I gain intrinsic reward and satisfaction from my job	1	2	3	4	5	6	7
I find that I am challenged by my work	1	2	3	4	5	6	7
My job gives me the opportunity to develop my knowledge and skills	1	2	3	4	5	6	7
I am able to add value to the team's work	1	2	3	4	5	6	7

Technology

This set of questions was adapted from Ocker et. al (In progress), with the following modifications:

- PDT System and Course management system were removed, as they do not apply to industry.
- External forums or bulletin boards are not secure enough for organizations who generally communicate inside an intranet firewall. Therefore these were removed from the options as well.
- Internet phone was combined with phone while Internet Phone with webcam became its own option, since we are isolating video technologies for H2.2

To what extent were the following means of communication used between sub-groups?

	Never To a Great extent						
Instant Messaging	1	2	3	4	5	6	7
Email	1	2	3	4	5	6	7
System for collaboration	1	2	3	4	5	6	7
System for archival and /or document sharing	1	2	3	4	5	6	7
Internet phone with Webcam (eg. SKYPE)	1	2	3	4	5	6	7
Video conferencing	1	2	3	4	5	6	7
Chat System	1	2	3	4	5	6	7
Audio-Teleconference Calls	1	2	3	4	5	6	7
Fax	1	2	3	4	5	6	7
Phone (Mobile, Landline, or Broadband)	1	2	3	4	5	6	7
Other	1	2	3	4	5	6	7

To measure 'contactability', as described in our literature review, we added the following question:

The quickest way to contact members of the distant sub-groups is by:

Instant Messaging
Email
Internet phone with Webcam
Chat System
Phone (Mobile, Landline, or Broadband)
Other

Policies

These questions are adapted from Ocker et. al (In progress) as well. We made the following modifications:

- Added a section for informal policies
- Added questions about availability policies from (Chudoba, 2005)
- Distinguished between face to face and other meeting modes to test H3.3
- Added a question about restrictions to test H3.4
- Added questions about training and mentoring to test H3.6 and H3.7
- Added a question about who works with whom to test H3.5
- Added questions about categories of policies we found in our literature review:

Courtesy

Documentation

Interaction Guidelines

Monitoring

Task Programming

To coordinate member efforts there were company policies related to:

	None				To a great extent			
Procedures for coordinating work	1	2	3	4	5	6	7	
Project Milestones and Delivery Schedule management	1	2	3	4	5	6	7	
Management of project documents and memos	1	2	3	4	5	6	7	
Regularly scheduled face to face team meetings within sub-groups	1	2	3	4	5	6	7	
Regularly scheduled electronic team meetings (including video or audio conferencing)	1	2	3	4	5	6	7	
Restrictions on face to face meetings within sub-groups so that remote members do not feel left out	1	2	3	4	5	6	7	

Work extended days in order to communicate with remote team members	1	2	3	4	5	6	7
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To coordinate member efforts we set up informal policies related to:

	None				To a great extent		
Procedures for coordinating work	1	2	3	4	5	6	7
Project Milestones and Delivery Schedule management	1	2	3	4	5	6	7
Management of project documents and memos	1	2	3	4	5	6	7
Regularly scheduled face to face team meetings within sub-groups	1	2	3	4	5	6	7
Regularly schedules electronic team meetings (including video conferencing)	1	2	3	4	5	6	7
Restrictions on face to face meetings within sub-groups so that remote members do not feel left out	1	2	3	4	5	6	7
Work extended days in order to communicate with remote team members	1	2	3	4	5	6	7

The following questions are for testing H3.5, H3.6, and H3.7. Training questions were adapted from Lurey and Raisinghani (2001)

	None				To a great extent		
I work directly with individual members of the distant sub-groups.	1	2	3	4	5	6	7
I received training for partially distributed team work	1	2	3	4	5	6	7
I received training in the technology I use	1	2	3	4	5	6	7
I had a mentor when I joined the team	1	2	3	4	5	6	7
During the team's first meeting, some time was dedicated to team building exercises such as meeting individual team members, creating effective team communication, and / or discussing conflict resolution	1	2	3	4	5	6	7
The organization has a strong educational system	1	2	3	4	5	6	7
I receive sufficient training from the	1	2	3	4	5	6	7

organization to develop my core skills							
Since the team's formation, team members have received training focused on becoming more effective in the virtual team setting	1	2	3	4	5	6	7
Training is based on only technical skills such as using specific applications or issues like product knowledge	1	2	3	4	5	6	7
Training seminars were developed specifically to help us communicate effectively with our fellow team members who work in dispersed locations	1	2	3	4	5	6	7

Effectiveness

The following questions are from Ocker et al (In Progress).

