University of South Australia

International Graduate School of Business

Managing Diversity and Conflict in Information Technology Project Teams in China

By

Ching-Ping Patty Farh

Submitted in fulfillment of the requirements for the Doctor of Philosophy Degree in Business and Management

2007

UNIVERSITY OF SOUTH AUSTRALIA
LIBRARY

Declaration

I declare that: this thesis presents work carried out by myself and does not incorporate without acknowledgement any material previously submitted for a degree or diploma in any university; to the best of my knowledge it does not contain any materials previously published or written by another person except where due reference is made in the text; and all substantive contributions by others to the work presented, including jointly authored publications, is clearly acknowledged.



Ching-Ping Patty Farh

2007

Acknowledgments

I would like to take this opportunity to thank my doctoral supervisor Dr. Margaret Patrickson for her guidance, advice and encouragement throughout this long and difficult process. Dr. Patrickson contributed invaluable criticism, and suggestions for improvement, without which I would never have been able to complete my thesis.

Many thanks are extended to the respondents who were kind enough to give the interviews and surveys for which anonymity was promised to protect confidence. I regret, therefore, that I cannot thank them by name.

Finally, I want to dedicate this work to my parents and my husband for their tolerance whilst this thesis was being written. Last but not least, I praise the Lord for giving me the wisdom and perseverance to complete this major endeavor in my life.

Abstract

Diversity and conflict are often perceived as double-edged swords (Milliken & Martins, 1996; Jehn, 1995), in that increasing diversity and conflict may improve team innovation (i.e., new design and problem solving), while at the same time, the increase in diversity and conflict may also harm implementation efficiency (i.e., speed, cost savings) and member satisfaction. The linkage between team outcomes and diversity and conflict has generally been found to be inconsistent in the literature (Williams & O'Reilly, 1998; De Dreu & Weingart, 2003). Jackson, Joshi & Erhardt (2003) were the first to propose that the social context in which a team resides plays a critical role in influencing the outcomes of diversity and conflict. This thesis argues that the interactions between diversity, conflict and team innovation may be clearer if the research population consists of innovative performance-driven IT project teams rather than arbitrary groups.

The research examines the effect of diversity and conflict in the tightly controlled context of IT service project teams in a Fortune 500 IT multinational in China (Mainland China, Hong Kong and Taiwan) that operate with cross-functional, cross-national, cross-regional, cross-company (internal employee versus external client/contractor) and cross-demographic membership. The thesis investigates how the characteristics of the teams, the type of tasks the teams perform, and the research location influence the process. A three-part model hypothesizing the associations between the variables is proposed where diversity is separated into functional and demographic diversity and its effects on team outcomes in terms of innovation, efficiency and member satisfaction are investigated. Conflict is separated into two conditions; task or relationship conflict, and is hypothesized as an intervening variable in this association while the adoption of cooperative goal and conflict management strategies by the teams is hypothesized as moderating the association.

Seventy-one IT service project teams with 71 project managers and 422 team members participated in this 11-month study. The results indicate that in an innovative IT project team context, the positive effects of functional diversity and task conflict can be brought out and that unintended demographic diversity need not drag a team down. Functional differences among team members were significantly positively related to team innovation yet had no negative associations with either team efficiency or member satisfaction. Demographic differences such as gender and national diversity had a significantly negative effect on member satisfaction. Task conflict was found to be positively associated with team innovation, whereas relationship conflict was negatively associated with team innovation. Both task conflict and relationship conflict were found to be significantly negatively related to member satisfaction. Task conflict and relationship conflict were

associated with team outcomes, but did not mediate the relationship between diversity and team outcomes.

Cooperative behaviors were found to have a positive effect on team outcomes in that cooperative conflict management was found to be positively related to team innovation and both cooperative conflict management and the adoption of cooperative goal were found to be positively related to team efficiency and member satisfaction. However, cooperative behaviors did not moderate the relationship between task conflict and team innovation; rather this relationship was moderated by project stage with earlier stages indicating a positive relationship and later stages indicating little relationship.

These findings suggest that the effects of diversity and conflict are more complex than previously considered and that models need to be expanded to include the influence of additional moderators such as project stage. A revised model with complex interrelationships among diversity, conflict, and team outcomes and project stage moderators is proposed in the final chapter.

The data presents details of a comprehensive field study into the effect of diversity and conflict on IT project teams in China. The unique nature of IT project teams in China has provided a rich testing ground that contributes to knowledge in the areas of diversity and conflict and highlights the following contributions: First, it has unraveled the crucial role of project stage in affecting group processes and outcomes in project teams; second, it questions existing theory regarding the use of types of conflict as the mediators between diversity and outcomes; third, it extends the diversity literature by introducing new diversity variables, i.e., national, regional, and company affiliations; fourth, it has tested some existing group theories on new group forms including short-term temporary, part-time membership, performance goal driven and virtual oriented IT project teams; fifth, it proposes a useful valid measurement of team performance by separating team innovation from team efficiency; sixth, it has tested some existing diversity and conflict theories in the Chinese context and lastly it has investigated the roles of cooperative goal and cooperative conflict management styles in the conflict-outcome relationship.

Table of Contents

Page

Declaration ii

Acknowledgments iii

Abstract iv

Table of Contents vi

List of Figures xii

List of Tables xiii

Chapter 1 Introduction 1

1.1 Characteristics of IT Project Teams 1
1.1.1 A Project Team is Goal Oriented and Skill Based 2
1.1.2 A Project can be Divided into Different Stages 2
1.1.3 Membership of a Project Team is Temporary 3
1.1.4 Typical Operation of IT Service Project Teams in Multinational Organizations 4
1.1.5 IT Project Teams may be Boundary-less 5
1.1.6 IT Project Teams may be Virtual 7
1.1.7 Summary of Modern Project Team Features 7

1.2 The Challenges and Opportunities Presented by Boundary-less Virtual Teams 8
1.2.1 Job Related Diversity and its Effect on Team Outcomes 9
1.2.2 Key Features of an Innovative Project Team 10
1.2.3 The Impact of Membership Diversity 10
1.2.4 Types of Diversity in Project Teams 11

1.3 Theories Addressing the Effects of Diversity 12
1.3.1 Importance of Task Type in Predicting the Association of Diversity-outcomes 12
1.3.2 The Importance of Performance Measures in Predicting the Association of Diversity-outcomes 13

1.4 Introducing the Mediators 14
1.4.1 Conflict as a Mediator Between the Impacts of Diversity on Outcomes 14
1.4.2 Interaction Between Task Conflict and Relationship Conflict 15
1.4.3 The Effect of Conflict in an IT Project Team 16

1.5 'When' Does Conflict Become Positive? 17
1.5.1 The Effects of Cooperative Conflict Management 18

1.5.2 The Effect of Cooperative Goal 19

1.6 The Research Location 19
1.6.1 The Importance of China 20
1.6.2 The Chinese Cultural Influence on Project Teams 20

1.7 Summary of the Introduction 21
1.7.1 Research Questions and Contribution 21
1.7.2 The Impact of the Chinese Context 22

Chapter 2 Literature Review 25

2.1 The Research Context 26
2.1.1 Cultural Differences between East and West 26

2.2 Teams 28
2.2.1 The Characteristics and Types of Teams 28
2.2.2 Project Teams within the IT Industry 30
2.2.3 Achieving Innovation Through the use of Project Teams 30
2.2.4 Composition of IT Project Teams 31

2.3 The Impact of Membership Diversity 32
2.3.1 Definition of Diversity 32
2.3.2 Choosing Types of Diversity in IT Project Teams 34
2.3.3 Functional Diversity 35
2.3.4 Demographic Diversity 37
2.3.5 Summary of Diversity Attributes 38
2.3.6 Theories Linking Types of Diversity and Team Behavior 38
2.3.7 Information/Decision Making Theory 38
2.3.8 Social Categorization Theory 39
2.3.9 Similarity/Attraction Theory 41

2.4 The Effect of the Two Types of Diversity 42
2.4.1 The Linkage between Functional Diversity and Innovation 42
2.4.2 The Importance of Task Type in Project Teams 43
2.4.3 The Importance of Type of Performance in Project Teams 44
2.4.4 Other Team Outcomes 45
2.4.5 Developing Linkages between Demographic Diversity and Member Satisfaction 46
2.4.6 The Effect of Demographic Diversity and Social Categorization Process in a Chinese Context 48

2.5 The Interrelationship of Components of Diversity 50
2.5.1 Conflict as a Mediator for Diversity-Outcomes Models 51
2.5.2 Task Conflict 51
2.5.3 Relationship Conflict 52
2.5.4 Task Conflict and its Linkage with Functional Diversity 53
2.5.5 Relationship Conflict and its Linkage with Demographic Diversity 53
2.5.6 Conflict and its Linkage to Outcomes 54
2.5.7 Task Conflict and its Linkage with Team Innovation 54
2.5.8 Task Conflict and its Linkage with Team Efficiency and Member Satisfaction 56

2.5.9 Relationship Conflict and its Linkage with Team Outcomes 57
2.5.10 The Relationship between Task Conflict and Relationship Conflict.....58
2.5.11 When Does Conflict Become Positive? 59

2.6 The Effect of Cooperative Conflict Management and Cooperative Goal on Project Teams 60
2.6.1 The Effect of Cooperative Conflict Management 60
2.6.2 Cooperative Conflict Management in Project Teams 61
2.6.3 Cooperative Conflict Management in a Chinese Context 62
2.6.4 Cooperative Conflict Management as a Moderator on the Task Conflict-team Innovation Relationship 64
2.6.5 The Effect of Cooperative Goal 65
2.6.6 Cooperative Goal in IT Project Teams 66
2.6.7 Cooperative Goal in a Chinese Context 67
2.6.8 Cooperative Goal as a Moderator to the Task Conflict-team Innovation Relationship 67

2.7 Summary of the Literature and Development of the Research Questions. 68

Chapter 3 Theoretical Framework and Development of Hypotheses 72

3.1 Conditions for IT Project Team Operation 72

3.2 Overview of the Research Model 72

3.3 Condition one: the Relationship between Diversity and Team Outcomes. 75
3.3.1 Functional Diversity and Team Outcomes (H1a, H1b, H1c) 77
3.3.2 Demographic Diversity and Team Outcomes (H2a, H2b, H2c) 78

3.4 Condition two: the Relationship between Diversity and Conflict; and Condition three: the Relationship between Conflict and Team Outcomes. 79
3.5 The Effect of Diversity on Conflict 80
3.5.1 The Effect of Functional Diversity on Task Conflict (H3) 80
3.5.2 Effect of Demographic Diversity on Relationship Conflict (H4) 80

3.6 The Effect of Conflict on Team Outcomes 81
3.6.1 Effect of Task Conflict on Team Outcomes (H5) 81
3.6.2 Effect of Relationship Conflict on Team Outcomes (H6) 82

3.7 The Mediating Effect of Conflict on Diversity in Team Outcomes Relationship (H7 & H8) 83
3.8 The Relationship between Task Conflict and Relationship Conflict (H9)..85
3.9 The Consequences of Task Conflict: Managing Task Conflict Effectively 85
3.9.1 Effect of Cooperative Conflict Management on Team Outcomes (H10)...86
3.9.2 Effect of Cooperative Goal on Team Outcomes (H11) 86
3.10 Moderators in the Research Model 87
3.10.1 Moderating Effect 88
3.11 Cooperative Conflict Management as a Moderator for the Relationship between Task Conflict and Team Innovation (H12) 90

3.12 Cooperative Goal as a Moderator of the Task Conflict-Team Innovation Relationship (H13) 92
3.13 Summary of Research model and Hypotheses 94

Chapter 4 Methodology 100

4.1 Data Collection 100
4.1.1 Cultural Differences between East and West 100

4.2 Variables for the Study 101
4.2.1 Independent Variables – Diversity 101
4.2.2 Dependent Variables – Team Outcomes 103
4.2.3 Mediating and Moderating Variables 105
4.2.4 Controls 106

4.3 Research Population and Sampling Procedures 108
4.3.1 Content and Target Populations for the Quantitative Data 108
4.3.2 Timing and Selection Criteria for Data Collection 109
4.3.3 Survey Response Rates 110
4.3.4 Preliminary Data Analysis 111

Chapter 5 Results 126

5.1 The Research Model 126
5.1.1 Justification for Using Multiple Regression Analyses (MRA) Instead of Structural Equation Modeling (SEM) 127

5.2 Inter-correlation Matrix of the Study's Variables 128
5.3 Effects of Functional Diversity on Team Innovation, Efficiency and Member Satisfaction (H1a, H1b, H1c) 131
5.4 Effects of Demographic Diversity on Team Innovation, Efficiency, and Member Satisfaction (H2a, H2b, H2c) 131
5.5 The Effects of Functional Diversity on Task Conflict (H3) 134
5.6 The Effects of Demographic Diversity on Relationship Conflict (H4) 134
5.7 Effects of Task and Relationship Conflict on Team Outcomes (H5a, H5b, H5c, H6a, H6b, H6c) 135
5.8 The Mediating Role of Task Conflict on the Relationship between Functional Diversity and Team Outcomes (H7) 137
5.9 The Mediating Role of Relationship Conflict on the Relationship between Demographic Diversity and Team Outcomes (H8) 138
5.10 The Relationship between Task and Relationship Conflict (H9) 138
5.11 The Effects of Cooperative Goal and Cooperative Conflict Management on Team Outcomes (H10a-c and H11a-c) 139
5.12 The Moderating Effects of Cooperative Conflict Management and Cooperative Goal on Task Conflict to Team Innovation Relationship (H12, H13) 140
5.13 Supplementary Analyses 142
5.14 Moderating Effects of Project Stage 143

5.15 Interaction Effects of Task Conflict and Relationship Conflict on Team Outcomes 146
5.16 Summary of Hypotheses Testing 148

Chapter 6 Discussion and Conclusion 151

6.1 Discussion of Results 154
6.2 The effect of Functional and Demographic Diversity on Team Outcomes 154
6.3 Effect of Task Conflict and Relationship Conflict on Team Outcomes ... 157
6.4 The Effect of Functional and Demographic Diversity on Conflict 158
6.5 Roles of Cooperative Goal and Cooperative Conflict Management 159
6.6 The Moderating Role of Project Stage 160
6.7 The Interactive Effects between Task Conflict and Relationship Conflict on Team Outcomes 161
6.8 Limitations of the Current Research 161
6.9 Strengths of the Study and its Contributions to the Literature 162
6.9.1 Proposal of a Measure of Team Performance that Separates Team Innovation from Team Efficiency Equation Modeling (SEM) 162
6.9.2 Uncovering of the Crucial Impact of Project Stage on Within-group Processes and Outcomes 163
6.9.3 Extension of the Diversity Literature through Introducing new Diversity Variables to Include National, Regional, and Company Diversity 163
6.9.4 Testing of Existing Team Theories in a Rich New Context of Temporary, Part-time and Performance Goal Focused IT Project Teams 163
6.9.5 Questioning of Existing Theory in which Conflict Mediates between Diversity and Outcomes 164
6.9.6 Investigation of the Roles of Cooperative Goal Adoption and Cooperative Conflict Management Style in the Diversity-Conflict-Outcome Relationship 165
6.9.7 Testing of the Diversity and Conflict Theories in the Chinese Context ... 165

6.10 Implications for Management of IT Project Teams 166
6.10.1 Team Composition 166
6.10.2 Managing Conflict 166

6.11 Conclusion 167

Bibliography 168

Appendix 178

Appendix A: The Cover Letter for the Study 180
Appendix B: Project Manager Survey 182
Appendix C: Team Member Survey 187
Appendix D: Ethic Approval 191
Appendix E: Diversity and Conflict in IT Project Teams in China (Farh, 2004) 193

List of Figures

3.1 Main Research Model.....74

3.2 Full Mediating Effect in a Three Part Model of X-M-Y.....74

3.3 Condition one: Relationship between Diversity and Team Outcomes.....76

3.4 Hypotheses on the Relationships between Diversity and Team Outcomes.....77

3.5 Illustrating Condition two (Relationship between Diversity and Conflict) and Condition Three (Relationship between Conflict and Team Outcomes) in the Research Model.....79

3.6 Hypotheses Linking Diversity, Conflict and Outcomes.....80

3.7 The Effect of X on Y Varies Depending on Different Levels of Moderator Z..... 88

3.8 An Example of Moderating Effect..... 89

3.9 Example: the Relationship between Work Motivation and Job Performance Moderated by Worker Ability.....90

3.10 The Moderating Effect of Cooperative Conflict Management on Task Conflict to Team Innovation Relationship.....91

3.11 The Moderating Effect of Cooperative Goal on Task Conflict to Team Innovation Relationship.....93

3.12 The Overall Integrated Research Model 99

5.1 The Interaction between Task Conflict and Project Stage on Team Innovation..... 145

5.2 The Interaction between Task Conflict and Project Stage on Member Satisfaction.....146

5.3 Interaction between Task Conflict and Relationship Conflict on Team Outcomes..... 148

6.1 Summaries of the Revised Model.....153

List of Tables

1.1 Differences between Members in Traditional Functional Teams and Modern Project Teams....8

1.2 Suggested Key Features of an Innovative Project Team....10

3.1 Summary of Research Hypotheses....96

3.2 Summary of Research Model Variables (will be further addressed in the next chapter)....98

4.1 Example of Diversity Index for Gender....103

4.2 Survey Response Rates....111

4.3 Descriptive Statistics for Responding Project Managers (PM)....112

4.4 Frequency Distributions for Responding Project Managers (PM)....113

4.5 Descriptive Statistics of Sample Project Teams....114

4.6 Characteristics of Sample Project Team and Team Members....115

4.7 Descriptive Statistics of Diversity Index Variables (N = 71)....117

4.8 Completely Standardized Factor Loadings for Task and Relationship Conflict, Cooperative Goal, Cooperative Conflict Management, and Member Satisfaction (N = 422)....119

4.9 Comparison of Measurement Models for Member Survey Multi-item Variables in the Study....112

4.10 Completely Standardized Factor Analysis for Team Innovation and Efficiency (N = 71)....123

4.11 Means, Standard Deviation, Reliability (α), Intraclass Correlation Coefficient (ICC(1)), and Within-Group Agreement (Rwg) of Selected Variables....125

5.1 Inter-correlation Matrix of Study's Variables (N = 71)....130

5.2 Multiple Regression Analysis of Effect of Functional Diversity on Team Outcomes and Task Conflict (N=71)....131

5.3 Multiple Regression Analysis of Effects of Demographic Diversity on Team Innovation (H2a) (N=71)....132

5.4 Multiple Regression Analysis of Effects of Demographic Diversity on Team Efficiency (H2b) (N=71)....133

5.5 Multiple Regression Analysis of Effects of Demographic Diversity on Member Satisfaction (H2c) (N=71)....134

5.6 Multiple Regression Analysis of Effects of Demographic Diversity on Relationship Conflict (H4) (N=71)..... 135

5.7 Multiple Regression Analysis of Effects of Task and Relationship Conflict on Team Outcomes (H5a-c, H6a-c) (N=71)..... 137

5.8 Multiple Regression Analysis of Effects of Cooperative Conflict Management and Cooperative Goal on Team Outcomes (H10a-c, H11a-c) (N=71)..... 140

5.9 Multiple Regression Analysis of Effects of Tasks Conflict on Team Innovation as Moderated by Cooperative Conflict Management and Cooperative Goal (H12, H13) (N=71)..... 142

5.10 Multiple Regression Analysis of Effects of Task and Relationship Conflict on Team Outcomes as Moderated by Project Stage N=71)..... 144

5.11 Multiple Regression Analysis of Effects of Tasks Conflict, Relationship Conflict, and their Interaction with Team Outcomes (N=71)..... 147

5.12 Summary of Hypotheses Testing Outcomes..... 149

Chapter 1

Introduction

The focus of this thesis is to study how the diverse skills, expertise and backgrounds of team members affect team outcomes such as team innovation, efficiency and member satisfaction, within Information Technology, hereafter IT, project teams in China. Among these three team outcomes, team innovation is particularly important within the IT industry. Given the increasing demand for innovation and the competitive nature of the market, how to make use of project teams to achieve innovation effectively is a critical topic for all IT firms (Gilson, Mathieu, Shalley & Ruddy, 2005; Kirkman, Rosen, Tesluk & Gibson, 2004).

Innovation can be a very different new idea or merely an incremental improvement over an existing process (Oldham & Cummings, 1998) and comes from seeing things differently. Innovation is more than creative ideas. It usually begins with individual's ideas, which become more mature and complete through open discussion with others in the team structure (Drach-Zahavy & Somech, 2001). It is possible for an individual to see things differently while working with the same group of people, but this generally happens slowly. To speed the innovation process up, one can utilize the input of different people, especially if these new people have different expertise and experiences that can contribute to the innovation goal (Ancona & Caldwell, 1992; Keller, 2001; Donnellon, 1993; Pelled, Eisenhardt & Xin, 1999). Evidence shows that using a team structure can help organizations not only create new ideas but also implement them successfully (Amabile, Conti, Coon, Lazenby & Herron, 1996). Within a team, innovation can introduce new ideas, processes, products or procedures, but these new activities may need to be implemented throughout the teams of an organization (West, 2002). Without a skilful team to deliver the innovation on time and on budget, individual creativity may not be implemented as effectively. To achieve overall team performance, project teams are often called upon to facilitate the innovation process.

1.1 Characteristics of IT Project Teams

Project teams are distinguishable from other types of teams because they are a particular type of team with a specific role.

1.1.1 A Project Team is Goal Oriented and Skill Based

Project team members are usually selected for a team to achieve a common purpose and performance goals (Katzenbach & Smith, 1999). They are specifically formed with team members whose various knowledge bases can contribute to solving complex business problems and, in turn, achieve higher team performance goals. Their members may be sourced from different functional units with different expertise, thus allowing them to potentially access a wider range of external information and create innovative knowledge and solutions (e.g., Lovelace, Shapiro & Weingart, 2001; Keller, 2001). Project teams have the potential to access different sources of expertise which can lead to team innovation, reduce error rates, reduce costs, improve schedule achievements, improve time to market and increase value for its customers (Guthrie, 1998). A project team is normally formed with complementary skills (Katzenbach & Smith, 1999) as opposed to similar skills as in the case of traditional functional teams.

Project teams have emerged as important vehicles with leverage over different skills that can identify high-quality solutions to organizational problems (Dumaine, 1991). The majority of Fortune 500 firms in the US now report using project teams compared to a minority of such companies a couple of decades ago (Lawler, Mohrman & Ledford, 1995).

A project is 'temporary', with a 'definite beginning' to start the project cycle and a 'definite end' when the project goal is achieved (Project Management Institute, 2004, p. 383). Unlike more static repetitive activities, a project has its own life cycle starting from the 'initiation stage', through to the 'planning stage', 'execution stage', 'control stage' to the 'closing stage' (Project Management Institute, 2004). Project teams also go through similar project stages for the duration of a project cycle.

1.1.2 A Project can be Divided into Different Stages

Project team stages are frequently divided into forming, storming, norming, performing and adjourning, as a project progresses from beginning to end (Tuckman, 1965). Team morale, group process and outcomes may vary at different stages of a project as project teams work together longer and face different challenges at different stages (Tuckman, 1965). Different project stages may produce different group processes, which in turn impact team outcomes (Jehn & Mannix, 2001). It was found that high performance teams generate and utilize a degree of task related team disagreement at different project stages and that this can contribute to team outcomes (Jehn & Mannix, 2001). It was also found that as the length of

time team members work together increases, surface level demographic differences (i.e., gender, age) become less visible and less harmful (Harrison, Price & Bell, 1998).

The work of the team, the project, is defined as 'a temporary endeavor undertaken to create a unique product, service or result' (Project Management Institute, 2004, p. 383). Consistent with this definition, a project team can be defined as a time-limited, non-repetitive group the purpose of which is to produce a one-time output (Cohen & Bailey, 1997).

1.1.3 Membership of a Project Team is Temporary

The project team, time-limited and temporary and with its diverse membership base (Ancona & Caldwell, 1992), has gradually replaced the former more or less semi-permanent functional team where membership was long term and members were mostly collocated. One typical structure is based on membership consisting of some peripheral and some core members, working on an assignment with specific performance goals, together with other members who come and go (Ancona & Caldwell, 1992). Compared to other types of group effort, a project team is generally more goal-oriented (Katzenbach & Smith, 1999) and, unlike permanent work teams, project team members can be in and out of teams according to the timing of their assignments during the life cycle of a project (Townsend, DeMarie & Hendrickson, 1998).

Project teams can source members from diverse functional areas (Keller, 2001) so that specialized expertise can be applied to a project. For example, new product development teams often choose their members from engineering, marketing or manufacturing departments (Keller, 2001; Ancona & Caldwell, 1992). In order to deliver project outcomes, a project team may temporarily recruit members from across functional and knowledge bases as they can have the best subject matter expertise (Donnellon, 1993; Pelled et al., 1999). Project team members may temporarily join a project on an assignment basis such that once their part of the project is complete they either return to their functional units or move on to another project (Ancona & Caldwell, 1992). Project team membership can be temporary because at different project stages, a team may need different expertise and members can be inserted or removed quickly when customer needs or environmental demands change (Townsend et al, 1998). Project team members may work for a team on a part-time basis and the length of secondments may vary. For example, some members may join a team in the early stage of a project and may leave at the mid-point stage once their part of the work is done, while on the other hand, other members may join the team in the mid stage of the project. These two groups of part-time members may be unaware of each other's existence, which may mean

there is a need for more coordination and communication in such teams than in traditional permanent teams whose members are mostly full-time, co-located and long-term.

The replacement of permanent teams by temporary project teams has been fostered by the increasing nature of globalization and advanced forms of information technology that have led to more and more teams being put together in ways that bring the best talents together from different places (Ashkenas, Ulrich, Jick & Kerr, 2002). Modern project teams, especially in the IT industry, tend to be multi-located, meeting irregularly and relying significantly on information exchange through the Internet (Kirkman, et al., 2004; Martins, Gilson, Maynard, 2004).

The modern form of project team has evolved from the traditional functional team in such a way that they are less limited by location and rigid organizational boundaries than earlier permanent functional teams, being described by Welch (2001) in his autobiographical book as 'boundary-less' organization.

1.1.4 Typical Operation of IT Service Project Teams in Multinational Organizations

Typically project teams in the IT industry are 'temporary', due to their members' temporary membership, and/or 'cross functional', due to their members' diverse functional expertise, and/or 'virtual' because of their members' geographical locations, and/or 'boundary-less', because of their members' diverse organization and company affiliations.

Among these IT project teams, IT service project teams tend to be more open and diverse (Kirkman, Rosen, Tesluk & Gibson, 2004) and will usually have a key customer sponsor that dictates the requirements and performance goals of a project. In consequence, customer satisfaction has become an important indicator of team performance (Jehn & Bezrukova, 2004; Kirkman, et al., 2004).

A typical IT service project team is first formed when an IT service provider signs an IT service contract with a customer (see chapter 2 and appendix E for more details of a previous study on IT project teams, Farh, 2004). A project manager is assigned by his/her company at the start of a project and is the single point of contact for the project. This individual is ultimately responsible for managing and leading the project to its successful conclusion (Gardiner, 2005). His/her mission is to lead a project team to design and deliver the services expected by the customer during the project cycle. The expected scope, budget and delivery schedule are normally set at the initial stage of the project. A project manager has to focus on the skills required for the project and source the best talent regardless of location, company affiliation or demographic background, in order to fulfill the customer's expectations and contractual requirements within the constraints of limited cost and time (Project Management Institute, 2004).

In order to meet customer expectation, it is imperative for IT service project teams to create innovative solutions for their customers. At times the talent and expertise needed for particular roles may not exist under a project manager's direct command; neither might they reside in the same functional unit, the same location, the same country, nor the same company. In addition demographic characteristics may not be shared. The unique advantage of multinational companies is that they are more able to source needed talent from within their global resources. In this way project teams may be comprised of team members from different organizational hierarchies, locations, regions and countries on a temporary basis during a project's life cycle (Farh, 2004).

Often the talent may come from outside a company, especially in the case of service project teams. For example, in order to gather customer requirements and change customers' existing processes, it may be necessary to involve them in project teams to ensure that projects can be designed and implemented according to customers' requirements. In order to work speedily and cost effectively, once the design specification is finalized, part of the coding and rollout of the system may be implemented in parallel using additional resources from external contractors and suppliers (Farh, 2004).

Despite the modern trend towards having more and more 'temporary', 'cross functional', 'boundary-less' and 'virtual' teams with members from diverse backgrounds, there has been little diversity research reported on within this complex form of team composition (Martins, Gilson & Maynard, 2004; Wong, Tjosvold, Wong & Liu, 1999). A modern IT service project team in a multinational tends to be comprised of members from very diverse backgrounds, which offers a rich context for studying a more complex form of diversity and it is this composition that forms the basis for the investigation pursued in this thesis. With a growing trend towards this form of project team, it is important to understand the effects of more complex forms of diversity; however, very few researches have yet addressed this gap.

1.1.5 IT Project Teams may be Boundary-less

A boundary-less project team is defined as a team which breaks down four different kinds of boundary, namely hierarchical, functional, geographic, and external (Ashkenas, Ulrich, Jick & Kerr, 2002). In other words, a modern project team may be composed of members that cross all four boundaries. The first two kinds of boundary, hierarchical and functional, have been torn down by cross-functional project teams. This type of project team utilizes flatter structures and is designed to reduce costs while maximizing flexibility and responsiveness to customer demands (e.g., Boyett & Conn, 1991; Donnellon, 1996).

The full team innovation cycle does not stop at the initial stages of gathering creative ideas; instead, it requires downstream successful implementation of creative ideas (West, 2002). Cross-functional project teams consist of members with expertise from different functional areas, including various forms of engineering, manufacturing or marketing. The advantages that cross-functional composition provides are multiple sources of information and perspectives, inclusion of downstream implementation concerns in upstream design, and speed to market, which is critical for success in high technology industries (Keller, 2001). With increasing globalization, many multinational firms have established branches in foreign regions and have broadened further to include forms of cross-national, cross-regional multinational project teams as their strategic problem-solving structure (Kinni, 1994). In addition, some leading global enterprises have brought in external customers and suppliers thus expanding membership across external company boundaries (Welch, 2001). One example of this is Motorola Inc., whose division general manager indicated that it would have been impossible for them to have managed the Iridium satellite communication project, given its size and complexity, in the traditional way and still completed it on time without such a structure (Kinni, 1994). The project team demanded a global perspective spanning both organizational and geographical boundaries. Since no one company had all the expertise and capabilities needed to build and launch the networks and no one national group had the power to administer it, the project team had to become more and more boundary-less in order for the project to succeed. It has now become common for more modern project teams to consist of not only internal company employees, but also external customers, suppliers and contractors from various organizations and locations. Such an open organization will demand more from a project teams' rich communication than traditional hierarchical and centralized organizations. 'Boundary-less' project teams are able to reach out to team members residing in different locations as communication is achieved through electronic exchange (Townsend et al, 1998).

In order to achieve the project goal, a project team needs to obtain the best talent, sometimes having to source its membership from outside the local area. Consequently it may include team members from remote locations that are assigned to the team on a temporary basis; which is more likely to be typical of organizations with sophisticated IT facilities (Kirkman et al., 2004; Martins et al., 2004). Selection of members for IT project teams is more open and flexible than for traditional work teams (Ashkenas, Ulrich, Jick & Kerr, 2002). Many IT project teams with easy access to technology can operate as virtual teams (Farh, 2004).

1.1.6 IT Project Teams may be Virtual

A virtual team is defined as a group of geographically and temporally dispersed individuals assembled via technology to accomplish an organizational task (Townsend et al, 1998). More and more IT teams have at least an element of virtuality in their operating activities due to advances in telecommunication and information technology that have created new opportunities for organizations, especially within IT industries to build and manage project teams using talented 'members situated in distant locations' (Kirkman et al, 2004). For example, in Kirkman et al's (2004) study of 35 IT system service project teams; the teams developed, installed, and serviced a computer travel reservation system for travel agencies where members of each team were geographically dispersed, with many members working from home. Virtual teams were created where each member had a different role, including account executives (selling the reservation systems), field service technicians (installing the systems), training representatives (training end users on the systems on-site), installation operation coordinators (setting up installation appointments), account management specialists (handling customer billing), and customer service representatives (handling customer phone calls and questions).

A recent study on project teams suggested that 60% of professional employees use the Internet or similar technology to collaborate with one another across geographic, organizational and other boundaries (Martins et al., 2004). While virtual team members may interact with one another in this way, their multi-location can result in a lack of richness in face-to-face communication (Kirkman, Rosen, Tesluk & Gibson, 2004). Mechanisms such as email, group software and teleconferencing are used extensively to simulate co-located communication but do not replace it completely.

1.1.7 Summary of Modern Project Team Features

Member roles in modern project teams significantly contrast with those of collocated functional teams with members belonging to the same company and sitting together for long periods of time as was typical in the 1970s (Lawler, Mohrman & Ledford, 1995). The modern project team is likely to consist of members chosen for the specific contribution they can make to a particular project on a temporary basis, who may be located in different countries, or regions, speak different first languages, belong to different organizations, have different experiences and may also differ significantly in their personal non-job related demographic characteristics, such as gender, race, and age (Earley & Mosakowski, 2000; Kirkman, et al., 2004; Farh, 2004). The nature of some of these differences is summarized in Table 1.1 below.

Table 1.1: Differences Between Members in Traditional Functional Teams and Modern Project Teams

Differences in team composition	1970's	2007
Expertise	Similar expertise	Multi-expertise
Functional Unit	Same functional unit	Multi-function unit
Organization Affiliation	Same company	Multi-company
Duration of membership	Long term	Temporary
Location	Co-locate	Multi-location
Nation/Region	Same nation/region	Multi-nation/region
Language	Same first language	Multi-first language
Gender	More male dominated	Both male and female
Race	Same race	Multi-racial

Source: Developed for this thesis

1.2 The Challenges and Opportunities Presented by Boundary-less Virtual Teams

Boundary-less and virtuality present opportunities to bring together diverse talents but in so doing they bring together other aspects of diversity. Existing diversity literature has mostly focused on group members from the same company or from the same location, with the most studied diversity attributes (i.e., race, gender, age, function) being limited within companies and location boundaries (Jackson, et al., 2003; Williams & O'Reilly, 1998). Very few diversity and team process studies have reported on field project teams with members from different companies (with the exception of e.g., Wong, Tjosvold, Wong & Liu, 1999) or with members from different locations (with the exception of e.g., Martins, Gilson & Maynard, 2004; Majchrzak, Malhotra, Stamps & Lipnack, 2004). The emergent diversity attributes (i.e., national, regional and company affiliation) are more likely to be seen in field project teams rather than student groups or laboratories. The difficulty of access to field data and limited capacity to control environmental factors have added even more limitations to research into these new diversity attributes. More optimistically, modern forms of teams

increasingly illustrate these new diversity attributes; which provides a research opportunity to explore the extent to which the findings in diversity literature may apply to this situation.

Diversity seems to be something of a conundrum in that increasing functional diversity can bring in different ideas then promote innovation as the primary effect, but functionally diverse persons also bring together their individual demographic characteristics, the side effects of which may potentially harm the team process (Jehn, Northcraft & Neale, 1999; William & O'Reilly, 1998).

The current study will focus on IT project teams, many of which operate in a virtual mode, where the invisibility of the virtual team members can hide the more visible personal demographic differences; because members are less likely to see visible demographic differences, there may be less of a chance of generating interpersonal friction (Majchrzak, Malhotra, Stamps & Lipnack, 2004). Moreover, project teams by nature are more temporary organizations than traditional work teams. If there is interpersonal friction in the project team, it will not be long term so people may be able to put up with it for a short while and focus on the task in hand. IT project teams may offer an opportunity to uncouple the primary effects of job related functional diversity and the side effect of non-job related personal demographic diversity through their unique temporary, virtual and task focused nature.

There is a small amount of literature that has reported the effects of diversity in the temporary and virtual team context (Majchrzak, Malhotra, Stamps & Lipnack, 2004), which raises an interesting research question: to what extent are IT project teams in a temporary and virtual team context able to reduce the harmful effect of non-job related diversity on team processes and bring out the beneficial effects of job related diversity on innovation performance?

1.2.1 Job Related Diversity and its Effect on Team Outcomes

For decades, those who have carried out research into teams have devoted substantial articles to understanding the effects of team composition on processes and performance (Li & Hambrick, 2005). Team diversity has captured the attention of those interested in innovation (Miron, Erez & Naveh, 2004), team scheduling and cost performance (Keller, 2001), team cooperation (Chatman & Flynn, 2001) and member satisfaction (De Dreu & Weingart, 2003). Modern managers have become more and more focused on how to create an environment to support project teams to manage diversity, resolve conflict, foster common goals and motivate highly skilled team members to produce effective project innovation, efficient implementation of innovation and team members' satisfaction (Kozlowski, Gully, McHugh, Salas, & Cannon-Bowers, 1996; Keller, 2001; Kirkman, Rosen, Tesluk & Gibson, 2004).

1.2.2 Key Features of an Innovative Project Team

Based on the above discussion, this thesis proposes that an innovative project team is formed with diverse skilled members who are able to manage their differences and conflicts in pursuit of common goals. At the end, the team is able to produce innovative solutions and implement the solutions efficiently with members' satisfaction. The key features of an innovative project team are listed in Table 1.2 as follows:

Table: 1.2 Suggested Key Features of an Innovative Project Team

Highly skilled team members- recruitment of members is based on skill and performance (Ancona & Caldwell, 1992)
Diverse skills and experiences (Jehn, et al., 1999)
Ability to manage diversity (Pelled, et al., 1999)
Ability to resolve conflicts (Chen, Liu & Tjosvold, 2005)
Capacity to reach common goals (Tjosvold, Tang & West, 2004)
Ability to create innovative solutions (Drach-Zahavy & Somech, 2001)
Ability to implement innovative solutions on time and on budget (Keller, 2001)
Members are satisfied (Chatman & Flynn, 2001)

Source: Developed for this research

In order to generate team innovation, therefore, the first step is to select the "right" members. In order to search for the best combination of task related attributes from team members, it is essential that the contributory effects of these on team outcomes be understood.

1.2.3 The Impact of Membership Diversity

The very nature of a modern project team means that the potential for diversity in member composition is significantly heightened over and above the earlier one location and single function team.

Guzzo and Dickson (1996, p. 331) define diversity as 'the dissimilarity among members'. Within work teams diversity can take many forms, which can be either readily detectable or may have less observable attributes. Although a large number of possible attributes can be used to differentiate individuals, certain demographic characteristics such as race, gender and age are more visible and likely to be used to categorize individuals in circumstances where members are seen by each other (Tsui, Egan & O'Reilly, 1992; Pelled, 1997; Williams & O'Reilly, 1998). Visible personal demographic characteristics, such as age, race or gender, have received attention, as has the impact of diverse job related attributes such as functional background (e.g., Pelled, Eisenhardt & Xin, 1999; Williams & O'Reilly, 1998; Chatman & Spataro, 2005).

Demographic attributes that are readily detectable, such as race, age and gender may be low in job relatedness (Pelled, 1996), but their high visibility typically stimulates associated social meaning for team members. This non-job related demographic diversity may have implications for interpersonal behavior (Jehn, Northcraft & Neale, 1999). On the other hand, attributes such as functional background and task expertise are often referred to as functional diversity (Jehn, et al., 1999).

1.2.4 Types of Diversity in Project Teams

In project teams, the critical factor determining whether a particular individual will be selected for membership is their expertise according to the project performance requirement (Kirkman, et al., 2004; Keller, 2001; Jackson, 1992). Different expertise and different organizational experiences contribute to functional diversity. This diversity is job related and serves as a criterion for member selection. It is the relevance of skills and experience that are the primary selection factors for membership of a team, however these members will also bring non-selected personal attributes; therefore personal diversity comes along with personal expertise. Functional diversity is thus a direct and primary contributor to the member selection process, while on the other hand, non-job related demographic diversity is an indirect and secondary contributor to membership. It seems that the separation of types of diversity into primary planned functional diversity and secondary unsought demographic diversity may be especially sharp in goal and skill based project teams rather than in the random composition of arbitrary groups because of the emphasis on expertise in the member selection process.

1.3 Theories Addressing the Effects of Diversity

Past literature has made reference to two different theories to explain the effect of primary and secondary diversity attributes on group process and performance. These two approaches may lead to potentially contradictory predictions about the effect of diversity. On one hand, the effect of primary diversity attributes such as functional diversity is predicted by information/decision-making theory, while on the other hand, the effect of secondary diversity attributes such as demographic diversity is predicted by social categorization theory.

Individual attributes such as expertise, knowledge, functional unit, and experiences are more related to functional background and experience and are highly job related and less visible. This type of difference in job related attributes is generally called functional diversity (Lawrence, 1997; Keller, 2001). Functional diversity has been investigated utilizing an

information/decision-making perspective that suggests that differences in group composition can facilitate access to diverse information from external sources, which in turn can enhance innovation (Lovelace, et al., 2001; Jehn et al., 1999) and improve decision-making quality (Knippenberg, De Dreu & Homan, 2004). However, this effect still needs to be confirmed in field work teams.

It has been suggested on the other hand that demographic diversity is related to social categorization theory which suggests that similarities and differences in demographic attributes such as age, gender and race are used to separate self and others into different categories, which distinguish people into 'in-group' and 'out-group' categories (Hertel & Kerr, 2001). People have a tendency to show positive behaviors toward in-group members and negative behaviors toward out-group members (Leung & Bond, 1984). If individuals show negative behavior to out-group members, this may cause intra-team conflict. This approach to the study of group process suggests that social category demographic diversity can lead to increased intra-team conflict and decreased member satisfaction when the level of diversity is high (Jehn et al., 1999; Pelled, et al., 1999; De Dreu & Weingart, 2003).

Without contextual information such as the type of work the team is doing or the type of industry in which the team resides or any special social situation, the findings of diversity across studies have been mixed (Jackson, et al., 2003; Williams & O'Reilly, 1998; Milliken & Martins, 1996). Sometimes the effect of functional diversity is positive. Sometimes it is negative. Many leading researchers have been asking in 'what' contexts, and 'how' and 'when' diversity is effective (Jackson, et al., 2003; Williams & O'Reilly, 1998). One approach has suggested the way to untangle the mixed results is to study diversity in an organizational context with clear understanding of task type and team characteristics (Jackson, et al., 2003).

1.3.1 Importance of Task Type in Predicting the Association of Diversity-outcomes

As previously mentioned, to explore the effect of diversity, contextual information, such as the type of task the project team performs, is an important factor for predicting outcomes (Jackson, et al., 2003). It has been found that when the project team task is creative and innovative, the potential benefit of expertise diversity is greater (Jackson, et al., 2003); when the project team task is routine, an increase in diversity may harm team performance (Ancona & Caldwell, 1992) and when task speed is the goal, diversity may interfere with efficiency (i.e., cost and schedule performance). In other words, the effect is different for different task types. For more innovative tasks, functional diversity is largely and positively related to innovation performance; for more routine tasks, functional diversity is largely and

negatively related to efficiency (Ancona & Caldwell, 1992). This reconfirms that it is hard to predict team performance without knowing the type of tasks a team performs.

In past literature, team performance was frequently measured without clearly specifying the task type information (Jackson, et al., 2003), which resulted in inconsistent findings (Williams & O'Reilly, 1998; Milliken & Martins, 1996). IT project teams with non-routine types of tasks might offer a more controlled context to test the assumption of positive cause-effect between functional diversity and innovation performance, and in turn contribute to the literature linking diversity and innovation.

Similarly, the measurement of team performance for different task types may not be the same. While testing the effect of diversity, it is important to understand the different types of team performance, as its association with diversity across studies has produced mixed results (Williams & O'Reilly, 1998). These issues are explored more fully in the next chapter.

1.3.2 The Importance of Performance Measures in Predicting the Association of Diversity-outcomes

Team performance has been measured in several ways. Two common methods are to assess either team efficiency, measured by the consumption of time and resources consistent with delivery of outcome, or to assess the quality of the outcome in terms of its innovative nature. For non-routine task type project teams such as IT project teams or new product development teams, the more common performance measurement is team innovation (Ancona & Caldwell, 1992). On the other hand, efficiency performance is usually used to measure task types that are comparatively more routine; normally project delivery, within budget and meeting the quality requirements.

These two types of performance are very distinct and should not be scaled together as one performance variable (Amabile, et al., 1996; Lovelace, et al., 2001). Functional diversity has been reported to increase innovation performance within project teams but impede implementation efficiency performance and member satisfaction because of the increasing difficulty it incurs for team management (Ancona & Caldwell, 1992). If these two distinct types of performance are combined, the conclusions may be misleading (Williams & O'Reilly, 1998). Failure to separate 'performance' in relation to innovative ideas and implementation efficiency of innovative ideas may cause a lack of agreement across studies as to the effects of diversity (Williams & O'Reilly, 1998). It is possible that ignoring the inconsistencies in past findings may have exacerbated this distinction. Separately measuring these two different performance types may better clarify the relationships among diversity and performance.

Less diversity among team members has been found to be associated with higher levels of member satisfaction and commitment (Tsui, et al., 1992). Member satisfaction is one

popular affective type of team process and usually is included as a key desired team outcome (De Dreu & Weingart, 2003). Therefore, in this thesis, the diversity of team outcomes includes not only planned performance goals such as innovation and efficiency, but also a broader view of overall team outcomes that includes member satisfaction (Hackman, 1987).

