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Conflict and Performance in Global Virtual Teams

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Conflict and Performance in Global Virtual Teams

Abstract

Increasing globalization and advances in communication technology have fuelled the emergence of global virtual teams (GVT). There is much potential for conflict in GVT as members work across cultural, geographical, and time boundaries. This study examines the antecedents of GVT conflict and the circumstances under which conflict affects team performance. An in-depth study of GVT conflict episodes was carried out using interviews, observations, communication logs, and documents. Based on findings from the teams under study interpreted in the light of prior literature, propositions are developed about the antecedents and impacts of GVT conflict as stated. GVT cultural diversity is likely to contribute to both task and relationship conflict, while functional diversity may result in task conflict. Large volume of electronic communication and lack of immediacy of feedback in asynchronous media can contribute to task conflict. Additionally, the relationship between task conflict and team performance is likely to be contingent upon task complexity and conflict resolution approach. The influence of relationship conflict on performance may depend on task interdependence and conflict resolution approach. The conflict resolution approach may in turn be determined by the nature of conflict attribution. These propositions have been synthesized into a model to guide future empirical research and GVT practice.

Keywords

Global virtual teams, diversity, communication technology, task characteristics, types of conflict, conflict resolution, team performance.

1. Introduction

Increasing globalization coupled with the opportunities presented by improving communication technology have led to the emergence of virtual structures in many organizations. Virtual teams refer to geographically and/or organizationally dispersed co-workers who work together using communication and information technologies to accomplish organizational tasks [55]. As an extension of the concept of virtual teams, global virtual teams (GVT) refer to globally dispersed co-workers working together under such circumstances. Members of GVT typically come from different continents or countries, interact via various forms of communication technology, and rarely or never see each other in person [18][28].

GVT offer several potential benefits to organizations. These include access to expertise, round-the-clock service to customers, fast response to global market demands, and saving of travel costs. GVT can reshape themselves in response to changes in environmental conditions [56]. However, team diversity and space-time dispersion in GVT may pose both opportunities for [57] as well as challenges to effective teamwork [33][55]. While team diversity is celebrated for stimulating creativity and allowing a variety of skills to be brought to bear on problems at hand [34], it may also reduce team cohesion and increase conflict [50].

Conflict in GVT may be exacerbated by communication delays, time zone differences, and lack of face-to-face contact due to space-time dispersion [39]. These factors may hinder development of understanding and relationships among members of GVT [17]. If poorly managed, conflict can lead to ineffective teamwork [40] and other negative outcomes [3] [60]. The importance of conflict management in achieving effective virtual team outcomes has been emphasized [63]. Thus, GVT can benefit from a better understanding of factors that trigger conflict as well as the possible impact of conflict on team performance. Knowledge of antecedents and impacts of GVT conflict can help design interventions to manage the causes and alleviate the negative outcomes of conflict.

Conflict in GVT has been gaining research interest in recent years. Conceptual studies [10][25] and empirical studies [43][44], including studies of student teams [49], have examined some of the antecedents to conflict and the relationship between conflict management approach and GVT performance. Particularly, the influence of certain technology and team elements on GVT conflict has been investigated [44]. However, the third essential element of GVT, task characteristics, has not been explored in relation to GVT conflict and its outcomes (although there is evidence of its influence in traditional team conflict [29]). Therefore there is a lack of research investigating these essential elements of GVT in totality, in relation to conflict and its impact on team performance.

Based on the above motivation, this exploratory case study examines the influence of technology, task, and team characteristics of GVT on conflict and outcomes, through analysis of conflict episodes. In-depth analysis of conflict episodes focusing on the key team, task, and technology elements, conflict processes, and outcomes should yield insights beyond prior studies using team level surveys. Questions addressed in this study are: How are various forms of team diversity in GVT linked to conflict? What is the role of technology in relation to conflict in GVT? How may task characteristics influence conflict processes and outcomes in GVT? The answers to these questions are used to build an integrative model of conflict and performance in GVT, which can guide future empirical research efforts and provide practical suggestions on conflict management in GVT.

2. Conceptual Background

Since our study aims to investigate the influence of team, technology, and task elements on conflict and resultant team performance, we review the relevant previous literature on these topics as a background for our study. Team performance typically focuses on task-related outcomes [53]. Task-related outcomes are the characteristics of the outcomes in terms of task achievement such as its quality and effectiveness. Therefore our assessment of performance is in terms of task quality.

2.1 Conflict Types

Conflict is defined as disagreement, both manifest and latent, among team members and implies incompatible goals or interests [59]. Conflict in teams can be broadly categorized into two main types: relationship conflict and task conflict [52]. Relationship conflict (also known as affective conflict) has affective components such as tension and friction [31]. It involves personal issues such as mutual dislike, personality clashes, and annoyance among team members. Some studies have reported that relationship conflict is detrimental to team performance [30] while others are less conclusive [29].

Task conflict reflects differences in viewpoints pertaining to team tasks. It may coincide with animated discussion and personal excitement but is usually devoid of the intense negative emotions commonly associated with relationship conflict [31]. It includes differences about how task accomplishment should proceed and issues of duty and resource delegation such as who should do what and how much responsibility each person should get. Several studies have reported that moderate levels of task conflict are beneficial to team performance [30][60].

2.2 Conflict Attribution and Resolution

Attribution theory explains how teams may proceed towards resolving misunderstandings and conflict [14]. When conflict surfaces, team members tend to make attributions regarding the cause of the problem [4]. Such attributions may be personal or situational in nature and may be constructive or non-constructive for continued communication. Personal attribution blames the problem on the characteristics or behavior of individuals [27] whereas situational attribution faults the situation or context. An attribution is constructive if it facilitates adaptation and non-constructive otherwise. Previous studies suggested that situational attribution tends to be more constructive for further communication, compared to personal attribution, because it modifies the rules that guide communication rather than allowing these rules to break down [4]. Subsequently, researchers have identified a third type of attribution, categorical attribution, as that based on the characteristics of social categories rather than individuals [37]. Categorical attribution may be particularly relevant for GVT where social category diversity is salient (see section 2.3).

Attribution can pave the way for conflict resolution [59]. There are three common conflict resolution approaches: integrative (solving the problem through collaboration), distributive (solving the problem through assertion), and avoidance (ignoring the problem) [65]. The integrative approach identifies and achieves outcomes that are satisfactory to all team members. The distributive approach yields outcomes that favor some team members but not others. The avoidance approach occurs when team members fail to confront the conflict and achieve no outcomes.

For traditional teams, the integrative approach appears to be most suitable for resolving strategic problems whereas the distributive approach appears to be least suitable [58]. However, in GVT comprising students, the integrative and distributive approaches appeared to facilitate team performance whereas the avoidance approach seemed to hinder team performance [43]. While some studies involving traditional software development teams [3][60] suggest that conflict resolution approach mediates the relationship between conflict and team performance, others [64] suggest that conflict resolution approach plays a moderating role in the relationship. The differences in results, suggest a need to look deeper into the processes of GVT conflict [39].

2.3 Team Diversity

In the past, studies on employee selection and socialization [11] promoted similarity in values and demographics as the basis for maintaining effective work environments. This has changed subsequently with researchers [23][75] calling for more team diversity to facilitate team performance. However,

empirical research on the effects of team diversity has produced mixed results. Consequently, more complex conceptualizations of team diversity have been proposed.

Two important types of team diversity are functional diversity (arising from differences in educational background, experience, and expertise among team members) and social category diversity (arising from differences in race, culture, gender, and age among team members) [51]. In traditional teams, functional diversity has been heralded for increasing innovation, developing clearer strategies, and responding faster to changes [7]. At the same time, differences in opinions and perspectives engendered by functional diversity have been found to increase task conflict [32][51]. In GVT comprising students, cognitive conflict among team members with different educational background has been observed [73]. However, it is not clear how such conflict may impact GVT performance.

An important aspect of social category diversity in GVT is cultural diversity. In traditional teams, social category diversity has been found to cause relationship conflict [32][51]. But the evidence about whether cultural diversity in GVT increases or decreases conflict has been mixed with some studies suggesting increases [18] and other studies being inconclusive [44]. These results highlight the need to re-examine cultural diversity more deeply [39].

Cultural diversity includes national and linguistic differences among members as well as differences along broader cultural dimensions [26]. Given that GVT members bring their disparate cultural values to the team, it is important to know how cultural dimensions may impact conflict and performance in GVT. Essentially five bipolar dimensions of culture have been identified as power distance, uncertainty avoidance, individualism, masculinity, and long-term orientation [26]. Power distance is the extent to which people expect and accept that power is distributed unequally. Uncertainty avoidance refers to the degree that people feel threatened by uncertain or unknown situations. Individualism implies belief in the primary importance of the individual as opposed to the group. Masculinity refers to cultures in which social gender roles are distinct. Long-term orientation is the degree to which people's efforts are focused towards the future rather than the present.

Of the five dimensions, individualism-collectivism has been identified as particularly relevant in the context of studying teams [49][66]. Prior research indicates that it influences cooperative behavior of individuals in a group and is likely to be the most important distinguishing feature of culture [71]. People from an individualistic culture tend to value personal time and the freedom to adopt personal approaches to their work. In contrast, people from a collectivistic culture tend to value team identity and the presence

of team standards for carrying out their work [26]. Prior research has indicated the influence of individualism-collectivism orientation on conflict management style [49] but not as an antecedent to conflict.

