Association for Information Systems
AIS Electronic Library (AISeL)

ICIS 2010 Proceedings

International Conference on Information Systems (ICIS)

2010

NATIONALITY DIVERSITY AND PERFORMANCE IN GLOBAL SOFTWARE DEVELOPMENT TEAMS: THE ROLE OF TEMPORAL DISPERSION AND LEADERSHIP

Iván Alfaro
University of Illinois at Chicago, ialfar2@uic.edu

Follow this and additional works at: http://aisel.aisnet.org/icis2010_submissions

NATIONALITY DIVERSITY AND PERFORMANCE IN GLOBAL SOFTWARE DEVELOPMENT TEAMS: THE ROLE OF TEMPORAL DISPERSION AND LEADERSHIP

Completed Research Paper

Iván Alfaro
Department of Information and Decision Sciences
University of Illinois at Chicago
2400 University Hall
601 South Morgan Street, MC 294
Chicago, IL 60607-7124
ialfar2@uic.edu

Abstract

Data from 247 global software development teams were used to examine the impact of temporal dispersion and leadership roles on the relationship between nationality diversity and team performance. Nationality diversity was positively related to team performance when project leaders regularly coordinate and monitor team members' activities, and acted as mentors and facilitator. However, when nationality diversity was low teams performed better when leaders did not regularly engage on these roles. Teams that experienced low temporal dispersion performed better that team that experienced high temporal dispersion regardless of their degree of nationality diversity. Finally, the effect of nationality diversity on team performance was positive on teams with low temporal dispersion, but negative on teams with high temporal dispersion. These findings suggest that teams under different conditions require different leadership schemas and emphasizes the complex roles that nationality diversity, temporal dispersion and leadership play on global teams.

Keywords: Geographically dispersed teams, diversity, leadership, global software development

Introduction

In today's global environment, where the barriers of distance can be overcome with technology, global teams have become a common practice in multiple organizations (Cousins, Robey, & Zigurs, 2007; Gibson & Cohen, 2003; Kanawattanachai & Yoo, 2002), and the software development industry has not been the exception (Desouza, Awazu, & Baloh, 2006; Farshcian, 2001; Gumm, 2006; Hayward, 2002; Kotlarsk, & Oshri, 2005). One of the benefits of implementing global software development teams is that the pool of human resources available is not limited to individuals located at a single site. Global teams can spam across different boundaries, such as space, time, and culture (Conchuir et al., 2009; D'Mello, Eriksen, 2010; I. van de Weerd et al., 2010). Global teams are diverse by nature. They are composed by individuals from different countries, with different cultural backgrounds, different set of social rules, and different native language (Martins, et al., 2004; Maznevski & Chudoba, 2000). Although global teams, as any other team, can be a diverse group based on age, sex, or educational background, a salient characteristic of global teams is the degree of nationality diversity among their members (Martins, et al., 2004; Maznevski & Chudoba, 2000).

Although literature about nationality diversity in teams is extensive for both collocated (e.g., Curşeu, & Schruijer, 2010; Dahlin, Weingart, & Hinds, 2005; Earley & Mosakowski, 2000; Kearney, & Gebert, 2009; Salk & Brannen, 2000;) and global teams (e.g., Connaughton, & Shuffler, 2007; Kayworth, & Leidner, 2000; Maznevski & Chudoba, 2000; Tsui, et al, 2007); there is still no consensus about the impact that nationality diversity has on team's performance. Nationality diversity can be detrimental for performance because it may reduce collective team identification, and increase conflict among team members, which reduces the capability of team members to properly work together (van Knippenberg, De Dreu, & Homan, 2004). Members from different nations may have different attitudes towards teamwork, power relations, or deadlines (Earley & Mosakowski, 2000; Hambrick, Davidson, Snell, & Snow, 1998; Hofstede 1980; Triandis, & Suh, 2002; Walsham, 2002). Thus, coordination and team cooperation may be hard to achieve when individuals with different views are required to work together (Polzer, Crisp, Jarvenpaa, & Kim, 2006). Moreover, when individuals from different countries work together they tend to have a more favorable attitude towards their fellow countrymen than to foreign members of their team, which ultimately can lead to low team cohesion, and high conflict (Lau, & Murnighan, 2005).

Despite its tendency to create low team cohesion and increase conflict, nationality diversity also has its positive side. Individuals from different countries have different ways to filter and interpreter information, as well as different ways to make decisions, approach problems, and perceive the environment (Earley & Mosakowski, 2000; Hambrick, Davidson, Snell, & Snow, 1998; Hofstede 1980; Triandis, & Suh, 2002; Walsham, 2002). These differences in cognitive schemas can promote creativity and faster problems resolution (Ancona & Caldwell, 1992; Bantel & Jackson, 1989; Blackburn, et al, 2003; De Dreu & West, 2001; Kirchmeyer & Cohen, 1992; Pelled et al., 1999). Thus, team composed by members from different nations can benefit from these pool of different task-related resources and knowledge, which offers a potential for global teams to perform well (e.McLeod and Lobel 1992, Watson et al. 1993).

In relation to global software development projects, the knowledge-based nature of this activity makes the combination of specialized skills and technical knowledge a key element for the success of any software development project (Anthes,. 2001; Damian, & Zowghi, 2003; Faraj and Sproull, 2000; Kraut, &Streeter, 1995). Hence, incongruent behavior among members from different countries, and in-group bias between collated and distant members can lead to frustration and misunderstandings during the execution of different software development activities (Herbsleb, Paulish, & Bass, 2005), and affect team's performance. However, when members of global software development teams can effectively combine their knowledge they can reduce cost, reduce project duration, and improve software quality (Barthélemy, 2001; DiRomualdo, & Gurbaxani, 1998; Ó Conchuir, et al., 2009).

It has been suggested that one of the reasons for mixed findings in the diversity – outcome relationship is that researchers had neglected to take into consideration the effects that contextual factors may have on how diversity manifests itself (Joshi, & Roh, 2009; van Knippenberg, & Schippers, 2007; van Knippenberg, De Dreu, & Homan, 2004; Reagans & Zuckerman, 2001). The presence of nationality diversity within a team does not necessary means that the team will benefit or suffer form it. The impact that nationality diversity has on a team performance may depend on internal characteristics and social structures of the team, specially those that influence team members' coordination and social interaction (Joshi, Roh, 2009; Kearney, gebert, & voelpel; 2009; van Knippenberg, De Dreu, & Homan, 2004).

The objective of this paper is to expand our understanding about nationality diversity in global development teams by identifying, to some extend, contextual factors that affect the nature of the relationship between nationality diversity and performance in global teams. To address this research endeavor, this paper tries to answer the following question: Does temporal dispersion and leadership behaviors influence how nationality diversity impacts performance in global teams?

Answering the research question presented in this paper is important because: 1) global software development teams are becoming a common standard in the industry (Kirsch, 2004; Kotlarsky & Ilan, 2005; Reza; Ali, Tabitha, 2006; Sarker, Sarker, 2009). Hence, a better understand of them is important to the literature and organizations (Earley & Mosakowski, 2000; O'Leary & Cumming, 2007; Tsui, et al, 2007). 2) Studies related to nationality diversity and performance in global teams have shown inconsistent results so far (Dube, & Pare, 2001; Mortensen & Hinds, 2001). This paper tries to provide a reason for theses mixing findings by bringing attention to the moderator effects that contextual factors may have in the nationality diversity – outcome relationship. And 3) researchers have called for a better examination of the elements that affect the nature of the relationship between nationality diversity and team performance (Evaristo, 2003; Horwitz & Horwitz, 2007; Jackson, Joshi, & Erhardt, 2003). This paper examines two of them: temporal dispersion and leadership behaviors. It is meaningful to investigate these two factors because literature has constantly found that they have a strong influence on team members' coordination and social interaction in global teams (Cramton, 2001; DeSanctis, Monge, 1999; Kayworth & Leidner, 2000; Kayworth & Leidner, 2001; Maznevski, Chudoba, 2000; O'Leary & Cumming, 2007).

The results of study make different contributions to literature. With respect to diversity, this study revels that even on an extreme diverse context, such as global software development teams, where social categorization can easily emerge based on nationality; and individuals with different cultural backgrounds, social rules, and native language have to work together to achieve a common goal, diversity can still have a positive impact on team performance. These results suggest that, under some circumstances, the benefits of diversity (e.g., diversity on task-relevant information) may overcome its possible negative effects (e.g., social categorization). Results also support the idea that leadership roles and temporal dispersion have an impact in the nature of the relationship between nationality heterogeneity and team performance. These findings expand our understanding of nationality diversity in teams. Finally, studies in global teams have focused so far on how the use rich communication technologies and long frequent communication episodes reduce the negative impact of low social interaction, and low common knowledge (Maznevski, & Chudoba, 2000). This study adds to the current literature and takes a different approach by highlighting the importance of the leadership function when it comes to manage diversity within global teams. On overall, the results of this study emphasize the need to indentify the condition under which teams are more or less likely to take advantage of the diversity among its members.

