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ABSTRACT

As virtual teams are inherently heterogeneous and distributed in nature they have a greater tendency to fracture into subgroups. Proper management of these subgroups is critical as they are often more detrimental than beneficial. Research that systematically examines subgroup formation is limited in identifying factors that influence the negative or positive impact of subgroups. To address this gap, we propose a new model based on Social Categorization Theory, Faultline Theory and the diversity literature. Our model takes into account the temporal impact of different cultural factors, namely surface and deep level culture diversity, with the alignment of other attributes on subgroup saliency. It also captures the interaction of varying levels of culture (national, organizational, functional) and their impact on subgroup dynamics. Additionally, the model represents the norms of technology use as a mediator for the impact of subgroup saliency on team performance.

Keywords

Cultural Diversity, Subgroups, Faultline, Virtual Teams, Technology Norms.

INTRODUCTION

Virtual teams have become a common way to manage distributed work as it allows organizations to assemble distant expertise and resources effectively. The diverse backgrounds of team members, the distributed nature of the work, and a heavy reliance on information communication technologies (ICT) all contribute to the complexities of virtual teaming processes. Organizations are continually challenged to maximize the advantages of diverse virtual teams while minimizing their disruptions. One of the primary disruptions is the emergence of subgroups within a team (Lau and Murnighan, 1998) which naturally form based on shared attributes such as demographics, geography, or cultural characteristics. For example, one could find a subgroup of junior Asian system developers and a subgroup of senior European system analysts within a virtual software engineering team. It is important to understand the type and magnitude of the impacts resulting from these subgroups configurations. In strong subgroups, in-group and out-group behavior can develop potentially resulting in the misattribution of other team members' contributions and unfavorable perceptions of the other subgroups ultimately leading to intra-team conflict (Cramton, 2001; Lau and Murnighan, 2005). However, subgroups can have a positive impact such as when they function as cohorts allowing team members to feel more comfortable in expressing their opinions due to the similarities in backgrounds (Gibson and Vermeulen, 2003). Given this tension, subgroups must be managed effectively to ensure effective collaboration. Additional research is needed to understand how to do this for the optimal benefit of the virtual team (Cramton and Hinds, 2005).

In reviewing the literature on subgroup formation two key gaps are easily identified. Firstly, the work that systematically examines virtual subgroup formation is limited. Of what does exist, there is an overemphasis on the role that geographical dispersion plays in triggering "in-group/out-group" dynamics among virtual team members (Polzer, Crisp and Kim, 2006). Although these studies are insightful, we argue that cultural factors may have a stronger influence on subgroup formation for several reasons. Globalization, outsourcing, and off-shoring practices have led to organizations to assemble teams from various parts of the world. These team members are likely to have diverse skills, cultural backgrounds, and values. Cultural values strongly affect the attitudes and behavior of individuals in team settings and have grater impacts to team performance than other demographic characteristics (Kirkman and Shapiro, 2005).The underlying differences among team members., rooted from difference cultural values consistently lead to incongruence of relationship values, time perceptions and eventually lead to conflicts (Kankanhalli, Tan and Wei, 2006; Shachaf, 2008). Contemporary cultural studies of virtual teams however often view culture as rigid and fixed, focusing almost exclusively on the national culture of team members (Gallivan and Srite, 2005). While tractable, this narrow view of culture does not consider the possible interaction of other dimensions of culture namely organizational, functional and team culture (one notable exception is Gibbs, Street and Brunswick, 2009). Given the popularity of outsourcing practices and virtual team work arrangements, different organizational and functional

cultures will most likely influence team dynamics particularly the evolution of subgroups. Our study responds to calls from researchers to integrate different levels of culture in influencing subgroup formation and team performance (Horwitz and Horwitz, 2007).

Secondly, studies related to subgroup formation have been largely founded on collocated team which differs from virtual teams along the primary mechanism of interaction (face-to-face vs. computer-mediated) and the range of dispersion among team members (collocated vs. globally distributed). There is limited emphasis on the role of information and communication technologies (ICT) in the current models that examine subgroups. This is particularly crucial since the process of impression formation that effects the categorization of team members into distinct subgroups is arguably different in collocated and virtual settings (Walther, 1997). Although ICT may provide less social cues for impression formation of team members, studies have shown that people will rely on whatever cues (e.g., word choice, paralinguistic cues, typographic information) available to form impression judgment towards others (Lea and Spears 1992). Through these minimal cues, people tend to make more intense, stereotyped, and exaggerated impression towards their team members in computer-mediated communication when compared to face-to-face interaction (Walther 1997; Hancock and Dunham, 2001). Grounded on this theory, we argue that virtual team members will use any available cues to categorize themselves into subgroups.