2.4 Communication Technology

Group support systems literature [42][62] has contributed to our understanding of the effect of technology on team conflict. These systems offer some capabilities similar to communication technology available to GVT, particularly, group support for communication (from features such as simultaneous input and public group display) and process structuring (from features such as agenda setting, agenda enforcement, and record of group interaction) [77].

Providing communication support through group support systems can help teams to generate more task conflict and resolve the conflict more effectively [62]. Providing process structuring support can reduce both task conflict and relationship conflict [42]. These findings suggest that conflict in computer-assisted teams may increase or decrease depending on the support provided. Although these studies have helped to elucidate the effects of communication technology on team conflict, they have been conducted in experimental settings and with artificial tasks. It is not clear whether these results would apply to GVT performing real tasks in field settings [63].

Researchers have discussed the role of technology in creating conflict in virtual teams. Virtual teams that relied more heavily on technology were found to experience more task conflict and the conflict seemed to be more detrimental for such teams than traditional teams [44]. Five types of communication problems are found to contribute to misunderstanding in virtual teams: failure to communicate contextual information; failure to communicate information evenly; differences in salience of information to individuals; differences in speed of access to information, and interpretation of the meaning of silence [14]. The causes of these problems cited were the geographic dispersion of team members, the information load, and the slow rate and feedback lag of communication media. Information overload is a consequence of large volume of communication, which has increased in the context of electronic communication [16].

Immediacy of feedback is the extent the medium enables the senders and recipients to give rapid bidirectional feedback on the information they receive [15]. The lack of immediacy of feedback in asynchronous communication can cause problems in development of mutual knowledge in distributed teams [14]. Given the reliance of GVT on ICT, it is important to investigate its effects on conflict in GVT.

2.5 Task Characteristics

Two characteristics of task that have been highlighted in the context of conflict and performance are task interdependence and task routineness. Task interdependence refers to the extent to which team members need to rely on each other to accomplish their task [72]. Prior studies indicate that the impact of relationship conflict on team performance may depend on task interdependence [29]. This impact may be stronger when there is greater task interdependence. In other words, dislike and friction may be more detrimental to team performance when team members are required to depend more on each other.

Task routineness refers to the degree of structuredness and programmability of the task [72]. Routineness has been inversely related to task complexity i.e., the degree of ambiguity in paths to and solutions of the task [9]. In relation to conflict phenomena, the impact of task conflict on team performance has been found to depend on task routineness [29]. Task conflict may be negatively related to team performance for routine tasks but positively related to team performance for non-routine tasks [29].

2.6 Scope of This Study

Table 1 summarizes the conflict literature by highlighting the relationships between key concepts for traditional teams and GVT. Figure 1 indicates the relationships between key concepts in the context of GVT conflict. From the summary, it is clear that several conceptual gaps exist in our understanding of conflict in GVT. First, some important relationships among concepts (for example, the moderating effects of task characteristics on the relationship between conflict and team performance) have not been tested for GVT. Second, several relationships among concepts that hold for traditional teams have ambiguous results in GVT (for example, the relationship between cultural diversity and conflict). Third, some relationships among concepts for traditional teams appear to be contradicted for GVT (for instance, the effect of distributive conflict resolution approach on team performance). As an effort towards bridging these conceptual gaps, the goal of this study is to build an integrative model of conflict and performance in GVT. Insights from our case study would be interpreted in light of the previous literature to generate the propositions for the model.

----- Insert Table 1 here -----

----- Insert Figure 1 here -----

3. Methodology

We used an exploratory case study as the basis for our research design [76]. Exploratory case studies are ideal for analyzing what is common and/or different across cases that share some key criteria (differences in team, task, and technology characteristics for our study). They are appropriate for preliminary studies

such as ours in which the researcher has little control over the key variables and wants to obtain a richer understanding of the phenomenon.

3.1 Team Background

The three GVT examined in this study were made up of masters level students from three universities (in North America, Europe, and Asia) who participated in a course on Global Project Coordination. Two GVT had members from all three universities while the remaining GVT had members from two universities.

As an integral part of the course, each student participated as a member of a GVT and each GVT completed a global industry-sponsored project. Relative to prior studies with student GVT, the three GVT examined in this study were comparatively more like organizational GVT. Team members had at least two years of work experience. The tasks (team projects) were formulated, monitored, and assessed by organizational sponsors. These projects were also longer lasting (around five months) than typical student team projects. Further, projects were assigned to team members by organizational sponsors and course faculty, who matched the skill profiles of team members to project requirements. The teams communicated considerably through teleconferencing, a medium commonly used in organizational GVT that has not been studied adequately in previous student GVT. At the end of the course, each GVT had to present their results to organizational sponsors and course faculty, who then awarded them a grade based on the quality of work done for their global project.

The GVT met face-to-face once at the beginning and once towards the end of the five-month course. They attended weekly video-conferencing lectures conducted by course faculty from the three universities. Throughout their projects, they communicated and collaborated using a variety of communication technology such as teleconferencing, email, web discussion boards, chat, and private community web spaces. Members of the three GVT were nationals of 11 countries spanning four continents (North America, Europe, Asia, and Africa). With these differences in cultural background and heavy reliance on communication technology, these teams clearly satisfied the key characteristics of GVT. The demographic characteristics of the three GVT are shown in Table 2.

----- Insert Table 2 here -----

3.2 Team Projects

Team A was assigned a global project sponsored by an international consulting company. The goal of the project was to collect information about risk assessment and management procedures in a variety of industries. The sponsor company provided members of Team A with a pre-designed risk assessment

questionnaire. Members of Team A used this questionnaire to gather information from global businesses through interviews with top executives. The team manager analyzed the data collected and prepared the final report. Since members of Team A could carry out their interviews independently of each other, the team task was deemed to be comparatively low in task interdependence. Since the team did not have to perform the more complex subtasks of the project, such as generating interview questions and preparing the report, the team task was considered to be comparatively low in task complexity (see Table 3).

----- Insert Table 3 here -----

Team B undertook a global project sponsored by an international telecommunications company. The goal of this project was to understand the global market for mobile applications from an Internet service provider (ISP) perspective. Members of Team B were first required to generate applications and interview questions. They then interviewed top executives from ISPs in three continents to identify significant and emerging mobile applications, the charging mechanisms used, and the underlying technology. Subsequently they needed to analyze the interview data and prepare their report. Given that members of Team B had to exchange information frequently during all subtasks except contacting and interviewing ISPs, the team task was considered to be comparatively high in task interdependence. Since members of Team B had to perform complex subtasks such as generating interview questions and applications as well as analyzing data and preparing the report with minimal assistance from the sponsor and manager, the team task was deemed to be comparatively high in task complexity (see Table 3).

Team C worked on a global project sponsored by an international computer company. The objective of this project was to re-engineer the financial analyst organization within the sponsor company to attain a more effective structure. Members of Team C had to prepare their own interview questions, interview finance executives (contacts provided by the sponsor) to elicit ideas on how to improve financial analyst structure, and prepare a report of solutions. Considering that members of Team C had to exchange information frequently throughout the project except during the interviews, but the project involved fewer members (with fewer interactions) spread across fewer locations than other teams, the team task was deemed to be comparatively moderate in task interdependence. Since members of Team C were provided moderate assistance for the more complex subtasks by their sponsor (provided contacts but not interview questions) and manager (help with analysis but not with report writing), the team task was considered to be comparatively moderate in task complexity (see Table 3).

3.3 Technology Use

All three GVT had the option to use email, teleconferencing, web discussion board, and various Internet based groupware technologies such as ICQ chat and e-circle. The web discussion board was a bulletin board linked to the course website where GVT members could post text messages. The messages could be viewed by anyone since there was no password protection on the course website. Messages for each team were structured into topics using discussion threads. E-circle is a private (password protected) community web space which allowed GVT to share document files, hold discussions, plan team events, and maintain team calendars and task lists.

Team A relied mainly on e-mail for communication and e-circle for sharing document files. They occasionally used the web discussion board. Team B relied less on e-mail for communication. They mainly used the web discussion board to share document files, and regularly posted the minutes and agenda of their conference calls there. They did not use e-circle or online chat facilities. Team C relied heavily on e-mail for communication. They supplemented conference calls with chat sessions. They used the web discussion board moderately. They used e-circle rarely to share document files. All three GVT made moderate use of conference calls (see Table 4).

----- Insert Table 4 here -----

The three GVT examined in this study differed in terms of team diversity (see Table 2), task characteristics (see Table 3), and communication technology used (see Table 4). These factors are important elements that could potentially impact conflict and team performance (see Table 1).

3.4 Data Collection

The data collection protocol (see Table 5) was developed based on guidelines suggested by qualitative research literature [41]. This protocol provided a framework for carrying out within GVT and across GVT analysis. Having a detailed case study protocol for data collection and data analysis helped to increase reliability of results [76].