Theoretical Background and Hypotheses

The paradox of National Diversity in Global Teams

National diversity within a team can be defined as the degree of dispersion of its members in terms of their country of residency. The larger the number of countries involved in a team, and the more evenly distributed the team members are across these countries, the greater the national diversity within the team (Blau, 1977). In global software development teams, members from different countries may have different cultural backgrounds, social norms, values, communication style, and even native language. If the cultural or social differences among team members located in different countries are strong enough, they may have problems creating and developing rich and meaningful interpersonal relationships, leading to low social integration among them (Blau, 1977; O'Reilly et al., 1989).

 Social identity theory (Tajfel, 1982) and self-categorization theory (Turner, 1985, 1987) posit that within a group, individuals tend to classify themselves and others based on salient traits or characteristics. As the classification process take place, individuals indentify with peers that are similar to them. This process is defined as social categorization (Pelled et al., 1999). In a team, members can classify themselves are others based on their differences on age, gender, ethnicity, tenure, or nationality, and create sub-groups accordingly.

In global teams, the possibility of social categorization based on nationality, rather that any other attribute, is high because nationality naturally divides the team into subgroups composed by members from the same country. In this

case, members share a common identity within their local peers and, at the same time, they perceive themselves as different from members form other countries (Cramton, & Hinds 2005; Earley, & Mosakowski, 2001; Lau, & Murnighan, 1998). In teams with strong sub-grouping, such as global teams, individuals tend to evaluate their in-group peers more favorably than their out-groups peers (Lau, & Murnighan, 2005). This strong social categorization of in-group vs. our-group based on nationality could create bias across distant members affecting team performance (Salk & Brannon 2000; Reagans, & Zuckerman, 2001). In multinational teams, cultural differences between members can impact interpersonal relationships and team cohesion (Kankanhalli, Tan, and Wei, 2007; Pelled, 1996; Mannix et al. 2002). Members from different countries may have different ways to approach teamwork, different perceptions of appropriate power relations, and attitudes to deadlines (Walsham, 2002), and these differences can contributes to the development of task and emotional conflict within the team affecting team coordination and cooperation (Elron 1997, Von Glinow et al. 2004). This is a critical issue for global software development teams because coordination and cooperation among team members is a key factor for success in software development projects (Faraj, & Sproull, 2000; Boh, Ren, Kiesler, & Bussjaeger, 2007). In software development teams, members more than often need to share and integrate knowledge to develop a piece of software. Moreover, when technical problems emerge, members are required to reconcile and recombine their opinions to generate solutions. If the differences among members in global software development teams prevent the proper coordination of activities such as code integration and technical problems solutions, team performances could be negatively affected.

Although nationality diversity could trigger task and interpersonal conflict and introduce coordination and cooperation problems in global team, nationality diversity can also be a source of valuable resources for global teams. One of the benefits of implementing global teams is that the pool of human resources available is not limited to the individuals located at a single site. Global teams are often formed to take advantage of specialized expertise and other resources distributed across different nations. This allows global teams to have access to a wider base of knowledge than collocated team because expert personnel may be available regardless of their location (Blackburn, et al, 2003). Individual from different nations have different ways to perceive and filter information, as well as different ways to make decisions and approach problems (Hofstede 2001). These differences in perspective offer a potential source of valuable resources for global teams (Kankanhalli, et al, 2005; Kiesler and Cummings 2002; Kirchmeyer & Cohen, 1992). Teams composed by members with different skills, educational backgrounds, expertise, or any other task-related attribute have access to a wide range of task-relevant information because each team members have a unique set of characteristics and resources that allow them to significantly contribute to the team (Pelled et al., 1999; van Knippenberg, De Dreu, and Homan, 2004). On the other hand, if members that have similar skills and expertise are part of a team, the team suffers of redundant information and limited resources, and the value that each member can bring to the team is low (Burt, 1992; Gargiulo & Benassi, 2000; Watson et al. 1993).

As we can see, there is no consensus about the impact that national diversity can have on performance in global teams (Dube, & Pare, 2001; Mortensen & Hinds, 2001; Polzer, Crisp, Jarvenpaa, & Kim, 2006). Nationality diversity may elicit social categorization processes, but it also may be the source of task-relevant information. It was been suggested that the reason for these mixed findings is that researchers have neglected to take into account contextual factors that could influence the diversity-outcome relationship (Joshi, & Roh, 2009; van Knippenberg, & Schippers, 2007; Knippenberg, De Dreu, & Homan, 2004; Reagans & Zuckerman, 2001). For example, it is more likely that national diversity exhibits a positive effect on team performance in global teams in a context where teamwork, social integration, and conflict management are the norm than is a context where the rules and social structures that govern a global team alienate distant members, and create barriers for integration, team cooperation (Cramton, 2001; Huang, Wei, Watson, &Tan, 2003; Sproull & Kiesler, 1986).

The role on Context in Diverse Teams

Whether diversity has a positive on negative effect on team performance depends on how team members interact which each other. Theory (van Knippenberg, De Dreu, and Homan, 2004) and empirical findings (Joshi, Roh, 2009) indicates that different contextual factors might influence the relationship between diversity and team performance. These contextual factors can be classified in two types. First, factors that influence how team members exchange task related information. Examples of these factors are task routineness (Pelled, Eisenhardt, Xin, 1999), task type, task interdependence (Karen, Northcraft, & Neale, 1999; Joshi, & Roh, 2009) or task complexity (Wegge et al., 2008). The second type of factors, are factors that influence the quality of the relationships among team members. Examples of these factors are work identity, degree of feeling valued and respected (Ely, & Thomas, 2001; Randel,

& Jaussi, 2003), time working together (Harrison, Price, Gavin, Florey, 2002; Schippers, Den Hartog, Koopman, & Wienk, 2003), or group longevity (Pelled, Eisenhardt, & Xin, 1999; Joshi, & Roh, 2009).

Following this same line of research, this paper proposes two new moderator of the diversity- performance relationship in global teams: temporal dispersion and leadership roles. In relation to leadership, prior research constantly suggests that leadership is important in the development of global teams (e.g., Avolio, Dodge, 2001; Bell, & Kozlowski, 2002; Hertel, Geiste, & Konrad, 2005). Through the execution of different roles, leader of global teams may affect how team members' exchanges of task related information, as well as how interpersonal relationships develop within the team (Jarvenpaa, Knoll, Leidner, 1998; Jarvenpaa, & Leidner, 1999; Kayworth, & Leider, 2000; Kayworth, & Leider, 2001; Wakefield, et al., 2008). Thus, leaders have an effect on the underlining processes that influence how diversity impacts team's performance (Kearney, & Gebert, 2009).

The second factor that this paper examines as moderator of the diversity- performance relationship in global teams is temporal dispersion. Although previous studies have examined the impact of dispersion on diverse teams (e.g., Cummings, 2004; Polzer, Crisp, Jarvenpaa, and Kim, 2006), those studies did not account for the possible effects of temporal dispersion. It is important to examine temporal dispersion in the context of global teams because temporal dispersion is a common characteristic of global teams and it is a factor that affects how members communicate with each other, either to exchange task-relevant information or to socialize (O'Leary & Cummings, 2007). Moreover, this paper focuses on temporal dispersion rather than in other type of dispersions, such as physical distance or number of site involved in the team, because temporal dispersion implies that that there are different locations involved in the team, and there is significant distant between each other, so temporal dispersion is explicitly accounting for those factors.

A third factor that also has the potential to influence how diversity manifest on global teams is technology. The physical and temporal distant among members of global teams force them to communicate and coordinate their activities mainly through information and communication technologies (ICT's) (Martins et al., 2004; Hertel et al., 2005). The type of technology used by global teams influences how team members develop their interpersonal relationships (Pauleen& Yoong, 2001; Dubé & Robey, 2008), as well as how they exchange and combine task-relevant information (Evaristo, Van Fenema, 1999; Newell, et al, 2006; Corso, et al, 2009). Thus, information and communication technologies have an important influence on how distant members interact with each other, and therefore, how diversity manifests itself. Considering that literature on distributed teams has primarily focused on technology and media usage as the key elements that moderate the social interaction among team members (Curçeu, et al, 2008; Martins et al., 2004; Hertel et al., 2005; Powell, 2004), the author acknowledges the role of ICTs in relation to this study but wishes to explore other elements that have not been previously analyzed as mean to expand current literature.

In sum, this paper proposes that temporal dispersion and leadership are factor that influence the impact that national diversity could have on team performance. Temporal dispersion isolates distant members from each other, making social integration harder, and reducing members' abilities to cooperate which each other. On the other hand, leadership can promotes rich interactions among team members by solving conflicts and making knowledge transfer and combination possible among team members.

Temporal Dispersion and National Diversity

Temporal dispersion "captures the extent to which team members' normal work hours overlap" (O'Leary, & Cummings, 2007, pp. 438). The fewer overlapping hours distant members have to work together, the higher the temporal dispersion among them. Bearing in mind that temporal dispersion forces distant member to interact with each other in asynchronous episodes (O'Leary, & Cummings, 2007), this paper proposes that temporal dispersion triggers the negative side of nationality diversity because as temporal dispersion increases, members from different countries have less opportunities to interact with each other, which in turns, limits the opportunities to overcome their differences.

