ABSTRACT

Title of Dissertation: THE PERFORMANCE OF
GLOBAL BUSINESS TEAMS
WITHIN MULTINATIONAL CORPORATIONS:
THE TEST OF AN INTERVENING PROCESS MODEL

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Global business teams are a critical component of the strategic management process of multinational corporations. In the context of this dissertation, they are defined as teams of managers who are responsible for a business or a function across several countries.

Given their multi-country charter, national diversity, and geographical dispersion, there are major questions as to the drivers of the performance of global business teams. Building on the growing literature, I propose an intervening process model of the performance of global business teams in relation to the following research question:

In the context of global business teams, how do composition, governance, and organizational context affect: (a) team identity, (b) team cognitive comprehensiveness, and (c) team performance?

The model links the variables of national diversity and geographical dispersion to the performance of global business teams through the mediating variables of team identity and team cognitive comprehensiveness. In addition, organizational policies and team governance are posited to moderate the relationships between team composition and emergent processes.

The model is tested using a field data set of global business teams. By and large, the empirical results provide little support for the hypotheses. In particular, no effect is found, direct or indirect, of composition on emergent processes and team performance. In addition, there is only limited support for the moderating influence of team governance.

However, several governance variables have a direct effect on team identity and team cognitive comprehensiveness. As a result, a post hoc model of the effect of team governance on the process and performance of global business teams is proposed and tested.

The results are broadly supportive. Specifically, team-based rewards have a significant and positive impact on the performance of global business teams through the mediating variables of team identity and team cognitive comprehensiveness. The frequency of face-to-face meetings has an indirect effect through team identity. Finally, geographical dispersion moderates the relationship of team-based rewards and frequency of e-mail communication with team cognitive comprehensiveness.

THE PERFORMANCE OF GLOBAL BUSINESS TEAMS

WITHIN MULTINATIONAL CORPORATIONS:

THE TEST OF AN INTERVENING PROCESS MODEL

by

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TABLE OF CONTENTS

CHAPTER 1: GLOBAL BUSINESS TEAMS: A PHENOMENON WORTH INVESTIGATING? 1

CHAPTER 2: COMPOSITION, DYNAMICS, AND PERFORMANCE OF GLOBAL BUSINESS TEAMS: CURRENT KNOWLEDGE AND FUTURE RESEARCH DIRECTIONS 10
Organizing Framework 10
Definition 10
Review Questions 11
Findings 14
The Literature 14
Impact of Team Composition 23
Impact of Team Governance 29
Impact of the Organizational Context 36
Antecedents and Consequences of Team Process 41
Antecedents of Team Performance 45
Summary and Research Question 47

CHAPTER 3: AN INTERVENING PROCESS MODEL OF THE PERFORMANCE OF GLOBAL BUSINESS TEAMS 50
General Approach 50
Variables of the Model 51
GBT Composition 51
GBT Process 52
Organizational Policies 54
GBT Governance 54
GBT Performance 55
Hypotheses 56
Impact of GBT Process 56
Impact of National Diversity 58
Impact of Geographical Dispersion 61
Interaction National Diversity and Geographical Dispersion 65
Moderating Influence of Organizational Policies 70
Moderating Influence of GBT Governance 74

CHAPTER 4: METHODS 81
Sample 81
Description 81
Systematic Approach 83
Data Collection 84
Survey Instrument 86
Questionnaire Design 86
Pre-testing 87
Translation 87

Pilot Testing 88
Measures 90
Satisfaction with GBT Performance 90
Perception of GBT Productivity 91
GBT Identity 92
GBT Cognitive Comprehensiveness 92
Team-based Rewards 93
Frequency of Face-to-face Meetings 94
Frequency of E-mail Communication 94
Internationalization of Organizational Policies 95
GBT Composition 95
Control Variables 96
Analytical Approach 98
Common-method Variance 98
Within-nationality Data Standardization 99
Data Aggregation at the Team Level 100
Path Analysis 102

CHAPTER 5: RESULTS 105
Descriptive Statistics and Correlations 105
Impact of Controls 108
Impact of GBT Process 109
GBT Identity 109
GBT Cognitive Comprehensiveness 110
Impact of National Diversity 110
GBT Identity 110
GBT Cognitive Comprehensiveness 111
Impact of Geographical Dispersion 111
GBT Identity 111
GBT Cognitive Comprehensiveness 111
Interaction of National Diversity and Geographical Dispersion 112
GBT Identity 112
GBT Cognitive Comprehensiveness 112
Moderating Influence of Organizational Policies 113
GBT Identity 113
GBT Cognitive Comprehensiveness 113
Moderating Influence of GBT Governance 114
GBT Identity 114
GBT Cognitive Comprehensiveness 114
Supplementary Analyses 123
Within-nationality Standardized Data 123
Multicollinearity 125
Direct Effect of Moderating Variables 131

CHAPTER 6: DISCUSSION AND INTERPRETATION 133
Alternative Measures of Performance 133

Post Hoc Model 136

CHAPTER 7: CONCLUSION 150
Summary 150
Results 150
Contribution 153
Limitations 155
Directions for Future Research 157
National Diversity 158
Geographical Dispersion 159
GBT Process 161
Multilevel Modeling 163
Methods 164
Concluding Remark 166

Appendix 4.1: R_{wg} Before Changes 167

Appendix 4.2: R_{wg} After Changes 182

Appendix 5.1: Analyses Using Within-nationality Standardized Data 197

Glossary 206

References 208

LIST OF TABLES

Table 2.1: Summary of the Literature

Table 5.1: Descriptive Statistics and Correlations

Table 5.2: Antecedents of GBT Identity

Table 5.3: Antecedents of GBT Cognitive Comprehensiveness

Table 5.4.a: Effect of Control Variables on GBT Performance

Table 5.4.b: Effect of GBT Composition on GBT Performance

Table 5.4.c: Effect of GBT Composition and Emergent Processes on GBT Performance

Table 5.5: Regressions using Raw and Within-nationality Standardized Data

Table 5.6.a: Effect of Interactions all at the Same Time or Separately: GBT Identity

Table 5.6.b: Effect of Interactions all at the Same Time or Separately: GBT Cognitive Comprehensiveness

Table 6.1.a: Correlations of Satisfaction with GBT Performance

Table 6.1.b: Correlations of Perception of GBT Productivity

Table 6.2: Antecedents of GBT Identity – Post Hoc Model

Table 6.3: Antecedents of GBT Cognitive Comprehensiveness – Post Hoc Model

Table 6.4a: Effect of GBT Governance and Emergent Processes on GBT Performance – Post Hoc Model, Members' evaluations

Table 6.4b: Effect of GBT Governance and Emergent Processes on GBT Performance – Post Hoc Model, Leaders' evaluations

Table 6.4c: Effect of GBT Governance and Emergent Processes on GBT Performance – Post Hoc Model, Sponsors' evaluations

Table 6.5.a: Effect of Interactions all at the Same Time or Separately: GBT Identity, Post Hoc Model

Table 6.5.b: Effect of Interactions all at the Same Time or Separately: GBT Cognitive Comprehensiveness, Post Hoc Model

Table 7.1: Summary of Results

Table 7.2: Summary of Post Hoc Model

LIST OF FIGURES

Figure 2.1: Organizing Framework

Figure 3.1: Schematic Representation of the Model

Figure 4.1: Distribution of Global Business Teams

Figure 6.1: Post Hoc Model of GBT Performance

CHAPTER 1. GLOBAL BUSINESS TEAMS: A PHENOMENON WORTH INVESTIGATING?

As companies globalize, they face an increasing need to coordinate their activities on a worldwide basis (Bartlett & Ghoshal, 1989; Govindarajan & Gupta, 2001a). Multinational corporations (MNCs) pursue such coordination by establishing one or more cross-border teams of managers, charging these teams with realizing the appropriate tasks (Snow, Davison, Snell, & Hambrick, 1996). A global business team (GBT) is defined in this dissertation as a team of managers who are responsible for a business or a function across several countries.

For example, in order to ensure consistent messaging across its vertical markets, Microsoft has established a team responsible for defining its image in the enterprise space. This team is composed of 18 managers from different nationalities who are operating from various locations in North and South America, Asia, and Europe. Another example is the team managing Panasonic's battery business worldwide. The majority of the team's eight managers are Japanese and located at the Tokyo headquarters and domestic plants. The remaining two managers are the representatives of the American region, based in Chicago, and the European region, based in Frankfort.

Why study GBTs specifically? Clearly, GBTs are a special case of teams, a phenomenon at the core of organizational life that has been studied for decades (Cohen & Bailey, 1997; Gist, Taylor, & Locke, 1987; Guzzo & Shea, 1992). However, as scholars specializing in the field have emphasized, GBTs differ from teams in general in several critical aspects (DiStephano & Maznevski, 2000;

Jarvenpaa & Leidner, 1999; Shapiro, Furst, Spreitzer, & Van Glinow, 2002). First, the defining factor of GBTs is that their charter is multi-country (Govindarajan & Gupta, 2001a; Snow et al., 1996). For example, Snow et al. (1996) described several cases of teams such a Heineken task force chartered with achieving production efficiency in Europe, an Eastman Kodak team who sought to tailor photo CD offerings to each country in the European market, and an IBM team of experts located in London and responsible for providing technical advice to airline clients worldwide. As noticed by these authors, GBTs can be used in a variety of ways to formulate and implement international strategies including global efficiency, local responsiveness, and organizational learning (Bartlett & Ghoshal, 1989; Govindarajan & Gupta, 2001a; Kobrin, 1994). Multi-country charter is the first critical difference of GBTs as compared to the teams generally studied in the literature.

As such, GBTs work across national, organizational, geographical, and time boundaries (Espinosa, Cummings, Wilson, & Pearce, 2003; Govindarajan & Gupta, 2001a). In particular, GBTs differ from other types of teams because they have to make decisions regarding the nationality of their members and the locations from which they operate (Jarvenpaa & Leidner, 1999; Maznevski & Chudoba, 2000). Given the requirements and importance of their task, GBTs may elect different levels of national diversity and geographical dispersion in order to harness the required level of knowledge and expertise. For example, Snow et al. (1996) described a British Petroleum team responsible for the development of the European gas market that picked members from France, Germany, and Norway based on their technical expertise as well as knowledge of local markets. In some instances, a high level of

heterogeneity within a GBT is desirable, while in others, homogeneity is preferred. For example, Salk and Brannen (2000) analyzed how collocation on the manufacturing site in Germany helped the managers of an international joint venture (IJV) between German and Japanese parents achieve the required level of cultural integration and differentiation between members for effective team process and successful business operations.

Given their attribute of national diversity and geographical dispersion, GBTs are quite distinctive in terms of structure, task environment, and processes (Earley & Gibson, 2001; Maznevski & Chudoba, 2000; Shapiro et al., 2002). Conceptual models and important questions pertaining to GBTs remain the same as for other types of teams (Earley & Gibson, 2001; Milliken & Martin, 1996). Nevertheless, the challenge for this stream of research is to identify those dimensions that are similar and those that are different from classical approaches to understand GBT performance (Hambrick, Davison, Snell, & Snow, 1998; Montoya-Weiss, Massey, & Song, 2001). As noticed by DiStephano and Maznevski (2000), GBTs are identical to other types of teams, but they present the most difficult case possible – as well as the one with the greatest potential.

Finally, the fact that GBTs are different is indicated by the high rate of failure reported in the literature (Govindarajan & Gupta, 2001a; Hambrick, Li, Xin, & Tsui, 2001; Johnson, Korsgaard, & Sapienza, 2002). Given their multi-country charter and the complexity of MNC operations, these findings can be understood. At the same time, improving the management, process, and performance of GBTs appears as a

critical task, because of the implications for global strategy (Martinez & Jarillo, 1989).

Given the importance of the phenomenon, it is not surprising that a growing stream of research has emerged in the course of the past decade studying the drivers of GBT performance. This research is synthesized in Chapter two and the review is organized around five questions, which are derived from the general literature on teams:

- What is the impact of team composition?
- What is the impact of team governance?
- What is the impact of the organizational context?
- What are the antecedents and consequences of team process?
- What are the antecedents of team performance?

For each question, key findings are summarized, potential gaps or puzzles are identified, and directions for future research are proposed. As a result of this review, the following research question is proposed for the dissertation:

> **Research Question**: In the context of global business teams, how do composition, governance, and organizational context affect: (a) team identity, (b) team cognitive comprehensiveness, and (c) team performance.

In an attempt to answer this question, an intervening process model of GBT performance and associated hypotheses are proposed in Chapter three. The conceptual approach is consistent with the Input-Throughput-Output model that is classical for the study of teams (DeSanctis & Poole, 1995; Guzzo & Shea, 1992; Lawrence, 1997). The literature on GBTs is still emerging so that arguments from this

research stream as well as the general literature on teams are woven together to develop the model (Cohen & Bailey, 1997; Earley & Mozakowski, 2000; Guzzo & Shea, 1992; Shapiro et al., 2002).

The inputs of interest are national diversity and geographical dispersion, which are the critical variables of GBT composition. The throughput variables are the emergent processes of GBT identity and GBT cognitive comprehensiveness, which reflect the key trade off between cohesiveness and cognitive capability associated with diversity issues in teams (Milliken & Martin, 1996; Williams & O'Reilly, 1998). In addition, organizational policies and GBT governance are included as moderating variables of the relationship between GBT composition and GBT emergent processes. GBTs and the organizations in which they operate can implement strategies that significantly improve GBT outcomes given a certain degree of national diversity and geographical dispersion. Finally, GBT performance is the obvious output of interest.

As such, the contribution is several-fold. First, the model accounts for the influence of both national diversity and geographical dispersion. Much of extant research has considered the unitary effect of either dimension, but rarely the joint effect of both on GBT performance. Second, GBT identity and GBT cognitive comprehensiveness are introduced as mediating variables in the relationship between GBT composition and GBT performance. This is a conceptual approach that, although it has been strongly advocated in recent years (Lawrence, 1997; Milliken & Martins, 1996; Reger, 1997), has received little attention in GBT research, but for a few exceptions (Earley & Mosakowski, 2000). The argument is that by introducing intervening processes, a more thorough explanation of GBT performance is provided.

Finally, while the literature has mostly focused on the examination of the impact of GBT composition on GBT performance, there is still a need to understand how MNCs can implement policies and GBTs themselves develop approaches that enhance their performance, given national diversity and geographical dispersion.

In Chapter four, the sample of GBTs and the methods used to test the hypotheses of the intervening process model of GBT performance are described. Survey questionnaires were used to collect the data. As a result, the questions of common-method variance and cross-national measurement have to be addressed (Podsakoff & Organ, 1986; van der Vijver & Leung, 1997). Common-method variance is dealt with by collecting data from different respondents and by implementing a Harman one factor test design. This test in particular indicates limited evidence of common-method variance.

Concerning the use of cross-national data, both raw and standardized within nationality data are considered. Regression results for both sets of data are consistent.

The use of data from individual respondents to measure team variables requires justifying for aggregation (Bliese, 2000; Klein et al., 2000). In general, aggregation indicators – $R_{wg(j)}$, ICC(1), and ICC(2) – are at an acceptable level for GBTs (Klein, Conn, Smith, & Sorra, 2001; Klein et al., 2000). For those variables and GBTs exhibiting a low aggregation validity, the values from outlier respondents are removed.

The results from the path analysis are presented in Chapter five. Hierarchical regressions are used, which is the recommended approach with samples of small size and data aggregated at the team level (Cohen, Cohen, West, & Aiken, 2003; Smith et

al., 1994). By and large, there is little empirical support for the hypotheses of the proposed intervening process model of GBT performance. In particular there is no direct effect of national diversity and geographical dispersion on either GBT identity, GBT cognitive comprehensiveness, or GBT performance.

Chapter five also discusses the implications of some of the methodological considerations expounded in Chapter four, namely the results of the hierarchical regressions using within-nationality standardized data and the impact of multicollinearity when testing the interactions. The results of the regressions with within-nationality standardized data are generally consistent with those using raw data. In addition, the examination of individual interactions indicates a significant moderating effect of the frequency of e-mail communication.

The direct effect of the moderating variables is also discussed in Chapter five. Internationalization of organizational policies has a positive and significant effect on GBT cognitive comprehensiveness. Both team-based rewards and frequency of face-to-face meetings have a significant and positive effect on GBT identity. Team-based rewards has a significant and positive effect on GBT cognitive comprehensiveness.

Finally, interpretation of the findings based on supplementary analyses is proposed in Chapter six. A measure of GBT performance based on members' ratings is used in the regressions that indicates a positive relationship with GBT identity and GBT cognitive comprehensiveness, but no significant association with national diversity and geographical dispersion. These findings, combined with the direct effects on GBT process observed for the governance variables, suggest a post hoc

model of GBT performance with GBT governance as the independent variable, GBT process as the mediating variable, and GBT composition as the moderating variable.

In general, the empirical results support this post hoc model. Team-based rewards have a direct effect on GBT performance, partially mediated by GBT identity and GBT cognitive comprehensiveness. Frequency of face-to-face meetings has an indirect effect on GBT performance through GBT identity. However, there is no effect of the frequency of e-mail communication, either on GBT process or GBT performance.

The post hoc analyses also indicate a moderating influence of national diversity and geographical dispersion on these relationships that supports and augments prior findings in the literature. These results imply that team governance is similar for multinational GBTs as compared to single nationality GBTs. However, and as demonstrated by Montoya et al. (2001), these results indicate a moderating effect of geographical dispersion. Specifically, team-based rewards and frequency of e-mail communication are more important for geographically dispersed than collocated GBTs.

In conclusion, the empirical results provide limited support for the hypotheses. Yet, they yield insight on the impact of the various factors of GBT composition, GBT governance, and organizational context on GBT process and performance. In addition, the post hoc model is a useful basis for future GBT research. Taken together with recent findings in the literature, these results suggest important directions for future GBT research, which are discussed in Chapter seven.

First, more sophisticated conceptualization of the impact of national diversity and geographical dispersion could be developed. In that regard, the inclusion of these two variables as moderators of the relationships between GBT governance and GBT process in the post hoc model is promising. Second, future research should provide a more comprehensive understanding of GBT process. That would include explicating what hybrid cultures exactly are, how they develop, and how they impact GBT performance. Third, and as suggested by extant research and given recent progress in theory and methods, more sophisticated multilevel modelsof GBT performance should be developed and tested. This area is critical to understand the recursive influences between GBTs and their MNC environment (Govindarajan & Gupta, 2001a; Ilgen, 1999; Kozlowski & Klein, 2000). Finally, cross national research is messy, and there are still some thorny methodological issues that need to be addressed in the field (Teagarden et al., 1995). One particular area is the methods necessary to study hybrid cultures of GBTs.

CHAPTER 2. COMPOSITION, DYNAMICS, AND PERFORMANCE OF GLOBAL BUSINESS TEAMS: CURRENT KNOWLEDGE AND FUTURE RESEARCH DIRECTIONS

In chapter two, the growing literature on GBTs is reviewed. In section 2.1, GBTs and associated terms are defined and the review questions are provided. In section 2.2, the main studies pertaining to GBTs are summarized and the findings discussed in the context of the general literature on teams. Finally, the focus of the dissertation and the research question are outlined in section 2.3.

2.1. ORGANIZING FRAMEWORK

2.1.1. Definition

There are multiple terms used to describe GBTs – or some related form of teams – including cross-cultural, cross-border, cross-national, global, global virtual, inter-cultural, international, multinational, multicultural, and transnational. Disciplinary biases may explain the choice of terms, e.g. global business teams for strategic management (e.g., Govindarajan & Gupta, 2001a), where the key issue is to understand the dynamics of the top management team as one of the key variables influencing MNC strategy and performance, transnational teams for organizational behavior (e.g., Earley & Mosakowski, 2000), where the major question is to tease out the impact of national diversity on team processes, and global virtual teams – which are nationally diverse and geographically dispersed GBTs – for management information systems (e.g., Jarvenpaa, Knoll, & Leidner, 1998), where the main

concern is to examine patterns of communication and the impact of information and communication technologies.

For the purpose of this dissertation, the definition of Maznevski and Chudoba (2000) provides a useful characterization. Global business teams are "(a) identified by their organization and their members as a team; (b) responsible for making and/or implementing decisions that are important to the organization's global strategy; (c) use technology-supported communication substantially more than face-to-face communication; (d) work and live in different countries" (Maznevski & Chudoba, 2000: 473). In addition, there are several terms that are important to understand GBTs in the context of this dissertation that are defined in the glossary.

2.1.2. Review Questions

The general literature on teams suggests several important areas for a review of GBT research (Cohen & Bailey, 1997; Gist et al., 1987). First, demographic issues are critical given the increasing diversity within organizations due to changes in the composition of the workforce and the development of new organizational forms (Jackson, May, & Whitney, 1995). At the individual level, characteristics of each team member influence his or her perceptions and behaviors, as examined in the field of relational demography (Riordan & Shore, 1997; Tsui, Egan, O'Reilly, 1992). At the team level, composition has been shown to influence internal processes such as social integration and innovation (Bantel & Jackson, 1989; Smith et al., 1994). Finally, diversity at multiple levels can have an impact on organizational outcomes.

For example, Hambrick, Cho, and Chen (1996) showed that management team heterogeneity impacted firms' competitive moves.

Several types of demographic variables have been studied in prior research (Milliken & Martins, 1996; Williams & O'Reilly, 1998). In general, the literature has made the distinction between visible – e.g., nationality, age, gender – and task-related – e.g., experience, function, and education – variables because diversity for these two types of variables leads to significantly different team outcomes (Jackson et al., 1995; Pelled, 1996). The body of research on demographic and diversity issues therefore drives the first review question:

What is the impact of team composition?

Team governance is the second area of review suggested by the general literature on teams. Teams have the opportunity to shape their processes through a variety of governance mechanisms including team-building, goal setting, team-based rewards, communication strategies, and leadership (Knight, Durham, & Locke, 2001). Team governance is important to align the interests of individual members with team objectives, facilitate their interaction, and ensure that their actions are consistent with organizational objectives (DeMatteo, Eby, & Sundstrom, 1998). As such, team governance is critical to improve outcomes at the individual, team, and organizational level. This body of research therefore drives the second review question:

What is the impact of team governance?

The impact of the organizational context on GBT process and performance is the third area of review suggested by the literature. Traditionally, teams have been studied independently from their organizational context. From the early 1980s to

the present however, research has increasingly focused on issues facing task-performing teams embedded in organizations, perhaps as a reflection of the simultaneous increase in team-based forms of organizations (Guzzo & Shea, 1992; Ilgen, 1999).

There are multiple variables of the organizational context that are potentially relevant to understand team process and performance. One useful classification is between tangible and intangible resources, or hardware and software, such as information systems and firm strategy (Hambrick, 1994; Sundstrom & Associates, 1999). In addition, theory and empirical findings have shown that the impact of contextual variables can be found at all levels as well as include recursive relationships (Cohen & Bailey, 1997; Gladstein, 1984). This body of research therefore drives the third review question:

What is the impact of the organizational context?

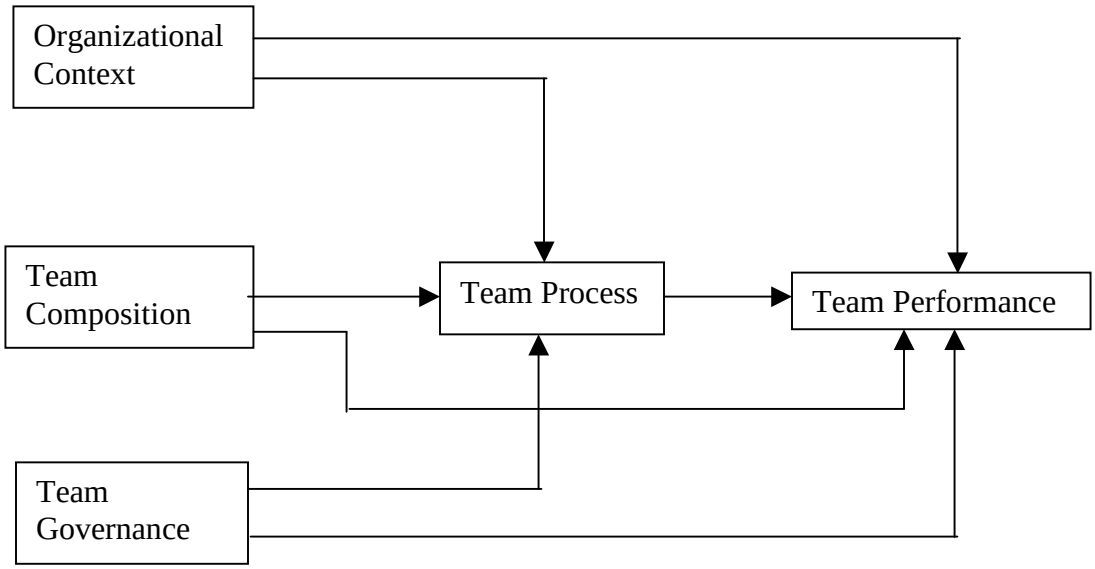
Models of team performance are characterized by a high degree of complexity (Goodman, Ravlin, & Schminke, 1987; Guzzo & Shea, 1992). This statement should be expected given the variables at different levels that the previous review questions suggest impact team process and performance. Nonetheless, they generally have two characteristics in common: 1) team process is a critical component of the models. 2) Team performance is invariably the output of interest. This observation therefore drives the fourth and fifth review questions:

What are the antecedents and consequences of team process?

What are the antecedents of team performance?

These review questions are graphically summarized in Figure 2.1. They are considered below in terms of key findings, commentaries on potential gaps and puzzles, and directions for future research. The review follows the approach of considering specific GBT results in the context of the general literature on teams.

Figure 2.1: Organizing Framework



2.2. FINDINGS

2.2.1. The Literature

Until recently, there was only limited research on the phenomenon of GBTs and management practice was far more advanced than scholarly investigation (Hambrick et al., 1998; Snow et al., 1996). Much of the initial work relied on anecdotal evidence and was applied in focus, aiming at providing actionable recommendations for managers and members of GBTs (e.g., Lipnack & Stamps,

1997; Solomon, 1995). The past decade has witnessed a reversal of this trend and a number of studies have been published to start filling the gaps in GBT research (Earley & Gibson, 2001).

A thorough search of electronic databases revealed several hundred articles on the topic of GBTs. A closer examination reduced the tally to 19 academic articles published in leading management journals. Table 2.1 summarizes for each study the focus of the research, the key findings, and the sample and methods used.

Table 2.1: Summary of the Literature

Authors	Data and Methods	Key Results
Cramton, 2001	13 dispersed teams comprised of students from George Mason University and other international universities for a seven week course assignment. 1649 pieces of e-mail, printouts of the online chats, team logs of the use of communication tools, and 26 papers analyzed per the case method proposed by Eisenhardt (1989).	Five types of failures reflecting the mutual knowledge problem appeared in dispersed collaboration: failure to communicate and retain contextual information, unevenly distributed information, difficulty to communicate and understand the salience of information, difference in speed of access to information, and difficulty of interpreting the meaning of silences. Hidden profiles of members formed, with the risk for dispositional versus situational attributions and negative consequences for cohesion and learning.
Cummings, 2003	Questionnaire data from 182 work groups dispersed around the world of a multinational telecom company headquartered in the United States. Ordered logit regression analyses were used to test the five hypotheses.	Structural diversity – along the dimensions of locations, functional assignments, reporting managers, and business units – enhanced the value of knowledge sharing for the performance of work groups.
DiStephano & Maznevski, 2000	Report on a systematic study of multicultural teams involving a review of the literature, collection of empirical data augmented by consulting relationships, executive education sessions, and cases studies in many companies.	Well managed diverse teams can outperform homogeneous ones. The approach proposed to improve the performance of diverse teams involves three phases: 1) mapping to understand the differences; 2) bridging to communicate and take the differences into account; 3) integrating to bring together and leverage the differences.

Earley & Mosakowski, 2000	Sample 1: 5 transnational teams from a clothing manufacturer with operations in the Pacific Rim. Sample 2: 92 participants in an executive management course belonging to 23 teams with three levels of national diversity performing repeated tasks twice. Sample 3: 161 students representing 24 transnational teams participating in an MBA course and evaluated on a group assignment. Qualitative analysis of field interviews. ANOVA was used to analyze survey data and demonstrate the quadratic effect. Regressions for the mediation tests.	Nationally homogeneous and heterogeneous transnational teams were more effective than moderately heterogeneous ones. Partial support for the mediation of emergent processes – shared identity, team efficacy, and intra-team communication – between national diversity and performance was also found.
Govindarajan & Gupta, 2001a	Conceptual development based on the observations of 70 global business teams in the field.	A framework for high-performing global business teams is proposed based on the careful definition of team charter, choice of the team members, and management of team process.
Hambrick, Davison, Snell, & Snow, 1998	Establish a conceptual understanding of the implications of multinational composition for group functioning.	Propose that multinational groups are effective for different types of tasks (computational, creative, and coordinative) depending on their degree of diversity on the dimensions of values, cognition, demeanors, and language.
Hambrick, Li, Xin, & Tsui, 2001	Conceptual model of the effect of compositional gaps within the international joint venture management groups (IJVMGs), which occur along parent company lines and influence group functioning and IJV effectiveness.	Compositional gaps provide different skills and perspectives within IJVMGs that may lead to healthy substantive conflict. However, compositional gaps also reduce identification with the team and generate emotional conflicts. A downward spiral of relational and task-related

		conflict can result in behavioral disintegration of IJVMGs. These harmful group processes interact with tensions between IJV parents to create a second downward spiral.
Jarvenpaa & Leidner, 1999	Sample of 75 global virtual teams with four to six members representing 385 masters students at 28 universities working on an eight week internet project. 29 with at least two respondents who completed both surveys were utilizable. An inductive case method was used to study 12 global virtual teams (Eisenhardt, 1989).	Trust in global virtual teams was possible. There were members' actions and communication behaviors that facilitated trust in the course of a virtual project. Early on, social communication and conveying enthusiasm was important. Members needed to be technically adept and show initiative. Later on, predictability of communication and timeliness of response mattered, as well as a marked shift to the substance of the task. In addition, successful teams exhibited rotating leadership, transition from procedure to task, and phlegmatic responses to crises.
Jarvenpaa, Knoll, & Leidner, 1998	Sample of 75 global virtual teams with four to six members representing 385 masters students at 28 universities working on an eight week internet project. Each member had a different nationality mix of low and high context cultures. Questionnaires were administered after the team-building exercises (first month) and at the end of the project (second month). Team e-mail communications were logged. MANOVA was used to test the effect of	The two week team-building exercise had an impact on team members' perceptions of the other members' ability, integrity, and benevolence. In the early phases of teamwork, team trust was predicted strongest by perceptions of other team members' integrity and weakest by perceptions of their benevolence. The effect of other members' perceived ability on trust decreased over time. The members' own propensity to trust had a significant, though unchanging effect on trust. High trust teams were proactive, driven by

	the antecedents of trust. Correlation analysis for the effect of team-building. Each case of high-trust and low-trust teams was analyzed.	output, used a positive tone, rotated leadership, established goals as a team, emphasized the interdependence of roles, managed their time, communicated frequently and regularly, and provided feedback to members.
Johnson, Korsgaard, & Sapienza, 2002	Questionnaire data from the members of 51 management teams of international joint ventures (IJVs) domiciled in the United States and Canada. Hypotheses were tested using repeated measures regression analyses.	Management teams were more committed to the IJV than to the parent companies and their commitment was influenced by perception of fairness and decision control.
Kayworth & Leidner, 2001	Questionnaire data collected from 13 global virtual teams composed of five to seven students from three universities in the United States, France, and Mexico, with each team assigned a leader and a task to complete over a five week period. MANOVA was used to determine the effect of leader effectiveness on communication effectiveness, communication satisfaction, and role clarity. Qualitative analysis of members' and leaders' perceptions helped identify drivers of leaders' effectiveness.	Effective leaders demonstrated behavioral complexity, empathy and ability to assert their authority, provided regular, detailed, and prompt communication, and articulated the roles and responsibilities of members.
Massey, Montoya-Weiss, & Hung, 2003	175 graduate students in the United States and Japan assigned to 35 five person teams dispersed across four sites. Teams communicated solely via Lotus	Successful enactment of a temporal coordination mechanism had a positive impact on the performance of the global virtual teams. Temporal coordination per say was not a driver

	Notes. Assignment lasted two weeks, with eight days for team collaboration. 812 communication incidents were content analyzed for four interaction behaviors. Team scores were cluster analyzed for interaction patterns.	of performance. Rather, it was the influence of coordination on interaction behavior that affected team performance.
Maznevski & Chudoba, 2000	Three global virtual teams (GVTs) at a multinational corporation studied over a 21 months period. Qualitative analysis of multiple data sources (interviews, observations of meetings and conference calls, communication logs, questionnaires, and company documents) guided by a framework based on Adaptive Structuration Theory.	Effective GVTs were characterized by a fit between decision process and complexity, and form of communication incidents. Second, effective GVTs sequenced these incidents to generate a deep rhythm of regular meetings interspersed with shorter encounters using various media.
Montoya-Weiss, Massey, & Song, 2001	175 graduate students in the United States and Japan from 35 five person teams dispersed across four sites. Teams communicated solely via Lotus Notes. The assignment lasted two weeks, with eight days devoted to team collaboration. Seemingly Unrelated Regression (SURE) analyses were used to test hypotheses.	The conflict management behaviors selected by the global virtual teams had an impact on their performance and this relationship was moderated by the use of a temporal coordination mechanism.
Salk & Brannen, 2000	Management team of one international joint venture (IJV) from German and Japanese parents made of 10 German, five Japanese, and one South African members (removed from the analyses).	National differences remained present in complex ways as determinants of individual influence within the IJV management team. In addition, the team context and the individual member's orientation to team norms contributed

	10 semi-structured interviews preceded the collection of network data through questionnaires from the 16 members of the IJV management team. Network analysis was conducted using UCINET and other analysis used SAS.	to channeling these differences.
Salk & Shenkar, 2001	40 formal interviews with the members of the management team of an international joint venture (IJV) of British and Italian parents between the 18^{th} and 48^{th} months of the IJV. Data qualitatively analyzed per Miles and Huberman (1989).	National social identities were the dominant sense-making vehicle used by IJV team members even though contextual changes occurred. Social identity enactments by team members mediated the relationship of contextual variables, both environmental and structural, with group and organizational outcomes such as role investment and job satisfaction.
Shapiro, Furst, Spreitzer, & Von Glinow, 2002	Conceptual model of effort-withholding behaviors in transnational teams, e.g., loafing, shirking, and free-riding.	Three characteristics of transnational teams (cultural value diversity, reliance on electronic communications, and lack of on-site monitoring) reduce the salience of transnational team identity which, in turn, increases members' propensity to withhold performance-effort.
Snow, Snell, Davison, & Hambrick, 1998	Data collected in three phases: 1) interviews with more than 100 team members and their leaders in 13 companies. 2) Survey filled by the members and leaders of 35 transnational teams. 3) Demonstration at the Wellcome Foundation. Development of a model of transnational team effectiveness using these data.	Drivers (task and composition) and design and management levers (leadership, organizational alignment, information and communication technologies, facilitation) have an impact on their process and business results of transnational teams.