An IT project team has the following characteristics: Its task type is innovative and non-routine and its innovation performance type is easily separated from efficiency performance type. It is possible that if one can control the contextual environment such as task type and performance type factors, the association diversity has with team outcomes in IT project teams may be predicted. This raises the following two research questions:

- In relation to the effect of member selection in terms of functional diversity i.e., the primary membership path: to what extent will diversity in member functional expertise impact on the achievement of innovation and team outcomes?
- In relation to the effect of secondary member characteristics i.e., the unsought path: to what extent does the demographic diversity of members' impact on the satisfaction of members and team outcomes?

Without rich contextual information, past diversity studies have responded to the inconsistent results by suggesting concentrating on mediating variables to detect 'how' diversity operates through mediator effects to become positive or negative to team outcomes (Milliken & Martins, 1996; Williams & O'Reilly, 1998; Jackson, et al., 2003).

1.4 Introducing the Mediators

A number of researchers have refined their research models, typically introducing possible mediators (e.g., Keller, 2001; Jehn, et al., 1999; Pelled, et al., 1999). Among different process variables, there has been particular interest in using conflict as one mediator to explain how the effects of diversity are mediated through the presence of conflict impacting on outcomes (Li & Hambrick, 2005; Jackson et al., 2003; Williams & O'Reilly, 1998; Jehn et al., 1999; Polzer, Milton & Swann, 2002).

1.4.1 Conflict as a Mediator Between the Impacts of Diversity on Outcomes

There are two types of conflict that have been frequently used as mediators between member diversity and team outcomes. One is task related conflict or disagreement and the other is interpersonal relationship conflict or friction (Jehn, 1995).

Task conflict is defined as 'disagreement about the tasks being performed' (Jehn, 1995, p258). The argument proposes that job related functional diversity can bring together different

member expertise and perspectives that may introduce job related task conflict (Jehn, Northcraft & Neale, 1999). In turn, this type of conflict, task conflict, has been proposed as potentially contributing to job related team innovation (Jehn, Northcraft & Neale, 1999; Pelled, et al, 1999). It has been proposed that task conflict that is job related plays a mediator role between job related functional diversity and job related innovation performance (Jehn, 1995).

Empirical studies have found that task conflict may be beneficial for innovation performance when the type of task the team performs is non-routine, but it may be harmful for implementation performance if the task is routine (Jehn, 1995; De Dreu & Weingart, 2003). In an IT project team context, the association between task conflict and innovation performance might be more positive when one considers that the key criterion for member selection is task expertise.

Functional diversity by skill selection may lead to task conflict as diversity in member expertise increases, which in turn, may lead to innovative outcomes. Yet functional diversity among team members may also bring together unsought demographic differences among team members. This secondary unsought path, non-job related demographic diversity, may lead to non-job related relationship conflict (Jehn, Northcraft & Neale, 1999; Pelled, et al, 1999) or 'interpersonal incompatibility' (Jehn, 1995, p258). This type of conflict, relationship conflict, may lead to difficulties in teamwork and misunderstandings among team members and has been claimed to be negatively associated with team processes such as member satisfaction (e.g., Jehn, et al., 1999; De Dreu & Weingart, 2003; Li & Hambrick, 2005).

However, without reference to a specific organizational context or type of task, empirical studies have found that these two types of conflict cannot be completely uncoupled and findings on the effect of diversity on conflict remain inconsistent (De Dreu & Weingart, 2003). It seems that a more in-depth understanding of interaction between task conflict (desired path) and relationship conflict (undesired path) is required.

1.4.2 Association between Task Conflict and Relationship Conflict

Some literature has suggested that there may be a high correlation between task conflict and relationship conflict (De Dreu & Weingart, 2003). It has been reported that task conflict has potentially positive effects on innovation (De Dreu & Weingart, 2003); however, it is also possible that task conflict may impact on outcome indirectly through its interaction with relationship conflict. On one hand, task conflict may trigger relationship conflict to harm member satisfaction, while on the other hand, relationship conflict may also trigger excessive task conflict and member dissatisfaction that harms performance.

It seems that different types of conflict may lead to different team outcomes and raises the question: how do different types of conflict impact on outcomes in IT project teams?

1.4.3 The Effect of Conflict in an IT Project Team

Clearly the work of an IT project team is required by its very nature to be innovative. Thus differences in the task expertise and functional backgrounds of team members can potentially bring about a more innovative outcome if the team can capitalize on the functional diversity (Jehn, 1995). It is, however, equally possible that the lack of face-to-face interaction in temporary or virtual project teams might generate misunderstanding and miscommunication; which in turn may be harmful for team processes and outcomes (Kirkman, Rosen, Tesluk & Gibson, 2004). On the other hand, given the lack of face-to-face personal interaction in temporary virtual project teams, members may have less opportunity to escalate relationship conflict (Majchrzak, Malhotra, Stamps & Lipnack, 2004). In addition, the temporary nature of project teams may make relationship conflict more bearable, as people may be able to put up with short-term relationship conflict and focus on the task itself, thus, contributing to the performance goals. It is possible that with the task goal focus and lesser personal contact of the IT project team environment, the strong association between task conflict and relationship conflict might be reduced, making the separation of primary path and secondary path easier. This raises the following two research questions:

In terms of the primary path – to what extent will diversity in member functional expertise impact on:

the incidence of conflict?

the achievement of innovation?

the efficiency of performance?

the satisfaction of members?

In terms of the secondary path - to what extent does the demographic diversity of members impact on:

the incidence of conflict?

the satisfaction of members?

the efficiency of performance?

the achievement of innovation?

Yet, in reality, the incidence and impact of diversity and conflict may be difficult to predict in a confined context such as IT project team environment. The majority of literature on team innovation seems to agree that moderate levels of task conflict and discussion can promote innovation, while arguments that become personal can trigger negative team processes such as relationship conflict, member dissatisfaction and implementation difficulty.

The benefits claimed for the primary desired path of functional diversity through task conflict to promote innovation performance have been questioned when task conflict is unable to separate itself from harmful relationship conflict (De Dreu & Weingart, 2003). This raised another research question: Is task conflict more likely to be positive when uncoupled from relationship conflict?

1.5 'When' Does Conflict Become Positive?

It seems that conflict among members frequently, but not always, impacts team outcomes. A more important consideration, however, may be how conflict is managed and 'when' a moderator can turn conflict into something that is either beneficial or less harmful (Williams & O'Reilly, 1998; Simons & Peterson, 2000). Recently scholars have suggested that learning how to manage conflict and turning it into a feature that is beneficial to the team is more important than the conflict itself (DeChurch & Marks, 2001; Polzer, Milton, Swann, 2002). There has been growing interest in recent diversity studies in the impact of diversity on conflict and how to manage it. Simons and Peterson (2000), for example, found that managing conflict to build trusting relationships among team members can prevent task conflict being misinterpreted as relationship conflict, thereby uncoupling task conflict from relationship conflict, which in turn allows the team to harvest the potential benefits of task conflict.

Effective conflict management may bring out the positive side of conflict and separate positive conflict from negative conflict. Williams and O'Reilly (1998) strongly recommended that cooperative behaviors promote the positive effects of diversity and conflict and mitigate their negative effects. To capture the benefits of diversity and conflict, they proposed that team members need to be able to resolve their differences through effective, cooperative management of team conflict (DeChurch & Marks, 2001; Polzer, Milton, Swann, 2002, Alper, Tjosvold & Law, 2000).

Williams & O'Reilly (1998) suggested that moderate levels of functional diversity and task conflict seem to be ideal, as these provide enough of an increase in diversity to generate a productive discussion of opposing views, and, in turn, has a positive impact on team innovation (Pelled, et al., 1999), while at the same time the conflict is not excessive enough to cause significant damage to the functioning of the team. Similarly, a degree of increase in task conflict can increase innovation and has relatively small negative effects on relationship conflict and member satisfaction. In order to maintain a moderate level of conflict, a favorable team climate, such as one that emphasizes a cooperative conflict management practice has

been proposed, which in turn may promote team innovation and effectiveness (West, 2002; Alper, Tjosvold & Law, 2000).

1.5.1. The Effects of Cooperative Conflict Management

Conceptually cooperative conflict management is a conflict handling approach where participants work cooperatively toward a win-win solution by bringing all the related issues and arguments of both parties into the open, sharing information and analyzing the situation objectively (Alper, Tjosvold & Law, 2000). In such a cooperative activity, members have been found to be more satisfied (Chatman & Flynn, 2001) and the team more innovative (Chen, Liu & Tjosvold, 2005). In a cooperative mode, participants communicate different opinions actively and agreeably and, in turn, task conflict is found to lead to more innovation and member satisfaction (DeChurch & Marks, 2001). In this mode, team members have the opportunity to resolve issues earlier and prevent them recurring later so that project teams have a higher chance of producing higher efficiency performance (Tjosvold, 1991). Cooperative conflict management seems to be able to maintain a moderate level of conflict, which in turn contributes to team innovation, efficiency and member satisfaction.

1.5.1.1 Cooperative Conflict Management as a Moderator for Conflict-Outcomes

Cooperative conflict management may have the potential to uncouple the interaction between task conflict and relationship conflict, as it may be able to bring out a more positive side of task conflict while minimizing the impact of relationship conflict (De Dreu & Weingart, 2003). It is possible that when cooperative conflict management is present, team members can handle task conflict in a cooperative way. In this mode, team members tend to treat task conflict as a constructive means of gathering opposing ideas and criticisms, and can, in turn, enhance the original ideas to make them more innovative. High cooperative conflict management seems more able to bring out the positive side of task conflict for the benefit of team innovation than it can when it is low. Therefore, it is proposed that cooperative conflict management may play a moderator role to strengthen the positive relationship between task conflict and team innovation.

As previously mentioned, cooperative conflict management practices are powerful, which leads to the question of how cooperative conflict management is formed. It has been suggested that a super-ordinate goal or cooperative goal can foster cooperation among conflicting parties (Chen, Chen & Meindl, 1998). Since an IT project team is set up to be goal focused, one frequently generated task conflict is goal disagreement (Jehn, 1995; Farh, 2004). It is possible that if a cooperative goal was to be emphasized and adopted through healthy discussion, this might influence the team outcomes.

1.5.2 The Effect of Cooperative Goal

When a cooperative goal is in place, team members tend to perceive conflict as a mutual problem that needs common consideration and this social norm may in turn lead to an open discussion and full exchange of information that then enhances the team's performance (Alper, Tjosvold & Law, 1998). In cooperative goal mode, teams turn task conflict into constructive controversy that can contribute to team innovation (Chen & Tjosvold, 2002). Moreover, cooperative goals encourage full sharing of expertise and knowledge to promote team innovation (Tjosvold, Tang & West, 2004). In a cooperative goal mode, where the environment is open and tolerates diverse viewpoints, members feel more satisfied, and opposing issues can be aired early to prevent future implementation difficulties so that the project goal can be achieve more efficiently.

1.5.2.1 Cooperative Goal as a Moderator for Conflict-Outcome

Cooperative goals may have the potential to uncouple the interaction between task conflict and relationship conflict; in as far as they are able to bring out a more positive side of task conflict while mitigating the impact of relationship conflict (De Dreu & Weingart, 2003). Cooperative goals encourage open discussion, which may prevent task conflict from being misinterpreted as personal attack (Simons & Peterson, 2000; Jehn, 1995; Lovelace et al, 2001; Amason, 1996). It is possible that when cooperative goals are high and well adopted that task conflict will bring out more of the positive side of conflict as it relates to team innovation performance than when cooperative goals are low. Cooperative goal may play a moderator role to strengthen the association between task conflict and team innovation.

1.6 The Research Location

This research involves data collected in China (Mainland, Hong Kong and Taiwan). Most earlier diversity research has been undertaken in the United States and there has been little carried out in Asia, with the exception of Chan & Goto, 2003; Farh, Tsui, Xin & Cheng, 1998, so this presents an opportunity to collect data from a little explored location. With more and more US multinational firms establishing branches in the region of China, many have adopted complex project teams as one of their strategic organization structures (Li, Tsui & Weldon, 2000; Farh, 2004). The issue of how to successfully apply the best features of the project teams that exist in the countries where their headquarters are located to the host

countries, such as China, for the benefit of local operations has become an important management issue (Hui and Graen, 1997).

1.6.1 The Importance of China

Theories of within-team diversity have not yet been well tested in the Chinese context. Managing project team diversity in a multinational context has however, become a critical issue in the field of management theory and management practice as China continues to expand its share of world trade. 'Because of China, the rest of Asia will become irrelevant (unimportant)' Jeff Immelt (1999), GE CEO said in 1999, and quoted by Ping-On Mak (2005), Senior Vice President, Human Resources, GE Consumer Finance Asia. Mak added, 'Whatever China cannot produce is likely to become dearer; whatever China can produce is likely to become cheaper' (South China Morning Post, January, 2005). China's path to modernization has become quite distinctive, and an understanding of how China manages its economic activities is crucial for conducting business successfully in this context. China, therefore, provides a potentially exciting location for conducting academic research with significant practical impact. Li et al. (2000) pointed out that Chinese characteristics have had particular limitations in currently influential Western theories of management and organization. Management research in the Chinese context, namely in China, Hong Kong and Taiwan, as in the current study, has the potential to explore these existing theories further as well as having the potential to develop new theories to contribute to global management and organization knowledge.

1.6.2 The Chinese Cultural Influence on Project Teams

As the focal project teams operate in China (Mainland, Hong Kong and Taiwan), it is important to consider any special impact this may have on the research. So far, few diversity studies have gathered data from Asia (with the exceptions of, Chan & Goto, 2003; Lee & Farh, 2004) and none has been undertaken on IT project teams that are boundary-less and have temporary virtual operation (with exception of the IT project team focus group study, Farh, 2004). The effectiveness of project teams in many US multinationals has motivated companies to use similar structures in China (Li, et al. 2000). Yet Chinese culture, may not replicate the observed effects of diversity within teamwork in the same way (Trandis, 2003; Hofstede, 2001; Early, 1989; Leung & Bond, 1984). There is little research evidence to show how well teamwork and diversity will be received in China, let alone with IT project teams that use 'boundary-less' and 'virtual' structures (Farh, 2005). Chinese culture presents a complex context for the study of IT project teams. The current study will attempt to verify

whether the findings of Western research on team diversity and conflict apply to IT project teams in the Chinese context.

1.7 Summary of the Introduction

The major purpose of the current research is to examine the effect of two forms of diversity in IT project teams; job related functional diversity and non-job related demographic diversity, as these impact on team innovation, efficiency performance and member satisfaction. This thesis focuses on IT project teams in one multinational company in China as these can provide a rich context to explore the effects of diversity and conflict on team innovation and effectiveness, while holding constant the contextual environment in which the data are collected (i.e., team characteristics, attributes of team composition, type of tasks, type of performance goals, approaches to managing conflicts, and the influence of Chinese culture). The next chapter will explore a model addressing these variables and the contribution of the intervening variables of conflict and its management. The next chapter will also develop the foundation for the research questions that follow.

1.7.1 Research Questions and Contribution

An IT project team is formed by selecting members with the different expertise needed to contribute to its mission. Team members can enter or leave a team on a temporary basis. The goal of an IT project team is to achieve innovation and implement innovation effectively. This thesis aims to discover whether the extent to which task-related functional diversity in the IT project team context is related to team innovation and other team outcomes. The first research question is as follows:

1. To what extent will diversity in member functional expertise impact on:
the incidence of conflict?
the achievement of innovation?
the efficiency of performance?
the satisfaction of members?

Modern IT project teams select members from those who display the diverse expertise that represents the different skills needed by the team. At the same time the members selected may also bring their non-job related personal attributes such as their age, gender and location, either national or regional, ,and even their employment in different companies. This type of personal demographic diversity is non-job related and unsought and has been found in earlier literature to be associated with relationship conflict which may potentially harm member

satisfaction and team performance. This thesis aims to discover whether the extent to which non-job related demographic diversity in the IT project team context is related to team outcomes. The second research question is as follows:

2. To what extent does the demographic diversity of members impact on:
   the incidence of conflict?
   the satisfaction of members?
   the efficiency of performance?
   the achievement of innovation?

1.7.2 The Impact of the Chinese Context

There have been only a few diversity studies that have looked beyond the traditional locations of Westernized economies. The need for such research is increasingly obvious as globalization forces more and more organizationally based teams to cross national and other traditional boundaries. Globalization has gradually been altering the composition of modern teams into more and more 'virtual' and less and less 'co-locate' entities (Martins, et al., 2004). With the accessibility the Internet provides and the pooling of global resources into international data banks, the modern project team can source its membership from different nations, regions, locations and even from external customers and suppliers. There has been little previous research undertaken on this open format of the modern project team.

The current research location will provide a previously unexplored opportunity to discover the extent to which earlier findings on diversity may be applicable to Chinese project teams. The China region is also an interesting research field because it is going through unprecedented social and economic reform and unusual hyper growth.

This thesis is organized into the following chapters:

Chapter 2: Expands on the ideas raised in this introduction and reviews past literature on project teams, covering issues such as characteristics of IT project teams, team performance, membership diversity, intra-team conflict, conflict management and goal management, and adds additional material concerning the context of China. It highlights research gaps and raises research questions.

Chapter 3: Develops the research model, justifies the research questions and specifies the research hypotheses.

Chapter 4: Describes the research method by which data collection was undertaken, describes the research population and introduces the sampling procedures. The study tested the research method via data collected through quantitative questionnaire surveys.

Chapter 5: Reports the results of the data analysis and hypothesis testing. Bivariate correlations among the studied variables were reported first; followed by statistical analysis to test the research hypotheses.

Chapter 6: Discusses the limitations of this research and its contribution to diversity literature and suggests the implications for future studies

Appendix: Definitions of Terminology

1. Innovation – defined as either an incremental improvement over an existing concept or a radically different new idea (Oldham & Cummings, 1996); Innovation is more than creative ideas. It is a process that begins with ideas from individuals, but these ideas can benefit from open discussion involving others as in the team structure (Drach-Zahavy & Somech, 2001).
2. Team innovation - defined as the introduction and application of ideas, processes, products or procedures new to the team, designed to significantly benefit the team (West, 2002).
3. Project - defined as 'a temporary endeavour undertaken to create a unique product, service or result' (Project Management Institute, 2004, p. 383).
4. Project team - defined as a time-limited, non-repetitive group charged with producing a one-time output (Cohen & Bailey, 1997). Project team consists of some peripheral and some core members, working on an ambiguous assignment with objectives that change over time, together with other members coming and going (Ancona & Caldwell, 1992).
5. Boundary-less project team - defined as a project team whose members come from four different kinds of boundaries, namely hierarchical, functional, geographic, and external (Ashkenas, Ulrich, Jick & Kerr, 2002).
6. Cross functional project team – defined as a project team which consists of members from different functional areas, such as expertise in various forms (Keller, 2001).
7. Virtual team - defined as a group of geographically and temporally dispersed individuals assembled via technology to accomplish an organizational task (Townsend et al, 1998).
8. Diversity - defined as the dissimilarity among members (Guzzo and Dickson, 1996, p. 331).
9. Task conflict is defined as 'disagreement about the tasks being performed' (Jehn, 1995, p. 258).
10. Relationship conflict is defined as 'interpersonal incompatibility' (Jehn, 1995, p. 258).
11. Cooperative conflict management – defined as a conflict handling approach where participants work cooperatively toward a win-win solution by bringing all relevant issues of both parties into the open, sharing information and analyzing the situation objectively (Alper, Tjosvold & Law, 2000).
12. Cooperative goal mode – defined as a social norm where team members tend to view a conflict as a mutual problem that needs common consideration and this social norm in turn leads to an open discussion and full exchange of information (Alper, Tjosvold & Law, 1998).

Chapter 2

Literature Review

As more and more leading companies adopt project team structures to capture potentially diverse expertise for solving complex business problems, improving performance and creating innovative solutions (Lovelace, Shapiro & Weingart, 2001; Keller, 2001), they also generate issues relating to how this form of structure can be best utilized. Individuals bring along their different expertise and also their diverse demographic and cultural backgrounds; this is a combination that can potentially cause conflict (Pelled, Eisenhardt & Xin, 1999) and needs to be balanced against their potential to deliver improved performance. The literature on teams, diversity, conflict, innovation and performance is voluminous, ranging from theoretical explorations to empirical findings and covering problem-solving teams within student groups to organizational work groups. It ranges from top management teams to project teams and across different industries from manufacturing to high technology production, and across different task types ranging from very routine to very complex and innovative (see Jackson, Joshi, Erhardt, 2003 for a review). Within this wide scope, there has been a particularly strong interest in the relationship between the heterogeneity within teams, conflict within the teams, and team output and performance (Li & Hambrick, 2005; Jackson, Joshi, Erhardt, 2003; Williams & O'Reilly, 1998; Milliken & Martins, 1996).

The focus of this research is to explore the effects of diversity and conflict on innovation and team outcomes within IT project teams in China. The following review of the relevant literature is organized into six parts as follows:

2.1. The research context, which describes the research location, i.e., China, and the potential impact of Chinese cultural influences.

2.2. Teams, which describes one special type of team; the IT project team and its special characteristics and how it differs from other types of teams.

2.3. Diversity, which illustrates definitions of the key variable, diversity. This section describes diversity, the different types of diversity and their related theoretical foundations.

2.4. The effect of different types of diversity on team outcomes is reviewed in this section.

2.5. The interrelationships between variables. The interrelationship between diversity and within-team conflict and team outcomes is described. It elaborates how different types of

diversity can impact to stimulate different types of conflict within teams and thus lead to various types of team outcomes.

2.6. This section introduces two potentially effective styles of managing team conflict and team goal differences, and how these in turn may impact on the relationship between within-team task conflict and team outcomes. Conflict management and team goals are reviewed (at this stage their potential impact is still undecided).

2.7. Summarizes the literature review, identifies research gaps, and points to the research opportunity.

2.1 The Research Context

When undertaking field research, it is essential that contextual factors be understood, regardless of whether researchers pay specific attention to them or not (Jackson et. al., 2003). For work teams, either within business units, whole organizations or even within industries or nation states, context provides the purpose, resources, social cues and meanings that help shape team behavior. After having reviewed sixty-three papers on workplace diversity, Jackson, et al. (2003) concluded that researchers have seldom studied the research context explicitly, although publications have usually provided rudimentary information about team, organizational or societal contexts. Their review covered publications on team and organization diversity from 1997 to 2002 and concluded that a lack of information about the context in which research has been conducted may impede our ability to understand the reasons for conflicting results found across studies.

The research location for this thesis is China (mainland, Hong Kong and Taiwan). Given that cultural differences between West and East may lead to non-replication of earlier findings, it is necessary to consider these differences and how they might result in divergent findings before observing team behavior in a Chinese context. The effects of diversity on teamwork that have been reported in North America may not be replicated in Chinese culture given its uniqueness (Triandis, 2003; Li, et al., 2000; Early, 1989; Leung & Bond, 1984). For this reason a brief summary of the major cultural differences appears below.

2.1.1 Cultural Differences between East and West

Many cross culture scholars (e.g., Triandis, 2003; Hofstede, 2001; Chen et al., 1998; Earley, 1989; Leung & Bond, 1984) have proposed that different cultures have different ideologies, and that such differences can be important in organizations that operate in different contexts or across national and cultural boundaries. Difficulties can arise when the

basic assumptions shared by people in a particular society, which form the basis for their interactions with others in the workplace, are different from one culture to another (Schwartz, 1994; Hofstede, 2001). Furthermore, people in various countries differ in the extent to which they believe these differences are important (Triandis, 2003).

Chinese culture is very different from that of North America (Triandis, 2003; Hofstede, 2001; Early, 1989; Leung & Bond, 1984). For example, individualism vs. collectivism is one of the major differential dimensions for comparing East and West that has been adopted by cross culture scholars (Earley, 1989; Triandis, 2003; Leung & Bond, 1984; Cox, Lobel & McLeod,, 1991; Hofstede, 2001; Chen et al., 1998) and has been suggested to account for the greatest differences in work goal priority (Milliken & Martins, 1996; Earley, 1989; Hofstede, 2001; Cox et al, 1991). Hofstede (2001) found that at a national level Asian, Latin, and African countries are more collectivistic than North American and Northern and Western European countries. At a group level, Cox, Lobel & McLeod (1991) found that Asians, Latinos, and Blacks demonstrate more team cooperative behaviors than Anglo-Americans. Similarly, it has been found that the Chinese engage in less social loafing than Americans do in group settings (Earley, 1989). This suggests that within the collectivistic Chinese culture, Chinese tend to work more for the collective good and towards common goals than their more individualistic American counterparts.

Individualism refers to the extent to which members of a culture view themselves as distinct persons and the emphasis they put on individual goals and self-accomplishment (Earley, 1989). Individualist cultures give less attention to group harmony, which may generate more group conflict, whereas collectivist cultures emphasize group ideologies and seek collective interests and group harmony (Tjosvold, Hui, Ding & Hu, 2003; Chen, et al., 2005). It is possible that the collectivist orientation of Chinese team members may act to promote team processes more strongly via a common purpose and team orientation. The importance of relationships in this collectivistic society may also suppress individual interests (Li, et al, 2000). In order to maintain group harmony, Chinese prefer to avoid conflict rather than directly confront opposing parties as more individualistic Westerns do (Leung, 1987). The preferred way of handling group conflict may be different, therefore, between East and West. It is certainly possible that Chinese culture may impact differently on how group diversity, conflict and teamwork are treated within teams in this location and this must be kept in mind while interpreting such data.

2.2 Teams

The organizational context for the current study is IT project teams. IT project teams are one type of team that operates within particular parameters to undertake specific tasks within IT organizations. These distinguishing characteristics, first raised in chapter 1, are further explored and expanded below.

The use of teams within organizations has a long history of being adopted to better compete and survive, in response to market forces that drive the need for continual innovation because of increasing competition and an uncertain environment (Gilson et al., 2005). They are popular because teams can provide a mechanism for sharing ideas and play an important role in facilitating the innovation process and the implementation of recommended innovation. Increasingly, the majority of these teams are knowledge based and are charged with complex tasks such as developing new products or services, improving organizational processes and satisfying complex customer requirements (Kirkman et al., 2004; Ancona & Caldwell, 1992; Keller, 2001) as well as solving clients' IT systems problems (Kirkman et al., 2004). Consistent evidence indicates companies are expanding their use of project team structures in response to the need to compete within shorter cycle times (Lovelace et al., 2001; Xie & Stringfellow, 1998).

In the IT industry, cross-functional new product development teams have been positively linked to rapid development of new products in 36 computer firms (Eisenhardt & Tabrizi, 1995). The capacity of the project team to do multiple activities simultaneously, rather than sequentially, saves product development time. Yet before further elaboration on the specific nature of project teams is provided, this chapter will explore different types of teams given that they have become a common structural mechanism adopted for particular purposes such as problem solving, decision making or innovative product development.

2.2.1 The Characteristics and Types of Teams

A team is defined as:

> 'a collection of individuals who are interdependent in their tasks, who share responsibility for outcomes, who see themselves and who are seen by others as an intact social entity embedded in one or more larger social systems, and who manage their relationships across organizational boundaries'
> (Cohen & Bailey, 1997, Page 241)

According to the above definition, although the composition of a team may or may not be boundary-less, team members need to work both interdependently and collectively. For example, development specialists in a team may work closely with production specialists back and forth several times to make sure that the designs that are being developed can be

operated. These tentative designs may be reviewed by the research and development and manufacturing functional managers and subsequent revisions may be required. The contributions of different specialist members within a team work interdependently, the team members' outcomes are shared and the team goals are also primarily interdependent.

Cohen and Bailey (1997) classified teams into four types: work teams, parallel teams, project teams, and management teams. Work teams are continuing work units that are responsible for producing goods or services. Typically their membership is stable, usually full time with individual contributions being well defined. Parallel teams put together people from different work units to perform functions that the regular organization does not normally perform well on an individual basis. Parallel teams are normally task forces that are used for problem-solving and improvement type activities. They are usually involved in giving advice and are not necessarily involved in idea implementation. Management teams coordinate and provide direction to their sub-units and laterally integrate interdependent sub-units across key business units. They are often used in action and negotiation type tasks and not necessarily in implementation (Cohen & Bailey, 1997). Project teams are adopted for project type tasks such as new product development and coordinating activities from innovation to implementation.

Project teams, the focus of this research effort, are a special type of team that produces one-time outputs, such as a new product or service or information system to be marketed by a company where project tasks are non-repetitive and non-routine in nature and involve the application of knowledge, judgement and expertise (Cohen & Bailey, 1997). In common with other types of teams they have a common purpose and performance goals (Katzenbach & Smith, 1999), but are usually temporary and formed for specific projects and are usually boundary-less in composition. Once the project goal is achieved, the project team is disbanded. Their team members also come and go depending on the task assignments and the different project stages. Project teams are formed by bring together members with the different expertise needed to achieve a project's performance goals and possibly come from different organizational functions. The expectation is that project team members will bounce new ideas off each other as each member sees things differently. This type of structure appears to have been adopted as a dominant form for the delivery of innovative products and services (Kirkman, et. al., 2004). Project team tasks are non-routine and mostly innovative. Should the project require expertise that does not exist within the local organizational structure, team members may be brought in from other functional units, locations or even from external customers and contractors. Newer types of project teams are emerging where members reside in different regions, even within different nation states (Martins, Gilson, Maynard, 2004). These 'virtual teams' (Townsend et al, 1998) tend to interact using the Internet rather than face-to-face interaction. Their use has grown because of the advantage

they have of being able to select the best talent to meet team performance goals without being restricted to members who are collocated. Virtual team members communicate via technology and are able to collaborate with one another across geographic, organizational and other boundaries (Martins, Gilson, Maynard, 2004).

A virtual team can be defined as a group of geographically and temporally dispersed individuals assembled via technology to accomplish an organizational task (Townsend et al, 1998). Such project teams dominate the Information Technology industry because of their access to advanced technology and employees' familiarity with Internet usage. Thus, modern project teams, but especially IT project teams, tend to be virtual.

The majority of existing team research has, however, been conducted on permanent work groups or student laboratory groups and field research on teams is relatively rare (Jackson, et al. 2003). Despite the growing trend towards 'boundary-less' or 'virtual' oriented project teams, reported findings on their operations are scarce (Martins, Gilson, Maynard, 2004).

2.2.2 Project Teams within the IT Industry

Innovation is the key requirement for the IT industry to retain its competitive edge. Eisenhardt & Tabrizi (1995) reported how the global computer industry depended on fast adaptation and claimed that an IT company's success was achieved through product innovation. For example, Hewlett-Packard was transformed from an instrument company to a computer-based company through new product innovation. Similarly, Intel changed from a memory company to a microprocessor firm through product innovation. Innovation has become the key requirement to succeed in the global market, where 'organizations must continuously develop innovative and high quality products and services, deliver them on time and at a lower cost than their competitors' (Miron, Erez & Naveh, 2004; p. 175). These requirements continue (Lam, 2006) such that rapid technological innovation has become accepted as the primary way by which firms in this industry adapt, grow and maintain their competitive edge.

2.2.3 Achieving Innovation Through the use of Project Teams

Organizations throughout the IT industry encourage their employees to be creative and the majority are adopting project teams to achieve innovation (Gilson, Shalley & Ruddy, 2005), with many reporting the use of project team structures to sustain their efforts to become more and more innovative (Ancona & Caldwell, 1992; Donnellon, 1993; Drach-Zahavy & Somech, 2001). Adherents believe that exposure to divergent and potentially conflicting perspectives in a team structure may accelerate the process by which more creative

and innovative ideas are produced (Richard, Barnett, Dwyer & Chadwick, 2004; Tjosvold et al., 2003). Competition can be further enhanced when project teams are also required to implement innovation on time and at a lower cost than their competitors (Miron et al., 2004). Project teams, therefore, need to not only generate innovation but also to work efficiently within limited time and budget constraints (Lovelace et al., 2001; Amabile, Conti, Coon, Lazenby & Herron, 1996).

Within the IT industry, belief is strong that innovation is not simply stimulated through a burst of creativity on the part of talented individuals, instead, it is an interactive process among team members (West, 2002). Although the process may begin with the production of ideas by individuals, innovative ideas may be unfairly abandoned if they are not communicated or properly discussed and do not involve the whole team (Drach-Zahavy et. al., 2001; Lovelace et al., 2001). Innovation is, therefore considered to be a continuous process that requires the participation of team members and intra-team interactions. West (2002) has suggested that the innovation cycle contains four phases: recognition of an opportunity for innovation, initiation of a team process to foster implementation, team implementation of the innovation, and stabilization of the innovation. Project teams can speed up the innovation process by undertaking multiple activities in parallel during the implementation stage, which in turn will improve project delivery efficiency (Eisenhardt & Tabrizi, 1995). Demands for shorter cycle times and cost savings (Lovelace et al., 2001; Xie & Stringfellow, 1998) imply that innovation can be coupled with a high level of continual efficient activity to bring ideas from the initiation stage to the implementation stage (Miron et al., 2004; Amabile et al., 1996). Therefore, in the innovative and non-routine task context, the performance goals of an IT project team are innovation, time and cost efficiency.

2.2.4 Composition of IT Project Teams

Based on the innovation and efficiency performance goals of IT projects, different job related expertise and its contribution to the project outcome is the dominant base for member selection into IT project teams (Lam, 2006; Keller, 2001). Yet expertise cannot be separated from other aspects of the individual members who simultaneously bring with them their different non-job related personal demographic attributes, such as age, gender, race, regional, national and company affiliations, none of which is part of their needed task contribution. Their expertise or job related attributes are a direct and planned contributor to the project team whereas their non-job related demographic differences form an indirect input to the operation of the team.

The influence of these more personal demographic characteristics has been the focus of past literature, which has investigated how they impact on team performance. Yet, very

few studies on boundary-less or virtual teams have been reported (Martins, Gilson, Maynard, 2004). The IT project teams that form the context of this research tend to have a wide range of demographic attributes amongst their members as the typical team under investigation is formed by members from different nation states, and from different areas of functional expertise. Some teams contain members from customer organizations or suppliers that are outside the project teams' organization.

2.3 The Impact of Membership Diversity

Given such a broad range of personal characteristics, it is helpful to consider the potential impact of these differences on the functioning of the team and the extent to which they might impact on team outcomes. Such differences have stimulated a continually expanding area of research looking at the impact of all forms of interpersonal diversity on joint activities. Before exploring the effect of diversity further, what diversity is and what the different forms of diversity are in the literature need to be illustrated.

2.3.1 Definition of Diversity

Diversity refers to differences between individuals on 'any attribute that may lead to the perception that another person is different from oneself' (Triandis, 2003; p. 486). A team's diversity is defined as the level of its 'dissimilarity among members' (Guzzo & Dickson, 1996, p. 331) or 'distribution of personal attributes among interdependent members of a work unit' (Jackson et al., 2003, p. 802) or the 'collective amount of differences among members within a social unit' (Harrison & Sin, 2005, p. 196). In principle, therefore, diversity refers to an almost infinite number of dimensions, ranging from task skills to interpersonal skills, from functional background to nationality background, from gender to age, and from political preference to sexual preference (Knippenberg et al., 2004). Though in theory diversity can relate to many human attributes, in practice these differences tend to be dominated by either diversity by virtue of competency or diversity by virtue of some personal characteristic. One could, however, also consider diversity to be differences in social class, culture and lifestyle, and perception of space, time, social identities, social distance, and different protocols between senders and receivers (Triandis, 2003).

Although many attributes can be studied, in practice, diversity research has mainly focused on attributes relating to functional background, tenure, education, age, gender and race (Knippenberg et al., 2004; Jackson, et al., 2003; Williams & O'Reilly, 1998). Among these, readily-detected attributes such as race, age and gender have been studied most because

from a legal perspective race, age and gender attributes represent protected categories in many countries and are therefore of interest to organizations aiming to comply with legal prohibitions against discrimination (Jackson et al., 2003). For this practical reason, according to Jackson et al (2003), the majority of studies on the impact of diversity have been undertaken on readily detectable attributes (89%) rather than functional diversity (gender diversity was included in 34% of studies, race diversity was included in 24% of studies, age diversity was included in 31% of studies). Of functional diversity studies, most were undertaken on functional background, education level and job tenure.

People can use many attributes to tell themselves that another person is different. Researchers have been developing classifications that group these different attributes into different types of diversity. A person's physical features (e.g., age, gender, and race) are one type, while other underlying attributes become clearer after knowing a person longer (e.g., personality, values). Other areas of difference include work related characteristics (e.g., expertise, functional background, tenure, education) (Milliken & Martins, 1996; Jackson et al., 2003).

Milliken and Martins (1996) concluded that diversity has largely been studied with respect to two types of traits; observable traits versus unobservable traits. Observable traits are mainly personal demographic characteristics (e.g., gender, age, and race) that are easily seen, while unobservable traits relate to personality, values and work related characteristics, such as knowledge and skills, tenure, education and functional background. Diversity has also been studied on two dimensions or 'levels' (Harrison, Price, Gavin & Florey, 2002); surface-level diversity to describe observable traits versus deep-level diversity to describe unobservable traits. Using this approach, readily detectable attributes such as age, gender and race are called surface-level diversity and the underlying psychological attributes such as personality, values and attitudes are called deep-level diversity (Harrison, et al., 2002). Jackson et al. (2003) adopted a similar differentiation using the terms 'relations-oriented' attributes and 'task-related' attributes, where relations-oriented diversity includes readily detectable demographics such as age, gender, and race which may shape interpersonal relationships but usually do not have a direct influence on task and performance, and task-oriented diversity which reflects attributes such as functional background, tenure, and education and are likely to be associated with knowledge, skills, and abilities needed in the workplace. Using this differentiation, task-oriented diversity such as functional background, expertise, education, and tenure attributes are more directly job related while relations-oriented diversity such as age, gender, race demographic attributes are non-job related.

In a recent review of diversity constructs, Harrison & Klein (in press) suggested that diversity be referred to as 'separation' between in-group and out-group triggered by a social

category effect, while at the same time diversity should also be referred to as 'variety' in relation to various information and functional background characteristics. Their view reinforces Jackson, et al.'s, (2003) view on underlying differences, that 'separation' is based on the difference between relations-oriented non-job related diversity and 'variety' is based on task-related job related diversity.

In summary, there are many ways to classify the different forms of diversity. For IT project teams, the question is; what is the dividing line?

2.3.2 Choosing Types of Diversity in IT Project Teams

As aforementioned, there are different labels to classify the different types of diversity. For a random group of people, any differences in personal attributes can be dividers for separating different types of diversity; however, contextual information, such as team characteristics, is important to determine the divider. Although Cox et al., (1991) and Tsui and O'Reilly (1989) have argued that readily detectable dimensions such as demographic differences in gender, age, and race may be associated with informational differences and innovation creation, for task performance focused IT project teams, more clearly job-related dimensions, such as functional background, are more likely to be associated with job relevant informational differences. Milliken and Martins (1996) in their review paper also suggested that diversity types such as technical ability and functional background, are underlying attributes that are more related to innovation task performance. In the case of IT project teams, the group of people is selected for a specific task related purpose. Those who put IT project teams together are generally guided by the main objective of reaching the intended outcomes quickly and with minimum use of scarce resources (Van Der Vegt, Van De Vliert & Oosterhof, 2003, Keller, 2001). In almost all situations, this is team performance where the primary purpose is to achieve the desired outcomes. In such cases, job relevancy or expertise with respect to the team's task is, in practice, the primary selection mechanism for membership. This leads to functional types of diversity dominating the selection mechanism as it is believed that these are more likely to promote an innovative outcome (Pelled, et al., 1999). Although, the selection of team members is likely to be based on the skills that are associated with successful innovation, in reality, one can only fill a team with whole people, i.e., those who posses specific expertise and at the same time bring their non-job related demographic differences such as age, gender, and race into play whether intentionally or unintentionally. One cannot avoid team members' associated personal demographic attributes, as these make indirect contributions to the team. Since these demographic attributes are randomly coincident, they are more likely to trigger group process than job performance (e.g., Hertel & Kerr, 2001; Jehn, et al., 1999; Tsui, et al., 1992). In other words, in an IT project

team context, non-job related demographic diversity indirectly shapes interpersonal relationships but does not have a direct influence on performance.

It seems that job related diversity may be especially important for innovative goal focused IT project teams. Job related attributes directly contribute to performance while non-job related attributes can be considered to make indirect contributions to performance. In a project team context, job relevancy seems to be an appropriate divider to classify diversity attributes into two types given the key member selection criterion is task relevant expertise: functional diversity can be used to describe differences on the job related dimension, and demographic diversity to describe differences on the more personal dimension. These are addressed in further detail below.

2.3.3 Functional Diversity

Functional diversity is defined as the degree to which a team is heterogeneous with respect to attributes that describe individuals' associations with tasks, such as functional areas that identify individuals' roles and positions within an organization (Pelled, Eisenhardt & Xin, 1999, page 3). A project team with functional diversity implies that team members are from different functional backgrounds or have different expertise. Jackson (1992) named this kind of functionally diversified project team a cross-functional team, which is comprised of team members from diverse functional areas. Ancona and Caldwell (1992) gave an example of a cross-functional new product team in high-technology firms:

> 'Each team was responsible for developing a prototype product and transferring it to manufacturing and marketing groups. For example, one team was developing a product to automate the sampling process used in liquid chromatography, and another team was developing a new publishing device that combined photographic and computer imaging processes. Each team was generating technological innovation, yet responsible for ensuring manufacturability and marketability'. (Page 326)

Project teams with functional diversity provide forums for sharing and coordinating information across different functions. Members differ in professional training, and in their roles and responsibilities. An example of a cross-functional project team for new product development is one formed by members from engineering, R&D, marketing, and manufacturing (e.g., Ancona & Caldwell, 1992). Another example of a multidiscipline project team for IT and software development is formed by information analysts, consultants, researchers, quality controllers, computer programmers, application specialists, and functional designers (e.g., Van Der Vegt, et al., 2003).

Past literature indicates that functional diversity is normally calculated by how many different business units are involved (Jehn et al., 1999; Pelled et al., 1999). In one recent

publication, Van Der Vegt & Bunderson (2005) used 'expertise diversity' to refer to differences in knowledge and skills domains where members of a team are specialized as a result of their knowledge and work experience. Traditional functional grouping often acts as a crude indicator of the actual task specializations that exist in real project teams. For example, a team of engineers may be very different in their technical specializations and play different functional roles but still be working within the same department or functional units. Functional role diversity (or expertise diversity) better captures the concept of these different diverse perspectives than the cruder idea of different functional units. Therefore, functional diversity is operated by functional role differences in this study. In an IT project team, bringing together individuals with different expertise to generate an innovation solution is the dominant criterion for member selection and functional diversity may be better captured by the label of functional role differences within the team.

In addition to functional role differences, education and tenure diversity are also highly job related and are likely to be particularly important in new product development project teams because they help determine one's technical skills, information and expertise (Pelled, et al., 1999; Pelled, 1996; Simons, Pelled & Smith, 1999). Education diversity may provide the project team with a broader set of perspectives, while tenure diversity has been found to be associated with innovation and improved task work such as clarifying group goals and setting priorities (Ancona & Caldwell, 1992; Pelled, 1996). However, in the IT project team context, all team members are knowledge workers with different IT specialties; as almost all team members have university degrees, conventional education diversity may possibly be difficult to differentiate in this context. In the case of tenure diversity, some IT project team members are from external companies who do not have tenure from the focal company (Farh, 2004). Comparing the tenure differences between internal team members and external team members is meaningless. Education diversity and tenure diversity will therefore, not be included in the current study.

Given that an IT project team is a performance based team similar to a new product development team, it needs to generate innovative products and new services by capturing different experiences and skills from members' diverse functional roles. Increasing functional diversity may be achieved by actively broadening the diversity of performance skills required.

2.3.4 Demographic Diversity

The term demographic diversity generally refers to the degree to which a team is heterogeneous with respect to non-job related or personal demographic attributes. Under this classification, the most frequently measured attributes are 'immutable' characteristics such as age, gender, and race (Pelled, Eisenhardt & Xin, 1999, page 1). It may be that age,

race/ethnicity and gender differences among team members may be critical to workforce management as team performance has been shown to be affected by demographic differences between two or more individuals (Tsui, Egan & Xin, 1995). Most reported demographic diversity studies have been based on team composition (Chatman & Spataro, 2005; Li & Hambrick, 2005; Williams & O'Reilly 1998). For example, researchers have found that age distribution reduces project team members' technical communication frequency; people tend to communicate with those who are of similar age to themselves (Zenger & Lawrence, 1989). O'Reilly, Caldwell & Barnett (1989) found that turnover was more likely for individuals whose demographic attributes were most different from others and Tsui et al. (1992) reported that individuals who were more different from others in terms of gender and race were less attached or less committed to the organization than individuals who were less different.

According to Williams and O'Reilly (1998), a large number of field studies have revealed that heterogeneity in demographic attributes (e.g., race and gender) can have negative effects on group process and performance. Diverse group members may employ divisive social groupings based on their demographic, functional or cultural differences instead of using the inclusive working boundary as the basis for social grouping. Such separation based on demographic characteristics, can often lead to internal and dysfunctional conflict, less frequent communication, and subsequent poor group performance (Pelled, Eisenhardt & Xin, 1999; Williams & O'Reilly, 1998). Consistently, Ancona and Caldwell (1992) have suggested that process loss, poor communication patterns and excessive conflict often plague teams with diverse personal demographics.