In software development teams, different activities are assigned to different roles. The person that collects the requirements may be different from the person that develops the code, which in turn may be different from the person that test it. Likewise, different roles participate at different phases of the project. When one phase is over, the outcome of that phase, such as requirements specification documents, UML diagrams, code modules, or any other artifact, is transferred to the group responsible for the next starting phase. Thus, actions such as code integration, code debugging, and defects corrections require the interactions of different team members, making software

development a highly interdependent endeavor (Faraj, & Sproull, 2000; Levesque, Wilson, Wholey, 2001). In global software development teams, if members want to collaborate with each other and have rich and meaningful interactions, they are forced to overcome cultural, social, and even idiomatic differences (Barkhi, Amiri, & James, 2006; Cramton, 2001; Sproull & Kiesler, 1986). Nevertheless, members of diverse teams can develop mechanism to overcome their differences (Hambrick, 1994; Kotlarsky, & Oshri, 2005; O'Reilly et al., 1989; Watson et al. 1998). As members interact with each other, they gain a better understanding of other's cultures, behaviors, and personality. This increases the levels of behavioral integration within the team (Hambrick, 1994), and reduces the negative effects that nationality diversity could have on performance in global teams (Earley and Elaine Mosakowski, 2000; Harrison, et al. 2002). However, temporal dispersion reduces the possibilities of rich interaction between members from distinct countries (O'Leary & Cummings, 2007). As members have less time to work together, they also have fewer opportunities to develop the mechanics required to overcome their cultural and social differences. Temporal dispersion forces team members to work apart on tasks, and to communicate with each other in asynchronous mode most of the time (Bell & Kozlowski, 2002, Griffith & Neale, 2001; Griffith, Sawyer & Neale, 2003; Kirkman et al., 2004; Zigurs, 2003). The absence of visual, social, and verbal interaction associated with such communication episodes reduces the ability of team members to understand their distant peers' context (Cramton, 2001; Sproull & Kiesler, 1986). The lack of common knowledge and understanding of others ideas, situations, and context creates barriers for social integration (Huang, Wei, Watson, &Tan, 2003), effective trust-building activities (Jarvenpaa; Knoll; Leidner, 1998; Jarvenpaa & Leidner, 1999; Polzer, Crisp, Jarvenpaa, & Kim, 2006), and conflict resolution episodes (Hinds and Bailey 2003; Hinds and Mortensen 2005; Purdy et al., 2000) among members from different countries, which may increase social distance among them (Tajfel, 1982; Turner, 1985, 1987)

Considering that: 1) temporal dispersion limits the amount of interaction among members from different nations and 2) nationality diversity has a negative impact on global teams performance when members from different nations cannot over their cultural, social, or even idiomatic differences, it is feasible to believe that in global teams with high levels of temporal dispersion distant members may have fewer chances to overcome their differences and reduce the social distant among them. Thus, a negative relationship between nationality diversity and team performance is expect in this scenario. Nevertheless, as temporal dispersion decreases, team members may have more changes to interact with each other, and reduce the social distant among them resulting in better changes to overcome their differences. In this case the negative impact between nationality diversity and team performance is expected to be weaker than in highly temporal distributed teams.

Hypothesis 1: In global software development teams, temporal dispersion moderates the relationship between national diversity and performance in global teams such that the relationship is negative for teams high in temporal dispersion. However, this negative relationship is weaker for teams low in temporal dispersion.

Leadership Roles and National Diversity

The theory of behavioral complexity in leadership examines the different roles that leaders should engage in order to be affective (Denison, at al., 1995; Hooijberg, 1996; Quinn 1988). Leaders should consider environmental and technological factors of the team such as workflow, communication patters, task interdependence, and environmental uncertainty, to decide which roles better fits the needs of their team (Buenger, Conlon, & Austin, 1996). In situations that require flexibility to the external environment, leaders should assume the innovator and broker role. In situations when leaders need to focus on external goals, the producer and director role are called. The mentor and facilitator role are required to effectively develop the personal relationships within the team. Finally, the coordinator and monitor role should take place in situations when internal stability of the team is needed (Denison, at al., 1995; Hooijberg, 1996; Quinn 1988). Moreover, the mentor, facilitator, coordinator, and monitor roles of leadership put emphasis on internal processes and on interaction among team members. The innovator, broker, producer, and director roles put emphasis on the adaptation to the organization's external environment or in the pursuit of goals external to the group (Denison, Hooijberg, & Quinn, 1995; Hooijberg, 1996).

These leadership roles can be seen as a portfolio of behaviors that allows leaders to respond to complex and ambiguous situations. However, not every leader should perform all roles with the same intensity. Whether a leader should engage on a particular set of behaviors depends on the demands that the team faces. These demands can come from internal and external needs, as well as from the requirement to have a more flexible or stable team.

Research suggests that in distributed teams, members have better changes to improve the quality of their interaction when the structure of the team promotes consistent communication behaviors and team development activities

(Jarvenpaa and Leidner 1999). This paper proposes that in global software development teams, project leaders can contribute to this effort by creating and maintaining proper communication structures and promote interpersonal development through the execution of the coordinator monitor, facilitator, and mentor role (Bell & Kozlowski, 2002; Kayworth & Leidner, 2000, 2002). The coordinator and monitor roles can influence the exchange of task-relevant information among team members (Bell & Kozlowski, 2002; Huang, Davison, Liu, and Gu, 2008; Kayworth & Leidner, 2001). Whether the mentor and facilitator roles can help team member develop a shared vision and a unified sense of purpose, as well as to promote collective team identification (Blackburn et al., 2003).

This paper focuses on the coordinator monitor, facilitator, and mentor role instead of the innovator, broker, producer, and director roles for the following reason. Theory (Van Knippenberg, De Dreu, & Homan, 2004) and empirical studies (Kearney, & Gebert, 2009; Kearney, Gebert, and Voelpel, 2009) suggest that diversity affects team performance through two processes: 1) elaboration of task-relevant information, and 2) social categorization. These two processes are rooted on team members' interaction with each other, rather than on their interaction with external organizational agents. Thus, from a theoretical point of view, leadership roles that are responsible for managing team members interactions (e.g., the mentor, facilitator, coordinator, and monitor roles) are the roles that may influence how nationality diversity impacts team performance, rather than those leadership roles that put emphasis on the relationship between the team and the external environment (e.g., the innovator, broker, producer, and director roles).

The coordinator, and Monitor Roles of Leadership

In software development projects, leaders act as coordinators, when they define the activities that will take place during the different phases of the project. This project plan will allow the team to fulfill their goals. Once the project plan is defined, project leaders need to assign resources to each task, and clearly specify timelines and deliverables free of gaps and overlaps (Hoegl & Gemuenden, 2001; Marks, et al., 2001). As members start to execute their tasks, project leaders need to exercise their monitor role and assure that team activities are been performed as expect. If the project leader realized that the team is not reaching its objective, the project leader should take corrective actions (Hackman, & Walton, 1986).

Leaders of dispersed teams who engage in continuous communication behaviors by coordinating and monitoring team's activities are able to set clear goals for the whole team and can provide constant feedback regarding team performance and goals achievements (Bell & Kozlowski, 2002; Kayworth & Leidner, 2001). Research suggests that successful communication and cooperation among team members improves team coordination and teamwork (Mohammed, & Angell, 2004). Thus, distributed teams that exhibit consistent communication behaviors, have better changes to improve the quality of their interaction episodes than teams with inconsistent communication behaviors (Jarvenpaa and Leidner 1999). In global teams, if there is a clear idea of individual roles in relation to the team's task, team members across different countries will share the same information (Cramton, 2001). Having team members with a clear vision and understanding of the current status of the project makes it easy for members to collaborated with each other (Fiol, & O'Connor, 2005). For example, it has been suggested that in culturally heterogeneous setting, such a global software development teams, teams perform equally or more effectively than homogeneous teams when leaders help to prevent communication breakdowns (Ayoko et al. 2002) and help to broker knowledge between culturally diverse members (Baba et al. 2004). Which are activates that can be achieved through the roles of monitor and coordinator.

Hypothesis 2: In global software development teams, leader's monitor and coordinator roles moderate the relationship between national diversity and team performance such that the relationship is positive for teams with a leader high in monitor and coordinator roles, and negative in teams with a leader low in monitor and coordinator roles.

The Mentor, and Facilitator Roles of Leadership

The negative impact of nationality diversity on team performance, represented by social categorization, is contingent to whether team members identification with their fellow countrymen is higher than their collective identification with the team (van Knippenberg, De Dreu, & Homan, 2004). Collective team identification may be achieved when members shared vision and a unified sense of purpose (Blackburn et al., 2003).