Compared with other teams you have worked on, use the following dimensions to rate the performance of your team.

	Low							High
Efficiency	1	2	3	4	5	6	7	
Quality	1	2	3	4	5	6	7	
Creativity	1	2	3	4	5	6	7	
Adherence to Schedule	1	2	3	4	5	6	7	
Coordination between sub-groups	1	2	3	4	5	6	7	
Communication between sub-groups	1	2	3	4	5	6	7	

The following are from Edwards and Sridhar (2002)

	Low							High
Satisfaction with project experience	1	2	3	4	5	6	7	
Learning from teammates	1	2	3	4	5	6	7	
Effect on Software Engineering Process	1	2	3	4	5	6	7	

The following questions are from Espinosa et al (2006).

	Low
--	-----

	High						
Cost / Effort to meet requirements	1	2	3	4	5	6	7
User satisfaction	1	2	3	4	5	6	7
Team satisfaction	1	2	3	4	5	6	7

The following questions are from Stringfellow (2003).

	Low High						
We communicate very well	1	2	3	4	5	6	7
We understand each other very well	1	2	3	4	5	6	7
The team produces high quality output	1	2	3	4	5	6	7
Our project is very successful	1	2	3	4	5	6	7
Our results are above average	1	2	3	4	5	6	7
Our final product is excellent	1	2	3	4	5	6	7
We are effective at accomplishing our task	1	2	3	4	5	6	7
I am satisfied with our progress on this task	1	2	3	4	5	6	7

And an overall question:

	Low						High
Team effectiveness	1	2	3	4	5	6	7

Us-vs.-Them

From Ocker et al (In Progress).

Please answer the following referring to interaction between sub-groups of your Partially Distributed Team.

	Strongly Agree						Strongly Disagree
Much disagreement exists	1	2	3	4	5	6	7
There are a great deal of personality conflicts	1	2	3	4	5	6	7
There are important differences concerning goals and objectives	1	2	3	4	5	6	7
We have trouble coordinating the pace members want to work at	1	2	3	4	5	6	7
We have difficulty with timing interactions between members	1	2	3	4	5	6	7

We experience interruptions or delay in the flow of work between members	1	2	3	4	5	6	7
I am aware of the activities members are working on	1	2	3	4	5	6	7
I am aware when members are available to meet (either electronically or face to face)	1	2	3	4	5	6	7
Often, it seems that members have project information I am not aware of	1	2	3	4	5	6	7
I feel confident about members' skills	1	2	3	4	5	6	7
I feel that members try to get out of their commitments	1	2	3	4	5	6	7
I feel that members keep their word	1	2	3	4	5	6	7
I feel confident that members would not exploit me	1	2	3	4	5	6	7
I feel that members try to get the upper hand	1	2	3	4	5	6	7
Every sub-group does their fair share of the work	1	2	3	4	5	6	7
I need information and advice from other sub-groups to perform my tasks	1	2	3	4	5	6	7
It is not necessary for me to coordinate or cooperate with distant sub-group members	1	2	3	4	5	6	7
Distant sub-group members:							
need information and advice from me to perform their job	1	2	3	4	5	6	7
pay little attention to my opinion	1	2	3	4	5	6	7
doubt my judgment	1	2	3	4	5	6	7
Avoid consulting me	1	2	3	4	5	6	7
are slow to respond to me	1	2	3	4	5	6	7
fail to pass on information	1	2	3	4	5	6	7
Submit low quality work	1	2	3	4	5	6	7
Compete with my sub-group in unproductive ways	1	2	3	4	5	6	7
Blame my sub-group for their mistakes	1	2	3	4	5	6	7
Complain about my sub-group	1	2	3	4	5	6	7
Put little effort into their work	1	2	3	4	5	6	7

The following relate to trust between sub-groups and is taken from Jarvenpaa and Leidner (1999). We will take one or two since we are not focusing on trust specifically.

Please answer the following referring to distant sub-groups of your Partially Distributed Team.