Our paper provides a synthesis of this literature as a foundation for examining the interaction of varying cultural dimensions in influencing subgroup saliency in virtual teams. The proposed model extends the literature by considering the temporal impact of different cultural diversity components, namely surface and deep level culture diversity on subgroup saliency. It moves beyond a monolithic view of culture by capturing the relationship of varying levels of culture (national, organizational, functional) as viewed through a lifecycle stage model of virtual teams. This model also incorporates norms of technology use as mediator for cultural impacts on subgroup dynamics and team performance. This model guides our on-going field research.

CONCEPTUAL MODEL DEVELOPMENT

Underlying Theories for Subgroup Formation

The proposed research model illustrates the interaction of factors that influence subgroup saliency and eventually team performance as teams move from Initiation to Culmination stage of virtual teams' development. Consistent with Social Categorization theory (Turner, 1985) team members will identify and differentiate themselves from others based on similarities of attributes. People are attracted to and prefer to be with similar others because they anticipate that their own values, attitudes, and beliefs will be reinforced. Team members tend to have less positive attitudes toward, and form fewer social attachments with, those who are perceived to be less like them (Tajfel and Turner, 1986).

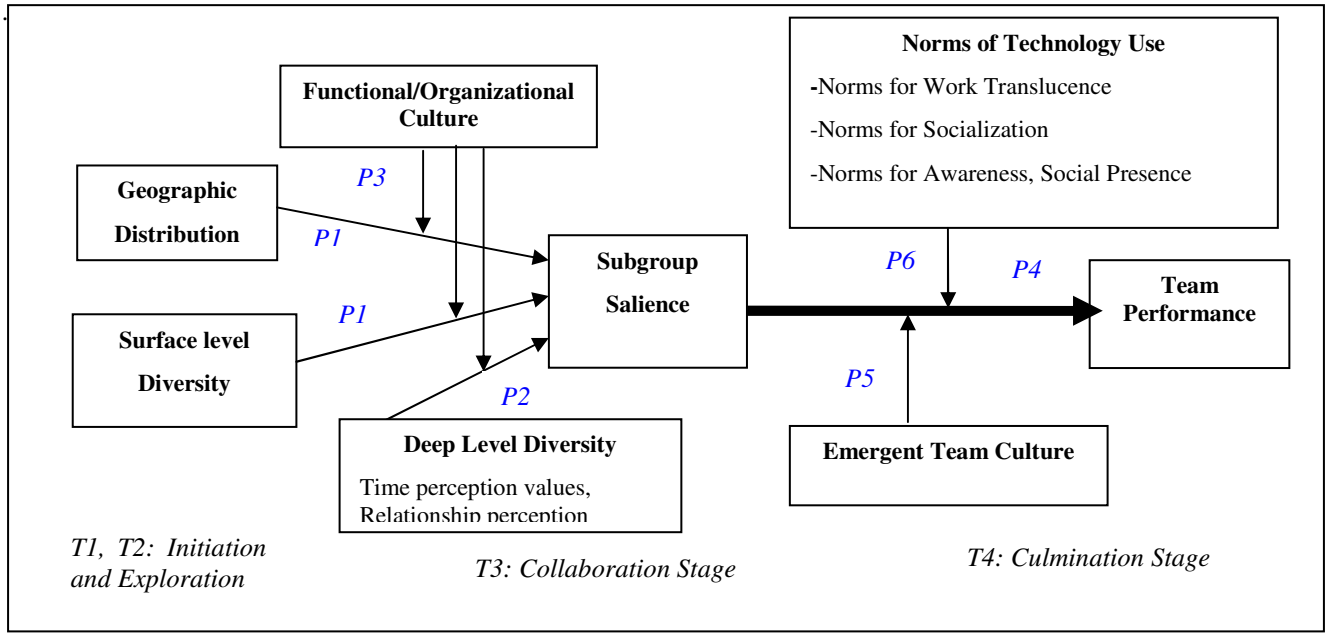

Figure 1. Model for Cultural Diversity Impact on Subgroup Salience and Team Performance in Virtual Teams

We draw upon the diversity literature to understand the role of diversity in triggering subgroup formation. Diversity can be characterized into two types; surface and deep level diversity (Harrison, Price, Gavin and Florey, 2002). Surface diversity is overtly observable characteristics such age, gender, sex, or ethnicity. Deep level diversity is based on differences in values, beliefs, and attitudes which manifested through interpersonal interaction over time. Based on Social Categorization theory people will initially rely on surface level diversity to categorize themselves into distinct subgroups, but with ongoing interaction deep level diversity will then be more prominent in the social categorization process.