Leaders acting as mentors demonstrate consideration, concern, and interest for the wellbeing of team members. Mentors are sensitive, open, and fair. The support provided by leaders creates a sense of belonging towards the team among members because mentors do a fair job dividing task responsibilities, overseeing people's contributions, and solving disagreements and conflict (Hooijberg, & Choi, 2000; Sarin & McDermott 2003). Likewise, leaders acting as facilitators identify critical differences among team members and develop mechanism to solve them (Denison et al.1995). They also encourage teamwork, and cohesion by promoting participation and conflict resolution (Quinn 1988, Denison et al. 1995). Through the facilitator role, leader seek consensus and increase mutual understanding among team members (Wakefield, Leidner, & Garrison, 2008). As leaders engage in these team building activities, trust (Jarvenpaa, Knoll, & Leidner, 1998; Jarvenpaa, & Leidner, 1999) and social integration (Kayworth & Leidner, 2002;Kayworth, & Leidner, 2000) among members of global team may increase. At the same time, team cohesion and identification can encourage extra-role helping behaviors among members in global teams (Wiesenfeld et al., 1999). Which in turn could reinforce trust and collective team identification among members from distinct countries (Jarvenpaa, Knoll, & Leidner, 1998; Jarvenpaa, & Leidner, 1999; Kayworth & Leidner, 2002;Kayworth, & Leidner, 2000).

As we can see through the execution of the mentor and facilitator roles leaders of global teams can make easier for members to identify themselves with the team and reduce the possible negative effects that differences based on nationality diversity may have on performance in global team (Fiol, & O'Connor, 2005).

Hypothesis 3: In global software development teams, leader's mentor and facilitator roles moderate the relationship between national diversity and team performance such that the relationship is positive for teams with leader high in mentor and facilitator roles, and negative in teams with leader low in mentor and facilitator roles.

Method

Setting

This study is based on secondary data provided by a multinational company from the telecommunications industry. The company has its headquarters located in Espoo, Finland, with offices in France, Mexico, Colombia, and Brazil. The business' model of the company is Software as a Service (SaaS) oriented. The company offers a set of product and services that can be adjusted to their customer needs. The telecommunications company hosts these products and services in-house. An important market segment for the company is its Latino American customers. Thus, the company has project managers located on the Colombia, Mexico and Brazil, while the software development teams are distributed across all five countries (Colombia, Mexico, Brazil, Finland, and France). Project managers can create their teams from members available in any office depending on resources available or time constrains.

Procedure

The data used in this study were collected electronically as part of a continuous improvement plan implemented by the Project Management Office of the company. At the end of each project, a survey is delivered via email to all team members, including the project manager. The project manager completes a survey about the project and team members. Similarly, team members complete a survey about the project and their manager. All participants in the project must answer the survey. If a team member, including the project manager, has not completed the survey after the first week of notice, the system sends a remainder to the employee' email.

Sample

The total sample consisted of 275 projects; which were the total number of projects managed by the Mexican, Colombian, and Brazilian office during 2007. The data came from three sources: 1) the project management system of the company, 2) project mangers, and 3) team members. The project management system of the company provided information on the location of the project manager and team members, the numbers of members involved in each team, the number of team members at each site, as well as information related to the projects such as cost, duration, etc. Team performance information was obtained from the survey completed by project managers, and team members rated their project manager roles.

To assure the quality of results, any team that had missing information was excluded from the study. This helps to control for the effects that non-responses could have on the rates of type II errors, distortions on the regression coefficients at the group level, and distortion of the correlation scores of the main variables (Allen, Stanley, Williams, & Ross, 2007; Timmerman, 2005). After reviewing missing data, two hundred and forty seven projects were included on the study (90 percent). Team size ranged from 3 to 9 members. The duration of these projects were between 18 and 87 days. In 32% of the projects, the project manager has totally isolated from other team members. Moreover, in 42% of the projects, team members were distributed across three different countries, and in 58% of the projects project members were distributed across two different countries. On average leaders managed 12 projects each.

Measures

Team Performance

 After each project was completed, project managers appraised their team's performance using a five-point Likert scales to rate team efficiency, quality of work delivered, and capacity of the team to deliver work according to schedule. The 3 items were adapted from a performance measure defined by Ancona and Caldwell (1992). The item-total correlation for all items was .87 and the Cronbach's alpha of the scale was .93.

Nationality diversity

Blau's (1977) heterogeneity index was used to compute nationality diversity. It was calculated using the following formula: $H = 1 - \Sigma P_i^2$, where P represents the fractional of team members from a particular nationality and $_i$ is the number of different nationalities presented on a team. Note that $0 < H < 1$. Values near zero correspond to homogeneous groups related to nationality diversity whether values near one correspond to highly diverse teams.

The nationality of each participant was determined using information from surveys. Each survey had two codes: one to identify the responder and one to identify the project. The responder code had a section that associates a responder with a specific branch on the company, and therefore, with a country. The information obtained by the surveys was compared with the information provided by the project management system of the company. No discrepancy was found. To account for the possibility that local branches could have foreign employees working onsite, the author contacted each branch and asked if there were any foreign employees working onsite during 2007. No case was reported.

Temporal dispersion

Temporal dispersion among team members were measured using the index defined by O'Leary & Cummings (2007), which was been previously used in research related to global teams (Hinds, & Mortensen, 2005; Joshi, Lazarova, & Liao, 2009). The index is computed with the following formula:

$\Sigma k_{i-j} (TimeZone_{i-j} * n_i * n_j) / (N^2 - N) / 2$.

Where *TimeZonesi-j* are the number of time zones between sites *i* and *j, k* is the total number of sites involved in the team, n_i is the number of team members in the ith site, n_j is the number of team members in the jth site, and N is total number of team members across all sites. The responders' codes from the survey filled by team members and project managers was used to determine the country of residence of each member and therefore, the time zone in which each team member was located.

Leadership roles.

 The host company used the guidelines of the Project Management Institutes (PMI) to develop a scale to measure different leadership behaviors. The scale measured leaders' ability to 1) Assign roles and responsibilities among team members. 2) Create schedules plan for team member's tasks and activities. 3) Engage in follow up meetings with team members. 4) Communicate changes on to the project scope to team members. 5) Inform team members about the over all project status. 6) Shows interest and concern to team members' needs. 7) Treats team members

with respect and empathy. 8) Promotes consensus among team members. 9) Solve discrepancies among team members.

A review of the project management literature (PMBOK Guide, 2004) indicated that items 1 to 5 of the scale are related to monitoring and coordinating activities. And items 6 to 9 are related to team members' development and conflict resolution activities. The author also verified the content validity of the items by reviewing literature about the behavioral perspective of leadership (Denison, at al., 1995; Hooijberg, 1996; Kayworth & Leidner, 2002; Wakefield, Leidner, Garrison, 2008; Quinn 1988). The activities described on the items 1 to 5 developed by the company are consistent with the definition of the coordinator and monitor roles described by the behavioral perspective of leadership. Likewise, The activities described on the items 6 to 9 developed by the company are consistent with the definition of the mentor, and facilitator roles described by the behavioral perspective of leadership. An exploratory factor analysis showed two distinct factors: one composed by items 1 to 5, and the second composed by items 6 to 9. These results support the idea that: 1) the monitor and coordinator roles are related because they focus on internal control and stability. And 2) the facilitator and mentor roles are related because they focus on human interactions and relations. For each factor the author averaged all items to create two scales that represent the for leadership roles examined in this paper. The Cronbach's alpha of the monitor-coordinator scale was .85. The Cronbach's alpha of the facilitator-mentor scale was .86.

Leadership roles were aggregated at the team level because the information about team performance was measured at the team level. I assessed intra group agreement (r_{wg}) on the leadership role scale items to confirm that members' responses were similar enough to be aggregated into a team score. Using the procedure recommended by LeBreton & Senter (2008), I estimated the r_{wg} index using two possible variances expected when there is a complete lack of agreement among team members. The r_{wg} index for all teams in both scenarios fell above .70, justifying the decision to aggregate member scores on leadership roles at the team level.

Project duration

Project duration influences the degrees to which members build shared mental models of each other (Rico et al., 2008). Similarly, by working together, individuals come to understand the knowledge, skills, and abilities of their peers (Liang, Moreland, & Argote, 1995; Pearsall & Ellis, 2006). Therefore, team duration could have an impact of how social categorization evolves in a team and an impact on how team members exchange task-relevant information, making important to control for it. Data about project duration was taken form the project management system of the company. A project starts at the moment the Project Management Office assigns a project manager to a project, and ends once the customer has signed the acceptance of the product. The information was provides in working days from the leader calendar. The official holidays where not including. Vacations or sick days reported from the project leader were not discounted.

Team Size

There is evidence that team size plays an important role on dispersed team's dynamics (Martins et al., 2004). For example, larger teams may find problems reaching consensus, because a higher number of individuals is required to agree in a common statement. Moreover, a higher number of team members implies that leaders are required to coordinate, control and oversee more individuals. Thus, team size can add complexity to team leaders' task. Project managers indicated the number of team members that participated in the project. The author compared this information with the codes related to the team members survey to verity that the information was accurate.

Hypotheses Testing

Descriptive statistics and correlations among the study variables for teams with complete data are presented in Table 1. A hierarchical multiple regression analysis design was used to test hypotheses. In the first block of the regression analysis I regressed the dependent variable (e.g. team performance) on control variables (team size, project duration, number of sites) to discard potential effects of compositional characteristics of the project on team performance. The second block included the centered scores of nationality diversity. The third block included the centered scores of leader's roles and temporal dispersion. Finally, each interaction effects were included in an independent block in the following order: first, the interaction between temporal dispersion and nationality diversity, then the interaction between the monitor-coordinator roles and nationality diversity, and finally the interaction between the facilitator-

mentor roles and nationality diversity (Chaplin, 1991; Champoux & Peter 1987, Cohen, Cohen, West, & Aiken, 2003). Al explanatory variables were z-standardized to have mean zero and variance one.