Van Glinow, Shapiro, & Brett, 2004	Conceptual model of the effect of national diversity on emotional conflicts and possible remedies.	Given that emotional conflicts are prevalent in nationally diverse groups, talking might not be the most feasible and desirable resolution approach. Aesthetic shared activities is one of the conflict management alternatives that can be effective in this type of situation.

2.2.2. Impact of Team Composition

The effect of diversity within teams can be predicated based on three main theories (Williams & O'Reilly, 1998). First, interaction among team members can be interpreted on the basis of social identification theory (Turner, 1982) or self-categorization theory (Tajfel, 1981). Social identity theory assumes that individuals have a need for self-esteem, which is established in reference to their social context. Individuals categorize people around them and define the boundaries of their respective in-groups and out-groups. More often than not, "otherness is seen as a deficiency" (Williams & O'Reilly, 1998: 84) and leads to some form of stereotyping, polarization, and in some extreme instances, racism. While social identity and self-categorization theories apply more directly to inter-group relationships, they have also been used for relational demography, which analyzes how members within a team perceive each other (Riordan & Shore, 1997; Tsui et al., 1992). Social identity and self-categorization theories are invoked to explain the negative association between team diversity and individual and team outcomes such as communication, conflict, and integration.

Second, the similarity/attraction paradigm (Berscheid & Walster, 1978; Byrne, 1971) emphasizes the similarity of members to understand interactions within teams; the more similar, the more attraction among members. Comparisons can be made based on appearance, experience, values, and beliefs. Consistent with social identity and self-categorization theories, that line of reasoning has been used to explain that team diversity is negatively associated with social outcomes at the individual and team level.

Finally, information and decision making theories are also important to predict the effect of team diversity on team outcomes (Williams & O'Reilly, 1998). The initial premise of these theories, which is identical to that of the similarity/attraction paradigm, is that communication is easier among similar individuals, both inside and outside the team, because of shared information and mental models. Conversely, members of a diverse team bring together different types of information and various cognitive approaches to the resolution of an issue. Information and decision making theories therefore argue that diverse teams benefit from more comprehensive information and broader perspectives, which in turn leads to more favorable team outcomes in the area of innovation, creativity, and decision making (Jackson et al., 1995).

As emphasized by Steiner (1972), these theories taken in conjunction make it difficult to predict the sign of the relationship between team composition and team performance. On the one hand, social identity theory, social categorization theory, and the similarity-attraction paradigm imply that homogeneous teams incur fewer conflicts and experience higher social cohesion than their heterogeneous counterparts. On the other hand, information and decision making theories suggest that diversity generates more informational and cognitive resources, which enhance the quality of the decision making process and result in more creative and comprehensive solutions implemented by teams. In Steiner's (1972) words, "we cannot expect to discover a single, all-purpose answer to the question: Is [team] heterogeneity more desirable than homogeneity?"

Such considerations are reflected in the results linking team composition to team performance found in the literature (Williams & O'Reilly, 1998). Still, although empirical findings are mixed, there are some common threads that can be observed (Milliken & Martins, 1996). First, teams that are more heterogeneous on visible characteristics such as age, gender, and race tend to be more prone to relational difficulties such as emotional conflict and lack of integration. Second, teams that are more diverse on task-related dimensions such as education, experience, and function are more likely to benefit from informational and cognitive advantages such as task conflict. These findings are consistent with the three theories expounded above. Finally, both these effects may come into play simultaneously, as each demographic variable can be placed on a continuum on the visible and task-related dimensions (Maznevski & Chudoba, 2000). For instance, nationally diverse teams may experience both relational difficulties and cognitive advantages because national diversity encompass both visible and task-related attributes.

The literature also suggests additional issues regarding the effect of team composition on team performance. First, while such effect has been considered for each demographic variable individually, there is the question of the interaction of different types of diversity (Milliken & Martins, 1996). For example, Lau and Murnighan (1998: 328) have posited that "when multiple individual attributes apparent to members are aligned, the formation of subgroups within a team becomes more likely". Second, both theory and empirical findings underscore the presence of intervening processes in explaining the relationship between team composition and team performance (Lawrence, 1997; Milliken & Martins, 1996). For example, several

studies have explored the antecedents and consequences of various types of conflict within teams (e.g., Jehn, 1997, 1995; Pelled, 1996). Finally, past research has provided conceptual and empirical evidence of the importance of accounting for moderating influences in understanding the relationship between team composition and team performance. The key lesson is that such moderators can be at the organizational – e.g., organizational culture, team – e.g., type of team, and individual level – e.g., style of the team leader (Cohen & Bailey, 1997). The subsequent sections on the impact of team governance and organizational context provide more detailed treatment of such moderating effects.

The literature has primarily focused on the two dimensions of national diversity and geographical dispersion when examining the impact of GBT composition. First, a main concern has been to tease out the relationship between national diversity and GBT process and performance. Consistent with the general literature on teams, the conceptual arguments have posited a negative relationship between national diversity and social processes of GBTs such as emotional conflict and team identity (Hambrick et al., 2001; Shapiro et al., 2002; Van Glinow, Shapiro, & Brett, 2004) and a positive effect on cognitive processes such as cognitive schemas (Hambrick et al., 1998).

Using three different samples, Earley and Mozakowski's (2000) found a negative relationship linking national diversity to GBT performance. Further, these authors hypothesized and found empirical support for the fact that the performance of nationally diverse GBTs improved over time (Earley & Mosakowski, 2000). This finding is consistent with the result from the diversity literature that showed that

given enough time, multinational teams performed better on complex tasks than homogeneous teams (Watson, Kumar, & Michaelsen, 1993).

In addition, Earley and Mosakowski (2000) examined the mediating influence of several variables such as team planning, communication, conflict, efficacy, and cohesion on the relationship between national diversity and GBT performance. While the empirical support for the mediating hypotheses was somewhat mixed, these results are consistent withrecent conceptualizations as well as related empirical findings in GBT research that have posited intervening processes to better explain the relationship between team composition and performance (Cummings, 2003; Lawrence, 1997; Pelled, 1996).

Based on a comprehensive review of the literature on 43 articles on virtual teams, Maznevski and Chudoba (2000) carefully analyzed the potential advantages and disadvantages of geographical dispersion. Cramton (2001) provided empirical support for these arguments in the context of GBTs. In her in-depth examination of the mutual knowledge problem within global virtual teams, Cramton (2001) showed that geographical dispersion provides a paradox for GBTs. While distance creates the potential for increased informational and cognitive resources, the mutual knowledge problem can also be exacerbated for the very same reason. In her study of 13 student teams from universities in the United States and abroad working on a global Internet project, Cramton (2001) found evidence of five types of issues that affected the establishment of mutual knowledge among members: failure to communicate and retain contextual information, unevenly distributed information, difficulty to

communicate and understand the salience of information, difference in the speed of access to information, and difficulty interpreting the meaning of silences.

Maznevski and Chudoba (2000) also noticed that different studies of virtual teams have found a negative, positive, or no relationships between geographical dispersion and team performance. In the specific case of GBTs, empirical studies still leave this particular area of research unattended and are more focused on the topic of team governance (e.g., Jarvenpaa et al., 1998; Montoya-Weiss et al., 2001), as will be reviewed in the next section.

Based on these findings in GBT research and given the current state of the literature on teams, there are a number of areas regarding the impact of GBT composition that would be worth exploring. First, the role of each diversity variable, including national diversity and geographical dispersion, needs to be clarified into a comprehensive multilevel explanatory model. In that regard, Salk and Brannen (2000) provided valuable insight into the multiple facets of the impact of members' nationality within GBTs – albeit in the case of a single team. Their results showed how the members of a German-Japanese IJV were able to operate effectively as a well integrated, and at the same time culturally differentiated team, for example in the area of advice-seeking. Further, the data of these authors "suggested that [national] differences in themselves do not cause problems: rather, it is how a team's context and individual team members' orientations to local (team) norms channel these differences" (Salk & Brannen, 2000: 200).

While there is a need for a more thorough understanding of the impact of each single composition variable, the study of their interaction also appears as a

worthwhile endeavor. For example, IJV management teams often split on both national and geographic lines (Salk & Shenkar, 2001). This example suggests a possible interaction between national diversity and other composition variables, including geographical dispersion. Exploring the application of the theory on fault lines to GBTs therefore would be a fruitful area of research (Lau & Murnighan, 1998).

Finally, while extant research has shown that successful GBTs often negotiate shared norms in order to operate effectively (Earley & Mosakowski, 2000), there is also evidence of the lingering influence of members' nationalities on GBT dynamics over their life cycle (Salk & Shenkar, 2001). It would be interesting to examine which elements of national identities persist, why, and what is the appropriate balance over time between cultural integration and differentiation for positive GBT outcomes.

2.2.3. Impact of Team Governance

Multiple dimensions of team governance have been studied including team building, socialization, goals setting, team-based rewards, communication, and leadership that appear in different models of team performance (Cohen & Bailey, 1997; Gist et al., 1987; Goodman et al. 1987; Guzzo & Shea, 1992). Governance represents the internal mechanisms that a team can manage to optimize process and improve performance (Cohen & Bailey, 1997; Govindarajan & Gupta, 2001a). In the context of GBTs, specific governance mechanisms such as team-building (DiStephano & Maznevski, 2000), conflict resolution (Montoya-Weiss et al., 2001;

Van Glinow et al., 2004) and leadership (Kayworth & Leidner, 2001) have also been analyzed in depth.

For example, Jarvenpaa et al. (1998) analyzed the drivers of trust using a sample of 75 global virtual teams with four to six members representing 385 masters students at 28 universities working on an eight week Internet project. Focusing on the best and worse performing teams of the sample, these authors found that the three global virtual teams with the highest level of trust were proactive, driven by output, used a positive tone in their communication, rotated leadership, established goals as a team, emphasized role interdependence, managed their time carefully, communicated frequently and regularly, and provided substantive and prompt feedback to members.

Team C, the last of the high trust teams studied by Jarvenpaa et al. (1998) also exhibited a pattern of open conflict resolution among all members that had a beneficial impact on team trust. In another part of their study, Jarvenpaa et al. (1998) found that team-building exercises at the beginning of the Internet project had a positive impact on individual perception of other members' ability, integrity, and benevolence, but not directly on team trust.

In a global virtual context, the governance mechanisms of team-based rewards and team communication are particularly important because of the boundaries across which GBTs have to operate (Espinosa et al., 2003) and are considered specifically below. The basic premise for establishing team-based rewards is that extrinsic incentives enhance the motivation of members to act together toward common goals and improve team performance (DeMatteo et al., 1998; Deutch, 1949). Team-based rewards lead individuals to pay more attention to and interact more effectively with

other team members (Harrison, Price, Gavin, & Florey, 2002). There have been many studies implemented to test Deutch's (1949) theory linking team-based rewards to team performance that have provided some empirical support to this conceptual argument (Cohen & Bailey, 1997; DeMatteo et al., 1998; Gist et al., 1987).

Still, the results pertaining to a direct effect are mixed and DeMatteo et al. (1998) suggested as part of their review of the literature that there are other moderating factors influencing the effectiveness of team-based rewards including their own characteristics, some team attributes, the organizational context, and individual differences among team members. In particular, one of the most consistent findings across samples and methodologies is that task interdependence and outcome interdependence interact to explain team performance (Wageman, 1995).

The importance of team-based rewards for GBT process and performance has been underlined by the care with which researchers have designed a team component into the grades of the students of the global virtual teams that they analyzed (Cramton, 2001; Jarvenpaa et al., 1998; Montoya-Weiss et al., 2001). First, the accounts provided by these authors have shown how challenging it is to implement such a grading procedure consistently across all participating universities. In addition, anecdotal evidence from the same studies demonstrated the negative impact that the incompleteness of the grading system had on the dynamics of the global virtual teams involved (Cramton, 2001). Still, a systematic examination of the effect of team-based rewards on GBT process and performance is lacking from the literature, in particular in conjunction with the variable of GBT composition.

Team communication is the second governance mechanism that is critical in the context of GBTs. Team communication can be considered both as a governance mechanism or a process (DeSanctis & Monge, 1999). It is best understood as a process when the main functions that are completed through team communication are considered, e.g., control, motivation, emotional expression, and information. It is best seen as a governance mechanism when the various underpinning strategies for team communication are described, e.g., choice of genre, formality, frequency, richness, and pacing (Brown & Eisenhardt, 1997; Daft & Lengel, 1984; Smith et al., 1994; Yates & Orlikowski, 1992).

Much of the recent research has focused on understanding the impact of national diversity and geographical dispersion on team communication (Earley & Gibson, 1998; Powell, Piccoli, & Ives, 2004). Difficulties in communicating across nationalities have been well documented, including within GBTs (Jarvenpaa & Leidner, 1999; Mead & Jones, 2002). Individuals across nationalities differ in communication style including their propensity for self-disclosure, the importance for them to save face, their attitude toward silence, what they believe constitute truthfulness, how they respond to inquiry or comment, and how they express themselves, e.g. the use of gestures and smiles. Multiple communication breakdowns based on language and cultural barriers can occur such as disconfirmed expectations, misattributions, and conflicting interpretations (Munster, 1993; Smith & Bond, 1998).

Two comments are worth making regarding this research stream. First, the impact of national diversity on team communication is mostly inferred from findings at the individual level of analysis that still have to be tested at the team level (Earley

& Gibson, 1998). Second, the focus of the literature has been on the relationship between national diversity and team communication. Increased attention on the impact of team communication on team process – e.g., conflict or cooperation – and team performance, which is often assumed in existing studies, appears warranted in future research (Maznevski, 1994).

Virtual communication has been studied in particular depth since several of the assumptions core to communication theory are challenged due to the lack of face-to-face interaction, technology mediation, and unshared context characterizing virtual teams (DeSanctis & Monge, 1999; Hinds & Bailey, 2000). On the one hand, some authors have claimed that communication within virtual teams is enhanced because the respective statuses are leveled and members communicate more freely as a result. On the other hand, other researchers have noticed possible problems because virtual communication lacks the non verbal cues entailed by face-to-face interactions, is often hindered by technology issues, and slowed by asynchronous operations. Not surprisingly given these conflicting forces, the empirical findings regarding the relationship between geographical dispersion and communication effectiveness have been mixed (Powell et al., 2004; Warkentin, Sayeed, & Hightower, 1997).

In addition, there are also two important results pertaining to virtual team communication (Powell et al., 2004). First, some level of direct communication appears desirable and has a positive impact on team process and performance, especially in the initial stages of the existence of virtual teams. There are tasks that are better accomplished face-to-face and social interaction facilitates relationships among members.

Second, and several studies of global virtual teams provide empirical support for this argument, there are best practices in team communication that have a positive impact on the process – e.g., trust and coordination – and performance of virtual teams. Given the multiple dimensions and dynamic nature of communication, much remain to be done to understand the optimal configuration of virtual team communication (Furst, Blackburn, & Rosen, 1999; Powell et al., 2004).

In GBT research, there are two specific results on team communication pertaining to pacing and temporal patterning (Massey, Montoya-Weiss, & Hung, 2003; Maznevski & Chudoba, 2000; Montoya-Weiss et al., 2001) and formality (Jarvenpaa et al., 1998; Jarvenpaa & Leidner, 1999). First, Maznevski and Chudoba (2000) found in their study of three global virtual teams analyzed over a 21-month period that the two effective global virtual teams were characterized by a fit between decision process and complexity, and form of communication incidents. In addition, these two effective global virtual teams sequenced communication incidents to generate a deep rhythm of regular meetings interspersed with shorter encounters using virtual media.

In related studies, Massey et al. (2003) showed how the use of a temporal coordination mechanism contributed to influence the type and timing of team interactions, two variables that in turn were related to the performance of global virtual teams. In addition, Montoya-Weiss et al. (2001) examined how the same temporal coordination mechanism interacted with other governance mechanisms, in this instance the approach to conflict resolution, to impact the performance of the global virtual teams in the sample under consideration.

Second, several studies have examined the content – relationship versus task – of GBT communication (Jarvenpaa et al., 1998; Jarvenpaa & Leidner, 1999). Based on the study of 12 global virtual teams of students working on an Internet project, Jarvenpaa and Leidner (1999) found that certain communication behaviors were conducive to a high level of team trust. During the early stages, social communication and conveying enthusiasm were important. Later on, being predictable and timely in one's communication as well as providing substantive comments were the major attributes. But other research has also found productive global virtual teams with limited evidence of social interaction, independently of their stage of development (Cramton, 2001).

While extant research demonstrates the importance of team governance, much remains to be done to understand the effect of various mechanisms in the GBT context. First, future research should clarify for each mechanism whether the effect is direct, mediating or moderating, or any combination of the three. In the case of team communication, there is empirical evidence for all aspects (Jarvenpaa et al., 1998).

In addition, and as suggested by Montoya-Weiss et al. (2001), each governance mechanism may operate differently in a global virtual environment. It may be that their effectiveness is contingent on GBTs' internal and external context (Salk & Brannen, 2000; Salk & Shenkar, 2001). Finally, and as proposed by human resources scholars (e.g., Baird & Meshoulam, 1988), governance mechanisms may be more efficient in bundles, which would warrant further examination.

Second, there are several unresolved issues pertaining to the effectiveness of team-based rewards that are particularly applicable to the GBT context. Given the

multiple national, geographical, and organizational boundaries across which GBTs have to operate, the classical questions of task versus outcome interdependence (Wageman, 1995), individual versus team-based rewards (Wagner, 1995), and equity versus equality-based compensation (Greenberg & Leventhal, 1976) become particularly critical.

Finally, GBT communication should be investigated in more depth. As suggested in the literature, there are several dimensions such as choice of medium, formality, frequency, richness and pacing that deserve particular attention given the technology mediation typical of GBTs. In addition, social networks theory suggests the importance of GBT members' interactions (Maznevski, Athanassiou, Zander, 2000). For instance, Jarvenpaa and Leidner (1999) noticed the importance of the *responses* to the initiatives of members by their GBT counterparts. Along these lines, Cramton (2001) emphasized the feedback loops that critically impact the mutual knowledge problem within GBTs.

2.2.4. Impact of the Organizational Context

The past two decades have seen an increased emphasis on the study of teams as they are embedded within organizations (Guzzo & Shea, 1992; Ilgen, 1999). Research on teams had traditionally been focused on internal dynamics, but scholars have come to the realization more recently that contextual influences have to be accounted for in order to provide more accurate explanations of team performance.

The overarching conceptual framework underpinning such a shift in research emphasis is systems theory and the associated development in multilevel analysis

(Ilgen, 1999; Klein & Kozlowski, 2000). Rousseau (1985) summarized the foundations of multilevel theory. In general, three main levels are recognized and teams are considered to be composed of individuals and to be nested in organizations. Given these basic premises, there are three major types of multilevel models – composition, cross-level, and multilevel – that can be applied to the study of teams embedded within organizations. A disciplined approach based on multilevel analysis allows correcting misspecification issues and addressing aggregation biases and cross-level fallacies in teams research (Kozlowski & Klein, 2000; Rousseau, 1985).

A related consideration is the dynamic aspect of teams within organizations (Ilgen, 1999). Teams and organizations in which they are embedded co-evolve over time. Specific techniques have been developed that take into account the dynamic nature of teams within organizations. For example, principles have been proposed by Kozlowski and Klein (2000) to incorporate time as a boundary condition or moderator, time-scale changes across levels, and the evolving nature of linkages overtime depending on organizational pacing in the development of multilevel models.

Given the conceptual framework provided by multilevel theory, there has been a number of studies that have examined the impact of contextual factors on team process and performance. Two main lessons can be gathered from this literature. First, there are multiple contextual influences that come into play (Cohen & Bailey, 1997; Guzzo & Shea, 1992). For example, Hambrick (1994) proposed several hypotheses linking variables of the strategic context such as organizational size, domain breadth, business strategy, organizational slack, environmental dynamism

with the behavioral integration of top management teams. Again, such contextual factors can be tangible or intangible, with a continuum in between these two extremes.

The second lesson, which is consistent with the conceptual framework of multilevel theory, is that contextual factors affect multiple team variables with different types of effects. As is discussed in more detail as part of the last review questions, contextual factors intervene at various stages of the models to explain team performance (Goodman et al., 1987; Guzzo & Shea, 1992). For example, the human resources available within an organization affect team composition (Gist et al., 1987). In addition, several models include task as a moderator of the relationship between team process and performance (e.g., Gladstein, 1984). Finally, multiple contextual factors have a direct effect on team performance (Guzzo & Shea, 1992).

In summary, theory and empirical findings from the literature support a perspective of complex, multilevel, and dynamic contextual influences on teams. A similar observation can be made for the research on GBTs (Snow et al., 1996). More than any other types of management teams, GBTs engage in vertical and lateral activities to gather the necessary resources and have to coordinate with other organizational stakeholders worldwide in order to accomplish their multi-country charter (Maznevski et al., 2000). At the same time, GBTs are constrained in their activities by a number of contextual factors such as firm strategy, organizational structure, and information systems (Bartlett & Ghoshal, 1989; Snow et al., 1996).

Leveraging identity, enactment, and social construction theories, Salk and her associates (Salk & Brannen, 2000; Salk & Shenkar, 2001) have made a vivid case for

the importance of the external context in their multifaceted exploration of IJV management teams. First, Salk and Brannen (2000) showed how national differences in combination with contextual factors explained individual influence within an IJV management team with Japanese and German parents. For example, Japanese managers relied more heavily on their national in-group for their task and advice-related networks than their German counterparts, consistent with the more collectivistic tendency in the Japanese culture. At the same time, Salk and Brannen (2000) found that the organizational context also contributed to enhance the status of the Japanese research and development manager and the German production manager because the IJV was a manufacturing venture.

In another IJV case study, Salk and Shenkar (2001) showed how national identities were the dominant sense-making vehicle used by the members of the management team to interpret contextual factors in which they operated. Specifically, these authors found that the Italian and English managers of the IJV differed in their interpretation of the use of the English language, human resource policies, resources commitment by parents, and problems with the Italian operations. As the conditions of the IJV evolved and new contextual factors came into play such as market threats, increased operating independence, and changing staffing policies, Salk and Shenkar (2001) also observed a pattern of national identity reinforcement.

While the studies by Salk and her associates have made the general case for an approach incorporating contextual factors at different levels to understand GBT process and performance, other research has addressed specific dimensions. Focusing on structure, Cummings (2003) found that the larger the number of supervisors

associated with a GBT, the stronger the positive effect of external knowledge sharing on GBT performance. From a process perspective, procedural justice and decision making autonomy have been shown to have a positive impact on the commitment of the management team to an IJV (Johnson et al., 2002). Finally, information and communication technologies have also been found to critically impact GBT performance. The key result in this area is that the technology must match the task (Maznevski & Chudoba, 2000; Shapiro et al., 2002).

While extant GBT research has shown their importance, there is still a number of questions regarding the impact of contextual factors. First, given the multiple variables that have been uncovered, it would be valuable to determine if some are more important than others for GBT process and performance (Salk & Shenkar, 2001). In addition, the nature of the relationships between context, team, and individual level influences are complex and would require additional explanation. For example, the studies by Salk and her associates reviewed above have provided evidence for both mediating and moderating effects linking national enactment and organizational features. In summary, a more comprehensive as well as specific examination of contextual influences on GBTs appears warranted: which are the critical factors, what is the nature of the relationships and their evolution over time, and how the variables interact.

Second, most extant research is aimed at understanding the impact of context on GBTs (Salk & Shenkar, 2001). But beyond the construction or enactment arguments invoked in prior research, it would be valuable to understand the initiatives that GBTs undertake to leverage the opportunities and defuse the threats in their

environment. There has been ample evidence of the importance of bridging boundaries for teams in order to survive and strive within organizations (Ancona & Cadwell, 1992). Further, GBTs should play an important role in originating as well as coordinating initiatives within MNCs (Govindarajan & Gupta, 2001a).

2.2.5. Antecedents and Consequences of Team Process

While other approaches are also available, the Input-Throughput-Output model remains the prevalent conceptual model used in the literature to understand the role of team process (Cohen & Bailey, 1997; Goodman et al., 1987; Guzzo & Shea, 1992), underpinning many empirical studies of team performance (Gladstein, 1984; Harrison et al., 2002; Weingart, 1997). One of the advantages of this model is that it is quite encompassing and allows the consideration of multiple variables at the organizational, team, and individual levels as the inputs of interest. For instance, Cohen and Bailey (1997) incorporated the variables of task design, team composition, organizational context, and environment as inputs to their review model of the literature on teams.

In general, team performance is taken as the output of interest. Because team performance is the dependent variable does not render the specification of conceptual models easier, as definition and operationalization remain a challenge (Ilgen, 1999). In general, team performance is comprised of several dimensions at potentially different levels. For example, Hackman (1990) proposed the three following dimensions: 1) productive output, 2) ability to work together, and 3) growth and well being of members.

While the Input-Throughput-Output model provides a valuable conceptual framework to understand the antecedents and consequences of team process, it is very general and a number of further specifications are warranted in order to make it more actionable (Goodman et al., 1987). First, the distinction needs to be made between processes and emergent states (Argote & McGrath, 1993; Marks, Mathieu, & Zaccaro, 2003). Emergent states "describe cognitive, motivational, and affective states of teams as opposed to the nature of their members' interactions" (Marks et al., 2003: 357). Processes can be defined as "establishing an acting group in an organizational context and involves selecting, organizing and fitting some people, tools, and purposes from the embedding context" (Argote & McGrath, 1993: 342).

Along these lines, Marks et al. (2003) analyzed how a recurring phase model made of transition, action, and interpersonal processes leads to emergent states within teams. This distinction between processes and emergent states echoes some of Pelled's (1997) concerns regarding the attribution assumption of organizational demographics. The consensus in the literature is that finer grained explanations are needed linking input to output through mediating throughput variables.

Second and related to the previous point, processes are dynamic and the formation of teams follows an evolutionary path (Chang, Bordia, & Duck, 2003). There are two classical approaches to describe team formation. First, the integrative model, which was initially defined by Tuckman (1965) and refined in subsequent research, suggests that teams evolve through successive phases of maturity. Second, the punctuated equilibrium model, which was proposed by Gersick (1989, 1988), implies that team development occurs at critical junctures during their life cycle.

The previous sections of the literature review have already shown the importance of composition, governance, and organizational context in determining GBT process. In addition, there are two results from the literature that are worth mentioning. First, there is growing empirical evidence of the importance of intervening processes in explaining the relationship between GBT composition and GBT performance. Earley and Mosakowski (2000) termed hybrid culture the conjunction of emerging processes mediating the relationship between GBT composition and GBT performance. They defined such a hybrid culture as "an emergent set of rules and actions, work capability expectations, and member perceptions that individuals within a team develop, share, and enact after mutual interactions" (Earley & Mosakowski, 2000: 27). Other empirical evidence for such a hybrid culture can also be found in Salk and Brannen (2000) and the work by Jarvenpaa and associates (Jarvenpaa et al., 1998; Jarvenpaa & Leidner, 1999).

Second, the literature has provided evidence that developing a hybrid culture can be a challenging endeavor for nationally diverse and geographically dispersed GBTs. The examination by Cramton (2001) of the mutual knowledge problem and how it surfaces within global virtual teams has been presented above in the section on the influence of geographical dispersion. In particular, Cramton (2001) showed that the lean communication, technology mediation, and unshared context characterizing global virtual teams entailed inadequate information and potentially negative personal attributions, thus contributing to the decreased social cohesion for such teams. Once tensions start surfacing, categorization tendencies and coalition-building become even

more accentuated for geographically dispersed GBTs than for collocated teams (Cramton, 2001; Kiesler, Siegel, & McGuire, 1984; Snow et al., 1996).

Hambrick et al. (2001) have posited similar degenerative spirals within IJV management teams. While these authors recognized, together with the conflict literature, that some level of task conflict can be positive for GBT performance, they also argued that at high levels there exists a risk of escalation between task and emotional conflicts that can lead to behavioral disintegration. Taken together, these conceptual arguments and empirical findings are consistent with the result that while heterogeneous GBTs have significant potential, they frequently fail to achieve it (Adler, 1997; DiStephano & Maznevski, 2000).

There are a number of important questions resulting from the current state of research on GBT process. First, while several scholars have focused on hybrid culture within GBTs (e.g., Adler, 1997; Earley & Mozakowski, 2000), there is still a lack of understanding regarding its nature and how it develops (Gist et al., 1987; Guzzo & Shea, 1992). For instance, several social processes such as unity and influence have been outlined as critical dimensions underpinning the dynamics of GBT interaction, which may be culturally or contextually determined (Earley & Mosakowski, 2000; Salk & Brannen, 2000; Shapiro et al., 2002). But empirical examination of other cognitive and symbolic processes contributing to hybrid cultures is still missing (Milliken & Martins, 1996). For example, there is little understanding of the factors that allow nationally diverse and geographically dispersed GBTs to exploit their informational and cognitive potential (Cummings, 2003).

In addition, it is unclear how much time and how difficult it is for ahybrid culture to form, or whether it is even needed. While several studies have made and empirically supported the argument for a structured approach over time (e.g., DiStephano & Maznevski, 2000; Earley & Mosakowski, 2000), others have found evidence of GBT process such as trust that emerged swiftly (Jarvenpaa et al., 1998; Jarvenpaa & Leidner, 1999). In addition, some GBTs appear able to create a hybrid culture with relative ease. For instance, Cramton (2001: 225) noticed that "nationality was a more malleable concept than what they [GBT members] expected […]. Individuals belonging to different nationalities, who interacted virtually, were able to modify their pre-existing cognitive schemes and meta-knowledge toward a more tolerant perspective".

2.2.6. Antecedents of Team Performance

Multiple models of team performance have been proposed in the literature (Goodman et al., 1987). As discussed above, Input-Throughput-Output is the prevalent approach, but additional insight has also been gained from other perspectives in the area of socio-technical theory, interaction processes, team development, team composition, goals setting, contextual factors, and inter-team relations (Guzzo & Shea, 1992).

In their review, Goodman et al. (1987) provided a valuable characterization of the various conceptual approaches. First, they are very general in nature, providing an overall flow of variables to explain team performance. Second, all models are multilevel, incorporating variables at the organizational, team, and individual level of

analysis. Third, they use mostly psychological and organizational rather than technological and economic variables. Fourth, team process plays a central role, consistent across models with that featured in the Input-Throughput-Output model. At the same time, each of the various approaches introduces specific hypotheses, makes particular assumptions, or introduce unique variables that differentiate the model.

As reviewed in the sections above, the findings from existing GBT research are consistent with the general literature on teams. First, results on the impact of national diversity and geographical dispersion imply interactions with other factors such as team longevity to explain GBT performance (Earley & Mosakowski, 2000). Second, several social– e.g., cohesion and identity (Earley & Mosakowski, 2000; Shapiro et al., 2002) – and cognitive – e.g., knowledge sharing (Cummings, 2003) – processes have a positive impact on GBT performance. Finally, governance mechanisms such as leadership (Kayworth & Leidner, 2001) and conflict resolution (Massey et al., 2003; Montoya-Weiss et al., 2001; Van Glinow et al., 2004) have an impact – either direct, mediated, or moderated – on GBT performance.

The general literature on teams suggests that future research on GBT performance should use measures that are more consistent in order to be able to compare across studies and at the same time should expand the range in order to provide a more complete understanding of GBTs (Ilgen, 1999; Lovelace, Shapiro, & Weingart, 2001). In particular, it may be that GBTs require specific measures of performance, beyond what has been used so far in a collocated context (Furst et al., 1999).

In addition, the previous sections of the literature review and prior research on teams drive toward the development and testing of more comprehensive models of GBT performance (Gladstein, 1984; Guzzo & Shea, 1992). At the same time, given the early stages of GBT research, there would be value in determining the specific effect of particular variables at the organizational, team, or individual level.

2.3. SUMMARY AND RESEARCH QUESTION

There has been a growing stream of research pertaining to GBTs in the course of the past decade. Such studies are critical to augment our understanding of the drivers of MNC performance with micro explanations (Hambrick et al., 2001; Salk & Shenkar, 2001). Martinez and Jarillo (1989) have emphasized the importance of more informal mechanisms such as GBTs to the global management process, and at the same time the relative paucity of research in this area. In particular, there is a lack of understanding of organizational functioning across boundaries and what hybrid cultures are (Earley & Mosakowski, 2000).

One of the key findings in the literature is the importance of team composition, namely national diversity and geographical dispersion, in explaining GBT process and performance. Extant research has assumed a unitary effect of either national diversity or geographical dispersion on GBT outcomes (Cummings, 2003; Earley & Mosakowski, 2000). In contrast, this dissertation considers both variables in conjunction, which allows evaluating their respective importance as well as their interaction.

Other research has also indicated the importance of expanding demographic interpretations of team functioning with the incorporation of intervening processes (Lawrence, 1997; Pelled, 1996; Reger, 1997; Smith et al., 1994). While theory has recognized the importance of both social and cognitive processes and their impact on GBT performance (e.g., Earley & Mosakowski, 2000), most studies have considered either type of processes independently.

This dissertation includes both social and cognitive processes as part of the conceptual model. As such it contributes to further explaining the various components of a hybrid culture. In addition, it aims at understanding "how to manage GBTs in a way that maintains the heterogeneity of perspectives but which also allows the GBT to reach [effective] decisions" (Janssens & Brett, 1997: 154).

Finally, recent research has demonstrated the multilevel and dynamic aspects of GBT process and performance. The work by Salk and her associates for instance has suggested that GBTs enact and socially construct a hybrid culture based on attributes from their internal and external context (Salk & Brannen, 2000; Salk & Shenkar, 2001). Other research has shown that GBTs utilize a variety of governance mechanisms and achieve their multi-country charter (Jarvenpaa et al., 1998; Jarvenpaa & Leidner, 1999).

What is further addressed in this dissertation is how MNCs by their policies and GBTs by their governance can improve on GBT outcomes. For instance, Hambrick et al. (2001) proposed that there is a need to better understand the different types of mechanisms that help prevent the downward spirals that are sometimes observed within IJV management teams.

These arguments taken in conjunction lead to the following research question for the dissertation:

Research Question: In the context of global business teams, how do composition, governance, and organizational context affect: (a) team identity, (b) team cognitive comprehensiveness, and (c) team performance?

A field study contributes to enhancing external validity and generalization of the results from prior research, which has often used student projects or focused on a few GBT cases. To date, only two among the 19 studies reviewed are based on large scale data sets from the field (Cummings, 2003; Johnson et al., 2002). Data triangulation, especially in a multinational setting, is an effective way to obtain more robust empirical results (Gelfand, Raver, & Hollcombe, 2002; van der Vijver & Leung, 1997).

CHAPTER 3. AN INTERVENING PROCESS MODEL OF THE PERFORMANCE OF GLOBAL BUSINESS TEAMS

In chapter three, the theory of an intervening process model of GBT performance is developed. The general approach is given in section 3.1 and the variables of the model are described in section 3.2. In section 3.3, specific hypotheses are argued.