-----Insert Table 5 here -----

Data was collected over a period of eight months. Throughout the five-month duration of the course, data was collected via observation of face-to-face meetings and conference calls, communication logs, and project documentation. Communication among members of the GVT via all communication technology, such as emails, e-circle logs, chat sessions, and web board discussion messages, was captured. Face-to-face meetings and conference calls were recorded. All available project documentation was archived. After the course, data was collected over a three-month period via interviews with members of the GVT

and course faculty (see Appendix for interview outline), and questionnaires completed by members of the GVT (see Appendix for questionnaire items).

3.5 Measures and Data Analysis

Gender diversity was measured using Blau's [5] index of heterogeneity. This index has been used to measure diversity in categorical variables in previous studies such as Pelled et al [51]. The value of the index can vary from zero (indicating all team members are the same on the attribute) to one (indicating all team members are different). Blau's index was not used for measuring functional, national, and linguistic diversity since for these forms of diversity certain categories may be closer spaced than others (the index assumes equal spacing between all categories of the attribute). For example for functional diversity, science and engineering backgrounds may be closer to each other than to other backgrounds such as business. Similarly for national diversity, Canadian and American nationalities may be closer to each other than to other nationalities such as Singaporean. Linguistic diversity was also difficult to measure through this index since several team members had more than one dominant language. For these forms of diversity as well as for cultural diversity along the individualism-collectivism dimension, the concepts of sub-groups and faultlines [19][36] were found to be more useful to assess the impact of diversity on conflict and other team outcomes. Relatively equal size and differing subgroups lead to stronger faultlines along which conflict may occur. Age diversity was measured using coefficient of variation (standard deviation of ages divided by mean of ages).

Task characteristics were evaluated based on project task descriptions (see Table 3). Team level assessment of degree of task conflict, relationship conflict, and dominant type of conflict resolution was done using pre-validated questionnaire items from Jehn [30] and Miranda and Bostrom [42] (see Appendix). The responses to questionnaires were averaged across the team to obtain the levels of conflict parameters. Team performance was assessed based on the objective grade awarded to the team. Conflict episodes were identified based on interview responses, lessons learned papers, and communication logs. Each conflict episode was analyzed for its type, cause, attribution, and resolution. The way in which the different constructs were measured or coded is summarized in Table 6. Table 7 summarizes the reliability measures of the team level questionnaire items for task conflict, relationship conflict, and conflict attribution for the three GVT. All reliability values are above the acceptable threshold of 0.7 [46].

----- Insert Table 6 here -----

----- Insert Table 7 here -----

Data analysis was carried out at two levels: detailed analysis of conflict episodes and aggregate (team-level) analysis of conflict parameters. Doing data analysis at both levels allowed for cross-level triangulation of findings. There were five major steps in the data analysis process. First, all data sources for each GVT were prepared and assembled. These activities included transcribing interviews and conference calls, printing communication logs (for all communication technology), and compiling questionnaire results and project documentation. Second, the data for each GVT was recorded on a case summary sheet where conflict episodes could be identified. To construct the overall sequence of events for each GVT, all the evidence from different data sources was sorted in chronological order. The interview transcripts followed by the lessons learned papers were used as primary sources to identify conflict episodes. This is because members themselves identified conflict episodes, their causes, and resolution in these data sources. Subsequently, communication logs of all media used by the team were also analyzed to determine additional conflict episodes and corroborate those obtained from the primary sources. All evidence was examined in detail by two independent researchers to identify the sources of conflict, type of conflict, parties involved in the conflict, and way in which the conflict was attributed and resolved. The perspectives of different team members were considered. Apart from conflict episodes, a timeline of key events in each GVT was created.

Third, within GVT analysis of conflict episodes was carried out for each GVT. The goal was to identify the relationships between conflict antecedents, such as team diversity and technology characteristics, and conflict type (task conflict or relationship conflict) as well as the relationships between conflict attribution (personal, situational, or categorical) and conflict resolution approaches (integrative, distributive, or avoidance). The data for each GVT was also compared with interview transcripts and questionnaire responses to assess agreement on the levels of task conflict and relationship conflict, and predominant conflict resolution approach in each GVT. Fourth, across GVT analysis was carried out by comparing conflict parameters across the three GVT. The objective was to identify the relationships between levels of conflict (task and relationship) and team performance, as well as to understand how these relationships might be moderated by task characteristics (interdependence and complexity) and conflict resolution approaches (integrative, distributive, or avoidance). The results were presented to members of the three GVT for their feedback.

Finally, all relationships among concepts (identified in the third and fourth steps) were integrated into a tentative theoretical model to guide future empirical research efforts and offer suggestions for practice. In each step of the data analysis process, the reliance on multiple data sources facilitated triangulation of evidence [76]. Moreover, the two independent researchers who coded the data separately achieved an

overall agreement level of 0.88 regarding the assignment of text to codes. The inter-rater reliability (number of coding agreements divided by the number of codings) was greater than the recommended level of 70% [41]. Their areas of disagreement were resolved through discussion.

4. Team Level Results

4.1 Team A

Team A comprised eleven members from six different countries with three different educational backgrounds (see Table 2). It was characterized by relatively higher gender diversity and low age diversity (see Table 2). This team displayed strong cultural fault lines between members from North America (USA and Canada), members from Europe (Sweden), and members from Asia (India and Singapore). The team also exhibited relatively weaker functional fault lines between engineering and science majors. For illustration, several conflict episodes from Team A are described below along with their type, cause, attribution, and resolution.

In a conflict episode, team members differed in their assumptions on whether their primary responsibility should be towards oneself or towards the team. Members from more collectivistic cultures (Singapore and India) perceived that their teammates from more individualistic cultures (USA and Canada) were not cooperative enough. A Singaporean team member wrote, *“As it turns out, Asian members approach the project as a real team effort. But members from North America were simply completing their own section and did not do much in helping others.”* This incident was considered as an episode of task conflict caused by cultural diversity. Since the conflict was blamed on the social category of members, conflict attribution was categorical. Given that members from collectivistic cultures expressed their concern about the lack of cooperation of members from individualist cultures, yet there was no corresponding adjustment in behavior from these members, the conflict resolution approach was distributive.

In another conflict episode, team members disagreed about a peer appraisal scheme suggested by their manager. The manager proposed the scheme to let team members rate each other in order to determine who should participate in the presentation to the sponsor. Members from collectivistic cultures (India and Singapore) were not comfortable about rating their teammates while members from individualistic cultures (USA and Canada) felt that the peer appraisal scheme was appropriate. The opposing sub-groups argued about the merits and demerits of the scheme but neither group changed their position. Eventually, the appraisal scheme was implemented. This was considered as an episode of task conflict caused by cultural diversity. Conflict attribution was categorical because sub-groups blamed the cause on the

different categories to which members belonged. Conflict resolution approach was distributive since one sub-group prevailed over the other.

In yet another conflict episode, there was mutual hostility between collectivistic members from India and Singapore and their North American teammates from individualistic cultures. The cause of conflict was differences in attitudes about separating personal life and professional life. North American members preferred to keep their professional and personal lives separate while Asian members felt that there was no problem in overlapping the two. An Asian member who knew a North American member professionally perceived that the relationship could also be personal. He discussed a personal matter with the North American member who got offended. The conflict escalated to the point where the manager intervened to make the Asian member apologize. This was considered as an episode of relationship conflict caused by cultural diversity. Since an individual rather than a sub-group was blamed for the conflict, conflict attribution was personal. Given that one party prevailed over the other, the conflict resolution approach was distributive.

In Team A, technology characteristics impacted task conflict. The large volume of e-mail communication resulted in information overload among team members. Consequently, contributions made by some team members were overlooked. For example, a team member proposed a solution for a particular subtask by email. Though some teammates appreciated this suggestion, it was eventually forgotten. Concurrently, there was another discussion that generated a large number of emails. After four days, another member sent an email to the team suggesting the same solution, without reference to the original suggestion. The member who made the original suggestion felt that his views were not valued by his teammates, resulting in task conflict. However, he did not blame any teammate but attributed the problem to information overload. This was considered as an episode of task conflict caused by technology factors. Conflict attribution was situational because the problem was blamed on the context. Conflict resolution approach was avoidance because the conflict was ignored.

Altogether, eleven conflict episodes were identified and analyzed for Team A (see Table 8). Questionnaire responses and in depth analysis suggested that the overall level of relationship conflict was high and the level of task conflict was low (see Table 9). Distributive conflict resolution approach was employed most frequently in Team A. Among the three GVT, Team A obtained a moderate project grade.

----- Insert Tables 8 and 9 here -----

4.2 Team B

Team B consisted of nine members from four different countries with three different functional backgrounds (see Table 2). It was characterized by relatively higher gender diversity and low age diversity (see Table 2). Moderate cultural fault lines appeared between members from North America (USA), members from Europe (Sweden), and members from Asia (China and Hong Kong) since there were relatively fewer members from collectivistic cultures than in team A. Weak functional fault lines also surfaced between engineering majors and the lone science major. For illustration, several conflict episodes in Team B are described below along with their type, cause, attribution, and resolution.

General animosity between team members from different countries resulted in conflict. In a conflict episode, which occurred when the team met face-to-face to present their results to the sponsor company, a member noted, *“A Swedish teammate complained that he didn’t like the American team members. He said that they did not appreciate Swedish ways. He was quite upset about this but didn’t make this known to the American team members.”* This incident was considered as an episode of relationship conflict caused by national diversity. Conflict attribution was categorical because the problem was blamed on a social category. Conflict resolution approach was avoidance because the concerns were not voiced to the offending party.