Table 1. Descriptive Statistics: Means, Standard Deviations, and Pearson's Correlations											
	Min	Max	Mean	S.D.	1.	2.	3.	4.	5.	6.	7.
1. Team Performance	1.00	5.00	2.23	1.54							
2. Nationality Diversity	0.51	0.90	0.64	0.10	.72**						
3. Temporal Dispersion	0.40	4.67	2.67	1.00	-.63**	.71**					
4. Leader Monitor-Coordinator Roles	1.00	5.00	3.24	1.14	.45**	.35**	-.36**				
5 Leader Facilitator-mentor Roles	1.00	5.00	3.28	1.75	.43**	.32**	-.35**	.28**			
6. Project Duration	18.00	85.0	48.01	1.61	0.00	0.00	.09	-.16*	-.21*		
7. Team Size	3.00	9.00	5.31	1.39	.02	-.02	.01	.19**	.16**	.13*	
8. Number of Sites	2.00	3.00	2.76	0.42	-.72**	.72**	.64**	-.37**	-42**	-.02	-.08

Results

In overall, the model account for 63% of the variance in team performance, $R^2 = 0.63$. Results indicate that temporal dispersion was negatively related to team performance ($\beta= -.21$), t(240) =-3.76, $\rho< .001$. Whereas nationality diversity, ($\beta= .54$), t(240) =7.46, $\rho< .001$, the monitor and coordinator roles, ($\beta= .21$), t(240) =4.76, $\rho< .001$, and the facilitator and mentor roles, ($\beta= .29$), t(240) =4.54, $\rho< .001$, were positively related to team performance. In relation to the hypotheses proposed in this paper, the interaction between temporal dispersion and nationality diversity was significant, ($\beta= -.13$), t(240) =-2.25, $\rho =.03$, with a significant increase in overall explained variance on team performance, ($\Delta R^2 = .03$), $\Delta F(2, 240) = 3.54$, $\rho = .03$. The interaction between the monitor and coordinator roles and nationality diversity was also significant, ($\beta= .17$), t(240) =2.64, $\rho =.04$, with a significant increase in overall explained variance on team performance ($\Delta R^2 = .02$) $\Delta F(2, 240) = 3.47$, $\rho = .03$. Finally, the interaction between the facilitator and mentor roles and nationality diversity was significant, ($\beta= .14$), t(240) =2.66, $\rho =.04$, with a significant increase in overall explained variance ($\Delta R^2 = .03$) $\Delta F(2, 240) = 3.38$, $\rho = .03$.

An examination of the simple slopes is required to further understand the effect of the interaction between leader roles, temporal dispersion and nationality diversity on team performance (Cohen & Cohen, 1983; Holmbeck, 2002). Results support Hypothesis 1. As seen in Figure 1, nationality diversity was negatively related to team performance at high levels of temporal dispersion, whether teams low on temporal dispersion did not experience this negative effect. Moreover, teams high on temporal dispersion exhibited lower performance than teams low on temporal dispersion. In relation to leadership roles, nationality diversity was positively related to team performance at high levels of monitor-coordinator roles, and negatively related to team performance at low levels of those leadership roles (see Figure 2). Thus, hypothesis 2 is supported. Likewise, nationality diversity was positively related to team performance at high levels of facilitator-mentor roles, and negatively related to team performance at low levels of those leadership roles (see Figure 3). Thus, hypothesis 3 is also supported.
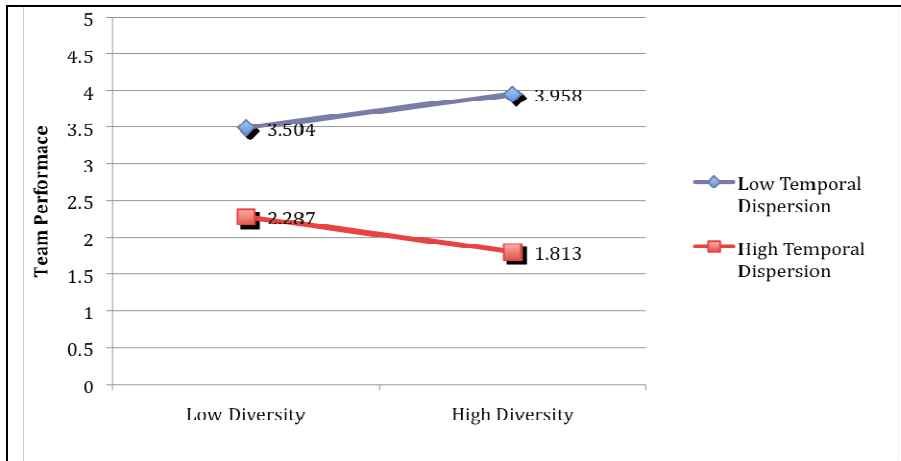
Figure 1. Moderating effects of temporal dispersion on the relationship between nationality diversity and team performance.
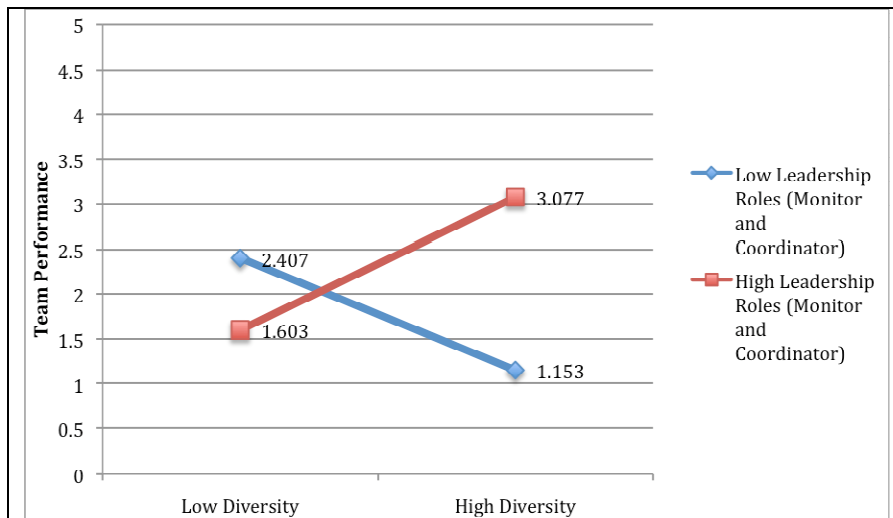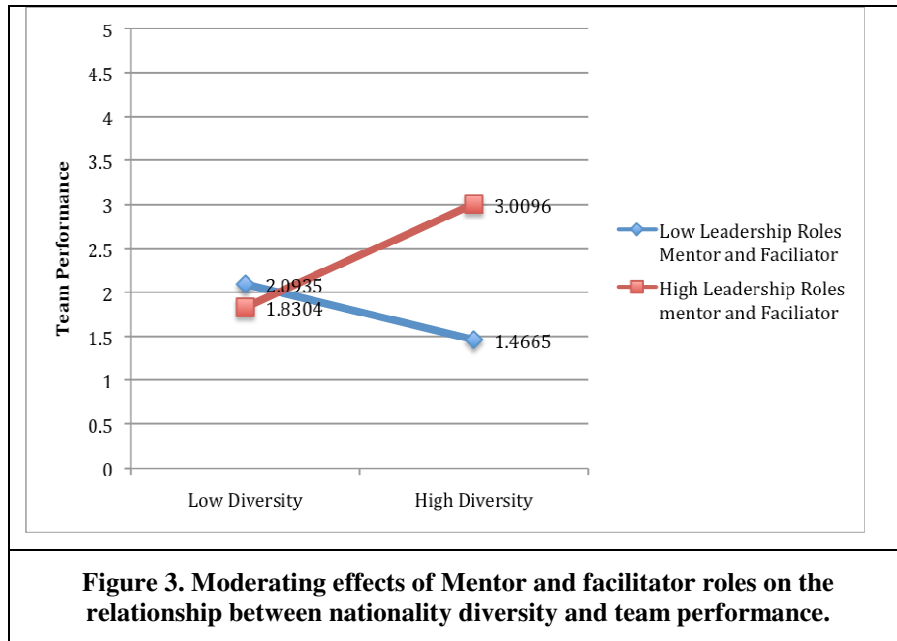

Figure 2. Moderating effects of monitor and coordinator roles on the relationship between nationality diversity and team performance.

Figure 3. Moderating effects of Mentor and facilitator roles on the relationship between nationality diversity and team performance.