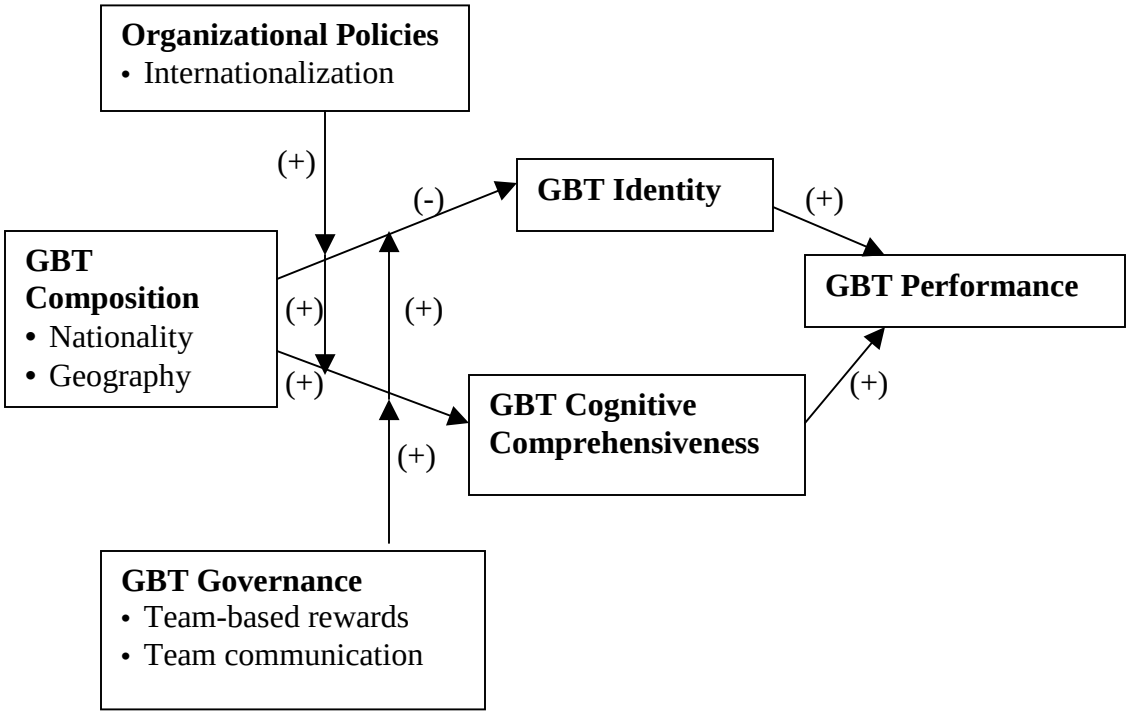
3.1. GENERAL APPROACH

The proposed model is consistent with the conceptual approaches that have been advocated for the study of teams (DeSanctis & Poole, 1994; Guzzo & Shea, 1992; Lawrence, 1997; Pelled, 1996) and builds on the advances in GBT research (Earley & Mosakowski, 2000; Teagarden et al., 1995). Its arguments draw from the general literature on teams and leverage commonalities to develop hypotheses specific to GBTs.

It can be conceived of three components: input, throughput, and output. In terms of the input component, the focus is on national diversity and geographical dispersion that appear as critical composition variables. In terms of the throughput component, I included GBT identity and GBT cognitive comprehensiveness, emergent processes that act as mediating variables between GBT composition and GBT performance. In addition, organizational policies and GBT governance – in the form of team-based rewards and team communication – are posited to moderate the relationship between GBT composition and GBT emergent processes. Finally, GBT

performance is the obvious output of interest. The schematic representation of the intervening process model of GBT performance and the hypothesized relationships appears on Figure 3.1.

Figure 3.1: Schematic Representation of the Model



3.2. VARIABLES OF THE MODEL

3.2.1. GBT Composition

From prior research, the key dilemma for GBTs relates to diversity issues (Adler, 1997; Simons, Pelled, & Smith, 1999; Teagarden et al., 1995; Webber & Donahue, 2001). On the one hand, heterogeneous GBTs can benefit from richer informational and more comprehensive cognitive resources, which results in more

creative solutions to achieve their charter (Hambrick et al., 1998). On the other hand, the same heterogeneity can lead to more difficult communication, increased conflict, and decreased social cohesion among members, rendering the implementation of GBT strategies more arduous (Govindarajan & Gupta, 2001a; Hambrick et al., 2001).

Two dimensions matter particularly in explaining GBT process and performance: national diversity and geographical dispersion (Jarvenpaa & Leidner, 1999; Maznevski & Chudoba, 2000; Shapiro et al., 2002). First, nationality of GBT members is critical because of the underlying assumptions and norms that explain differences in their values, attitudes, cognitions, and behaviors (Earley & Mosakowski, 2000; Hambrick et al., 1998; Salk & Brannen, 2000).

Second, the fact that GBT members work at different locations creates particular opportunities and challenges in terms of team structure, process, and contextual embeddedness as compared to collocated teams (Maznevski & Chudoba, 2000). In addition, members of geographically dispersed GBTs may exhibit particular values, attitudes, and behaviors, as in the case of expatriates (Black, Gregersen, Mendenhall, & Stroh, 1999). Hence, the model focuses on national diversity and geographical dispersion as the two composition variables critical for GBTs.

3.2.2. GBT Process

A model of GBT performance must incorporate intervening processes. Recent research has emphasized the importance of opening up the "black box of organizational demography" and accounting for the influence of cognitive, affective, communication, and symbolic processes (Milliken & Martins, 1996). This approach

supplements classical studies of diversity and provides more thorough explanations of team performance (Lawrence, 1997; Reger, 1997; Williams & O'Reilly, 1998). The two variables of GBT identity and GBT cognitive comprehensiveness, which have both interaction and emergent properties (Marks et al., 2003), are therefore included in the proposed model.

This view is consistent with previous findings that have shown that team cognitive comprehensiveness is an important variable explaining team performance (Miller, Burke, & Glick, 1998; Simons et al., 1999). Miller et al. (1998: 40) defined team cognitive comprehensiveness as "the extent to which an upper echelon executive team utilizes an extensive decision making process when dealing with immediate opportunities and threats […]. Behavioral indicators of the level of comprehensiveness include the extent to which brainstorming sessions occur, the number of alternative solutions that are seriously considered, and the extent to which quantitative analyses are conducted."

In addition, the model makes the distinction between social and cognitive processes and introduces GBT identity as another mediator between GBT composition and GBT performance (Cramton, 2001; Earley & Mosakowski, 2000; Hambrick et al., 2001; Shapiro et al., 2002). GBT identity can be defined as "the sense of entitativity or the common perception of GBT cohesiveness" (Earley & Mosakowski, 2000: 35). As such, the two variables of GBT identity and GBT cognitive comprehensiveness reflect the hybrid culture that the literature has posited is necessary for GBT performance (Earley & Mosakowski, 2000).

3.2.3. Organizational Policies

GBTs have to operate across multiple organizational, national, and geographical boundaries in order to be effective and achieve their goals (Bartlett & Ghoshal, 1989; Espinosa et al., 2003). Their success is contingent on organizational policies including location of corporate headquarters, official language used, human resource management systems, reporting structure and centralization, managerial systems, practices, and methods, and configuration of production sites (Salk & Brannen, 2000).

This dimension is captured here by the degree of internationalization of the organizational policies, as it is reflected for example by the use of expatriates, rotation of staff between corporate headquarters and foreign subsidiaries, and development of international managers (Kobrin, 1994). As indicated in the literature, such practices reflect the geocentric or global mindset of the MNC and its managers (Gupta & Govindarajan, 2002; Kobrin, 1994).

3.2.4. GBT Governance

In addition to an effective charter and composition, the success of GBTs also depends on their careful management (Govindarajan & Gupta, 2001a). While governance matters for all teams, it is particularly critical for GBTs in order to reconcile the complex contingencies characterizing their internal and external context (Cohen & Bailey, 1997; Montoya-Weiss et al., 2001; Salk & Shenkar, 2001).

There are multiple dimensions of governance that can be considered for GBTs (Jarvenpaa et al., 1998; Maznevski & Chudoba, 2000). The model focuses on two

particular mechanisms: 1) team-based rewards, which are important to align the behaviors of members with the GBT charter, given the multiple and possibly conflicting demands on their time and resources; and 2) team communication, which is critical for information exchange, knowledge sharing, coordination, and control (Shapiro et al., 2002). Team communication is a multidimensional concept with formality and frequency as two fundamental aspects (Smith et al., 1994).

3.2.5. GBT Performance

As discussed in the previous chapter, team performance is a complex and multidimensional construct (Cohen & Bailey, 1997; Ilgen, 1999). This issue is reflected in the various measures utilized in GBT research (Earley & Mosakowski, 2000; Snow et al., 1996). Maznevski and Chudoba (2000: 484) provided an example of such complexity by using "decision quality, actions and implementation quality, member commitment to the teams and its decisions, and cohesion among team members [as] the most important performance dimensions" for the three global virtual teams that they studied. For the purpose of this dissertation, particular dimensions are emphasized as appropriate. Specific hypotheses are advanced in the next section.

3.3. HYPOTHESES

3.3.1. Impact of GBT Process

While not totally unambiguous, the literature has generally assumed that a positive association exists between variables such as team identity, cohesion, and unity and team performance (Bettenhausen, 1991; Guzzo & Dickson, 1996; Weber & Donahue, 2001). This assumption is based on the argument that "cohesiveness should energize and direct team members toward successful task completion" (Mullen & Copper, 1994: 215), and has received significant empirical support. For instance, Smith et al. (1994) have shown for a sample of small technology firms that the social integration of their management teams was positively associated with financial performance.

In the literature relating to GBTs, Earley and Mosakowski (2000: 35) found that team identity was positively associated to satisfaction with team performance. Team identity is also an important component of the hybrid culture that GBTs need to establish in order to be successful, like in the case of the IJV management team studied by Salk and Brannen (2000), which was satisfactorily integrated and performed well.

These arguments lead to the following hypothesis:

Hypothesis 1: GBT identity has a positive impact on GBT performance.

The literature has recognized the criticality of cognitive processes at the team level (e.g., Mathieu, Hefner, Goodwin, & Salas, 2000), but there are still some thorny

theoretical and empirical issues associated with the concept of team mental models (Klimoski & Mohammed, 1994; Walsh, 1995). Initially, scholars thought that team heterogeneity, by generating cognitive diversity, would negate the pitfalls of groupthink possible in homogeneous teams and therefore would result in higher quality decisions.

But more recent research has shown that the relationship between team heterogeneity and cognitive diversity is actually non-existent (Glick, Miller, & Huber, 1993; Kilduff, Angelmar, & Mehra, 2000). Further, the same group of scholars has found a negative relationship between cognitive diversity and team performance (Miller et al., 1998). Instead, they indicated that team cognitive comprehensiveness possessed the properties originally expected from cognitive diversity. That is, positive relationships between team composition and team cognitive comprehensiveness, and team cognitive comprehensiveness and team performance, have been observed (Miller et al., 1998).

Supporting arguments can also be drawn from the conflict literature. Several studies have shown that substantive or task conflict can be beneficial under certain circumstances, especially in the case of a non routine and complex task, as is often the case for GBTs (Jehn, 1997, 1995). Such substantive conflict is achieved when "facts and perceptions are put under scrutiny and subjected to extensive debate. It helps in minimizing groupthink, which is an excessive striving for unanimity. It injects a healthy tension and ferment into team processes, which allow better and more creative choice to emerge. Studies generally have found a positive relationship between substantive conflict and team performance" (Hambrick et al., 2001: 1043).

There is empirical evidence in the literature of a positive relationship between cognitive factors and GBT performance. For instance, Jarvenpaa et al. (1998) observed how three high trust global virtual teams were able to leverage the knowledge of their members by preserving their autonomy on the one hand, and integrating individual contributions before important deadlines on the other hand (see also, Maznevski & Chudoba, 2000, for similar findings).

These arguments lead to the following hypothesis:

> **Hypothesis 2:** GBT cognitive comprehensiveness has a positive impact on GBT performance.

3.3.2. Impact of National Diversity

As discussed above, the literature has posited two main mechanisms by which national diversity affect team identity (Hambrick et al., 2001; Williams & O'Reilly, 1998). Both social identity theory (Turner, 1982) and the similarity-attraction paradigm (Tajfel, 1981) lead to the proposition that national diversity has a negative impact on team identity. Along these lines, scholars have noticed the risk of formation of coalitions (Thompson, 1967), emergence of fault lines (Lau & Murnighan, 1998), and establishment of status hierarchies (Hughes, 1971) in nationally diverse teams. Nationality being one of the most salient diversity variables, the development of negative attributions and subgroups is a likely occurrence (Cummings, 2003; Pelled, 1996; Salk & Shenkar, 2001; Shapiro et al., 2002).

In addition, the predictions of classical theories are challenged because of members from different nationalities have distinct perceptions of the self and assumptions about interaction with others, and team processes necessary to achieve

production, member support, and team well being are affected (Steiner, 1972; Adler, 1997). As a result of these differences, nationally diverse teams are assumed to encounter process losses, mainly due to communication difficulties and conflicts among members, which in turn may result in social disintegration.

Difficulties in communicating across nationalities have been well documented, including within GBTs (Cramton, 2001; Jarvenpaa & Leidner, 1999). Such challenges to cross-national communication contribute to the difficulties for nationally diverse GBTs to reach what Shapiro et al. (2002) called a mutual socio-emotional understanding.

Nationality is also one important dimension along which relational conflict can develop, based on visible – e.g., demeanors – and underlying – e.g., mental models – differences (Hambrick et al., 1998). An ironic issue is that conflict resolution approaches differ across countries, thus preventing addressing conflict effectively within nationally diverse GBTs (Montoya-Weiss at al., 2001; Van Glinow et al. 2004).

Some empirical support for these arguments can be found in GBT research. For instance, Earley and Mosakowski (2000) showed that the more nationally diverse GBTs that they studied fared worse on a number of social processes including team identity and unity, at least in the initial stages of their life cycle. Salk and Shenkar (2001) also described the differences in interpretation by the English and Italian managers of the events affecting their IJV, which indicated significant integration gaps within the management team.

In summary, negative attributions and the formation of subgroups are likely occurrences in nationally diverse teams, with process losses to be expected in the area of communication and conflict. These arguments lead to the following hypothesis:

Hypothesis 3: National diversity has a negative impact on GBT identity.

While nationally diverse teams can encounter process losses, they also benefit from informational and cognitive advantages. It is posited in information and decision making theories that heterogeneity among members has positive implications for the information and knowledge available within a team (Tsui & Gutek, 1999; Williams & O'Reilly, 1998). Along these lines, the minority influence literature has demonstrated that the presence of a few dissenting opinions can contribute to better team decisions (Moscovici, 1976; Nemeth, 1986).

The literature on task conflict also suggests cognitive advantages associated with team heterogeneity (Jehn, 1997, 1995; Jehn, Northcraft, Neale, 1999; Milliken & Martins, 1996; Pelled, 1996). For example, Elron (1997) found empirical evidence of a positive relationship between national diversity and cognitive conflict in her study of the management teams of MNC foreign subsidiaries.

Finally, the diversity literature also attributes cognitive benefits to the distinct values, skills, and information that nationally diverse members contribute (Markus & Kitayama, 1991; Milliken & Martins, 1996; Triandis, 1989). The presence of national diversity in a team is one way to introduce divergence of views that produces effects similar to internal criticism, consultation of external experts, and the installation of a

"devil's advocate" to remedy against the danger of groupthink that is possible in homogeneous teams (Govindarajan & Gupta, 2001a).

Some empirical support can be found in the GBT literature for these arguments. For example, DiStephano and Maznevski (2000) have shown that, even though the experience of minority managers is sometimes traumatic, their contribution is often critical to a more thorough understanding of international business issues. In one instance, these authors described how the extra steps taken by an American manager to elicit the contribution of his Japanese partner – who was a minority in this Anglo-dominated team of petroleum executives – helped add a significant contribution to the GBT's decision about a potential acquisition.

In summary, nationally diverse GBTs have the potential for significant informational and cognitive advantages due to the multiplicity of their members' perspectives. These arguments lead to the following hypothesis:

> **Hypothesis 4:** National diversity has a positive impact on GBT cognitive comprehensiveness.

3.3.3. Impact of Geographical Dispersion

Scholars have questioned whether virtuality required a new sociology of organizations (Handy, 1995; Jarvenpaa & Leidner, 1999; Nohria & Eccles, 1992). Classical theories of teams generally assume a shared environment and direct communication and the breach of these assumptions in a virtual context leads to believe that geographically dispersed teams are challenged to maintain the various processes necessary to ensure team production, member support, and team well being (Hinds & Bailey, 2000).

First, the related theories of social presence (e.g., Short, Williams, & Christie, 1976) and media richness (e.g., Daft & Lengel, 1984) posit that there is a need for relationship development among members that is hindered in the case of virtual teams because of the "lack of communication cues which are used by individuals to convey warmth, trust, attentiveness and other interpersonal interactions" (Jarvenpaa & Leidner, 1999: 793. See Shapiro et al., 2002, for related arguments). As a result of leaner communication, reduced cooperation and consensus can be expected in geographically dispersed teams (Hinds & Bailey, 2000).

In addition, virtual communication is affected by technology mediation (Shapiro et al., 2002). Unfortunately, there is a long litany of technical and process difficulties that members of virtual teams encounter when using information and communication technologies. In particular, several studies have found that information exchange between members of virtual teams was less complete, more biased, and proceeded at a slower rate than in the case of collocated teams (Hightower & Sayeed, 1996, 1995; Hollingshead, 1996). Such hindered communication in turn has a detrimental impact on the attributions of team members, which can become personal versus situational and destructive versus constructive (Cramton, 2001).

Finally, unshared context also contributes to lower the cohesion of geographically dispersed teams (Hinds & Bailey, 2000; Shapiro et al., 2002). Unshared context creates different work constraints that members often omit communicating to each other (Cramton, 2001). In addition, team members may be operating in different time zones, thus preventing synchronous communication.

Under conditions of demanding assignments and resource constraints, this lack of understanding and difficulties to communicate about their respective work context creates tensions and may result in negative personal attributions among members of geographically dispersed teams.

In the case of geographically dispersed GBTs, several process issues in the area of communication and cooperation have been identified that contributed to a weaker GBT identity. Shapiro et al. (2002) attributed the weaker identity of geographically dispersed GBTs to a lack of timely assistance and monitoring among members. Along the same lines, Cramton (2001) showed empirically the challenges of information exchange, interpretation, and coordination associated with global virtual teams, which easily degenerated into personal rather than task or situational attributions.

In summary, the cohesiveness of geographically dispersed GBTs can be challenged because of several process issues due to limited face-to-face interaction, technical difficulties, and the unshared context characterizing a virtual environment (Hinds & Bailey, 2000). These arguments lead to the following hypothesis:

> **Hypothesis 5:** Geographical dispersion has a negative impact on GBT identity.

Like in the case of national diversity, the effect of geographical dispersion on GBT cognitive comprehensiveness can be predicated on the basis of information and decision making theories (Williams & O'Reilly, 1998). Members of virtual teams often adopt mental models that are congruent with the local environment in which they operate, whether they are local nationals or expatriates (Black et al., 1999;

Kobrin, 1989). In addition to their own personal attributes, geographically dispersed members also have information on the context in which they work that is relevant to the team task (Cummings, 2003). Geographically dispersed teams benefit from a "combinatorial freedom" (DeSanctis & Monge, 1999: 693) that can be enhanced by computer mediation and the lateral interactions frequently observed when using electronic media (Kiesler et al., 1984).

A social capital and networks perspective is helpful to further understand the informational and cognitive advantages associated with geographically dispersed GBTs (Maznevski et al., 2000). In social networks theory, a core argument is that social capital leads to intellectual capital (Nahapiet & Ghoshal, 1998). Burt (1992) in particular emphasized the importance of structural holes within a social network in order to maximize its resources. The notion of structural holes implies that social networks are more effective when relationships are established to access individuals or groups that have no connections between them.

Granovetter (1973) also explained why only weak ties are recommended in order to maintain productive relationships. By weakness of ties, Granovetter (1973) meant the minimum requirements that are needed to establish links that are just strong enough to know about and have access to people or resources. Applied to a virtual context, social networks arguments imply that geographical dispersion leads to informational and cognitive advantages.

There are relatively few empirical studies of the cognitions of virtual teams (Hinds & Bailey, 2000), but some empirical support for the conceptual arguments above can be gathered from extant GBT research. As an anecdote, "global teams were

an efficient way for Larson-Paugh [the human resource director of Allergan Pharmaceuticals in Asia] to quickly understand company-wide compensation and benefit issues, and align them with the business philosophy to create a reward system that made sense at the local [and global] level" (Solomon, 1995: 56).

In a more systematic way, Cummings (2003) described some of the cognitive advantages available to GBTs thanks to their geographically dispersed members. Members are GBTs' "eyes and ears" in different environments and as such have access to different pieces of task-related information. In addition, each member has a social network on which the GBT can draw (Cummings, 2003). Along these lines, Jarvenpaa et al. (1998) and Jarvenpaa and Leidner (1999) showed how global virtual teams exhibiting high trust were able to harness the knowledge, skills, and expertise from all their members and reach positive project outcomes as a result.

In summary, if well integrated, the distinct perspectives of the members of geographically dispersed GBTs can translate into a more comprehensive approach to achieving their multi-country charter. These arguments lead to the following hypothesis:

> **Hypothesis 6:** Geographical dispersion has a positive impact on GBT cognitive comprehensiveness.

3.3.4. Interaction of National Diversity and Geographical Dispersion

GBTs determine their composition in order to best achieve their multi-country charter. A low level of national diversity is the strategy when a cadre of expatriates is deployed abroad by MNCs to manage important foreign subsidiaries (Edström & Galbraith, 1979; Maznevski et al., 2000; Snow et al., 1996). GBTs may also elect a

low level of geographical dispersion and a more centralized management approach (Kobrin, 1994). Finally, many GBTs are both nationally diverse and geographically dispersed (Snow et al., 1996; Jarvenpaa et al., 1998). In the next two hypotheses, the effect of the interaction between national diversity and geographical dispersion on GBT identity and GBT cognitive comprehensiveness is examined.

In a virtual context, negative attributions resulting from national differences are reinforced as GBT members lack face-to-face interaction to understand their counterparts and reach more accurate interpretations and appropriate actions in the course of their exchanges (Cramton, 2001). Communication difficulties within nationally diverse GBTs are compounded because the use of information and communication technologies often differs across nationalities, thus creating disconnects among GBT members (Van Glinow et al., 2004). In addition, conflicts generated by cross-national misunderstandings are magnified. Virtual communication is slower, more biased, feedback is less efficient, thus providing fewer opportunities for clarifications and leading disagreements to degenerate.

In a multinational context, the ambiguity associated with operating virtually increases with GBT members from different nationalities. Negative attributions that stem from an unshared context and difficulties using information and communication technologies are amplified because GBT members transmit and interpret information based their own national assumptions (Van Glinow et al., 2004). Similarly, the difficulty to build consensus and cooperation across locations is reinforced when GBT members are from different nationalities. Smoother and more fluid communication is one of the reasons why expatriates have been recommended as one

effective coordination and control mechanisms within MNCs (Edström & Galbraith, 1979; Kobrin, 1989).

One instance of interaction is when the conjunction of national diversity and geographical dispersion generates fault lines, like in the case of IJV management teams (Hambrick et al., 2001). The theory on fault lines proposes that subgroups appear within teams when several demographic attributes are aligned. As Lau and Murnighan (1998: 328) noticed, "the strength of fault lines depends on three compositional factors: (1) The number of individual attributes apparent to team members; (2) their alignment, and as a consequence; (3) the number of potentially homogeneous subgroups".

Several cases of subgroup formation along national and geographic lines have been reported in the GBT literature. For example, Kayworth and Leidner (2001) described how American students of one global virtual team were at odds with their remote Mexican counterparts, mainly due to incompatibilities of language and perceived divergence on the objectives, with a resulting low team cohesiveness that the leader had to address. In a field setting, Maznevski and Chudoba (2000) observed that managers of the core NewTech team collocated at the corporate headquarters communicated exclusively among themselves, with complete disregard for their remote foreign counterparts. Not surprisingly, team processes were rated quite low by the latter.

In summary, the interaction of national diversity and geographical dispersion results in more arduous social processes that contribute to weakening GBT identity. These arguments lead to the following hypothesis:

Hypothesis 7: National diversity and geographical dispersion interact to explain GBT identity. That is, the higher either of the two, the more negative the effect of the other on GBT identity.

The literature has made clear the informational and cognitive advantages associated with the utilization of global virtual teams (Snow et al., 1996). As described by Jarvenpaa and Leidner, (1999: 791), the concept of "global virtual implies permeable interfaces and boundaries; teams rapidly form, reorganize, and dissolve when the needs of a dynamic market place change; and individuals with differing competencies who are located across time, space, and nationalities. As companies expand globally, face increasing time compression in product development, and use more of foreign-subcontracted labor, virtual teams promise the flexibility, responsiveness, lower costs, and improved resource-utilization necessary to meet ever-changing task requirements in highly turbulent and dynamic global business environments".

The theory on social capital and networks is helpful to understand the interaction of national diversity and geographical dispersion in explaining GBT cognitive comprehensiveness (Ariel, 2001; Maznevski et al., 2000). Social networks theory implies that there is an optimum team configuration for maximum informational and cognitive advantages (Burt, 1992; Nahapiet & Ghoshal, 1998). In particular, GBTs have to be designed so that structural holes are formed within their social networks and their resources are accordingly compounded. National diversity and geographical dispersion are two such dimensions along which structural holes can be formed.

Geographical dispersion of members entails access to and intelligence about multiple local contexts relevant to the GBT charter. In addition, the participation of members from different nationalities avails a variety of skills, experience, and contacts that contribute to the social and intellectual capital of GBTs. When the advantages resulting from national diversity and geographical dispersion are combined, the whole becomes larger than the sum of the parts and the intellectual capital of GBTs is accordingly expanded (DeSanctis & Monge, 1999).

Along these lines, the literature has provided multiple examples of global virtual teams of students involving universities in the United States and abroad and the educational experience resulting from such configuration. Both national diversity and geographical dispersion of members were mutually reinforcing and combined in a virtuous cycle to maximize the learning of participants in the multinational and virtual projects (Jarvenpaa et al., 1998).

In addition, international research teams are increasingly frequently used (Teagarden et al., 1995). Such teams now often go beyond cross-national studies and form complex networks mimicking advanced organizational forms to achieve superior research outcomes, whereby the project benefit both from the geographical dispersion of members to gain local insight and from their particular domain of expertise to develop a more comprehensive perspective.

In summary, nationally diverse and geographically dispersed GBTs are a flexible way to combine a wealth of informational and cognitive resources, beyond what can be done with GBTs that are either nationally diverse or geographically dispersed. These arguments lead to the following hypothesis:

Hypothesis 8: National diversity and geographical dispersion interact to explain GBT cognitive comprehensiveness. That is, the higher either of the two, the more positive the effect of the other on GBT cognitive comprehensiveness.

3.3.5. Moderating Influence of Organizational Policies

A substantial literature in global strategy has developed in the course of the past two decades analyzing the success factors and MNC strategies dictated by the new requirements of the global arena (Bartlett & Ghoshal, 1989; Govindarajan & Gupta, 2001b). One key observation from this research stream is that macro or content factors such as strategy and structure are closely related – including top-down as well as bottom-up influences – with the more micro and process-oriented dimensions such as GBTs in predicting MNC outcomes (Govindarajan & Gupta, 2001b; Martinez & Jarillo, 1989). The subsequent two hypotheses focus on examining the impact of the internationalization of organizational policies on GBTs.

As argued in the context of hypothesis three, the development of negative attributions and the formation of subgroups among members occur in nationally diverse GBTs, with process losses to be expected in the area of communication and conflict as a result. The internationalization of organizational policies can help mitigate some of these deleterious effects in a number of ways. First, an organizational culture that is shared across international units contributes to GBT members having common goals, routines, and procedures, which allow working effectively across national boundaries (Wiener, 1988). An organizational culture that is consistent worldwide breeds familiarity and improves communication when GBT

members are from different nationalities, even without them having much prior experience working together.

Second a global mindset, when shared across the organization, can contribute to bridging negative attributions and help integrate the different nationalities of GBT members (Gupta & Govindarajan, 2002; Kobrin, 1994). GBT members with a global mindset are more open to the national differences of their counterparts, even though they realize that their relationships can be prone to ambiguity, thus reducing conflict.

As argued in the context of hypothesis five, the cohesiveness of a geographically dispersed GBT can be challenged because of limited cooperation and negative personal attributions due to the lack of face-to-face interaction, technical difficulties, and the unshared context associated with virtual operations. Again, an organizational culture with a strong international orientation coupled with a global mindset common to all organizational units facilitate understanding and enhance cooperation among geographically dispersed GBT members, even though they operate virtually most of the time, because of the language and mental models shared across the MNC. In addition, common management systems worldwide based on standardized information and communication technologies such as intranet, databases, and decision support systems (Shapiro et al., 2002; Snow et al., 1996) can reduce the ambiguity of virtual operations and limit the frustration of GBT members in the course of their interaction.

In summary, when GBTs benefit from consistent and supportive organizational policies on a worldwide basis, the negative impact of national diversity

and geographical dispersion on GBT identity is dampened. These arguments lead to the following hypothesis:

> **Hypothesis 9:** Organizational policies moderate the relationship between GBT composition and GBT identity. That is, the negative effect of national diversity and geographical dispersion on GBT identity is dampened at a high level of internationalization of the organizational policies.

As discussed above, GBT cognitive comprehensiveness depends on the successful exchange of information and sharing of knowledge among GBT members (Cummings, 2003). The literature has also shown that at high levels of national diversity and geographical dispersion, such information exchange and knowledge sharing can be a challenge, which has been identified as a special form of the mutual knowledge problem (Cramton, 2001). The proposition is that the internationalization of the organizational policies can ease the mutual knowledge problem in a multinational and virtual context and contribute to magnifying the positive effect of national diversity and geographical dispersion on GBT cognitive comprehensiveness.

As discussed in the context of hypothesis four, nationally diverse GBTs fully achieve their informational and cognitive potential if the voices of all members are heard (Jehn, 1995; Milliken & Martins, 1996; Moscovici, 1976). When operating in the context of an organizational culture that is shared across international units and a global mindset that fosters debate from various perspectives and ensures the integration of ideas, members from different nationalities can better understand and incorporate the contributions from each participant into the overall GBT solution (Gupta & Govindarajan, 2002; Kobrin, 1994). For example, it is important to select a

language that is acceptable to all the nationalities represented (Salk & Shenkar, 2001; Van Glinow et al., 2004).

As discussed in the context of hypothesis six, the informational and cognitive potential of geographically dispersed GBTs translates into more comprehensive approaches in achieving their multi-country charter only if effectively integrated (Cummings, 2003; DeSanctis & Monge, 1999). The internationalization of organizational policies can enhance such integration in a number of ways. First, an organizational culture that is consistent worldwide facilitates mutual understanding about respective contexts and reduces the need for face-to-face meetings between geographically dispersed GBT members. Second, a management and technology infrastructure that is standardized across the world allows geographically dispersed GBT members communicating their perspective in a more timely and effective manner (Snow et al., 1996). Along these lines, GBT members at different locations need to be experienced in information and communication technologies for more effective interaction.

Several studies have shown that the effect of heterogeneity on GBT process and performance is partially determined by an organizational context that supports members as they work across nationalities and locations (Hambrick et al., 2001). For example, the success of global virtual teams of students greatly depended on the quality of the technology infrastructure that they used to communicate and the faculty support that they received for their class project (Cramton, 2001; Jarvenpaa et al., 1998; Montoya-Weiss et al., 2001). International research teams provide another example whereby consistent organizational infrastructure and institutional support

played a critical role in order for nationally diverse and geographically dispersed GBTs to realize their potential. Teagarden et al. (1995) identified the establishment of a trans-organizational system as a key requirement for successful international research collaborations.

In summary, organizational policies that are consistent on a worldwide basis can significantly alleviate the mutual knowledge problem of nationally diverse or geographically dispersed GBTs. These arguments lead to the following hypothesis:

> **Hypothesis 10:** Organizational policies moderate the relationship between GBT composition and GBT cognitive comprehensiveness. That is, the positive effect of national diversity and geographical dispersion on GBT cognitive comprehensiveness is magnified at a high level of internationalization of the organizational policies.

3.3.6. Moderating Influence of GBT Governance

As discussed in Chapter two, team governance affects team process and performance in a number of ways (Cohen & Bailey, 1997; Gist et al., 1987). In the context of GBTs, Maznevski and Chudoba (2000: 476) observed that "two sets of empirical studies have found that when multicultural teams engage in effective integrative processes such as communication and conflict resolution, they perform at least as well as, and sometimes better than homogeneous teams". In the subsequent two hypotheses, the focus is on examining the moderating effect of two governance mechanisms on the relationship between GBT composition and GBT process: 1) team-based rewards, 2) team communication, with an emphasis on formality and frequency.

One of the strongest results in the literature is that team-based rewards must be aligned with a number of organizational, team, and individual level variables in order to be effective, including team composition (DeMatteo et al., 1998). The literature on this latter topic, while scarce, indicates that team-based rewards are important for the process and performance of nationally diverse or geographically dispersed GBTs because members of heterogeneous teams operate under different constraints and assumptions, especially when it comes to how teams should be functioning (Chen, Chen, & Meindl, 1998; Earley & Gibson, 1998; Van Glinow et al., 2004).

For nationally diverse and geographically dispersed GBTs, one of the primary issues is to motivate their members and align their expectations and behaviors with team objectives. Team-based rewards contribute to resolving the complex trade-offs associated with national diversity and geographical dispersion (Govindarajan & Gupta, 2001a; Espinosa et al., 2003). While intrinsic motivation based on the desire of individuals to learn, create, and improve is clearly an important factor for members of nationally diverse or geographically dispersed GBTs, extrinsic motivation in the form of team-based rewards is also critical given the multiple demands associated with the different contexts in which they operate (Cramton, 2001; Van Glinow et al., 2004). By helping clarify members' priorities and roles, team-based rewards contribute to enhancing the cohesiveness, unity, and identity of nationally diverse and geographically dispersed GBTs (Earley & Mosakowski, 2000).

Team communication is another governance mechanism that is posited to moderate the relationship between GBT composition and GBT process. Team

communication is a multidimensional construct, with the two dimensions of formality and frequency of primary importance (Smith et al., 1994). Formality reflects the ease and fluidity of the interactions between team members. Frequency characterizes the amount of information exchanged and knowledge transferred between members in the course of team communication.

Given the negative attributions associated with national diversity and the lack of social presence stemming from geographical dispersion, informal communication can help counter initial prejudices and overcome the liability of virtual communication. Van Glinow et al. (2004) have analyzed some of the creative ways such as aesthetic activities utilized to address the issues associated with multinational teams, where informality is an important component to help GBT members maintain positive relationships following communication failures and resolve emotional conflict.

In addition, an informal style has been found to be effective in the course of virtual communication (Jarvenpaa & Leidner, 1999). Geographically dispersed GBTs can also arrange to meet at regular intervals to foster more socialization among their members, especially in the initial stages of their life cycle (Maznevski & Chudoba, 2000). Such informal communication helps geographically dispersed members resolve GBT issues, both relational and technical.