Another conflict episode involving relationship conflict occurred when the team met face-to-face for their final presentation. An American team member had an altercation with a Swedish team member. The American member made negative comments about the Swedes that were reciprocated by the Swedish member. Other team members from both countries joined in to support their respective sides. However, they eventually resolved the conflict amicably by agreeing to focus on their project. This was considered as an episode of relationship conflict caused by national diversity. Conflict attribution was categorical because different categorical sub-groups blamed each other. Conflict resolution approach was integrative since the conflicting parties decided to focus on a common goal that was important to the team.

Team B relied less on email for communication than the other GVT. The team made maximal use of the web discussion board to share their document files, and post minutes and agenda of their conference calls. However, the lack of immediacy of feedback when communicating via the web discussion board contributed to task conflict in Team B. A team member posted his message on the web discussion board but the message did not appear. He was blamed by his teammates for being slow to respond. The member wrote, *“As written in my previous email, I did write this message last Friday. But I just clicked on the post button one time and the message somehow disappeared. Sorry for this. I hope you can read this one.”*

This was considered as an episode of task conflict arising from technology characteristics. Conflict attribution was situational because the problem was eventually attributed to the technological circumstances. Conflict resolution approach was integrative because the problem was resolved without any side losing out.

Altogether, eight conflict episodes were identified and analyzed for Team B (see Table 8). Questionnaire responses and in-depth analysis suggested that the overall level of relationship conflict was moderate and the level of task conflict was low (see Table 9). Avoidance conflict resolution approach was used most of the time in Team B. A team member noted, *“There were not many disagreements in our team. Even when there were, people preferred not to face any unpleasant situations. Rather they wished that the problem would eventually go away.”* Among the three GVT, Team B obtained the lowest project grade.

4.3 Team C

Team C comprised seven members from five different countries with two different functional backgrounds (see Table 2). It had relatively higher gender and moderate age diversity (see Table 2). Moderate cultural fault lines appeared between members from individualistic cultures (France) and members from collectivistic cultures (Singapore, Indonesia, and China). Relatively stronger functional fault lines surfaced between engineering majors and business majors. For illustration, several conflict episodes in Team C are described below along with their type, cause, attribution, and resolution.

Linguistic diversity, an aspect of cultural diversity [26], led to a conflict episode involving task conflict. A Singaporean student recalled, *“For the presentation, the French members had a problem with speaking English fluently. So we were doubtful whether they would be able to present properly.”* Team members who were more fluent in English initially felt apprehensive about allowing their French teammates to present. However, the French teammates assured the team that they would prepare their script carefully so that they could present effectively. This incident was considered as an episode of task conflict caused by cultural (linguistic) diversity. Conflict attribution was categorical because the cause was attributed to the category of one sub-group (the French). Conflict resolution approach was integrative because a solution that satisfied all parties was finally adopted.

Another conflict episode involving disagreements between engineering (four members) and business majors (three members) occurred during the preparation for the final presentation to the sponsor company. Both sub-groups held very different viewpoints on some issues. The engineering majors wanted to be very precise and to the point in their presentation. They wanted to focus solely on key aspects of the

findings. However, the business majors preferred to include the details of all the work they had done for the project, including interviews and thorough explanation of findings in their presentation. This was considered as an episode of task conflict caused by functional diversity. Conflict attribution was categorical because it was blamed on the functional background of the sub-groups. Conflict resolution approach was integrative because the team eventually consulted the sponsor company and adopted a presentation mode preferred by the sponsor company. This mode incorporated elements from both viewpoints.

Team C relied mostly on email for communication, with large volumes of email being exchanged throughout the project. Information overload in email communication led to a conflict episode involving task conflict. A member noted, *“I remember two weeks ago, as soon as I had done the first interview, I asked the whole team to immediately think about the way we would structure the analysis of all the interviews and what major trends we could identify. After two email requests, I had received no answer from anyone. Everyone ignored my message.”* This was considered as an episode of task conflict stimulated by technology characteristics. Conflict attribution was personal because the team member blamed his teammates for not responding. Conflict resolution approach was distributive given that the team member was ignored by his teammates.

Altogether, ten conflict episodes were identified and analyzed for Team C (see Table 8). Questionnaire responses and in-depth analysis suggested that the level of relationship conflict was negligible but the level of task conflict was high (see Table 9). Integrative conflict resolution approach was used most of the time in Team C. A team member recalled, *“We were very comfortable in expressing disagreement or criticizing each other. Even more, some of us were known as ‘solutions-critics’. This was done very openly because we all sought consensus in the interest of the team. We spent time during our weekly meetings to address the concerns of critics and to achieve consensus for the interests of all.”* Another team member summarized the conflict resolution approach, *“From the beginning, we really did integrate. Everyone was accommodating. We talked through everything. That was really the way we sorted things out.”* Among the three GVT, Team C obtained the highest project grade.

5. Synthesis of Results across Teams

Results obtained from within GVT analysis of conflict episodes generate insights on the antecedents of task conflict and relationship conflict (see Sections 5.1 to 5.4), and the relationships between conflict attribution and conflict resolution approaches (see Sections 5.5). Results of across GVT analysis of conflict parameters yield some important clues on how task conflict and relationship conflict may impact

team performance, and how this impact may be moderated by task characteristics and conflict resolution approach (see Sections 5.6 and 5.7).

5.1 Cultural Diversity

Cultural (including national and linguistic) diversity was the antecedent of a majority of conflict episodes (17 out of the 29 conflict episodes) investigated in this study. Since cultural values reflect and are conveyed through language during communication, linguistic diversity typically entails cultural diversity and vice versa. However cultural diversity additionally includes national differences as well as differences along broader cultural dimensions [26]. Among these 17 conflict episodes, five were coded as due to linguistic issues, five were due to national issues, and seven were likely due to broader cultural differences.

All three GVT witnessed conflicts related to use of languages specific to particular sub-groups, which excluded other team members from participating in the discussion. For example, Swedish members would break off into Swedish, Chinese-speaking members would communicate in Mandarin, and French-speaking members would converse in French. Whether such use was intentional or not, it reinforced language divides among team members. Another language related problem was due to more fluent usage of English by native speakers. Native English speakers dominated the airtime during conference calls and face-to-face meetings at the expense of other teammates. Linguistic diversity has been highlighted as an important aspect of cultural diversity [26]. The literature on global teamwork has underscored the importance of linguistic diversity in inter-cultural communication [38][47]. Language related problems have been highlighted in prior GVT studies [18][74]. Conflict episodes captured in this study reinforce this link between linguistic diversity and conflict in GVT.

National diversity gave rise to conflict when team members of one nationality had negative feelings towards their teammates of other nationalities, because of their nationality. Team B, which had an almost equal number of members from the USA and Sweden, witnessed several episodes of such conflict. Team members from these two countries made negative comments about each other's nationalities, often involving stereotypes. Such conflict appears to be linked to specific national differences. Ethnocentrism (belief that one's own nationality is superior), prejudice (unfavorable perception of people from other nationalities), and stereotyping (exaggerated generalization of attributes about people from other nationalities) are three traits related to national diversity that hamper communication in GVT [1]. These traits contributed to conflict episodes observed in this study.

Conflict episodes likely to be due to differences along broader cultural dimensions (individualism versus collectivism) were also witnessed in all three GVT¹. Individualism-collectivism differences may have caused team members to be divided in their opinions on whether to place team interests before self [12], whether to adopt individual or group based appraisal [21], and whether personal and professional matters should overlap. Individualism-collectivism has been found to be a salient and stable cultural dimension [22]. Empirical studies [13] have successfully used this cultural dimension to predict human behavior. Studies on GVT have also documented the influence of this cultural dimension on team behavior [73] and conflict [49]. Conflict episodes noted in this study add to such findings.

The impact of cultural (including national and linguistic) diversity on conflict may be explained by similarity attraction theory [8] and social identity theory [68]. Similarity attraction theory posits that people prefer to interact with like-minded others. Social identity theory suggests that people like to be affiliated with others belonging to their own social category (including culture and nationality). Previous studies [19][36] suggest that nationality and race attributes give rise to naturally occurring team fault lines along which conflict may emerge.

Social category diversity, which includes cultural diversity, has been reported to provoke hostility among members of traditional teams [32]. Such hostility often surfaces as relationship conflict. Results of this study extend this finding to GVT and highlight the cultural component of social category diversity as being important to GVT relationship conflict. Cultural (including national and linguistic) diversity has been a major cause of relationship conflict (9 out of the 11 conflict episodes examined) in all three GVT.

Proposition 1a: Cultural (including national and linguistic) diversity can lead to relationship conflict in GVT.

Research on traditional teams has not examined how cultural diversity may be related to task conflict. However differences in cultural background can lead to differences in workplace attitudes and behavior. For example, individualism-collectivism differences have been found to produce differing opinions on teamwork processes and compensation [26][69]. Results of this study add to the literature by suggesting

¹ While we did not measure member's individualism-collectivism orientation through scale items, a notion of their orientation was obtained during interviews with project members. Also team members themselves indicated particular episodes they felt were caused by differences along this orientation.

that cultural (including national and linguistic) diversity appears to be one of the important causes of task conflict (8 out of the 18 conflict episodes examined) in all three GVT.