Discussion

At the outset of this article, it is argued that the effect of nationality diversity on team performance is, to some extend, contingent to on the social structures that rule the team, specially the ones that are related to team members' coordination and interaction. Bering this in mind, the author proposed that temporal dispersion and leadership behaviors moderate the relation between nationality diversity and team performance. Researchers have called for a better understanding of the relationship among these variables, yet few studies have empirically examined these interaction processes. Results indicated that temporal dispersion is negatively associated with team performance, and teams that experienced low temporal dispersion performed better that team that experienced high temporal dispersion regardless of their degree of nationality diversity. When team members have few hours to work together, they are forced to communication with each other in an asynchronous mode. As a consequence, there could be a delay in the information that individuals from one site expect from distant team members (Cummings, Espinosa, and Pickering, 2009;Hertel et al. 2005; Kayworth, & Leidner, 2000). This delay in information distribution reduces team members' possibilities to communicate and solve problems in real time (Bell & Kozlowski, 2002; Kiesler & Cummings 2002). Additionally, it could increase the time the team requires to reach consensus or to make decision (Hollingshead, 1996; Sproull & Kiesler, 1986). Moreover, the effect of nationality diversity on team performance was positive on teams with low temporal dispersion, whereas the same relationship had a negative effect on teams with high temporal dispersion.

An interesting finding of the study is the positive main effect between nationality diversity and team performance. Literature suggests that nationality diversity has different effects on team dynamics at different points of time during the life spam of a project (Earley and Elaine Mosakowski, 2000; Harrison et al. 2002). During the initial stages of the project, members are unfamiliar with each other differences, and more effort is required to understand and solve these differences. As members start to interact, they develop internal mechanism to solve their differences, and gain a better understanding of each other. With enough interaction team members can learn how to take advantages of the diversity in views and experiences within the team (O'Reilly et al., 1989; Watson, et al., 1993). Taking into account that the data used in this paper was collected at the end of the projects, the results that we see could be related to the net effect that nationality diversity has on team performance after members have interact with each other for certain period of time. At the end of the project, team members were able to find a way to garner the positive effects of national diversity and to reduce it negative effects.

In relation to leadership roles, previous studies on dispersed teams have suggested that an excessive execution of the monitor and coordinator roles from leaders could create the perception of a lack of confidence from the leader to the team members, affecting team performance (Jarvenpaa, Knoll, & Leidner, 1998; Jarvenpaa, & Leidner, 1999).

However the constant execution of the monitor and coordinator roles by leaders had a positive impact on the performance of the teams involved in this study. Having different results across studies support the idea that leadership behavior should fit the needs of the team, no the other way around (Denison, at al., 1995; Hooijberg, 1996; Quinn 1988). Leaders should provide the best possible environment for team members to success in their tasks. Sometimes it is done thought empowerment and delegation; in the case of the teams participating in this study it was done through coordinating and monitoring their activities. The findings that the facilitator and mentor roles of leadership have a positive impact on team performance are consistent with previous studies about leadership on distributed teams (Kayworth, & Leider, 2000; Kayworth, & Leider, 2002; Wakefield, Leidner, Garrison, 2008) and highlight the influence that leaders have on the development of rich interpersonal relationship among members in multicultural teams (Avolio, Dodge, 2004).

These findings also emphasize the complex role that leaders play in global teams. Nationality diversity had a positive effect on team performance when leader constantly execute their monitor, coordinator, facilitator, and mentor roles. If leaders did not exhibit these behaviors frequently, nationality diversity had a negative impact on team performance. However, when diversity was low, teams had a better performance if their leaders did not constantly execute these roles. These finding suggest that teams under different conditions may require different leadership schemas and leader should acknowledge that under certain circumstance some behavior could do more harm than good.

Theoretical and practical implications

This study makes three contributions to the literature. First, it contributes to the global teams literature by examining how performance is influenced by nationality diversity, leadership behaviors, and temporal dispersion. This is especially important because literature on global teams has primarily focused on technology and media usage as the key elements that moderate the social interaction among team members (Martins, Gilson, & Maynard, 2004).

Second, the paper makes a contribution to the diversity literature by introducing two potential moderators of diversity-to-outcome relation: temporal dispersion and leadership behavior. This is relevant because several researchers have expressed concern that diversity studies in teams have mainly focused on the direct effect of diversity on performance, neglecting to take into account possible contextual variables (Joshi, & Roh, 2009; van Knippenberg, & Schippers, 2007; van Knippenberg, De Dreu, & Homan, 2004; Reagans & Zuckerman, 2001).

Finally, the third contribution is a reexamination of the leadership-performance relationship in dispersed teams. A number of studies have suggested a negative relationship between leadership behaviors related to the monitor or coordinator roles and team performance in dispersed teams. This premise is based on the assumption that team members perceive these monitor and coordinator roles as indicators of low trust from their project leaders. However, recent studies suggest that in some cases the same behaviors could be beneficial for team performance (Wakefield, Leidner, & Garrison, 2008). The analyses of the leadership monitor or coordinator role on this paper suggest that there should be a fit between leader's behaviors and teams needs. Leaders should understand that different teams requires different leadership behaviors, and they must be willing to adapt to teams conditions, and not to other way around. This is especially true in disperse teams where monitoring team performance, establishing well-defined goals and responsibilities, and creating cohesion among members are tasks that require more effort and resources than in a traditional context due to the limited face-to-face interactions among members (Hertel et al. 2005; Kayworth, & Leidner, 2002). Leaders in global teams need to understand how team dispersion, and team diversity affects the conditions of their environment so they can define proper strategies to accomplish their duties (Kayworth, & Leidner, 2001; Wakefield, Leidner, Garrison; 2008).

Limitations and Strengths

This study has several limitations. First, the study is based on secondary data collected internally by the host company. We could expect some bias related to team performance and leadership behavior, because there are based on responder's perceptions. However, the mean for team performance is somehow low (M = 2.23) and the values for leadership behavior is around the mean of the scale. Another limitation of the study is that all the data available is at the team level. This limited our possibilities to use a nested model design such as hierarchical linear modeling, which would have given us the possibility of conducting a multi-level study. Third, this study only focuses on leadership and temporal dispersion. However, by no means it intends to state that these are the only contextual factors that may influence the diversity-outcome relationship in global teams. For example, an important factor en

any disperse teams is information and communication technologies. Members of global teams face barriers for the elaboration of task-relevant information and the development of rich and meaningful interpersonal relationships, however these barriers may be reduced with the use of information and communication technologies. Information and communication technologies have the ability to modify behavior, rules, and resources usage of social systems (DeSanctis, Geradine & Poole, 1994; Poole, & DeSanctis, 1990), as well as to influence how members of global teams exchange task related information (Griffith, Sawyer, Neale, 2003; Maznevski, & Chudoba, 2000). Literature suggests that dispersed teams could use rich communication technologies combined with longer communication episodes or an increase in the frequency of their episodes to reduce the negative effects of low social interaction and low common knowledge created by team dispersion (Maznevski, & Chudoba, 2000). Moreover, global teams can use different technologies that no only improve the communication among distant members, but also improve the process of knowledge sharing and combination (Majchrzak, Rice, Malhotra, 2000; Ramesh, & Tiwana, 1999; Malhotra, Majchrzak, Lott, 2001; Lee, & Choi, 2003; Paul, 2006; Sambamurthy & Subramani, 2005; Alavi & Leidner, 2001). The above manifestations suggest that ICTs also have the potential to influence the diversity-outcome relationship in global teams. However, the study of this factor is out of the scope of this study, and the author recommends it inclusion in future research.

Another limitation of the study is that there are fewer participants (project leaders, and team members) than projects. Thus, is possible that the same responder participated in more than one team, and some observations about leadership roles and team performance are not independent. However, projects are unique by definition (Cohen & Bailey, 1997), and the output, tasks, and team composition varies form one project to another. This reduces the impact that the lack of independence could have on responders' observation.

Despite these limitations, there are several strengths on the study as well. The data came from different sources: leadership roles were reported by team members; team performance ratings were based on project leaders' report; information about team composition and dispersion was objectively measured using leaders' reports, members' surveys, and the project management system of the company. In addition to that, only teams without missing data were included on the study. This helps to control for the effects that non-responses could have on the rates of type II errors, distortions on the regression coefficients at the group level, and distortion of the correlation scores of the main variables (Allen, Stanley, Williams, & Ross, 2007; Timmerman, 2005). Finally, the fact that our study took place within a corporate scenario including real global teams distributed in two continents across five countries gives a better chance to understand the real impact of nationality diversity, temporal dispersion and leadership on global corporate teams, adding strength to the internal validity of our findings.

Future work

In global software development teams, leaders also face the same problems that team members have regarding team dispersion. In a dispersed context, where face-to-face interaction is limited, monitoring team performance, establishing well-defined goals and responsibilities, and creating cohesion among members are tasks that require more effort and resources than in a more traditional context (Hertel et al. 2005; Kayworth, & Leidner, 2002). Similarly, behavioral control methods, such as the monitor role of leadership, have been associated with significant trust decline in dispersed teams (Piccoli, & Blake Ives, 2003). Future studies of diversity on global team should analyze the role of local control mechanisms such as self-regulation or group control (Choudhury & Sabherwal, 2003) which could be more effective than external behavioral control methods, for they have a less impact on trust, a critical element on global teams (Jarvenpaa & Leidner 1999).