The potentially divisive effects of demographic diversity on increasing cognitive biases and decreased liking on work group functioning have been proposed to increase the potential for relationship and interpersonal related conflict (Jehn, 1995), and the communication difficulties that result diminish the ability of the group to solve problems, making the team being less likely to satisfy its members' needs. Unless mitigated by some other process, most publications predict that non-job related demographic diversity will have a negative impact on group process and member satisfaction (e.g., Hackman, 1987; De Dreu & Weingart, 2003). Race has been listed as a key demographic diversity attribute, but it may not apply in the Chinese context since China is basically a one race nation so that the differences between races are not as important as differences in location origin (Farh, Tsui, Xin & Cheng, 1998). Therefore, race as a diversity attribute is not included in the current study.

2.3.5 Summary of Diversity Attributes

In summary, a consensus is gradually forming among researchers (Chatman, et al., 2005; Jackson et al., 2003; Jehn et al, 1999, Pelled et al, 1999; Milliken & Martins, 1996; Tsui et al., 1992) that the most important difference underlying diversity dimensions is the one between 'demographic diversity' i.e., differences in 'observable traits' or 'readily detectable' or 'non-job related' or 'relations-oriented' attributes (such as gender and age), and 'functional diversity' i.e., differences in 'unobservable traits' or 'less visible underlying' or 'job related' or 'task-related' attributes (such as functional roles). Job related functional diversity and non-job related demographic diversity can be viewed as two distinct types of diversity. These different types of diversity can be explained using the two different theoretical perspectives explored below.

2.3.6 Theories Linking Types of Diversity and Team Behavior

Broadly speaking the underlying difference between functional diversity and demographic diversity has been explained with reference to different theoretical approaches (Williams & O'Reilly, 1998; Jehn et al., 1999; Jackson, et al., 2003). More job related functional diversity is associated with a framework of 'information/decision-making theory' (Drach-Zahavy & Somech, 2001; Keller, 2001; Milliken & Martins, 1996; Williams & O'Reilly, 1998; Jehn et al., 1999), while non-job related and readily detectable demographic diversity has been associated with a theoretical framework entitled 'social categorization theory' (Tajfel, 1981; Milliken & Martins, 1996; Williams & O'Reilly, 1998; Jehn et al., 1999). These two distinct theoretical approached are further addressed below.

2.3.7 Information/Decision Making Theory

The logic behind this theoretical framework known as information/decision making theory, results from diverse teams tending to possess a broader range of opinions, knowledge, skills, and abilities that are different and potentially non-redundant for the task at hand. Information/Decision Making Theory suggests that the direct contributions of team members that are based on differences in knowledge and skills may foster team innovation (Richard, Barnett, Dwyer & Chadwick, 2004). Such functionally diverse teams, where members represent different types of expertise, may sometimes outperform homogeneous teams (Keller, 2001). Several groups of researchers have proposed that functional variance in group composition can have a direct positive impact through the increase in the skills, abilities, information, and knowledge that this type of diversity brings to better achieve the performance goals (Polzer et al., 2002; Jehn, Northcraft, & Neale, 1999; Ancona & Caldwell, 1992 and Zenger & Lawrence, 1989). Furthermore, individuals in functionally diverse groups have greater access to informational networks outside their work groups and this added

information from external sources can enhance the technical quality, budget and schedule performance for the cross-functional new product development project team even when functional diversity may have a negative impact on group cohesiveness (Keller, 2001). From this perspective, functional diversity is valuable when it adds new information to enhance innovation (Lovelace et al., 2001). Ancona and Caldwell (1992) and Pelled, Eisenhardt and Xin (1999) have reported that functional or job related background diversity can provide the range of knowledge, skills and contacts to enhance innovation and problem solving.

Information/Decision Making theory suggests that functional diversity can not only provide a larger pool of resources, but may also have other beneficial effects. The conflicting viewpoints may force teams to be more thorough in processing task relevant information and in turn prevent the team from blindly taking a course of action on which there seems to be an initial consensus. Functional diversity can, therefore, improve decision-making quality (Knippenberg et al., 2004) and decision comprehension (Simons et al., 1999). In addition, exposure to diverging and potentially conflicting perspectives may lead to more creative and innovative ideas and solutions (Richard et al., 2004; Tjosvold et al., 2003; Polzer et al., 2002; Chatman et al., 1998; Keller, 2001; Ancona & Caldwell, 1992; Jehn et al., 1999; Zenger & Lawrence, 1989). In addition, Jehn et al. (1999) and Pelled et al. (1999) have reported an association between functional diversity and increased task conflict, higher performance and innovation (Amason & Sapienza, 1997; Jehn et al., 1999; Jehn, 1995). The benefits can be summarized as functional diversity being associated with team innovation.

2.3.8 Social Categorization Theory

While job related functional diversity is the primary criterion or direct path for member selection, nonetheless non-job related demographic diversity can be considered as a secondary mechanism that is an inevitable accompaniment of member selection (Gebert, Boerner & Kearney, 2006). Non-job related demographic and personal attributes are inevitably part of team membership for IT project teams and are randomly organized. Their effects may be more similar to arbitrarily arranged groups than performance-driven project teams; therefore, the phenomenon of non-job related demographic diversity in IT project teams may be better explained by group theory such as social categorization theory (Tajfel, 1981; Williams & O'Reilly, 1998).

Social categorization theory suggests that demographic diversity in personal attributes may potentially harm team processes and decrease member satisfaction (Williams & O'Reilly, 1998). This type of theoretical framework has mainly been associated with studies that have addressed readily detected, relations-oriented and non-job related demographic diversity (Jackson et al., 2003). Social categorization theory suggests that individuals are assumed to

have the desire to maintain a high level of self-esteem, and that this is often undertaken through a process of social comparison with others (Tajfel, 1981). In making these comparisons, individuals must first define themselves (Tajfel, 1981); a process that permits a person to define himself/herself in terms of a social identity (Brewer & Kramer, 1986). Social categorization theory proposes that people identify themselves through self-categorization where they classify themselves and others into social categories using visible characteristics such as age, race, and gender.

Such a conceptualization has been claimed to predict and help understand how such diversity attributes influence people's attitudes and behavior and in turn team dynamics (Jackson et al., 2003). As the self-categorization process encourages an individual to assume a positive self-identity, he/she tends to maximize 'in-group' distinctions and to perceive 'out-group' others as less attractive (Williams & O'Reilly, 1998). One's similarity on visible and relatively immutable traits influences feelings of identification (Tsui, Egan & O'Reilly, 1992). Within groups, identification based on demographic similarity is associated with in-group biases and team conflict (Jackson et al., 2003). Social categorization theory suggests that similarities and differences are used as a basis for separating self and others into different categories, which distinguish one's own in-group from others' out-groups (Hertel & Kerr, 2001).

People tend to like and trust in-group members more than out-group members and they generally tend to favor in-groups over out-groups as a result (Tsui, Egan & O'Reilly, 1992). As the comparison becomes clearer, one can develop positive behaviors toward in-group members and negative behaviors toward out-group members (Leung & Bond, 1984). The process of self-categorization often relies on primitive physical social categories such as race, gender, and age (Tsui, Egan & O'Reilly, 1992; Pelled, 1997; Williams & O'Reilly, 1998; Jackson et al., 2003) and otherness is typically seen as a deficiency (Li & Hsu, 1995). This process results in increased stereotyping and anxiety in heterogeneous groups, and in turn these effects decrease member satisfaction within teams, and increases in turnover may result, together with lower levels of cohesiveness, reduced intra-group communication, decreased cooperation, and higher levels of conflict (e.g., Pelled et al, 1999; Jehn et al, 1999). Researchers (Smith, Smith, Olian, Sims, O'Bannon & Scully, 1994; Tsui, Egan & O'Reilly, 1992; Pelled, 1997) have also found that diversity can promote the creation of in-groups/out-groups and other cognitive biases, which confirm the potential negative effects of demographic diversity on group processes and outcomes.

Consistent with the social category theoretical perspective described above, researchers (e.g., Triandis, 2003; Jehn, et al., 1999; Tsui, et al., 1992; Chatman, 1991) have suggested a similarity/attraction paradigm where people who are similar are perceived as in-

group members and others are more attracted to those who are similar to themselves. Similarity/Attraction theory provides an alternative way of theorizing demographic diversity.

2.3.9 Similarity/Attraction Theory

Similarity/Attraction theory proposes that individuals are more satisfied and intend to remain in their workplaces when working with others who are perceived to have similar attitudes. This view is confirmed by Chatman (1991) who tracked 171 auditors in large accounting firms and found that new recruits, whose values matched those of the firm, adjusted more quickly and experienced the most vigorous socialization as well as feeling most satisfied and intended to remain with the firm. Although differences among members of workgroups are the norm, it has been found that people prefer similarity in their interpersonal interactions (Tsui et al., 1992). Underlining these effects is the degree to which members perceive themselves to be similar to or different from others in the group. Similarity of attributes, ranging from attitudes and values to demographic variables, increases interpersonal attraction and liking (Williams & O'Reilly, 1998).

Similarity can be a very important factor in team member interactions. When people see each other as similar and as having something in common even if disagreement occurs, they are more likely to approach each other to discuss, negotiate, coordinate and use creative problem solving to bring about win/win solutions (Triandis, 2003). On the other hand, when people perceive each other as dissimilar and disagreement occurs they are more likely to confront or avoid each other, and find themselves in win/lose situations. In a free choice situation, when an individual is able to interact with any of a number of people, there is a strong tendency for people to choose others who are similar to themselves (Triandis, 2003). McCain, O'Reilly and Pfeffer (1983) hypothesized that members who were significantly younger or older than the majority of their colleagues would be most likely to experience being treated as outsiders.

Moreover, categorization processes may also act to produce sub-teams within a team (i.e., 'us' and 'them'), and give rise to inter-sub-team conflicts. As a result, the more homogenous a team, the higher the member attachment (Tsui et al., 1992); and the better the social integration (O'Reilly, et al., 1989), the fewer relationship conflicts (Jehn et al., 1999; Pelled et al., 1999), and also members are less likely to leave (Chatman, 1991). In all, these processes are proposed to result in higher overall team performance when teams are more homogeneous than heterogeneous (Jehn et al., 1999). Based on this theory, fostering a common identity and reaching a common goal to enhance the sense of similarity among diverse team members may have the potential to mitigate the negative effects of social

category diversity (Williams & O'Reilly, 1998). However, a powerful way to foster common goal has mostly been missing from the past literature.

After reviewing the above diversity theories and how these theories apply to two different types of diversity, it is important to further review how these two different types of diversity influence team outcomes.

2.4 The Effect of the Two Types of Diversity

As mentioned earlier, the use of cross functional teams as fundamental building blocks of organizational structure and strategy seems to be based on the information/decision-making assumption that teams can gather together the diversity of information, expertise, backgrounds, and values necessary to make things happen and produce effective organizational outcomes (Jackson, 1992), whilst at the same time being able to cope with social categorization distractions and work within non-job related differences. How to make functional diversity positive while minimizing suffering caused by negative personal diversity is a challenge.

2. 4.1 The Linkage between Functional Diversity and Innovation

Functional diversity may offer advantages such as increased creativity, innovation, and quality of performance (Drach-Zahavy & Somech, 2001). This process allows diverse individuals to gather information and combine ideas that stimulate integrated solutions to work-related problems, thus providing innovative performance benefits (Van Der Vegt, et al., 2003). Moreover, increased functional diversity (e.g., differences in functional roles, skills, and expertise), may increase external communication as well as creative and innovative behavior (Milliken & Martins, 1996). From an information and decision-making perspective, functional diversity in the composition of the focal IT project team is proposed to increase the information available for problem solving and, in turn, increase the ability of the team to generate creative solutions to problems (Kirkman, et al., 2004; Drach-Zahavy et al., 2001; Jehn, et al., 1999; Pelled, Eisenhardt & Xin, 1999).

However, the aforementioned potential benefit of idea generation that functional diversity gives may possibly be diluted by any potential social categorization type friction arising from accompanying unsought demographic diversity. Before further considering potential linkages between functional diversity and team innovation, it is important to

understand the context, such as type of task, in which a project team performs (Jackson, et al., 2003).

2.4.2 The Importance of Task Type in Project Teams

Innovation has been proposed to be the primary goal of the IT project team and it is here that the potential benefit of functional diversity is greatest (Jackson, et al., 2003; Ancona & Caldwell, 1992; Jehn, et al., 1999). Yet if the primary task of the project team is routine or when speed is the goal, it has been found that additional diversity may harm efficiency as delivery of projects within cost may be jeopardized and schedules delayed (Jackson, et al., 2003; Ancona & Caldwell, 1992). Jackson et al. (2003) have proposed that the potential benefits of diversity are greater when the team task requires creativity and innovation, which illustrates that there is a contradiction associated with diversity as functional diversity on one hand is good for innovative type performance while on the other hand it may be bad for efficiency type performance. It seems that task type can play an important role in helping to untangle the mixed findings relating to the positive and negative effects of functional diversity.

Much of the literature lacks this type of contextual information, however, and this may have led to inconsistent findings about the effects of functional diversity on team performance in the past. A clearly controlled contextual environment is preferred to better predict the effects of diversity; an environment that IT project teams, with their clear focus on the need for innovation, may potentially provide. Their demand for innovation may provide a unique opportunity to concentrate on the stimulating effects of non-routine task requirements and in turn emphasize the potentially positive contribution of functional diversity. The typical IT project team needs to not only achieve innovation performance but also implement innovative ideas within required cost and schedule efficiencies. Yet these two different performance measures may not result from the same team situation.

Before further considering potential linkages between functional diversity and team performance, it is important to understand the type of performance. A lack of understanding of the different types of performance may have resulted in inconsistent findings relating to functional diversity in past literature (Williams & O'Reilly, 1998).

2.4.3 The Importance of Type of Performance in Project Teams

As aforementioned, an innovative task requirement is different from that demanded by more routine tasks. The performance goals for both types are also different. Outcomes associated with innovative tasks are measured by the degree of innovation of team performance. Yet the more appropriate measure for routine tasks is efficiency of performance.

Innovative performance tends to be measured by the number of new ideas and enhancement over exiting processes, whereas efficiency performance tends to be measured by savings in cost and time. These two team performances are different measures and are underpinned by different constructs.

Just as task type plays an important role in the prediction of the different effects of functional diversity, different task types may also be associated with different team outcomes. Innovative tasks tend to be associated with the demand for functional diversity in order to bring about innovative performance outcomes. On the other hand, previous findings suggest that teams that undertake primarily routine tasks are associated with potentially negative outcomes when membership is functionally diverse. Since functional diversity can sometimes be positively associated with performance (innovation) and sometimes negatively associated with performance (efficiency), it is important to distinguish between these two types of team performance. Past researchers (e.g., De Dreu & Weingart, 2003; Chatman & Flynn, 2001; Donnellon, 1993) usually used crude overall 'performance' to refer to both types of performance, which may have caused the inconsistent findings across studies (Williams & O'Reilly, 1998). For example, if innovation performance is added to efficiency performance and measured as one performance variable, the contribution from the two types of performance may be neutralized. Consequently the effect of functional diversity on innovation becomes inconsistent, which generates a potential knowledge gap that can be investigated. Separating the measurement of innovative performance and treating it as a separate dependent variable from the efficiency type of team performance can potentially reduce the chances of mixed results. A few researchers (e.g., Drach-Zahavy & Somech, 2001; Ancona & Caldwell, 1992; Pelled, et al., 1999) have measured innovation performance and efficiency performance separately and were able to see the clear correlation between functional diversity and team innovation, which reduces the inconsistency of the findings. If non-routine task type and innovation performance were to be measured separately, then the IT project team can provide a good research context to explore the question of how to and to what extent job related functional diversity impacts on team innovation.

Innovation performance is simply one outcome of team activities, and other outcomes have been investigated in past diversity research (Williams & O'Reilly, 1998; Keller, 2001). In order to understand the effects of team diversity on overall team outcomes, it is necessary to be clear about what specific outcomes are being investigated, and how to measure them and why (Williams & O'Reilly, 1998, p. 81).

2.4.4 Other Team Outcomes

Team outcomes cover a broad spectrum and include not only (1) team productivity output and whether this exceeds the desired performance standards, but also (2) whether the team processes maintain or enhance the teamwork capability, and (3) whether the team experience satisfies rather than frustrates the personal needs of team members (Hackman, 1987). On the first point, IT project team outcomes have been traditionally measured in terms of innovation (Knippenberg et al., 2004; Miron et al., 2004; Ancona & Caldwell, 1992; Drach-Zahavy & Somech, 2001), on the second point, team outcomes refer to the teamwork used to achieve budget and schedule performance efficiency (Keller, 2001; Lovelace, 2001; Alper et al, 2000), and on the third point, team outcomes can be measured by members' affective needs (De Dreu & Weingart, 2003). Team innovation performance and team efficiency performance are the direct goals and business measures for project teams. In order to sustain the performance of a project team, it is necessary to maintain the team's affective needs; the third aspect of team outcomes (Gladstein, 1984).

Williams and O'Reilly (1998) used the term 'group process' to refer to the affective needs of team outcomes. They suggested that group process is frequently measured in terms of team members' satisfaction, social integration, communication, and ability to resolve conflict. Among these group process variables, member satisfaction has been used most frequently by researchers in this area (e.g., Chatman & Flynn, 2001; Jackson et al, 2003). De Dreu and Weingart (2003) confirmed this when they reported member satisfaction as the representative variable for group process outcomes while undertaking Meta analysis for 30 team diversity and outcomes studies.

Past literature has demonstrated that the most common team outcome dependent variables of team diversity have been team performance, measured in terms of innovation and efficiency and group processes, measured in terms of the presence or absence of conflict and member satisfaction (Li & Hambrick, 2005; Jackson, et al., 2003; Williams & O'Reilly, 1998). Team innovation performance and team efficiency performance are associated with job related functional diversity. When innovation performance can be measured separately, the IT project team may provide a good research context to explore the first research question; to what extent does job related functional diversity impact on team innovation and overall team outcomes? On the other hand, team member satisfaction tends to be more related to non-job related demographic diversity (Jehn, et al., 1999).

2.4.5 Developing Linkages between Demographic Diversity and Member Satisfaction

Whereas functional diversity is the dominant means of member selection, personal demographic differences with regard to race, gender, and age are not a deliberate choice; rather they are a consequence of the needed talent and the individuals who possess that talent.

Demographic diversity, in this context, may be low in job relatedness, which is considered to be less directly associated with team objectives and more related to non-job related member satisfaction (Pelled et al., 1999; Jehn, et al., 1999).

Personal differences may trigger similar effects found in earlier group research on non-job related demographic diversity. In general, it has been suggested that non-job related demographic differences trigger the process of social categorization and generate similar negative effects on group functioning (e.g., Chatman & Spataro, 2005). However, the effects of traditional demographic diversity such as age and gender have rarely been the focus of study in IT project teams. Moreover, the new personal demographic differences that IT project teams have introduced, e.g., nationality, have rarely been studied (with the exception of a multinational financial services firm study in Chatman & Spataro, 2005 and a transnational teams study in Earley & Mosakowski, 2000).

Nationality diversity, or experienced personal differences amongst team members, may possibly be more pronounced in collectivistic cultures such as China, which are very different from the highly individualistic cultures that are prevalent in the West (Triandis, 2003). It is possible that teams put together from across national, regional and cultural boundaries within a multinational context may trigger higher levels of intra-team conflict. Location of origin and first language/dialect may be a major source of social categorization for Chinese in lieu of race (Farh, Tsui, Xin & Cheng, 1998; Farh, 2004). In China, different languages and dialects are spoken in different regions, which can mean that people from other locations may not understand each other. The Chinese consider themselves to be one race and the 'in-group' and 'out-group' separation is more likely to be based on regional origin and regional dialect differences than on racial differences. Therefore, for IT project teams that operate in a Chinese context, race may not be a key demographic attribute, instead cross-national and cross-regional differences may trigger similar social categorization effects as personally based diversity (Farh, 2004).

In addition to cross-national/regional team membership, some of the leading multinationals have also broken company boundaries by bringing in external customers, suppliers, vendors and contractors to be part of their project teams (Welch, 2001; Kinni, 1994). Nowadays, it is hard for a company to have all the needed expertise and capabilities inside it, therefore, project teams that comprise members with different company affiliations have become more and more common. For example, the growth of partnerships among companies in China, Hong Kong and Taiwan has increased and this has led to many project teams having this type of membership base (eWeek, Feb 3, 2003). Companies may require external IT vendors' services when internal competency is not established or the in-house function is not operating at the required level of capability (Lam, 2006). One IT director said;

> 'during the application development process, there is often a spike of activities that our normal resources can't handle. We may need external expertise to help us in that area until we build up that competency.... The other important consideration is cost-effectiveness...For example, (for some cases), it isn't economically sound for us to undertake this in-house because of high capital outlays on equipment'. (Lam, 2006, page 12)

More and more modern project teams comprise partnerships between different companies. For example, in Macau, its explosive growth in gaming, sports facilities, hotels and other IT infrastructure will drive IT multinationals to use their leverage on overseas IT expertise and external vendors to encourage them to contribute as members of boundary-less teams (Hammond, 2006). The downside of boundary-less teams is that relationships can easily sour as the result of unrealistic expectations, lack of communication, stubborn refusal to compromise, poor conflict management and a lack of shared goals (Wilde, 1996; Farh, 2004). Wong, et al. (1999) found that opposing ideas about how to improve quality, as well as the different goals and cultures when two companies are involved are likely to result in significant conflict in the partnership team. Similar findings are reported by Li and Hambrick (2004) who found that conflict and disintegration characterized the interaction within teams formed by mixed membership in joint-venture work teams from different company backgrounds.

Some IT project teams are service project teams that liaise between a company and its customers. Yet perfect harmony may be an unrealistic goal for working with customers. Tjosvold (1993) argued that teams may have difficulty in discussing these conflicts in an open and cooperative way and this may pose a serious threat. He found that very few customers filed complaints with a company, but those who did were actually more likely to maintain loyalty than those who did not. The worst situation is when customers feel frustrated and end up giving their business to a competitor. Cross-company differences seem to trigger similar social categorization effects as those mentioned in the discussion about demographic diversity.

In order to study demographic diversity in boundary-less and virtual-oriented IT project teams, it may be necessary to include three new demographic diversity attributes of member differences, i.e., national background, regional background and company affiliation, in addition to the traditional demographic variables. The effect of these three new demographic diversity attributes is important for modern project teams and it has been indicated in recent literature that they need more follow up and more thorough investigation (Chatman & Spataro, 2005; Li & Hambrick, 2004). IT project teams offer a research opportunity to examine whether and to what extent these national, regional and company attributes trigger similar social categorization process as traditional non-job related demographic diversity.

2.4.6 The Effect of Demographic Diversity and Social Categorization Process in a Chinese Context

To study the effects of demographic diversity in teams, a team's associated social categorization process and its social context needs to be considered (Jackson, et al., 2003; Li & Hambrick, 2005). However, specific investigation of these dynamics has rarely been published with data from the Chinese context (with a few exceptions, e.g., Tsui & Farh, 1997; Bond,1986; Lee & Farh, 2004). Li and Hsu (1995), for example, investigated social categorization processes in Taiwan and found similar in-group favoritism, for example, their results showed that both group identity and friendship produced bias in rewards allocation. They showed that Chinese subjects allocated more rewards to their friends and in-group members. While it has generally been confirmed that people treat those in the out-group less favorably than those in the in-group (Hertel & Kerr, 2001), this pattern appears to be more pronounced within large and collectivistic cultures such as in China (Triandis, 2003).

Chinese culture, for example in Hong Kong, Taiwan, and China, has generally been found to be highly collectivistic relative to the tendency towards individualism found in the United States and Great Britain (Bond, 1991; Li et. al., 2000; Hofstede, 1994; Yang, 1993). Leung (1987)'s definition of individualism/collectivism in the Chinese context, for example, uses 'in-group out-group differences' as a basis of reference;

> 'Individualism refers to the tendency to be more concerned about the consequences of one's behavior for one's own needs, interests, and goals, whereas collectivism refers to the tendency to be more concerned about the consequences of one's behavior for in-group members and to be more willing to sacrifice personal interests for the attainment of collective interests. In individualist societies, the distinction between out-groups and in-groups is relatively unimportant, and self-sufficiency is emphasized more. In collectivist societies, behavior toward in-group members may be markedly different from behavior toward out-group members, and values such as interpersonal harmony and group solidarity are more emphasized'. (Page 899)

In-group refers to people who are similar to oneself and out-group to people who are different from oneself (Williams & O'Reilly, 1998; Li & Hsu, 1995; Hertel & Kerr, 2001). Leung (1987) confirmed that diversity theory of in-group and out-group is prevalent in Chinese collectivistic culture.

Similarly, Bond (1986) reviewed the social psychological literature on interpersonal attraction involving Chinese samples. They concluded that most Western models of interpersonal attraction from which social categorization theory is derived, can be applied to Chinese people. They also confirmed that social categorization processes influence interpersonal relations within the Chinese context. In collectivist cultures, such as China, one distinguishing feature of interpersonal networks is the trust and strong attachment to in-groups

and clear out-group boundaries (Leung & Bond, 1984). Within in-groups, such as families and work teams, conflict is often minimized; for example Chinese have been found to be more likely to sue strangers, but less likely to sue friends when compared with Americans (Leung, 1987). Indeed the Chinese can behave very aggressively toward outsiders.

Leung and Bond (1984) found that reward allocation distinctions between in-group and out-group members were indeed more pronounced among Chinese than among Americans. Therefore, seeking similarity and identity within a group can lead a team to fail to receive all available information due to the isolation of members who are different (Gigone & Hastie, 1993).

Milliken and Martins (1996) also found that intra-team diversity in relation to value and culture is more salient in collectivistic cultures (Milliken & Martins, 1996, p. 409). Triandis (2003) further supported this observation by stating that large monolingual, hierarchical countries are especially susceptible to diversity difficulties. He explained that in large, monolingual countries e.g., China, Latin America, and the US, most of the information in newspapers is from the country level and people can travel thousands of miles and still use their own language and do not have the motivation to learn other languages and cultures. Thus, members of such cultures, including the Chinese, are especially likely to be monolingual, ethnocentric and rank their own culture above others. He also proposed that the diversity bias between 'us' and 'them' is larger in collectivist than in individualist societies. IT project teams with their cross-national, cross-regional, multi-cultural diversity within the Chinese context, may provide a good opportunity to explore the extent to which these new demographic diversity attributes trigger social categorization process, and in turn their impact on intra-team relationships. This has led to the specification of the knowledge gap to be investigated here and the development of the second research question; to what extent does non-job related demographic diversity impact on member satisfaction and overall team outcomes?

Without a clear definition of context or knowledge of its likely impact, diversity can be a double-edged sword for teams (Milliken & Martins, 1996) because while it provides forums for sharing information across functional boundaries, the diverse views and backgrounds members bring with them may generate potentially negative impacts on group functioning and performance. In order to interpret the full effect of diversity further, the interrelationship of its components should be understood.

2.5 The Interrelationship of Components of Diversity

Despite an increasing spotlight on diversity in work groups, there is always more to be done. Milliken and Martins (1996, p. 403), in a comprehensive review of the diversity literature, concluded that without proper mediators or moderators;

> 'diversity appears to be a double-edged sword, increasing the opportunity for creativity as well as the likelihood that group members will be dissatisfied and fail to identify with the group'.

Investigations into diversity and work team performance have been what Lawrence (1997) referred to as 'black box' studies, which do not measure intervening process variables. In response to these inconsistent cumulative results, many researchers have refined their research models to ask whether diversity operates through a mediator to influence the outcomes and to ask 'when' and even 'how' diversity operates through a moderator to impact the outcomes (e.g., Li & Hambrick, 2005; Van Der Vegt & Bunderson, 2005; Knippenberg et al, 2004; Chatman & Flynn, 2001; Jehn et al., 1999). William and O'Reilly (1998) proposed that it is likely that increasing diversity has an exponential effect such that some small increases in diversity are less likely to be disruptive to group process than subsequent increases; that is, having one dissimilar member in a group creates less disturbance than two or more. They presume that the effect of increasing information availability is curvilinear where some initial diversity has more value than subsequent increments; that is, there is a diminishing value to added information. Therefore, the next research question is 'how' and 'when' is the right amount of diversity triggered to generate positive or negative team outcomes?

Tsui and O'Reilly (1989) were not surprised with these inconsistent results because without clear specification of contextual conditions, they believe that performance benefits should be expected only to the extent that team members successfully manage the difficulties of interacting with those who are dissimilar not just by the level of team diversity. The ability to manage conflict among team members seems to have more impact on the effect of diversity than the level of diversity itself. Williams and O'Reilly (1998), who reviewed forty years of diversity research, concluded that without proper contextual information, there are no consistent main effects of diversity on team performance and proposed that a more complex framework for the nature of diversity is needed to study the impact of diversity utilizing the two theoretical frameworks, namely social categorization theories that focus more on relational aspects of group process, and information/decision-making theories that concentrate on task related aspects of team processes as these may offer a way forward. However, because problematic intra-team relations and low team cohesiveness hurts performance (De Dreu &

Weingart, 2003; Jehn, 1995), it is hard to see how diversity can negatively impact relationships but at the same time enhance performance.

An alternative way to integrate social categorization and information/decision-making theories is to take the dimensions and types of diversity into account (Knippenberg, et al., 2004) and use process variables (e.g., conflict, communication) to explain how diversity operates through these mediators to impact outcomes (Williams & O'Reilly,1998). Jackson et al., (2003) echoed this viewpoint and suggested similar mediator variables (e.g., conflict, cooperation, communication). Within this broad scope, there has been a particularly strong interest in the research model that examines the association among demographic heterogeneity of teams, and within-team conflict and team performance (Li & Hanbrick, 2005; Jackson et. al., 2003; Polzer et al., 2002; Lovelace et al., 2001; Pelled et al., 1999; Jehn et al., 1999; Milliken & Martins, 1996; Williams & O'Reilly, 1998). Consistent with Knippenberg et al.'s (2004) argument, Jehn et al., (1999) found information type diversity to be positively associated with task related argument and idea conflict while simultaneously, for the same groups of people, that social category type diversity may generate interpersonal conflict within the team.

2.5.1 Conflict as a Mediator for Diversity-Outcomes Models

Conflict is a fundamental characteristic of individuals working in teams (Simons et al., 1999; Thamhain & Wilemon, 1975) and cannot be totally avoided. Jehn, et al.(1999) and Pelled, Eisenhardt and Xin (1999) are the early scholars who first suggested 'conflict' as a mediating process variable to untangle the complicated set of associations among different types of diversity (i.e., functional diversity versus demographic diversity) and performance and team outcomes. In the case of conflict as a mediator, Jehn (1995, 1997) distinguished two particularly important types of intra-team conflict; 'task conflict' and 'relationship conflict'.

2.5.2 Task Conflict

Task conflict is defined by Jehn (1995, p.258) as 'disagreement about the tasks being performed', including 'differences in view points, ideas and opinions' and issues as priorities, goals, alternatives, and appropriate choices for actions (Jehn, 1997; Pelled, et. al., 1999). Examples of task conflict are conflict over the distribution of resources, procedures and policies, and judgments and interpretation of facts.

When team members have different functional backgrounds, they may have dissimilar priorities, and may make assumptions about future events based on previous training and experiences (Pelled et al., 1999). For example, Pelled et al. (1999) described how people who come from sales and marketing typically see opportunities from positive angles and how this

differs from those who have engineering experience who view opportunities in terms of risks and issues. Due to their respective belief structures, team members with different backgrounds may have divergent interpretations of a task and these divergences are likely to be transformed into intra-team task conflict. As diversity within a team increases, such task conflict is likely to increase. While any type of diversity may trigger task conflict, some are more likely to do so than others, based on the relevance of their corresponding belief structure. Belief structures that are most relevant to the information processing task tend to influence interpretation of that task. An example of task conflict is transcribed as follows (Jehn, 1997);

> "Sometimes people get irritated at each other about work matters"
> "We usually fight about work things – interpreting our reports, disagreeing about government regulations."
> "We constantly fight about accounts and which numbers to use and how to interpret them. We really only fight about this work-stuff" (Page 542)

2.5.3 Relationship Conflict

Relationship conflict is defined by Jehn (1995, p. 258) as 'interpersonal incompatibility' accompanied by 'tension, animosity, annoyance' among team members. Examples of this sort of conflict are personal taste, political preferences, values and interpersonal style. This type of conflict tends to have a negative impact on performance (Jehn, 1995; Pelled, et al., 1999) and team members with higher relationship conflict tend to have lower member satisfaction, lower morale and higher behavior disintegration (Jehn, 1997; Pelled, et. al., 1999; De Dreu et al., 2003; Li et al., 2005).

Pelled et al.(1999) found that relationship conflict is shaped by a complex web of demographic diversity types and that increases in relationship conflict are based on stereotyping and social categorization. Compared with to job related task conflict, relationship conflict is non-job related and is shaped by social categorization. People in different social categories will be confronted directly with each other's negative stereotypes and relationship conflict may occur. An example of relationship conflict is transcribed as follows (Jehn, 1997);

> "Her attitude just stinks. It's a personality conflict in the first place. I'd rather be working for anyone else but her. I just can't stand her attitude and her voice. We just clash."
> "Like any situation, there are some of us that don't get along, and so we don't talk at all." (Page 542)

2.5.4 Task Conflict and its Linkage with Functional Diversity

Pelled et al (1999) found that diversity with respect to highly job related attributes such as functional background tend to be associated with task related conflict. Functional background is defined by individual's workplace experiences, specifically, whether an individual is exposed to a particular functional area and how much time he/she has worked for a company. It has been suggested that an exchange of different ideas can lead to moderate levels of task conflict, which are then associated with a more complete understanding of alternative solutions and result in more optimal decisions (Tjosvold, 1986; Schweiger, Sandberg & Rechner, 1989; Amason, 1996). Diversity that has strong job related attributes is suggested to have a stronger relationship with task conflict than less job related demographic attributes and relationship conflict (Jehn, et al., 1999; Pelled, et al., 1999; Lovelace et al., 2001).

Moreover, for cognitive tasks such as innovative tasks, project teams demand a higher level of experiences and knowledge, which is obtained through exposure to different functional expertise (Pelled, 1996). Ancona and Caldwell (1992) noted that for more innovative tasks such as those of new product development teams, functional background is likely to be particularly important because it determines team members' technical skills, information, and expertise. Other researchers (Milliken & Martins, 1996; Pelled, 1996) have similarly argued that functional expertise is especially relevant to team tasks. In all, job related functional diversity is more likely to be associated with task conflict for innovative type tasks. This is an association that has, however, not been well tested in IT project teams in China. While innovation increasingly becomes the competitive edge for many modern corporations, the effects of functional diversity become more and more important. This has raised an intriguing research question - to what extent does job related functional diversity impact on task conflict?

2.5.5 Relationship Conflict and its Linkage with Demographic Diversity

While job related diversity shapes task conflict, relationship conflict is shaped by a more complex power (Jehn, et al., 1999; Pelled, et al., 1999; Lovelace et al., 2001). Although many types of diversity may cause categorization, some types have a greater likelihood of doing so than others, depending on the level of changeability of the demographic attributes (Tsui, Egan & O'Reilly, 1992; Pelled, 1997; Williams & O'Reilly, 1998). Diversity based on relatively unchangeable attributes e.g., gender and age, which are less job related are particularly likely to trigger inter-category relationship clashes. For example, people feel especially opposed to others and are likely to discriminate against members of another category (Williams & O'Reilly, 1998). In all, non-job related demographic diversity is most likely to cause relationship conflict.

IT project teams consist of members brought together by virtue of their functional expertise with respect to the team task. They bring with them attributes ranging from different ages and gender to different national, regional and company affiliations. These attributes are indirectly incorporated into the project team along with their associated functional expertise. The effect of these new demographic diversity attributes has become more and more important, which raises a key research question; to what extent does non-job related demographic diversity (especially these new demographic diversity attributes) impact on relationship conflict?

Conflict is a fundamental characteristic of teams. In addition to the linkage with diversity, conflict itself may influence team outcomes (Simons et al., 1999; Jehn, 1995; Thamhain & Wilemon, 1975).

2.5.6 Conflict and its Linkage to Outcomes

Jehn (1995) has suggested that task conflict and task related disagreement tend to improve performance for non-routine tasks, while at the same time, relationship friction and interpersonal conflict tend to harm members' satisfaction (Jehn, 1995). It appears, therefore, that there is a correlation between conflict and team outcomes. Since Jehn's study (1995), there have been more than two dozen papers that have focused on relating conflict with team performance and group process outcomes (De Dreu, et al., 2003 for a meta-analysis; Li & Hambrick, 2005).

2.5.7 Task Conflict and its Linkage with Team Innovation

Consistent with Jehn's (1995) proposal, Tjosvold (1991) also indicated that task conflict might be beneficial. More recently, Li & Hambrick (2005) and Simons & Peterson (2000) following on from Jehn's (1995) study, have also proposed that task conflict has an effect on team performance. However, the positive effects on team performance can only be generated by task conflict and not by relationship conflict and only if teams are performing non-routine tasks (Jehn, 1995). Since then, other researchers, e.g., Jehn, Northcraft and Neale, (1999); Simons, Pelled and Smith (1999), have also found that task conflict has positive effects on team innovation performance. Simons and Peterson (2000) suggested that teams that experience task conflict tend to make better decisions because such disagreement encourages greater cognitive understanding of the issue being considered. Jackson, et al. (2003) and Jehn, Northcraft and Neale (1999) support this suggestion and suggest that for non-routine tasks, job related differences will be most beneficial.

It seems that task conflict that is triggered by job related debate can capture experiences, knowledge and skills that in turn contribute to cognitive task performance

(Pelled, 1996). Some empirical studies have also found that task conflict can stimulate effective decisions and innovations (Jehn, 1995, 1997; Pelled, et al., 1999). These publications support the idea that task conflict is largely constructive, job related and positive for team innovation (Jehn, 1995).

Since Jehn's (1995) pilot work, there have been many publications on the effect of intra-team conflict on team outcomes. De Dreu et al. (2003) reported a meta-analysis on the associations between relationship conflict, task conflict, team performance and team member satisfaction. Their analysis revealed strong negative, instead of Jehn's (1995) predicted positive, associations between task conflict and team performance. They argued that Jehn's (1995) theory on the positive effect of task conflict is an outlier compared with the remainder of the 26 studies included in their analysis. Yet it is possible that De Dreu, et al.'s (2003) finding, which is inconsistent with Jehn's (1995), may be explained by Jackson, et al.'s (2003) contextual information proposition.

Jackson, et al. (2003) suggested that it is important to consider contextual information such as task type and team performance goals when comparing the effects of team diversity across different studies. Jehn (1995) had suggested that when a task is complex, task conflict contributes to performance and when a task is routine, task conflict may actually harm performance. Task type, therefore, seems to play an important role in determining whether the effects of conflict on performance are positive or negative. Jackson, et al. (2003) reinforced this proposition and recommended accepting the assumption that when task requires creativity and innovation, job related diversity and task disagreement benefit performance. On the other hand, when a task is routine or when task speed is the goal, different opinions and arguments harm performance. They further agree that different task types can lead to different effects on team performance. This may account for inconsistent findings across different studies as to the effect of task conflict in the past literature.

Moreover, distinguishing between different types of tasks and different types of performance needs further detailed investigation. Performance goals for a project team may vary at different stages of a project. In the early stages, brainstorming may be a desired activity and lead to the best design for the overall blueprint. During this stage, a project team's deliverables are usually a proposal whose performance rating is mainly based on the quality and quantity of innovative ideas. However, after the design stage is settled, a project's objectives and deliverables for the later stages are usually about implementing innovative ideas and delivering services, and their performance ratings are mainly based on efficiency measurements such as cost, schedule effectiveness, quality and customer satisfaction. An innovation type of performance is likely, therefore, to be measured differently from an efficiency type of performance (Lovelace, et al., 2001; Ancona & Caldwell, 1992).

Most of the past research has tended to relate task conflict to performance without incorporating these differences i.e., without differentiating an innovative task from a routine task; and without differentiating an innovation performance from efficiency performance. This may have led to inconsistent conclusions across studies. IT project teams with their clear innovative task requirements and their relatively clear innovation performance goals may help untangle these mixed conclusions. This raises the issue of the extent to which a job related task conflict impacts on team innovation.

2.5.8 Task Conflict and its Linkage with Team Efficiency and Member Satisfaction

While team innovation tends to be the main performance goal in the design stage for more complex types of task, team efficiency tends to be the performance goal in the implementation stage for relatively routine tasks. When the key task is innovation, different perspectives and opposing ideas benefit innovation performance, however, when the team task is routine and when task speed is the measurement criterion, different perspectives and opposing ideas can harm efficiency type performance (Jackson et al., 2003; Jehn, 1995; Ancona & Caldwell, 1992). It is during the latter implementation stages of a project when time is critical, that task conflict may detract from team efficiency. Empirical evidence shows that when team members spend a lot of time and money arguing over technical issues and task coordination, it is unlikely that they will obtain the resources needed, such as money and help, for timely prototype development and commitment of appropriate resources and this in turn can delay the completion of a team's project (Lovelace et al., 2001; Gladstein, 1984). This lack of resources is also likely to cause an overrun of the original budget. This seems to suggest that task conflict may have a negative relationship with the efficiency type of team performance (e.g., meeting the schedule and cost constraint).

De Dreu et al. (2003) found that task conflict not only interferes with team performance but also reduces member satisfaction because it produces tension, antagonism, and distracts team members from performing a task. Member satisfaction is important for sustaining group processes. To achieve overall team outcomes, members must be satisfied (Hackman, 1987). De Dreu and Weingart's (2003) meta-analysis of 28 studies found that the average correlation between task conflict and member satisfaction is significantly negative, which is consistent with the findings of early conflict and group theorists who focused on the negative effects of group conflict (Hackman & Morris, 1975; Gladstein, 1984).

It seems that past literature is consistent in terms of the negative linkage between task conflict and team efficiency and member satisfaction; however, this finding has not been

previously tested in IT project teams in China and raises another issue for investigation; to what extent does job related task conflict impact on team efficiency and member satisfaction?

2.5.9 Relationship Conflict and its Linkage with Team Outcomes

Relationship conflict tends to be a product of interpersonal conflict which may make team members unwilling to share or listen to each other's different perspectives and potentially useful ideas, and in turn hurts team innovation (Jehn, 1995). Amason's (1996) study of top management teams revealed that relationship conflict was negatively associated with decision quality and cognitive task performance. In addition, when there is relationship conflict, team members are likely to waste time and energy making personal attacks, and as a result, may have little time and energy left to devote to the completion of critical tasks on time and within budget (Jehn, 1995). Relationship conflict, therefore, tends to harm team efficiency. De Dreu et al. (2003) undertook meta-analysis of 28 studies and consistently found that relationship conflict had negative correlations with team performance.

Furthermore, De Dreu et al.'s (2003) meta-analysis found that relationship conflict had consistently negative correlations with member satisfaction. It was also found that relationship conflict can impair worker morale (Jehn, et al., 1999) and tends to diminish team members' satisfaction (Pelled, et al., 1999). However, this finding has also not previously been tested in IT project teams in China.

In relationship centered China, the association between relationship conflict and project team outcome measures may not replicate Western findings, which raises another issue for investigation; to what extent does non-job related relationship conflict impact on team innovation, team efficiency and member satisfaction?

According to Jehn, et al., (1999) and Pelled, et al., (1999), social category diversity or demographic diversity through relationship conflict diminishes member satisfaction and team morale, while information diversity or functional diversity through task conflict enhances innovation. Conflict is thus a paradox in that task conflict tends to enhance team innovation and relationship conflict tends to diminish team members' satisfaction and team performance. However, it does seem that there are linkages between the type of member diversity within a team and the type of conflict and also between the type of conflict and the various team outcomes (i.e., innovation, efficiency, member satisfaction), with conflict appearing to play a mediator role for the diversity-conflict-outcome model (e.g., Li & Hambrick, 2005; Pelled et al., 1999; Jehn et al., 1999).

In relationship centered China and performance-focused IT project teams, the mediating effect of task conflict and relationship conflict may not replicate Western findings,

which raises another issue for investigation; to what extent do task and relationship conflict mediate the effects of diversity on team outcomes?

Past literatures have reported that task conflict has usually been associated with innovation and effective decisions, whereas relationship conflict has usually been associated with poor performance and poor member satisfaction (Jehn, 1995, Jehn, 1997; Pelled, et. al., 1999), which seems to suggest that different types of conflict drive different team outcomes. If task conflict tends to yield positive consequences for task performance and relationship conflict yields negative consequences, it seems that practical management researchers should just encourage task conflict and discourage relationship conflict; simple to say, but difficult to carry out because it may be impossible to completely separate the two.

2.5.10 The Relationship between Task Conflict and Relationship Conflict

The recommendation that task conflict be separated from relationship conflict without contextual information has been problematic because almost all studies that measure task and relationship conflict in teams have shown significant positive correlations between the two (Simons & Peterson, 2000). Most research has found that task conflict and relationship conflict are typically correlated (e.g. Pelled, Eisenhardt & Xin, 1999; Simons & Peterson, 2000). Indeed Pelled et al. (1999) tried to examine how to have task conflict without relationship conflict but found that they occur simultaneously in ongoing teams. Similarly, De Dreu and Weingart (2003) reported the average correlation between relationship conflict and task conflict as significantly positive (average r=.54; range from r=.34 to .88) in an examination of 28 past studies.