	Strongly Agree						Strongly Disagree
Overall, they are trustworthy	1	2	3	4	5	6	7
We are usually considerate of one another's feelings	1	2	3	4	5	6	7
The people are friendly	1	2	3	4	5	6	7
I can rely on them	1	2	3	4	5	6	7
We have confidence in one another	1	2	3	4	5	6	7
There is a noticeable lack of confidence	1	2	3	4	5	6	7
There is no team spirit	1	2	3	4	5	6	7
They show a great deal of integrity	1	2	3	4	5	6	7
I would be comfortable giving them a task or problem which was critical to the project, even if I could not monitor them.	1	2	3	4	5	6	7
I really wish I had a good way to oversee their work	1	2	3	4	5	6	7
I would be comfortable giving them complete responsibility for the completion of this project	1	2	3	4	5	6	7

Additional themes of Us-vs.-Them as identified in chapter 2 can be measured as follows:

Please answer the following referring to interaction between sub-groups of your Partially Distributed Team.

	Strongly Agree						Strongly Disagree
I often misunderstand them	1	2	3	4	5	6	7
I do not fully trust them	1	2	3	4	5	6	7
They often do not give my work the priority I need	1	2	3	4	5	6	7
I established friendships with members	1	2	3	4	5	6	7
They have unfair advantages	1	2	3	4	5	6	7
We do not have a team identity	1	2	3	4	5	6	7
I do not feel comfortable approaching them for help	1	2	3	4	5	6	7
I am unsure of their motives	1	2	3	4	5	6	7

Demographics, organizational, and team context

Some of the information in this section of the survey does not have a hypothesis related to it. However, these items were found to be important by virtual team researchers and we will use this data for exploratory research. To measure sub-group distance we will include questions about geographic, temporal, cultural, and other measures that were identified in the susceptibility section of chapter 2. Temporal and cultural distance will be determined using the country code provided.

Describe the sub-groups that make up your team and their locations:

Location:	A (Your Location)	B	C	D	E
State or Country:					
Number of Members					
% of time allocated to this project					

The following questions will be used to measure susceptibility that results from using different technologies between sub-groups, as well as variety of practices. The first is from Chudoba (2005) and the rest from Stringfellow (2003)

Please answer the following referring to interaction between sub-groups of your Partially Distributed Team.

	Strongly Agree						Strongly Disagree	
Members of distant sub-groups use different collaboration technologies	1	2	3	4	5	6	7	
Most of us have similar training	1	2	3	4	5	6	7	
Our professional background is similar	1	2	3	4	5	6	7	

The following are from Lurey and Raisinghani (2001)

How do you describe the task of this team?

☐ Software development

☐ R&D

☐ Other IT

☐ Other

How long do you expect this team to work together?

- ☐ Short term (under 1 year)
☐ Long term (over 1 year)

Your position in relation to this team

- ☐ Team Leader
☐ Team Member
☐ Other

How long has this team been in existence? ____ years ____ months

The demographic questions below are from our Fall 2007 interview instrument.

1. How many years of IT experience do you have?

- ☐ <1 ☐ 1-3 ☐ 3-5 ☐ 5-10 ☐ 10-15 ☐ 15+

2. How many years of experience do you have with Distributed Team work?

- ☐ <1 ☐ 1-3 ☐ 3-5 ☐ 5-10 ☐ 10-15 ☐ 15+

3. In what age group do you belong? ☐ Under 30 ☐ 31-40 ☐ 41-49 ☐ 50+

4. What is your education level? ☐ HS ☐ AS ☐ BS ☐ MS ☐ PhD

5. What racial or ethnic group do you think of yourself as?

- ☐ Asian ☐ Hispanic ☐ Middle Eastern ☐ White ☐ African American ☐ Other/Mixed

6. What is your gender: ____

7. What is your industry: _____

Based on your experiences what is the greatest challenge for a partially distributed team?

APPENDIX C

FULL SCALE SURVEY INSTRUMENT

Introduction and consent

The purpose of this survey is to gather information about work practices across physical locations. Your location is referred to as "Your Sub-Group". Locations of remote team members are referred to as "Sub-Group 1", "Sub-Group 2", etc.

Example:

Your Sub-Group: NY (US Eastern) with 11 members
 Sub-Group 2: NY (US Eastern) with 7 members
 Sub-Group 3: CA (US Pacific) with 10 members
 Sub-Group 4: India with 1 member

You will be one of 300 participants selected based on current (or recent) distributed team work. If you belong to more than one team, pick the one on which you spend the most time, or the one about which you know the most. We will refer to this as "your team."