Acknowledgements

References

Allen, N. J., D. J. Stanley, H. M. Williams, and S. J. Ross. "Assessing the Impact of Nonresponse on Work Group Diversity Effects," Organizational Research Methods (10:2), Apr, 2007, pp. 262-286.

Ancona, D. G., and D. F. Caldwell. "Bridging the Boundary: External Activity and Performance in Organizational Teams," Administrative Science Quarterly (37:4), Dec., 1992, pp. 634-665.

Avolio, B. J., S. Kahai, and G. E. Dodge. "E-Leadership: Implications for Theory, Research, and Practice," The Leadership Quarterly (11:4), 0, 2000, pp. 615-668.

Ayoko, O. B., C. E. J. Härtel, and V. J. Callan. "Resolving the Puzzle of Productive and Destructive Conflict in Culturally Heterogeneous Workgroups: A Communication Accommodation Theory Approach," International Journal of Conflict Management (1997-2002) (13:2), 04, 2002, pp. 165.

Baba, M. L., J. Gluesing, H. Ratner, and K. H. Wagner. "The Contexts of Knowing: Natural History of a Globally Distributed Team," Journal of Organizational Behavior (25:5), Aug., 2004, pp. 547-587.

Barkhi, R., A. Amiri, and T. L. James. "A Study of Communication and Coordination in Collaborative Software Development," Journal of Global Information Technology Management (9:1), 2006, pp. 44.

———. "A Study of Communication and Coordination in Collaborative Software Development," Journal of Global Information Technology Management (9:1), 2006, pp. 44.

Barry, E. J., C. F. Kemerer, and S. A. Slaughter. "Environmental Volatility, Development Decisions, and Software Volatility: A Longitudinal Analysis," Management Science (52:3), March 1, 2006, pp. 448-464.

Bell, B. S., and S. W. J. Kozlowski. "A Typology of Virtual Teams: Implications for Effective Leadership.(the Interface of Leadership and Team Processes)," Group & Organization Management (27:1), 03/01, 2002, pp. 14(36).

Boh, W. F., S. A. Slaughter, and J. A. Espinosa. "Learning from Experience in Software Development: A Multilevel Analysis.(Report)," Management Science (53:8), 08/01, 2007, pp. 1315(17).

Buenger, V., R. L. Daft, E. J. Conlon, and J. Austin. "Competing Values in Organizations: Contextual Influences and Structural Consequences," Organization Science (7:5), Sep. - Oct., 1996, pp. 557-576.

Cohen, A., E. Doveh, and U. Eick. "Statistical Properties of the rWG(J) Index of Agreement," Psychological Methods (6:3), September, 2001, pp. 297-310.

Cohen, S. G., and D. E. Bailey. "What Makes Teams Work: Group Effectiveness Research from the Shop Floor to the Executive Suite," Journal of Management (23:3), 1997, pp. 239-290.

Connaughton, S. L., and M. Shuffler. "Multinational and Multicultural Distributed Teams," Small Group Research (38:3), June 01, pp. 387-412.

———. "Multinational and Multicultural Distributed Teams," Small Group Research (38:3), June 01, 2007, pp. 387-412.

Cramton, C. D. "The Mutual Knowledge Problem and its Consequences for Dispersed Collaboration," Organization Science (12:3), May - Jun., 2001, pp. 346-371.

Cummings, J. N., J. A. Espinosa, and C. K. Pickering. "Crossing Spatial and Temporal Boundaries in Globally Distributed Projects: A Relational Model of Coordination Delay," Information Systems Research (20:3), 09, 2009, pp. 420-439.

Curşeu, P. L., and S. G. L. Schruijer. "Does Conflict Shatter Trust Or does Trust Obliterate Conflict? Revisiting the Relationships between Team Diversity, Conflict, and Trust," Group Dynamics: Theory, Research, and Practice (14:1), Mar, 2010, pp. 66-79.

DAHLIN, K. B., L. R. WEINGART, and P. J. HINDS. "Team Diversity and Information use," Academy of Management Journal (48:6), 12, 2005, pp. 1107-1123.

De Dreu, C. K. W., and M. A. West. "Minority Dissent and Team Innovation: The Importance of Participation in Decision Making," Journal of Applied Psychology (86:6), December, 2001, pp. 1191-1201.

Denison, D. R., R. Hooijberg, and R. E. Quinn. "Paradox and Performance: Toward a Theory of Behavioral Complexity in Managerial Leadership," Organization Science (6:5), Sep, 1995, pp. 524-540.

———. "Paradox and Performance: Toward a Theory of Behavioral Complexity in Managerial Leadership," Organization Science (6:5), Sep. - Oct., 1995, pp. 524-540.

Dubé, L., & Robey, D. Surviving the paradoxes of virtual teamwork. Information Systems Journal (2009) 19(1), 3-30

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

Elron, E. "Top Management Teams within Multinational Corporations: Effects of Cultural Heterogeneity," Leadership Quarterly (8:4), Winter97, 1997, pp. 393.

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

Evaristo R and Paul C van Fenema. A typology of project management: emergence and evolution of new forms, International Journal of Project Management (1999), 17 (5), pp. 275-281

Faraj, S., and L. Sproull. "Coordinating Expertise in Software Development Teams," Management Science (46:12), Dec., 2000, pp. 1554-1568.

Farshcian, B. A. "Integrating Geographically Distributed Development Teams through Increased Product Awareness," Information Systems (26:3), 5, 2001, pp. 123-141.

Fiol, C. M., and E. J. O'Connor. "Identification in Face-to-Face, Hybrid, and Pure Virtual Teams: Untangling the Contradictions," Organization Science (16:1), Jan. - Feb., 2005, pp. 19-32.

Gargiulo, M., and M. Benassi. "Trapped in Your Own Net? Network Cohesion, Structural Holes, and the Adaptation of Social Capital," Organization Science (11:2), Mar. - Apr., 2000, pp. 183-196.

Griffith, T. L., and M. A. Neale. "8. Information Processing in Traditional, Hybrid, and Virtual Teams: From Nascent Knowledge to Transactive Memory," Research in Organizational Behavior (23:2001, pp. 379-421.

Griffith, T. L., J. E. Sawyer, and M. A. Neale. "Virtualness and Knowledge in Teams: Managing the Love Triangle of Organizations, Individuals, and Information Technology," MIS Quarterly (27:2), Jun., 2003, pp. 265-287.

Hambrick, D. C., S. C. Davidson, S. A. Snell, and C. C. Snow. "When Groups Consist of Multiple Nationalities: Towards a New Understanding of the Implications," Organization Studies (Walter De Gruyter GmbH & Co.KG.) (19:2), 03, 1998, pp. 181-205.

Harrison, D. A., K. H. Price, J. H. Gavin, and A. T. Florey. "Time, Teams, and Task Performance: Changing Effects of Surface- and Deep-Level Diversity on Group Functioning," The Academy of Management Journal (45:5), Oct., 2002, pp. 1029-1045.

Hertel, G., S. Geister, and U. Konradt. "Managing Virtual Teams: A Review of Current Empirical Research," Human Resource Management Review (15:1), 03, 2005, pp. 69-95.

Hinds, P. J., and D. E. Bailey. "Out of Sight, Out of Sync: Understanding Conflict in Distributed Teams," Organization Science (14:6), Nov. - Dec., 2003, pp. 615-632.

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

Hollingshead, A. B. "Information Suppression and Status Persistence in Group Decision Making: The Effects of Communication Media," Human Communication Research (23:12, 1996, pp. 193-219.

Homan, A. C., D. van Knippenberg, G. A. Van Kleef, and C. K. W. De Dreu. "Bridging Faultlines by Valuing Diversity: Diversity Beliefs, Information Elaboration, and Performance in Diverse Work Groups," Journal of Applied Psychology (92:5), September, 2007, pp. 1189-1199.

Hooijberg, R. "A Multidirectional Approach Toward Leadership: An Extension of the Concept of Behavioral Complexity," Human Relations (49:07/01, 1996, pp. p917(30).

Hooijberg, R., and J. Choi. "Which Leadership Roles Matter to Whom? an Examination of Rater Effects on Perceptions of Effectiveness," The Leadership Quarterly (11:3), 0, 2000, pp. 341-364.

Horwitz, S. K., and I. B. Horwitz. "The Effects of Team Diversity on Team Outcomes: A Meta-Analytic Review of Team Demography.(Report)," Journal of Management (33:6), 12/01, 2007, pp. 987(29).

Huang, Q., R. Davison, H. Liu, and J. Gu. "The Impact of Leadership Style on Knowledge-Sharing Intentions in China," Journal of Global Information Management (16:4), Oct-Dec, 2008, pp. 67.

Huang, W. W., K. Wei, R. T. Watson, and B. C. Y. Tan. "Supporting Virtual Team-Building with a GSS: An Empirical Investigation," Decision Support Systems (34:4), 3, 2003, pp. 359-367.

III, C. A. O., D. F. Caldwell, and W. P. Barnett. "Work Group Demography, Social Integration, and Turnover," Administrative Science Quarterly (34:1), Mar., 1989, pp. 21-37.