Simons and Peterson (2000) also suggested that the positive effects of task conflict may be offset by relationship conflict and proposed three possible explanations that might account for this tight correlation between task conflict and relationship conflict; 'misattribution of task conflict as relationship conflict', 'harsh task conflict tactics triggering relationship conflict', and 'misattribution of relationship conflict as task conflict' (Simons & Peterson, 2000, p. 102). It seems, therefore, that task conflict and relationship conflict may interactively influence each other. An example of this would be where a task disagreement results in a heated exchange, which could be taken as a personal attack. Within a team, we then have both task conflicts and emotional relationship conflicts occurring at the same time. Team members may feel strongly that their views on a task issue are correct, and might appear impatient when others express different views, whereas members who are interrupted while expressing their ideas may feel they are not respected and their judgement and competence are being criticized (Tjosvold, 1991). This further supports the belief that task conflict is strongly correlated to relationship conflict.

Again this is a finding that has not been tested in IT project teams in China. It is also possible that the task focus of IT project teams may provide fewer chances of misattributing task conflict as relationship conflict because people are more likely to think that it is business related behavior rather than relationship related behavior. The 'virtual' orientation and lack of face-to-face contact within IT project teams may also have the same effect. IT project teams may still have correlation between the two types of conflict but it may not be as strong as that reported in the past studies. This raises another investigative issue; to what extent will there be a positive association between task conflict and relationship conflict?

Conflict is complex. Without rich contextual information and proper situational intervening qualifiers, potentially good conflict (task conflict) and potentially bad conflict (relationship conflict) cannot be uncoupled (Simons & Peterson, 2000) and the effects of task conflict are inconsistent (De Dreu & Weingart, 2003). The question is; in what situations can conflict become positive?

2.5.11 When Does Conflict Become Positive?

In order to integrate the inconsistent findings, Williams and O'Reilly (1998) proposed a mechanism whereby small increments in task disagreement may generate large positive increases in team creativity and meanwhile cause relatively small negative effects on team functioning. For example, Jehn (1995) refers to moderate levels of task conflict as being associated with better levels of team performance than either low or high levels of task conflict. She indicated a new research direction looking at ways to manage the moderate level of task conflict to produce optimal team outcomes. Several attempts (e.g., Polzer, et al., 2002; Knippenberg et al, 2004; Jehn et al., 2004; Van Der Vegt, et al., 2005) have been made to explore 'when' the moderate level of conflict and diversity is managed via a moderator to elicit positive outcomes.

In order to encourage team members to effectively communicate their knowledge and share their expertise so that team innovation is achieved, a favorable team climate must be present (West, 2002), which includes effective conflict management (DeChurch & Marks, 2001; Alper, et al., 2000). Thomas (1992) also suggested that conflict resolution techniques play a critical role in how well diverse and conflicting teams integrate. The existence of conflict is not the issue; it is the way it is managed that is important (Williams & O'Reilly, 1998).

Chinese collectivistic culture may have an impact on how conflict is managed. Diversity and conflict have generally been found to benefit performance when a favorable

team atmosphere exists; such conditions may exist in collectivistic cultures with cooperative norms (Chatman, Polzer, Barsade & Neale, 1998; Chatman & Flynn, 2001).

The way a team approaches goal conflict may also play an important role as many task conflicts are triggered by goal differences (Jehn, 1995). Goal differences among team members have been found to be especially related to team conflict in the case of performance goal-focused IT project teams (Farh, 2004). Therefore, goal congruence among members is critical to the success of a team. Approaches to managing different goals may be more important than the goal itself in terms of influencing team outcomes. Alper, et al., (1998) proposed that approaching goals cooperatively (cooperative goal) to foster a common goal via a sense of similarity among conflicting team members would produce positive team outcomes. It has also been suggested that approaching conflict cooperatively (cooperative conflict management) produces positive team outcomes (Alper, et al., 2000). Successfully managing conflict, and integrating common goals and team location within collectivistic culture might, therefore, help team outcomes (Williams & O'Reilly, 1998). Taking account of these findings, an emergent model on team processes would need to address how teams ensure that the positive outcomes of task conflict are realized (DeChurch & Marks, 2001).

2.6 The Effect of Cooperative Conflict Management and Cooperative Goal on Project Teams

This section reviews past literature that has reported the effects of cooperative goal and cooperative management of conflict on team performance.

2.6.1 The Effect of Cooperative Conflict Management

Cooperative conflict management is a conflict handling approach whereby team members work cooperatively toward a win-win solution by bringing all related issues of all parties to open, sharing discussions (Thomas & Kilmann, 1978). In this mode, team members work together to analyze the situation objectively, with the goal and purpose being to enlarge the pie rather than divide it. Cooperative conflict management, according to Tjosvold (1991), refers to 'open' discussion that encourages people to express their doubts and opinions. In conflict openness norms, conflict is openly discussed and approached cooperatively with 'open' being an important component for cooperative conflict management. Jehn (1995) found that teams' task conflict and job related disagreements have more positive outcomes

when 'conflict openness norms' are present rather than when they are absent and suggested that if task conflict is managed in a cooperative and open manner, the conflict is likely to benefit both team performance and member satisfaction.

Conflict management subsumes 'cooperative communication'. Cooperative communication is the explicit desire to find mutually beneficial (win-win) solutions to whatever conflicts are discussed (Lovelace et al., 2001). Cooperative communications have problem-solving orientations so that they are generally helpful for team outcomes (Lovelace, et al., 2001). Similarly, negotiation studies have found that disagreements generally lead to more integrative (mutually beneficial) outcomes when team members' communications consist of cooperative rather than contentious communications (e.g., Brett, Shapiro & Lytle, 1998). Effective team management tends to encourage cooperative communication, which helps to manage conflict and is associated with team innovation (Lovelace et al., 2001). How task conflict is communicated and approached by team members influences the quality of conflict outcomes. In a cooperative conflict management mode, team members feel that they are encouraged to communicate their different opinions on how to develop and implement projects. In this mode, they can integrate their various differences and the customers' requirements into a project's design and implementation phases.

In a cooperative conflict management mode, team members communicate cooperatively and exchange information on their different opinions, which in turn create innovative solutions. Here, team members tend to try hard to resolve issues earlier and prevent them re-emerging later (Tjosvold, 1991). Lovelace et al. (2001) found that the negative effects of task conflict on team efficiency (i.e., time and budget performance) are less in teams where members use cooperative communication. All in all, cooperative conflict management may enhance not only innovation performance but also assist time and cost efficiency.

2.6.2 Cooperative Conflict Management in Project Teams

An empirical study of 100 project teams found that conflict is a fundamental characteristic of project teams and that effective conflict management is critical to their success (Thamhan & Wilemon, 1975). Cooperation and communication within a team can increase its productivity and member satisfaction (Campion, Medsker & Higgs, 1993). Moreover cooperative conflict management is positively related to team efficiency, productivity, quality and cost saving (Alper, Tjosvold & Law, 2000). Project teams, even in the cross-company situation, with both internal and external contracted members who discuss conflict openly and cooperatively are more likely to develop trusting relationships which in

turn contribute to project quality, when compared to those who try to avoid conflict or discuss it competitively (Wong, Tjosvold, et al, 1999).

2.6.3 Cooperative Conflict Management in a Chinese Context

Considering the cultural contrasts between North Americans and Chinese, the effectiveness of different conflict management styles may not be the same. Most research on conflict resolution has been based on studies done in the West and only a few scholars (Leung, 1987; Kirkbride, Tang & Westwood, 1991; Morris, Williams & Leung, 1998; Xie et al, 1998; Wong et al., 1999; Tjosvold et al., 2003; Chen et al., 2005) have examined the effect of national culture on the preference for conflict handling strategies and the effectiveness of different conflict resolution methods.

Leung (1997) suggested that conflict has traditionally been considered destructive, especially in a collectivist society such as China because Chinese are highly sensitive to the possibility of losing social face in public. Chinese often avoid conflict so that they and those they are in conflict with need not fear disrespect. The risks of directly and openly addressing conflict have been theorized (Leung, 1997) to be particularly high in societies where relationships are highly important and where people have to preserve face, which makes Chinese less likely to deal openly with conflict. Considerable cross-cultural management and psychology research indicates that Chinese have a strong sense of interdependence as their identity is embedded in their social relationships (e.g., Hofstede, 2001; Bond, 1986). The strategies they use for resolving conflict tend to include the use of indirect language, middle men, face-saving and the taking of long range perspectives (Bond, 1986). A conflict avoidance management style, where conflict is not handled directly, has traditionally been assumed to reinforce interdependence, especially among Asian and other collectivistic people (Kirkbride et al., 1991).

This avoiding conflict management style may, however, simply be a preference among Chinese. In performance-focused IT project teams, team members may have to behave differently in order to achieve the business goal (Morris et al., 1998). It was, therefore, necessary for the effects of conflict management style on Chinese IT project teams to be tested in field studies (e.g., Xie et al. 1998; Tjosvold et al., 2003; Chen et al., 2005).

Recently, the effectiveness of the conflict management approach has been tested in China (Xie et al. 1998; Tjosvold et al., 2003), where it was found that cooperative conflict management, where conflict is not avoided but rather dealt with cooperatively, can trigger more open discussion and in turn result in innovation (Chen, Liu & Tjosvold, 2005). Xie et al (1998) also found that by employing a collaborative way of managing conflict new product teams in Chinese society increased their success more than in the US. They argued that this

was so because in collective cultures, the need for harmony tends to be high and individuals tend to have strong emotional attachment to the organizations they belong to. Collectivistic cultures emphasize group ideologies and seek collective interests, whereas individualistic societies emphasize individual goals, freedom of choice and competition. Strong, intra-team collectivistic cultures may, therefore, reduce conflict and the effects of social categorization (Chatman, Polzer, Barsade & Neale, 1998). It has been suggested that collectivistic cultures may be better able to address differences and conflict to generate more positive team outcomes because they encourage people to re-categorize one another as one team with common interests and similarity attraction (Chatman et al., 1998). Project teams in collectivistic cultures such as China, are more likely to use a cooperative approach to address conflict to further strengthen the positive relationship between job related task conflict and team innovation performance. Empirical studies have also found that cooperation facilitates harmony so that cooperative conflict management strategy tends to be more effective in high collectivistic cultures like the Chinese culture (Xie, et al., 1998). Xie et al. (1998) tested different conflict management methods with samples from Japan, Hong Kong, the US, and Great Britain and found that cooperation conflict management had a positive impact in most samples including the Chinese samples.

These findings contrast with earlier scholars (e.g., Kirkbride et al., 1991). Xie et al. (1998) found that using avoidance behaviors to handle cross-functional conflict was negatively associated with project team outcome measures in all countries including Hong Kong, regardless of their cultural differences. If conflict is avoided or not addressed in the early stages of a project team's existence, the possibility of killing projects with poor potential is reduced and thus increasing the likelihood of failure. Expensive re-design and re-scoping resulting from a lack of communication and conflict avoidance among team members with diverse background will significantly harm project outcomes. Their finding is consistent with Western literature that negative outcomes relate to less 'conflict openness norms' (Jehn, 1995). Xie et al.'s (1998) findings further emphasize the importance of cooperatively and openly managing conflict among different parties within project teams even within a Chinese context. Later research by Tjosvold et al. (2003) that surveyed the effect of cooperative conflict management in China indicated that cooperative conflict management can contribute to strong relationships, which in turn strengthen team effectiveness and employee citizenship. Their results were interpreted as supporting the traditional idea that relationships are critical for effective organization work in China. More recently, Chen et al. (2005) also found that top management teams in China that use cooperative conflict management can promote productive conflict and team effectiveness that in turn results in organizational innovation. In cross-company project team situations, Wong, et al (1999) found that even within a Chinese

context, team members who resolve conflicts directly and constructively in a cooperative conflict management way can help team members work together effectively and lead them to appreciate each other's abilities as well as foster their reliance upon one another. If people avoid conflict and deny that they need to rely on each other, teamwork will be more difficult to achieve. In IT project teams, therefore, cooperative conflict management still seems to be effective in reinforcing interdependence, which allows people to value each other's abilities and resources.

The above literatures suggest that cooperative conflict management in project teams within the collectivistic culture of Chinese organizations has a similar positive effect as it does on its counterparts in the West.

2.6.4 Cooperative Conflict Management as a Moderator on the Task Conflict-team Innovation Relationship

As aforementioned, managing and moderating an adequate amount of conflict is important in order to capitalize on conflict (Polzer, et al., 2002; Knippenberg et al., 2004; Jehn et al., 2004; Van Der Vegt, et al, 2005) as well as being important for team work (West, 2002). To moderate the right level of conflict is challenging because without detailed information and knowledge of the predicted effects of conflict, potentially good conflict (task conflict) and potentially bad conflict (relationship conflict) are typically interrelated. It is critical to find a mechanism to untangle the association between task conflict and relationship conflict. Since cooperatively managing conflict is so powerful, if the task conflict stimulation is augmented by cooperation, its negative consequences may potentially be reduced to a minimum. Amason and Sapienza (1997) found that 'open discussion' in situations of task conflict seldom leads to relationship conflict when team members are oriented cooperatively, making it possible, therefore, that when cooperative conflict management among team members is high, that it may offer a mechanism to reduce the tangle between potentially good conflict (task conflict) and potentially bad conflicts (relationship conflict).

Cooperative conflict management seems to have the potential to uncouple the linkage between task conflict and relationship conflict. If task conflict can be separated from relationship conflict, its ability to contribute to team innovation can be enhanced without interference from the detrimental effects of relationship conflict. It is possible that when cooperative conflict management is high rather than low, it may strengthen the positive side of task conflict and reduce its negative side, which in turn should enhance team innovation.

The moderating effect of cooperative conflict management to augment the existing model of linkage of task conflict and team innovation has not, however, been investigated in

previous literature or tested by field research. It raises another issue for investigation; to what extent will cooperative conflict management moderate the relationship between task conflict and team innovation?

If cooperative conflict management has such an influence on the effectiveness of team outcomes, one must ask how cooperative conflict management can be fostered. Deutsch (1973) links cooperative conflict management to the acceptance of cooperative goal which relate to individuals acceptance of the team goal. Goal attainment is of particular interest to a project team because the whole purpose of forming a project team is to recruit people who have the skills and resources to achieve a project's goals. Team members with different backgrounds may have different individual task goals, which are considered as potential sources of task conflict (Jehn, 1995). Goal conflict is particularly important in IT project teams (Farh, 2004) because such task differences might trigger relationship conflict, which in turn may harm team outcomes. As previously mentioned, goal differences or task conflict are not in themselves a problem; the problem is how to address this conflict to reach acceptance of a common goal that is important to team outcomes. Common goals have been proposed to be beneficial for dealing with goal differences and conflict (Williams & O'Reilly, 1998). Approaching a goal cooperatively (cooperative goal) may play a critical role in helping to produce positive team outcomes (Alper, et al., 1998).

2.6.5 The Effect of Cooperative Goal

Cooperative goal interdependent mode (abbreviated to cooperative goal) is a condition where individuals perceive their goals to be positively related so that as one person moves toward goal achievement the others also move toward goal achievement (Deutsch, 1973). Deutsch's (1973) theory of cooperation proposed that the way in which people believe their goals are related is an important factor affecting the dynamics and outcomes of their interaction. In cooperative goal mode, each party understands each other's goals and helps each other to reach them because if one succeeds, the others succeed. A cooperative goal may reduce in-group/out-group biases because in such an interactive mode, team members believe their goals are related (Deutsch, 1973). Chatman, Polzer, Barsade & Neale (1997) further suggested that a common goal and a strong, intra-group collectivistic culture may reduce the effects of social categorization.

Deutsch (1973) argues that people in a cooperative goal mode appreciate that they want each other to pursue their goals effectively, as others' effectiveness helps everyone reach their goals. In this mode, team members tend to view a conflict as a mutual problem that needs common consideration and a solution and this social context leads to full discussion of innovative solutions, which suggests that cooperative goal can foster an open-minded and

productive discussion of opposing views within task conflict that result in better team efficiency and customer satisfaction (Alper, Tjosvold & Law, 1998). It seems that when team members are in cooperative goal mode they are better able to capitalize on task conflict and integrate conflicting task related ideas into positive team outcomes.

2.6.6 Cooperative Goal in IT Project Teams

Goal conflict has been found to be one of the most important antecedents that trigger conflict in IT project teams (Farh, 2004). It is especially sharp when the goal conflict is with outsiders such as customers and vendors. Differences among members from two different companies may range from different goals and how to improve quality, to different styles and different organizational cultures, which may potentially result in significant conflict. In order to make a partnership work, both parties need to be interested in developing each other's capabilities regardless of their opposing opinions (Wong, et, al., 1999). In cooperative goal mode, the emphasis for both parties is on moving from contractual arrangements between client and vendor toward trusting relationships, instead of the two pulling apart (Kumar, 1996). In this situation, vendors can be motivated to provide the components needed to meet performance expectations (Kumar, 1996). Adopting a cooperative goal helps firms and vendors to discuss conflict openly and cooperatively, rather than to try to avoid conflict or discuss it competitively, making it easier to develop trust which in turn encourages vendors to contribute to project quality (Wong, et al, 1999). It is possible that when team members accept a cooperative goal, it can help both parties adopt a cooperative tyle to deal with task conflict constructively, and strengthen their relationships so that the positive effects of conflict are elicited and the negative effects reduced. On the other hand, when cooperative goal is absent the positive effects of task conflict cannot be capitalized on and the negative effects may not be reduced. Based on the above discussion, an effective team that encourages a cooperative goal seems to significantly improve IT project team outcomes.

2.6.7 Cooperative Goal in a Chinese Context

Deutsch's (1973) cooperative goal theory was developed in the West; however, it needs to be tested in the East to discover the extent of replication in a collectivistic culture such as China. The literature has suggested that collectivism fosters the development and adoption of superior goals that encourage cooperation among members with conflicting interests (Chen, Chen & Meindl, 1998). It has also been proposed that strong intra-team collectivistic cultures and a common goal may reduce the negative effects of social categorization (Chatman, Polzer, Barsade & Neale, 1997; Williams & O'Reilly, 1998) and that when an organization emphasizes collectivistic rather than individualistic cultural values,

individual differences may not be so substantive (Chatman & Spataro, 2005). It has also been suggested that background differences may lead to creative innovation through a collectivistic cultural norm rather than an individualistic cultural norm (Chatman, Polzer, Barsade & Neale, 1998).

Chen et al., (2002) tested the theory of using cooperative goal to identify conditions that promote team innovation in China and found that student teams in China, with cooperative goal engaged in open-minded discussion which fostered constructive controversy (i.e., taking other's perspectives, open discussion of their opposing views and integrating these to form the best solutions) and enhanced their innovation and loyalty. Tjosvold et al. (2004) studied 100 teams in China and found that Chinese people believe that as one person moves toward the achievement of a goal, others also move towards reaching their goals (Tjosvold, et al., 2004). This suggests that cooperative goal should become the foundation for effective team reflexivity (i.e., developing new ideas or methods that respond to emerging condition and challenge), which in turn should promote innovation in the Chinese context. Furthermore, when cooperative goal mode is employed, team members feel that their opinions are heard and their goals are incorporated into the team's goal, making them more likely to feel satisfied. By the same token, when opposing views are integrated into better solutions for the common good, cooperative goal will most likely prevent a reworking of the conflict at a later stage which will improve project implementation efficiency. Just like their Western counterparts, Chinese team members understand that other members' goal attainment helps both parties to be successful. Therefore, with cooperative goal, Chinese people want each other to perform effectively, so they interact in ways that promote mutual goals and resolve issues for mutual benefit, which in turn will improve team innovation, team efficiency and member satisfaction.

2.6.8 Cooperative Goal as a Moderator to the Task Conflict-team Innovation Relationship

As aforementioned, managing and moderating an adequate amount of conflict is important in order to capitalize on conflict (Polzer, et al., 2002; Knippenberg et al., 2004; Jehn et al., 2004; Van Der Vegt, et al, 2005). To moderate a right level of conflict is challenging because the potentially good conflict (task conflict) and potentially bad conflict (relationship conflict) are typically interrelated. It is critical to find a mechanism to untangle the association between task conflict and relationship conflict.

Past studies have suggested that teams benefit from task conflict when they cultivate an environment that is open and tolerant of diverse viewpoints, which can prevent task disagreements from being misinterpreted as personal attacks (Amason, 1996, Lovelace et al., 2001, Jehn, 1995, Simons & Peterson, 2000). In goal-focused project teams, when goals are

reached in open and cooperative ways among team members, it may help in resolving task conflict. Goal achievement is the main purpose of a project team so that managing goal conflict is critical to the success of a project team (Farh, 2004). In order to achieve the team goal, team members must depend on each others' success and focus on the task itself and suppress negative feelings. It is possible to uncouple the linkage between task conflict and relationship conflict when cooperative goal appears which in turn, may contribute to team innovation. On the other hand, when cooperative goal is absent, it may be difficult to uncouple the two types of conflict which in turn, may not bring out the positive effect of task conflict and may not reduce the negative side of task conflict.

The moderating effect of cooperative goal, which is to augment the existing model of linkage of task conflict and team innovation, has not, however, been investigated in previous literature neither has it been tested in field research. It is possible with the augmentation of the moderating effect of cooperative goal, that the linkage of task conflict and team innovation can be better predicted, which raises another investigative question; to what extent will cooperative goal moderate the relationship between task conflict and team innovation?

2.7 Summary of the Literature and Development of the Research Questions

Diversity scholars (e.g., Williams & O'Reilly, 1998; Jackson et al., 2003) agree that although there are so many diversity attributes, they can be classified into two main types and each type has been conceptualized by two predominant but nonetheless different underlying theories; information/decision-making theory and social categorization theory. Information/decision-making theory has been predominantly associated with functional diversity attributes and social categorization theory has been predominantly associated with demographic diversity (Pelled, et al., 1999; Jehn, et al., 1999). Also important is the type of task undertaken by a team and the basis for member selection as these may influence the effects of diversity (Jackson, et al., 2003).

This research proposes to investigate the functioning of a special type of team, namely project teams in the IT industry within greater China (mainland, Hong Kong, Taiwan). In this situation, members are selected on the basis of the expertise they can contribute to a team's performance focused tasks; they meet irregularly, some interacting only in virtual mode. The goal of these IT project teams is to achieve innovation and implement it effectively. This research aims to investigate both the degree to which both types of diversity among team members contribute to innovative outcomes, and the degree to which each is associated with implementation efficiency and member satisfaction. At the same time, the research will

address the process by which these outcomes are reached. The literature suggests that this process involves several steps depending on the degree of both task expertise diversity and demographic diversity among members. Research gaps and research questions have been identified or hypothesized to examine the potential for member differences to generate conflict and the process by which any such conflict is handled and resolved and how it influences the outcomes.

The research proposes that the effect of job related functional diversity (i.e., functional role) is better understood using information/decision-making theory and that the effect of non-job related, readily detected or relation related demographic diversity is better understood using social categorization theory. The effect of diversity across different studies without detailed contextual information has been mixed (Jackson et al., 2003). Among the efforts to untangle the inconsistent findings on the effects of diversity, it has been suggested that appropriate mediators such as type of conflict can explain how diversity impacts performance and member satisfaction (Lawrence, 1997; Milliken & Martins, 1996; Williams & O'Reilly, 1998; Li & Hambrick, 2005, Pelled, et al, 1999; Jehn, et al., 1999). This research proposes that functional diversity drives innovation via task conflict and demographic diversity diminishes member satisfaction and team outcomes via relationship conflict.

Even though the effect of diversity on team performance is inconsistent across different studies, Jackson et al. (2003) suggest that there is still a pattern to follow in studying diversity in specific types of teams with specific task types and project goals. IT project teams are performance focused, such that the impact of member diversity should be along the lines of job relevancy as it relates to the main task of the team. The primary criterion for member selection is based on job related functional contribution. Inevitably members also bring their associated demographic diversity attributes to the team as secondary by-products. The research questions are divided into two groups by this criterion. One set addresses the issues relating to the impact of functional diversity on task conflict and their subsequent impact on team outcomes. The other addresses the impact of demographic diversity on relationship conflict and its subsequent impact on team outcomes.

Research questions associated with job related differences are:

1. To what extent does job related functional diversity impact on team outcomes (team innovation, team efficiency and member satisfaction)?
2. To what extent does job related functional diversity impact on within-team task conflict?
3. To what extent does job related task conflict impact on team innovation?
4. To what extent does job related task conflict impact on team efficiency and member satisfaction?

5. To what extent do task conflicts mediate the effects of functional diversity on team outcomes?

Research questions associated with non-job related differences are:

1. To what extent does non-job related demographic diversity impact on team outcomes (member satisfaction, team innovation, and team efficiency)?
2. To what extent does non-job related demographic diversity impact on relationship conflict?
3. To what extent does non-job related relationship conflict impact on team innovation, team efficiency and member satisfaction?
4. To what extent does relationship conflict mediate the effects of demographic diversity on team outcomes?

The literature has also suggested that potentially good conflict (task conflict) is unable to be separated from potentially bad conflict (relationship conflict). The strength of this correlation needs to be investigated further and whether there is a chance to reduce their interaction in IT project teams explored. This raises the following research question:

1. To what extent will there be a positive association between task conflict and relationship conflict?

Conflict itself is not the main issue; how it is managed and its impact on team outcomes is (Williams & O'Reilly, 1998). Based on the prior discussion, this thesis proposes that cooperative conflict management and cooperative goal acceptance are positively related to team outcomes.

Research questions associated with cooperative conflict management and cooperative goal are:

1. To what extent will cooperative conflict management impact team innovation, team efficiency and member satisfaction?
2. To what extent will cooperative goal impact team innovation, team efficiency and member satisfaction?

To uncouple potentially good conflict (task conflict) from potentially bad conflict (relationship conflict), it is proposed that cooperative conflict management and cooperative goal may play moderator roles to turn task conflict into more positive team outcomes.

Research questions associated with the moderating effects of cooperative conflict management and cooperative goal are:

1. To what extent will cooperative conflict management moderate the relationship between task conflict and team innovation?
2. To what extent will acceptance of cooperative goal moderate the relationship between task conflict and team innovation?

With rich contextual information from IT project teams in China, the current study may provide a more controlled environment to answer the above research questions. In line with the research questions, a research model will be proposed to be tested within this unique context.

Chapter 3

Theoretical Framework and Development of Hypotheses

As this opening paragraph will summarize, diversity, which in this case results from recruiting team members from different backgrounds, acts as a double-edged sword; the increase of diversity can improve team innovation, yet at the same time, it can also harm implementation efficiency and member satisfaction (Milliken & Martins, 1996). Yet, past literatures that deal with how people from different backgrounds work together and why they work in these ways has led to inconsistent findings on group outcomes (Harrison & Klein, in press; Jackson et al., 2003; William & O'Reilly, 1998; Milliken and Martins, 1996). This thesis argues that the linkage may be clearer between diversity and team innovation in the context of innovation performance-driven IT project teams than in arbitrary groups.

3.1 Conditions for IT Project Team Operation

In the current study, the task type and performance goals can be clearly identified within an IT project team environment. The main performance goal of an IT project team is to create innovation and implement the innovation efficiently. This task is non-routine, similar to the task requirements of new product development teams. The current study aims to develop and test a research model to predict the effect of diversity in such IT project teams in China. The research questions proposed in chapter 2, section 2.7 are further elaborated below to form an unfolding conceptual framework that in turn leads to the emergence of hypotheses that address the anticipated relationships among the study's variables.

3.2 Overview of the Research Model

This thesis argues that in an IT project team context, the nature of the task and the abilities team member needs to have underpinned the member selection process, and also argues that deliberate functional diversity is often the driver for team innovation. Functionally diverse team members cannot, however, help but bring with them their diverse

personal demographic attributes; a situation that typifies multinational IT organizations. This thesis argues that this demographic diversity opens the way for intra team conflict, which in turn, may interfere with effective team outcomes. The research model addresses these two main types of diversity – deliberately selected functional diversity and the accompanying non-selected demographic diversity.

As discussed in the previous chapter, inconsistent finding in diversity presents a research challenge. In order to understand the full effect of diversity, many process variables have been proposed to address the 'black box' (intervening variable) between diversity and team outcomes (Lawrence, 1997). Conflict has been identified as one of the most frequent process variables in past literature (Li & Hambrick, 2005). Conflict and disagreement are inevitable whenever team members of different backgrounds come together and furthermore, task related conflict or differences in ideas about how to solve problems as well as relational conflict or differences over interpersonal issues have both been linked to team outcomes (Lovelace, Shapiro & Weingart, 2001, Gebert, Boerner & Kearney, 2006).

The proposed research model consists of three parts; diversity, conflict, and team outcomes. Part one addresses the antecedent variables, both functional and demographic diversity, the second part is the process variable, conflict, and the third part is the outcome variable, team outcomes. The antecedent variable, diversity, is an independent variable, which describes the degree of the differences in background among team members. The process variable, conflict, has been discussed in section 2.5.1 of chapter 2 as a mediator between diversity and team outcomes (Li & Hambrick, 2005; Pelled, et al., 1999). The outcome variable is team outcomes, a dependent variable which describes the consequences of diversity and group process such as team performance and member satisfaction. Separating the model into three distinct parts is an oversimplification as, in reality, components of the model such as team process and outcomes are reciprocally caused. The model is illustrated in figure 3.1 below.

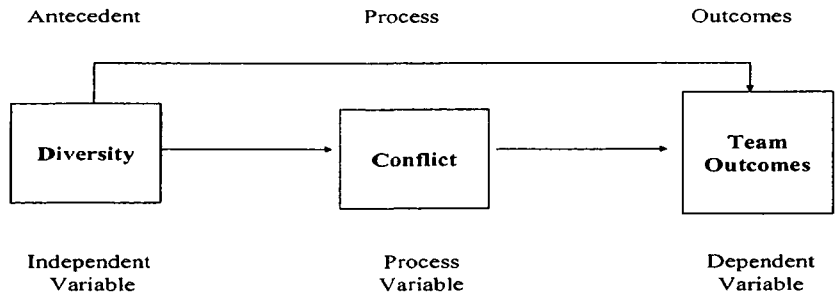


Figure 3.1 Main Research Model

This three part model of antecedent-process-outcome posits a set of interrelated relationships among diversity, conflict and team outcomes. In this model, both the effect of job-related functional diversity path and the non-job related demographic diversity path will be examined. For conflict to fully mediate between the antecedents and the outcomes, several conditions must be met. For explanatory purposes, it is assumed that the antecedent variable is "X", the outcome variable is "Y", and the process variable is "M". The direct relationship between "X" and "Y" is called "c". The relationship between "X" and "M" is called "a". The relationship between "M" and "Y" is called "b". This is illustrated in figure 3.2 below.

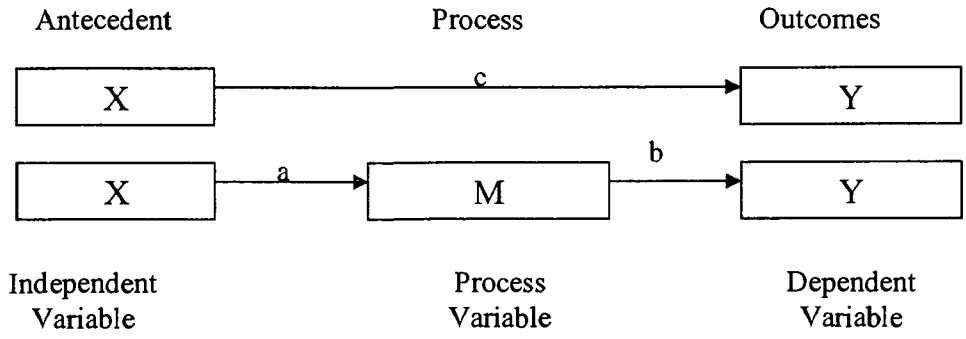


Figure 3.2 Full Mediating Effect in a Three Part Model of X-M-Y

Conceptually, for a full mediating model of "X→M→Y" to hold, the following four conditions must be met (Baron & Kenny, 1986).

- Condition one: X must have an effect on Y (i.e., "c" must be significant),
- Condition two: X must have an effect on M (i.e., "a" must be significant),
- Condition three: M must have an effect on Y (i.e., "b" must be significant),
- Condition four: When M is controlled, X no longer has an effect on Y.

The major hypotheses in this thesis can be organized according to these four conditions. They are described in sections 3.3 to 3.7 below.

3.3 Condition one: the Relationship between Diversity and Team Outcomes

The first six hypotheses of this thesis focus on Condition one - the relationship between X and Y, where X refers to diversity; Y refers to team outcomes (see figure 3.3 below).

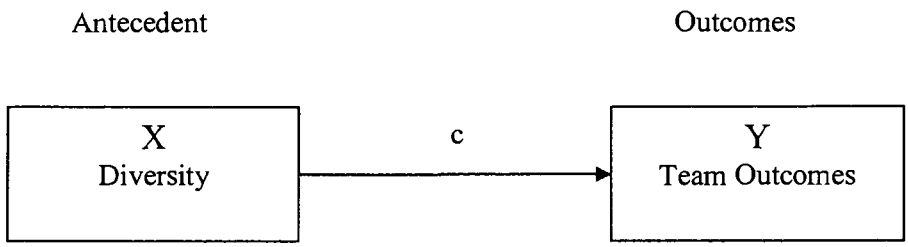


Figure 3.3 Condition one: Relationship between Diversity and Team Outcomes

Investigating the linkage between diversity and team outcomes will involve breaking down the dependent variable, team outcomes, into separate measures, first of all by separating the dependent variable into affective outcomes and performance outcomes and then further separating performance outcomes into team innovation and team efficiency as discussed in section 2.4.3 of chapter 2. This separation addresses earlier criticisms (Williams & O'Reilly, 1998) that one reason for inconsistent findings in diversity research has been the lack of an identical and consistent measure of team performance. The research model, thus distinguishes three types of team outcomes - team innovation, team efficiency and member satisfaction.

Two types of diversity (functional diversity and demographic diversity) affecting three types of team outcomes, lead to a total of six hypotheses. The first three hypotheses (H1a, H1b, H1c) link functional diversity to each of the three team outcomes. Likewise, the next three hypotheses (H2a, H2b, H2c) link demographic diversity to each of the three team outcomes. These hypotheses are illustrated in figure 3.4 below, and further justified in sections 3.3.1. and 3.3.2 below.

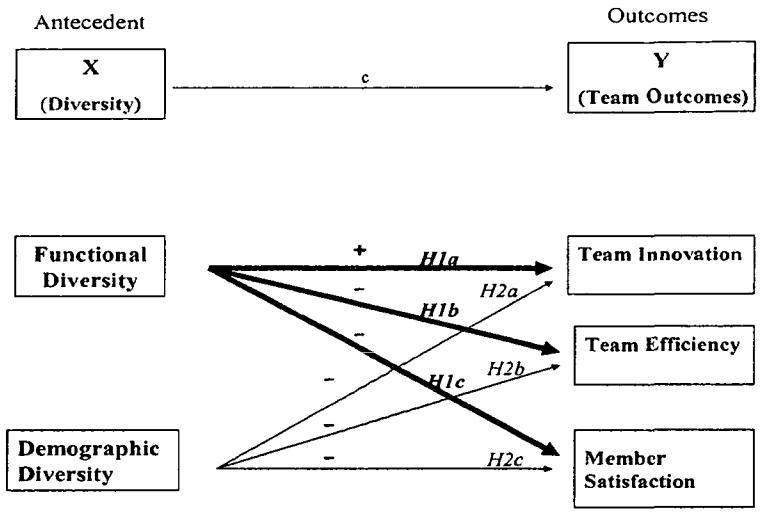


Figure 3.4 Hypotheses on the Relationships between Diversity and Team Outcomes

3.3.1. Functional Diversity and Team Outcomes (H1a, H1b, H1c)

Though past literature has found that functional diversity may not invariably generate creative ideas and innovation performance (Ancona & Caldwell, 1992; Lovelace, et al., 2001), it will do so more frequently when the task requirement is to be innovative (Drach-Zahavy & Somech, 2001; Jehn, et. al., 1999; Pelled, et al., 1999). Functional diversity associated with routine tasks may not generate innovation performance; rather as has been reported in such cases, it tends to be associated with less teamwork, and may even harm efficiency performance by missing budget and schedule targets, especially when speed is important (Ancona & Caldwell, 1992; Williams & O'Reilly, 1998; Jackson, et al., 2003). In other words, the effects of functional diversity can be positive in relation to innovation performance and negative in relation to implementation performance, depending on the different task requirements. As discussed in section 2.4.2 of chapter 2, it is generally accepted that diversity is harmful to team efficiency when speed is one of the desired project outcomes (Jackson, et al., 2003). Within an IT project team context, meeting tight deadlines is one project constraint, and this is especially so in the later stages of a project when the nature of tasks are more routine than in the earlier stages. Moreover, past literature has generally accepted that task related differences and disagreements may trigger intra-team conflict and reduce member satisfaction (De Dreu & Weingart, 2003; Jehn, 1995). Therefore, the following hypotheses are proposed:

Hypothesis 1a:

Functional diversity will have a positive association with team innovation (H1a, linking X to Y).

Hypothesis 1b:

Functional diversity will have a negative association with team efficiency (H1b, linking X to Y).

Hypothesis 1c:

Functional diversity will have a negative association with member satisfaction (H1c, linking X to Y).

3.3.2 Demographic Diversity and Team Outcomes (H2a, H2b, H2c)

As discussed in section 2.4.5 of chapter 2, the members of 'boundary-less' IT project teams in this study may bring with them a number of demographic differences. These include both traditional differences such as age and gender and additional differences such as national differences, regional differences and different company affiliations. These demographic attributes are passive in as much as they are not deliberate aspects of the selection process. It is this kind of non-selected diversity that is most likely to trigger non-job related group social categorization processes, and in turn, generate undesired outcomes such as member dissatisfaction. Moreover, the separation of 'in-group' and 'out-group' is sharper in a Chinese context than it is in a Western one (Triandis, 2003). Intra-team relationship conflict between subgroups may be triggered, which in turn may harm team innovation and team efficiency (Ancona & Caldwell, 1992; De Dreu & Weingart, 2003). Based on the above discussion, this thesis proposes the following hypotheses:

Hypothesis 2a:

Demographic diversity will have a negative association with team innovation (H2a, linking X to Y).

Hypothesis 2b:

Demographic diversity will have a negative association with team efficiency (H2b, linking X to Y).

Hypothesis 2c:

Demographic diversity will have a negative association with member satisfaction.

Hypotheses 1 (a,b,c) and 2 (a,b,c) are foundational hypotheses based on past literatures (Pelled, et al., 1999; Jehn, et al., 1999). However, this thesis proposes that the predictive power of these foundational hypotheses is stronger in this new and more specific

team context, than in other arbitrary groups (as discussed in sections 2.1, 2.2, and 2.3.2 of chapter 2).

3.4 Condition two: the Relationship between Diversity and Conflict; and Condition three: the Relationship between Conflict and Team Outcomes

For a full mediating model of "X→M→Y" to hold, Condition two (the relationship between X and M) and Condition three (the relationship between M and Y) must hold. This is illustrated below in figure 3.5.

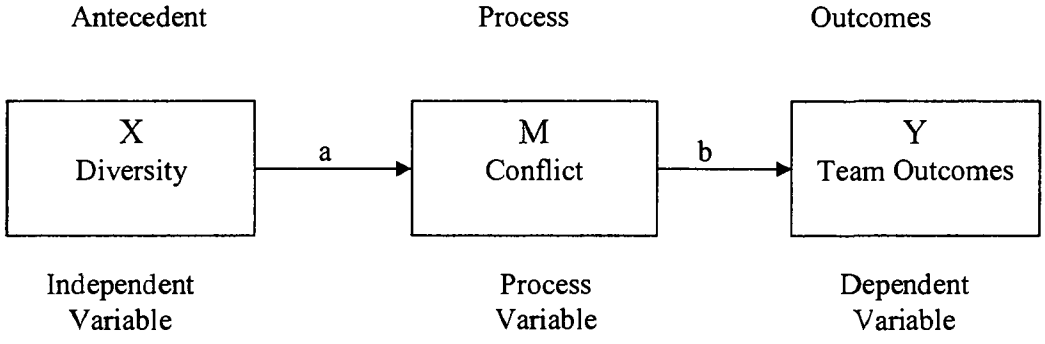


Figure 3.5 Illustrating Condition two (Relationship between Diversity and Conflict) and Condition three (Relationship between Conflict and Team Outcomes) in the Research Model.

Hypotheses 3 and 4 pertain to condition two, the relationship between diversity and conflict. As described in section 2.5.1 of chapter 2, two types of conflict are distinguished in this study; namely task conflict, which arises from functional diversity and relationship conflict, which arises from demographic diversity (Pelled, 1996). Hypothesis 3 refers to the relationship between functional diversity and task conflict, while Hypothesis 4 refers to the relationship between demographic diversity and relationship conflict.

Hypotheses 5 and 6 pertain to Condition three, the relationship between conflict and team outcomes. Since there are two types of conflict affecting three types of team outcomes, this results in six specific hypotheses. Hypotheses 5a, 5b, and 5c link task conflict to team innovation, team efficiency and member satisfaction, respectively and Hypotheses 6a, 6b, and 6c link relationship conflict to team innovation, team efficiency and member satisfaction,

respectively. Hypotheses 3, 4, 5, and 6 are illustrated in figure 3.6 below and justified in sections 3.5.1. to 3.6.2.3.

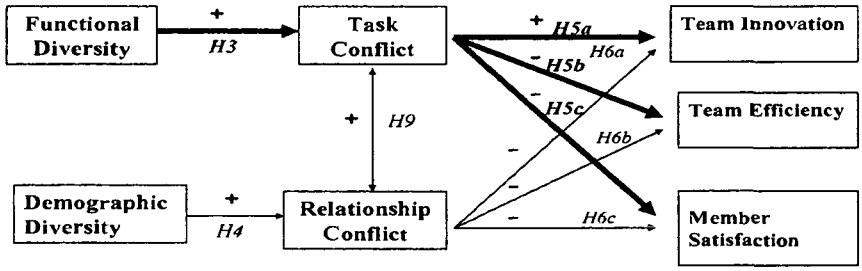


Figure 3.6 Hypotheses Linking Diversity, Conflict and Outcomes

3.5 The Effect of Diversity on Conflict

3.5.1 The Effect of Functional Diversity on Task Conflict (H3)

IT project teams are planned to provide an environment that encourages discussion of conflicting task related views and perspectives, which in turn, enriches the level of comprehension of all possible alternatives (Simons, et. al., 1999) before it can integrate these to produce innovative solutions (Van Der Vegt, et al., 2003). Given that the stimulating effect of different points of view underlies the member selection process, the model proposes that there is a positive linkage between functional diversity and task conflict.

Hypothesis 3:

Functional diversity will have a positive association with task conflict.

3.5.2 Effect of Demographic Diversity on Relationship Conflict (H4)

Demographic diversity is not part of the member selection process but is an inevitable accompaniment to it and may accidentally trigger interpersonal arguments and relationship conflict; an issue that was discussed in section 2.5.5 of chapter 2. In relationship centered China, the likelihood of this happening is probably higher than in Western countries. This

thesis tests whether there is a positive linkage between demographic diversity and relationship conflict.

Hypothesis 4:

Demographic diversity will have a positive association with relationship conflict.

3.6 The Effect of Conflict on Team Outcomes

3.6.1 Effect of Task Conflict on Team Outcomes (H5)

Hypothesis 5 can be broken down into three separate hypotheses, each of which links task conflict to a specific type of team outcome. H5a refers to the relationship between task conflict and team innovation, H5b refers to the relationship between task conflict and team efficiency, and H5c refers to the relationship between task conflict and member satisfaction. Each hypothesis is discussed below.

3.6.1.1 Effect of Task Conflict on Team Innovation (H5a)

As discussed in section 2.5.7 of chapter 2, task conflict can improve decision quality (Amason, 1996) and team innovation (Tjosvold, 1991; Pelled, 1996; Pelled, et al., 1999). However, task conflict may not always produce team innovation (De Dreu & Weingart, 2003; Lovelace, et al., 2001) but depends on the type of task the team performs (Jackson, et al., 2003). Task conflict is likely to enhance team innovation (Jehn, 1995) only if project teams perform non-routine innovative tasks where exposure to different ideas and task related arguments can help team members see more alternatives and think outside their own boxes. The performance goal and purpose of an IT project team is team innovation, a goal which is achieved by encouraging team members to approach task conflict and task related arguments positively (Jehn, 1997) i.e., where task related conflicts of opinion are taken advantage of (Pelled, et al., 1999; Simons, et al., 1999). Therefore, this thesis proposes that in the IT project team context, task related arguments and task conflict are more likely to be associated with innovation related performance.

Hypothesis 5a:

Task conflict will have a positive association with team innovation.

3.6.1.2 Effect of Task Conflict on Team Efficiency (H5b)

As discussed in section 2.5.8 of chapter 2, task related disagreement can disturb project implementation (Ancona & Caldwell, 1992), and in turn can harm team efficiency (De Dreu & Weingart, 2003; Jehn, 1995; Xie, et al., 1998). This inefficiency effect is exemplified when the task type is routine (Jehn, 1995) and when speed is the goal (Jackson et al., 2003). In the latter stages of a project, when the IT project team is more established, the task type tends to become more routine than in the earlier design stage. Moreover, at the later implementation stage of a project, speed can become a priority. Deadline pressure and task disagreement may delay the completion of a project and overrun the original budget. Therefore, this thesis proposes that in the IT project team context, task conflict is negatively associated with team efficiency.