Frequent communication is also important for nationally diverse and geographically dispersed GBTs given their multi-country charter and heterogeneous composition. National diversity and geographical dispersion require a significantly larger amount of communication between members in order to understand the needs

at the local level, determine the joint activities across countries, harness the necessary resources across boundaries, and ultimately accomplish the GBT task (Jarvenpaa et al., 1998; Jarvenpaa & Leidner, 1999; Shapiro et al., 2002). In the process, a number of clarifications and adjustments have to be made due to the complexity of the activities undertaken and the possible misunderstandings and communication failures appearing among GBT members from different nationalities (Van Glinow et al., 2004). Frequent communication also is necessary to help bridge the gaps among geographically dispersed members, overcome the technical difficulties associated with virtual communication, and understand the different contexts in which they operate.

Extant GBT research supports these arguments. In general, members of nationally diverse and geographically dispersed GBTs that are more productive communicate more often, especially in informal and social ways. For example, there is empirical evidence of the value of informal communication, especially in the early phases of the life cycle of global virtual teams (Jarvenpaa & Leidner, 1999). In addition, frequent communication was one of the attributes of the global virtual teams that exhibited high trust analyzed by Jarvenpaa et al. (1998). Along the same lines, Kayworth and Leidner (2001) observed that student participants required from their leader frequent, regular, and prompt communication to manage their global virtual teams.

In summary, GBT governance contributes to alleviating process losses associated with national diversity and geographical dispersion, thus reducing their negative effect on GBT identity. These arguments lead to the following hypothesis:

Hypothesis 11: GBT governance – team-based rewards and team communication – moderates the relationship between GBT composition and GBT identity. That is, the negative effect of national diversity and geographical dispersion on GBT identity is dampened when GBT governance is tighter.

Team governance is also an important factor to unlock the informational and cognitive potential of nationally diverse and geographically dispersed GBTs. For instance, hybrid culture theory (Earley & Mozakowski, 2000) has posited that mechanisms such as team communication and conflict resolution are valuable for transnational teams to reach higher quality decisions and more comprehensive solutions.

In particular, team-based rewards are critical in the case of nationally diverse and geographically dispersed GBTs in order to harness members' resources toward achieving the team charter (Jarvenpaa et al., 1998; Jarvenpaa & Leidner, 1999). Cramton (2001) showed that the quality of decisions of global virtual teams depended on members' willingness to make their knowledge and expertise available, ability to share it with others within the team, and collective capability to coordinate and leverage this information and knowledge to complete the task. Team-based rewards are effective incentives to overcome the difficulties in the area of information exchange and knowledge sharing induced by operating across nationalities and locations.

An informal component in GBT communication is warranted if emotional rather than substantive conflict starts affecting the task of nationally diverse and geographically dispersed GBTs (Jarvenpaa & Leidner, 1999; Van Glinow et al.,

2004). Personal attributions are a frequent occurrence within virtual GBTs because of communication failures and task overload (Cramton, 2001; Hambrick et al., 2001). In addition, national stereotypes compound communication difficulties and can lead to the creation of subgroups whereby productive information exchange and knowledge sharing is hindered in nationally diverse GBTs (Lau & Murnighan, 1998). In these cases, a more informal and social communication style can contribute to reducing the risk of disintegration spirals (Cramton, 2001; Hambrick et al., 2001).

Finally, frequent communication is critical so that valuable information possessed by members does not remain "hidden" within nationally dispersed and geographically dispersed GBTs (Cramton, 2001). GBT members from different nationalities may be more or less willing or able to communicate with their counterparts (DiStephano & Maznevski, 2000; Salk & Shenkar, 2001). In addition, virtual communication can be less than complete because discussions are more biased and proceed at a slower rate than face-to-face (Cramton, 2001). As a result, team communication needs to be more frequent given national diversity or geographical dispersion in order to gather and integrate the resources available from all GBT members into the most comprehensive solution.

There is empirical evidence supporting the moderating impact of team communication on the relationship between GBT composition and GBT cognitive comprehensiveness. Members of productive GBTs that are nationally diverse and geographically dispersed communicate more often, frequently engage in constructive arguments, critically analyze issues when meeting face-to-face, and focus on tasks in

a positive manner virtually (Jarvenpaa et al., 1998). For example, Cummings (2003) found that dispersed GBTs that had a higher level of intra-team communication performed better on a number of measures, including cognitive comprehensiveness.

In summary, team-based rewards and team communication provide the incentives and the means for nationally diverse and geographically dispersed GBTs to fully achieve their cognitive potential. These arguments lead to the following hypothesis:

> **Hypothesis 12:** GBT governance – team-based rewards and team communication – moderates the relationship between GBT composition and GBT cognitive comprehensiveness. That is, the positive effect of national diversity and geographical dispersion on GBT cognitive comprehensiveness is stronger when GBT governance is tighter.

CHAPTER 4. METHODS

Considerable progress has been made in cross-national and multilevel methodologies on which can be drawn to investigate GBTs (Gelfand et al., 2002; Klein & Kozlowski, 2000). When it comes to cross-national issues, equivalence at the conceptual, measurement, and scalar level must be maintained throughout the research project (Harpaz, 1995; van der Vijver & Leung, 1997). The major multilevel question for this dissertation is to ensure that aggregation of individual data at the team level is justified (Bliese, 2000). Finally, the issue of self reporting has to be addressed since survey questionnaires were used (Podsakoff & Organ, 1986). These considerations have implications in terms of sampling, design of the survey instrument, treatment of the data, and analytical approach, which are discussed in the sections below.

Chapter four is organized as follows. First, the sample and the approach to data collection are described in section 4.1. The design of the survey instrument is explained in section 4.2. The specific measures for the constructs of interest are given in section 4.3, and the various analytical steps are outlined in section 4.4.

4.1. SAMPLE

4.1.1. Description

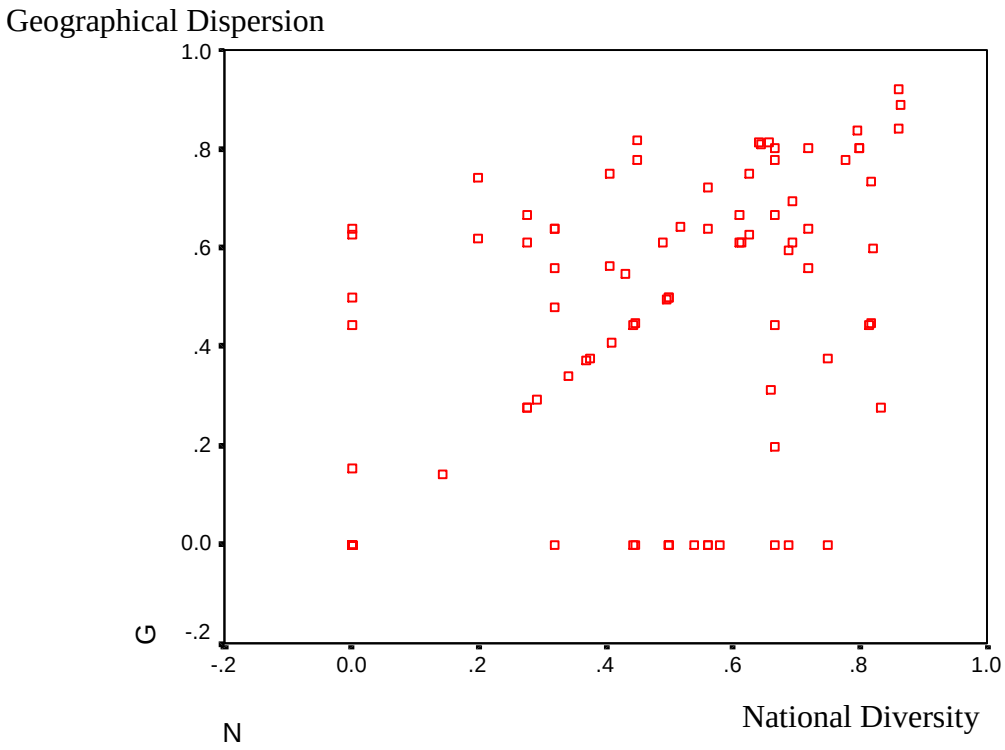
The 106 GBTs for which data were collected represented 651 international managers belonging to 41 MNCs (2.59 GBTs per firm on average, with a range from 1 to 9). 16 MNCs were headquartered in the United States contributing a total of 28

GBTs, 9 in France (37 GBTs), 8 in Japan (15 GBTs), and 8 in Mexico (26 GBTs). Among the participating firms, 17 were in the manufacturing sector (61 GBTs), 2 in the consumer goods sector (8 GBTs), 10 in the technology sector (18 GBTs), and 10 in the services sector (19 GBTs).

The business units in which the GBTs operated averaged US$1.4 billion of sales, ranging from US$10.0 million to US$11.0 billion. International sales represented 69% of total sales (min. = 5%, max. = 100%) and 65% of the members of the top management teams had international experience in these business units (min. = 10%, max. = 100%).

The GBTs had 6.81 participants on average (including the leader and members, with a range from 2 to 16). Forty six GBTs were global in scope and had worldwide responsibilities, while 60 GBTs were regional and focused on a group of countries such as Europe or Latin America. Thirty six GBTs managed a business unit, while 70 GBTs were responsible for a function, such as manufacturing or human resources. Finally, the scatter plot appearing on Figure 4.1 indicates the profile of the GBTs along the dimensions of national diversity (mean = 0.40, s.d. = 0.30) and geographical dispersion (mean = 0.38, s.d. = 0.32).

Figure 4.1: Distribution of Global Business Teams



Among the respondents, the average age was 41.3 (min. = 23, max. = 77) and 20% were women. The average number of years of university education was 5.1 (min. = 0, max. = 12), the average number of years participating in the GBT was 3.6 (min. = 0.1, max. = 22), and the average job tenure was 3.9 years (min. = 0.1, max. = 31).

86.2% of the GBTs contacted accepted to participate in the survey. The response rate for the members of those GBTs that were included in the analyses was 90.0%.

4.1.2. Systematic Approach

Given the constraints in access, time, and funding, a systematic or theoretical approach to sampling was implemented (Teagarden et al., 1995). This approach is

consistent with the type of hypothesis-driven and generalization research attempted in this dissertation and at the same time is more manageable than random sampling given the size of the GBT population (Ronen & Shenkar, 1985; van der Vijver & Leung, 1997). The basic premise of systematic sampling is to gather data with a sufficient amount of variance on the key variables of interest in order to be able to test the proposed theory (Gelfand et al., 2002; Kozlowski & Klein, 2000).

For this dissertation, three main criteria guided the selection of the GBTs for the sample. First, MNCs headquartered in countries well apart on the dimensions of power distance, uncertainty avoidance, masculinity, and collectivism were selected: the United States, Japan, France, and Mexico (Hofstede, 1980). These countries are also representative of the three blocks of the triad as well as emerging economies (Ohmae, 1985). In addition, the firms considered were representative of four industry sectors: manufacturing, consumer goods, technology, and services (Bartlett & Ghoshal, 1989). Finally, GBTs with significant variance on key team variables such as national diversity and geographical dispersion were included in the sample (see Figure 4.1).

4.1.3. Data Collection

Within each GBT, the participation of the sponsor, leader, and members was sought. The sponsor was a senior executive who directly supervised the establishment of the GBT and to whom the leader and members were accountable for performance. The leader was the manager responsible for the strategy and operations of the GBT.

Finally, the members were charged with the implementation of the GBT charter based on their respective skills and accountabilities.

An example of GBT is the participants in an international business development team of the chemicals strategic business unit of an oil major. The sponsor was the president of the strategic business unit, the leader was the manager in charge of international business development reporting to the president headquartered in Paris, and the members were three managers of foreign subsidiaries located in South Africa, Singapore, and South Korea.

Gaining access was based on personal contacts. Access was easy to obtain due to the topicality of the study, the fact that the project had no cost involved for participating MNCs except for the time required to complete the questionnaires, and the promise to provide a free report summarizing the key results to participants.

Data collection for a given GBT proceeded as follows. In the first step, I contacted the GBT leaders by e-mail, telephone, or face-to-face meeting in order to explain the purpose, process, and expected results of the survey and discuss how the study would apply in the context of their team. The conditions of confidentiality for participants and how the data collected were to be utilized for future research were also clarified. Following this conversation, the GBT leader received a model of introduction letter and the Leader questionnaire. In the second step, the leader introduced the survey to the GBT members and sponsor by e-mail, with a copy to me. I then e-mailed to them a short presentation of the project, the instructions, and the questionnaire as attached Microsoft Word files. In the third step, participants responded back directly to me by e-mail or fax. This approach facilitated data

collection and minimized the administration time required from firms, allowing answering the questions and ensuring the confidentiality of GBT members. When further clarification on their response was needed, participants were contacted by e-mail, fax, or telephone to obtain the required information.

In addition to the process described above, a number of steps were taken to ensure a high response rate and the quality of the data (Edwards, Thomas, Rosenfeld, & Booth-Kewley, 1997; Fowler, 1993; Teagarden et al. 1995). First, the documents of the survey were personalized for each participant. Second, participants were promised a report summarizing the results of the study free of cost. Finally, several rounds of follow-up e-mails and telephone calls were completed.

4.2. SURVEY INSTRUMENT

4.2.1. Questionnaire Design

The English version of the questionnaire was developed based on a comprehensive search of the literature on the topic of GBTs. All questions, whenever possible, utilized well established scales from the literature in order to ensure the validity and reliability of the measurements.

The questions were constructed to reflect measurement at the team level (Klein & Kozlowski, 2000). The recommendation, which still needs to gain further empirical support, is to phrase the items so as to render the collective perceptions of team processes by GBT members (Chan, 1998).

4.2.2. Pre-testing

Special care was taken to write "good" items (Edwards et al., 1997; Fowler, 1995, 1993). In addition, the questionnaire was pre-tested in the course of 12 face-to-face interviews with GBT managers (Fowler, 1995). The pre-testing helped identify potential improvements and avoid ambiguous, biased, and vague questions, use appropriate language, eliminate double negatives, keep the items simple and short, and deal with sensitive items. The interviews also provided insight into the format and ease of use of the questionnaire, including layout, presentation, length, and order and number of items.

4.2.3. Translation

Discussions with the GBT managers involved in the pre-tests indicated that the translation of the questionnaire in the languages of the countries in which participating MNCs were headquartered would facilitate survey administration. Using a translation/ back-translation approach, the English version of the questionnaire was therefore translated into French, Japanese, and Spanish (Brislin, 1986, 1980). The translators were academics bilingual in English and the target languages. The translation/ back-translation approach is an effective way to check for translation accuracy that has been widely applied in cross-national research (Gelfand et al., 2002; van der Vijver & Leung, 1997).

The translation in each target language proceeded as follows. In the first step, the questionnaire was translated from English into the target language by a designated translator. In the second step, the resulting questionnaire in the target language was

translated back into English by a different translator, who had no prior knowledge of the English original. In the third and final step, the two translators discussed and reconciled the differences between the original and the back-translation in English. This procedure led to improvements in both the English and target language versions of the questionnaire.

An additional step was taken in order to confirm the quality of the various translations of the questionnaire. Bilingual scholars, expert in the field of the study and blind to the translation/ back-translation process, were asked to comment on the French, Japanese, and Spanish versions as compared to the English original. This process can be considered as a form of the committee translation approach (Gelfand et al., 2002; van der Vijver & Leung, 1997) and contributed to the increased validity of the survey instrument (Ronen & Shenkar, 1985). These reviews yielded several style and presentation suggestions that were incorporated in the various versions of the questionnaire.

4.2.4. Pilot Testing

Pilot testing of the questionnaire was completed with eight GBT managers – two from each of the American, French, Japanese, and Mexican nationalities – using the same process as the one planned for the survey (Fowler, 1995). These pilot tests yielded important feedback on the questionnaires and the method of survey administration (Teagarden et al., 1995).

The pilot tests led to improvements in three main areas. First, adjustments were made to the French, Japanese, and Spanish versions of the questionnaire. For

instance, a French manager thought that the wording of some questions came across as negative or restrictive. For example, she suggested to replace the word “survie” (survival) with “pérennité” (perennity).

Second, the testers generally found that the questionnaire was too long. “The survey took almost an hour to complete, since I did take the time to consider my answers” commented an American manager. And he added: “while many questions have been repeated to ensure statistical accuracy, you nonetheless might want to look at ways for reducing these to keep the survey shorter”. As a result, a few questions that appeared redundant were removed and several questions non core to the dissertation were shortened to include only the minimum of items necessary for adequate measurement.

Finally, the GBT managers who participated in the pilot tests made several suggestions on the format of the survey documents. Based on these comments, several alternatives were considered, including posting the questionnaire on the web. In the end, e-mail and attached files in Microsoft Word was retained as the best medium given the requirements for ease and flexibility of use and was deemed the most effective at eliciting a high response rate in the global environment typical of GBT managers.

These improvements to questionnaire content and survey process are consistent with the recommendations resulting from prior complex cross-national studies (Gelfand et al., 2002; Teagarden et al., 1995). It is important for this type of research to make sure that the methodology is appropriate and replicable, provides the required depth, and is ethically acceptable. Regarding tasks and instructions,

participants must be able to understand the questions, have the relevant information available, and be motivated to respond consistently across nationalities (Fowler, 1995; Gelfand et al., 2002).

Overall, the feedback from the testers for both content and format of the survey was quite positive, which was an encouragement for the next phase of data collection. As the French manager of a technology firm based in London commented: “j’ai trouvé le questionnaire intéressant et facile/dynamique à remplir” (I found the questionnaire interesting and easy/dynamic to complete).

The pre-tests and pilot tests were conducted prior to obtaining approval from the Human Subject Review Committee. Accordingly, the corresponding data do not appear in the dissertation and will not be used for analysis in future publications.

4.3. MEASURES

4.3.1. Satisfaction with GBT Performance

The GBT sponsor was asked the following question:

Please indicate the extent to which you agree or disagree with the following statement (1 completely disagree; 5 completely agree):

1) I am satisfied with the performance of the GBT.

Sponsor responses: mean = 3.94, s.d. = 0.77.

The GBT leader was asked the following question:

Please indicate the extent to which you agree or disagree with the following statement (1 completely disagree; 5 completely agree):

1) Most members are satisfied with the performance of the GBT.

Leader responses: mean = 3.71, s.d. = 0.74.

In addition, a composite measure was created by taking an average of the sponsor's and leader's ratings:

Composite responses: mean = 3.81, s.d. = 0.66, avg. R_{wg} = 0.82, ICC(1) = 0.29, ICC(2) = 0.55.

These items were adapted from Earley and Mosakowski (2000).

4.3.2. Perception of GBT Productivity

The GBT sponsor and the GBT leader were asked the following questions:

Please indicate whether you agree or disagree with the following statements (1 completely disagree; 5 completely agree):

1) Most of the time, the GBT keeps its operating costs low.
2) Most of the time, the GBT tries new ways to improve its productivity.
3) Most of the time, the GBT produces high quality work.
4) Most of the time, the GBT is run efficiently.

Sponsor responses: mean = 3.97, s.d. = 0.62, Cronbach = 0.73.

Leader responses: mean = 3.99, s.d. = 0.61, Cronbach = 0.72.

A composite measure was created by taking an average of the sponsor and leader ratings:

Composite responses: mean = 3.97, s.d. = 0.52, Cronbach = 0.76, avg. R_{wg} = 0.90, ICC(1) = 0.32, ICC(2) = 0.59.

These items were adapted from Riordan and Shore (1997).

4.3.3. GBT Identity

The GBT members were asked the following question:

Please indicate whether you agree or disagree with the following statements (1 completely disagree; 5 completely agree):

1) Most members feel a strong sense of belonging to the GBT.
2) Most members feel part of the GBT.
3) The GBT has a lot of personal meaning to most members.

A composite measure was created by taking an average of the members' ratings:

Members' responses: mean = 3.85, s.d. = 0.56, Cronbach = 0.92, avg. R_{wg} = 0.79, ICC(1) = 0.16, ICC(2) = 0.53.

These items were adapted from Meyer, Allen, and Smith (1993).

4.3.4. GBT Cognitive Comprehensiveness

The GBT members were asked the following question:

Please indicate how often the GBT adopts the following approaches when confronted with an important problem or opportunity (1 almost never; 5 almost always):

1) Develop many alternative responses.
2) Consider many diverse criteria for eliminating possible courses of action.
3) Thoroughly examine multiple explanations for the problem or the opportunity.
4) Conduct multiple examinations of any suggested courses of action.

5) Search extensively for possible responses.

A composite measure was created by taking an average of the members' ratings:

Members' responses: mean = 3.42, s.d. = 0.41, Cronbach = 0.82, avg. R_{wg} = 0.85, ICC(1) = 0.06, ICC(2) = 0.28.

These items were adapted from Miller et al. (1998).

4.3.5. Team-based Rewards

The GBT members were asked the following question:

Please indicate how often the following happens when performance goals of the GBT are attained or surpassed (1 almost never; 5 almost always):

1) Most members are rewarded for the achievement of the GBT.

2) Most members are recognized for the achievement of the GBT.

In addition, the GBT members were asked the following question:

Please indicate how often the following happens when performance goals of the GBT are <u>not</u> attained (1 almost never; 5 almost always):

1) Most members are held responsible for the performance of the GBT.

2) Most members are told to improve the performance of the GBT.

A composite measure was created by taking the mean of the members' ratings:

Members' responses: mean = 3.20, s.d. = 0.59, Cronbach = 0.79, avg. R_{wg} = 0.77, ICC(1) = 0.25, ICC(2) = 0.71.

These items were adapted from Van de Ven and Ferry (1980).

4.3.6. Frequency of Face-to-face Meetings

The GBT members were asked the following question:

Please indicate how frequently on average the GBT interacts as a group in each of the following manners (1 once a year or less frequently; 5 once a week or more frequently):

1) Face-to-face meetings.

A composite measure was created by taking the mean of the members' ratings:

Members' responses: mean = 3.21, s.d. = 1.09, avg. R_{wg} = 0.72, ICC(1) = 0.57, ICC(2) = 0.90.

This item as well as the next one were adapted from a communication frequency scale by Van de Ven and Ferry (1980).

4.3.7. Frequency of E-mail Communication

The GBT members were asked the following question:

Please indicate how frequently on average the GBT interacts as a group in each of the following manners (1 once a year or less frequently; 5 once a week or more frequently):

1) Through e-mail.

A composite measure was created by taking the mean of the members' ratings:

Members' responses: mean = 4.62, s.d. = 0.45, avg. R_{wg} = 0.80, ICC(1) = 0.21, ICC(2) = 0.66.

4.3.8. Internationalization of Organizational Policies

The GBT leader was asked the following question:

Please indicate whether you agree with the following statements (1 completely disagree; 5 completely agree):

1) A manager who began her/his career in any country has an equal chance to become the head of the organizational unit.
2) Within 10 years, I expect to see a foreign national as the head of the organizational unit.
3) Within 10 years, I expect to see foreign nationals become senior executives of the organizational unit.
4) Within the organizational unit, nationality is unimportant in selecting individuals for managerial positions.

Leaders' responses: mean = 3.26, s.d. = 1.00, Cronbach = 0.76.

These items were adapted from Kobrin (1994).

4.3.9. GBT Composition

The measure of heterogeneity for categorical variables was computed using Blau's index, $B = 1-\Sigma P_i^2$, where P_i is the proportion of members for category i. This approach to computing a diversity indicator applied to the dimensions of nationality (national diversity mean = 0.40, s.d. = 0.30), and geography (geographical dispersion mean = 0.38, s.d. = 0.32).

4.3.10. Control Variables

The following controls were incorporated at the organization and team level.

Organizational size. Organizational size is a variable that has consistently been identified to have an impact on team process and performance (e.g., Gladstein, 1984). It was measured as the number of employees of the business unit, of which the logarithm was taken (mean = 3596, s.d. = 5398).

Percentage of international sales. Internationalization has a critical impact on all aspects of the management process of an organization (Bartlett & Ghoshal, 1989). The degrees of internationalization was measured as the degree of international sales (mean = 0.69, s.d. = 0.27).

Country of origin of the parent company. The country of origin of the parent company has a significant impact on international management practices (Gupta, Govindarajan, & Malhotra, 1999). It is indicated by three different dummy variables for France, Japan, and Mexico, with the United States being the base case.

Industry sector. It is acknowledged that management practices differ across industry sectors with a related impact on various organizational phenomena (Bartlett & Ghoshal, 1989; Porter, 1980). Industry sectors are indicated here by three dummy variables for consumer goods, technology, and service, with manufacturing being the base case.

GBT size. Size is a major variable defining team structure, process and performance (Gladstein, 1984; Steiner, 1972). Size included the leader as well as the members of the GBT (mean = 6.81, s.d. = 3.08).

GBT longevity. The developmental view of team dynamics suggests that teams go through successive phases before reaching a steady state (Tuckman, 1965). Accordingly, team longevity was measured as an important influence on GBT process and performance. The measure of team longevity was provided by the leader based on his or her evaluation of when the GBT was created (mean = 6 years).

GBT composition. A comprehensive body of literature has indicated the importance of several composition variables for team process and performance (Milliken & Martins, 1996; Williams & O'Reilly, 1998). For numerical variables, the standard deviation was used, after controlling for the mean as a measure of heterogeneity (Bedeian & Mossholder, 2000). This approach applied to age (mean = 41.14, s.d. = 6.60) and education (mean = 5.18, s.d. = 1.30). In the case of function, a categorical variable, Blau's index was used (mean = 0.30, s.d. = 0.31).

Interdependence of GBT task. Task has been identified to be an important component of models of team process and performance (Gladstein, 1984; Hambrick et al., 1998). Here, the GBT members were asked whether they agreed with the following statement (1 completely disagree; 5 completely agree):

1) Weekly or more frequent interaction between most members is needed to do the work of the GBT effectively.

A composite measure was created by taking the mean of the members' ratings:

Members' responses: mean = 3.53, s.d. = 0.88, avg. R_{wg} = 0.54, ICC(1) = 0.17, ICC(2) = 0.59.

This item was adapted from Gladstein (1984).

4.4. ANALYTICAL APPROACH

Because data were collected through questionnaires from informants of different nationalities and aggregated at the team level, the issues of common-method variance, within-nationality data standardization, and data aggregation had to be considered.

4.4.1. Common-method Variance

Podsakoff and Organ (1986) have summarized the problems that arise when self reports are used in organization research to gather data such as personality information, characteristic behaviors, psychological states, and perception of external contextual variables. In such instances, the problem of common-method variance arises due to respondents' desire to be consistent and socially "correct" in their responses.

The issue of common-method variance was addressed in two steps. First, data were collected from multiple informants: the sponsors, leaders, and members of the GBTs. The measures for national diversity, geographical dispersion, and internationalization of organizational policies were provided by the GBT leader, since the leader is the best positioned to provide global data on the GBT and the organization.

Measures of GBT emergent processes – team identity and cognitive comprehensiveness – and GBT governance – team-based rewards, frequency of face-to-face meetings, and frequency of e-mail communication – were obtained from the

GBT members only, since they were the main participants in the internal GBT operations.

Finally, the measures of GBT performance were based on sponsors' and leaders' evaluations. Because of their position, the sponsor and the leader were the primary sources of information on GBT performance. Sponsors were included in order to obtain an evaluation from somebody outside the GBT in addition to the leader.

Second, a Harman one factor design test was implemented (Harman, 1967). The purpose of this procedure is to establish that the variables of interest are clearly differentiated from each other and it checks the factor structure on the independent and dependent variables (Podsakoff & Organ, 1986). Loading on one factor provides evidence of common-method variance. In the three tests where the measures of performance – sponsor, leader, and sponsor + leader – were introduced together with the other variables, several factors corresponding to the independent and dependent variables appeared as expected. In addition, no one single factor represented more than 50% of the total variance in each of the three tests.

4.4.2. Within-nationality Data Standardization

While all attempts were made in the phases of questionnaire design and survey administration to ensure measurement equivalence, the various nationalities of the respondents could still introduce biases (van der Vijver & Leung, 1997). In particular, some nationalities can be associated with responses sets such as extremes and acquiescence (Gelfand et al., 2002; Leung & Bond, 1989). The methods to deal

with theses biases are complex and still not entirely settled. A conservative approach adopted here is to conduct analyses using both raw and within-nationality standardized data and compare the results (van der Vijver & Leung, 1997).

This method assumes samples of equal sizes for each nationality, which is an unlikely occurrence in the context of GBTs (Leung & Bond, 1989; Ronen & Shenkar, 1985). For instance, there were 43 nationalities with one to 164 respondents in the GBTs sampled here. A possible approach in this case is to use country clustering, which has been legitimized by prior research (Brodbeck et al., 2000; Ronen & Shenkar, 1985). This research stream has shown that countries that exhibit similar work behaviors and values can be clustered. As a result, respondents were grouped into four Anglophone, Latin, Asian, and European clusters. Again, the advantage of this approach is to provide a form of nationality standardization. The obvious disadvantage is that some nationalities that are moderately close to each other can be grouped in the same cluster.

4.4.3. Data Aggregation at the Team Level

Since the GBT variables were measured using responses of single informants, some criteria had to be used to justify aggregation of individual data at the team level. Bliese (2000) suggested two criteria for data aggregation. First, *within-group agreement* indicates "the degree to which raters provide the same ratings" (Bliese, 2000: 351).

The R_{wg} or $R_{wg(j)}$ is the most frequently used measure of within-group agreement and is computed by comparing an observed group variance to an expected

random variance for each variable and each team. In general, the expected random variance is taken to be that of a uniform distribution, which is two in the case of a five point scale. The $R_{wg(j)}$ formula for a scale with J items is as follows (James, Demaree, & Wolf, 1984):

$$R_{wg(J)} = \frac{J\,[1 - (as_{xj}^2/2)]}{J\,[1 - (as_{xj}^2/2)] + (as_{xj}^2/2)}$$

where as_{xj}^2 is the average of the observed variances for each of the J items forming the scale.

Reliability is the second criteria for data aggregation, which reflects the consistency of the informants in their evaluation (Bliese, 2000). If the rating for a variable by a given informant has a certain level within her range, it should have the same relative level for a different informant within his rating range.

The ICC(1) and ICC(2) are the indicators commonly used in organization research to assess reliability. These indicators are given by the following formulas:

$$ICC(1) = \frac{MSB - MSW}{MSB + [(k\text{-}1) \times MSW]}$$

$$ICC(2) = \frac{MSB - MSW}{MSB}$$

where MSB is the between-group mean square for the variable of interest, MSW is the within-group mean square, and k is a weighted-average group size computed across the sample.

The advantage of the $R_{wg(j)}$ index is that inter-rater agreement is evaluated separately for each variable and each team. In addition, the ICC(1) and ICC(2) provide an aggregate indication of the level of within and between-group variance

and whether the test of substantive relationships between team variables is warranted. Thus, the two approaches are complementary (Klein et al., 2000).

There is some variation in the way these tests are implemented, but a recent review of the literature indicated that commonly accepted rules of thumbs are that for a given variable the average $R_{wg(j)}$ across teams should be higher than 0.7, the F-test for the ICC(1) should be statistically significant, and the ICC(2) should at least be equal to 0.50 to justify aggregation (Klein et al., 2000).

The values of the $R_{wg(j)}$ for the raw data are provided in Appendix 4.1. On average, these values appear low according to the standards described above, but may be acceptable in the case of GBTs given their heterogeneity (Klein et al., 2001). The approach used to deal with low indicators' values was to remove outlier member ratings when $R_{wg(j)} < 0$ or $R_{wg(j)} > 1$. That approach yielded acceptable $R_{wg(j)}$ values and at the same time minimized information loss. The $R_{wg(j)}$ values for the corrected data appear in Appendix 4.2. The aggregation indicators presented above in the Measures section reflect these changes in the data.

4.4.4. Path Analysis

The basic approach with path analysis is to regress each dependent variable in turn on the variables affecting it (James, Muliak, & Brett, 1984; Pedhazur & Schmelkin, 1991). The direct effects are given by the regression coefficients when all the variables with direct effects are included. Indirect effects are obtained from the products of the direct effects along the paths separating the dependent and independent variables. The total effect are the sum of the direct and indirect effects.

Finally, the difference of the correlation between the dependent and independent variables and the total effect indicates the spuriousness of the relationship between the two (Cohen & Cohen, 1983).

As explained by Cohen and Cohen (1983), hierarchical regressions, also called reduced-form regressions in the context of path analysis, can facilitate the computation of the various effects. Using hierarchical regression, each variable is entered by order of causal priority. The total effect of a variable on the dependent variable is obtained by its regression coefficient when it is first entered in the regression, and its direct effect is the regression coefficient when all variables with a direct effect are entered simultaneously.

The advantage of entering the variables through a causal hierarchy is that the various components of the indirect effect of a variable can be derived when subsequent variables, which are lower in the causal hierarchy, are entered in the hierarchical regression. The indirect effect of a variable through a causally "lower" variable is the difference between the regression coefficient for the variable at the previous stage of the hierarchical regression, minus the regression coefficient for the same variable at the step including the causally "lower" variable.

In general, conceptual models include sets of variables that are causally ordered. In this case, the approach for single variables explained above can be generalized. Hierarchical or reduced-form regressions are again used to determine the total, direct, and indirect effects of the various sets of variables on the dependent variable (Cohen & Cohen, 1983).

In order to test the hypotheses of the intervening process model of GBT performance, the approach was therefore as follows. First, GBT performance was the dependent variable using the six measures indicated above. The independent variables were entered in the six hierarchical regressions in the following order:

1. control variables;
2. team composition;
3. emergent processes.

Second, GBT identity and GBT cognitive comprehensiveness became the dependent variables in the subsequent analytical steps. The independent variables were entered in two hierarchical regressions with the following steps:

1. control variables;
2. team composition;
3. interaction of national diversity and geographical dispersion;
4. interactions of team composition with the internationalization of the organizational policies and team governance.

CHAPTER 5. RESULTS

The results are presented in Chapter five. In section 5.1, descriptive statistics and correlations for the variables of interest are provided. In section 5.2, the impact of control variables is discussed. In the subsequent sections 5.3. to 5.8, the results pertaining to specific hypotheses are introduced. Finally, supplementary analyses pertaining to within-nationality standardization and multicollinearity are shown in section 5.9. The direct effect of moderating variables is also discussed in that last section.

5.1. DESCRIPTIVE STATISTICS AND CORRELATIONS

Table 5.1 below provides the means, standard deviations, and correlations of the variables of interest. The values are reported for data that have been transformed to achieve the required levels for the aggregation indicators, but before within-nationality standardization. As explained in Chapter four and reported in appendices 4.1 and 4.2, ratings for a few individuals within a few GBTs were removed in order to obtain aggregation indicators $0 < R_{wg(j)} < 1$ for each variable and each GBT.