Proposition 1b: Cultural (including national and linguistic) diversity can lead to task conflict in GVT.

5.2 Functional Diversity

Apart from cultural diversity, functional diversity was another antecedent of conflict episodes (5 out of the 29 conflict episodes) indicated in this study. When people with different functional background work together, they may have dissimilar belief structures (e.g., priorities, assumptions, and understanding) based on their previous training and experience [32][51]. People with business background typically see opportunities and issues from different vantage points compared to people with engineering training [20]. In a study involving GVT, students with different educational background have been reported to have different cognitive processes [74].

Based on the results of this study, functional diversity seems to be another cause of task conflict apart from cultural diversity (5 out of 18 conflict episodes examined). In Team A and Team B, the predominance of engineering and science majors (compared to business majors) might have resulted in less task conflict. Science and engineering background majors are likely to be more proximate in functional assumptions as compared to differences with business majors. In Team C, engineering and business majors each made up about half the team. This might have caused more task conflict.

Proposition 2: Functional diversity can lead to task conflict in GVT.

Given that we did not find instances of functional diversity leading to relationship conflict in the three GVT examined, no propositions were formed in this regard.

5.3 Technology Characteristics

Yet another antecedent of conflict episodes was technology characteristics (5 out of the 29 conflict episodes examined in this study). The volume of communication in teams tends to increase with the use of electronic communication [16]. High access, one-to-many media like email allow large volume of communication on concurrent tasks and this often leads to information overload. Cognitive flexibility theory [67] suggests that, because of our limited memory and processing capability, the human brain suffers from cognitive overload when there is too much information to digest. When this happens, teams are found to ignore some information thus engaging in biased discussion [24] or forget about some aspects of mutual knowledge thus resulting in less shared reality [14].

Based on the results of this study, the large volume of electronic communication through easily accessible media such as email may be a cause of task conflict (2 out of 18 conflict episodes examined). In Team A and Team C, information overload caused contributions of some team members to be overlooked. When there were too many emails to be processed, members ignored certain emails of other members. This caused resentment in the members whose emails had been overlooked. Team B had a lower volume of communication in terms of email (see Table 4). They mainly used the web discussion board, which had a record of past messages for team communication. They did not experience task conflict due to information overload.

Proposition 3a: Volume of electronic communication can lead to task conflict in GVT.

For effective communication, people need to not just provide relevant information but also receive feedback on their message. The use of asynchronous electronic media like email tends to delay feedback [6]. This lack of immediacy of feedback can bring about conflict when communicating parties ascribe the wrong meanings to instances of silence from the other end [14], giving rise to misunderstandings. Lack of immediacy of feedback can be a distinct cause for conflict over and above information overload. While overload causes ignoring of certain communication, lack of immediacy of feedback does not allow confirmation of receipt of communication. Both technology characteristics have been identified as causes of lack of mutual understanding in teams [14].

Results of this study suggest that the lack of immediacy of feedback (arising from asynchronous electronic communication) seems to be a cause of task conflict in addition to other causes such as diversity and information overload (3 out of 18 conflict episodes examined). In Team A, delays in feedback caused team members to accuse each other of inadequate contribution to the project. In Team C, such delays caused anxiety among team members eager to make progress on their project. In Team B, messages that took some time to appear on the web discussion board caused team members to blame each other for not working fast enough. These delays led to task conflict.

Proposition 3b: Lack of immediacy of feedback (arising from the use of asynchronous electronic media) can lead to task conflict in GVT.

Results of this study agree with the group support systems literature that communication support increases task conflict (see Table 1). However, from our study it is not clear how electronic communication may impact relationship conflict. Given that such instances have not been observed in the three GVT studied, no propositions have been formed.

5.4 Age and Gender Diversity

A few conflict episodes indicated age and gender diversity as possible antecedents (2 out of the 29 conflict episodes investigated in this study). All three GVT had a fair amount of gender diversity (see Table 2). Team C exhibited more age diversity than the other two GVT because one team member was significantly older than the others (see Table 2). Social identity theory [68] posits that people like to be affiliated with others in the same social category (including age and gender). Hence, age and gender diversity can potentially create fault lines that give rise to conflict e.g. generational conflicts.

Team C witnessed a conflict episode arising from age diversity. The significantly older team member had a different work schedule than other (younger) team members. The younger members were inclined to working late just before project deadlines whereas the older team member preferred to adjust his schedule such that he would not have to stay up late prior to deadlines. This resulted in scheduling conflict within the team. This incident is consistent with predictions of social identity theory. Team A experienced a conflict episode due to gender diversity. A male team member criticized his female teammates for inappropriate behavior though he did not blame his male teammates who behaved likewise. This incident is also consistent with predictions of social identity theory.

However, there were few such conflict episodes although all three GVT had gender diversity. This may be due to the fact that employees are increasingly adjusted to a mixed gender workplace and also due to the presence of more salient intra-team diversity (cultural diversity) in the teams under study. With the exception of a few studies [2], which have indicated higher levels of conflict in mixed gender groups, in general the findings indicate no influence of gender diversity on conflict [51]. Similarly for age diversity, majority of studies have not been able to find significant effect of such diversity on conflict [35][51]. Given that there were few conflict episodes involving age and gender diversity in the three GVT examined, no propositions have been formed.

5.5 Conflict Attribution and Conflict Resolution Approach

For the conflict episodes coded in this study, Team A exhibited more personal attribution (5 out of 11 conflict episodes), Team B exhibited more categorical attribution (6 out of 8 conflict episodes), and Team C exhibited more situational attribution (7 out of 10 conflict episodes). Overall, the results agree with prior predictions [14] that members of GVT are more likely to make personal or categorical attribution (18 episodes) rather than situational attribution (11 episodes). This is likely because, given the lack of

situational information about their remote teammates, people tend to make more dispositional attribution [45].

According to attribution theory, personal attribution of a conflict blames the problem on the characteristics or behavior of individuals involved [27]. Since personal attribution is likely to worsen relationships and breakdown the rules of communication [4], it may be less likely to lead to integrative conflict resolution which requires solving the problem through collaboration. Personal attribution is therefore likely to lead to distributive resolution, where the strongest party asserts over the others. Situational attribution of a conflict blames the problem on the situation or context [27]. In such cases, the parties involved may be more amenable to collaborate to modify the context since they do not blame each other and communication can be adapted accordingly [4]. Therefore situational attribution leaves the door open for integrative conflict resolution. Categorical attribution [37] faults the problem to social categories of the opposing group as opposed to characteristics of individuals. In such situations, the adaptation or response to the problem could be constructive or destructive depending on whether people are able to rationalize the categorical attribution or not i.e., different forms of conflict resolution are possible.

In accordance with the discussion above, different conflict attribution seemed to lead to different conflict resolution approaches. In this study, personal attribution was followed by mainly distributive conflict resolution (5 out of 7 conflict episodes) and situational attribution was followed by mainly integrative conflict resolution (10 out of 11 conflict episodes). Categorical attribution was followed by integrative (3 out of 11 conflict episodes), distributive (4 out of 11 conflict episodes), or avoidance conflict resolution (4 out of 11 conflict episodes). Since the finding about categorical attribution is essentially a non-finding, no proposition was formed about this type of attribution.

Proposition 4a: Situational conflict attribution can lead to integrative conflict resolution in GVT.

Proposition 4b: Personal conflict attribution can lead to distributive conflict resolution in GVT.

5.6 Conflict Type, Task Characteristics, and Team Performance

Research on traditional teams suggests that higher levels of task conflict are associated with better team performance when teams work on non-routine tasks [29]. In accordance with previous research, results of this study reveal that task complexity (which is inversely related to task-routineness) may moderate the relationship between task conflict and team performance in GVT. Task complexity is not likely to directly impact team performance but is likely to determine how task conflict will influence performance. When task complexity is moderate or high, debate among the members about the task can help to bring out

better solutions. However when task complexity is low, the solution is well understood and debate about the task may not be beneficial.

In our study, team C exhibited a high level of task conflict as well as a high level of team performance. Working on a moderate complexity task, team performance seemed to have benefited from the efforts of team members to challenge each other for better ideas and debate with each other about pertinent issues. Although these efforts brought about task conflict, the end result was high quality solutions for the moderate complexity task. Team B displayed a low level of task conflict as well as a low level of team performance. Although the team was confronted with a high complexity task, team members failed to thoroughly debate the key issues pertaining to the task. As a result, the team did not experience much task conflict. Neither was the team able to offer high quality solutions for the task. More task conflict could potentially have yielded better solutions for this high complexity task. In Team A, the low complexity task did not require team members to deeply discuss issues pertaining to the task. Hence, the low level of task conflict did not seem to adversely impact the quality of the solutions. While we have an indication of the nature of the moderation effect, we do not propose the specific nature of the effect since our findings derive from one set of levels of moderating variables in the three teams and not from a larger sample of teams. The same holds for the other moderating propositions 5b, 6a, and 6b. Overall,

Proposition 5a: Task complexity can moderate the relationship between task conflict and team performance in GVT.