Hypothesis 5b:

Task conflict will have a negative association with team efficiency.

3.6.1.3 Effect of Task Conflict on Member Satisfaction (H5c)

As discussed in section 2.5.8 of chapter 2, task related disagreement is found to undermine group cohesion (Keller, 2001), disturb technical communication (Zenger & Lawrence, 1989), and in turn may impede member satisfaction (De Dreu & Weingart, 2003; Jehn, 1995). In relationship centered China, task conflict is likely to be mistaken as personal attack, and in turn, may be more likely to impede member satisfaction than in Western countries. Therefore, this research proposes that in the IT project team context, task conflict is negatively associated with member satisfaction.

Hypothesis 5c:

Task conflict will have a negative association with member satisfaction.

3.6.2 Effect of Relationship Conflict on Team Outcomes (H6)

Hypothesis 6 can be broken down into three separate hypotheses, each of which links task conflict to a specific type of team outcome. H6a refers to the relationship between relationship conflict and team innovation, H6b refers to the relationship between relationship conflict and team efficiency, and H6c refers to the relationship between relationship conflict and member satisfaction. Each hypothesis is discussed below.

3.6.2.1. Effect of Relationship Conflict on Team Innovation (H6a)

Section 2.5.9 of chapter 2 indicates that relationship conflict has been found to consistently interfere with information sharing and wastes members' energy (Jehn, 1995; De Dreu et. al., 2003), as well as being generally harmful to team decision quality (Amason, 1996)

and cognitive tasks like innovation. Therefore, this thesis proposes that relationship conflict is harmful to team innovation.

Hypothesis 6a:

Relationship conflict will have a negative association with team innovation.

3.6.2.2. Effect of Relationship Conflict on Team Efficiency (H6b)

Chapter 2, section 2.5.9 found consistent results that show that relationship conflict harms teamwork and impedes team efficiency (De Dreu & Weingart, 2003; Jehn, 1997). For the IT project team, when speed to the market is a major goal, especially at the later implementation stage, excessive relationship conflict will most likely lead to missed team schedules and budget targets. Moreover, in relationship centered China, relationship conflict is more likely to interfere with teamwork than in Western countries. Therefore, this research proposes that relationship conflict is harmful to team efficiency.

Hypothesis 6b:

Relationship conflict will have a negative association with team efficiency.

3.6.2.3 Effect of Relationship Conflict on Member Satisfaction (H6c)

Chapter 2, section 2.5.9 consistently found that relationship conflict impedes member satisfaction (De Dreu & Weingart, 2003; Jehn, 1997), causes people's feelings to be hurt (Jehn, 1995; De Dreu et. al., 2003) and increases turnover of team members (Pelled, 1996), which is particularly significant in China where relationships are so important. Conflict, especially interpersonal conflict, is very likely to trigger bad feelings and harms group harmony and member satisfaction. Therefore, this research proposes that relationship conflict is harmful to member satisfaction.

Hypothesis 6c:

Relationship conflict will have a negative association with member satisfaction.

3.7 The Mediating Effect of Conflict on Diversity in Team Outcomes Relationship (H7 & H8)

As previously mentioned, the current research model, where it is proposed that conflict mediates the relationship between diversity and team outcomes, can be conceptually divided into two sub-models. The first sub-model is: functional diversity→task

conflict→team outcomes. The second sub-model is: demographic diversity→relationship conflict→team outcomes. These two sub-models together form an integrated model of diversity to conflict to outcomes. Such a three part model has been proposed before but the findings were inconsistent mainly due to a lack of contextual information (Gebert, et al., 2006; Li & Hambrick, 2005, Lovelace, et, al., 2001; Pelled, et al, 1999; Jehn, et al., 1999; Pelled, 1996). This thesis tests the model in a new context by arguing that in the IT project team context, where clear innovation goal and non-routine tasks exist the process of diversity through conflict to team outcomes can be clearly differentiated and tested. Based on the two sub-models, two separate formal mediating hypotheses are proposed:

Hypothesis 7:

Task conflict will mediate the relationship between functional diversity and team outcomes.

Hypothesis 8:

Relationship conflict will mediate the relationship between demographic diversity and team outcomes.

For each of these two hypotheses to be confirmed, all of the four conditions described in section 3.2 must hold respectively. For Hypothesis 7, Condition one requires that functional diversity be significantly related to team outcomes (H1a, H1b, and H1c). Condition two requires that functional diversity be significantly related to task conflict (H3). Condition three requires that task conflict be significantly related to the three team outcomes (H5a, H5b, and H5c). Condition four requires that, when task conflict is statistically controlled, functional diversity no longer has a significant relationship with the three team outcomes (see chapter 5, section 5.8 for details). Therefore, the confirmation of Hypothesis 7 is largely conditional on the confirmation of hypotheses H1, H3, and H5.

Similarly, for Hypothesis 8 to be confirmed, the same four conditions must be met. Condition one requires that demographic diversity be significantly related to team outcomes (H2a, H2b, and H2c). Condition two requires that demographic diversity be significantly related to relationship conflict (H4). Condition three requires that relationship conflict be significantly related to the three team outcomes (H6a, H6b, and H6c). Condition four requires that when relationship conflict is statistically controlled, demographic diversity no longer has a significant relationship with the three team outcomes (see chapter 5, section 5.8 for details). Therefore, the confirmation of Hypothesis 8 is largely conditional on the confirmation of hypotheses H2, H4, and H6.

While the two aforementioned sub-models are conceptually distinct, they are connected in reality. For example, the selected functional experiences of a team member cannot be separated from his/her personal demographic attributes (refer to section 2.2.4 of chapter 2). Similarly, task related conflict cannot be completely separated from interpersonal relationship conflict (refer to section 2.5.10 of chapter 2). We turn to this issue below.

3.8 The Relationship between Task Conflict and Relationship Conflict (H9)

Although task conflict emerges from differences among members and reflects the path by which team members were selected and relationship conflict is unplanned, nonetheless past literature has usually found a high correlation between task conflict and relationship conflict (De Dreu & Weingart, 2003; Simon & Peterson, 2000; Pelled, et al., 1999). As yet it remains to be established whether such a high correlation will also be found in IT project teams given their temporary membership base, their innovation task purpose and their often virtual operation. For example, one might anticipate that the lack of personal face-to-face contact could potentially reduce the negative conflict triggered by 'visible' demographic diversity so that people will be able to focus more on task related discussion, which might potentially reduce the tight relationship between task conflict and relationship conflict. On the other hand, lack of rich face-to-face communication in a virtually located IT project team, may foster task disagreement, and may trigger mistrust, misunderstanding and personal attack, although the level of harmfulness may be reduced. Moreover, in a Chinese context, task conflict is more likely to accidentally trigger relationship conflict than it is in Western settings. Therefore, this thesis proposes to test the extent of the relationship between task conflict and relationship conflict by proposing that the relationship is positively correlated.

Hypothesis 9:

There will be a positive association between task conflict and relationship conflict.

3.9 The Consequences of Task Conflict: Managing Task Conflict Effectively

As discussed in chapter 2, the consequences of conflict, especially task conflict, in IT project teams can be beneficial to team innovation (refer to section 2.5.7), but at the same time, aspects of both task and relationship conflict may potentially harm team efficiency and

member satisfaction (refer to section 2.5.8 and 2.5.9). This presents a challenge in relation to how potentially good conflict (task conflict) is managed in order to promote a beneficial set of outcomes (DeChurch & Marks, 2001) and suppress the undesirable effects (Gebert, et. al., 2006; Simons & Peterson, 2000). Past literature discussed in chapter 2, section 2.5.10, indicated that the effects of task conflict are inconsistent (De Dreu & Weingart, 2003) in as much as individual differences and conflicting opinions were perceived as a 'double-edged sword' (Lawrence, 1997; Milliken & Martins, 1996).

As previously mentioned, conflict itself is not a concern; it is how conflict is effectively managed that is more important to team outcomes (section 2.5.11 of chapter 2). Favorable conditions such as cooperative conflict management and cooperative goal were proposed (section 2.6 of chapter 2).

3.9.1 Effect of Cooperative Conflict Management on Team Outcomes (H10)

As mentioned previously in section 2.6.1 of chapter 2, cooperative conflict management is proposed to have similar positive effects on team innovation, team efficiency and member satisfaction in IT project teams (refer to section 2.6.2 of chapter 2) in the Chinese cultural context (refer to section 2.6.3 of chapter 2) as in its counterparts in the West. Therefore, the following three hypotheses are advanced:

Hypothesis 10a:

Cooperative conflict management will have a positive association with team innovation.

Hypothesis 10b:

Cooperative conflict management will have a positive association with team efficiency.

Hypothesis 10c:

Cooperative conflict management will have a positive association with member satisfaction.

3.9.2 Effect of Cooperative Goal on Team Outcomes (H11)

As previously mentioned in section 2.6.5 of chapter 2, cooperative goal is proposed because it would have similar positive effects on team innovation, team efficiency and member satisfaction in IT project teams (refer to section 2.6.6 of chapter two) in Chinese cultural contexts (refer to section 2.6.7 of chapter two) as in Western contexts. Therefore, the following hypotheses are proposed:

Hypothesis 11a:

Cooperative goal will have a positive association with team innovation.

Hypothesis 11b:

Cooperative goal will have a positive association with team efficiency.

Hypothesis 11c:

Cooperative goal will have a positive association with member satisfaction.

As proposed in H5 (a,b,c) and H6 (a,b,c), the general effects of both task conflict and relationship conflict on team outcomes are negative with the exception that task conflict has a positive effect on team innovation. The positive effect of task conflict on team innovation may, however, not be straightforward because I expect a positive relationship between good conflict (task conflict) and bad conflict (relationship conflict) (H9). As proposed in H10 and H11, favorable conditions such as cooperative conflict management and cooperative goal can enhance team outcomes. It is possible that these favorable conditions can increase the positive effect of task conflict on team innovation.

3.10 Moderators in the Research Model

Section 2.5.11 of chapter 2 indicates that a moderate level of task conflict is beneficial to the team but it should neither be too much nor too little (Jehn, 1995; Jehn & Mannix, 2001). However, the issue of when a moderate level of task conflict has been reached or how to manage it remains largely unaddressed. Some literature has suggested that if effective conflict management can be implemented, this can maintain just the moderate level of task conflict to improve team outcomes (West, 2002; Xie, et al., 1998; Thamhain & Wilemon, 1975). It has also been found that approaching task conflict cooperatively through open discussion makes relationship conflict much less likely (Tjosvold, et al., 2003; Amason & Sapienza, 1997; Williams & O'Reilly, 1998). Therefore, cooperative conflict management may uncouple the interaction between good task conflict and bad relationship conflict. Among different kinds of task conflict, goal conflict is one of the most common conflicts within project teams. In addition Alper et al (2000) found that approaching goal conflict cooperatively can produce positive team outcomes. Furthermore within the collectivistic cultural context of China, Chatman et al (1998) found the cooperative approach to be considered as a favorable team condition that turns diversity and conflict into positive outcomes.

As discussed in section 2.6.4 and section 2.6.8 of chapter 2, it seems that a cooperative approach toward task conflict, such as cooperative conflict management and the existence of a cooperative goal are important factors in managing task conflict and result in team innovation. This leads this thesis to ask whether either or both cooperative conflict management and a cooperative goal will moderate the relationship between task conflict and team innovation.

Previously presented hypotheses H1 to H11 aim to clarify existing theories simply and in a new context; however, the discussion below presents exploratory hypotheses for the moderating effects of cooperative conflict management and cooperative goal on task conflict to team innovation relationship. The aim of these new hypotheses is to contribute new knowledge to the existing literature on the diversity—conflict—outcome relationship. Before presenting the moderating hypotheses, the meaning of moderating effect is explained below.

3.10.1 Moderating Effect

There are three components involved in substantiating a moderating effect – an independent variable, a dependent variable and the moderator variable. The moderating effect occurs when the effect of an independent variable on a dependent variable varies across different levels of a third variable – the moderator (Baron & Kenny, 1986; Edwards & Lambert, in press). Moderation is often involved in research on situational conditions which influence the strength of the relationship between a predictor (independent variable) and an outcome (dependent variable). For explanatory purposes, it is assumed that the predictor (independent variable) is "X", the outcome (dependent variable) is "Y", and the moderator variable is "Z". The strength of the relationship between "X" and "Y" varies depending on the levels of the moderator, "Z". This interaction is illustrated in figure 3.7 below.

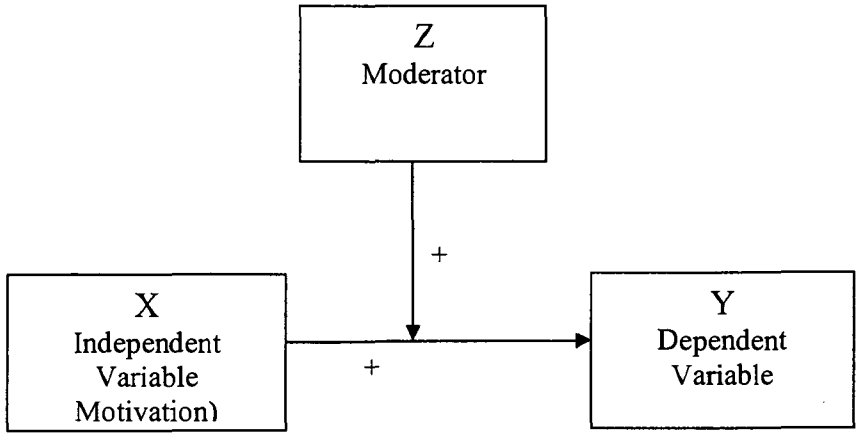


Figure 3.7 The Effect of X on Y Varies Depending on Different Levels of Moderator Z.

For example, it may be hypothesized that worker ability moderates the association between work motivation and job performance such that the positive association is stronger when work ability is high than when it is low. In this case, the independent variable (X) is Work motivation; the dependent variable (Y) is Job performance; the moderator variable (Z) is Worker ability.

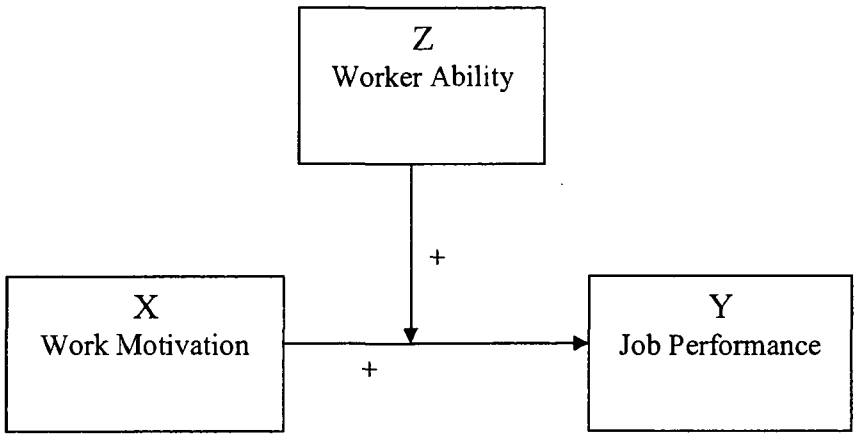


Figure 3.8 An Example of Moderating Effect

Assuming that multiple regression analysis (see chapter 5, section 5.12 for details) found a significant interaction effect between work motivation and worker ability on job performance, this would provide the initial support for the hypothesis. To interpret the interaction, the relationship between work motivation and job performance can be plotted under high and low worker ability groups (see figure 3.9 below).

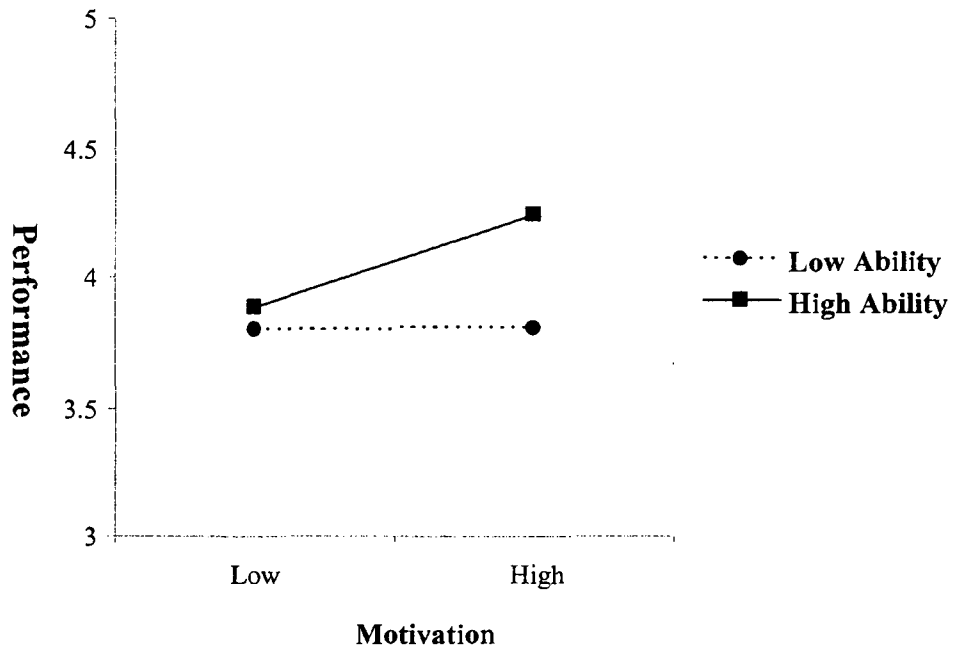


Figure 3.9 Example: the Relationship between Work Motivation and Job Performance Moderated by Worker Ability

The above figure shows that when worker ability is high, work motivation is positively related to job performance; when worker ability is low, work motivation is not related to job performance. In the above example, the moderating hypothesis is confirmed.

3.11 Cooperative Conflict Management as a Moderator for the Relationship between Task Conflict and Team Innovation (H12)

As discussed in chapter 2, section 2.6.4, cooperative conflict management may play the role of moderator in the task conflict-to-team outcomes relationship. In other words, this means that cooperative conflict management may moderate the relationship between task conflict (independent variable) and team innovation (dependent variable). Using the aforementioned model of moderating effect in this case, the independent variable (X) is task conflict, the dependent variable (Y) is team innovation and the moderator variable (Z) is cooperative conflict management. A diagram of the moderating effect on this relationship is shown below.

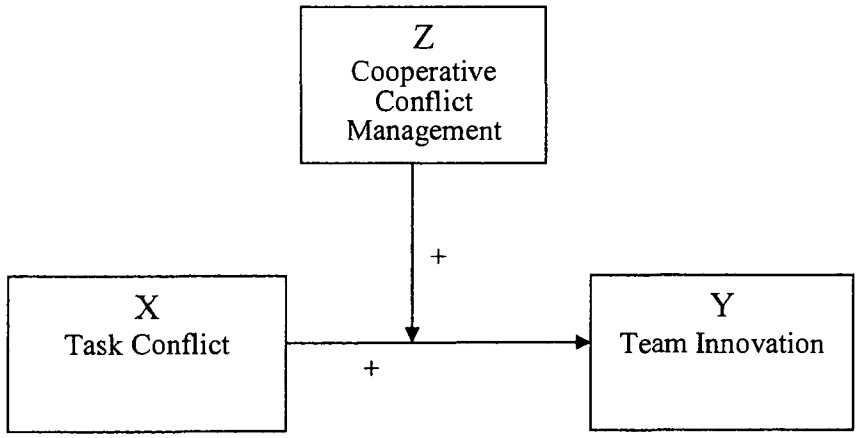


Figure 3.10 The Moderating Effect of Cooperative Conflict Management on Task Conflict to Team Innovation Relationship

The above diagram shows that the effect of task conflict on team innovation is proposed to vary depending on different levels of moderator - cooperative conflict management.

Cooperative conflict management practices encourage open debate, cooperative behavior, the sharing of different opinions, and in turn enhance team innovation (Jehn, et al., 1999; Chen, et al., 2005). Cooperative behaviors can also mitigate the potentially negative effects of diversity and conflict (Williams & O'Reilly, 1998; Jehn, et al., 1999). It is possible that if task conflict is managed in a cooperative way that open sharing and the integration of conflicting ideas may be more easily brought about and personal attacks reduced, to the benefit of team innovation. There is also evidence that cooperative conflict management is effective in IT project teams in a Chinese context (refer to sections 2.6.2 and 2.6.3 of chapter 2). It is likely that in the focal project teams, when cooperative conflict management is high, task conflict may be more positively related to team innovation and when cooperative conflict management is low, task conflict may not be related to team innovation. A fuller discussion of these points was presented in chapter 2, section 2.6.4, which suggested that a cooperative approach to conflict management might be a moderator between task conflict and team innovation.

Hypothesis 12: Cooperative conflict management will moderate the association between task conflict and team innovation such that the positive association will be stronger when cooperative conflict management is high than when it is low.

The following sections are discussions on the second moderator – the cooperative goal. Literature has found that cooperative conflict management is facilitated by the existence of a cooperative goal (Deutsch, 1973). Cooperative goal and cooperative conflict management are related but are not the same thing. Conceptually, cooperative conflict management is a set of behaviors aimed at addressing conflict in ways that lead to resolution, whereas cooperative goal is about the adoption, by all members of the team, of an overriding goal which each team member accepts as being more important than personal individual goals (Deutsch, 1973).

Since goals are very important to project teams (Katzenbach & Smith, 1999), management of goal differences is critical for team success. It is, therefore, important that team co-ordination is facilitated through team goals (Chatman & Flynn, 2001) to reduce the conflict that is often related to task conflict (Jehn, 1995). If a project team approaches goal conflict cooperatively it may make a big difference to the team outcomes.

In the project team context, team goals are clearly defined so that team members are more prone to cooperation than separation. In the context of a collectivistic culture, the Chinese tend to work more cooperatively toward common goals than their American counterparts where the culture tends to be more individualistic (Cox, et al., 1991; Earley, 1989). This leads to the next question – in the focal project team context, to what extent will the cooperative goal moderate the relationship between task conflict and team innovation?

3.12 Cooperative Goal as a Moderator of the Task Conflict-Team Innovation Relationship (H13)

As discussed in chapter 2, section 2.6.8, cooperative goal plays the role of moderator in the task conflict-to-team outcomes relationship. In other words, this means that cooperative goal may moderate the relationship between task conflict (independent variable) and team innovation (dependent variable). Using the aforementioned model of moderating effect in this case, the independent variable (X) is task conflict, the dependent variable (Y) is team innovation and the moderator variable (Z) is cooperative goal. A diagram of the moderating effect in this relationship is shown below.

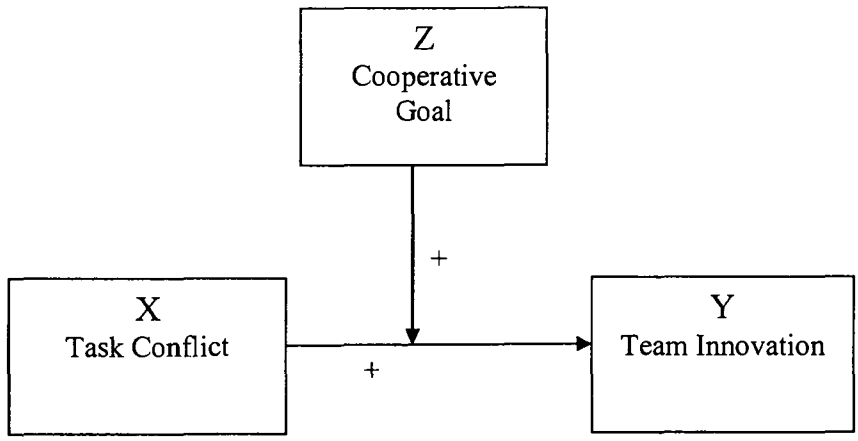


Figure 3.11 The Moderating Effect of Cooperative Goal on Task Conflict to Team Innovation Relationship

The above diagram shows that the effect of task conflict on team innovation is expected to vary depending on different levels of the moderator - cooperative goal.

As mentioned above, establishing the right type and the right level of conflict are important for team work (West, 2002) and several studies have explored managing and capitalizing on diversity and conflict (Polzer, et al., 2002; Knippenberg et al., 2004; Jehn & Bezrukova, 2004; Van Der Vegt, et al, 2005). In addition to adopting a cooperative approach to conflict management, favorable climate conditions such as reaching common goals and fostering cooperation norms have been suggested (Chatman & Flynn, 2001; Williams & O'Reilly, 1998). Approaching goal conflict cooperatively to reach a common goal among team members is known as team cooperative goal mode, where team members appreciate others' goal attainment as a way to achieve their own goals and as a means of enhancing team dynamics and outcomes (Deutsch, 1973).

Goal conflict is one of the more frequent task related conflicts a project team will experience (Xie, et al., 1998) and how to manage it effectively is critical to the success of a project team. A cooperative goal can foster cooperation among team members even if they have conflicting personal goals and interests. In a cooperative goal mode, team members treat task related problems and conflict as common issues for the whole team to work out together. In the collective Chinese culture, there is evidence (Chen, et al., 2002) that cooperative goal encourage open-minded discussion as well as encourage team members to be more willing to see things from others' perspectives, which in turn facilitates the integration of diverse ideas, and generates innovative solutions (Tjosvold, et al., 2004). If task conflicts are managed in a cooperative way, open sharing and the integration of opposing task related ideas can be more

easily brought about and personal attacks reduced. This in turn can uncouple the problematic linkage between potentially positive task conflict and negative relationship conflict.

It is, therefore, very likely that when the level of cooperative goal is high that task conflict is more positively related to team innovation and when cooperative goal is low, task conflict is less likely to be related to team innovation. Therefore, this thesis proposes that cooperative goal be a moderator between task conflict and team innovation.

Hypothesis 13: Cooperative goal will moderate the association between task conflict and team innovation such that the positive association will be stronger when cooperative goal is high than when it is low.

3.13 Summary of Research model and Hypotheses

Based on the aforementioned research questions and their corresponding research hypotheses, this research proposes a conceptual framework to explore the impact of intra-team diversity through conflict to team outcomes. The effect of the proposed three part model, diversity-conflict-outcomes, is designed for testing in IT project teams in China. The conceptual framework consists of a three part model; the first part is the antecedent and independent variables of functional diversity and demographic diversity. The second part is the process and mediator variables which are task conflict and relationship conflict. The third part is the outcome and dependent variables which are team innovation, team efficiency and member satisfaction. This three part model is conceptually separated by two paths (i.e., two sub-models). The primary path is initiated by selected functional diversity, while the other path is initiated by non selected demographic diversity. This three part model also implies that conflict has a mediating effect between diversity and team outcomes.

As previously mentioned, in order to support the full mediating role of conflict in the three part model, four conditions must be met.

1) Condition one: functional diversity is proposed to link to team outcomes (H1); demographic diversity is proposed to link to team outcomes (H2).
2) Condition two: functional diversity is proposed to link to task conflict (H3); demographic diversity is proposed to link to relationship conflict (H4).
3) Condition three: task conflict is proposed to link to team outcomes (H5); relationship conflict is proposed to link to team outcomes (H6).

4) Condition four: when task conflict is controlled, functional diversity no longer affects team outcomes (H7); when relationship conflict is controlled, demographic diversity no longer has an effect on team outcomes (H8).

This three part model of diversity-conflict-team outcomes had been adopted from earlier literatures in Western countries (Pelled, et al., 1999; Jehn, et al., 1999) and elaborated in this research for a new context. The weight of existing literature proposes that diversity (functional diversity and demographic diversity) and conflict (task conflict and relationship conflict) are negatively related to team outcomes. However, it is argued in the context of this thesis that when innovation is a major desired outcome within the task oriented IT project team context, the primary selection path, functional diversity and resultant task conflict are more likely to bring out innovation.

It seems that conflict is an important factor in bringing about positive team outcomes so effective ways of managing conflict are critical. This model proposes that cooperative conflict management (H10) and cooperative goal (H11) may manage conflict resulting in positive team outcomes.

Although the aforementioned three part model conceptually separates potentially desired diversity (functional diversity) and potentially desired conflict (task conflict) from undesired diversity (demographic diversity) and undesired conflict (relationship conflict), in reality, it is hard to uncouple the interaction between potentially desired conflict (task conflict) and undesired conflict (relationship conflict) (H9). Separation may be assisted by the addition of two variables to the model (cooperative conflict management and cooperative goal) that moderate the nature of the relationship between task conflict and team outcomes. The model aims to test whether the positive effect of task conflict-to-team innovation can be better harvested when these two moderators are high rather than when they are low. Therefore, this research hypothesizes that when cooperative conflict management and cooperative goal are high, team members are more likely to manage task conflict at a suitable level to bring out positive innovation outcomes than when cooperative conflict management and cooperative goal are low (H12, H13).

In summary, there are a total of 25 hypotheses in the current research model. These hypotheses are listed as follows.

Table 3.1 Summary of Research Hypotheses

Identifier	Hypotheses
H1a	Functional diversity will have a positive association with team innovation
H1b	Functional diversity will have a negative association with team efficiency
H1c	Functional diversity will have a negative association with member satisfaction
H2a	Demographic diversity will have a negative association with team innovation
H2b	Demographic diversity will have a negative association with team efficiency
H2c	Demographic diversity will have a negative association with member satisfaction
H3	Functional diversity will have a positive association with task conflict
H4	Demographic diversity will have a positive association with relationship conflict
H5a	Task conflict will have a positive association with team innovation
H5b	Task conflict will have a negative association with team efficiency
H5c	Task conflict will have a negative association with member satisfaction
H6a	Relationship conflict will have a negative association with team innovation
H6b	Relationship conflict will have a negative association with team efficiency
H6c	Relationship conflict will have a negative association with member satisfaction
H7	Task conflict will mediate the relationship between functional diversity and team outcomes
H8	Relationship conflict will mediate the relationship between demographic diversity and team outcomes
H9	There will be a positive association between task conflict and relationship conflict
H10a	Cooperative conflict management will have a positive association with team innovation
H10b	Cooperative conflict management will have a positive association with

Identifier	Hypotheses
	team efficiency
H10c	Cooperative conflict management will have a positive association with member satisfaction
H11a	Cooperative goal will have a positive association with team innovation
H11b	Cooperative goal will have a positive association with team efficiency
H11c	Cooperative goal will have a positive association with member satisfaction
H12	Cooperative conflict management will moderate the association between task conflict and team innovation such that the positive association will be stronger when cooperative conflict management is high than when it is low
H13	Cooperative goal will moderate the association between task conflict and team innovation such that the positive association will be stronger when cooperative goal is high than when it is low

This study's variables are further classified in Table 3.2 below.

Table 3.2 Summary of Research Model Variables (will be further addressed in the next chapter)

Variable Type	**General Variable Label**	**Specific Variables Used in the Study**
Independent Variables	Functional Diversity	Functional Role
Independent Variables	Demographic Diversity	Gender, Age, Nationality, Region, Company Affiliation
Dependent Variables	Team Outcomes	Team Innovation, Team Efficiency, Member Satisfaction
Mediators / Moderators / Independent Variables	Conflicts Cooperation	Task Conflict, Relationship Conflict Cooperative Conflict Management, Cooperative Goal

A graphic summary of the research model describing the relationships of all variables is provided as follows:

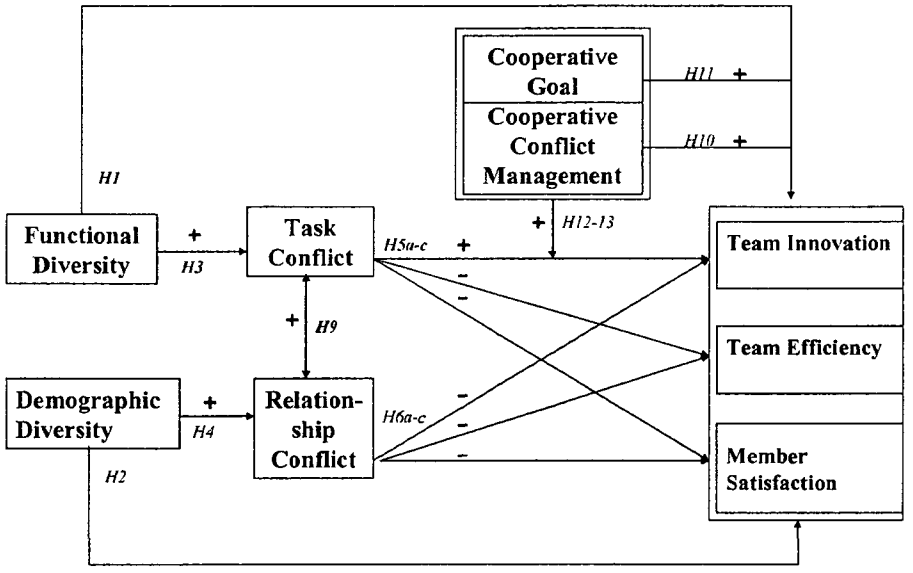


Figure 3.12 The Overall Integrated Research Model

Chapter 4

Methodology

This chapter describes the research method used in this thesis as well as how the data collection was undertaken, the research population, the sampling procedures, the nature of the data, and how the variables were measured. The data collected in this thesis were designed to test the research hypotheses presented in chapter 3, section 3.13. The quantitative research methodology was chosen to examine the relationship between the variables, with the justification for its choice being given in section 4.3.4.2 below. The major contribution of quantitative methods, such as analytical survey questionnaires, is to rigorously test hypotheses through a structured methodology with high reliability and validity (Gill & Johnson, 1997). This chapter focuses on the methods adopted for data collection and will present some preliminary descriptive data analysis as well as the statistical analysis of the measurement scales used in this study. The more detailed findings from the hypotheses testing are presented in the chapter 5.

As argued in chapter 3, the effect of diversity and conflict within teams is more easily predicted when the nature of the teams and their social context is well defined. In this research the teams were drawn from a number of IT project teams in one company in China where the team tasks were clearly defined. The teams were chosen for their differences in member expertise, a feature that is more likely to stimulate innovation (Jackson, et al., 2003). This presents an opportunity to focus on one task type (innovative task) and one team type (IT project team) in one IT multinational firm in China.

The potential benefits of this approach are tighter control of the variables. However, it is possible that associated disadvantages may limit the generalization of the result to other types of teams, other types of tasks and other cultural backgrounds. These issues are discussed more fully in Chapter 6.

4.1 Data Collection

In 2005, the multinational involved in this research employed over 10,000 people in its Greater China division (mainland, Hong Kong, Taiwan). There were over a hundred IT

service projects underway at any one time involving around one third of the company's employees. A project could last from 3 months to over 3 years with team sizes varying from 5 to over 100 people. In this company project success is measured by company managers based on their feedback from clients relating to their satisfaction with project innovation, quality, cost, and speed efficiency. IT project teams within the firm are all temporary with many operating in both boundary-less and virtual modes.

There were two main groups targeted for this data collection. The first group was either project managers or team leaders (for simplicity they are all called project managers in this thesis) who had many years of experiences in managing IT project teams. The second, larger group consisted of core members of the project teams. Most core team members work fulltime on projects and for the duration of the projects and have significant impact on the delivery of key project modules. Their input and perceptions were important.

Access to participants was secured from the participating firm's senior managers, who granted permission to the researcher to collect data from their project managers and their team members. Ethical approval was granted by the University of South Australia (see Appendix D). All participants were aware of the purpose of the study and that their responses would be treated in confidence (see the cover letters in Appendix A). The researcher is an internal training consultant in the company who has been employed there for more than ten years and has experience with its project management practices, having conducted many training courses for project managers during this time. The participating project managers were all recruited from participants in project management classes taught by the researcher, knew her, and indicated their willingness to assist in her research.

4.2 Variables for the Study

This section describes the variables used in the research model. These variables are described in the following sequence of; independent variables (diversity), dependent variables (team outcomes), mediating variables (conflicts), then moderating variables (cooperative conflict management and cooperative goal).

4.2.1 Independent Variables - Diversity

Two main types of diversity were measured– functional and demographic. To calculate diversity indices (see below) requires background information about the distribution of each diversity attribute in the project team. In previous literature (e.g., Jehn, et al., 1999;

Pelled, et al., 1999) these data were generally collected from team members and then combined to create the diversity indices (see section 4.2.1.3 for calculation of diversity indices). Such an approach works better when there is more complete information and less missing data. In a temporary membership situation, the rate of missing data is expected to be much higher given that IT project teams are generally more mobile than permanent teams and a number of team members work remotely. In this situation project managers were considered to be a knowledgeable alternative source of information and were requested to identify their core team members and provide this diversity information for their teams.

4.2.1.1 Functional Diversity Variables

Functional diversity was measured by job related functional roles (refer to section 2.3.3 of chapter 2), repeating the process utilized by Van Der Vegt, et al (2005). Team members were categorized into nine main functional roles based on the company's employment categories: Architect, Consultant, Development, Testing, Operations Support, Sales & Engagement, Technical Support, Project Office Administration, and Others.

4.2.1.2 Demographic Diversity Variables

Five demographic diversity attributes were measured. These comprised traditional attributes such as age and gender, and were supplemented by additional attributes such as nationality (which included language), regional location (which included dialect) and whether or not the member was a company employee (company affiliation), in accordance with the discussion in sections 2.3.5 and 2.4.5 in chapter 2.

4.2.1.3 Diversity Indices

Two types of diversity indices were calculated – a coefficient of variation and a heterogeneity index (Pfeffer & O'Reilly, 1987; Teachman, 1980); the former is for numeric variables (e.g., age) and the latter is for categorical variables (e.g., gender, or nationality). For numeric data such as age, Pfeffer and O'Reilly (1987) suggest that the coefficient of variation (defined as the standard deviation divided by the mean) provides a direct measure of dispersion of diversity. For example, to assess the relative dispersion of a team's age, each group's standard deviation of age is divided by the group mean.

When data are categorical or the utility of values is irrelevant, a different form of diversity index is more appropriate. Teachman (1980) suggests an entropy-based diversity index, commonly referred to as heterogeneity index, which is defined by the following formula:

$$\text{Diversity} = \Sigma - P_i(\ln P_i),$$

where P_i represents the proportion of the work unit that has each diversity characteristic.

The categorical diversity index represents the sum of the products of each category's percentage in the team's makeup and the natural log of its percentage; the higher the diversity index, the greater the distribution of characteristics within the team. For example, if a team is composed of six individuals, one engineer and five sales people, its diversity index is .4506; if all six members are engineers, the diversity index is 0.00; and if three members are engineers and three sales people, the diversity index is .6931 (Jehn, Northcraft & Neale, 1999). The only exception is when a demographic characteristic is not represented in the team, the value assigned is zero. In another example, if the team is composed of 6 members, 2 male, 4 female, the team diversity index is 0.64, using the following formula for the diversity index for gender (refer to Table 4.1):

H = -((male/sum1)*ln(male/sum1) + (female/sum1)*ln(female/sum1)).

H = -((2/6)*ln(2/6) + (4/6)*ln(4/6)) = 0.37 + 0.27 = 0.64.

Table 4.1 Example of Diversity Index for Gender

	Number of each gender	P (percent of each gender)	Ln (P)	-P*Ln(P)
Male	2	0.333333	-1.09861	0.366204
Female	4	0.666667	-0.40547	0.27031
Sum	6	1		0.636514

This research utilized six diversity variables. Using the aforementioned formula, each variable comes up with its own diversity index, with the exception of age which was calculated from information provided by project managers and was often supplied as an estimate. Numeric data such as age is harder for project managers to estimate so this information was filled out in rough categories using age ranges. All six diversity variables used the heterogeneity index method to calculate their diversity indices. The higher the diversity index number is the higher the dispersion of that variable within the team.

4.2.2 Dependent Variables – Team Outcomes

There are three team outcome variables that are dependent variables in this research; team innovation, team efficiency and member satisfaction (see section 3.3, chapter 3). These three variables were measured as follows:

4.2.2.1 Team Innovation

The team innovation scale used in this study was modified from Oldham and Cummings (1998), a scale that is commonly chosen for its strong reliability (reliability= 0.90). It not only measures the quality and quantity of original ideas but also the usefulness of the ideas for organizations and the practical approaches needed to implement the original ideas (Amabile, et al., 1996). Team innovation was assessed by the project managers because the project manager is the spokesperson for a project team and the one to receive feedback about the team's outcomes from higher level executives and external customers.

The scale was a 7-point Likert scale with ranges from 1 (strongly disagree) to 7 (strongly agree). The scale had 4 items:

'This team has produced highly creative output';

'This team has produced original and practical output';

'This team has shown great ability to use existing information or materials to develop products or services that are useful to its clients';

'This team has adapted well to the changing circumstances' (item four was subsequently dropped after CFA analysis, see section 4.3.4.2.3).

4.2.2.2 Team Efficiency

The Team efficiency scale was modified from Ancona and Caldwell's (1992) team efficiency scale. Team efficiency in this study was measured by schedule performance and budget performance because this performance scale is commonly used and has strong reliability (reliability=0.87) (Ancona & Caldwell, 1992). In practice team efficiency has commonly been measured by technical quality, especially new product development (Keller, 2001). Moreover, for a service project team, customer satisfaction is usually used to measure team performance (see section 1.1.4 of chapter 1). Therefore, in this study, these additional items will be included. Similar to team innovation, team efficiency was also assessed by project managers because they have better knowledge of feedback about team outcomes from higher level executives and external customers.

The final team efficiency scale was a 7-point Likert scale with ranges from 1 (strongly disagree) to 7 (strongly agree) and 4 items:

'This team has produced output of high technical quality';

'This team has earned high customer satisfaction';

'This team has kept its project on schedule';
'This team has excellent cost performance'.

4.2.2.3 Member Satisfaction

This scale was adopted from Priem, Harrison & Muir (1995) because it is well established in literature with strong reliability (reliability= 0.94, DeChurch & Marks, 2001). It is assessed by core team members who are the best source of whether they are satisfied or not. The scale was a 7-point Likert scale with ranges from 1 (strongly disagree) to 7 (strongly agree). There were two items:
'Working with this team has been an enjoyable experience'.
'I would like to work with this team in the future'.

4.2.3 Mediating and Moderating Variables

In the following section, the intervening variables will be elaborated. In this research, two mediators – relationship conflict and task conflict and two moderating variables– cooperative goal and cooperative conflict management are investigated. The data on these variables were collected from core team members because members have had first hand experience of intra-team conflict and cooperation on a daily basis.

4.2.3.1 Relationship and Task Conflict

Relationship and task conflict were measured using scales developed by Jehn (1995) because these scales are well established in the literature with strong reliability (reliability of relationship conflict = 0.92; reliability of task conflict = 0.87) (Jehn, 1995; Pelled et al., 1999). Each type of conflict was measured by four items on a 5-point Likert scale with ranges from 1 (none) to 5 (a lot). The score for each type of conflict was calculated by the mean of all 4 items. The group conflict score was derived by aggregating individual level scores from all members for each conflict (see section 4.3.4.2.4 for aggregation of team level from individual level). Four items for relationship conflict were:
'How much are personality clashes evident in your team?'
'How much tension is there among the members of your team?'
'How often do people get angry while working in your team?'
'How much jealousy or rivalry is there among the members of your team?'
Four items for task conflict were:
'To what extent are there differences of opinion in your team?'
'How often do the members of your team disagree about how things should be done?'

'How often do the members of your team disagree about which procedure should be used to do your work?'

'To what extent are the arguments in your team task-related?'

4.2.3.2 Cooperative Goal and Cooperative Conflict Management

Cooperative goal was measured using Alper, Tjosvold and Law's (1998) scale because this scale is well published in the literature with strong reliability (reliability =0.81) (Alper, et al., 1998; Chen & Tjosvold, 2002). Cooperative goal was measured by the following four items:

'Our team members "swim or sink" together'.

'Our team members want each other to succeed'.

'The goals of team members go together'.

'When our team members work together, we usually have common goals'.

Cooperative conflict management was measured using Alper, Tjosvold and Law's (2000) scale because this scale is well published in the literature with strong reliability (reliability= 0.92) (Alper, et al., 2000; Chen, Liu & Tjosvold, 2005). Cooperative conflict management was measured by the following five items:

'Members encourage a "we are in it together" attitude'.

'Members seek a solution that will be good for all of us'.

'Members treat conflict as a mutual problem to solve'.

'We work so that to the extent possible we all get what we really want'.

'Members combine the best of positions to make an effective decision'.

All items were measured on 7-point Likert scales with ranges from 1 (strongly disagree) to 7 (strongly agree).

4.2.4 Controls

In multivariate research, it is necessary to control the influence of extraneous variables (Kerlinger & Lee, 2000). Extraneous variables are those independent variables which can influence the dependent variables but are extraneous to the purposes of the study (Kerlinger & Lee, 2000), so that the effects of the focal independent variables on the dependent variables can be accurately assessed. In experimental research, the influence of extraneous variables is minimized or nullified by elimination (i.e., keeping it constant), random assignment, or matching (i.e., creating equivalent control group). In field survey research such as the current study, the influence of extraneous variables is controlled by measuring them explicitly and

then including them as control variables in multivariate statistical analysis (Kerling & Lee, 2000).