Table 5.1: Descriptive Statistics and Correlations

	Mean	s.d.	X1	X2	X3	X4	X5	X6
X1: National diversity	0.40	0.30						
X2: Geographical dispersion	0.38	0.32	0.60***					
X3: Internationalization	3.26	1.00	0.34***	0.21*				
X4: Team-based rewards	3.20	0.59	-0.02	0.01	-0.07			
X5: Face-to-face meetings	3.21	1.09	-0.53***	-0.68***	-0.19*	0.09		
X6: E-mail communication	4.62	0.45	-0.14	-0.23*	0.03	0.26**	0.31***	
X7: Team identity	3.85	0.56	-0.09	-0.15	-0.05	0.33***	0.23*	0.15
X8: Cogn. comprehensiveness	3.42	0.41	0.03	-0.07	0.06	0.21*	0.05	0.12
X9: Performance sponsor	3.94	0.77	-0.04	0.13	0.08	0.18	-0.08	0.17
X10: Performance leader	3.71	0.74	-0.03	-0.02	-0.07	0.34***	0.13	0.12
X11: Performance both	3.81	0.66	-0.03	0.05	-0.00	0.34***	0.07	0.21*
X12: Productivity sponsor	3.97	0.62	0.13	0.16	0.01	0.09	-0.22*	0.06
X13: Productivity leader	3.99	0.61	0.02	0.02	-0.12	0.29**	-0.02	0.11
X14: Productivity both	3.97	0.52	0.08	0.10	-0.06	0.23*	-0.13	0.11

* $p < 0.05$; ** $p < 0.01$; *** $p < 0.001$.

Table 5.1: Descriptive Statistics and Correlations (Continued)

	X7	X8	X9	X10	X11	X12	X13
X1: National diversity							
X2: Geographical dispersion							
X3: Internationalization							
X4: Team-based rewards							
X5: Face-to-face meetings							
X6: E-mail communication							
X7: Team identity							
X8: Cogn. Comprehensiveness	0.44***						
X9: Performance sponsor	0.03	0.03					
X10: Performance leader	0.08	0.04	0.37***				
X11: Performance both	0.05	0.02	0.85***	0.83***			
X12: Productivity sponsor	0.10	0.20*	0.51***	0.23*	0.39***		
X13: Productivity leader	0.00	0.14	0.25**	0.53***	0.47***	0.41***	
X14: Productivity both	0.05	0.21*	0.45***	0.44***	0.51***	0.84***	0.84***

* $p < 0.05$; ** $p < 0.01$; *** $p < 0.001$.

5.2. IMPACT OF CONTROLS

The coefficients for the control variables are considered when they are significant for both the regressions with raw and within-nationality standardized data. In the contrary instance, they are not discussed.

First, team identity is higher for GBTs from MNCs whose corporate headquarters are located in France and that operate in the consumer goods and services sectors. In addition, team size, task interdependence, and average age of members are negatively positively, and positively associated with GBT identity, respectively.

Second, the average education of members has a positive effect on GBT cognitive comprehensiveness. Finally, the performance of GBTs from MNCs operating in the technology and services sectors is lower. Regarding team-level factors, team size is negatively associated with GBT performance.

Some of these results provide valuable insight on the operations of GBTs. As expected, GBT size is negatively associated with GBT identity and GBT performance. This result is consistent with the findings of the literature (Smith et al., 1994; Summers, Coffelt, & Horton, 1988). As GBT size increases, the opportunity for interaction between members decreases and the likelihood of the formation of subgroups increases, resulting in lower team cohesiveness, integration, and performance.

In addition, the average age of members is found to be positively associated with GBT identity. Assuming that such theory applies to the team context, this result

is consistent with the literature on commitment (Meyer & Allen, 1997). With age, members tend to build emotional links that lead them to identify more with their GBT and comply with its objectives. There also exists increased financial incentives for members to remain with their GBT as well as associated costs if they leave.

Finally, the result concerning the impact of the average education of members on GBT cognitive comprehensiveness is interesting. Together with the non significance of the coefficients for education dispersion and functional heterogeneity, this finding supports the hypothesis that quality is more important than quantity within GBTs when it comes to explaining cognitive comprehensiveness. This is an important consideration, which has still received little conceptual and empirical examination in the literature (Miller et al., 1997; Simons et al., 1999).

5.3. IMPACT OF GBT PROCESS

As can be seen from the tables reporting the regressions for the antecedents of GBT performance, none of the hypotheses (1-2) pertaining to the impact of GBT process are supported. More specifically, the impact of GBT process is characterized as follows:

5.3.1. GBT Identity

Hypothesis 1 predicted that GBT identity would have a positive impact on GBT performance. As indicated in Table 5.4.c, there is no support for that hypothesis. For five of the six measures of GBT performance, the coefficient for GBT identity is

non significant. For one measure of GBT performance, productivity as perceived by the GBT leader, the regression coefficient for GBT identity is actually negative and significant ($b = -0.20$, $p < 0.05$).

5.3.2. GBT Cognitive Comprehensiveness

Hypothesis 2 predicted that GBT cognitive comprehensiveness would have a positive impact on GBT performance. As indicated in Table 5.4.c, there is no support for that hypothesis. For all six measures of GBT performance, the regression coefficients for GBT cognitive comprehensiveness are non significant.

5.4. IMPACT OF NATIONAL DIVERSITY

As can be seen from the tables reporting the regressions for the antecedents of GBT identity and GBT cognitive comprehensiveness, none of the hypotheses (3-4) pertaining to the impact of national diversity are supported. More specifically, the impact of national diversity is characterized as follows:

5.4.1. GBT Identity

Hypothesis 3 predicted that national diversity would have a negative effect on GBT identity. As indicated in equation 2 of Table 5.2, there is no support for this hypothesis ($b = -0.01$, non significant).

5.4.2. GBT Cognitive Comprehensiveness

Hypothesis 4 predicted that national diversity would have a positive effect on GBT cognitive comprehensiveness. As indicated in equation 2 of Table 5.3, there is no support for this hypothesis (b = 0.09, non significant).

5.5. IMPACT OF GEOGRAPHICAL DISPERSION

As can be seen from the tables reporting the regressions for the antecedents of GBT identity and GBT cognitive comprehensiveness none of the posited hypotheses (5-6) pertaining to the impact of geographical dispersion are supported. More specifically, the impact of geographical dispersion is characterized as follows:

5.5.1. GBT Identity

Hypothesis 5 predicted that geographical dispersion would have a negative effect on GBT identity. As indicated in equation 2 of Table 5.2, there is no support for this hypothesis (b = -0.00, non significant).

5.5.2. GBT Cognitive Comprehensiveness

Hypothesis 6 predicted that geographical dispersion would have a positive effect on GBT cognitive comprehensiveness. As indicated in equation 2 of Table 5.3, there is no support for this hypothesis (b = -0.01, non significant).

5.6. INTERACTION OF NATIONAL DIVERSITY AND GEOGRAPHICAL DISPERSION

As can be seen from the tables reporting the regressions for the antecedents of GBT identity and GBT cognitive comprehensiveness, none of the hypotheses (7-8) pertaining to the impact of the interaction between national diversity and geographical dispersion are supported. More specifically, the interactions between national diversity and geographical dispersion are characterized as follows:

5.6.1. GBT Identity

Hypothesis 7 predicted that national diversity and geographical dispersion would form a negative interaction to explain GBT identity. As indicated in equation 3, Table 5.2, there is no support for this hypothesis (b = 0.06, non significant).

5.6.2. GBT Cognitive Comprehensiveness

Hypothesis 8 predicted that national diversity and geographical dispersion would form a positive interaction to explain GBT cognitive comprehensiveness. As indicated in equation 3, Table 5.3, there is no support for this hypothesis (b = 0.09, non significant).

5.7. MODERATING INFLUENCE OF ORGANIZATIONAL POLICIES

As can be seen from the tables reporting the regressions for the antecedents of GBT identity and GBT cognitive comprehensiveness, none of the posited hypotheses (9-10) pertaining to the moderating influence of organizational policies on the relationship between GBT composition and GBT identity and GBT cognitive comprehensiveness are supported. More specifically, the results indicate that the impact of organizational policies is characterized a follows:

5.7.1. GBT Identity

Hypothesis 9 predicted that organizational policies would moderate the relationship between GBT composition and GBT identity. As indicated in equation 5 of Table 5.2, there is no support for this hypothesis. Both coefficients for the interaction terms of internationalization with national diversity and geographical dispersion are non significant.

5.7.2. GBT Cognitive Comprehensiveness

Hypothesis 10 predicted that organizational policies would moderate the relationship between GBT composition and GBT cognitive comprehensiveness. As indicated in equation 5 of Table 5.3, there is no support for this hypothesis. Both the coefficients for the interaction terms of internationalization with national diversity and geographical dispersion are non significant.

5.8. MODERATING INFLUENCE OF GBT GOVERNANCE

As can be seen from the tables reporting the regressions for the antecedents of GBT identity and GBT cognitive comprehensiveness, there is some support for hypothesis 12 regarding to the moderating influence of GBT governance on the relationship between GBT composition and GBT cognitive comprehensiveness, but no support for hypothesis 11 in which GBT identity as the dependent variable. More specifically, the impact of GBT governance is characterized a follows:

5.8.1. GBT Identity

Hypothesis 11 predicted that GBT governance would moderate the relationship between GBT composition and GBT identity. As indicated in equation 5 of Table 5.2, there is no support for this hypothesis, as none of the coefficients for the interaction terms of GBT governance with national diversity and geographical dispersion are significant.

5.8.2. GBT Cognitive Comprehensiveness

Hypothesis 12 predicted that GBT governance would moderate the relationship between GBT composition and GBT cognitive comprehensiveness. As indicated in equation 5 of Table 5.3, there is some support for this hypothesis. The coefficient for the interaction between geographical dispersion and team-based rewards is found to be positive and significant ($b = 0.29$, $p < 0.05$). The coefficients

for the other interaction terms of team governance with national diversity and geographical dispersion are non significant.

Table 5.2: Antecedents of GBT Identity

	Dependent Variable: GBT Identity				
	Eq. 1	Eq. 2	Eq. 3	Eq. 4	Eq. 5
Constant	-0.35+	-0.34	-0.40	-0.33	-0.52+
Control variables					
Organizational size	-0.12	-0.11	-0.12	-0.13	-0.16+
% international sales	0.00	0.00	0.02	-0.02	-0.01
France	0.37+	0.36	0.39+	0.24	0.42
Japan	-0.46+	-0.47	-0.43	-0.41	-0.44
Mexico	0.58+	0.56+	0.59+	0.50	0.71+
Consumer goods	0.74*	0.74*	0.74*	0.84*	0.76+
Technology	-0.15	-0.16	-0.16	-0.03	0.05
Services	0.73**	0.72*	0.75*	0.73*	0.68*
Team longevity	0.08	0.08	0.08	0.07	0.10
Team size	-0.19*	-0.19*	-0.20*	-0.19*	-0.20*
Task interdependence	0.16+	0.16+	0.17+	0.12	0.14
Average age	0.20*	0.20+	0.21*	0.19+	0.22*
Age dispersion	-0.06	-0.06	-0.07	-0.09	-0.08
Average education	-0.08	-0.08	-0.07	-0.07	-0.07
Education dispersion	0.14+	0.14+	0.14+	0.14+	0.11
Functional heterogeneity	0.09	0.09	0.11	0.06	0.05
Independent variables					
National diversity		-0.01	0.00	0.03	0.05
Geographical dispersion		-0.00	-0.00	0.10	0.08
Internationalization				-0.00	-0.04
Team-based rewards				0.16+	0.16+
Face-to-face meetings				0.23+	0.19
E-mail communication				-0.13	-0.13
Interaction terms					
Nationality * geography			0.06		
Nationality * intl.					0.07
Nationality * rewards					-0.18
Nationality * meetings					0.05
Nationality * e-mail					-0.02
Geography * intl.					-0.03
Geography * rewards					0.20
Geography * meetings					-0.09
Geography * e-mail					0.06

R^2	0.32	0.32	0.33	0.37	0.40
d.f.	16, 87	18, 85	19, 84	22, 81	30, 73
F	2.59**	2.25**	2.13**	2.14**	1.62*
R^2 change		0.00	0.00	0.04	0.03
d.f.		2, 85	1, 84	6, 81	8, 73
F change		0.00	0.22	0.94	0.50

+ $p < 0.10$; * $p < 0.05$; ** $p < 0.01$; *** $p < 0.001$. T-tests are for one-tail significance level.

Table 5.3: Antecedents of GBT Cognitive Comprehensiveness

	Dependent Variable: GBT Cognitive Comprehensiveness				
	Eq. 1	Eq. 2	Eq. 3	Eq. 4	Eq. 5
Constant	-0.19	-0.27	-0.36	-0.35	-0.61*
Control variables					
Organizational size	-0.15+	-0.15+	-0.17+	-0.20*	-0.25*
% international sales	-0.04	-0.06	-0.03	-0.08	-0.05
France	-0.08	-0.03	0.01	-0.04	-0.16
Japan	-0.04	0.05	0.11	0.42	0.65+
Mexico	0.26	0.38	0.43	0.46	0.88*
Consumer goods	0.93*	0.93*	0.91*	0.80*	0.46
Technology	0.21	0.25	0.24	0.41	0.46+
Services	0.38	0.40	0.45	0.38	0.34
Team longevity	0.10	0.10	0.12	0.08	0.13
Team size	-0.19*	-0.20*	-0.21*	-0.21*	-0.20*
Task interdependence	0.08	0.09	0.10	0.05	0.11
Average age	0.12	0.13	0.14	0.16	0.21*
Age dispersion	0.09	0.10	0.09	0.09	0.04
Average education	0.31**	0.30**	0.32**	0.38***	0.41***
Education dispersion	0.08	0.08	0.09	0.08	0.09
Functional heterogeneity	0.08	0.13	0.11	0.02	0.03
Independent variables					
National diversity		0.09	0.11	0.11	0.17
Geographical dispersion		-0.01	-0.00	0.02	0.03
Internationalization				0.20*	0.26**
Team-based rewards				0.22*	0.22*
Face-to-face meetings				0.14	0.10
E-mail communication				-0.11	-0.22*
Interaction terms					
Nationality * geography			0.09		
Nationality * intl.					0.10
Nationality * rewards					0.01
Nationality * meetings					-0.10
Nationality * e-mail					0.13
Geography * intl.					-0.04
Geography * rewards					0.29*
Geography * meetings					-0.06
Geography * e-mail					0.08

R^2	0.31	0.32	0.32	0.38	0.46
d.f.	16, 87	18, 85	19, 84	22, 81	30, 73
F	2.49**	2.21**	2.11**	2.27**	2.09**
R^2 change		0.01	0.00	0.07	0.11
d.f.		2, 85	1, 84	6, 81	8, 73
F change		0.29	0.53	1.47	1.37

+ $p < 0.10$; * $p < 0.05$; ** $p < 0.01$; *** $p < 0.001$. T-tests are for one-tail significance level.

Table 5.4.a: Effect of Control Variables on GBT Performance

	Satisfaction w/ Performance			Perception of Productivity		
	Sponsor	Leader	Both	Sponsor	Leader	Both
Constant	0.28	0.58*	0.46*	0.47+	0.64**	0.66**
Control variables						
Organizational size	0.11	-0.06	0.03	0.17+	-0.06	0.06
% international sales	-0.20+	-0.02	-0.14	-0.01	-0.09	-0.05
France	0.07	-0.10	0.04	-0.44+	-0.40+	-0.53*
Japan	-0.41	-0.98**	-0.88**	-0.40	-0.98**	-0.83*
Mexico	-0.49	-0.37	-0.45	-0.37	-0.39	-0.44
Consumer goods	0.13	-0.25	0.02	-0.42	-0.20	-0.37
Technology	-0.08	-0.75**	-0.47+	-0.53+	-0.53+	-0.61*
Services	-0.74*	-1.04***	-1.06***	-0.32	-0.91**	-0.68*
Team longevity	0.03	-0.04	-0.03	0.14	0.02	0.10
Team size	-0.30**	-0.20*	-0.25**	-0.08	-0.08	-0.09
Task interdependence	-0.04	0.17+	0.10	0.03	0.23*	0.17+
Average age	-0.16	0.03	-0.07	0.01	-0.01	0.02
Age dispersion	0.23*	-0.03	0.05	0.04	0.06	0.07
Average education	0.04	-0.08	-0.09	0.19+	0.02	0.12
Education dispersion	0.09	-0.09	0.06	0.10	0.13+	0.14+
Funct. heterogeneity	-0.01	-0.15	-0.08	-0.16	-0.20+	-0.21*
R^2	0.22	0.27	0.24	0.17	0.25	0.21
d.f.	16, 85	16, 87	16, 87	16, 87	16, 86	16, 87
F	1.48	1.98*	1.71	1.14	1.76*	1.48

+ $p < 0.10$; * $p < 0.05$; ** $p < 0.01$; *** $p < 0.001$. T-tests are for one-tail significance level.

Table 5.4.b: Effect of GBT Composition on GBT Performance

	Satisfaction w/ Performance			Perception of Productivity		
	Sponsor	Leader	Both	Sponsor	Leader	Both
Constant	0.30	0.61*	0.48+	0.36	0.60*	0.58*
Control variables						
Organizational size	0.13	-0.05	0.03	0.16+	-0.07	0.05
% international sales	-0.13	-0.02	-0.12	0.00	-0.10	-0.05
France	0.02	-0.12	0.01	-0.38	-0.37	-0.47+
Japan	-0.55+	-1.01**	-0.97**	-0.37	-0.93**	-0.78*
Mexico	-0.47	-0.43	-0.48	-0.16	-0.32	-0.29
Consumer goods	0.13	-0.25	0.03	-0.40	-0.20	-0.36
Technology	-0.11	-0.70**	-0.48+	-0.46+	-0.51+	-0.56+
Services	-0.62*	-1.07**	-1.01**	-0.19	-0.89**	-0.60*
Team longevity	0.07	-0.04	-0.01	0.16+	0.02	0.11
Team size	-0.30**	-0.19*	-0.25**	-0.10	-0.09	-0.10
Task interdependence	-0.05	0.16+	0.09	0.04	0.24*	0.18+
Average age	-0.22*	0.03	-0.10	-0.00	-0.00	-0.00
Age dispersion	0.21*	-0.03	0.05	0.03	0.06	0.07
Average education	0.04	-0.08	-0.09	0.18+	0.02	0.12
Education dispersion	0.08	-0.01	0.06	0.09	0.13+	0.13
Funct. heterogeneity	0.05	-0.16	-0.06	-0.12	-0.20+	-0.19+
GBT composition						
National diversity	-0.28*	-0.02	-0.13	-0.03	0.04	0.02
Geog. dispersion	0.24*	-0.02	0.10	0.14	0.00	0.07
R^2	0.26	0.27	0.25	0.18	0.25	0.22
d.f.	18, 83	18, 85	18, 85	18, 85	18, 84	18, 85
F	1.58	1.73*	1.55	1.06	1.54	1.32
R^2 change	0.04	0.00	0.01	0.01	0.00	0.00
d.f.	2, 83	2, 85	2, 85	2, 85	2, 84	2, 85
F change	2.04	0.04	0.45	0.55	0.07	0.22

+ $p < 0.10$; * $p < 0.05$; ** $p < 0.01$; *** $p < 0.001$. T-tests are for one-tail significance level.

Table 5.4.c: Effect of GBT Composition and Emergent Processes on GBT Performance

	Satisfaction w/ Performance			Perception of Productivity		
	Sponsor	Leader	Both	Sponsor	Leader	Both
Constant	0.31	0.59*	0.47+	0.40	0.56*	0.57*
Control variables						
Organizational size	0.13	-0.06	0.03	0.18+	-0.07	0.06
% international sales	-0.13	-0.02	-0.12	0.01	-0.09	-0.04
France	-0.00	-0.09	0.02	-0.39	-0.29	-0.43+
Japan	-0.52+	-1.05**	-0.99**	-0.35	-1.03**	-0.84*
Mexico	-0.49	-0.39	-0.45	-0.23	-0.25	-0.28
Consumer goods	0.13	-0.20	0.08	-0.54	-0.16	-0.41
Technology	-0.09	-0.79*	-0.48+	-0.49	-0.56+	-0.61*
Services	-0.65*	-1.01**	-0.97**	-0.26	-0.79*	-0.58+
Team longevity	0.07	-0.04	-0.01	0.14	0.03	0.10
Team size	-0.30**	-0.20*	-0.26***	-0.07	-0.10	-0.09
Task interdependence	-0.06	0.18+	0.10	0.03	0.26*	0.19+
Average age	-0.23*	0.05	-0.09	-0.03	0.02	0.00
Age dispersion	0.22*	-0.03	0.04	0.02	0.04	0.05
Average education	0.06	-0.09	-0.08	0.14	-0.04	0.06
Education dispersion	0.07	0.00	0.06	0.08	0.15+	0.14+
Funct. heterogeneity	0.05	-0.16	-0.05	-0.13	-0.19+	-0.19+
GBT composition						
National diversity	-0.27*	-0.02	-0.13	-0.04	0.03	0.01
Geog. dispersion	0.24*	-0.02	0.09	0.15	0.00	0.07
GBT process						
Team identity	0.06	-0.08	-0.04	0.04	-0.20*	-0.11
Comprehensiveness	-0.04	0.01	-0.01	0.12	0.12	0.14
R^2	0.26	0.27	0.25	0.20	0.27	0.23
d.f.	20, 81	20, 83	20, 83	20, 83	20, 82	20, 83
F	1.40	1.55	1.38	1.02	1.54	1.25
R^2 change	0.00	0.00	0.00	0.01	0.03	0.01
d.f.	2, 81	2, 83	2, 83	2, 83	2, 82	2, 83
F change	0.13	0.24	0.08	0.65	1.46	0.76

+ $p < 0.10$; * $p < 0.05$; ** $p < 0.01$; *** $p < 0.001$. T-tests are for one-tail significance level.

5.9. SUPPEMENTARY ANALYSES

These findings are complemented by the analyses presented below. First, the regressions run with within-nationality standardized data are reported, which are generally consistent. In addition, analyses are provided with the interaction terms pertaining to national diversity and geographical dispersion entered one at a time for GBT identity and GBT cognitive comprehensiveness as the dependent variables in order to clarify the issue of multicollinearity. Again, these results are broadly consistent with the initial findings. Finally, the direct effects of the moderating variables of organizational policies and GBT governance on GBT process are commented upon.

5.9.1. Within-nationality Standardized Data

The results of the regressions using within-nationality standardized data are presented in Appendix 5.1. Table 5.5 below summarizes the similarities and differences between the two sets of analyses.

By and large, the results of the regressions for the two data sets are consistent. The only difference is that the coefficient for the interaction between geographical dispersion and team-based rewards in the equation for GBT cognitive comprehensiveness is non significant when using within-nationality standardized data, thus weakening the support for hypothesis 12.

Table 5.5: Regressions using Raw and Within-nationality Standardized Data

	GBT Identity		GBT Comprehensiveness		GBT Performance		GBT Productivity	
	Raw	Standard	Raw	Standard	Raw	Standard	Raw	Standard
National diversity	-0.01	0.05	0.09	0.01	No	No	No	No
Geographical dispersion	-0.00	-0.04	-0.01	0.06	No	No	No	No
Nationality * geography	0.06	0.06	0.09	0.14				
Nationality * intl.	0.07	0.07	0.10	0.06				
Nationality * rewards	-0.18	-0.15	0.01	0.31				
Nationality * meetings	0.05	-0.10	-0.10	-0.00				
Nationality * e-mail	-0.02	0.32	0.13	0.21				
Geography * intl.	-0.03	-0.04	-0.04	-0.07				
Geography * rewards	0.20	0.11	0.29*	0.17				
Geography * meetings	-0.09	-0.00	-0.06	-0.00				
Geography * e-mail	0.06	-0.02	0.08	0.09				
Identity					No	No	No	No
Comprehensiveness					No	No	No	No

5.9.2. Multicollinearity

Multicollinearity can be a challenging issue when testing for interactions. The values computed for the various indicators – Variance Inflation Factors (VIFs) and Condition Indexes (CIs) – indicate that the level of multicollinearity is actually moderate for the regressions considered (Cohen et al., 2003). In this case, the advice is to examine the regressions for the interaction terms entered one at a time, as multicollinearity can still be present.

Table 5.6 below shows the results when the interaction terms are entered all at the same time or separately – the reported coefficients are based on the regressions that use raw data. By and large, the results are consistent between the two approaches.

There is one important difference between the two approaches. When entered individually, the interaction terms with e-mail communication have coefficients that are significant and positive in the regression with GBT cognitive comprehensiveness as the dependent variable. This result provides additional support to hypothesis 12 and implies a slightly different view of team communication from what has generally be assumed.

In much of the literature (Adler, 1997; DiStephano & Maznevski, 2000; Earley & Mosakovski, 2000; Maznevski & Chudoba, 2000), it is proposed that face-to-face interaction is critical for nationally diverse and geographically dispersed GBTs, especially in the early stages of their life cycle. Consistent with several other GBT studies, the findings concerning the moderating effect suggest that maintaining frequent e-mail communication is an attribute of successful GBTs and that processes

of global virtual teams can be established swiftly (Jarvenpaa et al., 1998; Kayworth & Leidner, 2001).

Table 5.6.a: Effect of Interactions all at the Same Time or Separately: GBT Identity

	Dependent Variable: GBT Identity								
	Eq. 1	Eq. 2	Eq. 3	Eq. 4	Eq. 5	Eq. 6	Eq. 7	Eq. 8	Eq. 9
Constant	-0.40	-0.33	-0.32	-0.32	-0.35	-0.38	-0.31	-0.30	-0.52+
Control variables									
Organizational size	-0.15+	-0.13	-0.13	-0.13	-0.13	-0.14	-0.13	-0.14	-0.16+
% international sales	-0.02	-0.03	-0.02	-0.03	-0.02	-0.01	-0.03	-0.03	-0.01
France	0.30	0.27	0.24	0.24	0.26	0.26	0.23	0.24	0.42
Japan	-0.34	-0.35	-0.42	-0.41	-0.38	-0.37	-0.42	-0.45	-0.44
Mexico	0.53	0.44	0.50	0.50	0.51	0.65	0.49	0.50	0.71+
Consumer goods	0.89*	0.88*	0.85*	0.84*	0.85*	0.76+	0.85*	0.78*	0.76+
Technology	0.01	-0.04	-0.03	-0.03	-0.01	0.02	-0.02	-0.06	0.05
Services	0.76*	0.69*	0.73*	0.72*	0.75*	0.73*	0.72*	0.67*	0.68*
Team longevity	0.08	0.06	0.07	0.07	0.07	0.11	0.07	0.06	0.10
Team size	-0.19*	-0.19*	-0.19*	-0.19*	-0.19*	-0.20*	-0.19*	-0.19*	-0.20*
Task interdependence	0.12	0.11	0.12	0.12	0.12	0.14	0.12	0.13	0.14
Average age	0.19+	0.18+	0.18+	0.18+	0.19+	0.20+	0.18+	0.18+	0.22*
Age dispersion	-0.09	-0.07	-0.09	-0.09	-0.08	-0.10	-0.09	-0.09	-0.08
Average education	-0.07	-0.07	-0.09	-0.07	-0.06	-0.07	-0.08	-0.09	-0.07
Education dispersion	0.15+	0.12	0.14+	0.14+	0.14+	0.14+	0.14+	0.14	0.11
Function heterogeneity	0.07	0.04	0.06	0.06	0.06	0.07	0.06	0.03	0.05
Independent variables									
National diversity	0.03	0.03	0.03	0.03	0.03	0.04	0.03	0.04	0.05
Geographic dispersion	0.09	0.08	0.10	0.10	0.10	0.11	0.09	0.09	0.08
Internationalization	0.01	0.01	-0.00	-0.00	0.05	0.00	-0.00	0.01	-0.04
Team-based rewards	0.16+	0.16+	0.16+	0.16+	0.16+	0.17+	0.16+	0.15+	0.16+

Face-to-face meetings	0.21+	0.23+	0.23+	0.23+	0.22+	0.22+	0.23+	0.23+	0.19
E-mail communication	-0.13	-0.10	-0.13	-0.13	-0.13	-0.17+	-0.14	-0.15+	-0.13
Interaction terms									
Nationality * intl.	0.05								0.07
Nationality * rewards		-0.10							-0.18
Nationality * meetings			0.01						0.05
Nationality * e-mail				0.01					-0.02
Geography * intl.					0.03				-0.03
Geography * rewards						0.13			0.20
Geography * meetings							0.01		-0.09
Geography * e-mail								0.09	0.06
R^2	0.37	0.37	0.37	0.37	0.37	0.38	0.37	0.38	0.40
d.f.	23, 80	23, 80	23, 80	23, 80	23, 80	23, 80	23, 80	23, 80	30, 73
F	2.03**	2.07**	2.02**	2.02**	2.02**	2.11**	2.02**	2.09**	1.62*
R^2 change	0.00	0.00	0.00	0.00	0.00	0.01	0.00	0.01	0.03
d.f.	1, 80	1, 80	1, 80	1, 80	1, 80	1, 80	1, 80	1, 80	8, 73
F change	0.26	0.41	0.00	0.01	0.10	1.33	0.01	1.00	0.50

+ $p < 0.10$; * $p < 0.05$; ** $p < 0.01$; *** $p < 0.001$. T-tests are for one-tail significance level.

Table 5.6.b: Effect of Interactions all at the Same Time or Separately: GBT Cognitive Comprehensiveness

	Dependent Variable: GBT Cognitive Comprehensiveness								
	Eq. 1	Eq. 2	Eq. 3	Eq. 4	Eq. 5	Eq. 6	Eq. 7	Eq. 8	Eq. 9
Constant	-0.45+	-0.36	-0.38	-0.26	-0.40+	-0.47*	-0.26	-0.28	-0.61*
Control variables									
Organizational size	-0.21*	-0.20*	-0.19*	-0.21*	-0.19*	-0.21*	-0.20*	-0.21*	-0.25*
% international sales	-0.08	-0.07	-0.07	-0.12	-0.08	-0.06	-0.10	-0.09	-0.05
France	0.04	-0.07	-0.02	-0.06	-0.01	0.01	-0.10	-0.04	0.16
Japan	0.52	0.35	0.44	0.38	0.49	0.51	0.34	0.35	0.65+
Mexico	0.51	0.53	0.48	0.36	0.48	0.80*	0.38	0.46	0.88*
Consumer goods	0.87*	0.77*	0.77*	0.79*	0.83*	0.61+	0.88*	0.68+	0.46
Technology	0.46+	0.43	0.41	0.35	0.44	0.53*	0.42	0.34	0.46+
Services	0.43	0.42	0.40	0.28	0.42	0.38	0.35	0.27	0.34
GBT longevity	0.08	0.10	0.08	0.04	0.07	0.17+	0.08	0.06	0.13
GBT size	-0.21*	-0.21*	-0.21*	-0.18*	-0.21*	-0.23**	-0.21*	-0.20*	-0.20*
Task interdependence	0.06	0.05	0.05	0.05	0.06	0.09	0.06	0.08	0.11
Average age	0.17+	0.16	0.16	0.15	0.16	0.20*	0.16	0.16	0.21*
Age dispersion	0.09	0.08	0.09	0.07	0.10	0.06	0.09	0.08	0.04
Average education	0.38***	0.38***	0.39**	0.38**	0.40**	0.38***	0.35**	0.35***	0.41***
Education dispersion	0.09	0.11	0.09	0.08	0.10	0.09	0.09	0.08	0.09
Function heterogeneity	0.04	0.03	0.02	-0.01	0.03	0.04	0.01	-0.03	0.03
Independent variables									
National diversity	0.11	0.11	0.12	0.11	0.10	0.14	0.12	0.14	0.17
Geographic dispersion	0.00	0.03	0.01	0.03	0.2	0.04	0.01	0.01	0.03
Internationalization	0.21*	0.19*	0.20*	0.21*	0.21*	0.21*	0.19*	0.23*	0.26**
Team-based rewards	0.21*	0.22*	0.22*	0.19*	0.22*	0.24*	0.21*	0.19*	0.22*

Face-to-face meetings	0.11	0.13	0.13	0.17	0.13	0.11	0.14	0.15	0.10
E-mail communication	-0.11	-0.15	-0.11	-0.15+	-0.10	-0.19*	-0.13	-0.16+	-0.22*
Interaction terms									
Nationality * intl.	0.08								0.10
Nationality * rewards		0.10							0.01
Nationality * meetings			-0.02						-0.10
Nationality * e-mail				0.13+					0.13
Geography * intl.					-0.07				-0.04
Geography * rewards						0.30**			0.29*
Geography * meetings							0.09		-0.06
Geography * e-mail								0.19*	0.08
R^2	0.39	0.39	0.38	0.39	0.39	0.43	0.39	0.42	0.46
d.f.	23, 80	23, 80	23, 80	23, 80	23, 80	23, 80	23, 80	23, 80	30, 73
F	2.19**	2.20**	2.15**	2.26**	2.18**	2.66**	2.18**	2.48**	2.09**
R^2 change	0.00	0.01	0.00	0.01	0.00	0.05	0.00	0.03	0.11
d.f.	1, 80	1, 80	1, 80	1, 80	1, 80	1, 80	1, 80	1, 80	8, 73
F change	0.57	0.81	0.04	2.26	0.44	7.34**	0.42	4.70*	1.37

+ $p < 0.10$; * $p < 0.05$; ** $p < 0.01$; *** $p < 0.001$. T-tests are for one-tail significance level.

5.9.3. Direct Effect of Moderating Variables

Impact of organizational policies. As indicated in equation 4 of Table 5.3, the coefficient for internationalization in the regression with GBT cognitive comprehensiveness as the dependent variable is positive and significant ($b = 0.20$, $p < 0.05$). Along with recent research emphasizing the importance of the organizational context (e.g., Cummings, 2003), this result shows that the perception of international fairness induces a willingness to share resources from GBT members. This finding is consistent with procedural justice research in the MNC context (Johnson et. al., 2002; Kim & Mauborgne, 1993, 1991) and would indicate that results in this area can generalize to team outcomes and to cognitive as well as social processes.

Impact of GBT governance. As indicated in equation 4 of Table 5.2, the regression coefficient for team-based rewards is positive and marginally significant for GBT identity ($b = 0.16$, $p < 0.10$). These results are consistent with the argument that extrinsic motivation is important for the emergence of positive social outcomes for GBTs (DeMatteo et al. 1998; Jarvenpaa & Leidner, 1999).

As indicated in equation 4 of Table 5.3, the regression coefficient for team-based rewards is positive and significant for GBT cognitive comprehensiveness ($b = 0.22$, $p < 0.05$). This result is consistent with findings from prior research indicating that extrinsic motivation is important to free up members' resources in order to further GBT cognitive comprehensiveness (Kayworth & Leidner, 2001).

As indicated in equation 4 of Table 5.2, the regression coefficient for frequency of face-to-face meetings is positive and marginally significant for GBT identity ($b = 0.23$, $p < 0.10$). This result underscores the importance of face-to-face interaction for the emergence of positive social outcomes for GBTs (Maznevski & Chudoba, 2000). However, as indicated in equation 4 of Table 5.3, the frequency of face-to-face meetings has no direct effect on GBT cognitive comprehensiveness ($b = 0.14$, non significant).

As indicated in equation 4 of Table 5.2 and in equation 4 of Table 5.3, the frequency of e-mail communication has no direct effect on either GBT identity or GBT cognitive comprehensiveness ($b = -0.13$, non significant. $b = -0.11$, non significant, respectively).