———. "Work Group Demography, Social Integration, and Turnover," Administrative Science Quarterly (34:1), Mar., 1989, pp. 21-37.

Jackson, S. E., A. Joshi, and N. L. Erhardt. "Recent Research on Team and Organizational Diversity: SWOT Analysis and Implications," Journal of Management (29:6), 12, 2003, pp. 801-830.

Jarvenpaa, S. L., K. Knoll, and D. E. Leidner. "Is Anybody Out there?" Journal of Management Information Systems (14:4), Spring98, 1998, pp. 29-64.

Jarvenpaa, S. L., and D. E. Leidner. "Communication and Trust in Global Virtual Teams," Organization Science (10:6, Special Issue: Communication Processes for Virtual Organizations), Nov. - Dec., 1999, pp. 791-815.

Jehn, K. A., G. B. Northcraft, and M. A. Neale. "Why Differences make a Difference: A Field Study of Diversity, Conflict, and Performance in Workgroups," Administrative Science Quarterly (44:4), Dec., 1999, pp. 741-763.

Joshi, A., M. B. Lazarova, and H. Liao. "Getting Everyone on Board: The Role of Inspirational Leadership in Geographically Dispersed Teams," Organization Science (20:1), Jan, 2009, pp. 240-252.

JOSHI, A., and H. ROH. "The Role of Context in Work Team Diversity Research: A Meta-Analytic Review," Academy of Management Journal (52:3), 06, 2009, pp. 599-627.

Kanawattanachai, P., and Y. Yoo. "Dynamic Nature of Trust in Virtual Teams," The Journal of Strategic Information Systems (11:3-4), 12, 2002, pp. 187-213.

KANKANHALLI, A., B. C. Y. TAN, and W. E. I. KWOK-KEE. "Conflict and Performance in Global Virtual Teams," Journal of Management Information Systems (23:3), Winter2006, 2006, pp. 237-274.

Kayworth, T., and D. Leidner. "The Global Virtual Manager: A Prescription for Success," European Management Journal (18:2), 4, 2000, pp. 183-194.

———. "Leadership Effectiveness in Global Virtual Teams," Journal of Management Information Systems (18:3), 2002, pp. 7-40.

Kearney, E., and D. Gebert. "Managing Diversity and Enhancing Team Outcomes: The Promise of Transformational Leadership," Journal of Applied Psychology (94:1), January, 2009, pp. 77-89.

KEARNEY, E., D. GEBERT, and S. C. VOELPEL. "When and how Diversity Benefits Teams: The Importance of Team Members' Need for Cognition," Academy of Management Journal (52:3), 06, 2009, pp. 581-598.

Kirsch, L. J. "Deploying Common Systems Globally: The Dynamics of Control," Information Systems Research (15:4), December 1, 2004, pp. 374-395.

Kotlarsky, J., and I. Oshri. "Social Ties, Knowledge Sharing and Successful Collaboration in Globally Distributed System Development Projects," European Journal of Information Systems (14:1), Mar, 2005, pp. 37.

Lau, D. C., and J. K. Murnighan. "Demographic Diversity and Faultlines: The Compositional Dynamics of Organizational Groups," The Academy of Management Review (23:2), Apr., 1998, pp. 325-340.

LeBreton, J., and J. Senter. "Answers to 20 Questions about Interrater Reliability and Interrater Agreement," Organizational Research Methods (11:4), Oct, 2008, pp. 815.

Levesque, L. L., J. M. Wilson, and D. R. Wholey. "Cognitive Divergence and Shared Mental Models in Software Development Project Teams," Journal of Organizational Behavior (22:2, Special Issue: Shared Cognition), Mar., 2001, pp. 135-144.

Martins, L. L., L. L. Gilson, and M. T. Maynard. "Virtual Teams: What do we Know and Where do we Go from here?" Journal of Management (30:6), 11, 2004, pp. 805-835.

Maznevski, M. L., and K. M. Chudoba. "Bridging Space Over Time: Global Virtual Team Dynamics and Effectiveness," Organization Science (11:5), Sep/Oct, 2000, pp. 473.

Mohammed, S., and L. C. Angell. "Surface- and Deep-Level Diversity in Workgroups: Examining the Moderating Effects of Team Orientation and Team Process on Relationship Conflict," Journal of Organizational Behavior (25:8), Dec., 2004, pp. 1015-1039.

Mortensen, M., and P. J. Hinds. "Conflict and Shared Identity in Geographically Distributed Teams," International Journal of Conflict Management (1997-2002) (12:3), 07, 2001, pp. 212.

Murnighan, J. K., and D. E. Conlon. "The Dynamics of Intense Work Groups: A Study of British String Quartets," Administrative Science Quarterly (36:2), Jun., 1991, pp. 165-186.

O'Leary, M. B., and J. N. Cummings. "The Spatial, Temporal, and Configurational Characteristics of Geographic Dispersion in Teams," MIS Quarterly (31:3), 09, 2007, pp. 433-452.

PAULEEN, D. J. "An Inductively Derived Model of Leader-Initiated Relationship Building with Virtual Team Members," Journal of Management Information Systems (20:3), Winter2003, 2003, pp. 227-256.

Pearsall, M. J., A. P. J. Ellis, and J. M. Evans. "Unlocking the Effects of Gender Faultlines on Team Creativity: Is Activation the Key?" Journal of Applied Psychology (93:1), January, 2008, pp. 225-234.

Pelled, L. H. "Demographic Diversity, Conflict, and Work Group Outcomes: An Intervening Process Theory," Organization Science (7:6), Nov, 1996, pp. 615-631.

Pelled, L. H., K. M. Eisenhardt, and K. R. Xin. "Exploring the Black Box: An Analysis of Work Group Diversity, Conflict, and Performance," Administrative Science Quarterly (44:1), Mar., 1999, pp. 1-28.

Polzer, J. T., C. B. Crisp, S. L. Jarvenpaa, and J. W. Kim. "Extending the Faultline Model to Geographically Dispersed Teams: How Colocated Subgroups can Impair Group Functioning," Academy of Management Journal (49:4), 08, 2006, pp. 679-692.

Purvanova, R. K., and J. E. Bono. "Transformational Leadership in Context: Face-to-Face and Virtual Teams," The Leadership Quarterly (20:3), 6, 2009, pp. 343-357.

Reagans, R., and E. W. Zuckerman. "Networks, Diversity, and Productivity: The Social Capital of Corporate R&D Teams," Organization Science (12:4), Jul. - Aug., 2001, pp. 502-517.

Rico, R., M. Sánchez-Manzanares, F. Gil, and C. Gibson. "Team Implicit Coordination Processes: A Team Knowledge-Based Approach," Academy of Management Review (33:1), 01, 2008, pp. 163-184.

Salk, J. E., and M. Y. Brannen. "National Culture, Networks, and Individual Influence in a Multinational Management Team," The Academy of Management Journal (43:2), Apr., 2000, pp. 191-202.

Sarker, S., and S. Sarker. "Exploring Agility in Distributed Information Systems Development Teams: An Interpretive Study in an Offshoring Context," Information Systems Research (20:3), September 1, 2009, pp. 440-461.

Simons, T., L. H. Pelled, and K. A. Smith. "Making use of Difference: Diversity, Debate, and Decision Comprehensiveness in Top Management Teams," The Academy of Management Journal (42:6), Dec., 1999, pp. 662-673.

Sproull, L., and S. Kiesler. "Reducing Social Context Cues: Electronic Mail in Organizational Communications," Management Science (32:11), Nov., 1986, pp. 1492-1512.

Triandis, H. C., and E. M. Suh. "Cultural Influences on Personality," Annual Review of Psychology01/01, 2002, pp. 133(28).

Tsui, A. S., S. S. Nifadkar, and A. Y. Ou. "Cross-National, Cross-Cultural Organizational Behavior Research: Advances, Gaps, and Recommendations," Journal of Management (33:3), 06, 2007, pp. 426-478.

van Knippenberg, D., and M. C. Schippers. "Work Group Diversity," Annual Review of Psychology (58:1), 01/01, 2007, pp. 515-541.

van Knippenberg, D., C. K. W. De Dreu, and A. C. Homan. "Work Group Diversity and Group Performance: An Integrative Model and Research Agenda," Journal of Applied Psychology (89:6), Dec, 2004, pp. 1008-1022.

Wakefield, R., D. Leidner, and G. Garrison. "A Model of Conflict, Leadership, and Performance in Virtual Teams," Information Systems Research (19:4), Dec, 2008, pp. 434.

Wakefield, R. L., D. E. Leidner, and G. Garrison. "A Model of Conflict, Leadership, and Performance in Virtual Teams," Information Systems Research (19:4), 12, 2008, pp. 434-455.

———. "A Model of Conflict, Leadership, and Performance in Virtual Teams," Information Systems Research (19:4), 12, 2008, pp. 434-455.

Walsham, G. "Cross-Cultural Software Production and use: A Structurational Analysis," MIS Quarterly (26:4), Dec., 2002, pp. 359-380.

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

Zigurs, I. "Leadership in Virtual Teams: Oxymoron Or Opportunity?" Organizational Dynamics (31:4), 01, 2003, pp. 339-351.