In the context of team research, team size and team longevity (equivalent to project stage) are two extraneous variables to be controlled for in this study. Team size is a commonly used control variable in group research (e.g., Keller, 2001; Pelled, et al., 1999) because larger teams have more potential for heterogeneity, which may influence group dynamics and performance (Ancona et al., 1992). On the other hand, the length of the project is another control variable, as the longer members can interact may impact on intra-team conflict and outcomes (Jehn & Mannix, 2001). In following this established procedure, this research uses team size and project stage as two control variables.

4.2.4.1 Team Size

Team size was measured by the total number of core team members. In temporary project teams, many team members are in and out of project teams during different periods, so the team size may vary depending on the different stages of a project. Since core team members are key contributors to project outcomes, it is more meaningful to use core team member size than total team member size.

4.2.4.2 Project Stage

As described in chapter 1, section 1.1.2, a typical project has different dynamics and outcomes at different stages of a project. Project stage is a relatively new variable because in past studies most teams used team longevity as a control variable, largely because permanent groups or student groups do not have stages in their projects. In the current study, project stage was measured by the percent completion ratio of the project to enable comparison across projects with different duration. Project completion ratio is defined as current accomplished project effort divided by total required project effort. A lower number for the project completion ratio means the project is in its early stages and a higher number for the project completion ratio means the project is in its later stages. The current data were collected at a particular time when each project would have been at its own particular stage. These cross-sectional data on particular project stage for each project team were represented by percent completion of the project. Project stage ratio is much better than project longevity at comparing different team dynamics at different times for each project team. For example, 3 months into a 3-month project is different from 3 months into a 3-year project. Although both projects are 3 months old, the first project stage ratio is 100% and the second project stage ratio is 8%. This measure, therefore, enables capture of the effects of diversity and conflict within different project stages, as these may well be different.

4.3 Research Population and Sampling Procedures

Data collected in this research involved a quantitative survey of 71 project teams with 71 project managers and 422 team members over 11 months (April 2004 to February 2005). There were about 100 projects underway at that time that fitted the survey criteria (see section 4.3.2 below). All were invited to participate in the research; 87 agreed of which 71 met the criteria for data analysis (see current study cover letter in Appendix A). The data for the study were collected from two major sources - project managers and core team members. Project managers had overall responsibility for the end to end execution and outcome of projects so they were most knowledgeable about project-wide information. Core team members are key contributors to the project outcomes and are semi-permanent to the team so they were most knowledgeable about team processes and team dynamics. The current study, therefore, needed to collect two different sets of input data from each project team - one survey from its project manager and one survey from its core team members.

4.3.1 Content and Target Populations for the Quantitative Data

The current study involved two surveys of differing content. The first survey targeted project managers (the PM survey) and the second was aimed at the core team members that were participating in the study (the CM survey). The PM survey was administered first because it contained a request for details on how to contact core team members. Only the core team members of a project identified by its project manager were invited to participate in the subsequent team member surveys. The PM survey was four pages long and the team member survey was two pages long (see Appendix B for the Project Manager survey and Appendix C for the team member survey).

The PM survey was divided into two parts - PM survey part 1 and PM survey part 2. The first part of the survey asked participating project managers to fill out basic background information about the project, to identify core team members and core team member distribution on selected diversity attributes and asked the project manager for his/her own personal data. The second part of the survey asked project managers to rate his/her perceptions of key variables such as conflict, cooperative goal and cooperative conflict management, and team performance outcomes.

The team member survey asked core team members to report their perceptions of the levels of intra-team task and relationship conflict, the presence and power of any cooperative goal, the nature of cooperative conflict management, and the level of individual member

satisfaction. It also requested optional personal information such as business unit, gender, and cultural background.

4.3.2 Timing and Selection Criteria for Data Collection

The timing of when data are captured is important. If the data are captured at too early a stage in the project, there is not enough member interaction, and therefore conflict and cooperation may not have fully developed. If the data are captured after the project has been completed, the team will have been disbanded and it is harder to collect the information. The projects targeted in this study were those that were not in their initial stages but had not already been completed so that the team process and group dynamic could be captured. These projects were also ones that had duration of at least 3 months and were at least 10% into the project life cycle at the time of survey, so that team members had experience of interacting with one another.

Team size is also an important factor. The ideal team size for the study was not too large and not too small because if the team size is less than 5, it is hard to see diversity and conflict behavior, on the other hand, if team size is too large, it influences group dynamics and performance (Ancona et al., 1992). Therefore, the selected team size in the current study was between 5 and 20 members.

A list of current on-going projects and their project managers that fitted these criteria was obtained and screened to select suitable projects that were at least 10% underway, contained at least 5 team members, and had specific deliverable goals. Larger project teams were broken down into sub-teams of 5 to 20 members, each led by a project leader. In such cases, it was the sub-team which was the unit of study. With the help of professional leaders from within the participating firm, 100 project teams were identified and approached of which 87 voluntarily participated and 71 were suitable to be analyzed in this study (see section 4.3.3. below).

The project manager survey was completed by project managers during face-to-face or telephone interviews, which lasted between one and two hours. It was administered when at least 10% of the project had been completed, which allowed for team dynamics to have evolved in the case of new projects.

In general, team members were nominated by project managers to complete the team member survey and the majority of project managers nominated all team members. If the project team size was large (i.e., more than 20 members), project managers were asked to identify 'core team members' to participate in the study. Core team members were defined as those who had responsibility for or who participated in the delivery of key project modules and who spent at least 50% of their working time on the project during the main phases of its

execution. If a team was very large (i.e., more than 20), it would normally be broken into several sub-teams. Member surveys were administered about one or two days after the project manager completed his or her survey.

Between April and November 2004, 100 qualified project managers were invited to participate in this research. They were chosen based on the above selection criteria and with the assistance of senior project management. Email was used to invite them to participate because this was considered the most effective way of sending out the invitations within an IT firm. The project managers were interviewed either in face-to-face interviews or through telephone interviews. All project managers and team members completed their questionnaires, which were in the form of web based surveys.

Participants in the research came from three Chinese regions; therefore, three versions of the questionnaire were used. A version using Chinese with simplified characters was used in mainland China, Chinese with complex characters was used in Taiwan and an English version was used in Hong Kong. The survey was first prepared in English and translated into Chinese using forward and backward translation procedures and then verified. To assure measure equivalence in the Chinese and English versions, scales used in the study were translated into Chinese and then translated independently back into English (Brislin, 1980). Experts in Chinese also examined the questionnaire to ensure the items were interpretable in Chinese. Unless noted, all multiple-item measures used a seven-point response scale ranging from "strongly disagree" (1) to "strongly agree" (7).

4.3.3 Survey Response Rates

A cover letter, which recapped the purpose of the current study and reassured participants of confidentiality as well as reiterating that their participation was voluntary, was attached to the body of the survey (see the attachment in Appendix A). Each project team had one project manager, who was responsible for completing the project manager survey for the project team he/she represented. Among the 87 project teams whose project managers had agreed to participate in the study, 16 were disqualified because of project manager turnover, or the project had already closed before I captured the team member data, or the project team member's response rate was lower than 50%. The number of usable project manager returns was reduced to 71 out of the 100 originally invited to participate (71% usable rate). After collecting project managers' data via the PM survey, 565 team members were identified by participating project managers and were invited, via email, to participate in the team member survey. To increase the response rate, it was the project managers who sent out the email invitations to their core team members to encourage their cooperation. Each team member's

name was protected by assigning a unique identification to each person as well as a password to protect confidentiality. Project managers were asked to provide their team members' email addresses. After the project managers had sent out the invitations, I emailed each individual team member and asked them to voluntarily fill out the web-based team member survey using his/her unique logon identification and password. 442 team members out of the 565 invited returned their surveys; a response rate of 78%. After eliminating disqualified teams and their team member surveys, I obtained 422 usable member surveys, resulting in a response rate of 75%. The details of which are summarized in Table 4.2.

Table 4.2 Survey Response Rates

Categories	Project Manager Survey	Team Member Survey
Number of Surveys Sent Out	100	565
Number of Returned Surveys	87 (87%)	442 (78%)
Number of Usable Surveys	71 (71%)	422 (75%)

4.3.4 Preliminary Data Analysis

The preliminary data analysis is presented in two parts. Part one is a descriptive data analysis and part two is the statistical analysis of the measurement scales used in this study.

4.3.4.1 Part one: Descriptive Data Analysis

4.3.4.1.1 The Characteristics of the Sample: Project managers

The survey respondents were 71 project managers. They had an average age of 36.2 years and had worked for the firm for an average of 5.02 years. Their average project management experience within the firm was 3.71 years and their average project management experience outside the firm was 3.19 years. See Table 4.3 for project manager characteristics.

Table 4.3 Descriptive Statistics for Responding Project Managers (PM)

	Minimum	Maximum	Mean	Std. Deviation
PM Age	26	50	36.24	5.89
PM Tenure	0	17	5.02	3.71
Project management experiences within the firm	0	13	3.71	2.79
Project management experiences outside the firm	0	15	3.19	3.56

More project manager characteristics are presented in frequency distribution format in Table 4.4. These results show that almost all project managers (94.4%) were regular staff from four business units in the firm. These four business units' project types are all IT service projects ranging from IT infrastructure, consulting, and outsourcing to application maintenance. The project managers were mostly men (83.1%), with undergraduate (66.2%) or Masters/PhD degrees (31%). Most were Chinese (95.8%) with 43.7% being from Mainland China, 29.6% from Taiwan, and 21.1% from Hong Kong. 56.3% preferred speaking Mandarin although some, especially those from Hong Kong preferred speaking the Cantonese dialect (23.9%).

Table 4.4 Frequency Distributions for Responding Project Managers (PM)

Variable	Category	Frequency	Percent
PM affiliation to Business Units	infrastructure	23	32.4
	consulting	32	45.1
	outsourcing	8	11.3
	Application maintenance	4	5.6
	External contractor	4	5.6
PM Gender	Category	Frequency	Percent
	male	59	83.1
	female	11	15.5
PM Education	Category	Frequency	Percent
	university	47	66.2
	Master/PhD	22	31.0
PM Cultural background	Category	Frequency	Percent
	Mainland China	31	43.7
	Hong Kong	15	21.1
	Taiwan	21	29.6
	others	3	4.2
PM Mother Tongue	Category	Frequency	Percent
	Mandarin	40	56.3
	Cantonese	17	23.9
	Taiwanese	5	7.0
	Shanghainese	5	7.0
	English	2	2.8

4.3.4.1.2 The Characteristics of the Sample: Project teams and team members

In terms of team and team member respondents, there were 71 team responses and 422 team member responses. The characteristics for these are represented in Table 4.5. The team size is represented by the number of core team members in each project team. The average team size was 6.96. All 71 project teams had more than 5 team members except one team that

had 3 core team members. Project stage is represented by the percentage completion of the project. The sample project teams had an average project stage ratio of 64.82%. The average age of members was 32.3 years.

Table 4.5 Descriptive Statistics of Sample Project Teams

	Minimum	Maximum	Mean	Std. Deviation
Core team size	3	16	6.96	2.56
Project stage (completion percent)	10	100	64.82	25.89
Member age	22	58	32.31	6.00

More descriptions of the project teams are listed in Table 4.6. The results show that 49.3% of the projects consisted of consulting and system integration projects, 33.8% were IT infrastructure implementation projects, and 16.9% were data center outsourcing and code maintenance projects (see Table 4.4). The majority (81.7%) of projects were fixed priced contracts, where project teams are unable to get additional funding regardless of increasing requirements. Such contracts usually have limited time and resources so the majority of projects have budget constraints and cost pressures. 66.2% of the projects had completed more than 50% of project assignments.

More descriptions of characteristics of participating team members are listed in Table 4.6. Not all project teams had full-time committed team members; 59.2% had part-time members (34% had 1-3 part timers; 25.2% had 4-8 part timers). Not all project team members were from the focal firm, with 40% being from external contractors and customers. 74.9% of the participating team members were male. 27.3% of the team members were technical specialist or technical support and 21.8% were consultants. 95.1% had undergraduate, Masters or PhD degrees. 93.4% were Chinese (49.5 from the Mainland; 26.1% from Taiwan; 17.8% from Hong Kong). The major dialect/languages were Mandarin (64.9%) and Cantonese (19.9%), followed by Taiwanese and Shanghainese.

Table 4.6 Characteristics of Sample Project Team and Team Members

Variables	Category	Frequency	Percent
Project type	consulting	35	49.3
	infrastructure	24	33.8
	outsourcing	8	11.3
	application maintenance	4	5.6
Project contract type	fixed price	58	81.7
	time & material	13	18.3
Project stage	10-25	8	11.3
	26-50	16	22.5
	51-75	18	25.4
	75-100	29	40.8
No. of part-time members	0	29	40.8
	1-3	24	34.0
	4-8	18	25.2
External team members	contractor/customers	169	40
Team member gender	male	316	74.9
	female	90	21.3
Team member functional roles	technical specialist/support	115	27.3
	consultant	92	21.8
	development/ testing	57	13.5
	architect	53	12.6
	operation support	17	4.0
	project officer administrator	13	3.1
	engagement /sales specialist	10	2.4
Team member	university	289	68.5

Variables	Category	Frequency	Percent
education			
	master/PhD.	112	26.6
Team member regions/nations	Mainland China	209	49.5
	Taiwan	110	26.1
	Hong Kong	75	17.8
	Other nation	28	6.6
Team member dialect/language	Mandarin	274	64.9
	Cantonese	84	19.9
	Taiwanese	23	5.5
	Shanghainese	15	3.6

4.3.4.1.3 Distribution of Diversity Indices

There are two types of diversity indices – coefficient of variation and heterogeneity index (Pfeffer and O'Reilly, 1987; Teachman, 1980); the former is for numeric variables (e.g., age) and the latter is for categorical variables (e.g., gender, nationality). As has been previously mentioned in this research, only the heterogeneity index is used here. The heterogeneity index of diversity formula was applied to all teams and for all six diversity attributes in this thesis. The higher the number of the diversity indexes the higher the level of diversity in a team. Among all demographic and functional diversity, age diversity in the sample project teams had the largest mean diversity index (.79), followed by functional role diversity (mean diversity index .69). The details of the focal project teams' diversity index distribution are listed in Table 4.7.

Table 4.7 Descriptive Statistics of Diversity Index Variables (N = 71)

Diversity Variables	Minimum	Maximum	Mean	Std. Deviation
1. **Age**	.00	1.55	.79	.32
2. **Functional role**	.00	1.79	.69	.51
3. **Cross company**	.00	1.37	.56	.45
4. **Gender**	.00	.69	.37	.27
5. **Nationality**	.00	1.05	.08	.21
6. **Region**	.00	.68	.07	.19

4.3.4.2 Part Two: Statistical analysis of the measurement scales

In this study, since all variables were measured using well-established measurement scales, the purpose of conducting the statistical analysis was to validate whether these scales performed well for this study's sample. The analytic analysis planned to use structural equation modeling (SEM) to assess and validate the psychometric properties and distinctiveness of multi-item scales (Hair, Anderson, Tatham & Black, 1998).

Structural equation modeling (SEM), often referred to simply as LISREL (one of the most popular software packages that runs such analysis), is a tool that allows separate relationships for each of a set of dependent variables. SEM technique provides the 'appropriate and most efficient estimation technique for a series of separate multiple regression equations estimated simultaneously' (Hair, Anderson, Tatham & Black, 1998, p. 17). Structural equation modeling (SEM) can be used to conduct confirmatory factor analysis (CFA), which analyzes the underlying dimensions among a number of observed variables. These dimensions are represented by latent factors. As variables load highly on a latent factor, they become descriptors of the underlying dimension. By examining the loadings of the variables on the factors, we can identify and confirm the character of the underlying dimension. The benefit of using SEM to conduct CFA in validating measurement scales is illustrated by Hair, et al. (1998, p 616) as follows:

'The factors are, in measurement model (of SEM) terms, the latent variables. Each variable acts as an indicator of each factor (because every variable has a loading for each factor). Used in this manner, factor analysis is primarily an exploratory technique because of the researcher's limited control over which variables are indicators of which latent construct (i.e., which variables 'load' on each factor). SEM, however, can play a confirmatory role because the researcher has complete control over the specification of indictors for each construct. Moreover, SEM allows for a statistical test of the goodness-of-fit for the proposed confirmatory factor solution, which is not possible with principal components or factor

analysis. Confirmatory factor analysis (CFA) is particularly useful in the validation of scales for the measurement of specific constructs.'

As mentioned before, this research measured all key variables by adopting existing scales. The researcher knew *a priori* which set of items corresponded to which latent factor, therefore, SEM was used to validate the multi-item measurement scales. The details of the SEM analysis are presented in the following sections.

4.3.4.2.1 Structural Equation Modeling Analysis of the Multi-item Scales

In this thesis, SEM was used to validate the multi-item scales (see sections 4.3.4.2.2 & 4.3.4.2.3). In order to assess the overall goodness-of-fit of the data to the model in SEM, it was necessary to test the statistical significance of the fit. However, so far, there is no single statistical test that best describes the 'strength' of the model's predictions (Hair, et al., 1998). Three goodness-of-fit test measurements are commonly used to gauge the model fit - the comparative fit index (CFI; Bentler, 1990), the root mean square error of approximation (RMSEA; Browne & Cudeck, 1993) and the goodness-of-fit index (GFI) (Joreskog & Sorbom, 1993). The CFI has been identified as the best approximation of the population value for a single model; with values = .90 it is considered indicative of good fit (Medsker, Williams, & Holahan, 1994). The RMSEA shows how well the model, with unknown but optimally chosen parameter values, would fit the population covariance matrix if it were available (Browne & Cudeck, 1993). Values of less than .05 are indicative of good fit, between 0.05 and under 0.08 of reasonable fit, between 0.08 and 0.10 of mediocre fit, and > 0.10 of poor fit (Browne & Cudeck, 1993). The GFI is an indicator of the relevant amount of variances and covariances accounted for by the model and, thus, shows how closely the model comes to perfectly reproducing the observed covariance matrix. Values of the GFI should range between 0 and 1 and a value of > 0.90 is usually taken as reflecting acceptable fit (Diamantopoulos & Siguaw, 2000; Hu & Bentler, 1999). The chi-square values (χ^2) were reported to provide a statistical basis for comparing the relative fit of nested models.

4.3.4.2.2 SEM Analysis of Team Member Ratings

Team members provided ratings for the whole group on task conflict, relationship conflict, cooperative goal, cooperative conflict management, and member satisfaction using the established scales described above. These five variables were measured by well-established scales with a total of 19 Likert items (see Table 4.8 for a detailed item listing). The five-factor model (task conflict, relationship conflict, cooperative goal, cooperative conflict management, and member satisfaction) was estimated using the covariance matrix in

LISREL 8.50 (Joreskog & Sorbom, 1993). Results of this analysis yielded good fit indices, χ^2 (142, N = 422) = 277.46, $p < .01$; CFI = .97; RMSEA = .048; GFI = .94.

Table 4.8 shows the completely standardized factor loadings for the items for the five variables. All items or indicators loaded significantly ($p < .01$) on their intended latent variables with factor loadings ranging from .42 to .96 (mean factor loadings = .78; median factor loadings = .79).

Table 4.8 Completely Standardized Factor Loadings for Task and Relationship Conflict, Cooperative Goal, Cooperative Conflict Management, and Member Satisfaction (N = 422)

Item Description	Factor Loadings*
Cooperative Conflict Management	
1. Members encourage a "we are in it together" attitude.	0.83
2. Members seek a solution that will be good for all of us.	0.74
3. Members treat conflict as a mutual problem to solve.	0.71
4. We work so that to the extent possible we all get what we really want.	0.80
5. Members combine the best of positions to make an effective decision.	0.77
Cooperative Goal	
6. Our team members 'swim or sink' together.	0.69
7. Our team members want each other to succeed.	0.80
8. The goals of team members go together.	0.93
9. When our team members work together, we usually have common goals.	0.92
Relationship Conflict	
10. How much are personality clashes evident in your team?	0.64
11. How much tension is there among the members of your team?	0.72
12. How often do people get angry while working in your team?	0.79
13. How much jealousy or rivalry is there among the members of your team?	0.76
Task Conflict	
14. To what extent are there differences of opinion in your team?	0.74

Item Description	Factor Loadings*
15. How often do the members of your team disagree about which procedure should be used to do your work?	0.86
16. How often do the members of your team disagree about how things should be done?	0.81
17. To what extent are the arguments in your team task-related?	0.42
Member Satisfaction	
18. Working with this team has been an enjoyable experience.	0.94
19. I would like to work with this team in the future.	0.96

* All loadings were significant at $p < .01$.

Considering their conceptual overlap, three alternative models were examined against the baseline five-factor model. Model 1 was a four-factor model with cooperative goal merged with cooperative conflict management to form a single factor; Model 2 was a four-factor model with relationship conflict merged with task conflict to form a single factor; Model 3 was a one-factor model combining all five measures to form a single factor. Note that Models 1 to 3 are nested in the baseline five-factor model, which allows us to compare their model fit versus the baseline model by conducting the Chi-square differences test (Hair, Anderson, Tatham, & Black, 1998). As shown in Table 4.9, when the indicators of cooperative goal and cooperative conflict management were collapsed to fit a four-factor model (i.e., Model 1), the model exhibited poor overall fit, χ^2 (146, N = 422) = 777.61, $p < .01$; CFI = .91; RMSEA = .10; GFI = .84, and was significantly worse than the baseline model, χ^2 difference (4) = 500.15, $p < .01$. This provides ample evidence for the discriminant validity between cooperative goal and cooperative conflict management. Similarly, when the indicators of relationship conflict and task conflict were collapsed to fit a four-factor model (i.e., Model 2), the model exhibited poor overall fit, χ^2 (146, N = 422) = 670.07, $p < .01$; CFI = .92; RMSEA = .092; GFI = .86, and was significantly worse than the baseline model, χ^2 difference (4) = 392.61, $p < .01$. This provides evidence of the discriminant validity between relationship conflict and task conflict at the team member level. When all indicators were collapsed to form a single factor (i.e., Model 3), the model exhibited poor overall fit, χ^2 (152, N = 422) = 2553.27, $p < .01$; CFI = .64; RMSEA = .19; GFI = .61, and was significantly worse than the baseline model, χ^2 difference (10) = 2275.81 $p < .01$. The above analysis provides support for the contention that team members can perceive differences among

cooperative goal, cooperative conflict management, relationship conflict, task conflict and member satisfaction and that the five scales have good construct validity.

In addition, the Cronbach alphas for the five scales were: task conflict (.76), relationship conflict (.82), cooperative goal (.90), cooperative conflict management (.88), and team member satisfaction (.94). All exceeded the traditional benchmark of .70 (Nunnally & Bernstein, 1994). These results suggest that the variables of task conflict, relationship conflict, cooperative goal, cooperative conflict management, and member satisfaction have good reliability for further data analysis.

Table 4.9 Comparison of Measurement Models for Member Survey Multi-item Variables in the Study

Model	Factors	χ^2	d.f.	$\Delta\chi^2$	RMSEA	CFI	GFI
Null model	All the indicators are independent	5180.84	171				
Baseline model	Five-factor model cooperative goal, cooperative conflict management, relationship conflict, task conflict, member satisfaction	277.46	142		.048	.97	.94
Model 1	Four factors: Cooperative goal and cooperative conflict management combined into one factor, along with relationship conflict, task conflict, and member satisfaction	777.61	146	500.15**	.10	.91	.84
Model 2	Four factors: Relationship conflict and task conflict combined into one factor, along with cooperative goal, cooperative conflict management, and member satisfaction	670.07	146	392.61**	.092	.92	.86
Model 3	One factor: all five variables combined into one	2553.27	152	2275.81**	.19	.64	.61

4.3.4.2.3 SEM Analysis of Project Manager Ratings of Team Innovation and Team Efficiency

Team innovation and team efficiency were rated by project managers, each using four Likert item scales. The two-factor model (team innovation and team efficiency) was estimated using the covariance matrix in LISREL 8.50 (Joreskog & Sorbom, 1993). The results of CFA yielded reasonable fit indices, χ^2 (19, N = 71) = 27.43, $p < .01$; CFI = .95; RMSEA = .080; GFI = .91. Table 4.10 shows the completely standardized factor loadings for the items for the two variables. All items or indicators loaded significantly ($p < .01$) on their intended latent variables with factor loadings ranging from .54 to .93 (mean factor loadings = .71; median factor loadings = .71). The less than desirable level of fit as indicated by the large RMSEA value suggested that the model would fit the data better by relaxing some parameters. An examination of the modification index revealed that the model would fit better if cross loading was allowed from Team Efficiency for item 4 of Team Innovation. Indeed, when this cross loading is freed, the results of CFA yielded excellent fit indices, χ^2 (18, N = 71) = 14.32, $p > .68$; CFI = 1.00; RMSEA = .00; GFI = .95. Item 4 of Team Innovation actually loaded higher on Team Efficiency than on its intended latent factor Team Innovation (.48 vs. .29). In retrospect, the fourth item 'This team has adapted well to the changing circumstances', could refer not only to the innovativeness of the team, but also to a key aspect of team efficiency because during the execution of the project, the team is often plagued by resource shortages and unpredictable obstacles. Thus, it is understandable that adaptation to changing circumstances is an indicator for both team innovation and team efficiency. To make the two constructs distinct, the fourth item was dropped from the team innovation scale in the subsequent analysis.

The Cronbach alpha for team innovation is .85, and .76 for team efficiency. Thus, both have exceeded the .70 standard. These results suggest that the variables of team innovation and team efficiency have good reliability for further data analysis.

Table 4.10 Completely Standardized Factor Analysis for Team Innovation and Efficiency (N = 71)

	Item Description	Factor Loadings*
Team Innovation		
1.	This team has produced highly creative output.	0.76
2.	This team has produced original and practical output.	0.93
3.	This team has shown great ability to use existing information or	0.71

	Item Description	Factor Loadings*
	materials to develop products or services that are useful to its clients.	
4.	This team has adapted well to changing circumstances.	0.54
Team Efficiency		
5.	This team has produced output of high technical quality.	0.65
6.	This team has earned high customer satisfaction.	0.84
7.	This team has kept its project on schedule.	0.69
8.	This team has excellent cost performance.	0.57

* All factor loadings were significant at $p < .01$.

4.3.4.2.4 The Importance of Data Aggregation

This current study is conducted at the team level, however, task and relationship conflict, cooperative goal, conflict management, and member satisfaction were measured at the member level. To meaningfully aggregate these individual-level variables to the team level, special handling was required (James, Demaree, & Wolf, 1993).

4.3.4.2.5 Justification of Aggregation

To justify that these individual-level variables can be meaningfully aggregated to the team level, according to James, Demaree and Wolf (1993), demonstration is required to show that a) there is sufficient within-group agreement within each team on each variable; and b) there is large between-group variance relative to within-group variance. I assessed the extent of within-group agreement by computing the within-group agreement indices: Rwg (James, Demaree, & Wolf, 1993). Although there are no precise standards concerning adequate Rwg levels, a rule of thumb of .70 or higher (Klein &Weaver, 2000) was applied to the current study. The mean and median of Rwgs for all scales were much higher than .70 (see Table 4.11), indicating a high level of within-group agreement. Intraclass correlation coefficients (ICC1, James, et al., 1993) were also calculated to examine the proportion of the total variance of the sample population (422 members in this case) that can be explained by group membership (71 teams in this case). To justify for aggregation and group level analysis, the ICC1 needs to be significant. There is no minimum value for ICC1, however, Bliese (2000) has found that the

median value of ICC1 across a number of studies in which member data was aggregated to the group level is .12. The ICC1s for all scales in this study were highly significant ($p < .01$) with all values exceeding .09. These results suggest that the various variables measured at the individual level can be justifiably aggregated to team level for further data analysis.

Table 4.11 Means, Standard Deviation, Reliability (α), Intraclass Correlation Coefficient (ICC(1)), and Within-Group Agreement (Rwg) of Selected Variables

Scale	Mean	Std. Deviation	α	ICC1	Rwg (mean)	Rwg (medium)
Relationship Conflict	2.08	.63	.82	.11**	.90	.89
Task Conflict	2.61	.63	.76	.11**	.89	.91
Member Satisfaction	5.79	1.06	.95	.22**	.82	.90
Cooperative Conflict Management	5.86	.86	.88	.09**	.90	.95
Cooperative Goal	5.91	.89	.90	.17**	.91	.93

This chapter has only presented a preliminary data analysis. The full report on the result of hypotheses testing will be presented in the next chapter.

Chapter 5

Results

This chapter describes the statistical methods used to test the research hypotheses and the findings. Firstly I will justify why multiple regression analysis (MRA) was selected as the primary vehicle for hypothesis testing and then describe the means, standard deviations, and bi-variate correlations among the study's variables. Finally, the results of hypothesis testing using MRA are described. Before proceeding to justify the use of MRA, the research model is will be reviewed.

5.1 The Research Model

As discussed in section 3.13, chapter 3, this thesis adopts a three-part model of diversity-to-conflict-to-team outcomes. There are two paths to proceed through this three-part model. One path is led by functional diversity and task conflict and the other is led by demographic diversity and relationship conflict. Conflict is proposed to be a mediator between diversity and team outcomes. Cooperative conflict management and cooperative goal were proposed as moderators to moderate the relationship between task conflict and team innovation.

To test this research model, a total of 25 hypotheses were proposed (see chapter 3, section 3.13). The first 17 of these hypotheses were built on testing the operation of the three-part model (diversity to team outcomes, diversity to conflict, and conflict to team outcomes). Previous research testing of this three-part model has led to inconsistent results that are difficult to generalize across different cultural contexts. This thesis tests the three-part model in new and well-defined IT project teams in the Chinese cultural context. The last 8 hypotheses were added to the three-part model to test the main effects of cooperative conflict management and cooperative goal on team outcomes as well as their moderating effects on the task conflict to team innovation relationship.

5.1.1 Justification for Using Multiple Regression Analyses (MRA) Instead of Structural Equation Modeling (SEM)

Both multiple regression analysis (MRA) and structural equation modeling (SEM) can be used to conduct multivariate data analysis. The major advantages of using structural equation modeling in multivariate analysis are twofold: a) it controls for measurement errors when testing hypothesized relationships; and b) it allows for the assessment of the overall fit of the research model to the data (Hair et al., 1998). However, SEM is not without its limitations. First, SEM assumes multivariate normality (Diamantopoulous & Siguaw, 2000) and second, to generate valid parameter estimates in SEM, it is generally accepted that the minimum sample size to ensure appropriate use of maximum likelihood estimation, the most common approach to parameter estimation in SEM, is 150 to 200 (Ding, Velicer, & Harlow, 1995). Hair et al. (1998, p 605) "recommend a sample size of 200, with increases occurring if misspecification is suspected, the model is overly large or complex, the data exhibit non-normal characteristics, or an alternative estimation procedure is used". Third, although recent advances in SEM have developed techniques to test interaction (or moderating) effects in the research model (e.g., Cortina, Chen & Dunlap, 2001), such techniques are cumbersome to use. For these reasons, most research involving testing interaction (or moderating) hypotheses has not used SEM as the data analysis strategy (Cortina, Chen & Dunlap, 2001).

In contrast, MRA is by far the most widely used multivariate technique (Hair et al., 1998). It is a statistical technique that can be used to analyze the relationship between a single dependent variable and several independent (predictor) variables. It is particularly suitable for testing hypotheses that involve mediating and moderating hypotheses (Cohen, Cohen, West & Aiken, 2003). The major advantages of MRA over SEM are threefold. First, while SEM requires multivariate normality, MRA only requires the normality of the error term distribution, which is much easier to meet than multivariate normality (Hair et al., 1998; West, Finch & Curran, 1995) and second, the minimum sample size requirement for MRA is less stringent than SEM (Hair et al., 1998). A general rule is that the ratio of observations to independent variables should never fall below 5:1 (Hair et al., 1998). For example, for an equation that has six independent variables, the minimum sample size for MRA is only 30 (6 x 5 = 30). Third, there are well developed, powerful procedures for testing both mediating and moderating hypotheses within the framework of MRA (Cohen, Cohen, West & Aiken, 2003).

For in-group research such as this study, where the unit of analysis is group instead of individual, the sample size (i.e., the number of groups) is usually too small (under100) for SEM analysis. In addition, most group research involves testing moderating hypotheses. For these two

reasons, MRA has become the predominant methodology for data analysis technique in group research. For example, a cursory review of recent group studies published in top-tier management journals (such as *Administrative Science Quarterly*, *Academy of Management Journal*, and *Journal of Applied Psychology*) all used MRA or MRA-based techniques for hypothesis testing (e.g., Keller, 2006; Li & Hambrick, 2005; Kirkman, et.al., 2004; Polzer, et. al. 2002; Jehn, et.al. 1999; Pelled, Eisenhardt & Xin, 1999).

In the current study, my sample size is small (71 groups); despite the fact that my data were collected from 422 team members and 71 project managers. Moreover, my research model is highly complex, involving some 15 variables and tests both mediating and moderating hypotheses. MRA was, therefore, selected as the statistical technique for hypothesis testing.

5.2 Inter-correlation Matrix of the Study's Variables

Before embarking on a multivariate data analysis, the means and standard deviations of the study's variables and their bi-variate correlations will be examined. Table 5.1 below presents the means, standard deviations, and the inter-correlation matrix of the study's variables. Several observations may be drawn from the table:

1. The means and standard deviations for variables that were measured using standard scales such as relationship conflict, task conflict, cooperative conflict management, and cooperative goal were quite similar to those found in prior research (e.g., Jehn, et.al. 1999; Alper, et. al., 1998; Alper, et. al., 2000).
2. The three types of team outcomes were relatively distinct. Member satisfaction was not significantly correlated with either team innovation or team efficiency. While team innovation and team efficiency were significantly correlated ($r = .389$, $p < .01$), the level of correlation was modest; the two variables shared only about 15% of the common variance ($.389 \times .389 = .151$).
3. Functional role diversity has a significant positive correlation with task conflict ($r = .196$, $p < .10$) and with team innovation ($r = .259$, $p < .05$).
4. Demographic diversity variables were generally uncorrelated with team outcomes. Only gender diversity was significantly negatively related to member satisfaction ($r = -.299$, $p < .01$), and cross-national diversity was negatively related to member satisfaction ($r= -.222$, $p < .07$). Age, cross-company, and cross-regional diversity had little effect on team

outcomes. These findings suggest that demographic diversity as a whole had a limited effect on team outcomes.

5. Neither functional nor demographic diversity was correlated with either relationship conflict or task conflict.
6. Task conflict had a significant negative association with member satisfaction ($r = -.37$, $p < .01$). Relationship conflict also had a significant negative association with member satisfaction ($r = -.455$, $p < .01$). Yet, both had no significant relationship with either team innovation or team efficiency.
7. Relationship conflict and task conflict were significantly positively correlated ($r = .43$, $p < .01$). This suggests that teams that have high relationship conflict also tend to experience high task conflict.
8. Cooperative goal had a significant positive correlation with member satisfaction ($r = .83$, $p < .01$), but its correlation with team innovation or team efficiency was non-significant. Cooperative conflict management had a significant positive correlation with member satisfaction ($r = .727$, $p < .01$) and team efficiency ($r = .246$, $p < .05$).
9. Relationship conflict and task conflict were significantly negatively correlated with cooperative goal and cooperative conflict management respectively (r's = -.36 to -.548, $p < .01$). This suggests that cooperative goal and cooperative conflict management can reduce both task and relationship conflict in IT project teams.
10. Gender diversity lowered cooperative goal and cooperative conflict management significantly ($r = -.339$, $p < .01$; $r = -.249$, $p < .05$, respectively). Cross-national diversity also lowered cooperative conflict management significantly ($r = -.266$, $p < .05$).
11. While group size was generally unrelated to conflict and team outcomes, project stage was significantly positively correlated with relationship conflict ($r = .356$, $p < .01$) and task conflict ($r = .236$, $p < .05$). In other words, when a project moved towards its completion stage, both task and relationship conflict tended to rise.

An examination of the bi-variate correlations in the matrix reveals that the study's variables correlate with each other in a meaningful manner, and provide initial support for some of the research hypotheses. I then turned to MRA for a formal test of each research hypothesis. Since all of the research hypotheses are directional (i.e., they predict either a positive or a negative functional relationship between the independent and dependent variables), one-tailed tests were employed in all hypothesis testing to increase statistical power (Cohen et al. 2003).

Table 5.1 Inter-correlation Matrix of Study's Variables (N = 71)

	Means	SD	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
1. Relationship conflict	2.08	0.33	1.000														
2. Task conflict	2.61	0.35	.428	1.000													
3. Team innovation	5.53	0.89	-.081	.190	1.000												
4. Team efficiency	5.44	0.96	-.062	-.160	.389	1.000											
5. Member satisfaction	5.75	0.64	-.455	-.372	.003	.166	1.000										
6. Diversity: cross-company	0.56	0.45	-.039	-.125	.014	-.027	.210	1.000									
7. Diversity: age	0.78	0.32	-.015	-.139	.106	.067	.064	.156	1.000								
8. Diversity: gender	0.37	0.27	.027	-.079	-.155	-.191	-.299	.021	-.056	1.000							
9. Diversity: cross-national	0.08	0.21	.038	.152	.053	.047	-.222	.003	.140	.069	1.000						
10. Diversity: cross-regional	0.07	0.19	-.129	.014	-.182	-.139	.054	-.175	-.029	.025	.208	1.000					
11. Diversity: functional role	0.69	0.51	.196	.031	.259	.068	.007	.042	.184	-.084	.075	-.087	1.000				
12. Group size	6.96	2.56	.111	-.036	.149	.070	.054	.134	.235	-.007	.028	.028	.250	1.000			
13. Project stage	64.82	25.89	.356	.236	.092	.099	-.089	.067	-.086	-.054	.036	-.120	.018	-.168	1.000		
14. Cooperative goal	5.87	0.50	-.508	-.360	.057	.186	.831	.173	.040	-.339	-.207	.083	.006	.137	-.226	1.000	
15. Cooperative conflict management	5.82	0.42	-.548	-.457	.190	.246	.727	.197	.112	-.239	-.266	-.094	.056	.151	-.224	.769	1.000

Note: $|r| > .30, p < .01$; $|r| > .23, p < .05$; $|r| > .19, p < .10$.

5.3 Effects of Functional Diversity on Team Innovation, Efficiency and Member Satisfaction (H1a, H1b, H1c)

Hypothesis 1 stated that functional diversity will have a positive association with team innovation (H1a), and a negative association with team efficiency (H1b) and member satisfaction (H1b). To test H1, team innovation, team efficiency and member satisfaction were regressed on functional role diversity, respectively, while controlling for team size and project stage. The results are shown in Table 5.2 below. As can be seen from the table, functional role diversity was found to have a significant positive effect on team innovation ($\beta = .23$, $p < .05$), but no significant effect on team efficiency and member satisfaction. Thus, H1a was supported, whereas H1b and H1c were rejected.

Table 5.2 Multiple Regression Analysis of Effect of Functional Diversity on Team Outcomes and Task Conflict (N=71)

Predictor	Team Innovation	Team Efficiency	Member Satisfaction	Task Conflict
	H1a	H1b	H1c	H3
	β	β	β	β
Control Variables				
Team Size	.11	.08	.04	-.00
Project Stage	.11	.11	-.08	.24†
Functional Diversity				
Functional Role	**.23***	.05	-.00	.03
ΔR^2	.05	.00	.00	.00
Overall R^2	.09	.02	.01	.06
F-value	2.09	.45	.22	1.34

† p<.10, * p<.05, **p<.01

5.4 Effects of Demographic Diversity on Team Innovation, Efficiency, and Member Satisfaction (H2a, H2b, H2c)

Hypothesis 2 stated that demographic diversity will have a negative association with team innovation (H2a), team efficiency (H2b), and member satisfaction (H2c). To test H2, I regressed

each of the three team outcomes on each of the five types of demographic diversity (age, gender, cross-company, cross-regional, and cross-national), while controlling for team size and project stage. The results for H2a (team innovation) are presented in Table 5.3 below, which shows that among the five types of demographic diversity, only cross-regional diversity had a marginally significant negative effect on team innovation ($\beta = -.17$, $p < .10$). None of the other forms of demographic diversity had a significant effect on team innovation. Thus, H2a was not supported.

Table 5.3 Multiple Regression Analysis of Effects of Demographic Diversity on Team Innovation (H2a) (N=71)

Predictor	**Team Innovation**					
	β	β	β	β	β	β
Control Variables						
Team Size	.15	.17	.17	.17	.17	.16
Project Stage	.12	.11	.12	.10	.12	.09
Demographic Diversity						
Age	.08					.06
Gender		-.15				-.15
Cross Company			-.02			-.05
Cross Region				**-.17†**		**-.20†**
Cross Nation					.04	.09
$\triangle R^2$	.01	.02	.00	.03	.00	.07
Overall R^2	.04	.06	.04	.07	.04	.10
F-value	.99	1.37	.85	1.59	.89	1.01

† p<.10, * p<.05, **p<.01

The results for H2b (team efficiency) are presented in Table 5.4. As can be seen from the table, among the five dimensions of demographic diversity, gender diversity has a marginally significant negative effect on team efficiency ($\beta = -.19$, $p < .10$). None of the other forms of demographic diversity has a significant effect on team efficiency. Thus, H2b was not supported.

Table 5.4 Multiple Regression Analysis of Effects of Demographic Diversity on Team Efficiency (H2b) (N=71)

Predictor	Team Efficiency					
	β	β	β	β	β	β
Control Variables						
Team Size	.08	.09	.10	.09	.09	.09
Project Stage	.12	.10	.12	.10	.11	.09
Demographic Diversity						
Age	.06					.04
Gender		**-.19†**				**-.18†**
Cross-Company			-.05			-.07
Cross-Regional				-.13		-.15
Cross-National					.04	.08
ΔR^2	.00	.03	.00	.02	.00	.06
Overall R^2	.02	.05	.02	.03	.02	.08
F-value	.48	1.22	.45	.79	.44	.78

†p<.10, * p<.05, **p<.01

The results for H2c (member satisfaction) are presented in Table 5.5 below. As can be seen from the table, among the five demographic diversity dimensions, gender and cross-national diversity have significant negative effects on member satisfaction ($\beta = -.30$, $p < .01$; $\beta = -.22$, $p < .05$; respectively). Cross-company diversity had a positive effect on member satisfaction. Thus, H2c was partially supported.

Table 5.5 Multiple Regression Analysis of Effects of Demographic Diversity on Member Satisfaction (H2c) (N=71)

Predictor	Member Satisfaction					
	β	β	β	β	β	β
Control Variables						
Team Size	.03	.04	.01	.04	.05	-.00
Project Stage	-.08	-.10	-.10	-.08	-.07	-.09
Demographic Diversity						
Age	.05					.04
Gender		-.30**				-.29**
Cross-Company			.22			.24
Cross-Regional				.04		.14
Cross-National					-.22*	-.23*
ΔR^2	.00	.09	.05	.00	.05	.20
Overall R^2	.01	.10	.06	.01	.06	.21
F-value	.27	2.53†	1.30	.26	1.37	2.38*

†p<.10, * p<.05, **p<.01

5.5 The Effects of Functional Diversity on Task Conflict (H3)

Hypothesis 3 stated that functional diversity will have a positive effect on task conflict. To test H3, task conflict was regressed on functional role diversity, while controlling for team size and project stage. The finding of this analysis is presented in Table 5.2 (refer to section 5.3). The results showed that functional role diversity had no effect on task conflict. H3 was not supported.

5.6 The Effects of Demographic Diversity on Relationship Conflict (H4)

Hypothesis 4 stated that demographic diversity will have a positive effect on relationship conflict. To test H4, relationship conflict was regressed on the five dimensions of demographic diversity. Findings of this analysis are shown in Table 5.6 below. From the table, it can be seen

that none of the five forms of demographic diversity had any significant effect on relationship conflict. Thus H4 was rejected. It is worth noting, however, that project stage had a strong positive effect on relationship conflict. Project teams closer to completion tended to experience more relationship conflict than those that were in an earlier stage.

Table 5.6 Multiple Regression Analysis of Effects of Demographic Diversity on Relationship Conflict (H4) (N=71)

Predictor	Relationship Conflict					
	β	β	β	β	β	β
Control Variables						
Team Size	.18	.18	.19	.18	.18	.20
Project Stage	.38**	.39**	.39**	.38**	.38**	.38**
Demographic Diversity						
Age	-.03					-.02
Gender		.05				.05
Cross-Company			-.09			-.11
Cross-Regional				-.09		-.12
Cross-National					.02	.04
$\triangle R^2$	.00	.00	.01	.01	.00	.02
Overall R^2	.16	.16	.16	.16	.16	.18
F-value	4.16**	4.22**	4.40**	4.39**	4.16**	1.98†

†p<.10, * p<.05, **p<.01

5.7 Effects of Task and Relationship Conflict on Team Outcomes (H5a, H5b, H5c, H6a, H6b, H6c)

Hypothesis 5 stated that task conflict will have a positive association with team innovation (H5a), but a negative association with team efficiency (H5b) and member satisfaction (H5c). To test H5, each team outcome was regressed on task conflict while controlling for team size and project stage. The results are shown in Table 5.7 below, which shows that task conflict had a marginally significant positive effect on team innovation ($\beta = .18$, $p < .10$), a marginally significant negative effect on team efficiency ($\beta = -.19$, $p < .10$), and a significant negative effect

on member satisfaction (β = -.37, $p < .01$). These findings provide strong support for H5a, H5b and H5c.