CHAPTER 6. DISCUSSION AND INTERPRETATION

By and large, there was little empirical support for the hypotheses associated with the intervening process model of GBT performance. Further analyses and a post hoc model are therefore proposed in Chapter 6 to interpret this lack of significant results.

There were two major issues encountered in testing the intervening process model of GBT performance: 1) relationships between GBT process and GBT performance; and, 2) relationship between GBT composition and GBT process. These two points are developed in section 6.1. In addition, a post hoc model of GBT performance is proposed in section 6.2, which is grounded in the theory on team governance reviewed in Chapter 2 and builds on the results described in Chapter 5.

6.1. ALTERNATIVE MEASURES OF PERFORMANCE

In the analyses, sponsors' and leaders' ratings were utilized as measures of GBT performance. The main advantage of using these measures is to fend the risk of common-method variance off. There are also disadvantages, including social desirability and unreliability of the responses of these particular informants. As emphasized in the literature, senior managers sometimes paint a rosier picture than actual of a business situation for self-serving attributions and attempts to influence the impressions of external stakeholders (Clapham & Schwenk, 1991).

In addition, several of the sponsors also indicated that their evaluations were unreliable as the GBTs operated quite autonomously, whereby sponsors had insufficient information to form their judgment on their performance.

Finally, leaders should be the best informed on GBT performance. Nonetheless, because the GBT charter is multi-country, leaders sometimes lacked information on some components of GBT performance and productivity. For example, it was a possible occurrence that leaders were located at the MNC headquarters and had visibility only on GBT performance data for the headquarters' region, but not for the entire world.

Performance data were also collected from GBT members. Advantages of these data is that members have first-hand experience of their GBT and that responses from several informants increase reliability. The main threats when using members' evaluation of GBT performance are social desirability and common-method variance.

To address these concerns with members' ratings of GBT performance, two tests were conducted. First, t-tests revealed that the average of members' evaluations of GBT performance were significantly lower than those of the sponsors and the leaders, thus alleviating the risk of social desirability bias associated with their responses. Second, a Harman one factor test design confirmed that the members' ratings of GBT performance together with the independent variables loaded on the expected variables, thus indicating an acceptable level of common-method variance.

The correlations between the evaluations of the sponsor, leader, and members indicated in Table 6.1 help understand the differences between the various performance measures. These correlations, while significant, are only moderate, and

indicate that the satisfaction with GBT performance and the perception of GBT productivity by the sponsor, the leader, and the members differ to some extant.

There are several potential reasons for these differences, both conceptual and measurement-based. Some of these reasons have been discussed above, but given the specificity of GBTs, future research appears warranted to study them specifically and examine what is the best approach to measure GBT performance.

Table 6.1.a. Correlations of Satisfaction with GBT Performance

	Sponsor	**Leader**
Sponsor		
Leader	0.37***	
Members	0.22*	0.26*

Table 6.1.b. Correlations of Perception of GBT Productivity

	Sponsor	**Leader**
Sponsor		
Leader	0.41***	
Members	0.27*	0.33*

Regressions were run using members' ratings. The coefficients for GBT identity and GBT cognitive comprehensiveness are positive and significant (satisfaction with GBT performance: $b_{identity} = 0.47$, $p < 0.001$. $b_{comprehensiveness} = 0.17$, $p < 0.05$. Perception of GBT productivity: $b_{identity} = 0.37$, $p < 0.001$. $b_{comprehensiveness} = 0.17$, $p < 0.10$).

The coefficients for national diversity and geographical dispersion remain non significant (satisfaction with GBT performance: $b_{nationality} = 0.00$, n.s., $b_{geography} = 0.01$, n.s. Perception of GT productivity: $b_{nationality} = -0.08$, n.s., $b_{geography} = 0.07$, n.s.).

Given the methodological caveats discussed above, these results indicate that national diversity and geographical dispersion have no effect, direct or indirect, on GBT performance. These results also provide some support for a positive relationship of GBT identity and GBT cognitive comprehensiveness with GBT performance.

6.2. POST HOC MODEL

As discussed above, the empirical findings described in Chapter 5 cast doubt on the validity of the theory developed in Chapter 3. This theory, together with much of prior GBT research, focused on understanding the impact of national diversity and geographical dispersion on GBT process and performance (Cramton, 2001; Earley & Mosakowski, 2000; Hambrick et al., 1998). This approach was justified given the salience of these two heterogeneity variables within GBTs and the emphasis placed in the literature on composition variables to explain team outcomes (Maznevski & Chudoba, 2000; Milliken & Martins, 1996; Shapiro et al., 2002; Williams & O'Reilly, 1998).

As reviewed in the section on team governance in Chapter two, alternative models of GBT performance have been also proposed. One that is gaining support from various studies links GBT governance to GBT process and performance (Jarvenpaa et al., 1998; Jarvenpaa & Leidner, 1999; Montoya-Weiss et al., 2001). This approach is fruitful because classical theories from the general literature on teams can be used (Cohen & Bailey, 1997; Guzzo & Shea, 1992). At the same time,

the dimensions of team governance that are specific to GBTs have to be identified (Montoya-Weiss et al., 2001; Van Glinow et al., 2004).

The results presented in paragraph 5.9.3 appear consistent with an emphasis on GBT governance as primary drivers of GBT process and performance. As described in that section, team-based rewards were found to have a positive and significant impact on both GBT identity and GBT cognitive comprehensiveness. The frequency of face-to-face meetings had a positive and significant impact only on GBT identity.

These results, together with several recent GBT studies and team governance theory (e.g., DeMatteo et al., 1998), suggest the interest of examining a model of GBT performance with governance mechanisms as independent variables and national diversity and geographical dispersion as moderators. In this post hoc model, governance mechanisms are posited to have a direct effect on GBT process (Gist et al., 1987). At the same time, the moderating influences of national diversity and geographical dispersion are incorporated in order to reflect the differentiated impact of the various governance mechanisms in the GBT context (Montoya-Weiss et al., 2001). These arguments lead to the following hypotheses:

> **Hypothesis a:** GBT governance – team-based rewards and team communication – has a positive effect on GBT identity.

> **Hypothesis b:** GBT governance – team-based rewards and team communication – has a positive effect on GBT cognitive comprehensiveness.

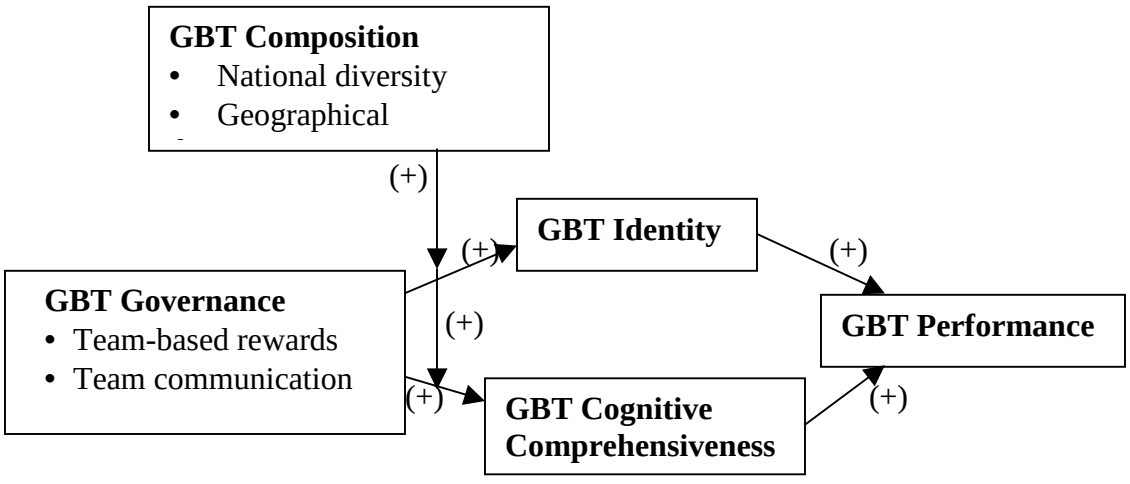
> **Hypothesis c:** The relationship of GBT governance and GBT process is moderated by national diversity. That is, the positive effect of GBT

governance on GBT process is magnified at a high level of national diversity.

Hypothesis d: The relationship of GBT governance and GBT process is moderated by geographical dispersion. That is, the positive effect of GBT governance on GBT process is magnified at a high level of geographical dispersion.

This post hoc model helps untie one of the apparent paradoxes associated with GBT diversity, as suggested by the literature (Steiner, 1972; Williams & O'Reilly, 1998). It implies that all types of GBTs can achieve a high level of cohesiveness and cognitive comprehensiveness simultaneously. The challenge is to use the appropriate balance of governance mechanisms depending on the level of national diversity and geographical dispersion. The post hoc model is depicted graphically on Figure 6.1 and the results of the regressions are reported in Tables 6.2, 6.3, 6.4, and 6.5.

Figure 6.1: Post Hoc Model of GBT performance



There is broad empirical support for the model. First, and as indicated in equations 2, 3, 5, and 6 of Table 6.4a, team-based rewards have a positive effect on GBT performance that is partially mediated by GBT identity and GBT cognitive comprehensiveness.

Second, the frequency of face-to-face meetings has an indirect effect on GBT performance only through the mediating influence of GBT identity, as indicated in equation 2 of Table 6.2 and equations 3 and 6 of Table 6.4a.

Third, no significant effect is found, direct or indirect, of the frequency of e-mail communication on GBT performance, as indicated in Table 6.2, 6.3, and 6.4a.

Finally, the story unfolding from the study of the interactions between GBT governance and GBT composition can be seen in Table 6.5. National diversity is found without a significant moderating effect on the relationships between the various mechanisms of GBT governance and either GBT identity or GBT cognitive comprehensiveness. In addition, the interactions of team-based rewards and frequency of e-mail communication with geographical dispersion have a positive and significant effect on GBT cognitive comprehensiveness.

There are several lessons that can be gathered from this analysis. First, governance mechanisms have a direct impact on GBT process and performance, a finding that is consistent with the general literature on teams as well as with other GBT studies (Jarvenpaa et al., 1998; Jarvenpaa & Leidner 1999; Montoya-Weiss et al., 2001). Further, the results indicate that specific governance mechanisms affect GBT process differentially. Team-based rewards have both a direct effect on GBT performance and an indirect effect through GBT identity and GBT cognitive

comprehensiveness. The frequency of face-to-face meetings has an effect on GBT performance, but only through the mediating influence of GBT identity. Finally, there is no effect of frequency of e-mail communication on GBT process and performance.

In addition, results concerning the moderating influence of national diversity and geographical dispersion confirm and expand prior research that showed that governance mechanisms operate differently for GBTs as compared to other types of teams (Montoya-Weiss et al., 2001; Van Glinow et al., 2004). On the one hand, the results indicate that governance mechanisms operate the same independently of the degree of national diversity within GBTs. On the other hand, there is some variation when it comes to geographically dispersed GBTs. Specifically, the impact of team-based rewards and frequency of e-mail communication on GBT cognitive comprehensiveness is stronger for geographically dispersed than for collocated GBTs.

Table 6.2: Antecedents of GBT Identity – Post Hoc Model

	Dependent Variable: GBT Identity			
	Eq. 1	Eq. 2	Eq. 3	Eq. 4
Constant	-0.35+	-0.27	-0.33	-0.43
Control variables				
Organizational size	-0.12	-0.13	-0.13	-0.13
% international sales	0.00	-0.01	-0.02	-0.01
France	0.37+	0.23	0.24	0.35
Japan	-0.46+	-0.42	-0.41	-0.25
Mexico	0.58+	0.39	0.51	0.65+
Consumer goods	0.74*	0.78*	0.84*	0.73+
Technology	-0.15	-0.08	-0.03	0.01
Services	0.73*	0.67*	0.73*	0.66*
Team longevity	0.08	0.07	0.07	0.10
Team size	-0.19*	-0.18*	-0.19*	-0.20*
Task interdependence	0.16+	0.12	0.12	0.14
Average age	0.20*	0.20*	0.19+	0.20+
Age dispersion	-0.06	-0.08	-0.09	-0.08
Average education	-0.08	-0.06	-0.07	-0.08
Education dispersion	0.14+	0.15+	0.14+	0.10
Functional heterogeneity	0.09	0.04	0.06	0.04
Independent variables				
Team-based rewards		0.17*	0.16+	0.17+
Face-to-face meetings		0.16+	0.23+	0.22+
E-mail communication		-0.13	-0.13	-0.12
National diversity			0.03	0.05
Geographical dispersion			0.10	0.10
Interaction terms				
Nationality * rewards				-0.18
Nationality * meetings				0.05
Nationality * e-mail				-0.01
Geography * rewards				0.19
Geography * meetings				-0.09
Geography * e-mail				0.05
R^2	0.32	0.36	0.37	0.40
d.f.	16, 87	19, 84	21, 82	27, 76
F	2.59**	2.51**	2.26**	1.85*
R^2 change		0.04	0.04	0.03
d.f.		3, 84	5, 82	6, 76
F change		1.73	1.14	0.62

+ $p < 0.10$; * $p < 0.05$; ** $p < 0.01$; *** $p < 0.001$. T-tests are one-tail significance level.

Table 6.3: Antecedents of GBT Cognitive Comprehensiveness – Post Hoc Model

	Dependent Variable: Comprehensiveness			
	Eq. 1	Eq. 2	Eq. 3	Eq. 4
Constant	-0.19	-0.17	-0.25	-0.35
Control variables				
Organizational size	-0.15+	-0.15+	-0.16+	-0.18*
% international sales	-0.04	-0.04	-0.07	-0.05
France	-0.08	-0.18	-0.13	-0.09
Japan	-0.04	0.09	0.18	0.21
Mexico	0.26	0.17	0.32	0.61
Consumer goods	0.93*	0.87*	0.92*	0.62
Technology	0.21	0.30	0.37	0.38
Services	0.38	0.38	0.41	0.36
Team longevity	0.10	0.10	0.09	0.14
Team size	-0.19*	-0.18*	-0.19*	-0.19*
Task interdependence	0.08	0.03	0.04	0.09
Average age	0.12	0.13	0.13	0.16
Age dispersion	0.09	0.08	0.09	0.03
Average education	0.31**	0.33**	0.32**	0.33**
Education dispersion	0.08	0.08	0.08	0.08
Functional heterogeneity	0.08	0.04	0.04	0.05
Independent variables				
Team-based rewards		0.20*	0.20*	0.20*
Face-to-face meetings		0.07	0.14	0.14
E-mail communication		-0.08	-0.09	-0.19+
National diversity			0.13	0.17
Geographical dispersion			0.04	0.07
Interaction terms				
Nationality * rewards				0.03
Nationality * meetings				-0.07
Nationality * e-mail				0.10
Geography * rewards				0.26*
Geography * meetings				-0.02
Geography * e-mail				0.05
R^2	0.31	0.35	0.36	0.42
d.f.	16, 87	19, 84	21, 82	27, 76
F	2.49**	2.35**	2.16*	2.03**
R^2 change		0.03	0.04	0.06
d.f.		3, 84	5, 82	6,76
F change		1.40	1.08	1.35

+ $p < 0.10$; * $p < 0.05$; ** $p < 0.01$; *** $p < 0.001$. T-tests are one-tail significance level.

Table 6.4a: Effect of GBT Governance and Emergent Processes on GBT Performance – Post Hoc Model, Members' Evaluations

	Satisfaction w/ Performance			Perception of Productivity		
	Eq. 1	Eq. 2	Eq. 3	Eq. 4	Eq. 5	Eq. 6
Constant	0.37+	0.41+	0.53	-0.27	0.42+	0.54*
Control variables						
Organizational size	-0.19*	-0.18*	-0.12	-0.11	-0.09	-0.02
% international sales	-0.01	0.00	0.02	0.01	0.03	0.04
France	-0.14	-0.29	-0.36+	-0.27	-0.41+	-0.46*
Japan	-0.81*	-0.58+	-0.40	-0.92**	-0.72*	-0.58+
Mexico	-0.38	-0.51+	-0.65*	-0.18	-0.30	-0.46
Consumer goods	-0.54	-0.71+	-1.17**	-0.32	-0.53	-0.94*
Technology	-0.48+	-0.36	-0.33	-0.53+	-0.47+	-0.48+
Services	0.14	0.15	-0.18	0.16	0.16	-0.14
Team longevity	-0.03	-0.05	-0.10	0.16+	0.13	0.09
Team size	-0.10	-0.08	0.03	-0.02	0.01	0.10
Task interdependence	0.11	0.04	-0.01	0.05	-0.02	-0.06
Average age	0.11	0.12	0.02	0.04	0.04	-0.05
Age dispersion	0.11	0.10	0.14+	0.13	0.14	0.16+
Average education	0.15+	0.19*	0.19*	-0.03	0.02	-0.01
Education dispersion	0.15+	0.13+	0.05	0.19*	0.18*	0.11
Funct. heterogeneity	-0.11	-0.18+	-0.19*	-0.04	-0.09	-0.11
GBT governance						
Team-based rewards		0.32**	0.22**		0.26**	0.17+
Face-to-face meetings		0.08	-0.01		0.04	-0.03
E-mail communication		-0.06	0.00		0.03	0.09
GBT process						
Team identity			0.45***			0.36***
Comprehensiveness			0.13+			0.11+
R^2	0.29	0.37	0.54	0.24	0.29	0.41
d.f.	16, 86	19, 83	21, 81	16, 87	19, 84	21, 82
F	2.22**	2.57**	4.49***	1.67	1.80*	2.71***
R^2 change		0.08	0.17		0.05	0.12
d.f.		3, 83	2, 81		3, 84	2, 82
F change		3.43*	14.70***		2.10	8.41***

+ $p < 0.10$; * $p < 0.05$; ** $p < 0.01$; *** $p < 0.001$. T-tests are one-tail significance level.

Table 6.4b: Effect of GBT Governance and Emergent Processes on GBT Performance – Post Hoc Model, Leaders' Evaluations

	Satisfaction w/ Performance			Perception of Productivity		
	Eq. 1	Eq. 2	Eq. 3	Eq. 4	Eq. 5	Eq. 6
Constant	0.58*	0.71**	0.67**	0.64**	0.68**	0.62*
Control variables						
Organizational size	-0.06	-0.05	-0.07	-0.06	-0.04	-0.06
% international sales	-0.02	-0.04	-0.04	-0.09	-0.08	-0.08
France	-0.10	-0.31	-0.28	-0.40+	-0.52*	-0.46+
Japan	-0.98**	-0.91**	-0.97**	-0.98**	-0.85*	-0.96**
Mexico	-0.37	-0.64	-0.58+	-0.39	-0.48	-0.39
Consumer goods	-0.25	-0.30	-0.16	-0.20	-0.32	-0.21
Technology	-0.75**	-0.70*	-0.70*	-0.53+	-0.46+	-0.49+
Services	-1.04***	-1.12***	-1.01***	-0.91**	-0.89**	-0.74*
Team longevity	-0.04	-0.07	-0.06	0.02	-0.00	0.00
Team size	-0.20*	-0.16+	-0.19*	-0.08	-0.05	-0.07
Task interdependence	0.17+	0.09	0.11	0.23*	0.19+	0.22*
Average age	0.03	0.02	0.05	-0.01	-0.01	0.03
Age dispersion	-0.03	-0.04	-0.04	0.06	0.08	0.06
Average education	-0.08	-0.04	-0.04	0.02	0.05	0.01
Education dispersion	-0.01	-0.01	0.01	0.13+	0.12	0.14+
Funct. heterogeneity	-0.15	-0.22*	-0.22*	-0.20+	-0.24*	-0.23*
GBT governance						
Team-based rewards		0.23*	0.26**		0.19+	0.22*
Face-to-face meetings		0.18+	0.21*		0.04	0.08
E-mail communication		-0.05	-0.08		0.02	-0.00
GBT process						
Team identity			-0.14			-0.25*
Comprehensiveness			-0.03			0.09
R^2	0.27	0.33	0.34	0.25	0.27	0.31
d.f.	16, 87	19, 84	21, 82	16, 86	19, 83	21, 81
F	1.98*	2.13**	2.02**	1.98*	2.13**	2.02*
R^2 change		0.06	0.02		0.03	0.03
d.f.		3, 84	2, 82		3, 83	2, 81
F change		2.40	0.97		1.63	1.70*

+ $p < 0.10$; * $p < 0.05$; ** $p < 0.01$; *** $p < 0.001$. T-tests are one-tail significance level.

Table 6.4c: Effects of GBT Governance and Emergent Processes on GBT Performance – Post Hoc Model, Sponsors' Evaluations

	Satisfaction w/ Performance			Perception of Productivity		
	Eq. 1	Eq. 2	Eq. 3	Eq. 4	Eq. 5	Eq. 6
Constant	0.28	0.31	0.32	0.47+	0.35	0.39
Control variables						
Organizational size	0.11	0.17+	0.17+	0.17+	0.19*	0.22*
% international sales	-0.20+	-0.17	-0.17	-0.01	0.04	0.04
France	0.07	0.03	-0.00	-0.44+	-0.35	-0.34
Japan	-0.41	-0.30	-0.26	-0.40	-0.17	-0.15
Mexico	-0.49	-0.50	-0.52	-0.37	-0.15	-0.19
Consumer goods	0.13	-0.15	-0.15	-0.42	-0.70+	-0.86*
Technology	-0.08	-0.15	-0.12	-0.53+	-0.51+	-0.54+
Services	-0.74*	-0.74*	-0.76*	-0.32	-0.20	-0.29
Team longevity	0.03	-0.00	-0.00	0.14	0.14	0.12
Team size	-0.30**	-0.24*	-0.24*	-0.08	-0.07	-0.04
Task interdependence	-0.04	-0.07	-0.08	0.04	0.04	0.03
Average age	-0.16	-0.18+	-0.18+	0.01	0.03	-0.00
Age dispersion	0.23*	0.24*	0.26*	0.04	0.06	0.06
Average education	0.04	0.06	0.09	0.19+	0.20*	0.17
Education dispersion	0.09	0.06	0.06	0.10	0.07	0.05
Funct. heterogeneity	-0.01	-0.00	-0.00	-0.16	-0.14	-0.14
GBT governance						
Team-based rewards		0.22*	0.22*		0.15	0.17+
Face-to-face meetings		-0.08	-0.09		-0.11	-0.09
E-mail communication		0.08	0.08		0.08	0.04
GBT process						
Team identity			0.08			0.07
Comprehensiveness			-0.07			0.12
R^2	0.22	0.26	0.26	0.17	0.22	0.23
d.f.	16, 85	19, 82	21, 80	16, 87	19, 84	21, 82
F	1.48	1.51	1.36	1.14	1.23	1.19
R^2 change		0.04	0.00		0.04	0.02
d.f.		3, 82	2, 82		3, 84	2, 82
F change		1.51	0.24		1.59	0.87

+ $p < 0.10$; * $p < 0.05$; ** $p < 0.01$; *** $p < 0.001$. T-tests are one-tail significance level.

Table 6.5.a: Effect of Interactions all at the Same Time or Separately: GBT Identity, Post Hoc Model

	Dependent Variable: GBT Identity						
	Eq. 1	Eq. 2	Eq. 3	Eq. 4	Eq. 5	Eq. 6	Eq. 7
Constant	-0.32	-0.33	-0.32	-0.38	-0.32	-0.29	-0.43
Control variables							
Organizational size	-0.13	-0.13	-0.13	-0.14+	-0.13	-0.14+	-0.13
% international sales	-0.03	-0.02	-0.03	-0.01	-0.03	-0.02	-0.01
France	0.27	0.24	0.24	0.26	0.23	0.24	0.35
Japan	-0.36	-0.41	-0.41	-0.37	-0.42	-0.46	-0.25
Mexico	0.43	0.50	0.50	0.65+	0.49	0.49	0.65+
Consumer goods	0.88*	0.84*	0.84*	0.76*	0.85*	0.79*	0.73+
Technology	-0.05	-0.03	-0.03	0.02	-0.03	-0.06	0.01
Services	0.70*	0.73*	0.72*	0.73*	0.72*	0.68*	0.66*
Team longevity	0.06	0.07	0.07	0.11	0.07	0.07	0.10
Team size	-0.19*	-0.19*	-0.19*	-0.20*	-0.19*	-0.19*	-0.20*
Task interdependence	0.11	0.12	0.12	0.14	0.12	0.13	0.14
Average age	0.18+	0.19+	0.18+	0.20+	0.19+	0.18+	0.20+
Age dispersion	-0.07	-0.09	-0.09	-0.10	-0.09	-0.09	-0.08
Average education	-0.07	-0.07	-0.07	-0.07	-0.07	-0.09	-0.08
Education dispersion	0.12	0.14+	0.14+	0.14+	0.14+	0.14+	0.10
Function heterogeneity	0.04	0.06	0.06	0.07	0.06	0.03	0.04
Independent variables							
Team-based rewards	0.16+	0.16+	0.16+	0.17+	0.16+	0.15+	0.17+
Face-to-face meetings	0.23*	0.23+	0.23+	0.22+	0.23+	0.23*	0.22+
E-mail communication	-0.10	-0.13	-0.14	-0.17+	-0.14	-0.15+	-0.12
National diversity	0.04	0.03	0.03	0.04	0.03	0.04	0.05
Geographic dispersion	0.08	0.10	0.10	0.11	0.09	0.09	0.10

Interaction terms							
Nationality * rewards	-0.10						-0.18
Nationality * meetings		0.00					0.05
Nationality * e-mail			0.01				-0.01
Geography * rewards				0.13			0.19
Geography * meetings					0.01		-0.09
Geography * e-mail						0.09	0.05
R^2	0.37	0.37	0.37	0.38	0.37	0.38	0.40
d.f.	22, 81	22, 81	22, 81	22, 81	22, 81	22, 81	27, 76
F	2.19**	2.14**	2.14**	2.23**	2.14**	2.21**	1.85*
R^2 change	0.01	0.00	0.00	0.01	0.00	0.01	0.03
d.f.	1, 81	1, 81	1, 81	1, 81	1, 81	1, 81	6, 76
F change	0.75	0.00	0.00	1.34	0.01	1.00	0.62

+ $p < 0.10$; * $p < 0.05$; ** $p < 0.01$; *** $p < 0.001$. T-tests are for one-tail significance level.

Table 6.5.b: Effect of Interactions all at the Same Time or Separately: GBT Cognitive Comprehensiveness, Post Hoc Model

	Dependent Variable: GBT Cognitive Comprehensiveness						
	Eq. 1	Eq. 2	Eq. 3	Eq. 4	Eq. 5	Eq. 6	Eq. 7
Constant	-0.26	-0.26	-0.18	-0.37	-0.15	-0.18	-0.35
Control variables							
Organizational size	-0.17	-0.16+	-0.17*	-0.17*	-0.17+	-0.17*	-0.18*
% international sales	-0.06	-0.07	-0.10	-0.05	-0.10	-0.07	-0.05
France	-0.16	-0.13	-0.16	-0.10	-0.21	-0.15	-0.09
Japan	0.11	0.18	0.12	0.25	0.09	0.08	0.21
Mexico	0.41	0.32	0.23	0.64+	0.23	0.30	0.61
Consumer goods	0.87*	0.92*	0.91*	0.74*	1.00*	0.83*	0.62
Technology	0.39	0.37	0.31	0.47+	0.37	0.30	0.38
Services	0.45+	0.41	0.33	0.41	0.37	0.32	0.36
Team longevity	0.11	0.09	0.07	0.18+	0.10	0.08	0.14
Team size	-0.20*	-0.19*	-0.17+	-0.21*	-0.19*	-0.18	-0.19*
Task interdependence	0.04	0.04	0.04	0.08	0.05	0.06	0.09
Average age	0.13	0.13	0.12	0.17+	0.13	0.12	0.16
Age dispersion	0.07	0.09	0.07	0.06	0.08	0.07	0.03
Average education	0.33**	0.33**	0.32**	0.32**	0.30**	0.29**	0.33**
Education dispersion	0.10	0.07	0.07	0.08	0.08	0.07	0.08
Function heterogeneity	0.06	0.04	0.02	0.07	0.03	0.01	0.05
Independent variables							
Team-based rewards	0.20*	0.20*	0.17+	0.22*	0.19*	0.17+	0.20*
Face-to-face meetings	0.14	0.14	0.17	0.12	0.15	0.15	0.14
E-mail communication	-0.13	-0.09	-0.12	-0.17+	-0.11	-0.13	-0.19+
National diversity	0.12	0.13	0.13	0.15	0.13	0.15	0.17
Geographic dispersion	0.05	0.04	0.05	0.06	0.03	0.03	0.07

Interaction terms							
Nationality * rewards	0.12						0.03
Nationality * meetings		-0.00					-0.07
Nationality * e-mail			0.11				0.10
Geography * rewards				0.29**			0.26*
Geography * meetings					0.10		-0.02
Geography * e-mail						0.16*	0.05
R^2	0.37	0.36	0.36	0.41	0.36	0.38	0.42
d.f.	22, 81	22, 81	22, 81	22, 81	22, 81	22, 81	27, 76
F	2.12**	2.04**	2.11**	2.51**	2.08**	2.27**	2.03**
R^2 change	0.01	0.00	0.01	0.05	0.00	0.02	0.06
d.f.	1, 81	1, 81	1, 81	1, 81	1, 81	1, 81	6, 76
F change	1.14	0.00	1.02	6.71**	0.54	3.20	1.35

+ $p < 0.10$; * $p < 0.05$; ** $p < 0.01$; *** $p < 0.001$. T-tests are for one-tail significance level.

CHAPTER 7. CONCLUSION

In section 7.1, the key results, potential weaknesses, and noteworthy contributions to the literature are summarized. In section 7.2., directions for future research are proposed. The hope is that these suggestions, together with the recommendations from prior studies, will be a strong incentive to further the agenda of GBT research.

7.1. SUMMARY

7.1.1. Results

The goal of this dissertation was to provide a better understanding of the main factors influencing GBT performance. First, extant research pertaining to the impact of composition, governance, and organizational context on emergent processes and team performance was integrated, potential gaps and puzzles were identified, and directions for future research were proposed. This review of the literature led to focus on the following research question:

> **Research Question**: In the context of global business teams, how do composition, governance, and organizational context affect: (a) team identity, (b) team cognitive comprehensiveness, and (c) team performance?

In order to address this question, a set of hypotheses of an intervening process model relating the variables of composition (national diversity and geographical dispersion) and emergent processes (GBT identity and GBT cognitive

comprehensiveness) to GBT performance was developed. The moderating influences of organizational policies and GBT governance were also hypothesized.

In order to test this model, a data set of 106 GBTs from 41 multinational companies headquartered in the United States, France, Japan, and Mexico was assembled. Survey questionnaires were collected from 651 GBT members, which represented a 90.0% response rate for the GBTs analyzed. 86.2% of the GBTs contacted yielded usable data. These data were then treated in several steps to reflect their cross-national and multilevel aspects. Reduced-form regressions were used to conduct the path analysis necessary to test the model.

In general, the empirical tests provided little support for the hypotheses. In particular, there was no evidence found of an effect of GBT composition on GBT process and GBT performance, and only a few of the interactions with GBT governance were significant. The results are summarized in Table 7.1.

Table 7.1: Summary of Results

Hypothesis	Results
Impact of GBT Process	
H1 of GBT Identity	No support
H2 of GBT Cognitive Comprehensiveness	No support
Impact of National Diversity	
H3 on GBT Identity	No support
H4 on GBT Cognitive Comprehensiveness	No support
Impact of Geographical Dispersion	
H5 on GBT Identity	No support
H6 on GBT Cognitive Comprehensiveness	No support
Interaction	
H7 on GBT Identity	No support
H8 on GBT Cognitive Comprehensiveness	No support
Moderating Influence of Policies	
H9 on GBT Identity	No support
H10 on GBT Cognitive Comprehensiveness	No support
Moderating Influence of Governance	
H11 on GBT Identity	No support
H12 on GBT Cognitive Comprehensiveness	Some support

Further examination of extant literature and empirical results led to the testing of a post hoc model where GBT governance was the independent variable and national diversity and geographical dispersions were the moderators. Broad empirical support was found for this post hoc conceptualization. The results are summarized in Table 7.2.

Table 7.2: Summary of Post Hoc Model

Hypothesis	Results
Impact of GBT Process	
Of GBT Identity	Some support
Of GBT Cognitive Comprehensiveness	Some support
Impact of Team-based Rewards	
On GBT Identity	Supported
On GBT Cognitive Comprehensiveness	Supported
On GBT Performance	Supported
Impact of Face-to-face Meetings	
On GBT Identity	Supported
On GBT Cognitive Comprehensiveness	No support
On GBT Performance	Supported
Impact of E-mail Communication	
On GBT Identity	No support
On GBT Cognitive Comprehensiveness	No support
On GBT Performance	No support
Moderation of National Diversity	
On GBT Identity	No support
On GBT Cognitive Comprehensiveness	No support
Moderation of Geographical Dispersion	
On GBT Identity	No support
On GBT Cognitive Comprehensiveness	Some support

7.1.2. Contribution

Taken together, the results from this dissertation make several contributions to the literature. First, the findings clarify several critical aspects of the role of national diversity and geographical dispersion for GBT process and performance. Prior research (e.g., Earley & Mosakowski, 2000; Hambrick et al., 1998) indicated the importance of the nationalities of GBT members. Instead, the results presented here suggest that the effect of national diversity on GBT operations is negligible, at least for the governance mechanisms and the emergent processes considered.

Conversely, the virtual quality of GBTs has some important consequences. Namely the impact of team-based rewards and e-mail communication on team process and performance is larger for geographically dispersed GBTs. These results provide some empirical grounding in the context of GBTs for the on-going debate on the need for specific theories in the case of virtual organizations (Handy, 1995; Jarvenpaa & Leidner, 1999; Nohria & Eccles, 1992).

Second, the findings from this dissertation shed some light on the impact of team governance and the mechanisms that GBTs can use to improve process and performance. Past research has emphasized the importance of several mechanisms such as team-building (DiStephano & Maznevski, 2000) conflict resolution (Montoya-Weiss et al., 2001; Van Glinow et al., 2004) and leadership (Jarvenpaa & Leidner, 1999) for GBT governance. The results presented here showed specifically the respective role of team-based rewards, frequency of face-to-face meetings, and frequency of e-mail communication in explaining GBT performance through the mediating influence of GBT identity and GBT cognitive comprehensiveness.

Finally, we learn in this dissertation about the influence of several contextual variables on GBT process and performance. Prior research has demosntrated the importance of context in determining GBT outcomes (e.g., Salk & Brannen, 2000; Salk & Shenkar, 2001). By showing the importance of the location of corporate headquarters on GBT outcomes, this dissertation expands on prior findings in the IJV literature that emphasized the importance of the nationality of the parent companies (Johnson et al., 2002; Salk & Shenkar, 2001). Specifically, GBTs operating in MNCs

that were headquartered in France were found to have a higher level of cohesiveness than their counterparts for other countries – the United States, Japan, and Mexico.