Our model was also founded on Faultline Theory (Lau and Murnighan, 1998) which posits that the correlation between different attributes influences the likelihood that diversity elicits sub-categorization processes. For example a group of Asian system developers with a group of European system analyst will have stronger faultlines since the ethnicity and functional attributes correlate with each other. Using this we argue that the interaction of surface diversity (observable attributes) and geographical location will influence subgroup saliency in initial stages of virtual teaming. As the team engaged in further interaction deep level diversity (national culture) will influence the subgroup saliency (Hofstede, 1980; Kirkman and Shapiro, 2001).

Virtual Team Development

In linking the impact of cultural diversity with virtual team development processes we refer to Sarker and Sahay (2003) study. They suggest that there are basically four phases in virtual teaming: *Initiation, Exploration, Collaboration and Culmination*. In the *Initiation* phase, the team identity is fragmented as participants were more related with their local members. This fragmentation often continues to the *Exploration* phase where team members are still in the process of establishing norms. Teams that successfully transcend to the *Collaboration* phase have successfully established shared norms and goals for the project. This phase is also marked by a shared team identity. Some teams may revert back from collaboration to initiation when they cannot effectively handle issues in tasks (e.g., deadlines) and team relationships (e.g., silence). For the most effective teams, team solidarity remains high until the *Culmination* phase and may continue after the project ends.

Surface Level Diversity and Virtual Team Development

In forming a virtual team, the *Initiation* stage often involves dealing with huge uncertainty resulting from the distance and a general lack of knowledge about team members' identities (Sarker and Sahay, 2003). One of the immediate sources of categorization is geography. Collocated team members tend to identify themselves together as a group and view distant team members as a different subgroup (Bos, Shami, Olson, Cheshin and Nan, 2004; Polzer et al., 2006). Distributed team members naturally formed groups based on their location and adopted an "us" versus "them" attitude that caused them to blaming another subgroup for lack of performance (Armstrong and Cole, 2002).This early stage of virtual team development is also marked by a strong tendency for team members to identify each other based on their ethnicity (Shachaf, 2008). As virtual team members often have the 'kick-off' meeting either face-to-face or through video conferencing, this provides an immediate ethnic identification opportunity. Ethnicity is also readily identifiable via surnames, accents, and writing style (Shachaf, 2008). Studies have shown how team members often seek peer support and align themselves with team members from a similar ethnic background (Gibbs et al., 2009). This can often lead to stereotyping or negative perceptions towards other ethnic groups. For example, in a study of a distributed software development team Germans team members were described as being stubborn by the Canadian subgroups while the Canadians were described as being laid back by the Germans (Kiel, 2003). Based on Faultline Theory we argue that the geographical separation will interact with surface diversity in influencing subgroup saliency. We believe that these differentiated identities will likely persist in the next stage; *Exploration,* which is usually characterized by sharp demarcations between distributed subgroups (Sarker and Sahay, 2003). Hence we posit that:

> *P1: The interaction of geographic and surface level diversity will influence subgroup saliency in Initiation and Exploration stage of virtual team development process.*

Deep Level Culture Diversity and Virtual Team Processes

Following the *Initiation* and *Exploration* stages, we can expect that the subgroups will continue interacting with each other, negotiating norms for collaborative work and task delivery (Sarker and Sahay, 2003). Studies have shown that deep level diversity is rooted in different cultural values and influences the way team members collaborate with each other (Earley and Mosakowski, 2000; Harrison et al., 2002). Cultural values influence the perceptions of relationships, time, and collaboration. In terms of relationship perception, individualism and collectivism are cultural values the influence the degree to which people value independence versus group membership. The differences here can cause conflict among team members. For example, team members with collectivist values were annoyed with the individualists' obsession with their self-interest and lack of effort to reach group consensus (Kankanhalli et al., 2006). Differences in time perception often lead to irritation,

frustration and inaccurate attribution of team members from other group. For example in Winkler and Bouncken's (2009) study, the monochronic team members were irritated by the lack of punctuality of the polychronic team members, perceiving the polychronics as contributing less to the team (Hall and Hall, 1990). In monchronic culture, people have sequential linear time perception and are more task-completion oriented. In polychronic culture people focus on several things at once and emphasis relationship building (Hall and Hall, 1990). Cultural values also significantly influence team members' approaches to managing tasks (Fayad, 2010).The lack of a shared interpretive framework between the two subgroups created breakdowns in communication and prevented the construction of a joint team identity. Thus we argue that the differences in deep cultural values can further exacerbate the subgroups salience throughout the *Collaboration* stage:

> *P2: Deep level culture values will exert more influence towards subgroups saliency in Collaboration stage of virtual team development process.*

Organizational and Functional Culture as a Mediator for Subgroup Saliency

As subgroups exist in teams, we argue that organizational and functional culture may influence the salient differences among subgroups. Functional culture is defined by Bloor and Dawson (1994) as the shared language, behavior, accepted practices and skills related to one's job. Studies have demonstrated how the functional culture was able to reduce the effects of national culture as all members shared a common core of knowledge, know-how, and representations (Chevrier, 2003; Gibbs et al., 2009). For example in engineering culture the system code, project documents, and technical vocabularies became the common language, thus facilitating communication among multicultural team members (Gibbs et al., 2009). In this case, the functional culture was more salient than other cultures and allowed them to collaborate effectively. However, the mediating effect of functional culture is not always positive. Although team members may share the same professional background, the training and education system may lead them to have different philosophies and methodological approaches in performing tasks (Chevrier, 2003). In this situation the functional culture will further exacerbate the differences in the team.

When functional culture is not shared, organizational culture may provide a common, institutionalized set of behavioral norms to guide members regardless of their national and functional background. We define organizational culture as the pattern of shared values that define appropriate attitudes and behaviors and establish what is important for organizational members (Hofstede, 1998). As organization culture acculturates team members around common values, these enable diverse team members to share expectations of acceptable behavior and promote a greater sense of unity (Seymen, 2006). Hence we propose:

> *P3: The functional and organizational culture will mediate the subgroup saliency in virtual teams*

Subgroups Salience and Team Performance

Previous studies have demonstrated that among teams that had a high impact of subgroups, communication and sharing information were usually within rather than across their subgroups (Panteli and Davison, 2005; Huang and Ocker, 2006) Team members also tend to have unfavorable perception for team members that resided in another subgroup (Huang and Ocker, 2006; Lau and Murnighan, 2005). The segregate communication and selective distribution of information result to conflict among team members and eventually decrease the team's overall performance. Hence we propose:

> *P4: High subgroup saliency negatively impacts team performance through selective distribution of information and unfavorable perception between subgroups.*

Emergent Team Culture as a Mediator

We argue that the subgroup saliency effect can be reduced, if not diminished over time when diverse teams able to develop a hybrid team culture (Earley and Mosakowski, 2000) that provides a sense of group identity for all group members, promotes psychological safety for communication openness within the team. Within this healthy team culture environment, subgroups should be able to have open dialogue to overcome their differences, hence improving team performance. Hence we posit:

> *P5: The emergent team culture provides a sense of group identity that mediates the subgroup impact towards team performance.*

Norms of Technology Use as a Mediator

Researchers suggest that cultural diversity leads to different ways of using technology (Maznevski and Chudoba, 2000). Virtual team members often have diverse cultural backgrounds, work experiences, and expertise. They may initially rely on these in determining appropriate collaborative and communicative behavior. As they begin to interact with each other, virtual team members will develop routines of interaction and accepted behaviors, learning to use collaborative technologies in ways

that lead to shared meanings. These use practices are described as appropriation of technology in Adaptive Structuration Theory (DeSanctis and Poole, 1994). This theory argues that distributed teams can benefit from the capability of technology only if they agree on whether and how to use it. When dispersed team members share expectations regarding technology use, this collective knowledge might facilitate their exchanges, despite of their diversity. We define this as norms of technology use. Based on previous work, we identified several norms of technology use that potentially alleviate the miscommunication and misattribution problems in culturally diverse virtual teams. We briefly highlight the four most promising here.

Norms for Using Technology in Achieving Work Translucence

Because virtual teams have few opportunities for casual physical encounters, they need to work on objects and their representations within a common repository to interpret the actions of the others, thus creating translucence. Adaptation of a common repository requires negotiations that develop shared meaning related to the use of the technology. For example, Damian, Izquierdo, Singer, and Kwan (2007) demonstrated how culture influences the negotiation of technology norms in updating changes on a distributed software engineering team. Here Canadians were recording the changes in the "build" notes assuming that the US team members would refer to the notes for any updates. On the contrary, the US team had a different culture of reporting changes which relied on an email list. Failure to negotiate a mutual norm in using technology for promoting translucence in collaborative work resulted in frustration among the Canadian and US team members. The importance of translucence has been demonstrated in the successful collaboration among the distributed virtual open source software (OSS) developers (Yamauchi, Yokozawa, Shinohara and Ishida, 2000). The OSS developers had a mutual norm using Concurrent Versions System (CVS) to centralize all the source code, which promoted awareness of any changes. This transparency provided, in a limited way, one level of awareness about what others are doing and enabled the subgroups to coordinate and collaborate effectively, hence improving the team's overall performance.