Hypothesis 6 stated that relationship conflict will have a negative association with team innovation (H6a), team efficiency (H6b) and member satisfaction (H6c). To test H6, each team outcome was regressed on relationship conflict while controlling for team size and project stage. The results are also shown in Table 5.7, which shows that relationship conflict had a marginally significant negative effect on team innovation (β = -.17, $p < .10$) and a significant negative effect on member satisfaction (β = -.51, $p < .01$), but no effect on team efficiency (β = -.13, n.s.). These findings provide support for H6a and H6c but not H6b.

Because task and relationship conflict were correlated (see section 5.10), I included both types of conflict in the multiple regression equation simultaneously to see if the findings still held. The results of this analysis are also shown in Table 5.7 (see the columns H5a+H6a, H5b+H6b, and H5c+H6c). The findings are consistent with those when each type of conflict was analyzed separately. On team innovation, task conflict had a positive effect (β = .28, $p < .05$) and relationship conflict had a negative effect (β = -.28, $p < .05$). On team efficiency, only task conflict had a marginal negative effect (β = -.17, $p < .10$). For member satisfaction, both task conflict and relationship conflict had significant negative effects (β = -.22, $p < .05$; β = -.42, $p < .01$; respectively).

Table 5.7 Multiple Regression Analysis of Effects of Task and Relationship Conflict on Team Outcomes (H5a-c, H6a-c) (N=71)

Predictors	Team Innovation			Team Efficiency			Member Satisfaction		
	H5a	H6a	H5a+H6a	H5b	H6b	H5b+H6b	H5c	H6c	H5c+H6c
	β	β	β	β	β	β	β	β	β
Control Variables									
Team Size	.17	.20	.22†	.09	.11	.10	.04	.13	.12
Project Stage	.08	.19	.16	.16	.17	.18	.01	.11	.13
Team Conflict									
Task Conflict	.18†		.28*	-.19†		-.17†	-.37**		-.22*
Relationship Conflict		-.17†	-.28*		-.13	-.06		-.51**	-.42**
ΔR^2	.03	.02	.09*	.04	.02	.04	.13	.22	.26
Overall R^2	.07	.06	.12	.05	.03	.06	.14	.23	.27
F-value	1.58	1.44	2.33†	1.25	.75	.98	3.64*	6.64**	6.03**

† p<.10, * p<.05, **p<.01

5.8 The Mediating Role of Task Conflict on the Relationship between Functional Diversity and Team Outcomes (H7)

Hypothesis 7 stated that task conflict will mediate the relationship between functional diversity and team outcomes. To test mediation, I used the following causal steps procedure (Baron & Kenny, 1986) in which the relationships among X (i.e., functional role diversity), Y (i.e., team outcomes), and the mediator variable M (i.e., task conflict) are analyzed as follows:

(a) Y is regressed on X;

(b) M is regressed on X; and

(c) Y is regressed on both X and M.

These regression equations can be written as follows:

$$Y = a1 + b1X + e1 \quad (1)$$

$$M = a2 + b2X + e2 \quad (2)$$

$$Y = a3 + b3X + b4M + e3 \quad (3)$$

According to Edwards and Lambert (in press), to establish mediation using the causal steps procedure, most researchers apply the following four conditions outlined by Baron and Kenny (1986):

(a) *X* should relate to *Y* in Equation 1, such that b1 is significant;

(b) *X* should relate to *M* in Equation 2, such that b2 is significant;

(c) *M* should relate to *Y* in Equation 3, such that b*4* is significant; and

(d) The relationship between *X* and *Y* in Equation 4 (i.e., b3) should be non-significant or significantly smaller than the relationship between *X* and *Y* in Equation 2 (i.e., b1). Assuming the first three conditions are satisfied, complete mediation is inferred if b3 is not significant, whereas partial mediation is inferred if b3 remains significant but is significantly smaller than b1.

Condition (a) was tested in H1a, H1b and H1c of which only H1a (functional diversity has a positive effect on team innovation) was supported.

Condition (b) was tested in H3 (functional diversity has a positive effect on task conflict), and was rejected.

Since condition (b) is a necessary condition to establish mediation and since condition (b) was rejected, Hypothesis 7 was rejected as well. That is, task conflict did not mediate the relationship between functional diversity and team outcomes.

5.9 The Mediating Role of Relationship Conflict on the Relationship between Demographic Diversity and Team Outcomes (H8)

Hypothesis 8 stated that relationship conflict will mediate the relationship between demographic diversity and team outcomes. The same procedures for testing mediation described above were used here.

Condition (a) was tested in H2a, H2b, and H2c, of which only H2c (demographic diversity has a negative effect on member satisfaction) was partially supported.

Condition (b) was tested in H4 (demographic diversity has a negative effect on relationship conflict), which was rejected.

Since condition (b) is a necessary condition to establish mediation and since condition (b) was rejected, Hypothesis 8 was rejected as well. That is, relationship conflict did not mediate the relationship between demographic diversity and team outcomes.

5.10 The Relationship between Task and Relationship Conflict (H9)

Hypothesis 9 stated that there will be a positive association between task conflict and relationship conflict. As can be seen from Table 5.1, task conflict and relationship conflict were significantly positively correlated ($r = .43$, $p < .01$). When team size and project stage were partialled out from both variables, they were still significantly positively correlated (partial correlation = .39, $p < .01$). Thus, H9 is strongly supported.

5.11 The Effects of Cooperative Goal and Cooperative Conflict Management on Team Outcomes (H10a-c and H11a-c)

Hypothesis 10 stated that cooperative conflict management will have a positive association with team innovation (H10a), team efficiency (H10b) and member satisfaction (H10c). To test H10, each team outcome was regressed on cooperative conflict management while controlling for team size and project stage. The results are shown in Table 5.8. From Table 5.8, it can be seen that cooperative conflict management had significant positive effects on team innovation ($\beta = .20$, $p < .05$), team efficiency ($\beta = .28$, $p < .05$), and member satisfaction ($\beta = .75$, $p < .01$). These findings provide strong support for H10a, H10b and H10c.

Hypothesis 11 stated that cooperative goal will have a positive association with team innovation (H11a), team efficiency (H11b) and member satisfaction (H11c). To test H11, each team outcome was regressed on cooperative goal while controlling for team size and project stage. The results are also shown in Table 5.8, and show that cooperative goal had a significant positive effect on team efficiency ($\beta = .21$, $p < .05$) and member satisfaction ($\beta = .86$, $p < .01$), although its effect on team innovation was non-significant ($\beta = .06$, n.s.). These findings provide support for H11b and H11c but not H11a.

Because cooperative conflict management and cooperative goal were substantially correlated ($r = .77$, $p < .01$) as shown in Table 5.1, I included both in the multiple regression equation simultaneously to see if the above findings still held. Before proceeding with such an analysis, I need to first check whether the correlation between cooperative conflict management and cooperative goal has resulted in multicollinearity, which could compromise the validity of the analysis. According to Hair et al. (1998, p 193), a common cutoff threshold for diagnosing high collinearity in multiple regression is a tolerance value of under .10, which corresponds to a VIF (variance inflation factor) value above 10. In the regression results reported in Table 5.8, all deviance values for cooperative conflict management and cooperative goal exceeded .40 with VIF lower than 2.50. Thus, multicollinearity does not appear to be a concern in the analysis.

The results of this analysis are also shown in Table 5.8 (see the columns H10a+H11a, H10b+H11b, and H10c+H11c). The findings were consistent with those when cooperative conflict management and cooperative goal were analyzed separately. Cooperative conflict management had a positive effect on team innovation ($\beta = .36$, $p < .05$) and cooperative goal had no significant effect ($\beta = -.21$, n.s.). On team efficiency, only cooperative conflict management had a marginal positive effect ($\beta = .27$, $p < .10$) and the effect of cooperative goal was no longer significant ($\beta = .01$, n.s.). On member satisfaction, both cooperative conflict management and cooperative goal had significant positive effects ($\beta = .24$, $p < .05$; $\beta = .68$, $p < .01$; respectively).

Table 5.8 Multiple Regression Analysis of Effects of Cooperative Conflict Management and Cooperative Goal on Team Outcomes (H10a-c, H11a-c) (N=71)

Predictors	**Team Innovation**			**Team Efficiency**			**Member Satisfaction**		
	H10a	H11a	H10a+ H11a	H10b	H11b	H10b+ H11b	H10c	H11c	H10c+ H11c
	β	β	β	β	β	β	β	β	β
Control Variables									
Team Size	.15	.16	.15	.06	.07	.06	-.05	-.05	-.06
Project Stage	.16	.13	.15	.17	.16	.17	.07	.10	.11
Team Cooperation Variables									
Cooperative Conflict Management	.20*		.36*	.28*		.27†	.75**		.24*
Cooperative Goal		.06	-.21		.21*	.01		.86**	.68**
$\triangle R^2$	.04	.00	.06	.07	.04	.07	.53	.69	.72
Overall R^2	.08	.04	.09	.09	.06	.09	.54	.70	.73
F-value	1.82	.94	1.68	2.17	1.42	1.60	25.80**	52.69**	43.44**

† p<.10, * p<.05, **p<.01

5.12 The Moderating Effects of Cooperative Conflict Management and Cooperative Goal on Task Conflict to Team Innovation Relationship (H12, H13)

Hypothesis 12 stated that cooperative conflict management will moderate the relationship between task conflict and team innovation. To test moderation effects using MRA, I followed the standard two-step procedure outlined in Cohen et al. (2003). In Step 1, the dependent variable (i.e., team innovation) was regressed on the main effect variable (i.e., task conflict), and the moderator (i.e., cooperative conflict management) with control variables also included (i.e., team size and project stage). In Step 2, the interaction term between the main effect and the moderator was added to the above equation. The moderating effect was tested by examining the change in R square attributable to the interaction term. If the interaction term added to Step 2 of the regression analysis produces a significant R square change (i.e., significantly increases the amount of variance explained in the dependent variable team innovation), then cooperative conflict management is said to be a moderator of the relationship between task conflict and team innovation. In MRA, the test for the significance of R square change due to the interaction term is equivalent to the test of significance of the beta coefficient for the interaction term in Step 2. Therefore, when the interaction term is significant, it indicates the presence of a significant moderating effect. Following a significant interaction, the relationship between the main effect (i.e., task conflict) and the dependent variable (i.e., team innovation) can then be plotted for the high and low values of the moderating variable (i.e., 1 standard deviation above the mean and 1 standard deviation below the mean).

Table 5.9 presents the results of the moderated regression analysis for Hypothesis 12. Because the interaction term between task conflict and cooperative conflict management was non-significant ($\beta = .06$, n.s.), this suggests that cooperative conflict management did not moderate the relationship between task conflict and team innovation. H12 was rejected.

Hypothesis 13 stated that cooperative goal will moderate the relationship between task conflict and team innovation. I used the same procedure as for H12 to test H13. Table 5.9 also presents the results of the moderated regression analysis for Hypothesis 13. Because the interaction term between task conflict and cooperative goal was non-significant ($\beta = .15$, n.s.), this suggests that cooperative goal did not moderate the relationship between task conflict and team innovation. H13 was also rejected.

Table 5.9 Multiple Regression Analysis of Effects of Tasks Conflict on Team Innovation as Moderated by Cooperative Conflict Management and Cooperative Goal (H12, H13) (N=71)

Predictors	**Team Innovation**				
	H12		H13		combined
	Step 1	Step 2	Step 1	Step 2	
	β	β	β	β	β
Control Variables					
Team Size	.13	.13	.16	.15	.13
Project Stage	.11	.11	.10	.09	.10
Main Effects					
Task Conflict	.33**	.33**	.22*	.24*	.34**
Cooperative Conflict Management	.35**	.32*			.49**
Cooperative Goal			.14	.09	-.24†
Interaction Effects					
Cooperative Conflict Management * Task Conflict		**.06**			-.05
Cooperative Goal * Task Conflict				**.15**	.17
$\triangle R^2$		.00		.02	.02
Overall R^2	.16	.16	.08	.10	.19
F-value	3.06*	2.47*	1.47	1.46	2.09

† p<.10, * p<.05, **p<.01

5.13 Supplementary Analyses

Two supplementary analyses were conducted. The first explored the moderating effect of project stage on the relationship between conflict and team outcomes. Recent research by Jehn & Mannix (2001) pointed out that time factor and levels of different types of conflict are important in affecting the relationship between conflict and team performance. They found that teams performing well were characterized by low but increasing levels of process conflict, low levels of relationship conflict, with a rise near project deadlines, and moderate levels of task conflict at the midpoint of group interaction. In this study, I also found that project stage was significantly correlated with relationship conflict ($r = .356$, $p < .01$) and task conflict ($r = .236$, $p < .05$) (in Table 5.1). These findings suggest that it is worth exploring the potential moderating effect of project stage on conflict to team outcomes relationships.

The second supplementary analysis explored the potential interactive effects between task conflict and relational conflict on team outcomes. Research on task and relationship conflict has mainly focused on the direct main effects of these two types of conflict on team outcomes (Simons & Peterson, 2000; De Dreu & Weingart, 2003). Very little previous research, with the exception of Jehn & Mannix's study (2001), has reported an interactive effect between the two types of conflict on team outcomes. Because task and relationship conflict were found to have divergent effects on team innovation (see H5a, H6a) in IT project teams, it is interesting to explore their joint or interactive effect on team outcomes. The results of these two supplementary analyses are reported below.

5.14 Moderating Effects of Project Stage

In testing the moderating effect of project stage on the relationships between conflict and team outcomes, I applied the same steps outlined above. In Step 1, I included the main effect (i.e., task conflict and relationship conflict) and the moderator (i.e., project stage) along with the control variable (i.e., team size). In Step 2, the interaction terms between the main effect and the moderator were then computed and added into the regression equation (i.e., task conflict by project stage interaction, and relationship conflict by project stage interaction). I then examined whether the beta coefficients for the interaction terms were significant or not. The results of these analyses are shown in Table 5.10 below. As can be seen from the table, project stage was found to moderate the relationship between task conflict and team innovation ($\beta = -.32$, $p < .05$) and the relationship between task conflict and member satisfaction ($\beta = -.25$, $p < .05$).

To interpret the interaction effect on team innovation, I plotted the relationship between task conflict and team innovation for the high and low values of project stage (i.e., 1 standard deviation above the mean and 1 standard deviation below the mean). As can be seen in Figure

5.1 below, when project stage is low (i.e., the project is in its early stage), task conflict is positively related to team innovation; when project stage is high (i.e., the project are near completion), there is no relationship between task conflict and innovation.

Table 5.10 Multiple Regression Analysis of Effects of Task and Relationship Conflict on Team Outcomes as Moderated by Project Stage (N=71)

Predictor	Team Innovation		Team Efficiency		Member Satisfaction	
	Step 1	Step 2	Step 1	Step 2	Step 1	Step 2
	β	β	β	β	β	β
Control Variables						
Team Size	.22	.20	.10	.09	.12	.10
Main Effects						
Task Conflict	.28*	.33**	-.17	-.14	-.22*	-.19
Relationship Conflict	-.28*	-.33**	-.06	-.09	-.42**	-.46**
Project Stage	.16	.17	.18	.19	.13	.12
Interaction Effects						
Task Conflict*Project Stage		-.32*		-.19		-.25*
Relationship Conflict*Project Stage		.19		.14		.09
$\triangle R^2$		.07		.03		.05
Overall R^2	.12	.20	.06	.08	.27	.32
F-value	2.33†	2.60*	.98	.96	6.03**	4.90**

† p<.10, * p<.05, **p<.01

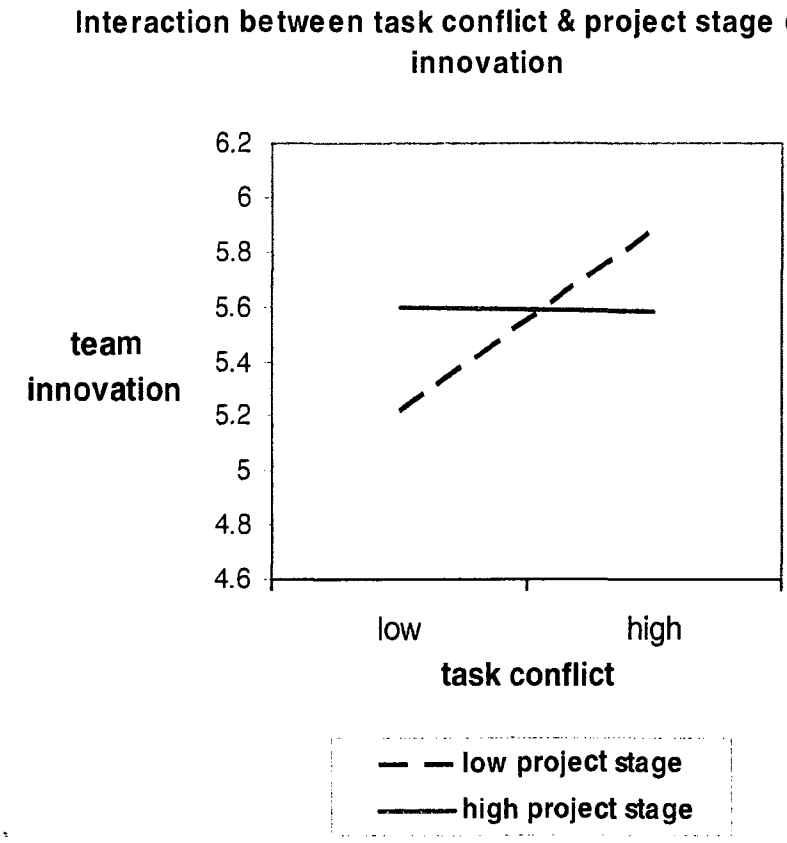


Figure 5.1 The Interaction between Task Conflict and Project Stage on Team Innovation

Project stage was also found to moderate the relationship between task conflict and member satisfaction. To interpret the interaction effect on member satisfaction, I plotted the relationship between task conflict and member satisfaction for the high and low values of project stage (i.e., 1 standard deviation above the mean and 1 standard deviation below the mean). As can be seen in Figure 5.2 below, when project stage was low (i.e., the project is in its early stage), task conflict was negatively related to member satisfaction; when project stage was high (i.e., the project are near completion), the negative relationship between task conflict and member satisfaction grew much stronger.



Figure 5.2 The Interaction between Task Conflict and Project Stage on Member Satisfaction

5.15 Interaction Effects of Task Conflict and Relationship Conflict on Team Outcomes

In testing the interaction effect of task conflict and relationship conflict on team outcomes, the same steps for testing moderating effects apply (see section 5.12). In Step 1, I included the two main effects (i.e., task conflict and relationship conflict) along with the control variables (i.e., team size and project stage) in the regression analysis. In Step 2, the interaction term between task conflict and relationship conflict was then computed and added into the regression equation. I then examined whether the beta coefficient for the interaction term was significant or not.

The results of these analyses are shown in Table 5.11 below. As can be seen from the table, task conflict and relationship conflict had a significant interaction with member satisfaction only ($\beta = -.26$, $p < .05$).

Table 5.11 Multiple Regression Analysis of Effects of Tasks Conflict, Relationship Conflict, and their Interaction with Team Outcomes (N=71)

Predictors	Team Innovation		Team Efficiency		Member Satisfaction	
	Step 1	Step 2	Step 1	Step 2	Step 1	Step 2
	β	β	β	β	β	β
Control Variables						
Team Size	.22	.20	.10	.10	.12	.09
Project Stage	.16	.14	.18	.18	.13	.09
Main Effects						
Task Conflict	.28*	.30*	-.17	-.17	-.22*	-.18†
Relationship Conflict	-.28*	-.31*	-.06	-.06	-.42**	-.47**
Interaction Effects						
Task Conflict*Relationship Conflict		-.12		-.00		**-.26***
$\triangle R^2$		.01		.00		.06
Overall R^2	.12	.14	.06	.06	.27	.33
F-value	2.33†	2.05†	.98	.77	6.03**	6.34**

† p<.10, * p<.05, **p<.01

To interpret the interaction effect on member satisfaction, I plotted the relationship between relationship conflict and member satisfaction for the high and low values of relationship conflict (i.e., 1 standard deviation above the mean and 1 standard deviation below the mean). As can be seen in Figure 5.3 below, when relationship conflict was low, task conflict had no effect on member satisfaction; when relationship conflict was high, task conflict was strongly negatively related to member satisfaction.

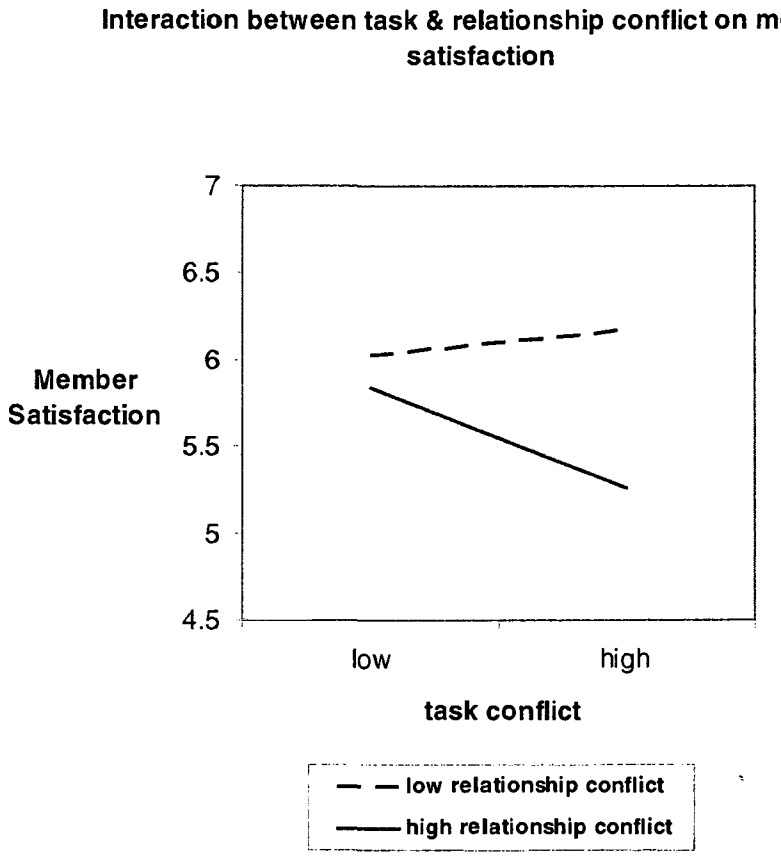


Figure 5.3 Interaction between Task Conflict and Relationship Conflict on Team Outcomes

5.16 Summary of Hypotheses Testing

Table 5.12 below summarizes the results of hypothesis testing. H1a, H5a-c, H6a, H6c, H9, H10a-c, H11b, and H11c were supported. H2c was partially supported. H1b, H1c, H2a, H2b, H3, H4, H6b, H7, H8, H11a, H12 and H13 were not supported. I will discuss these findings and their implications in chapter 6.

Table 5.12 Summary of Hypotheses Testing Outcomes.

Identifier	Research Hypotheses	Findings
H1a	Functional diversity will have a positive association with team innovation	supported
H1b	Functional diversity will have a negative association with team efficiency	rejected
H1c	Functional diversity will have a negative association with member satisfaction	rejected
H2a	Demographic diversity will have a negative association with team innovation	rejected
H2b	Demographic diversity will have a negative association with team efficiency	rejected
H2c	Demographic diversity will have a negative association with member satisfaction	partially supported
H3	Functional diversity will have a positive association with task conflict	rejected
H4	Demographic diversity will have a positive association with relationship conflict	rejected
H5a	Task conflict will have a positive association with team innovation	supported
H5b	Task conflict will have a negative association with team efficiency	supported
H5c	Task conflict will have a negative association with member satisfaction	supported
H6a	Relationship conflict will have a negative association with team innovation	supported
H6b	Relationship conflict will have a negative association with team efficiency	rejected
H6c	Relationship conflict will have a negative association with member satisfaction	supported
H7	Task conflict will mediate the relationship between functional diversity and team outcomes	rejected
H8	Relationship conflict will mediate the relationship between demographic diversity and team outcomes	rejected
H9	There will be a positive association between task conflict and	supported

Identifier	Research Hypotheses	Findings
	relationship conflict	
H10a	Cooperative conflict management will have a positive association with team innovation	supported
H10b	Cooperative conflict management will have a positive association with team efficiency	supported
H10c	Cooperative conflict management will have a positive association with member satisfaction	supported
H11a	Cooperative goal will have a positive association with team innovation	rejected
H11b	Cooperative goal will have a positive association with team efficiency	supported
H11c	Cooperative goal will have a positive association with member satisfaction	supported
H12	Cooperative conflict management will moderate the association between task conflict and team innovation such that the positive association will be stronger when cooperative conflict management is high than when it is low	rejected
H13	Cooperative goal will moderate the association between task conflict and team innovation such that the positive association will be stronger when cooperative goal is high than when it is low	rejected

Chapter 6

Discussion and Conclusion

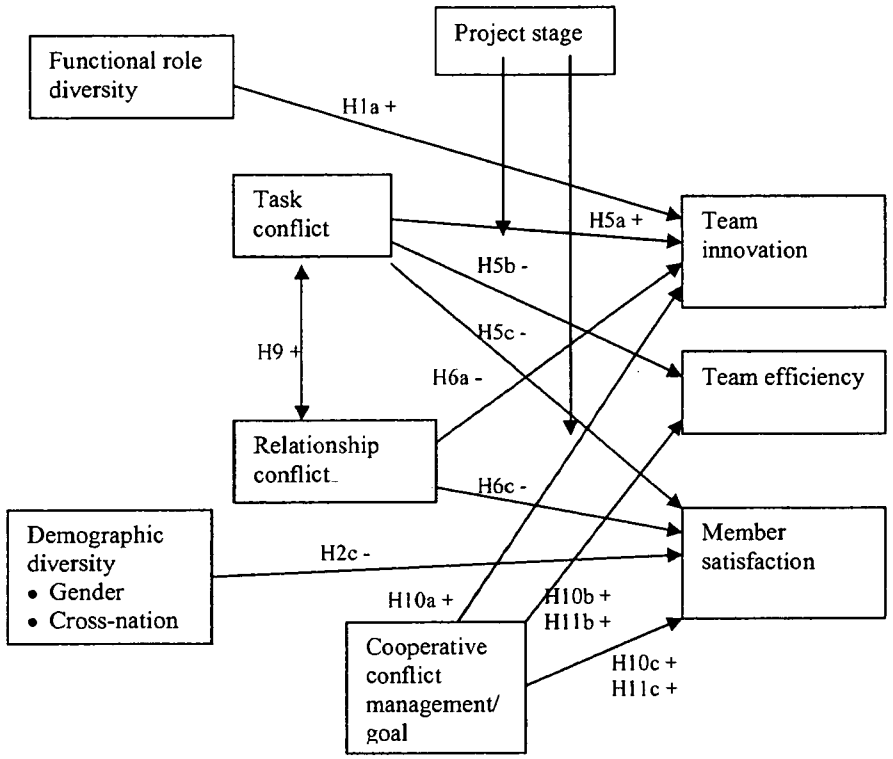
The purpose of this thesis was to investigate the complex relationships among team diversity, conflict, and team outcomes in IT project teams in China. Based on the model developed in chapter 3 (see Figure 3.12 in Section 3.13 of chapter 3), twenty-five hypotheses were proposed and tested by surveying a sample of 71 project teams with 71 project managers and 422 team members in a major multinational IT firm in China. The previous chapter reported the detailed results of this hypothesis testing and showed that among the twenty-five hypotheses, 12 were supported, 12 were rejected, and one was partially supported. The results indicate that in an innovative IT project team context, the positive effects of functional diversity and task conflict can be brought out and that teams need not be dragged down by unintended demographic diversity. Functional diversity among team members was significantly positively related to team innovation, yet, had no negative associations with either team efficiency or member satisfaction. Demographic diversity such as gender and national diversity had a significant negative effect on member satisfaction. Task conflict was found to be positively associated with team innovation, whereas relationship conflict was negatively associated with team innovation. Both task conflict and relationship conflict were found to be significantly negatively related to member satisfaction. Task conflict and relationship conflict were associated with team outcomes. Cooperative conflict management was found to be positively related to team innovation and both cooperative conflict management and the adoption of cooperative goal were found to be positively related to team efficiency and member satisfaction.

The mixed findings suggested a need to revise the originally proposed model to fit the reality of IT project teams in China. Figure 6.1 below presents a revised model based on the confirmed hypotheses in the original model. While much of the revised model remains the same as the original model, it departs from it in two ways. First, although both functional and demographic diversity affect team outcomes as hypothesized, their effects are not mediated by task or relationship conflict as previously thought because neither form of diversity had a significant effect on task or relationship conflict. Second, neither cooperative conflict management nor the adoption of cooperative goal moderated the relationship between task conflict and team innovation as hypothesized. Instead, project stage emerged as a powerful

moderator of both the relationship between task conflict and team innovation and the relationship between task conflict and member satisfaction, in the supplementary data analysis. In addition, I found more information on the impact on task conflict by relationship conflict interaction and their effect on member satisfaction. The study's major research findings and their implications are discussed below.

Figure 6.1 Summaries of the Revised Model

(Only the statistically significant relationships are shown)



6.1 Discussion of Results

The following discussion is organized into seven main sections. First, I shall discuss the findings of functional and demographic diversity effects on team outcomes. Second, the effect of task conflict and relationship conflict on team outcomes is addressed. Third, I turn to the relationship between diversity and conflict. Fourth, the roles of cooperative conflict management and cooperative goal are addressed. Fifth, the supplementary findings regarding the moderating effects of project stage and the interaction effect between task and relationship conflict are discussed. Sixth, the limitations of the current study are described, along with possible future research directions. Finally, I will describe the strengths and the contributions of this thesis research to the literature and its benefits for practitioners.

6.2 The effect of Functional and Demographic Diversity on Team Outcomes

In this research, it was hypothesized that functional diversity would have a positive association with team innovation (H1a) and a negative association with team efficiency (H1b) and member satisfaction (H1c). The findings of the study support H1a, but reject H1b and H1c. This means that functional diversity significantly contributes to team innovation but with no significant negative side effects on team efficiency and member satisfaction. In retrospect, this pattern of findings is not too surprising given that the positive effect of functional diversity is probably brought out more in an IT project team because it is a knowledge based professional team with a sense of urgency and high pressure to innovate new products so that leveraging members' technical skills, information and expertise becomes imperative for achieving the project goal. In such teams, people are probably more focused on task related technical issues than emotional interpersonal issues. Moreover, the positive effect of functional diversity on team innovation may be more pronounced in Chinese culture because Chinese collectivistic culture encourages project team members to value teamwork and the sharing of common goals and common interests. This is consistent with Chatman et al's (1998) theory that collectivistic cultures seem better able to make diversity a more positive resource for team creativity. It also supports Jackson et al's (2003) argument that it is important to consider a team's context when interpreting the effects of its diversity.

Furthermore, the way functional diversity was measured in this study may have contributed to the above findings. Functional diversity was measured by functional role diversity, and as a result is more closely tied to the skill requirements of the project team than the

functional diversity measures used in previous research such as functional background (e.g., Ancona & Caldwell, 1992). Since functional roles in this IT firm are not aligned with departments, functional role diversity may have the positive effect of broadening teams' expertise mix without the negative side effect of interference from member's identification with their own functional departments.

This finding is very encouraging because previous literature had painted a negative picture of the team diversity to team performance relationship (e.g. Hackman 1987; Hackman & Morris, 1975). The current finding supports information and decision-making theory (e.g., Ancona & Caldwell, 1992; Jehn, Northcraft & Neale, 1999; Zenger & Lawrence, 1989) by indicating that job related diversity might be good for team effectiveness because variance in group composition can have a direct positive impact through the increase in the skills, abilities, information, and knowledge that diversity brings.

It was also hypothesized that demographic diversity would have a negative association with team innovation (H2a), team efficiency (H2b), and member satisfaction (H2c) but both H2a and H2b were rejected and only partial support was found for H2c in that among the five dimensions of demographic diversity, only gender and cross-national diversity had any significant negative effect on member satisfaction. None of the other three demographic diversity dimensions (i.e., age, cross-company, cross-regional diversity) had a significant effect on member satisfaction, team innovation or team effectiveness. Since gender and cross-national diversities are highly visible attributes among the five demographic dimensions, these visible and salient differences between male and female and between Chinese and foreigner may have contributed to their significant effects. Gender and cross-national diversity are part of non-selected diversity in IT project teams that may possibly trigger non-job related group social categorization processes, which in turn, may generate member dissatisfaction. It is consistent with the literature that the more detectable attributes such as gender and race tend to have stronger negative effects than other less visible demographic attributes such as education or personality (e.g., Williams & O'Reilly, 1998; Harrison, et al., 2002). Moreover, a sharp in-group and out-group distinction built around these highly visible differences is more prevalent in collectivistic cultures such as China than in individualistic cultures such as the US (Triandis, 2003).

Another factor that may have contributed to the negative effect of gender diversity on member satisfaction is that all IT project teams were male dominated. When low status minority members, i.e., females, enter IT project teams, they may inadvertently threaten the majority members, i.e., the males, and cause them to be dissatisfied (Tsui, et al., 1992). This may lower member satisfaction in these teams.

That cross-national demographic diversity led to lower member satisfaction is understandable given that previous research has highlighted difficulties in cross-cultural communication (Chatman & Spataro, 2005). Similarly, age diversity had been considered in past literature to be a readily detectable attribute and detrimental to group processes (Tsui, Egan & O'Reilly, 1992; Pelled, 1997; Williams & O'Reilly, 1998); in young and new technology driven IT project teams, the negative effects of age diversity may be reduced. One reason is that in performance goal focused IT project team, senior team members that are selected into a team are probably more skilled and knowledgeable so that they earn the respect of other team members by playing a mentor and expert role to junior team members. Another reason is that project team membership is not long term, and people usually can put up with interpersonal dissatisfaction because team members do not have to see each other again once a project ends. The third reason could be that, since many team members work in virtual format, they don not get to see each other, therefore they may not even know each other's age. Therefore, in performance driven IT project team, age diversity is less likely to trigger a social categorization effect.

This study is among the first to have examined the effects of cross-company, cross-national, and cross-regional diversity. These relationships are especially meaningful for multinational firms which need to manage diversity and potential conflict in a global context. While cross-national diversity had a negative effect on member satisfaction, regional diversity had no effect. This may have occurred because few teams in this research sample drew team members from across regions, thus restricting the variance of this diversity variable. Another reason for its weak effect may be because this attribute was not highly visible and hence less detectable.

Surprisingly, though cross-company diversity was hypothesized to have a negative effect on member satisfaction, it was instead found to have a positive effect (beta = .20). This is hard to interpret because projects that involve outside contractors and customers may differ from projects that use only internal members in many ways. It is possible that non-company members are from less well known vendors who may report a higher level of satisfaction because they value the opportunity of working in a top IT multinational.

In summary, and in contrast with prior research (e.g. Hackman 1987; Hackman & Morris, 1975; Harrison, et al., 2002), non-job related demographic diversity was found to have only limited effects on team outcomes. It had no effect on either team innovation or team efficiency, and only gender and cross-national diversity had negative effects on member satisfaction.

The task focused nature of IT project teams may explain the positive findings. Moreover, the temporary and virtual orientation of IT project teams may reduce the chance of interpersonal friction associated with permanent workgroups. Team members were still able to carry out the required business communication via non-personal email to maintain a more emotion-free

business relationship so that diversity in this context had fewer significant negative effects on team performance (Majchrzak et al., 2004). There have been few diversity studies conducted in a virtual team context, therefore, future studies to explore whether virtual teams can reduce the psychological obstacles caused by diversity are called for. In all, the findings further support Jackson, et al.'s (2003) argument that it is important to put a team within its social context in order to interpret the effect of its diversity. We cannot just take the literature findings on diversity in permanent groups and apply them to IT project teams without considering the specific nature of this type of team.

6.3 Effect of Task Conflict and Relationship Conflict on Team Outcomes

As hypothesized, both task conflict and relationship conflict are related to team outcomes. Specifically, I found that task conflict had a positive association with team innovation (H5a), a negative association with team efficiency (H5b) and a negative association with member satisfaction (H5c). I also found that relationship conflict had a negative association with team innovation (H6a) and a negative association with member satisfaction (H6c). Task conflict was also found to be significantly correlated with relationship conflict (H9). These findings are generally consistent with prior literature (e.g. Pelled, et al, 1999; Jackson, et al., 2003; Simons & Peterson, 2000; De Dreu & Weingart, 2003) and further support the argument that in non-routine tasks such as IT project teams, task conflict can elicit positive effects for innovation (H5a) (Tjosvold, 1991; Jehn, 1995; Pelled, et al., 1999). Although past literature has reported task conflict as being more negatively related to team performance than positive (De Dreu & Weingart, 2003), this thesis argues that these inconsistent findings were caused by not separating the measurement of team innovation from team efficiency. These findings support the argument that task conflict is significantly positively associated with team innovation but significantly negatively associated with team efficiency. This result also confirms that team innovation and team efficiency are two distinct variables. Once these two performance types were studied separately, it was found that the predictive power of task conflict to team innovation was increased and the inconsistent findings were reduced. This separation of performance types may contribute to future studies on conflict and outcomes.

Relationship conflict on the other hand, was found to have a significant negative effect on team innovation (H6a). Yet, the study found no effect between relationship conflict and team efficiency.

The contrasting effect of task conflict and relationship conflict on team innovation (H5a, H6a) is particularly interesting. Task conflict increases innovation, whereas relationship conflict

reduces it; yet both types of conflict are positively correlated (H9). The interesting finding in current study is that the coupling between task conflict (good conflict) and relationship conflict (bad conflict) is less than prior findings (r=.39 in current study versus much higher correlation in prior literature, e.g., average r=.54; range from r=.34 to .88 in De Dreu & Weingart's Meta analysis, 2003). It may be explained that in IT project teams with innovation goal focus and temporary nature may be better able to separate the tangling effect between good conflict and bad conflict than traditional face to face groups. It further supports that in virtual oriented IT project team, task conflict can bring out the positive effect of task conflict with less interference from relationship conflict than traditional teams.

In summary, task conflict and relationship conflict have contrasting effect on team innovation but both conflicts are correlated. The challenge facing project managers is how to raise (not stifle) task conflict to a moderate level, yet at the same time guard it carefully so as not to allow it to spill over into the relationship domain, which may increase relationship conflict. It further supports the argument that conflict is important, yet how and when to manage conflict at the moderate level is more important.

6.4 The Effect of Functional and Demographic Diversity on Conflict

Contrary to expectations and prior research findings by Jehn et al. (1999) and Pelled et al. (1999), functional diversity did not have a positive association with task conflict (H3), and demographic diversity did not have a positive association with relationship conflict (H4). This lack of association between diversity and conflict indicates that task conflict does not mediate the relationship between functional diversity and team outcomes (H7) and that relationship conflict does not mediate the relationship between demographic diversity and team outcomes (H8). There are three issues to be discussed here:

a) The lack of relationship between diversity and conflict suggests that diversity is not a major source of experienced conflict in these IT project teams. This probably can be attributed to task focus and the temporary nature of IT project teams which makes these surface-level diversity factors less important.

b) If diversity is not the source of conflict, what might be the source of conflict in IT project teams? Are goal conflict and personality conflict important? One prior study (Farh, 2004) found that in IT project teams in China, among diversity attributes, deep-level diversity such as goal differences and personality differences were more likely to be listed as major sources of conflict than surface-level diversity such as age and gender difference. This in turn supports Harrison, et al.'s (1998) argument that deep-level diversity has a longer-term

effect on team process than surface-level diversity. Further exploration may assist with clarification.

c) Another explanation for the lack of relationship between diversity and conflict could be Chinese cultural influence. In relationship centered Chinese culture, the interpersonal relationships are largely captured in the idea of guanxi (Farh, Tsui, Xin & Cheng, 1998). Guanxi is defined as 'the existence of direct particularistic ties between individual and others' (Farh, et al., 1998, p. 471). Guanxi refers to the existence of the relationship between two parties as former classmates, relatives, same last name, same natal origin, former colleagues, former teacher/student, former boss/subordinate, or former neighbors (Farh, et al., 1998). It was found that the similarities and dissimilarities between Chinese guanxi have more powerful effect than demographic composition upon team process (Chou, Cheng, Huang & Cheng, 2006). It further supported that deep-level value diversity has critical effects upon trust relationship and attitudinal effectiveness among team members (Harrison, et al., 1998; Chou, et al., 2006).

6.5 Roles of Cooperative Goal and Cooperative Conflict Management

In IT project teams, members' goal differences have been identified as a major source of conflict (Farh, 2004). Managing team conflict at the right level can influence the result of conflict (DeChurch & Marks, 2001; Alper, et al., 1998). This study found that either a higher level of cooperative conflict management behavior or a higher level of adoption of cooperative goal reduced relationship conflict (r= -.508, -.548) and task conflict (r= -.36, -.457). Therefore, whether the different goals of each member can be amalgamated in a collaborative way becomes critical to team outcomes.

The findings of this study indicate that adopting cooperative goal has a significant positive correlation with the outcomes of team efficiency and member satisfaction but unexpectedly, no significant effect on team innovation. This, therefore, is only partially consistent with the North American findings (e.g., Alper, et al., 1998) and does not confirm recent findings from China (Tjosvold et al., 2003) which found the opposite. This might be explained in terms of cooperative goal not being as influential in expertise based and virtual oriented project teams than they appear to be in permanent long-term workgroups. Again further study is required.

The findings also indicate that approaching conflict management in a cooperative fashion is significantly positively associated with team innovation, team efficiency and member satisfaction. This result challenges the old adage that in a relationship centered society like China,

avoidance conflict management may be preferred even if it is not effective (e.g. Bond, 1986). IT project teams with their expertise based, temporary nature and lesser reliance on a co-located team structure, may be better able to risk short-term relationships by opening up conflicting ideas, expressing their feelings and negotiating cooperatively with each other towards a win-win solution without suffering long-term detriment. This argument supports Montoya-Weiss et al.'s (2001) prior study that found that the use of temporal coordination tools such as email and groupware can improve the performance of virtual teams, by reducing the negative effect of avoidance conflict management styles on team performance. The current result also further supports Tjosvold et al.'s (2003) findings that the Western style of cooperative conflict management can also be effective in collectivistic cultures such as China.

Contrary to expectations, the proposed moderating effect of cooperative conflict management and cooperative goal on the relationship between task conflict and team innovation was not significant. This is difficult to decipher but it may be because there is not enough variation among teams on how they manage their conflicts and goal differences cooperatively.

6.6 The Moderating Role of Project Stage

One important and interesting finding concerns the critical role of the project stage, which indicates that project stage is significantly positively correlated with both relationship conflict and task conflict. Though Jehn & Mannix (2001) had previously reported that conflict patterns may shift and change over time and that these can in turn impact group outcomes, stage of project life was not initially considered as part of the research model in this study. Yet it was found to be a significant moderator of the relationship between task conflict and team innovation. When the project is in its early stage, task conflict is significantly positively related to team innovation. When the project is near completion, there is no such significant relationship. It seems that early stage task conflict is beneficial to team innovation because team members can fully debate important issues at the beginning and thus work through them to establish appropriate project goals, appropriate ground rules, and appropriate project requirements to enable them to reach a design solution as early as possible. If task conflict persists toward the completion stage, team members have to focus more on implementation and rushing to complete the project on time. By this point, it is too late to change the design so that debating task issues at this late stage will not result in innovation.

Project stage was also found to moderate the relationship between task conflict and member satisfaction in that the relationship between task conflict and member satisfaction becomes increasingly negative as the project progresses toward completion. In other words,

when projects are in the early stage, the relationship between task conflict and member satisfaction is slightly negative. When projects are near completion, task conflict is significant negatively related to member satisfaction. It seems then, that if a project is near completion, meeting the deadline is more important; therefore, if team members are still arguing about how things should be done, members feel very unsatisfied.

In summary, combining the above two findings on the moderating effect of project stage suggests that task conflict might be beneficially encouraged in the early stage rather than the later stage of a project because this is the best time for increasing innovation while still maintaining member satisfaction.

6.7 The Interactive Effects between Task Conflict and Relationship Conflict on Team Outcomes

The findings indicate that when relationship conflict is high, task conflict is strongly negatively related to member satisfaction and when relationship conflict is low, task conflict is not related to member satisfaction. In other words, when team members experience interpersonal friction, they can become even more dissatisfied if they continue to argue about task issues. Past literature (e.g., Jehn, 1995, De Dreu & Weingart, 2003) has focused largely on the direct effect of conflict. Very little research has reported on the interactive effect between the two types of conflict on team outcomes. Future studies on this topic are suggested.

6.8 Limitations of the Current Research

As project teams become more and more virtual, their membership tends to expand to contain more and more members from different nations, regions, and locations, many of whom speak different languages or dialects. They may reside in different locations and work for projects on either a temporary or part-time basis. The current research did not focus on the degree of virtuality of the project teams so that a more in-depth analysis on its interaction effect with diversity and conflict could not be undertaken. Future studies are suggested to specifically focus on the degree of virtuality and how this impacts diversity, conflict and outcomes for teams.

Similarly, the current study did not initially look at the impact of project stage. Future team studies might benefit from the inclusion of project stage as a key variable, especially in the temporary project team context.