Beyond what has been done in prior research, which was generally based on the study of student projects or only a few cases of GBTs, this dissertation also shows the importance of the industry sector in which GBTs operate. Specifically, GBTs in the consumer goods and service sectors were found to be more cohesive than their counterparts in manufacturing and technology, while GBTs in the technology and service sectors performed worse than GBTs in manufacturing and consumer goods. Therefore, this dissertation shows that GBT practices differ across sectors, which would indicate that prescriptions to improve GBT management need to be tailored to the industry context.

7.1.3. Limitations

Despite the value of these empirical findings based on a large scale data set of GBTs, there are several limitations that have to be mentioned, in which light the results of this dissertation need to be interpreted cautiously. First, given the relative paucity in the area of GBT research at present, much of the theory was built around other streams of the literature, e.g. teams, identity, diversity. Much remains to be done to assess the validity of these theories in a GBT context or whether there are boundaries to their application. As DiStephano and Maznevski (2000) discussed, GBTs are the most complex type of teams to study within organizations.

Beyond the question of theories underpinning the GBT phenomenon, construct operationalization is another critical issue that affects at least three areas of the conceptual model examined in this dissertation. First national diversity is a crude measure of what the different nationalities of members mean for GBT operations (Webber & Donahue, 2001). As discussed in the literature review, several dimensions of heterogeneity are captured when considering national diversity including values, beliefs, attitudes, personalities, knowledge, skills, abilities, as well as more visible attributes.

Similarly, geographical dispersion as measured in this dissertation simultaneously includes several aspects of interacting across distance including cultural, organizational, physical, and temporal dimensions. Better operationalization of the geographical dispersion construct requires distinguishing between these various dimensions. For example, O'Leary and Cummings (2002) examined the spatial, temporal, and configurational features that characterize geographical dispersion in teams. These authors developed five indexes focusing on the number of sites, members' isolation (the number of team members at each site), separation (based on the distance between the sites), overlap (differences in time zones), and role (distance of each member to the team leader) that are associated with geographical dispersion.

In addition, measures of performance are fraught with ambiguity in the GBT context. For a cross-sectional study like this dissertation, objective measures that are consistent across firms and teams are impossible to obtain. Subjective measures have several weaknesses including the risk of social desirability. The limitations associated with using the various types of informants to collect performance measures were also

discussed in section 6.1. Finally, and as well documented in the literature, measures of performance have to be clearly differentiated depending on the research focus. For instance, Lovelace et al. (2001) used innovativeness and constraint adherence-based measures of performance to study the effect of intra-team task disagreement, with an expectation of a negative association with both types of performance measures.

Finally, this dissertation is based on a cross-sectional data set. As discussed in the literature review, it is a valuable approach to augment prior empirical studies based on student projects or a few cases of GBTs. At the same time, there are serious limitations associated with a cross-sectional research design in the GBT context. First, such teams are the object of frequent re-compositions that have an impact on their structure and are difficult to measure (Hopkins & Hopkins, 2002). In addition, this approach is ineffectual to account for the development of GBT processes and the various phases of formation of a hybrid culture (Earley & Mosakowski, 2000; Jarvenpaa & Leidner, 1999). Finally, given the interdependence of GBTs with their external context, there are macro factors whose cycles affect GBT processes and performance, and that are not captured using a cross-sectional research design.

7.2. DIRECTIONS FOR FUTURE RESEARCH

While disconcerting on the surface, these results nonetheless lead to interesting considerations and directions for future research, five of which are discussed below.

7.2.1. National Diversity

Because of the salience of members' nationalities, understanding the impact of national diversity on GBT performance has been one of the key undertakings in the literature. However, the findings in this area still require clarification.

In this dissertation, building on prior research, a number of refinements were proposed in order to make progress. Specifically, two emergent processes, GBT identity and GBT cognitive comprehensiveness were posited to act as mediators between national diversity and GBT performance. As emphasized in the literature, such an approach should yield a more comprehensive understanding of GBT functioning (Earley & Mosakowski, 2000; Lawrence, 1997; Pelled, 1996). In addition, a more refined measure of national diversity using Blau' index was introduced, versus the classical dichotomy between nationally heterogeneous and homogeneous GBTs typically utilized in the literature. As pointed out by Hambrick et al. (1998), more sophisticated measures are needed to understand the subtle effects associated with national diversity.

While these improvements were warranted, they were not quite sufficient to fully reflect the complex effects of nationality within GBTs. Based on the results from past studies and these findings, there are at least two possible areas for future research. First, a multilevel conceptualization of the impact of nationality within GBTs appears warranted (Gelfand et al., 2002). While national diversity is a team attribute, several scholars have pointed out to the fact that nationality is enacted and sustained at the individual and contextual level (Salk & Brannen, 2000; Salk & Shenkar, 2001). In that regard, Thomas and his associates (Thomas, 1999; Thomas,

Ravlin, & Wallace, 1996) have made important strides by accounting for several properties and testing a comprehensive model of the impact of members' nationalities on team process.

In addition, future research should consider the impact of nationality on GBT process and performance from a more dynamic perspective. For instance, Salk and Brannen (2000: 458), instead of viewing national diversity as the shock of "billiard balls", proposed a "negotiated culture perspective, which sees national traits as elements that, over time, can be recombined or modified through ongoing interactions through team members". Future research should investigate which national traits become more salient depending on the context and whether the contextual features considered are nationally bounded.

In summary, this study and prior research in conjunction suggest a much more intricate role for nationality in the understanding of GBT process and performance. Other fields such as anthropology, culture studies, and sociology support such a complex view of the role of nationality within organizations. Unitary and universalistic conceptualizations, while sometimes useful, are unlikely to suffice when more complex relationships with GBT variables are to be expected (Earley & Mosakowski, 2000; Gelfand et al., 2002).

7.2.2. Geographical Dispersion

The impact of geographical dispersion on GBT process and performance is best understood in the context of the broader debate pertaining to virtuality within organizations (Handy, 1995; Jarvenpaa & Leidner, 1999; Nohria & Eccles, 1992). By

and large, scholars are concerned because the lack of shared context and the process and technical impediments resulting from computer-mediated communication fundamentally change the nature of operations within global virtual teams (Cramton, 2001). Nevertheless, researchers have also recognized the obvious advantages associated with geographical dispersion (Jarvenpaa & Leidner, 1999; Maznevski & Chudoba, 2000).

The purpose of this dissertation was to test some of the important hypotheses pertaining to virtuality theory in the GBT context. The main thrust was to empirically evaluate the impact of geographical dispersion on both social and cognitive processes, namely GBT identity and GBT cognitive comprehensiveness. Another aspect was to consider the interaction between national diversity and geographical dispersion. Finally, this study used a measurement continuum from collocated to geographically dispersed GBTs, thus refining on the collocated-virtual dichotomy utilized in prior studies.

The results regarding the effect of geographical dispersion on GBT process and performance parallel those found for national diversity, suggesting that extant theories of virtuality may still be insufficient to account for the impact of geographical dispersion. In addition, these findings are actually consistent with several of the more recent studies that found that global virtual teams operate differently on several dimensions as compared to their collocated counterparts (Montoya-Weiss et al., 2001).

In light of these considerations, several directions appear worth investigating for future research, driven by the need for more sophisticated explanations of the

impact of geographical dispersion. First, it would be valuable to gain a fine grained understanding of the dynamics of virtual GBTs, beyond the dimension of geographical dispersion generally studied in the literature (Cramton, 2001). For example, few studies have accounted for the impact of face-to-face interaction of members of the core GBT versus the virtual communication with their remote colleagues (see for example the case of the NewTech GBT in Maznevski & Chudoba, 2000). From a more dynamic perspective, it would be interesting to examine how temporal rhythms and pacing at the team level account for the dyadic interactions occurring within GBTs.

In a different direction, it would be valuable to "unbundle" and tease out the particular effects of specific dimensions associated with geographical dispersion, as suggested by Cummings and his colleagues (Espinosa et al., 2003; O'Leary & Cummings, 2002). In addition, and moving beyond the interaction between national diversity and geographical dispersion considered in this dissertation, several interactions between GBT composition variables appear possible that still have to be explored. The studies by Salk and her associates suggest that it is a valuable research area, for which the theory on fault lines would provide a valuable conceptual lens (Lau & Murnighan, 1998).

7.2.3. GBT Process

Much of the recent research on teams has focused on better understanding the relationships between composition, process, and performance to provide a quite more sophisticated and powerful interpretation of team functioning, beyond classical

demographic arguments (Lawrence, 1997; Millikens & Martins, 1996; Pelled, 1996; Reger, 1997). The GBT literature has proceeded along these lines, with authors identifying cultural synergy (Adler, 1997) or hybrid culture (Earley & Mosakowski, 2000) as critical determinants of GBT performance.

This dissertation built on these findings and advanced the literature in several respects. First, it proposed GBT identity and GBT cognitive comprehensiveness as two critical components of a hybrid culture. Prior GBT literature has considered either social (e.g., Earley & Mosakowski, 2000) or cognitive (e.g., Cramton, 2001) processes, but rarely both types in conjunction. Second, a careful measurement approach of these constructs at the team level was implemented reflecting the responses of individuals from multiple nationalities. As will be further discussed below, research methods for diversity issues are still fraught with complex and largely unresolved questions.

The empirical results in this dissertation were mixed and, together with other GBT studies, suggest that future research efforts could be applied in several directions. Clearly, a better understanding of the main components of a hybrid culture is warranted. While the literature has emphasized its importance, there is still the need to define what are the main symbolic, social, and cognitive components, their respective importance, and how they relate to each other (Milliken & Martins, 1996).

Further, it would be worth developing more comprehensive models of GBT performance, potentially drawing on extant theories of team performance, e.g. McGrath (1984). In particular, recent studies have indicated that several factors such as team composition (Cummings, 2003), task (Hambrick, et al., 1998), and

organizational characteristics (Cummings, 2003) act as important moderators of these relationships.

7.2.4. Multilevel Modeling

A key lesson from prior research is that GBTs are a multilevel construct, and that variables at the national, environmental, organizational, team, and individual level contribute to explaining their performance (Hambrick et al., 1998; Maznevski et al., 2000). For instance, Snow et al. (1996), using Bartlett and Ghoshal's (1989) MNC framework, showed how GBTs can be used to achieve global efficiency, local responsiveness, or a combination of both – if organizational learning is pursued. As discussed before, variables at the team level such as composition, governance, and task have an impact on GBT performance (Earley & Mosakowski, 2000; Hambrick et al., 1998). Finally, authors have analyzed how variables such as values, attitudes, mental models, and behaviors of individual members, in particular those of the leader, impact GBT process and performance (Jarvenpaa et al., 1998; Jarvenpaa & Leidner, 1999; Salk & Brannen, 2000).

This dissertation made several attempts to incorporate multilevel considerations, both conceptually and methodologically. The influence of the organizational policies in which the GBTs operate was included and great care was taken to reflect and validate measurements at the team level. Nevertheless, the theoretical development and empirical testing of such multilevel models of GBT performance remain a vast undertaking.

Such an endeavor will benefit from the recent advances in multilevel theory that can be valuably applied to the GBT context (Klein & Kozlowski, 2000). The benefits of multilevel theorizing are now well established, including bridging the micro-macro divide, portraying a richer view of organizational life, building synergies between various domains of organizational analysis, as well as providing important practical insight (Klein, Tosi, & Cannella, 1999). There now exists a set of "central principles of multilevel theory building and research organized around the *what*, *how*, *where*, and *why* (and *why not*) of multilevel theoretical models" (Kozlowski & Klein, 2000: 12). GBTs appear to be a valuable topic for the application of multilevel analysis (Klein et al., 1999; Salk & Shenkar, 2001).

Using a qualitative approach, Salk and her associates (Salk & Brannen, 2000; Salk & Shenkar, 2001) have provided an illustration of the direction that could be used to deepen our knowledge of the complex dynamics of GBT process and performance. The grounded models that were induced from this research stream could lend themselves to other forms of multilevel analysis (Klein et al., 1999).

7.2.5. Methods

Methods in cross-national and multilevel research have made considerable strides in the course of the past decade, and several recommendations were incorporated in this dissertation (Gelfand et al., 2002; Klein & Kozlowski, 2000). In particular, special care was taken to establish equivalence for the various levels of analysis and to ensure that team constructs were appropriately measured (Klein et al., 2000; van der Vijver & Leung, 1997). There remains a number of important

methodological questions and challenges that hopefully will be addressed in future years to provide yet more rigorous approaches to studying GBTs. Two specific issues are discussed below.

First, the literature is concerned with the equivalence required across nationalities at all steps of a project in order to ensure the validity of international management research (Harpaz, 1995; van der Vijver & Leung, 1997). Focusing only on conceptual equivalence, various strategies have been recommended (Berry, 1989; Brodbeck et al., 2000). The main question in this area pertains to the differences between emic and etic constructs and how researchers should approach the issue. The debate is on-going and we are still learning from research currently implemented in this area.

Further, the phenomenon of GBTs lends itself to a different question (Van Glinow et al., 2004). Assuming that GBTs develop a hybrid culture as suggested in the literature, the question becomes how it should be studied, since by essence a hybrid culture is GBT-specific and relatively transient. The literature is still silent on this particular issue.

Second, the hypotheses proposed here built on findings and theory derived from case studies and student projects that constitute the bulk of the empirical settings in the GBT literature. Data triangulation is important in a cross-national environment (Rieger & Wong-Rieger, 1988), and the results presented here seem to challenge some of the wisdom received from prior research. As a result, additional studies utilizing large samples of actual GBTs appear warranted since they are still relatively scarce – where in particular better, e.g. objective, measures of GBT performance

would be included. Such a research endeavor would allow determining the validity of extant findings or on the contrary provide new directions for future research.

7.3. CONCLUDING REMARK

As emphasized in the literature (Earley & Gibson, 2001; Govindarajan & Gupta, 2001a), GBTs have become a fixture of MNCs and are here to stay. It is therefore critical to provide a quite more comprehensive understanding of their functioning. For practitioners, it is urgent to find more robust and actionable methodologies and tools that prevent the high rates of failure encountered with GBTs and lead to business success in the global arena. From a scholarly standpoint, it is important to clarify the dynamics specific to GBTs and their impact on the strategic management process of MNCs.

Appendix 4.1: R_{wg} Before Changes

A) Based on Members' Ratings

Teamid	Identity	Cognition	Identityc	Cognitionc
10101	0.78	0.87	0.66	0.82
10201	0.62	0.86	0.53	0.86
10301	-3.4E+15	0.88	-1.24	0.80
10401	0.81	0.91	0.87	0.86
10501	0.90	2.50	0.89	-1.12
10502	0.37	0.92	0.31	0.79
10503	0.89	0.93	0.90	0.93
10504	0.89	0.91	0.93	0.89
10601	0.99	0.95	0.98	0.93
10602	0.78	0.86	0.77	0.83
10603	0.92	0.94	0.90	0.93
10604	0.68	0.86	0.45	0.77
10701	0.75	0.81	0.64	0.70
10801	0.89	0.77	0.90	0.77
10901	0.25	0.90	0.48	0.87
10902	0.81	0.86	0.83	0.82
11001	.	.	.	.
11002	-0.30	3.33	0.66	3.18
11101	0.91	079	0.92	0.66
11201	0.72	0.90	0.74	0.85
11301	0.78	0.88	0.80	0.84

Teamid	Identity	Cognition	Identityc	Cognitionc
11401	0.68	0.92	0.58	0.92
11402	0.92	0.47	0.93	0.42
11403	0.60	0.94	0.51	0.98
11404	0.92	0.92	0.90	0.93
11405	0.55	0.92	0.44	0.92
11501	0.94	0.83	0.93	0.73
11601	0.95	0.91	0.94	0.88
20101	0.82	0.87	0.82	0.85
20102	0.45	0.91	0.46	0.89
20103	0.92	0.93	0.92	0.92
20201	9.21	0.86	10.10	0.88
20202	0.15	0.90	0.49	0.91
20301	0.76	0.82	0.74	0.79
20401	0.81	0.90	0.83	0.88
20402	0.94	0.84	0.95	0.85
20403	0.63	0.54	0.67	0.63
20404	0.78	0.93	0.79	0.92
20405	0.00	0.84	0.23	0.84
20501	1.00	0.86	1.00	0.82
20502	0.71	0.47	0.63	0.25
20503	0.58	0.92	0.60	0.89
20504	0.91	0.89	0.91	0.87
20505	0.89	0.77	0.90	0.70
20601	0.85	0.91	0.87	0.92

Teamid	Identity	Cognition	Identityc	Cognitionc
20701	0.88	0.83	0.89	0.83
20702	0.92	0.96	0.93	0.98
20703	0.90	0.88	0.90	0.91
20704	0.89	0.92	0.91	0.92
20801	0.82	0.78	0.84	0.77
20802	0.81	0.93	0.77	0.93
20901	0.57	0.90	0.55	0.87
20902	0.94	0.82	0.94	0.80
21001	0.99	0.87	0.99	0.81
21101	0.86	0.94	0.86	0.94
21102	0.81	0.87	0.81	0.85
21103	.	.	.	.
21201	0.50	0.91	0.62	0.90
21202	0.95	0.81	0.94	0.81
21203	0.89	0.74	0.89	0.68
21204	0.75	0.78	0.71	0.73
21205	0.51	0.79	0.67	0.77
21206	0.91	0.87	0.94	0.85
21207	-0.28	0.46	-0.26	0.25
21208	0.94	0.95	0.95	0.94
30101	0.79	0.94	0.48	0.93
30201	0.97	0.92	0.97	0.90
30301	0.86	0.86	0.69	0.73
30302	0.93	0.93	0.86	0.89

Teamid	Identity	Cognition	Identityc	Cognitionc
30401	0.85	0.81	0.69	0.61
30501	0.81	0.94	0.48	0.90
30502	0.91	0.91	0.85	0.84
30503	0.92	0.97	0.94	0.94
30505	0.79	0.91	0.66	0.87
30506	0.79	0.90	0.52	0.83
30601	0.76	0.94	0.51	0.92
30701	0.95	0.89	0.96	0.87
30702	0.88	0.86	0.82	0.79
30801	0.95	0.93	0.91	0.89
30802	0.91	0.87	0.82	0.76
40101	0.50	0.90	0.37	0.90
40102	0.15	0.97	-0.13	0.90
40201	0.94	0.88	0.93	0.88
40202	0.83	0.85	0.80	0.84
40203	.	.	.	.
40301	-2.36	0.81	11.26	0.88
40302	0.83	0.91	0.81	0.91
40303	0.56	0.67	0.51	0.58
40401	0.95	1.81	0.93	1.69
40402	0.84	0.88	0.82	0.86
40403	0.92	0.85	0.92	0.83
40404	0.75	0.81	0.75	078
40405	0.37	0.77	0.26	075

Teamid	Identity	Cognition	Identityc	Cognitionc
40501	0.92	0.95	0.91	0.92
40601	0.98	0.88	0.98	0.87
40602	0.46	0.81	0.42	0.78
40607	0.94	0.81	0.93	0.78
40608	0.70	0.79	0.66	0.77
40701	0.94	0.68	0.93	0.63
40702	0.74	0.84	0.72	0.82
40703	0.97	0.83	0.97	0.80
40704	0.95	0.90	0.95	0.89
40801	.	.	.	.
40802	0.71	0.92	0.54	0.89
40803	.	.	.	.
40804	0.81	0.83	0.76	0.81

B) Based on Members + Leaders' Ratings

Teamid	Task	Incentives	Meetings	E-mail	Taskc	Incentivesc	Meetingsc	E-mailc
10101	0.27	0.88	0.45	0.92	0.44	0.88	0.61	0.89
10201	0.38	0.60	0.33	0.69	0.60	0.75	0.49	0.40
10301	-0.35	0.72	0.85	-0.60	0.38	0.88	0.94	0.16
10401	0.27	0.16	-0.13	0.92	0.64	0.76	0.41	0.87
10501	0.83	0.87	0.50	1.00	0.90	0.90	0.47	1.00
10502	0.88	0.04	-1.00	1.00	0.82	0.54	-0.04	1.00
10503	0.65	0.65	0.15	1.00	0.69	0.78	0.53	1.00
10504	0.67	0.87	-0.79	0.88	0.81	0.87	-0.04	0.88
10601	0.15	0.91	1.00	1.00	-0.03	0.92	0.98	1.00
10602	0.20	0.76	0.90	0.41	0.31	0.78	0.90	0.58
10603	0.44	0.89	0.82	0.75	0.57	0.91	0.89	0.78
10604	0.29	0.87	0.75	0.94	0.48	0.91	0.84	0.91
10701	0.53	0.87	0.94	0.12	0.58	0.87	0.91	0.00
10801	0.50	0.81	0.79	0.26	0.59	0.86	0.82	0.56
10901	0.67	0.57	0.43	1.00	0.64	0.70	0.64	1.00
10902	0.85	0.71	0.15	1.00	0.90	0.81	0.61	1.00
11001	0.75	0.71	1.00	0.75	0.76	-0.35	1.00	0.94
11002	1.00	0.74	1.00	0.83	0.96	0.92	0.98	0.66
11101	0.60	0.36	0.85	1.00	0.50	0.61	0.92	1.00
11201	0.35	0.89	0.65	0.25	0.56	0.93	0.69	-0.52
11301	0.57	0.70	0.75	0.51	0.68	0.84	0.68	0.30
11401	0.85	0.72	0.60	1.00	0.91	0.83	0.61	1.00

Teamid	Task	Incentives	Meetings	E-mail	Taskc	Incentivesc	Meetingsc	E-mailc
11402	0.15	-20.00	0.90	1.00	0.42	0.22	0.96	1.00
11403	0.54	0.89	0.88	0.88	0.78	0.89	0.88	0.77
11404	0.05	0.68	0.86	0.88	0.26	0.77	0.87	0.77
11405	0.50	0.62	0.90	0.90	0.69	0.82	0.89	0.80
11501	0.85	0.89	0.92	1.00	0.89	0.91	0.95	1.00
11601	0.20	0.65	-0.33	0.92	0.40	0.67	0.23	0.89
20101	0.32	0.86	0.69	0.88	0.53	0.88	0.70	0.89
20102	0.45	0.89	0.92	1.00	0.62	0.91	0.92	1.00
20103	0.87	0.92	0.57	-0.14	0.91	0.94	0.59	-0.07
20201	-1.00	0.76	-0.35	1.00	-0.33	0.82	-0.34	1.00
20202	0.21	0.94	0.67	1.00	0.46	0.96	0.66	1.00
20301	0.50	0.91	0.79	0.53	0.63	0.93	0.80	0.56
20401	0.19	0.31	0.67	0.47	0.42	0.61	0.72	0.51
20402	0.24	0.71	1.00	0.87	0.59	0.79	0.96	0.91
20403	0.26	0.79	0.86	0.71	0.58	0.82	0.94	0.79
20404	0.20	0.78	0.84	0.75	0.48	0.85	0.82	0.79
20405	0.57	0.77	0.75	0.00	0.69	0.84	0.72	0.06
20501	0.83	0.97	0.50	0.83	0.88	0.97	0.52	0.84
20502	0.72	0.88	0.67	1.00	0.82	0.88	0.74	1.00
20503	0.27	0.89	0.32	0.92	0.38	0.92	0.27	0.92
20504	0.87	0.82	1.00	1.00	0.91	0.86	1.00	1.00
20505	0.53	0.83	0.24	1.00	0.74	0.92	0.19	1.00
20601	-0.29	0.77	0.79	0.57	0.24	0.86	0.75	0.69
20701	0.36	0.76	0.55	-0.12	0.59	0.86	0.57	0.16

Teamid	Task	Incentives	Meetings	E-mail	Taskc	Incentivesc	Meetingsc	E-mailc
20702	0.80	0.95	0.92	1.00	0.88	0.97	0.92	1.00
20703	-0.10	108.00	-0.10	-0.40	0.49	-0.15	-0.22	-0.04
20704	0.00	-0.09	0.50	0.88	0.58	0.54	0.39	0.91
20801	0.61	0.82	0.75	-0.71	0.79	0.88	0.72	-0.47
20802	0.26	0.92	-0.24	0.88	0.46	0.94	0.30	0.75
20901	0.60	0.75	0.83	0.88	0.72	0.82	0.73	0.89
20902	0.75	0.69	0.85	1.00	0.83	0.78	0.86	1.00
21001	0.65	0.78	0.12	1.00	0.72	0.83	0.28	1.00
21101	0.21	0.71	0.88	0.83	0.45	0.76	0.88	0.84
21102	0.75	0.72	-0.15	-0.60	0.83	0.79	-0.09	-0.50
21103	0.00	0.84	1.00	1.00	0.30	0.89	0.76	1.00
21201	0.36	0.81	0.72	-0.12	0.58	0.90	0.68	0.24
21202	0.00	0.90	0.50	-0.60	0.31	0.92	0.74	-0.74
21203	0.54	0.81	0.88	0.83	0.68	0.85	0.88	0.84
21204	0.08	0.82	0.63	-0.13	0.44	0.88	0.50	0.12
21205	0.15	0.57	0.80	-0.04	0.53	0.77	0.71	0.27
21206	0.21	-4.00	0.54	0.83	0.64	0.18	0.54	0.86
21207	0.26	0.47	0.02	0.88	0.48	0.66	0.07	0.89
21208	0.72	0.92	0.87	-0.40	0.78	0.93	0.89	-0.31
30101	0.21	0.90	1.00	-0.13	0.34	0.89	0.82	-0.30
30201	-0.15	0.69	-0.15	0.60	0.40	0.76	0.40	0.65
30301	0.65	0.90	1.00	1.00	0.73	0.90	1.00	1.00
30302	0.43	0.70	-0.07	0.71	0.58	0.67	0.25	0.50
30401	0.65	0.86	1.00	1.00	0.73	0.85	1.00	1.00

Teamid	Task	Incentives	Meetings	E-mail	Taskc	Incentivesc	Meetingsc	E-mailc
30501	0.33	0.89	0.33	0.83	0.48	0.89	0.59	0.71
30502	-0.47	0.77	0.63	0.61	-0.10	0.74	0.68	0.41
30503	0.50	0.82	0.61	0.50	0.64	0.87	0.73	0.81
30505	0.83	0.79	-0.79	0.54	0.82	0.82	-0.24	0.22
30506	0.54	0.91	1.00	0.67	0.64	0.90	1.00	0.42
30601	0.92	0.69	1.00	0.92	0.92	0.55	0.94	0.85
30701	1.00	0.74	0.60	1.00	1.00	0.88	0.56	1.00
30702	0.67	0.87	0.80	1.00	0.78	0.88	0.85	1.00
30801	0.35	0.77	-0.15	-0.60	0.50	0.75	0.29	-1.80
30802	0.73	0.83	0.47	0.95	0.79	0.82	0.67	0.91
40101	-0.17	0.80	0.33	-1.67	0.32	0.86	0.67	-3.71
40102	0.54	0.61	1.00	0.88	0.73	0.75	1.00	0.78
40201	0.83	0.85	-0.17	0.83	0.88	0.91	0.34	0.65
40202	0.88	0.88	0.54	0.88	0.93	0.92	0.77	0.78
40203	1.00	0.71	0.75	1.00	1.00	0.85	0.48	1.00
40301	-0.35	0.92	0.90	0.15	0.15	0.94	0.84	-0.70
40302	0.33	0.64	0.42	0.79	0.55	0.82	0.72	0.65
40303	0.94	0.92	0.04	0.94	0.96	0.95	0.48	0.88
40401	-0.25	0.46	0.40	0.60	0.26	0.76	0.74	0.51
40402	0.67	0.76	0.92	0.87	0.80	0.87	0.96	0.76
40403	0.43	0.86	0.89	0.94	0.67	0.91	0.95	0.89
40404	0.88	0.76	0.83	0.50	0.93	0.87	0.92	0.12
40405	0.88	0.50	-1.13	-1.00	0.93	0.77	-0.05	-2.53
40501	0.93	0.76	0.26	0.88	0.92	0.84	0.30	0.75

Teamid	Task	Incentives	Meetings	E-mail	Taskc	Incentivesc	Meetingsc	E-mailc
40601	0.33	-1.04	0.67	0.54	0.61	0.47	0.83	0.19
40602	0.54	0.86	0.88	0.88	0.73	0.91	0.94	0.78
40607	-1.12	0.71	0.88	1.00	-0.25	0.84	0.94	1.00
40608	0.33	0.87	1.00	0.88	0.61	0.92	1.00	0.79
40701	0.50	0.81	1.00	0.54	0.71	0.89	1.00	0.19
40702	0.05	0.79	0.52	0.65	0.44	0.87	0.76	0.38
40703	0.10	0.91	-0.15	0.90	0.47	0.94	0.43	0.82
40704	-0.15	0.31	0.65	0.90	0.33	0.72	0.83	0.82
40801	1.00	0.92	1.00	1.00	1.00	0.94	1.00	1.00
40802	0.88	0.79	0.67	1.00	0.93	0.79	0.75	1.00
40803	0.75	0.90	1.00	1.00	0.85	0.94	1.00	1.00
40804	-0.17	0.95	0.33	1.00	0.32	0.97	0.67	1.00

C) Based on Leader + Sponsor's Ratings

Teamid	Performance	Productivity	Performancec	Productivityc
10101	0.75	0.97	0.93	0.88
10201	0.75	0.97	0.25	0.99
10301	1.00	1.00	0.93	0.99
10401	1.00	1.00	0.93	1.00
10501	1.00	1.00	0.89	0.98
10502	0.75	-0.80	0.12	1.96
10503	0.75	0.90	0.92	0.90
10504	0.75	0.97	0.93	0.98
10601	1.00	1.00	0.89	0.98
10602	1.00	1.00	0.76	0.97
10603	1.00	1.00	0.93	0.99
10604	1.00	1.00	0.93	0.99
10701	1.00	1.00	0.93	1.00
10801	0.75	0.98	0.95	0.93
10901	0.75	0.87	0.88	0.90
10902	1.00	0.98	0.93	0.98
11001	1.00	0.90	0.89	0.93
11002	-1.25	0.84	-0.95	0.87
11101	0.75	0.90	0.93	0.91
11201	1.00	1.00	0.86	0.99
11301	1.00	1.00	0.88	0.99
11401	1.00	1.00	1.00	1.00

Teamid	Performance	Productivity	Performancec	Productivityc
11402	1.00	1.00	1.00	1.00
11403	0.00	0.98	0.06	0.97
11404	1.00	1.00	0.98	1.00
11405	1.00	0.98	0.94	0.97
11501	0.75	0.92	0.93	0.87
11601	0.00	0.48	-1.22	3.67
20101	1.00	0.95	0.89	0.89
20102	0.75	0.95	0.82	0.92
20103	1.00	0.84	0.89	0.49
20201	1.00	1.00	0.97	0.99
20202	1.00	1.00	0.89	1.00
20301	1.00	0.97	0.77	0.93
20401	1.00	0.95	0.89	0.96
20402	1.00	1.00	0.89	1.00
20403	0.75	0.97	0.95	0.96
20404	0.75	0.97	0.93	0.94
20405	0.75	0.98	0.93	0.98
20501	0.00	0.57	0.25	0.53
20502	0.75	0.97	0.93	0.91
20503	0.75	0.87	0.99	0.77
20504	1.00	0.90	0.97	0.73
20505	0.75	0.90	-0.16	0.72
20601	1.00	1.00	0.89	0.99
20701	0.75	0.95	0.82	0.95

Teamid	Performance	Productivity	Performancec	Productivityc
20702	1.00	0.84	0.93	0.67
20703	0.75	0.97	0.82	0.95
20704	0.75	0.95	0.15	0.90
20801	0.75	0.95	0.93	0.94
20802	0.00	0.21	0.03	60.97
20901	0.75	0.97	0.82	0.91
20902	1.00	0.90	0.89	0.87
21001	1.00	1.00	0.77	1.00
21101	0.00	0.97	-.25	0.90
21102	0.75	0.71	-0.16	0.65
21103	0.75	0.97	-0.16	0.96
21201	1.00	0.92	0.89	0.92
21202	0.75	0.98	0.15	0.97
21203	0.75	0.92	-0.16	0.73
21204	1.00	0.97	0.89	0.96
21205	1.00	0.98	0.89	0.97
21206	0.75	.	-0.16	.
21207	1.00	0.98	0.89	0.95
21208	0.75	0.97	0.82	0.96
30101	0.75	0.76	-0.07	0.19
30201	0.75	0.97	0.98	0.86
30301	0.75	0.48	0.98	0.65
30302	1.00	1.00	0.96	1.00
30401	0.75	0.90	0.98	0.65

Teamid	Performance	Productivity	Performancec	Productivityc
30501	0.75	0.97	0.99	0.95
30502	0.75	0.65	-0.16	0.69
30503	1.00	0.97	0.79	0.93
30505	0.75	0.98	-0.16	0.95
30506	-1.25	0.80	-0.77	0.81
30601	0.44	0.86	0.50	0.43
30701	0.75	0.65	0.98	0.73
30702	0.75	0.97	0.86	0.95
30801	0.75	0.97	0.98	0.97
30802	0.75	0.97	0.98	0.93
40101	1.00	0.95	0.99	0.95
40102	1.00	1.00	0.99	1.00
40201	0.75	0.71	0.35	0.79
40202	0.75	0.57	0.41	-0.02
40203	0.75	0.95	0.79	0.96
40301	1.00	0.98	0.99	0.99
40302	1.00	0.98	0.93	0.99
40303	1.00	1.00	0.91	0.99
40401	0.75	0.90	0.52	0.47
40402	1.00	0.90	0.99	0.94
40403	0.75	0.95	0.86	0.92
40404	1.00	0.98	1.00	0.97
40405	0.00	0.21	-0.43	-0.58
40501	1.00	0.97	0.91	0.94

Teamid	Performance	Productivity	Performancec	Productivityc
40601	0.75	0.97	0.62	0.96
40602	0.75	0.97	0.62	0.97
40607	1.00	0.95	0.99	0.95
40608	1.00	0.92	0.99	0.90
40701	1.00	0.97	0.99	0.96
40702	1.00	0.84	0.99	0.79
40703	1.00	0.97	0.99	0.95
40704	0.75	0.95	0.79	0.92
40801	1.00	0.76	1.00	0.87
40802	0.75	0.71	0.89	0.78
40803	0.75	0.90	0.79	0.94
40804	0.75	0.36	0.79	0.60

Appendix 4.2: R_{wg} After Changes

A) Based on Members' Ratings

Teamid	Identity	Cognition	Identityc	Cognitionc
10101	0.78	0.87	0.66	0.82
10201	0.62	0.86	0.53	0.86
10301	0.94	0.88	0.99	0.80
10401	0.81	0.91	0.87	0.86
10501	0.90	0.00	0.89	0.75
10502	0.37	0.92	0.31	0.79
10503	0.89	0.93	0.90	0.93
10504	0.89	0.91	0.93	0.89
10601	0.99	0.95	0.98	0.93
10602	0.78	0.86	0.77	0.83
10603	0.92	0.94	0.90	0.93
10604	0.68	0.86	0.45	0.77
10701	0.75	0.81	0.64	0.70
10801	0.89	0.77	0.90	0.77
10901	0.25	0.90	0.48	0.87
10902	0.81	0.86	0.83	0.82
11001	.	.	.	.
11002	1.00	1.00	0.66	0.98
11101	0.91	0.79	0.92	0.66
11201	0.72	0.90	0.74	0.85
11301	0.78	0.88	0.80	0.84