All answers will be kept completely confidential. Participation is voluntary and financial compensation is not provided. You can opt out at any time by closing the browser window.

This form was created by researchers from the New Jersey Institute of Technology. It was examined to ensure compliance with international rules established for the protection of participants involved in research and approved by the university's Human Subject Review Board, chaired by: Dawn Hall Aggar, PhD.
 Campbell 320, University Heights
 Newark, NJ 07102-1961

If you wish to contact the individuals responsible for the study, they are:

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In answering the questions, it is understood that you will be estimating some of the answers to the best of your ability. However, if you have no basis on which to make an estimate, then skip that question. The survey should take about 10 minutes.

Thank you in advance for your time.

*** 1. Do you wish to continue?**

☐ No

☐ Yes

Team Configuration

Please refer to the (one) partially distributed team you selected to answer the following questions.

Describe the sub-groups that make up your team, per geographic location.

*** 2. Please enter a location for each sub-group, as well as the number of members in it.**

Note: If two sub-groups are located in the same area (ex. US-Eastern, enter this area twice)

	Location	Members
Your Sub-Group	<input type="text"/>	<input type="text"/>
Sub-Group2	<input type="text"/>	<input type="text"/>
Sub-Group3	<input type="text"/>	<input type="text"/>
Sub-group4	<input type="text"/>	<input type="text"/>
Sub-Group5	<input type="text"/>	<input type="text"/>

3. Which, if any, of the Sub-Groups put forth the most effort on the project (you may select more than one)

- ☐ Your Subgroup ☐ Subgroup2 ☐ Subgroup3 ☐ Subgroup4 ☐ Subgroup5 ☐ All contribute
equally

4. How are Sub-Groups distributed organizationally? (Select all that apply)

- ☐ Sub-Groups belong to the same organization
- ☐ Sub-Groups belong to organizations with different functions
- ☐ Sub-Groups belong to different companies

5. What motivates you to work on this project? (Rate all that apply)

[illegible]

6. This question refers to interaction within the local sub-group.

How often do you meet in person with members of your local sub-group?

Technology and Training

7. To what extent are the following means of communication used between distant sub-groups?

[illegible]

8. To what extent do you agree with the following?

	Not At All	1	2	3	4	5	6	To a Great Extent
Every sub-group uses the same communication technologies	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Our communication technologies are reliable	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Our communication technologies are well supported	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I am an experienced user of communication technologies	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

9. Please answer the following regarding training and team building

	Not At All	1	2	3	4	5	6	To a Great Extent
I received training to help me communicate effectively with team members who work in remote locations	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I received training in the communication technology I use	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I participated in team building exercises	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Policies

This section refers to policies. Some policies are mandated by the company or team leader. We refer to these as 'company policies'.

Sometimes when company policies do not exist, 'Good Practices' can be adapted by team members informally.

For example: Returning phone calls within 24 hours may not be required by management, but may be an informally established 'etiquette or practice' in the team.

We call these 'Informally Practiced' policies.

10. Please indicate if Company Policies exist or Informal practices exist related to:

	Company Policy exists	Informally Practiced	Not practiced
Procedures for coordinating work	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Project schedule management and status updating	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Management of project documents	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Regularly scheduled whole-team face-to-face meetings	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Regularly scheduled whole-team meetings via tele-conference	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Working extended hours in order to meet with remote team members	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Returning phone calls, email, etc. within a set amount of time	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

*** 11. Please rate your team (including all sub-groups) based on the following dimensions**

	Low						High
	1	2	3	4	5	6	7
Efficiency	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Quality of results	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Adherence to schedule	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Satisfaction with the project experience	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Satisfaction with the team experience	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Team effectiveness	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Interaction between sub-groups

Please answer the following referring to interaction between sub-groups of your Partially Distributed Team.