The literature on traditional teams suggests that higher levels of relationship conflict are associated with lower team performance when teams work on interdependent tasks [29]. Results of this study reveal that task interdependence may also moderate the relationship between relationship conflict and team performance in GVT. While task interdependence may not impact team performance directly by itself, it is likely to influence the relationship between relationship conflict and performance. When task interdependence is moderate or high, relationship conflict may not allow team members to work together to accomplish their task as they need to. However when task interdependence is low, relationship conflict may not impact performance since members can ignore the unpleasantness and work independently to accomplish the task.

In our study, team C exhibited a low level of relationship conflict and a high level of team performance. Working on a moderate interdependence task, team members had to work cohesively to complete the task well. Indeed, team members collaborated very well and often tried to facilitate the efforts of each other. The resulting team spirit seemed to be critical as the team worked together to generate high quality

solutions for the moderate interdependence task. Team B displayed a moderate level of relationship conflict and a low level of team performance. Although the team was working on a high interdependence task, some team members did not integrate their work well with the rest of the team due to relationship conflict. Consequently, the team failed to put together their materials to offer high quality solutions for the task. Less relationship conflict could potentially have resulted in better solutions for this high interdependence task. In Team A, the low interdependence task did not require team members to work together closely to attain quality solutions for the task. The team showed a high level of relationship conflict arising from mutual hostility among team members, who criticized the attitudes of each other. However, this did not seem to adversely impact the quality of the solutions for the low interdependence task. Overall,

Proposition 5b: Task interdependence can moderate the relationship between relationship conflict and team performance in GVT.

5.7 Conflict Type, Conflict Resolution Approach, and Team Performance

The literature on virtual teams suggests that the interaction style among team members affect team performance [54]. Results of this study reinforce this observation by showing that conflict resolution approach (which is related to interaction style) moderates the relationship between conflict and team performance in GVT. Conflict resolution approach is not likely to influence team performance by itself but is likely to influence performance in conjunction with the type of conflict. Task conflict needs to be resolved either integratively (through collaboration) or distributively (through assertion such as a manager or superior would do) since avoiding or ignoring the conflict is not likely to lead to beneficial task outcomes. On the other hand, relationship conflict should be resolved integratively (through collaboration) to avoid harmful effects on performance. Distributive or avoidance resolution can leave members with low cohesion and team efficacy leading to lower performance.

In our study, team C seemed to have benefited from the use of integrative conflict resolution approach to deal with their high level of task conflict. This approach drove the team to continually search for ideas and solutions that were better than those suggested. They obtained a high grade. Team B appeared to have suffered from the use of avoidance conflict resolution approach to deal with their moderate level of relationship conflict. By not addressing the conflict, team members failed to develop good team rapport that would have allowed them to work together more effectively to complete the task. They obtained a low grade. Team A did not seem to have benefited from the use of distributive conflict resolution approach. This approach might have helped them to make some progress on resolving task conflict, when team members could not agree on issues related to the task. However, this approach also appeared to have

added to the hostility in the team and contributed to relationship conflict, when team members engaged in mutual criticisms after some sub-groups won and others lost in disagreements pertaining to personal issues. The team obtained a moderate grade.

Prior research suggests that the integrative conflict resolution approach tends to be most effective in facilitating team performance, followed by the distributive approach, and finally the avoidance approach [58]. In this study, the distributive conflict resolution approach had alleviated task conflict in Team B but aggravated relationship conflict in the same team. Therefore, results of this study add to earlier findings by demonstrating that the distributive conflict resolution approach may not be less effective than the integrative approach for resolving task conflict in GVT. Also, the distributive conflict resolution approach may not be more effective than the avoidance approach for resolving relationship conflict in GVT. Overall,

Proposition 6a: Conflict resolution approach can moderate the relationship between task conflict and team performance in GVT.

Proposition 6b: Conflict resolution approach can moderate the relationship between relationship conflict and team performance in GVT.

Figure 2 summarizes the propositions developed in this study. This model can be used to guide future empirical research efforts on conflict in GVT. Besides verifying the body of knowledge on traditional teams for applicability in the context of GVT, this model also highlights some key issues pertaining to conflict in GVT. First, GVT rely heavily on communication technology for coordination in the course of completing their task. Communication technology characteristics can induce task conflict in GVT. Second, GVT are typically composed of members from a number of different nationalities. Cultural (including national and linguistic) diversity can lead to both task conflict and relationship conflict. Third, GVT are often formed to deal with complex tasks or interdependent tasks. Task complexity and task interdependence can moderate the impact of task conflict and relationship conflict on team performance respectively.

----- Insert Figure 2 here -----

6. Conclusion

Through an in-depth investigation of conflict episodes in three GVT, this study contributes to our understanding of conflict in GVT in several important ways. First, it confirms that certain aspects of previous theory related to conflict in traditional teams hold for GVT. For example, the relationship between functional diversity and task conflict can be extended from traditional teams to GVT. Also, the

moderating impact of task characteristics on the relationships between conflict and team performance apply in traditional teams as well as in GVT. Second, this study extends other aspects of previous theory to apply to GVT. For example, cultural (including national and linguistic) diversity has been found to induce conflict in GVT much more than in traditional teams. Also, the relationship between cultural diversity and task conflict has been indicated for GVT. This is salient given that previous studies [32][51] have not considered how social category diversity may be related to task conflict. Third, this study pinpoints the role of communication technology in bringing about conflict in GVT. It identifies two technology characteristics (large volume of electronic communication and lack of immediacy of feedback) that lead to task conflict in GVT. This is significant because GVT rely on such communication technology to a large extent and therefore should be aware of such consequences. Fourth, this study provides some clues on the relationship between conflict attribution and conflict resolution approaches in GVT. These initial findings can be verified in future research on conflict in GVT.

6.1 Limitations and Extensions

The main limitation of this study is that the results are obtained based on an in-depth study of conflict episodes in three GVT. While allowing richer analysis to be performed, this limits the generalizability of our findings. We see this study as a step towards facilitating larger scale studies in organizational contexts (other than the university and sponsor organization in this study) in which the impact of organizational factors on GVT conflict could also be investigated. For instance, the role of leadership, organizational culture, and power could also be studied in the context of GVT conflict. Also GVT conflict phenomena in different domains such as software development or customer service and for different GVT structures such as networked or parallel teams could be explored.

Additionally, future studies may extend the model of Figure 2 by further examining the impact of communication technology characteristics and functional diversity on relationship conflict. Finer conceptualization of conflict types (including process conflict) and conflict resolution approaches (including accommodating and compromising) could be considered. The relationship between conflict type and resolution approach could be explored. Other dimensions of culture and their impact on conflict resolution approach could also be investigated. Outcomes besides team performance such as satisfaction and the feedback effects of outcomes on antecedents of conflict may be investigated. The relationships in the model of Figure 2 can be tested for generalizability through large-scale surveys.

6.2 Suggestions for Practice

Results of this study offer several suggestions for managing conflict in GVT. First, the causes of task conflict and relationship conflict in GVT can be identified and made known to team members through training. GVT can examine their cultural (including national and linguistic) and functional composition to identify potential fault lines from their inception so that they can more readily evolve mechanisms and norms to deal with such differences. During the course of their work, better awareness of diversity and its implications can lead to better adjustment behaviors on the part of members. For example, differences in assumptions between members from individualistic cultures and members from collectivistic cultures can be highlighted to team members so that they can better appreciate the perspectives of their teammates. Likewise, differences in thinking between more technical (engineering or science) background members and members with business background can be openly discussed so that members can have a better understanding of mutual perspectives. These measures may help to alleviate conflict in GVT.

Second, managers of GVT should be aware of the potential conflicts resulting from team diversity and the performance impacts of conflict. Where possible, cultural diversity can be minimized through selection of team members when the team is likely to work on a high interdependence task. Some global organizations such as IBM and Hewlett Packard have attempted to deal with potentially adverse impacts of cultural diversity by promoting a dominant organizational culture for their employees [48][61]. Also, if the team is likely to work on high complexity tasks, functional diversity can be encouraged to the extent that it brings to bear a wider variety of perspectives and thereby promotes discussion about task alternatives. However, the ensuing task conflict needs to be resolved integratively or distributively, rather than ignored, in order to stimulate performance.

Third, managers of GVT need to be aware of communication technology effects such as large volume of electronic communication and lack of immediacy of feedback that may impact conflict. Advanced communication technologies that may alleviate overload problems arising from large volume of communication include group calendar systems such as Lotus Raven and email filtering systems such as AIMS and SPIDER [70]. Techniques that may alleviate problems due to lack of immediacy of feedback include having periodic conference calls for synchronization and norms for responding to emails and web postings.

Last, managers of GVT should be cognizant of the relationship between conflict attribution and conflict resolution approaches as well as the effectiveness of various conflict resolution approaches. The integrative conflict resolution approach has been reported to be most effective. This approach is likely to

be used when there is situational conflict attribution. Some groupware may have consensus building capabilities that support this approach [62]. Where it is not possible to use this approach, GVT may rely on the distributive conflict resolution approach if they have to rapidly deal with task conflict so as to meet deadlines. This approach is likely to be used when there is personal conflict attribution.