Norms for reducing intercultural miscommunication through technology

Cultural differences among subgroups often exacerbate communication problems. When people are uncertain as to how to respond to certain messages, they often just ignore them or make unfavorable attributions about the sender's motive and personality. Problems like language barriers and miscommunication due to non-native speakers' accents and differences in communication style have led to conflicts among culturally diverse subgroups (Diamant, Hall and Fussell, 2008). In coping with this problem, we argue that certain norms of technology use can be adopted for reducing miscommunication. In one approach, team members can employ multiple channels of communication synchronously to create a common ground among dispersed team members. For example, using application sharing or Lotus Sametime e-Meetings during teleconferences to review software designs, allowed dispersed software developers to reach consensus, confirming their design selection and making sure that every members had a common understanding (Shachaf, 2008). Certain teams have also created "teleconference norms" in which a moderator and a note taker are be assigned at each geographical location. After the teleconferences have ended, the notes were sent out immediately to all team members through email. This use of multiple channels for achieving common ground has been useful in minimizing uncertainty on the decisions made in the prior meeting (Sutanto, Phang, Kankanhalli and Tan, 2004). Through effective communication, subgroups are able to collaborate effectively, hence improving team performance.

Norms for Socialization Using Technology

The use of ICT for socialization has been found to be very important in reducing the saliency of subgroups (Ocker, Webb, Hiltz and Brown, 2010; Panteli and Davison, 2005). For example in Panteli and Davison (2005) study, teams that had low saliency of subgroups were characterized as having intense socialization started early in initiation phase. Their early investment in socialization helped them to collaborate effectively in later stages. On the contrary, the teams which had a high impact of subgroups were mainly using ICT for task related activities. In these teams, "them-and-us" attitudes emerged from a higher awareness of cultural differences that led to conflicts and miscommunication. The opportunity to have spontaneous communication through synchronous technology like instant messaging is also important to alleviate differences among subgroups in dispersed teams (Hinds and Mortensen, 2005). These increase opportunities to share information; including information about one's own interests, a crucial element for fostering personal relationship and collaborative conflict resolution among culturally diverse virtual team members The relatively quick turn taking in instant messaging systems makes feedback and repair much easier, decreasing the likelihood of irreparable misunderstanding between dispersed team members (Setlock, Fussell and Neuwirth, 2004).

Norms for Asymmetry of Awareness and Social Presence

As team members are becoming more globally disperse, there is minimum overlapping time zone that allows synchronous communication to happen and this complicates the coordination process (Hinds et al., 2005). Team members from different countries need to institutionalize norms for maintaining virtual presence (Sarker and Sahay, 2004).This can be achieved when all team members are aware of the whereabouts and the availability of team members to avoid misattribution of the team members' reasons for not responding in timely manner. We argue that establishing norms for logging on and responding to messages are important in reducing misattribution issues especially among the subgroups. We believe that cultivating these norms of technology usage will potentially reduce the differences among potential subgroups caused by culture and distance. Hence we argue:

> *P6: Norms of technology usage allow team members to achieve a common ground and develop an understanding of their peers and their tasks, allowing them to have healthy relationship and collaborate effectively hence increasing team performance.*

IMPLICATIONS

Researchers have come to realize that we are just beginning to understand the cultural influences in virtual team dynamics. Our proposed model takes a new approach in examining different levels of culture and systematically captures the varying culture dimensions and their impact on subgroup formation in virtual teams. The model also responds to calls for further research on factors that influence the effect of diversity on team process and outcomes (Stahl, Maznevski, and Voigt, 2010). Rather than examining a single moderator this model takes a step further by postulating emergent team culture and norms of technology use as potential mediators of subgroups impact towards team performance. This model will guide our ongoing field research and we anticipate that the data from these studies will validate and expand our model. We believe that this model will be useful to the larger community by highlighting the various dimensions of cultural impact and ways in which technology can be appropriated to mitigate the negative impacts, enabling effective collaboration among diverse virtual team members.

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