*** 12. Interaction between Sub-Groups is such that**

	Not At All						To a Great Extent
	1	2	3	4	5	6	7
We often work together to negotiate who does what	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
We often work together to schedule tasks	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
We often work together to complete a task	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Tasks are assigned by leaders	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I have learned things from working with them	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I am aware of their activities and availability	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I am aware of their information and expertise	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I have regular meetings with distant sub-group members	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Distant sub-group members split their time between this project and other projects	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

*** 13. Relations Between Sub-Groups is such that**

	Not At All						To a Great Extent
	1	2	3	4	5	6	7
There is mutual respect	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I feel comfortable approaching them for help	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
There is good team spirit	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Much disagreement exists	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
They blame my sub-group for their mistakes	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
They compete with my sub-group in unproductive ways	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
They give my work the priority I need	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Overall, they are trustworthy and show a great deal of integrity	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

About You

14. What is your industry

- ☐ Telecommunications
- ☐ Financial
- ☐ Pharmaceutical
- ☐ Other

15. How would you describe the task of this team

- ☐ Software Development
- ☐ Other IT
- ☐ Analytics
- ☐ Other

16. How long has this team been in existence

- ☐ less than 2 years
- ☐ 2 - 4 years
- ☐ 5+ years

17. How many years of experience do you have with Distributed Team work

- ☐ less than 2 years
- ☐ 2 - 5 years
- ☐ 6+ years

18. Your position in relation to this team

- ☐ Team Member
- ☐ Team Leader
- ☐ Sub-Group Leader

19. What is your gender

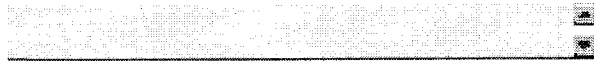
- ☐ Male
- ☐ Female

20. What is your age group

- ☐ Under 30
- ☐ 30-45
- ☐ 45+

Conclusion

21. Based on your experiences what is the greatest challenge (such as current economic conditions) for a distributed team



Thank You

Thank you for completing our survey.

Please forward it to colleagues working in Partially Distributed Teams.

For further comments or to send us contacts please write to fp3@njit.edu

APPENDIX D

IRB APPROVAL

Institutional Review Board: HHS FWA 00003246

Notice of Approval

IRB Protocol Number: E131-09

Principal Investigators: Robin Privman and Roxanne Hiltz

Information Systems

Title: Survey of Partially Distributed Teams – Final Survey

Performance Site(s): Off-Site Sponsor Protocol Number (if applicable):

Type of Review: FULL ☐ EXPEDITED ☒

Type of Approval: NEW ☒ RENEWAL ☐ REVISION ☐

Approval Date: January 16, 2009 Expiration Date: January 15, 2010

1. **ADVERSE EVENTS:** Any adverse event(s) or unexpected event(s) that occur in conjunction with this study must be reported to the IRB Office immediately (973) 642-7616.

2. **RENEWAL:** Approval is valid until the expiration date on the protocol. You are required to apply to the IRB for a renewal prior to your expiration date for as long as the study is active. It is your responsibility to ensure that you submit the renewal in a timely manner.

3. **CONSENT:** All subjects must receive a copy of the consent form as submitted.

4. **SUBJECTS:** Number of subjects approved: 300.

5. The investigator(s) did not participate in the review, discussion, or vote of this protocol.

6. APPROVAL IS GRANTED ON THE CONDITION THAT ANY DEVIATION FROM THE PROTOCOL WILL BE SUBMITTED, IN WRITING, TO THE IRB FOR SEPARATE REVIEW AND APPROVAL.

Dawn Hall Apgar, PhD, LSW, ACSW,
Chair IRB January 16, 2009

APPENDIX E

FREQUENCY DISTRIBUTIONS OF SURVEY ITEMS

This appendix lists statistics for survey responses that were not discussed in detail in the main document.

Table E.1 Participant Industry

Industry	N	%
Telecom	133	55.9%
Other	52	21.8%
Financial	33	13.9%
Pharmaceutical	11	4.6%
IAEM Community	9	3.8%
	238	100.0%

Table E.2 Sub-Group Locations

Raw Values					
	<i>Subgroup 1</i>	<i>Subgroup 2</i>	<i>Subgroup 3</i>	<i>Subgroup 4</i>	<i>Subgroup 5</i>
US Eastern	79%	45%	17%	9%	5%
US Central	11%	18%	13%	2%	1%
Other (in US)	5%	14%	11%	6%	3%
Europe	1%	8%	5%	3%	0%
India	3%	9%	8%	3%	1%
Other (Intl.)	2%	6%	5%	6%	3%
N/A	0%	0%	41%	71%	87%
Adjusted to Omit N/A Data Points					
US Eastern	79%	45%	29%	32%	42%
US Central	11%	18%	21%	7%	6%
Other (in US)	5%	14%	19%	20%	19%
Europe	1%	8%	8%	9%	3%
India	3%	9%	14%	10%	10%
Other (Intl.)	2%	6%	9%	22%	19%