GVT will play an increasingly important role in organizations that seek to compete globally. As an emerging structure that has become possible and popular during the last decade (with rapid advances in communication technology), knowledge about how to effectively manage GVT conflict is currently lacking. While many anecdotal accounts of GVT benefits have appeared in the popular press, factors that may increase the probability of realizing these benefits (or factors that may hinder attainment of these benefits) are not well understood. Through an in-depth examination of conflict episodes in three GVT that culminated in a theoretical model, this study attempts to shed some light on how to manage conflict in GVT. Future research along this direction can help organizations to unlock the benefits that GVT may bring.

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8. Appendix

8.1 Interview Outline

1. Can you identify some episodes of conflict in your team?
 - a. What things were frowned upon in your team?
 - b. What made people dislike working in your team?
 - c. What tensions were there in your team?
 - d. What problems occurred in your team?
2. What was the cause of the conflict?
 - a. People? Please elaborate.
 - b. Technology? Please elaborate.
 - c. Others? Please elaborate.
3. What was the nature of the conflict?
 - a. Task? Please elaborate.
 - b. Relationship? Please elaborate.
4. What was the level of the conflict?
 - a. Low (hardly any differentiation among positions).
 - b. Medium (some differentiation among positions).
 - c. High (very clear differentiation among positions).
5. What was the conflict resolution approach used?
 - a. Integrative? Please elaborate.

- b. Distributive? Please elaborate.
- c. Avoidance? Please elaborate.

8.2 Questionnaire Items

1. Task conflict: Scale of 1 (Never) to 7 (Always).
 - a. My team tended to disagree over alternatives.
 - b. The disagreements experienced by my team were directly related to task.
 - c. My team members disagreed over solutions proposed.
 - d. My team members advocated different viewpoints.
 - e. The differences experienced by my team were task related.
2. Relationship conflict: Scale of 1 (Never) to 7 (Always).
 - a. My team members confronted each other on personal matters.
 - b. My team members made negative remarks about each other.
 - c. Negative comments made by some of my team members were targeted at others.
 - d. Some of my team members tended to ridicule others.
 - e. The differences experienced by my team were interpersonal related.
3. Avoidance conflict resolution approach: Scale of 1 (Never) to 7 (Always).
 - a. My team members attempted to avoid confronting each other.
 - b. My team members did not acknowledge and confront conflict openly.
 - c. My team members ignored others who expressed a different viewpoint.
 - d. My team members avoided taking controversial positions.
4. Distributive conflict resolution approach: Scale of 1 (Never) to 7 (Always).
 - a. Some of my team members yielded during conflict though they did not agree.
 - b. Some of my team members dominated others during disagreements.
 - c. Some of my team members attempted to win their positions during arguments.
 - d. Our solutions satisfied the criteria of only some of my team members.
5. Integrative conflict resolution approach: Scale of 1 (Never) to 7 (Always).
 - a. My team members examined the viewpoints of everyone.
 - b. My team members resolved conflict by meeting the criteria of everyone.
 - c. My team members attempted to integrate the objectives of everyone.
 - d. Our solutions satisfied the criteria of everyone.

Concepts	Empirical Findings involving Traditional Teams	Empirical Findings involving GVT
<i>Team diversity and conflict</i>	<ul style="list-style-type: none"> • Functional diversity is positively related to task conflict [32][51] • Social category diversity (which includes cultural diversity) is positively related to relationship conflict [32][51] 	<ul style="list-style-type: none"> • Functional diversity is positively related to task conflict [73] • Cultural diversity is not related to relationship and task conflict [44] • Cultural diversity is positively related to conflict [18]
<i>Communication technology and conflict</i>	<ul style="list-style-type: none"> • Communication support is positively related to task conflict [62] • Process structuring support is negatively related to task conflict and relationship conflict [42] 	<ul style="list-style-type: none"> • Reliance on technology is positively related to task conflict [44] • Reliance on technology is not related to relationship conflict [44]
<i>Task conflict and team performance moderated by task routineness</i>	<ul style="list-style-type: none"> • Task conflict is negatively related to performance for routine tasks [29] • Task conflict is positively related to performance for non-routine tasks [29] 	<ul style="list-style-type: none"> • Not tested
<i>Relationship conflict and team performance moderated by task inter-dependence</i>	<ul style="list-style-type: none"> • Relationship conflict is negatively related to performance for interdependent tasks [29] 	<ul style="list-style-type: none"> • Not tested
<i>Conflict resolution and team performance</i>	<ul style="list-style-type: none"> • Integrative approach is positively related to team performance [58] • Distributive approach is negatively related to team performance [58] • Avoidance approach is negatively related to team performance [58] 	<ul style="list-style-type: none"> • Integrative approach is positively related to team performance [43] • Distributive approach is positively related to team performance [43] • Avoidance approach is negatively related to team performance [43]

Table 1 - Summary of Relevant Conflict Literature

Team	Size	Gender	Diversity	University	Nationality	Education
A	11 members	4 female 7 male	Gender = 0.67 Age = 0.32	5 North America 4 Europe 2 Asia	1 Canada 1 Egypt 2 India 1 Singapore 4 Sweden 2 USA	7 engineering 2 business 2 science
B	9 members	4 female 5 male	Gender = 0.71 Age = 0.20	4 North America 3 Europe 2 Asia	1 China 1 Hong Kong 3 Sweden 4 USA	5 engineering 3 business 1 science
C	7 members	3 female 4 male	Gender = 0.70 Age = 0.45	4 North America 3 Asia	1 China 2 France 1 Indonesia 2 Singapore 1 Tunisia	4 engineering 3 business

Table 2 - Demographic Characteristics of GVT

	Team A	Team B	Team C
Task details	<ol style="list-style-type: none"> 1. Identify companies in suggested industries to interview 2. Contact executives from each company 3. Interview executives and administer risk assessment survey <p>(all subtasks require minimal interdependence)</p>	<ol style="list-style-type: none"> 1. Generate applications via brainstorming 2. Generate and refine interview questions 3. Identify Internet service providers to interview 4. Contact executives from each Internet service provider 5. Interview executives 6. Consolidate data and analyze results 7. Prepare report <p>(all subtasks except 4,5 require interdependence)</p>	<ol style="list-style-type: none"> 1. Generate interview questions 2. Interview people in sponsor company 3. Assess existing financial analyst organization 4. Suggest ideas to improve financial analyst organization 5. Consolidate data and analyze results 6. Prepare report <p>(all subtasks except 2 require interdependence)</p>
Assistance from sponsor	<ul style="list-style-type: none"> • Provide some interview contacts • Provide all interview questions 	<ul style="list-style-type: none"> • Minimal 	<ul style="list-style-type: none"> • Provide all interview contacts • Provide no interview questions
Assistance from manager	<ul style="list-style-type: none"> • Team manager aggregates data and prepares report 	<ul style="list-style-type: none"> • Minimal 	<ul style="list-style-type: none"> • Aggregate data with qualitative analysis
Task characteristics	<ul style="list-style-type: none"> • Low interdependence • Low complexity <p>(full assistance from manager and sponsor for complex subtasks)</p>	<ul style="list-style-type: none"> • High interdependence • High complexity <p>(minimal assistance from manager and sponsor for complex subtasks)</p>	<ul style="list-style-type: none"> • Moderate interdependence • Moderate complexity <p>(moderate assistance from manager and sponsor for complex subtasks)</p>

Table 3 - Task Description for GVT

	Team A	Team B	Team C
Emails per student	437/11 = 39.7	248/9 = 27.6	374/7 = 53.4
Web discussion board messages per student	19/11 = 1.7	94/9 = 10.4	54/7 = 7.7
Chat sessions	1	0	5
E-circle (private community webspace) use	High	Nil	Low
Teleconference calls	8	8	6

Table 4 - Technology Use by GVT

Data Source	Details
Semi-structured interviews	<ul style="list-style-type: none"> • Interviews with team members and course faculty (average length of interview was 60 minutes)
Observation of meetings	<ul style="list-style-type: none"> • All face-to-face meetings, presentations, and breaks throughout a 4 day period
Observation of conference calls	<ul style="list-style-type: none"> • Team A: 8 meetings (average length was 60 minutes) • Team B: 8 meetings (average length was 45 minutes) • Team C: 6 meetings (average length was 60 minutes)
Communication logs	<ul style="list-style-type: none"> • All communication among team members (i.e., email, chat sessions, web discussion board messages, and e-circle logs)
Questionnaires	<ul style="list-style-type: none"> • Questionnaires completed by team members (average time to complete questionnaire was 20 minutes)
Project documentation	<ul style="list-style-type: none"> • Description of project • Personal information of team members • Lessons learned papers by team members • Grade awarded to team