Teamid	Identity	Cognition	Identityc	Cognitionc
11401	0.68	0.92	0.58	0.92
11402	0.92	0.47	0.93	0.42
11403	0.60	0.94	0.51	0.98
11404	0.92	0.92	0.90	0.93
11405	0.55	0.92	0.44	0.92
11501	0.94	0.83	0.93	0.73
11601	0.95	0.91	0.94	0.88
20101	0.82	0.87	0.82	0.85
20102	0.45	0.91	0.46	0.89
20103	0.92	0.93	0.92	0.92
20201	0.94	0.86	0.94	0.88
20202	0.15	0.90	0.49	0.91
20301	0.76	0.82	0.74	0.79
20401	0.81	0.90	0.83	0.88
20402	0.94	0.84	0.95	0.85
20403	0.63	0.54	0.67	0.63
20404	0.78	0.93	0.79	0.92
20405	0.77	0.84	0.23	0.84
20501	1.00	0.86	1.00	0.82
20502	0.71	0.47	0.63	0.25
20503	0.58	0.92	0.60	0.89
20504	0.91	0.89	0.91	0.87
20505	0.89	0.77	0.90	0.70
20601	0.85	0.91	0.87	0.92

Teamid	Identity	Cognition	Identityc	Cognitionc
20701	0.88	0.83	0.89	0.83
20702	0.92	0.96	0.93	0.98
20703	0.90	0.88	0.90	0.91
20704	0.89	0.92	0.91	0.92
20801	0.82	0.78	0.84	0.77
20802	0.81	0.93	0.77	0.93
20901	0.57	0.90	0.55	0.87
20902	0.94	0.82	0.94	0.80
21001	0.99	0.87	0.99	0.81
21101	0.86	0.94	0.86	0.94
21102	0.81	0.87	0.81	0.85
21103	.	.	.	.
21201	0.50	0.91	0.62	0.90
21202	0.95	0.81	0.94	0.81
21203	0.89	0.74	0.89	0.68
21204	0.75	0.78	0.71	0.73
21205	0.51	0.79	0.67	0.77
21206	0.91	0.87	0.94	0.85
21207	0.65	0.46	0.80	0.25
21208	0.94	0.95	0.95	0.94
30101	0.79	0.94	0.48	0.93
30201	0.97	0.92	0.97	0.90
30301	0.86	0.86	0.69	0.73
30302	0.93	0.93	0.86	0.89

Teamid	Identity	Cognition	Identityc	Cognitionc
30401	0.85	0.81	0.69	0.61
30501	0.81	0.94	0.48	0.90
30502	0.91	0.91	0.85	0.84
30503	0.92	0.97	0.94	0.94
30505	0.79	0.91	0.66	0.87
30506	0.79	0.90	0.52	0.83
30601	0.76	0.94	0.51	0.92
30701	0.95	0.89	0.96	0.87
30702	0.88	0.86	0.82	0.79
30801	0.95	0.93	0.91	0.89
30802	0.91	0.87	0.82	0.76
40101	0.50	0.90	0.37	0.90
40102	0.15	0.97	0.70	0.90
40201	0.94	0.88	0.93	0.88
40202	0.83	0.85	0.80	0.84
40203	.	.	.	.
40301	0.83	0.81	0.73	0.88
40302	0.83	0.91	0.81	0.91
40303	0.56	0.67	0.51	0.58
40401	0.95	0.50	0.93	0.94
40402	0.84	0.88	0.82	0.86
40403	0.92	0.85	0.92	0.83
40404	0.75	0.81	0.75	0.78
40405	0.37	0.77	0.26	0.75

Teamid	Identity	Cognition	Identityc	Cognitionc
40501	0.92	0.95	0.91	0.92
40601	0.98	0.88	0.98	0.87
40602	0.46	0.81	0.42	0.78
40607	0.94	0.81	0.93	0.78
40608	0.70	0.79	0.66	0.77
40701	0.94	0.68	0.93	0.63
40702	0.74	0.84	0.72	0.82
40703	0.97	0.83	0.97	0.80
40704	0.95	0.90	0.95	0.89
40801	.	.	.	.
40802	0.71	0.92	0.54	0.89
40803	.	.	.	.
40804	0.81	0.83	0.76	0.81

B) Based on Members + Leaders' Ratings

Teamid	Task	Incentives	Meetings	E-mail	Taskc	Incentivesc	Meetingsc	E-mailc
10101	0.27	0.88	0.45	0.92	0.44	0.88	0.61	0.89
10201	0.38	0.60	0.33	0.69	0.60	0.75	0.49	0.40
10301	0.83	0.72	0.85	1.00	0.38	0.88	0.94	0.16
10401	0.27	0.16	0.65	0.92	0.64	0.76	0.41	0.87
10501	0.83	0.87	0.50	1.00	0.90	0.90	0.47	1.00
10502	0.88	0.04	1.00	1.00	0.82	0.54	0.98	1.00
10503	0.65	0.65	0.15	1.00	0.69	0.78	0.53	1.00
10504	0.67	0.87	0.83	0.88	0.81	0.87	0.76	0.88
10601	0.15	0.91	1.00	1.00	0.66	0.92	0.98	1.00
10602	0.20	0.76	0.90	0.41	0.31	0.78	0.90	0.58
10603	0.44	0.89	0.82	0.75	0.57	0.91	0.89	0.78
10604	0.29	0.87	0.75	0.94	0.48	0.91	0.84	0.91
10701	0.53	0.87	0.94	0.12	0.58	0.87	0.91	0.00
10801	0.50	0.81	0.79	0.26	0.59	0.86	0.82	0.56
10901	0.67	0.57	0.43	1.00	0.64	0.70	0.64	1.00
10902	0.85	0.71	0.15	1.00	0.90	0.81	0.61	1.00
11001	0.75	0.71	1.00	0.75	0.76	0.68	1.00	0.94
11002	1.00	0.74	1.00	0.83	0.96	0.92	0.98	0.66
11101	0.60	0.36	0.85	1.00	0.50	0.61	0.92	1.00
11201	0.35	0.89	0.65	0.25	0.56	0.93	0.69	0.68
11301	0.57	0.70	0.75	0.51	0.68	0.84	0.68	0.30
11401	0.85	0.72	0.60	1.00	0.91	0.83	0.61	1.00

Teamid	Task	Incentives	Meetings	E-mail	Taskc	Incentivesc	Meetingsc	E-mailc
11402	0.15	0.97	0.90	1.00	0.42	0.22	0.96	1.00
11403	0.54	0.89	0.88	0.88	0.78	0.89	0.88	0.77
11404	0.05	0.68	0.86	0.88	0.26	0.77	0.87	0.77
11405	0.50	0.62	0.90	0.90	0.69	0.82	0.89	0.80
11501	0.85	0.89	0.92	1.00	0.89	0.91	0.95	1.00
11601	0.20	0.65	1.00	0.92	0.40	0.67	0.23	0.89
20101	0.32	0.86	0.69	0.88	0.53	0.88	0.70	0.89
20102	0.45	0.89	0.92	1.00	0.62	0.91	0.92	1.00
20103	0.87	0.92	0.57	0.52	0.91	0.94	0.59	0.55
20201	0.33	0.76	0.83	1.00	0.58	0.82	0.89	1.00
20202	0.21	0.94	0.67	1.00	0.46	0.96	0.66	1.00
20301	0.50	0.91	0.79	0.53	0.63	0.93	0.80	0.56
20401	0.19	0.31	0.67	0.47	0.42	0.61	0.72	0.51
20402	0.24	0.71	10.00	0.87	0.59	0.79	0.96	0.91
20403	0.26	0.79	0.86	0.71	0.58	0.82	0.94	0.79
20404	0.20	0.78	0.84	0.75	0.48	0.85	0.82	0.79
20405	0.57	0.77	0.75	0.00	0.69	0.84	0.72	0.06
20501	0.83	0.97	0.50	0.83	0.88	0.97	0.52	0.84
20502	0.72	0.88	0.67	1.00	0.82	0.88	0.74	1.00
20503	0.27	0.89	0.32	0.92	0.38	0.92	0.27	0.92
20504	0.87	0.82	1.00	1.00	0.91	0.86	1.00	1.00
20505	0.53	0.83	0.24	1.00	0.74	0.92	0.19	1.00
20601	0.50	0.77	0.79	0.57	0.24	0.86	0.75	0.69
20701	0.36	0.76	0.55	0.92	0.59	0.86	0.57	0.16

Teamid	Task	Incentives	Meetings	E-mail	Taskc	Incentivesc	Meetingsc	E-mailc
20702	0.80	0.95	0.92	1.00	0.88	0.97	0.92	1.00
20703	0.54	0.89	0.54	0.54	0.49	0.89	0.54	0.58
20704	0.00	0.94	0.50	0.88	0.58	0.54	0.39	0.91
20801	0.61	0.82	0.75	0.90	0.79	0.88	0.72	0.91
20802	0.26	0.92	0.75	0.88	0.46	0.94	0.30	0.75
20901	0.60	0.75	0.83	0.88	0.72	0.82	0.73	0.89
20902	0.75	0.69	0.85	1.00	0.83	0.78	0.86	1.00
21001	0.65	0.78	0.12	1.00	0.72	0.83	0.28	1.00
21101	0.21	0.71	0.88	0.83	0.45	0.76	0.88	0.84
21102	0.75	0.72	0.67	1.00	0.83	0.79	0.68	1.00
21103	0.00	0.84	1.00	1.00	0.30	0.89	0.76	1.00
21201	0.36	0.81	0.72	0.50	0.58	0.90	0.68	0.24
21202	0.00	0.90	0.50	0.50	0.31	0.92	0.74	0.53
21203	0.54	0.81	0.88	0.83	0.68	0.85	0.88	0.84
21204	0.08	0.82	0.63	0.75	0.44	0.88	0.50	0.12
21205	0.15	0.57	0.80	0.19	0.53	0.77	0.71	0.27
21206	0.21	0.87	0.54	0.83	0.64	0.18	0.54	0.86
21207	0.26	0.47	0.02	0.88	0.48	0.66	0.07	0.89
21208	0.72	0.92	0.87	0.60	0.78	0.93	0.89	0.62
30101	0.21	0.90	1.00	0.33	0.34	0.89	0.82	0.69
30201	0.67	0.69	0.88	0.60	0.40	0.76	0.40	0.65
30301	0.65	0.90	1.00	1.00	0.73	0.90	1.00	1.00
30302	0.43	0.70	0.87	0.71	0.58	0.67	0.25	0.50
30401	0.65	0.86	1.00	1.00	0.73	0.85	1.00	1.00

Teamid	Task	Incentives	Meetings	E-mail	Taskc	Incentivesc	Meetingsc	E-mailc
30501	0.33	0.89	0.33	0.83	0.48	0.89	0.59	0.71
30502	0.85	0.77	0.63	0.61	0.32	0.74	0.68	0.41
30503	0.50	0.82	0.61	0.50	0.64	0.87	0.73	0.81
30505	0.83	0.79	0.83	0.54	0.82	0.82	1.00	0.22
30506	0.54	0.91	1.00	0.67	0.64	0.90	1.00	0.42
30601	0.92	0.69	1.00	0.92	0.92	0.55	0.94	0.85
30701	1.00	0.74	0.60	1.00	1.00	0.88	0.56	1.00
30702	0.67	0.87	0.80	1.00	0.78	0.88	0.85	1.00
30801	0.35	0.77	0.83	0.50	0.50	0.75	0.29	1.00
30802	0.73	0.83	0.47	0.95	0.79	0.82	0.67	0.91
40101	0.75	0.80	0.33	1.00	0.32	0.86	0.67	1.00
40102	0.54	0.61	1.00	0.88	0.73	0.75	1.00	0.78
40201	0.83	0.85	0.75	0.83	0.88	0.91	0.34	0.65
40202	0.88	0.88	0.54	0.88	0.93	0.92	0.77	0.78
40203	1.00	0.71	0.75	1.00	1.00	0.85	0.48	1.00
40301	1.00	0.92	0.90	0.15	0.15	0.94	0.84	0.76
40302	0.33	0.64	0.42	0.79	0.55	0.82	0.72	0.65
40303	0.94	0.92	0.04	0.94	0.96	0.95	0.48	0.88
40401	0.50	0.46	0.40	0.60	0.26	0.76	0.74	0.51
40402	0.67	0.76	0.92	0.87	0.80	0.87	0.96	0.76
40403	0.43	0.86	0.89	0.94	0.67	0.91	0.95	0.89
40404	0.88	0.76	0.83	0.50	0.93	0.87	0.92	0.12
40405	0.88	0.50	0.75	1.00	0.93	0.77	0.26	1.00
40501	0.93	0.76	0.26	0.88	0.92	0.84	0.30	0.75

Teamid	Task	Incentives	Meetings	E-mail	Taskc	Incentivesc	Meetingsc	E-mailc
40601	0.33	0.99	0.67	0.54	0.61	0.47	0.83	0.19
40602	0.54	0.86	0.88	0.88	0.73	0.91	0.94	0.78
40607	1.00	0.71	0.88	1.00	0.12	0.84	0.94	1.00
40608	0.33	0.87	1.00	0.88	0.61	0.92	1.00	0.79
40701	0.50	0.81	1.00	0.54	0.71	0.89	1.00	0.19
40702	0.05	0.79	0.52	0.65	0.44	0.87	0.76	0.38
40703	0.10	0.91	0.33	0.90	0.47	0.94	0.43	0.82
40704	0.67	0.31	0.65	0.90	0.33	0.72	0.83	0.82
40801	1.00	0.92	1.00	1.00	1.00	0.94	1.00	1.00
40802	0.88	0.79	0.67	1.00	0.93	0.79	0.75	1.00
40803	0.75	0.90	1.00	1.00	0.85	0.94	1.00	1.00
40804	0.75	0.95	0.33	1.00	0.32	0.97	0.67	1.00

C) Based on Leader + Sponsor's Ratings

Teamid	Performance	Productivity	Performancec	Productivityc
10101	0.75	0.97	0.93	0.88
10201	0.75	0.97	0.25	0.99
10301	1.00	1.00	0.93	0.99
10401	1.00	1.00	0.93	1.00
10501	1.00	1.00	0.89	0.98
10502	0.75	0.57	0.12	.
10503	0.75	0.90	0.92	0.90
10504	0.75	0.97	0.93	0.98
10601	1.00	1.00	0.89	0.98
10602	1.00	1.00	0.76	0.97
10603	1.00	1.00	0.93	0.99
10604	1.00	1.00	0.93	0.99
10701	1.00	1.00	0.93	1.00
10801	0.75	0.98	0.95	0.93
10901	0.75	0.87	0.88	0.90
10902	1.00	0.98	0.93	0.98
11001	1.00	0.90	0.89	0.93
11002	.	0.84	.	0.87
11101	0.75	0.90	0.93	0.91
11201	1.00	1.00	0.86	0.99
11301	1.00	1.00	0.88	0.99
11401	1.00	1.00	1.00	1.00

Teamid	Performance	Productivity	Performancec	Productivityc
11402	1.00	1.00	1.00	1.00
11403	0.00	0.98	0.06	0.97
11404	1.00	1.00	0.98	1.00
11405	1.00	0.98	0.94	0.97
11501	0.75	0.92	0.93	0.87
11601	0.00	0.48	.	.
20101	1.00	0.95	0.89	0.89
20102	0.75	0.95	0.82	0.92
20103	1.00	0.84	0.89	0.49
20201	1.00	1.00	0.97	0.99
20202	1.00	1.00	0.89	1.00
20301	1.00	0.97	0.77	0.93
20401	1.00	0.95	0.89	0.96
20402	1.00	1.00	0.89	1.00
20403	0.75	0.97	0.95	0.96
20404	0.75	0.97	0.93	0.94
20405	0.75	0.98	0.93	0.98
20501	0.00	0.57	0.25	0.53
20502	0.75	0.97	0.93	0.91
20503	0.75	0.87	0.99	0.77
20504	1.00	0.90	0.97	0.73
20505	0.75	0.90	.	0.72
20601	1.00	1.00	0.89	0.99
20701	0.75	0.95	0.82	0.95

Teamid	Performance	Productivity	Performancec	Productivityc
20702	1.00	0.84	0.93	0.67
20703	0.75	0.97	0.82	0.95
20704	0.75	0.95	0.15	0.90
20801	0.75	0.95	0.93	0.94
20802	0.00	0.21	0.03	0.86
20901	0.75	0.97	0.82	0.91
20902	1.00	0.90	0.89	0.87
21001	1.00	1.00	0.77	1.00
21101	0.00	0.97	0.25	0.90
21102	0.75	0.71	.	0.65
21103	0.75	0.97	.	0.96
21201	1.00	0.92	0.89	0.92
21202	0.75	0.98	0.15	0.97
21203	0.75	0.92	.	0.73
21204	1.00	0.97	0.89	0.96
21205	1.00	0.98	0.89	0.97
21206	0.75	.	.	.
21207	1.00	0.98	0.89	0.95
21208	0.75	0.97	0.82	0.96
30101	0.75	0.76	.	0.19
30201	0.75	0.97	0.98	0.86
30301	0.75	0.48	0.98	0.65
30302	1.00	1.00	0.96	1.00
30401	0.75	0.90	0.98	0.65

Teamid	Performance	Productivity	Performancec	Productivityc
30501	0.75	0.97	0.99	0.95
30502	0.75	0.65	.	0.69
30503	1.00	0.97	0.79	0.93
30505	0.75	0.98	.	0.95
30506	.	0.80	.	0.81
30601	0.44	0.86	0.50	0.43
30701	0.75	0.65	0.98	0.73
30702	0.75	0.97	0.86	0.95
30801	0.75	0.97	0.98	0.97
30802	0.75	0.97	0.98	0.93
40101	1.00	0.95	0.99	0.95
40102	1.00	1.00	0.99	1.00
40201	0.75	0.71	0.35	0.79
40202	0.75	0.57	0.41	0.75
40203	0.75	0.95	0.79	0.96
40301	1.00	0.98	0.99	0.99
40302	1.00	0.98	0.93	0.99
40303	1.00	1.00	0.91	0.99
40401	0.75	0.90	0.52	0.47
40402	1.00	0.90	0.99	0.94
40403	0.75	0.95	0.86	0.92
40404	1.00	0.98	1.00	0.97
40405	0.00	0.21	.	0.93
40501	1.00	0.97	0.91	0.94

Teamid	Performance	Productivity	Performancec	Productivityc
40601	0.75	0.97	0.62	0.96
40602	0.75	0.97	0.62	0.97
40607	1.00	0.95	0.99	0.95
40608	1.00	0.92	0.99	0.90
40701	1.00	0.97	0.99	0.96
40702	1.00	0.84	0.99	0.79
40703	1.00	0.97	0.99	0.95
40704	0.75	0.95	0.79	0.92
40801	1.00	0.76	1.00	0.87
40802	0.75	0.71	0.89	0.78
40803	0.75	0.90	0.79	0.94
40804	0.75	0.36	0.79	0.60

Appendix 5.1: Analyses Using Within-nationality Standardized Data

Table A.1: Descriptive Statistics and Correlations

	Mean	s.d.	X1	X2	X3	X4	X5	X6
X1: National diversity	0.40	0.30						
X2: Geographical dispersion	0.38	0.32	0.60***					
X3: Internationalization	0.00	0.74	0.12	0.06				
X4: Team-based rewards	0.00	0.43	0.03	0.05	0.01			
X5: Face-to-face meetings	0.09	0.76	-0.33***	-0.61***	-0.03	0.18		
X6: E-mail communication	0.14	0.45	-0.03	-0.16	0.13	0.27**	0.34***	
X7: Team identity	0.02	0.55	-0.05	-0.11	-0.03	0.30**	0.31***	0.17
X8: Cogn. comprehensiveness	0.03	0.43	0.01	-0.02	-0.01	0.23*	0.16	0.09
X9: Performance sponsor	0.13	0.88	-0.08	0.05	0.05	0.14	0.06	0.23*
X10: Performance leader	0.27	0.79	0.01	-0.00	-0.03	0.21*	0.16	0.05
X11: Performance both	0.22	0.74	-0.04	-0.02	0.00	0.22*	0.17	0.20*
X12: Productivity sponsor	0.04	0.70	0.03	0.09	-0.00	0.04	-0.08	0.01
X13: Productivity leader	0.28	0.63	0.07	0.05	-0.13	0.16	0.03	0.04
X14: Productivity both	0.17	0.60	0.06	0.05	-0.08	0.13	0.01	0.05

* $p < 0.05$; ** $p < 0.01$; *** $p < 0.001$.

Table A.1: Descriptive Statistics and Correlations (Continued)

	X7	X8	X9	X10	X11	X12	X13
X1: National diversity							
X2: Geographical dispersion							
X3: Internationalization							
X4: Team-based rewards							
X5: Face-to-face meetings							
X6: E-mail communication							
X7: Team identity							
X8: Cogn. Comprehensiveness	0.41***						
X9: Performance sponsor	0.08	-0.02					
X10: Performance leader	0.03	0.10	0.50***				
X11: Performance both	0.07	0.07	0.88***	0.87***			
X12: Productivity sponsor	0.07	0.06	0.42***	0.25**	0.32***		
X13: Productivity leader	-0.09	0.12	0.29**	0.47***	0.43***	0.50***	
X14: Productivity both	-0.03	0.09	0.39***	0.40***	0.41***	0.88***	0.85***

* $p < 0.05$; ** $p < 0.01$; *** $p < 0.001$.

Table A.2: Antecedents of GBT Identity

	Dependent Variable: GBT Identity				
	Eq. 1	Eq. 2	Eq. 3	Eq. 4	Eq. 5
Constant	-0.31	-0.31	-0.38	-0.32	-0.36
Control variables					
Organizational size	-0.11	-0.12	-0.13	-0.13	-0.15
% international sales	-0.00	-0.01	-0.00	-0.06	-0.07
France	0.39+	0.40+	0.43+	0.29	0.34
Japan	-0.11	-0.08	-0.04	-0.03	-0.04
Mexico	0.26	0.27	0.30	0.24	0.20
Consumer goods	0.70+	0.70+	0.69+	0.87*	0.83+
Technology	-0.24	-0.24	-0.24	-0.10	-0.08
Services	0.66*	0.64*	0.67*	0.68*	0.62*
Team longevity	0.08	0.07	0.08	0.04	0.02
Team size	-0.16+	-0.16+	-0.17+	-0.14	-0.12
Task interdependence	0.25*	0.26*	0.26*	0.16+	0.17+
Average age	0.25*	0.26*	0.26*	0.20+	0.22+
Age dispersion	-0.09	-0.08	-0.09	-0.13	-0.14
Average education	-0.11	-0.11	-0.10	-0.10	-0.11
Education dispersion	0.12	0.12	0.12	0.15+	0.14+
Functional heterogeneity	0.06	0.05	0.07	0.00	-0.01
Independent variables					
National diversity		0.05	0.07	0.04	0.04
Geographical dispersion		-0.04	-0.04	0.13	0.09
Internationalization				-0.01	0.00
Team-based rewards				0.14+	0.12
Face-to-face meetings				0.31**	0.29*
E-mail communication				-0.12	-0.12
Interaction terms					
Nationality * geography			0.06		
Nationality * intl.					0.07
Nationality * rewards					-0.15
Nationality * meetings					-0.10
Nationality * e-mail					0.32
Geography * intl.					-0.04
Geography * rewards					0.11
Geography * meetings					-0.00
Geography * e-mail					-0.02

R^2	0.29	0.29	0.29	0.35	0.37
d.f.	16, 87	18, 85	19, 84	23, 80	33, 70
F	2.21**	1.93*	1.83*	2.17**	1.70*
R^2 change		0.00	0.00	0.06	0.02
d.f.		2, 85	1, 84	6, 81	8, 73
F change		0.08	0.27	1.25	0.28

+ $p < 0.10$; * $p < 0.05$; ** $p < 0.01$; *** $p < 0.001$. T-tests are for one-tail significance level.

Table A.3: Antecedents of GBT Cognitive Comprehensiveness

	Dependent Variable: GBT Cognitive Comprehensiveness				
	Eq. 1	Eq. 2	Eq. 3	Eq. 4	Eq. 5
Constant	-0.16	-0.23	-0.36	-0.22	-0.23
Control variables					
Organizational size	-0.12	-0.12	-0.14	-0.14	-0.18
% international sales	-0.08	-0.08	-0.05	-0.10	-0.10
France	0.18	0.22	0.28	0.11	0.08
Japan	0.01	0.05	0.14	0.14	0.08
Mexico	0.05	0.17	0.24	0.11	0.19
Consumer goods	0.57	0.58	0.58	0.60	0.44
Technology	0.03	0.08	0.07	0.22	0.30
Services	0.19	0.26	0.33	0.29	0.25
Team longevity	0.07	0.07	0.09	0.04	0.07
Team size	-0.12	-0.13	-0.15	-0.12	-0.09
Task interdependence	0.18+	0.18+	0.20*	0.07	0.10
Average age	0.14	0.14	0.15	0.11	0.13
Age dispersion	-0.01	-0.01	-0.03	-0.03	-0.08
Average education	0.16+	0.15	0.18+	0.22+	0.17
Education dispersion	0.04	0.03	0.04	0.05	0.06
Functional heterogeneity	0.10	0.12	0.17	0.06	0.06
Independent variables					
National diversity		0.01	0.04	-0.01	0.03
Geographical dispersion		0.06	0.06	0.14	0.11
Internationalization				0.07	0.09
Team-based rewards				0.23*	0.21+
Face-to-face meetings				0.18	0.14
E-mail communication				-0.09	-0.17
Interaction terms					
Nationality * geography			0.14		
Nationality * intl.					0.06
Nationality * rewards					0.31
Nationality * meetings					-0.00
Nationality * e-mail					0.21
Geography * intl.					-0.07
Geography * rewards					0.17
Geography * meetings					-0.00
Geography * e-mail					0.09

R^2	0.14	0.14	0.15	0.19	0.27
d.f.	16, 87	18, 85	19, 84	22, 81	30, 73
F	0.88	0.78	0.79	0.86	0.80
R^2 change		0.00	0.01	0.06	0.08
d.f.		2, 85	1, 84	6, 81	8, 73
F change		0.14	1.00	0.92	0.97

+ $p < 0.10$; * $p < 0.05$; ** $p < 0.01$; *** $p < 0.001$. T-tests are for one-tail significance level.

Table A.4.a: Effect of Control Variables on GBT Performance

	Satisfaction w/ Performance			Perception of Productivity		
	Sponsor	Leader	Both	Sponsor	Leader	Both
Constant	0.36	0.68**	0.50*	0.31	0.61*	0.53*
Control variables						
Organizational size	0.05	-0.02	-0.04	0.10	-0.05	0.01
% international sales	-0.18+	0.02	-0.09	-0.02	-0.07	-0.04
France	0.18	-0.14	0.12	-0.21	-0.28	-0.32
Japan	0.21	-0.49+	-0.30	-0.15	-0.42	-0.38
Mexico	-0.72*	-0.73*	-0.76*	-0.27	-0.64+	-0.52
Consumer goods	-0.18	-0.52	-0.26	-0.45	-0.45	-0.55
Technology	-0.47+	-0.88**	-0.71*	-0.61*	-0.53+	-0.65*
Services	-1.12**	-1.15***	-1.10***	-0.05	-0.89**	-0.44
Team longevity	0.06	-0.05	-0.06	0.14	0.02	0.08
Team size	-0.38***	-0.18*	-0.29**	-0.09	-0.10	-0.10
Task interdependence	0.04	0.28**	0.19*	0.04	0.15+	0.13
Average age	-0.11	0.05	-0.05	-0.02	-0.08	-0.06
Age dispersion	0.21*	0.00	0.07	0.05	0.08	0.09
Average education	0.03	-0.05	-0.12	0.10	0.02	0.06
Education dispersion	0.01	-0.01	-0.01	0.12	0.12	0.14
Funct. heterogeneity	0.09	-0.15	-0.09	-0.14	-0.10	-0.14
R^2	0.27	0.22	0.23	0.14	0.12	0.12
d.f.	16, 75	16, 87	16, 87	16, 85	16, 86	16, 87
F	1.69	1.50	1.57	0.84	0.71	0.75

+ $p < 0.10$; * $p < 0.05$; ** $p < 0.01$; *** $p < 0.001$. T-tests are for one-tail significance level.

Table A.4.b: Effect of GBT Composition on GBT Performance

	Satisfaction w/ Performance			Perception of Productivity		
	Sponsor	Leader	Both	Sponsor	Leader	Both
Constant	0.40	0.74**	0.60*	0.27	0.57*	0.52+
Control variables						
Organizational size	0.07	-0.02	-0.03	0.10	-0.05	0.01
% international sales	-0.13	-0.00	-0.10	-0.01	-0.09	-0.05
France	0.10	-0.17	0.07	-0.20	-0.24	-0.31
Japan	0.07	-0.48	-0.34	-0.18	-0.33	-0.35
Mexico	-0.73+	-0.86*	-0.94*	-0.21	-0.58	-0.50
Consumer goods	-0.19	-0.55	-0.28	-0.42	-0.46	-0.55
Technology	-0.50+	-0.92**	-0.77*	-0.59+	-0.51+	-0.65*
Services	-1.07**	-1.26***	-1.20***	0.02	-0.92**	-0.45
Team longevity	0.10	-0.07	-0.07	0.15	0.01	0.08
Team size	-0.38**	-0.17+	-0.27**	-0.09	-0.10	-0.10
Task interdependence	0.03	0.29**	0.19*	0.03	0.17+	0.14
Average age	-0.16	0.08	-0.03	-0.04	-0.06	-0.06
Age dispersion	0.21*	0.01	0.07	0.04	0.09	0.10
Average education	0.03	-0.04	-0.11	0.09	0.02	0.06
Education dispersion	0.01	-0.01	-0.00	0.12	0.12	0.14
Funct. heterogeneity	-0.05	-0.19+	-0.12	-0.11	-0.12	-0.14
GBT Composition						
National diversity	-0.21+	0.07	0.00	-0.08	0.12	0.04
Geog. dispersion	0.17	-0.13	-0.10	0.10	-0.07	-0.02
R^2	0.28	0.22	0.23	0.14	0.12	0.14
d.f.	18, 73	18, 85	18, 85	18, 83	18, 84	18, 85
F	1.60	1.36	1.42	0.76	0.66	0.67
R^2 change	0.02	0.01	0.01	0.01	0.01	0.00
d.f.	2, 73	2, 85	2, 85	2, 83	2, 84	2, 85
F change	0.92	0.43	0.34	0.24	0.32	0.87

+ $p < 0.10$; * $p < 0.05$; ** $p < 0.01$; *** $p < 0.001$. T-tests are for one-tail significance level.

Table A.4.c: Effect of GBT Composition and Emergent Processes on GBT Performance

	Satisfaction w/ Performance			Perception of Productivity		
	Sponsor	Leader	Both	Sponsor	Leader	Both
Constant	0.41	0.74**	0.61*	0.28	0.54+	0.50+
Control variables						
Organizational size	0.06	-0.02	-0.02	0.10	-0.06	0.01
% international sales	-0.14	0.01	-0.10	-0.01	-0.08	-0.04
France	0.10	-0.15	0.06	-0.20	-0.20	-0.27
Japan	0.12	-0.49	-0.34	-0.18	-0.35	-0.37
Mexico	-0.74+	-0.85*	-0.94*	-0.21	-0.55	-0.48
Consumer goods	-0.23	-0.53	-0.31	-0.43	-0.41	-0.51
Technology	-0.44	-0.95**	-0.78*	-0.59+	-0.57+	-0.69*
Services	-1.09**	-1.22***	-1.21***	0.02	-0.83*	-0.38
Team longevity	0.11	-0.07	-0.08	0.15	0.01	0.08
Team size	-0.38***	-0.17+	-0.27**	-0.09	-0.11	-0.11
Task interdependence	0.01	0.30**	0.18+	0.03	0.19+	0.16
Average age	-0.17	0.09	-0.04	-0.04	-0.03	-0.03
Age dispersion	0.23*	0.02	0.07	0.04	0.07	0.08
Average education	0.09	-0.07	-0.12	0.09	-0.03	0.02
Education dispersion	-0.01	0.00	-0.00	0.12	0.14	0.15+
Funct. heterogeneity	-0.05	-0.20+	-0.13	-0.12	-0.13	-0.15
GBT Composition						
National diversity	-0.20	0.07	0.04	-0.08	0.13	0.05
Geog. dispersion	0.17	-0.14	-0.11	0.10	-0.10	-0.04
GBT process						
Team identity	0.14	-0.10	-0.01	-0.00	-0.21*	-0.16
Comprehensiveness	-0.12	0.10	0.06	0.02	0.18+	0.11
R^2	0.30	0.24	0.23	0.14	0.16	0.14
d.f.	20, 71	20, 83	20, 83	20, 81	20, 82	20, 83
F	1.51	1.28	1.26	0.67	0.79	0.67
R^2 change	0.02	0.01	0.00	0.00	0.04	0.02
d.f.	2, 71	2, 83	2, 83	2, 81	2, 82	2, 83
F change	0.77	0.60	0.13	0.02	1.90	0.87

+ $p < 0.10$; * $p < 0.05$; ** $p < 0.01$; *** $p < 0.001$. T-tests are for one-tail significance level.

GLOSSARY

Cognitive comprehensiveness: extent to which an upper echelon executive team utilizes an extensive decision making process when dealing with immediate opportunities and threats […]. Behavioral indicators of the level of comprehensiveness include the extent to which brainstorming sessions occur, the number of alternative solutions that are seriously considered, and the extent to which quantitative analyses are conducted (Miller et al., 1998: 40).

Global business teams: (a) identified by their organization and their members as a team; (b) responsible for making and/or implementing decisions that are important to the organization's global strategy; (c) use technology-supported communication substantially more than face-to-face communication; (d) work and live in different countries (Maznevski & Chudoba, 2000: 473).

Global virtual teams: global virtual teams are those global business teams that are nationally diverse and geographically dispersed, like student teams from several domestic and international universities working on an Internet project (Jarvenpaa, et al., 1998).

Governance: mechanisms and levers that global business teams have under their control to manager their process, e.g. team-building, socialization, goals setting, team-based rewards, and communication strategies (Cohen & Bailey, 1997; Govindarajan & Gupta, 2001a).

Hybrid culture: an emergent set of rules and actions, work capability expectations, and member perceptions that individuals within a team develop, share, and enact after mutual interactions (Earley & Mosakowski, 2000: 27).

Identity: a sense of entitativity or the common perception of GBT cohesiveness (Earley & Mosakowski, 2000: 35).

Process: the distinction needs to be made between processes and emergent states. Emergent states "describe cognitive, motivational, and affective states of teams as opposed to the nature of their members' interactions" (Marks et al., 2003: 357). Processes can be defined as "establishing an acting group in an organizational context and involves selecting, organizing and fitting some people, tools, and purposes from the embedding context" (Argote & McGrath, 1993: 342). Because they have both interaction and emergent properties, team identity and team cognitive comprehensiveness are termed emergent processes in this dissertation.

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