Table E.3 Sub-Group Members

Raw Number						
	1	2 to 4	5 to 9	10 to 14	15 to 19	20+
<i>Subgroup 1</i>	24	77	71	24	10	32
<i>Subgroup 2</i>	36	85	53	23	9	32
<i>Subgroup 3</i>	29	64	16	11	3	17
<i>Subgroup 4</i>	18	23	12	4	2	10
<i>Subgroup 5</i>	7	12	4	2	1	5
By Percent						
<i>Subgroup 1</i>	10%	32%	30%	10%	4%	13%
<i>Subgroup 2</i>	15%	36%	22%	10%	4%	13%
<i>Subgroup 3</i>	21%	46%	11%	8%	2%	12%
<i>Subgroup 4</i>	26%	33%	17%	6%	3%	14%
<i>Subgroup 5</i>	23%	39%	13%	6%	3%	16%

Table E.4 Which Subgroups Put in the Most Effort

Responses	
Subgroup 1 only	102
Subgroup 2, 3, 4, or 5 only	31
Subgroup 1 and another subgroup, but not all	37
All subgroups equally	59
No response	9

Table E.5 Organizational Distribution

Responses	
Sub-Groups Belong to the Same Organization	108
Sub-Groups Belong to Organizations with Different Functions	68
Sub-Groups Belong to Different Companies	21
A Combination of the Above	25

Table E.6 Local Sub-Group Meeting Frequency

Responses	
At Least Twice a Week	96
Weekly	41
Twice a Month	9
Monthly	13
Rarely	59
Never	11

Table E.7 Policy Counts

	Company Policy exists	Informally Practiced	Not Practiced
Procedures for coordinating work	60	157	21
Project schedule management and status updating	110	112	16
Management of project documents	122	91	25
Regularly scheduled whole-team face-to-face meetings	30	96	112
Regularly scheduled whole-team meetings via tele-conference	51	131	56
Working extended hours in order to meet with remote team members	14	177	47
Returning phone calls, email, etc. within a set amount of time	22	179	37

Table E.8 Team Task

Software Development	92
Other	65
Analytics	41
Other IT	29
Any aspect of Emergency Preparedness or Response	9

Table E.9 Motivation Responses

	What motivates you to work on this project? (Rate all that apply)							
	Flexible Schedule	Challenging Work	Professional Development	Ability to creatively use my skills	Financial and other Compensation	Helping my company to achieve important goals	Reduced commute / location flexibility / ability to stay in current location	It is a project that I was told to work on
1=Not at All	68	31	28	29	41	37	74	86
2	22	6	6	7	10	2	16	20
3	18	7	17	5	13	10	10	13
4	26	21	28	24	34	19	26	27
5	32	33	40	34	36	37	24	23
6	35	74	61	76	58	77	42	24
7=To a Great Extent	37	66	58	63	46	56	46	45
Total	238	238	238	238	238	238	238	238
Mean	3.78	5.12	4.94	5.13	4.56	4.98	3.92	3.56
Standard Dev	2.26	1.98	1.94	1.94	2.08	2.02	2.38	2.38

Table E.10 Training Responses

Please answer the following regarding your team training			
	I received training to help me communicate effectively with team members who work in remote locations	I received training in the communication technology I use	I participated in team building exercises
1=Not at All	115	105	89
2	34	33	35
3	22	24	21
4	20	24	21
5	17	21	29
6	14	17	20
7=To a Great Extent	14	13	19
Skipped	2	1	4
Mean	2.53	2.69	3.01
Standard Dev	1.93	1.95	2.08

Table E.11 Communication Scale and Project Responsibilities Responses

Relations Between Sub-Groups is such that							
1=Not at All 7=To a Great Extent	We often work together to negotiate who does what	We often work together to schedule tasks	We often work together to complete a task	Tasks are assigned by leaders	I have learned things from working with them	I have regular meetings with some distant sub-group members	Distant sub-group members split their time between this project and other projects
1	11	6	7	8	2	18	18
2	18	13	10	7	2	9	17
3	24	22	12	17	10	24	13
4	30	34	29	30	23	35	27
5	49	60	61	48	40	37	33
6	49	56	63	67	76	43	53
7	40	30	52	47	62	56	69
Skip	17	17	4	14	23	16	8
Mean	4.79	4.89	5.24	5.20	5.67	4.88	5.07
SDev	1.74	1.52	1.52	1.55	1.26	1.86	1.92

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