Table 5 - Data Collection Protocol

Category / Construct	Instrument	Derived from
Team diversity <ul style="list-style-type: none"> • Age • Cultural <ul style="list-style-type: none"> • Cultural dimension • Language • National • Functional • Gender 	Based on team composition: <ul style="list-style-type: none"> • Coefficient of variation for age in yrs • Faultlines based on: <ul style="list-style-type: none"> • Individualism / Collectivism • Dominant language (s) • Major country (ies) • Engineering/science vs business • Blau's index [5] for male / female 	Team member demographic and educational characteristics
Task characteristics: <ul style="list-style-type: none"> • Task complexity • Task interdependence 	Coded based on description of construct <ul style="list-style-type: none"> • [9] • [72] 	Team project descriptions
Conflict type (team level) <ul style="list-style-type: none"> • Task conflict • Relationship conflict 	[30]	Questionnaire answered by all team members
Conflict resolution (team level) <ul style="list-style-type: none"> • Integrative • Distributive • Avoidance 	[42]	Questionnaire answered by all team members
Team Performance <ul style="list-style-type: none"> • Task outcome 	Grade	Course grade sheet
Conflict episode level <ul style="list-style-type: none"> • Conflict type • Cause <ul style="list-style-type: none"> • Team diversity <ul style="list-style-type: none"> • Age diversity • Cultural (including cultural dimension, language and national) diversity • Functional diversity • Gender diversity • Communication technology <ul style="list-style-type: none"> • Volume of communication • Immediacy of feedback • Conflict attribution <ul style="list-style-type: none"> • Personal • Categorical • Situational • Conflict resolution <ul style="list-style-type: none"> • Integrative • Distributive • Avoidance 	Mentioned in interviews and lessons learned papers or coded based on description of construct from: <ul style="list-style-type: none"> • [30] • [26] • [20] • [14] • [4] • [37] • [42] 	Interviews, lessons learned papers, meeting observation and communication logs, project documentation

Table 6 - Construct Measurement

Construct	Reliability (Cronbach Alpha)
All teams	
Task Conflict	0.98
Relationship Conflict	0.93
Integrative resolution	0.94
Distributive resolution	0.81
Avoidance resolution	0.71
Team A	
Task Conflict	0.92
Relationship Conflict	0.90
Integrative resolution	0.90
Distributive resolution	0.81
Avoidance resolution	0.73
Team B	
Task Conflict	0.95
Relationship Conflict	0.89
Integrative resolution	0.83
Distributive resolution	0.77
Avoidance resolution	0.73
Team C	
Task Conflict	0.92
Relationship Conflict	0.89
Integrative resolution	0.82
Distributive resolution	0.78
Avoidance resolution	0.75

Table 7 - Construct Reliabilities

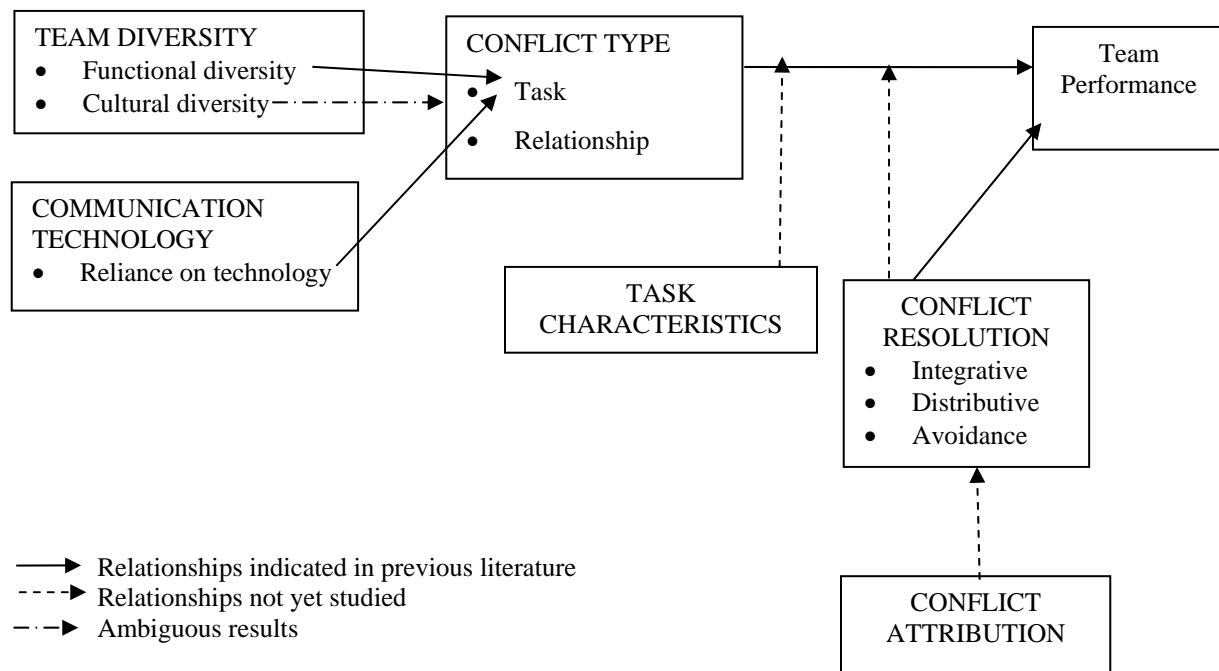
Conflict Episodes	Number of episodes		
	Team A	Team B	Team C
<u>Episode type:</u>			
- task conflict	6	4	8
- relationship conflict	5	4	2
Total Episodes	11	8	10
<u>Antecedent of conflict:</u>			
• <i>Cultural diversity</i> leading to			
- task conflict	3	2	3
- relationship conflict	4	4	1
• <i>Functional diversity</i> leading to			
- task conflict	1	1	3
- relationship conflict	0	0	0
• <i>Age diversity</i> leading to			
- task conflict	0	0	0
- relationship conflict	0	0	1
• <i>Gender diversity</i> leading to			
- task conflict	0	0	0
- relationship conflict	1	0	0
• <i>Technology characteristics</i> leading to			
- task conflict	2	1	2
- relationship conflict	0	0	0
<u>Conflict resolution:</u>			
- integrative resolution	2	2	9
- distributive resolution	6	2	1
- avoidance resolution	3	4	0
<u>Conflict attribution:</u>			
<i>Personal attribution</i> followed by			
- integrative resolution	0	0	0
- distributive resolution	4	0	1
- avoidance resolution	1	1	0
<i>Categorical attribution</i> followed by			
- integrative resolution	0	1	2
- distributive resolution	2	2	0
- avoidance resolution	1	3	0
<i>Situational attribution</i> followed by			
- integrative resolution	2	1	7
- distributive resolution	0	0	0
- avoidance resolution	1	0	0

Table 8 - Summary of Conflict Episodes

Conflict Parameter	Team A	Team B	Team C
Level of task conflict (on a scale of 1 to 7)	Low (2.0)	Low (1.8)	High (5.4)
Level of relationship conflict (on a scale of 1 to 7)	High (6.0)	Moderate (3.0)	Low (1.5)
Dominant conflict resolution approach	Distributive	Avoidance	Integrative
Level of team performance	Moderate	Low	High

Table 9 - Summary of Conflict Parameters

Figure 1 - Relationships between key concepts in the context of GVT conflict



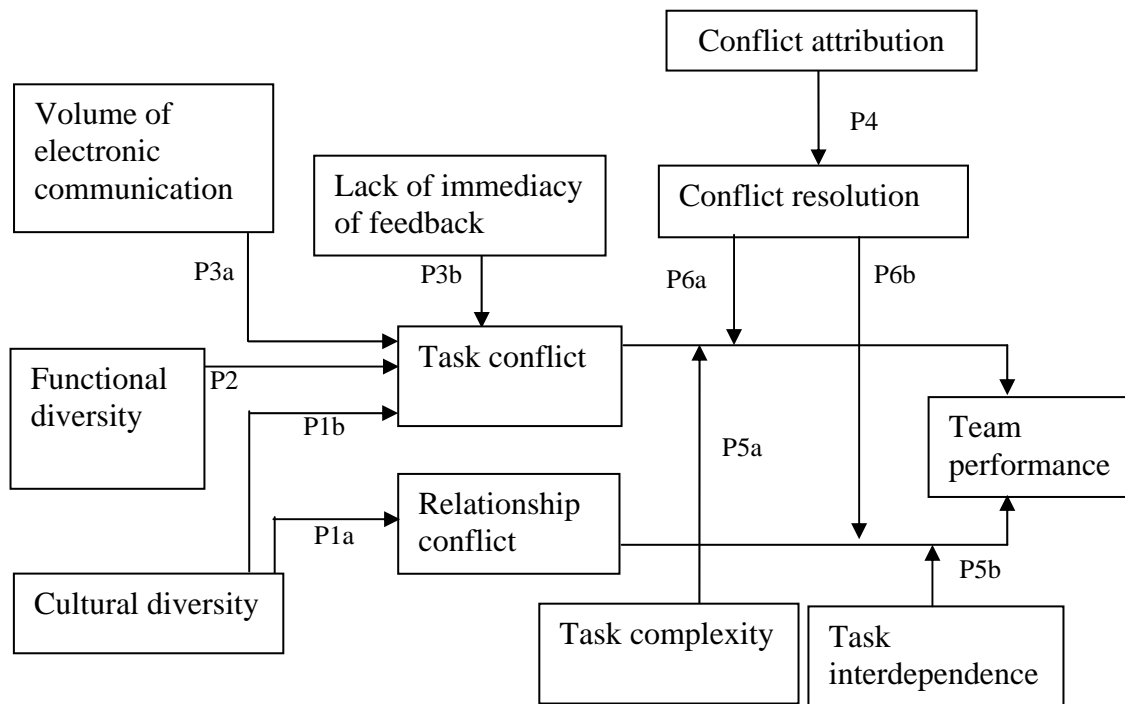


Figure 2 - Proposed Model of Conflict and Performance in GVT