No research study can hope to address all potential variables and consequently there are other considerations that have not been captured in the current study. First of all, the current study was conducted in a specific type of team in a specific company which may limit its generalization to other types of teams. Other key factors such as whether a project team has sufficient resources, a sufficient budget, or sufficient management support should also be considered. According to Gladstein (1984) resource availability may directly influence a team's performance. If resources are highly constrained, a different process or pattern of communication may, therefore, develop than if they are available (Ancona & Caldwell, 1992). Other considerations not captured in the current study, include whether tasks were interdependent, complex, or routine and whether project managers exhibited strong leadership or had the authority to choose team members or whether team members worked for the project on a full-time or part-time basis. Future studies are suggested to include these variables.

Last but not least, project performance data were collected only from project managers. An independent performance rating from the manager one level above each project manager was not collected in the current study. Podsakoff & Organ (1986) suggested that researchers should obtain independent and criterion variables from different sources. Future studies, it is suggested, should collect performance data from both project managers and their higher level managers.

6.9 Strengths of the Study and its Contributions to the Literature

The current study is one of the first comprehensive field studies of the effect of diversity and conflict on IT project team outcomes in China. The unique nature of IT project teams in this multinational context gives a rich testing condition to contribute to the knowledge areas of diversity and conflict. The current study provides the following unique contributions.

6.9.1 Proposal of a Measure of Team Performance that Separates Team Innovation from Team Efficiency

By far the majority of earlier group research has measured group outcomes by a global construct called team performance which combines the outcome of team innovation (e.g., new ideas generated and implemented) with team efficiency (e.g., effectiveness on cost, time and quality). This separation may have contributed to mixed findings in the past. As Ancona &

Caldwell (1992) have stated, the measure should be different for innovation type performance and implementation type performance. More recently, De Dreu et al.'s (2003) meta-analysis of past findings, which did not recognize the difference between these two measures, led them to conclude that the effect of conflict on team performance is mixed. In this study, team performance was measured separately as both team innovation and team efficiency, which may help untangle some of these mixed findings.

The type of task a team performs also limits the ability to separately measure the two different types of team performance. Many prior studies on diversity, conflict and innovation have been undertaken on student groups or problem solving teams where team performance can only be measured by the quality and quantity of creative ideas, while not enabling comparison of innovation with how efficiently innovative ideas are implemented into a product and service. In the real business world, creative ideas and designs need to be generated and also implemented into innovative products; therefore, the separation of the two different performance constructs in the current study for field project teams is meaningful to the management research field. This result also supports the argument that functional diversity and task conflict have significant positive effects on innovation but no positive effects on team efficiency. If innovation and team efficiency had not been measured separately, the current study's outcomes could have been more difficult to interpret.

6.9.2 Uncovering of the Crucial Impact of Project Stage on Within-group Processes and Outcomes

Most former studies were undertaken on permanent groups or student groups where projects had the same start time and teams were at the same project stage as each other with projects having the same duration and the membership remaining static. Within these studies timing of project stage was not as important as it has been found to be for temporary project teams. The current study indicates the key role played by project stage for this type of team.

The current study shows how the impact of project stage fleshes out the key role played by project longevity in the development and resolution of within-team conflict, and how this in turn impacts on team outcomes. Measuring project stage as a continuous percentage of project completion ratios was adopted in the current study. The findings suggest that if task conflict is encouraged in the early stages of a project, this might significantly benefit team innovation. Similarly reducing task conflict in the late project stages might improve member satisfaction.

6.9.3 Extension of the Diversity Literature through Introducing new Diversity Variables to Include National, Regional, and Company Diversity

The temporary, knowledge based, boundary-less and virtual features of IT project teams have provided a rich ground to analyze different diversity and conflict patterns. Normally, these kinds of teams are more expertise and task focused and experience less need for emotional attachment than permanent static teams. For this reason, many modern project teams, especially IT service project teams, tend to build a team by adopting a boundary-less approach. Such a boundary-less team introduces new diversity variables including cross-national, cross-regional, and cross-company diversity in addition to traditional forms of diversity. These new types of differences have been addressed in the present study.

The results show that cross-national diversity was negatively related to member satisfaction, whereas cross-company diversity was positively related to member satisfaction.

6.9.4 Testing of Existing Team Theories in a Rich New Context of Temporary, Part-time and Performance Goal Focused IT Project Teams

The current study is among the first to utilize temporary, part-time membership and performance goal focused IT project teams to investigate the relationship among diversity, conflict and outcomes. As mentioned before, IT project teams are very technical and task oriented so that members debate problem-solving issues more than they do different beliefs, behaviors or social norms. A project team is a temporary workgroup and members are less concerned about long-term friendships because they do not have to put up with each other beyond the life of the project nor even continuously during the life of the project. Thus, they tend to be less reactive to demographic differences. Not only is this type of diversity more 'surface' level but it is also easier to ignore. An IT project teams' short-term and virtual nature may help members disregard surface-level out-group bias problems because even if team members are very different, the project is over and the team disbanded before their differences can develop into deep-level negative conflicts. Team members communicate about business ideas via non-personal email so that they are able to maintain a more emotion-free business relationship. This boundary-less temporary organization model might be more productive than those teams whose members work side by side (Majchrzak et al., 2004) and it is possible that virtual teams can be freer from the psychological obstacles that are part of the daily life of permanent teams. This study found that in IT project teams, both functional and demographic diversity had little significant negative effect on either team innovation or team efficiency. Instead, both functional diversity and task conflict were positively related to team innovation. Task conflict was also found to be less coupled with harmful relationship conflict than prior studies.

Earlier scholars often examined the direct effect of team diversity and conflict on team outcomes without contextual information and reached conclusions with inconsistent results (Jackson, et al., 2003; Jehn, 1995). The current study attempts to untangle earlier inconsistent

findings by providing a clear and well defined context to better predict the effect of diversity and conflict. This is the first study to use temporary, boundary-less and innovation focused IT project teams in China to examine these relationships.

6.9.5 Questioning of Existing Theory in which Conflict Mediates between Diversity and Outcomes

Earlier research proposed that conflict was a mediator between team diversity and outcomes (Jehn et al, 1999, Pelled et al., 1999). This study tested this mediator theory and found that, contrary to Jehn et al. (1999) and Pelled et al.'s (1999) finding, functional diversity had no significant positive associations with task conflict, and demographic diversity had no significant positive associations with relationship conflict. In other words, there were other factors that caused conflict but not necessarily member diversity. This research found that task conflict and relationship conflict do not mediate between diversity and outcomes; diversity does not go through conflict to influence team outcomes.

As aforementioned, this finding may be explained by the source of conflict emanating from more deep-level diversity than surface-level diversity (Harrison et al. 1998) as well as from IT project teams' expertise focus, and temporary and virtual nature, which may lead team members to care less about surface-level differences. In addition the fact that members spend less time with each other may reduce interpersonal conflict (Majchrzak, et el. 2004). The current study contributes to existing research by questioning the validity of the mediator effect of conflict between both forms of diversity and team outcomes.

6.9.6 Investigation of the Roles of Cooperative Goal Adoption and Cooperative Conflict Management Style in the Diversity-Conflict-Outcome Relationship

In the extant literature, scholars who have examined the direct effect of team diversity and conflict on team outcomes have reached inconsistent results (Williams & O'Reilly, 1998; Lovelace, et al., 2001). Their studies have suggested that diversity and conflict can be a mixed blessing, in that too much is no good and too little is no good either (Milliken & Martins, 1996; Tjosvold, et al., 2003). The current study hypothesized that team outcomes would be influenced by how a team manages conflict and whether a team can reach a common goal. These two additional factors; adoption of a cooperative goal and a cooperative conflict management style, have been found to be effective for team outcomes.

The findings support Harrison et al.'s (1998, 2002) distinction between surface-level and deep-level diversity. They have suggested that surface-level diversity can be weakened as team life unfolds but that deep-level differences such as goal differences and attitudinal differences remain detrimental. The current study shows that adopting a cooperative goal and a cooperative

conflict management style can contribute to team outcomes. Future studies are suggested to include cooperative behaviors and collectivistic behaviors as factors in the overall diversity, conflict and outcomes model.

6.9.7 Testing of the Diversity and Conflict Theories in the Chinese Context

This study is among the first to empirically test the impact of member diversity and within-team conflict utilizing IT project teams in China. Existing theories and models have been well tested in North America, however, they have only rarely been tested in China. Though there have been a number of publications addressing cross-cultural comparisons in China, almost none of them has investigated diversity and conflict in IT project teams (Hofstede, 1994; Leung, 1988; Bond, 1986). In such a relationship centered collectivistic culture how to manage demographic diversity and relationship conflict is critical to the successful management of diversity.

The findings indicate that both forms of diversity in IT project teams in China have little negative effect on team performance. Instead, the current study found a positive effect of functional diversity on team innovation. This might be explained by strong intra-team Chinese collectivistic culture being able to value teamwork, form common goals and reduce the negative effect of social categorization as suggested by Chatman et al. (1998).

6.10 Implications for Management of IT Project Teams

The findings of this study have several important implications for the management of IT project teams.

6.10.1 Team Composition

IT project teams are usually assembled based on a number of factors such as skill requirements, budget constraints, time constraints, and personnel availability with little consideration of demographic factors. This study's findings suggest that two additional factors need to be considered. First, to boost team innovation, project teams should strive to increase functional role diversity among members. A typical IT functional team is mainly composed of IT specialists, but by including members from other functional areas such as IT architects and business consultants, greater team innovation may result. Second, both gender and cross-national diversity were found to lead to lower member satisfaction, which suggests that when women and foreign experts are included into a team, the project manager needs to pay special attention to the individual needs of all team members, because, for example, when female members are included,

male members can feel threatened, and when foreign experts are included, team members may experience difficulties in cross-cultural communication.

6.10.2 Managing Conflict

How conflict is managed plays a key role in influencing team effectiveness. A highly effective team needs to have a relatively high level of task conflict in the beginning stage of the project cycle and a relatively low level of relationship conflict throughout a project cycle. Project managers can increase task conflict in the beginning stage of a project by creating a group norm of open communication (Lovelace, et al., 2001). In doing so, the project manager should make sure that task conflict is contained in the task domain and does not spill over into the interpersonal domain where relationship conflict is generated. As the project moves toward its final (execution and closing) stage, it is important for project managers to keep both task conflict and relationship conflict low. When conflict erupts at this stage, a Chinese project manager may be tempted to adopt a strategy of avoidance, however, this study found that cooperative conflict management (instead of competitive conflict management) and cooperative goal (instead of competitive goal) are beneficial to team outcomes.

6.11 Conclusion

In summary, the current study's results support value-in-diversity theory by reporting team innovation benefits via job related diversity (i.e., functional roles and expertise) and value-in-conflict by reporting team innovation benefits via task related conflict. Project managers should learn how to take advantage of task conflict and how to manipulate conflict timing by encouraging task conflict in the early stage and discouraging task conflict at the later stage of a project. Since team innovation is considered a competitive edge for modern businesses in an increasingly globalized world, all modern managers and researchers should know how to leverage the rich diverse background of complex boundary-less teams and foster team cooperative goal and cooperative conflict management culture to contribute to business outcomes and the knowledge world.

Throughout, this current research has drawn extensively on literatures in the fields of diversity, conflict and team outcomes associated with organizational behavior, project management and Chinese cultural perspectives. It has explored the opportunity to extend existing theories and develop new approaches for understanding the complexities of these interrelationships. It provides a valuable insight for practitioners on how to better manage diversity and conflict in IT project teams in China.

Bibliography

Alper, S., Tjosvold, D., & Law, K.S. (1998). Interdependence and controversy in group decision making: Antecedents to effective self-managing teams. *Organizational Behavior and Human Decision Processes, 74,* 33-52.

Alper, S., Tjosvold, D., & Law, K.S. (2000). Conflict management, efficacy, and performance in organizational teams. *Personnel Psychology, 53,* 625-642.

Amabile, T.M., Conti, R., Coon, H., Lazenby, J., & Herron M. (1996). Assessing the work environment for creativity. *Academy of Management Journal, 39,* 1154-1184.

Amason, A.C. (1996). Distinguishing the effects of functional and dysfunctional conflict on strategic decision making: Resolving a paradox for top management teams. *Academy of Management Journal, 39,* 123-148.

Amason, A.C., & Sapienza, H.J. (1997). The effects of top management team size and interaction norms on cognitive and affective conflict. *Journal of Management, 23,* 495-516.

Ancona, D.G., & Caldwell, D.F. (1992). Demography and design: Predictors of new product team performance. *Organization Science, 3,* 321-341.

Anderson, J.C., & Gerbing, D.W. (1988). Structural equation modeling in practice: A review and recommended two-step approach. *Psychological Bulletin, 103,* 411-423.

Ashkenas, R., Ulrich, D., Jick, T., & Kerr, S. (2002). *The boundaryless organization: breaking the chains of organizational structure.* New York, NY: John Wiley & Sons, Inc.

Baron, R.M., & Kenny, D.A. (1986). The moderator-mediator variable distinction in social psychological research: Conceptual, strategic, and statistical considerations. *Journal of Personality and Social Psychology, 5,* 1173-1182.

Bentler, P.M. (1990). Comparative fit indexes in structural models. *Psychological Bulletin, 107,* 238-246.

Bliese, P.D. (2000). Within-group agreement, non-independence, and reliability: Implications for data aggregation and analysis. In K.J. Klein & S.W.J. Kozlowski (Eds.), *Multilevel theory, research, and methods in organizations: Foundations, extensions, and new directions* (pp. 349-381). San Francisco, CA: Jossey-Bass.

Bond, M.H. (1991). *Beyond the Chinese face: insights from psychology.* Hong Kong: Oxford University Press.

Bond, M.H.(1986). *The psychology of the Chinese people.* Hong Kong: Oxford University Press.

Boyett, J.H., & Conn, H.P. (1991) *Workplace 2000: The revolution reshaping American business.* New York, NY: Dutton.

Brett, J.M., Shapiro, D. L., & Lytle, A.L. (1998). Breaking the bonds of reciprocity in negotiations. *Academy of Management Journal, 41,* 410-424.

Brewer, M.B., & Kramer, R.M. (1986). Choice behavior in social dilemmas: Effects of social identify, group size, and decision framing. *Journal of Personality and Social Psychology, 50,* 543-549.

Brislin, R.W. (1980). Translation and content analysis of oral and written material. *Handbook of Cross Cultural Psychology, 2,* 339-444.

Browne, M.W., & Cudeck, R. (1993). Alternative ways of assessing model fit. In. K.A. Bollen & J.S. Long (Eds.), *Testing structural equation models* (pp. 136–162). Newbury Park, CA: Sage.

Campion, M.A., Medsker, G.J., Higgs, A.C., (1993). Relations between work group characteristics and effectiveness: implications for designing effective work groups. *Personnel Psychology, 1993, 46,* 823-850.

Chan, D.K.S., & Goto, S.G. (2003). Conflict resolution in the culturally diverse workplace: Some data from Hong Kong employees. *Applied Psychology: An International Review, 52,* 441-460.

Chatman, J.A. (1991). Matching people and organizations: Selection and socialization in public accounting firms. *Administrative Science Quarterly, 36,* 459-484.

Chatman, J.A., & Flynn, F.J. (2001). The influence of demographic heterogeneity on the emergence and consequences of cooperative norms in work teams. *Academy of Management Journal, 44,* 956-974.

Chatman, J., Polzer, J., Barsade, S., & Neale, M. (1998). Being different yet feeling similar: The influence of demographic composition and organizational culture on work processes and outcomes. *Administrative Science Quarterly, 43,* 749-780.

Chatman, J.A., & Spataro, S.E. (2005). Using self-categorization theory to understand relational demography-based variations in people's responsiveness to organizational culture. *Academy of Management Journal, 48*(2), 321-331.

Chen, C.C., Chen, X., & Meindl, J.R. (1998). How can cooperation be fostered? The cultural effects of individualism-collectivism. *Academy of Management Review, 23*(2), 285-304.

Chen, G., Liu, C., & Tjosvold, D. (2005, March). Conflict management for effective top management teams and innovation in China. *The Journal of Management Studies. 42*(2), 277.

Chen, G., & Tjosvold, D. (2002, September-October). Cooperative goals and constructive controversy for promoting innovation in student groups in China. Journal of Education for Business, 78(1) 46.

Chou, L.F., Cheng, B.S., Huang, M. P., & Cheng, H.Y. (2006). *Guanxi networks and member's effectiveness in Chinese team: The mediated effects of trust networks.* Asian Journal of Social Psychology, 9(2), 79-95, (SSCI).

Cohen, J., Cohen, P., West, S. G., & Aiken, L. S. (2003). *Applied multiple regression/correlation analysis for the behavioral sciences. (3rd ed.).* Hillsdale, NJ: Erlbaum.

Cohen, S.G., & Bailey. D.E. (1997). What makes teams work: Group effectiveness research from the shop floor to the executive suite. *Journal of Management, 23*(3), 239-290.

Cortina, J. M., Chen, G., & Dunlap, W.P. (2001). Testing interaction effects in LISREL: Examination and illustration of available procedures. *OrganizationalResearch Methods, 4,* 324-360.

Cox, T., Lobel, S., & McLeod, P. (1991). Effects of ethnic group cultural differences on cooperative and competitive behaviour on a group task. *Academy of Management Journal, 34,* 827-847.

De Church, L.A., & Marks, M.A. (2001). Maximizing the benefits of task conflict: The role of conflict management. *International Journal of Conflict Management, 12*(1), 4-22.

De Dreu, C.K.W., & Weingart, L.R. (2003). Task versus relationship conflict, team performance, and team member satisfaction: A meta-analysis. *Journal of Applied Psychology, 88,* 741-749.

Deutsch, M. (1973). *The Resolution of conflict.* New Haven, CT: Yale University Press.

Diamantopoulos, A. & Siguaw, J.A. (2000). *Introducing LISREL: A guide for the unlimited.* London, UK: Sage Publications.

Ding, L., Velicer, W.F., & Harlow, L.L. (1995). Effects of estimation methods, number of indicators per factor, and improper solutions on structural equation modeling fit indices. *Structural Equation Modeling, 2,* 119-143.

Donnellon, A. (1993). Crossfunctional teams in product development: Accommodating the structure to the process. *Journal of Product Innovation Management. 10,* 377-392.

Donnellon, A. (1996). *Team Talk: The Power of Language in Team Dynamics.* Cambridge, MA: Harvard Business School Press.

Drach-Zahavy, A., & Somech, A. (2001). Understanding team innovation: The role of team processes and structures. *Group Dynamics: Theory, Research, and Practices, 5,* 111-123.

Dumaine, B. (1991, June 17). The bureaucracy busters. *Fortune,* pp. 36-50.

Earley, P.C. (1989). Social loafing and collectivism: a comparison of the United States and the People's Republic of China. *Administrative Science Quarterly, 34,* 565-581.

Earley, P.C., & Mosakowski, E.M. (2000). Creating hybrid team cultures: An empirical test of international team functioning. *Academy of Management Journal, 43,* 26-49.

Edwards, J.R. & Lambert, L.S. (in press). Methods for integrating moderation and mediation: A general analytical framework using moderated path analysis, *Psychological Methods.*

Eisenhardt, K.M., & Tabrizi, B.N. (1995). Accelerating adaptive processes: Product innovation in the global computer industry. *Administrative Science Quarterly, 40*(1),84-110.

Farh, C.P. (2004, October 11). *Diversity and conflict in IT project teams in China.* Paper presented at the ProMAC 2nd International Conference on Project Management, Tokyo Bay Area, Japan. (The full paper is attached in appendix E)

Farh, C.P. (2005, August). *Managing innovation in project team in multinationals – the role of diversity, conflict and project stage.* Paper presented at the symposium on Team innovation: Effects of leadership, team composition, structure, and processes, at the 2005 Academy of Management Conference in Hawaii, USA.

Farh, J.L., Tsui, A.S., Xin, K. & Cheng, B.S. (1998). The influence of relational demography and Guanxi: The Chinese case. *Organization Science, 9,* 471-488.

Gardiner, P. (2005). *Project management: A strategic planning approach.* New York, NY: MacMillan.

Gebert, D., Boerner, S., & Kearney, E. (2006, August). *Cross-functionally and innovation in new product development teams: A dilemmatic structure and its consequences for the management of diversity.* Paper presented at the 2006 Academy of Management Conference in Atlanta, Georgia.

Gigone, D., & Hastie, R. (1993). The common knowledge effect: Information sharing and group judgement. *Journal of Personality and Social Psychology, 65,* 959-974.

Gill, J., & Johnson, P. (1997). *Research methods for managers.* (2nd ed.), London, UK: Paul Chapman Publishing Ltd.

Gilson, L., Mathieu, J.E., Shalley, C.E., & Ruddy, T.M. (2005). Creativity and standardization: complementary or conflicting drivers of team effectiveness? *Academy of Management Journal, 48*(3), 521-531.

Gladstein, D.L. (1984). Groups in context: A model of task group effectiveness. A*dministrative Science Quarterly, 29,* 499-517.

Guthrie, S. (1998, March). *Project Management Journal, 29*(1), 5

Guzzo, R., & Dickson M. (1996). Teams in organizations: Recent research on performance and effectiveness. *Annual Review of Psychology, 47,* 307-338.

Hackman, J. (1987). The design of work teams. In J. Lorsch (ed.), *Handbook of Organizational Behavior* (pp. 315-342). Englewood Cliffs, NJ: Prentice-Hall.

Hackman, J.R., & Morris, C.G. (1975). Group tasks, group interaction process, and group performance effectiveness: A review and proposed integration. In L. Berkowitz (ed.), *Advances in Experimental Social Psychology* (vol. 8, pp. 45-99). San Diego, CA: Academic Press.

Hair, J.F., Anderson, R.E., Tatham, R.L., & Black, W.C. (1998). Multivariate data analysis (4th ed.). New York, NY: MacMillan Publishing Company.

Hammond, Stefan (2006, May 10) Macau: expansion drive vendors, workers and IT expertise. *Computeworld Hong Kong.*

Harrison, D., & Klein, K.J. (in press). What's the difference? Diversity constructs as separation, variety, or disparity in organizations. *Academy of Management Review.*

Harrison, D., Price, K., Gavin, J., & Florey, A. (2002). Time, teams, and task performance: Changing effects of surface and deep-level diversity on group functioning. *Academy of Management Journal, 45,* 1029-1045.

Harrison, D., & Sin, H. (2005). What is diversity and how should it be measured? In A.M. Konrad, P. Prasad, & J.K. Pringle (Eds.), *Handbook of workplace diversity* (pp. 191-216). Newbury Park, CA: Sage Publications.

Harrison, D.A., Price, K.H., & Bell, M.P. (1998). Beyond relational demography: Time and the effects of surface- and deep- level diversity on work group cohesion. *Academy of Management Journal, 41,* 96-107.

Hertel, G., & Kerr, N.L. (2001). Priming in-group favoritism: The impact of normative scripts in the minimal group paradigm. *Journal of Experimental Social Psychology, 37,* 316-324.

Hofstede, G. (1994). Management scientists are human. *Management Science. 40,* 4-13.

Hofstede, G. (2001). *Culture's consequences* (2nd ed.). Thousand Oaks, CA: Sage Publications.

Hu, L., & Bentler, P.M. (1999). Cutoff criteria for fit indexes in covariance structure analysis: Conventional criteria versus new alternatives. *Structural Equation Modeling, 6,* 1–55.

Hui, C., & Graen, G.B. (1997). Guanxi and professional leadership in contemporary Sino-American joint ventures in mainland China. *Leadership Quarterly, 8,* 451-65.

Jackson, S. (1992). Team composition in organizations. In S. Worchel, W. Wood, & J. Simpson (Eds.), *Group Process and Productivity* (pp. 1-12). London, UK: Sage.

Jackson, S.E., Joshi, A., & Erhardt, N.L. (2003). Recent research on team and organizational diversity: SWOT analysis an implications. *Journal of Management, 29,* 801-830.

James, L.R., Demaree, R.G., & Wolf, G. (1993). Rwg: An assessment of within-group interrater agreement. *Journal of Applied Psychology, 78,* 306-309.

Jehn, K.A. (1995). A multimethod examination of the benefits and detriments of intragroup conflict. *Administrative Science Quarterly, 40,* 256-282.

Jehn, K.A. (1997). A qualitative analysis of conflict types and dimensions in organizational groups. *Administrative Science Quarterly, 42,* 530-557.

Jehn, K.A., & Bezrukova, K. (2004). A field study of group diversity, workgroup context, and performance. *Journal of Organizational Behavior, 25,* 703-729.

Jehn, K.A., & Mannix, E. (2001, April). The dynamic nature of conflict: A longitudinal study of intragroup conflict and group performance. *Academy of Management Journal, 44*(2), 238.

Jehn, K.A., Northcraft, G., & Neale, M. (1999). Why differences make a difference: A field study of diversity, conflict, and performance in work groups. *Administrative Science Quarterly, 44,* 741-763.

Joreskog, K.G., & Sorbom, D. (1993). *LISREL 8: Structural equation modeling with the SIMPLIS command language.* Hillsdale, NJ: Lawrence Erlbaum Associates Publishers.

Katzenbach, Jon R., & Smith, D.K. (1999). *The wisdom of teams.* New York: HarperCollins.

Keller, R.T. (1992). Transformational leadership and the performance of research and development project groups. *Journal of Management, 18,* 489-501.

Keller, R.T. (2001). Cross-Functional project groups in research and new product development: diversity, communications, job stress, and outcomes. *Academy of Management Journal, 44*(3), 547-555.

Kerlinger, F.N., & Lee, H.B. (2000). *Foundations of behavioral research.* New York, NY: Prentice Hall.

Kinni, T.(1994, March 21). Boundary-busting teamwork. *Industry Week,* 72-74.

Kirkbride, P.S., Tang, S., & Westwood, R.I. (1991). Chinese conflict preferences and negotiation behavior: Cultural and psychological influences. *Organization Studies, 12*(3), 365-86.

Kirkman, B.L., Rosen, B., & Tesluk, P.E., Gibson, C.B. (2004). The impact of team empowerment on virtual team performance: the moderating role of face-to-face interaction. *Academy of Management Journal, 47*(2), 175-192.

Klein, H.J., & Weaver, N.A. (2000). The effectiveness of organizational-level orientation training program in the socialization of new hires. *Personnel Psychology, 53,* 47-66.

Knippenberg Daan van, De Dreu, C.K.W., & Homan, A.C. (2004). Work group diversity and group performance: an integrative model and research agenda. *Journal of Applied Psychology, 89*(6), 1008-1022.

Kozlowski, S.W.J., Gully, S.M., McHugh, P.P., Salas, E., & Cannon-Bowers, J.A. (1996). A dynamic theory of leadership and team effectiveness: Developmental and task contingent leader roles. In G.R. Ferris (ed.), *Research in personnel and human resource management* (Vol. 14, pp. 253-305). Greenwich, CT: JAI Press.

Kumar, N. (1996, November-December). The power of trust in manufacturer-retailer relationships, *Harvard Business Review,* pp. 92-106.

Lam, Sheila. (2006, May 10). Vibrant within mobility. *Computerworld Hong Kong.*

Lawler, E.E. III, Mohrman, S.A., & Ledford Jr., G.E. (1995). *Creating high performance organizations: Practices and results of employee involvement and Total Quality Management in Fortune 1000 Companies.* San Francisco, CA: Jossey-Bass.

Lawrence, Barbara S. (1997). The black box of organizational demography. *Organization Science, 8*(1), 1-22.

Lee, C., Farh, J.L. (2004). Joint effects of group efficacy and gender diversity on group cohesion and performance. *Applied Psychology: an international review, 53*(1),136-154.

Leung, K. (1987). Some determinants of reactions to procedural models for conflict resolution: A cross-national study, *Journal of Personality and Social Psychology, 53*(5), 898-908.

Leung, K., & Bond, M.H. (1984). The impact of cultural collectivism on reward allocation. *Journal of Personality and Social Psychology, 47,* 793-804.

Li, J.T., & Hambrick, D.C. (2005). Factional groups: A new vantage on demographic faultlines, conflict, and disintegration in work teams. *Academy of Management Journal, 48*(5), 794-813.

Li, J.T., Tsui, A.S., & Weldon, E. (2000). *Management and organizations in the Chinese context.* London, UK: Macmillan Press Ltd.

Li, M.C., & Hsu, C.S. (1995). *In-group favoritism and development of communal identity: The case of college students in Taiwan.* Paper presented at the Biannual Meeting of Chinese Psychologists, Taipei, R.O.C. (in Chinese).

Lovelace, K., Shapiro, D.L., & Weingart, L.R. (2001). Maximizing cross functional new product teams' innovativeness and constraint-adherence: A conflict communications perspective. *Academy of Management Journal, 44*(4), 779-793.

Majchrzak, A., Malhotra, A., Stamps, J., & Lipnack, J. (2004, May). Can absence make a team grow stronger? *Harvard Business Review, 82*(5), 131-137.

Martins, L.L., Gilson, L.L., Maynard, M.T. (2004, December). Virtual Teams: What do we know and where do we go from here? *Journal of Management, 30*(6), 804-835.

McCain, B., O'Reilly, C., & Pfeffer, J. (1983). The effects of departmental demography on turnover: The case of a university. *Academy of Management Journal, 26,* 626-641.

Medsker, G.J., Williams, L.J., & Holahan, P.J. (1994). A review of current practices for evaluating causal models in organizational behavior and human resources management research. *Journal of Management, 20,* 439–464.

Milliken, F., & Martins, L. (1996). Searching for common threads: Understanding the multiple effects of diversity in organizational groups. *Academy of Management Review, 21,* 402-433.

Miron, E., Erez, M., & Naveh. E. (2004). Do personal characteristics and cultural values that promote innovation, quality, and efficiency compete or complement each other? *Journal of Organizational Behavior, 25,* 175-199.

Montoya-Weiss, M.M., Massey, A..P., & Song. M. (2001). Getting it together: Temporal coordination and conflict management in global virtual teams. *Academy of Management Journal, 44*(6), 1251-1262.

Morris, M.W., Williams, K.Y., Leung, K., et al. (1998). Conflict management style: Accounting for cross-national differences. *Journal of International Business Studies, 29,* 729-748.

Nunnally, J.C., & Bernstein, I.H. (1994). *Psychometric theory.* (3rd ed.) New York, NY: McGraw-Hill.

Oldham, G., & Cummings, A. (1998). Creativity in the organizational context. *Productivity, 39*(2), 187-194.

O'Reilly, C.A., Caldwell, D.F., & Barnett, W.P. (1989). Work group demography, social integration, and turnover. *Administrative Science Quarterly, 34,* 21-37.

Pelled, L. (1996). Demographic diversity, conflict, and work group outcomes: An intervening process theory. *Organization Science, 7,* 615-631.

Pelled, L. (1997). Relational demography and perceptions of group conflict and performance: A field investigation. *International Journal of Conflict Resolution, 7,* 230-246.

Pelled, L.H., Eisenhardt, K.M., & Xin, K.R. (1999). Exploring the black box: An analysis of work group diversity, conflict, and performance. *Administrative Science Quarterly, 44,* 1-28.

Pfeffer, J., & O'Reilly, C. (1987). Hospital demography and turnover among nurses. *Industrial Relations, 36,* 158-173.

Podsakoff, P.M., & Organ, D.W. (1986). Self-reports in organizational research: Problems and prospects. *Journal of Management, 12*(4), 525-530.

Polzer, J.T., Milton, L.P., & Swann, Jr, W.B. (2002). Capitalizing on diversity: Interpersonal congruence in small work groups. *Administrative Science Quarterly, 47,* 296-324.

Priem, R.L., Harrison, D.A., & Muir, N.K. (1995). Structured conflict and consensus outcomes in group decision making. *Journal of Management, 21,* 691-710.

Project Management Institute (PMI) (2004). *A guide to the project management body of knowledge*, Upper Darby, PA: Project Management Institute.

Richard, O.C., Barnett, T., Dwyer, S., & Chadwick, K. (2004). Cultural diversity in management, firm performance, and the moderating role of entrepreneurial orientation dimensions. *Academy of Management Journal, 47*(2), 255-266.

Swartz, S.H. (1994). Beyond individualism/collectivism: New cultural dimensions of values. In U. Kim, H.C. Triandis, C. Kacitcibasi, S.C. Choi, & G. Yoon, (Eds.), *Individualism and collectivism: Theory, methods, and applications* (pp. 85-119). Thousand Oaks, CA: Sage.

Schweiger, D.M., Sandberg, W.R., & Rechner, P.L. (1989). Experiential effects of dialectical inquiry, devil's advocacy, and consensus approaches to strategic decision making. *Academy of Management Journal, 32,* 745-772.

Simons, T., Pelled, L.H., & Smith, K.A. (1999). Making use of difference: Diversity, debate, and decision comprehensiveness in top management teams. *Academy of Management Journal, 42,* 662-673.

Simons, T.L., & Peterson, R.S. (2000). Task conflict and relationship conflict in top management teams: The pivotal role of intragroup trust. *Journal of Applied Psychology, 85,* 102-111.

Smith, K.G., Smith, K.A., Olian, J.D., Sims, H.P., O'Bannon, D.P., & Scully, J.A. (1994). Top management team demography and process: The role of social integration and communication. *Administrative Science Quarterly, 39,* 412-438. Some determinants of conflict avoidance. (1998). *Journal of Cross-Cultural Psychology 19,* 125-136.

Tajfel, H. (1981). *Human groups and social categories: studies in social psychology.* Cambridge, UK: Cambridge University Press.

Teachman, J.D. (1980). Analysis of population diversity. *Sociological Methods and Research, 8,* 341-362.

Thamhain, H.J., & Wilemon, D.L. (1975). Diagnosing conflict determinants in project management. *IEEE transactions on engineering management, EM-22*(1), 35-44.

Thomas, K.W. (1992). Conflict and negotiation processes in organizations. In M.D. Dunnette & L.M. Hough (Eds.), *Handbook of industrial and organizational psychology* (2nd ed., Vol. 3), (pp. 651-717). Palo Alto, CA: Consulting Psychologists Press

Thomas, K.W., & Kilmann, R.H. (1978). Comparison of four instruments measuring conflict behavior. *Psychological Reports, 42,* 1139-1145

Tjosvold, D. (1986). Constructive controversy: A key strategy for groups. *Personnel, 63,* 39-44.

Tjosvold, D. (1991). *The conflict positive organization.* Reading, MA: Addison Wesley.

Tjosvold, D. (1993). *Teamwork for customers: building organizations that take pride in serving.* San Francisco, CA: Jossey-Bass Inc.

Tjosvold, D., Hui, C., Ding, D.Z., & Hu, J. (2003). Conflict values and team relationships: Conflict's contribution to team effectiveness and citizenship in China. *Journal of Organizational Behavior, 24,* 69-88.

Tjosvold, D., Tang, M.M.L., & West, M. (2004, October). Reflexivity for team innovation in China: The contribution of goal interdependence. *Group & Organization Management, 29*(5), 540-559.

Townsend, A., DeMarie, S., & Hendrickson, A. (1998). Virtual teams: Technology and the workplace of the future. *Academy of Management Executive, 12(3),* 17-29.

Triandis, H.C. (2003). The future of workforce diversity in international organisations: A commentary. *Applied Psychology: An International Review, 52*(3), 486-495.

Tsui, A.S., Egan, T.D., & O'Reilly, C.A. III (1992). Being different: Relational demography and organizational attachment. *Administrative Science Quarterly, 37,* 549-579.

Tsui, A.S., Egan, T.D., & Xin, K.R. (1995). Diversity in organizations: Lessons from demography research. In M.M. Chemers, S. Oskamp, & M.A. Costanzo (Eds), *Diversity in organizations: New perspectives for a changing workplace,* (pp. 191-219). Thousand Oaks, CA: Sage Publications

Tsui, A.S., & Farh, J.L. (1997). Where Guanxi matters: Relational demography and Guanxi in the Chinese context. *Work and Occupations, 24,* 56-79.

Tsui, A.S., & O'Reilly, C.A. (1989). Beyond simple demographic effects: The importance of relational demography in supervisor-subordinate dyads. *Academy of Management Journal, 32,* 402-420.

Tuckman, B.W. (1965). Developmental sequences in small groups. *Psychological Bulletin, 63,* 384-399.

Van Der Vegt, G.S., & Bunderson, J.S. (2005). Learning and performance in Multidisciplinary teams: the importance of collective team identification. *Academy of Management Journal, 48*(3), 532-547.

Van Der Vegt, G.S., Van De Vliert, E., & Oosterhof, A. (2003). Informational dissimilarity and organizational citizenship behaviour: the role of intrateam interdependence and team identification. *Academy of Management Journal, 46*(6), 715-727.

Welch, J. (2001). *Jack: Straight from the gut.* New York, NY: Warner Books

West, M.A. (2002). Sparkling fountains or stagnant ponds: An integrative model of creativity and innovation implementation in work groups. *Applied Psychology: An International Review, 51,* 355-424.

West, S.G., Finch, J.F., & Curran, P.J. (1995). Structural equation models with non-normal variables: Problems and remedies. In R.H. Hoyle (ed.). *Structural equation modeling: Concepts, issues and applications* (pp. 56-75). Thousand Oaks, CA: Sage.

Wilde, Candee (1996). Avoiding the D word. *Computerworld, Feb 26, 30, 9;* SI11.

Williams, K.Y., & O'Reilly, C.A. (1998). Demography and diversity in organizations. In B.M. Staw, & R.M. Sutton (Eds.), *Research in Organizational Behavior, 20*, 77-140). Stamford, CT: JAI Press.

Wong, A., Tjosvold, D., Wong, W.Y.L, & Liu, C.K. (1999). Cooperative and competitive conflict for quality supply partnerships between China and Hong Kong. *International Journal of Physical Distribution & Logistics Management, 29*(1), 7.

Xie, J., Song, X.M., & Stringfellow, A. (1998). Interfunctional conflict, conflict resolution styles, and new product success: A four-culture comparison. *Management Science, 44,* 192-206.

Yang, K.S. (1993). Chinese Social Orientation: An Integrative Analysis. In L.Y. Cheng, F.M.C. Cheung, & Char-Nie (Eds.), *Psychotherapy for the Chinese: Selected Papers from the First International Conference* (pp. 19-56). The Chinese University of Hong Kong.

Zenger, T.R., & Lawrence, B.S. (1989). Organizational demography: The differential effects of age and tenure distributions on technical communication. *Academy of Management Journal, 32,* 353-376.

Appendices

Appendix A	The Cover Letter for the Study.....
Appendix B	Project Manager Survey.....
Appendix C	Team Member Survey.....
Appendix D	Ethic Approval.....
Appendix E	Diversity and Conflict in IT Project Teams in China.....

Appendix A

The Cover Letter for the Study

Appendix A: The Cover Letter for the Study

Date:
Subject: Project Team Experience Survey

Dear participant:
May I ask your help to complete a survey about your working experience in your current project team?

Your current Project Team name:_____

The purpose of the survey is to understand how project teams work in your company. Please describe your current project name on the top of the survey and answer the questionnaires according to this project team. You have been invited as a representative member of your project team to fill out this survey. After sample surveys are gathered from other teams, we will aggregate the responses, and analyze and contrast the profiles of different teams. Only aggregated data will be reported in the final reports. These results will be used for future improvement of our project management courses and enhancement of academic knowledge on project teams.

Please be assured that your responses to my research are confidential. You may withdraw from the research at any time which will not affect your position, performance rating, treatment or care. All data will be stored in my personal home in a locked cabinet for 7 years. All records containing personal information will remain confidential and no information which could lead to identification of any individual will be released. I will take every care to remove responses from any identifying material as early as possible. Likewise individual's response will be kept confidential by me and not be identified in the reporting of the research. However I cannot guarantee the confidentiality or anonymity of material transferred by email or the internet. If you have any ethical concerns on my research, please contact Vicki Allen, Executive Officer, Human Research Ethics Committee, Mawson Lakes Campus, University of South Australia, GPO BOX 2471, Adelaide, SA 50000, Australia.

Due to time urgency, I would appreciate that you would mail or email the survey directly back to Patty Farh in one week.

Thank you again for your kind assistance in this matter.

Patty Farh
Taikoo Place, 979 King's Road
Quarry Bay, Hong Kong

Emailed: Patty_Farh@yahoo.com

Appendix B

Project Manager Survey

Appendix B: Project Manager Survey

Project Manager Survey 1

Your Project Name: _____

Please provide basic background information about the focal project.
Please fill in the blanks shaded in blue.

_____ Focal project division: 1) ITS 2) BCS 3) SO 4) AMS 5) ISSC 6) CDL/CRL
7) Others (please list: _____).

_____ Project start date (yy/mm/dd) _____ Project end date (yy/mm/dd)

_____% What percentage of the project has been completed as of today? (in %)

_____ Project location.

Focal Project Key Deliverables:

_____

_____

Project team Definition and Composition

Project team is comprised of project manager and team members. Project team members can include focal company staff, contractors or customer members.

Project team members can be categorized into core team members and non-core team members. Core team members are those who are responsible for or participate in the delivery of key project modules. During the main phase of project execution, these core team members spent at least 50% of their working time on the focal project. This study is primarily focused on the relationship between core team member behavior and project team performance.

How many core team members (excluding yourself)? _____ Core Team Member Names: _____

Part 1: Basic Information about Your Project Team

Please provide information about the core members of your team. Please fill in the information in the blue field. For any question, if you are not absolutely certain about the exact answer, please provide your best estimate.

1. Sources of core team members on your project.

Focal company	Subcontractor #1	Subcontractor #2	Customer	Other: _____

2. Among your core team members who are focal company staff, which division do they come from?

ITS	BCS	SO	AMS	others:

3. Age distribution of your core team members.

Below 25	26-30	31-35	36-40	41-45	46-50	Above 50

4. Gender distribution of your core team members.

male _____ female _____

5. Educational background of your core team members.

High school or below	University graduate	master or Ph.D.

6. Cultural background of your core team members.

Mainland	Hong Kong	Taiwan	Australia	ASEAN	Others_____

7. What functional roles do core team members play?

Architect	Consultant	Development	Testing Specialist	Operation Support
Sales/Engagement	Technical Support	Project Office Administrator	Others: _____	

Part 2. Your personal background information. Please fill in the blue fields.

_____ Which department do you belong?
1) ITS 2) BCS 3) SO 4) AMS
5) IGS Sales 6) Brand 7) CDL & CRL 8) TSS
9) Sales/Marketing/Client 10) Other dept in focal company(_____)
11) contractor 12) customer

_____yr How long have you been working for the focal company? (in years).

(mon) How long have you managed this focal project? (in months)

Your age _____ yrs

_____ Sex: 1) male、 2)female

_____ Your highest education: 1) high school or below、 2) university、 3) master、 4) Ph.D.

_____ Your cultural background (Choose one with which you identified the most)
1) Mainland 2) Hong Kong 3) Taiwan 4) Australia 5) ASEAN 6) Others(_____)

Project Manager Survey 2

	Part 1. Please read each statement carefully. Based on the actual situation of your project team, please select from 1 (strongly disagree) to 7 (strongly agree) to answer. There is no right or wrong answer. We are interested in your view only. 'Members' or 'Team members' here refer to the core members on your project team. Thank you!	Strongly Disagree	Disagree	Somewhat Disagree	Undecided	Somewhat Agree	Agree	Strongly Agree
1	Members of this team 'swim or sink' together.	1	2	3	4	5	6	7
2	Members of this team want each other to succeed.	1	2	3	4	5	6	7
3	The goals of team members go together.	1	2	3	4	5	6	7
4	When members of this team work together, they usually have common goals.	1	2	3	4	5	6	7
5	Members encourage a 'we are in it together' attitude.	1	2	3	4	5	6	7
6	Members seek a solution that will be good for all of them.	1	2	3	4	5	6	7
7	Members treat conflict as a mutual problem to solve.	1	2	3	4	5	6	7
8	Members work so that to the extent possible they all get what they really want.	1	2	3	4	5	6	7
9	Members combine the best of positions to make an effective decision.	1	2	3	4	5	6	7

	Part 2. Based on the frequency of occurrence the following behaviors in your project team, please select from 1 (never) to 5 (always) to answer. There is no right or wrong answer. We are interested in your view only. 'Members' or 'Team members' here refer to the core members on your project team. Thank you!	Never	Rare	Occasionally	Often	Always
1	How much are personality clashes evident in this team?	1	2	3	4	5
2	How much tension is there among the members of this team?	1	2	3	4	5
3	How often do people get angry while working in this team?	1	2	3	4	5
4	How much jealousy or rivalry is there among the members of this team?	1	2	3	4	5
5	To what extent are there differences of opinion in the team?	1	2	3	4	5
6	How often do the members of this team disagree about how things should be done?	1	2	3	4	5
7	How often do the members of this team disagree about which procedure should be used to do their work?	1	2	3	4	5
8	To what extent are the arguments in this team task-related?	1	2	3	4	5

	Part 3. Please read each statement carefully. Based on the actual situation of your project team, please select from 1 (strongly disagree) to 7 (strongly agree) to answer. Thank you!	Strongly Disagree	Disagree	Somewhat Disagree	Undecided	Somewhat Agree	Agree	Strongly Agree
1	This team has produced highly creative output.	1	2	3	4	5	6	7
2	This team has produced original and practical output.	1	2	3	4	5	6	7
3	This team has shown great ability to use existing information or materials to develop products or services that are useful to its clients.	1	2	3	4	5	6	7
4	This team has adapted well to the changing circumstances.	1	2	3	4	5	6	7
5	This team has produced output of high technical quality.	1	2	3	4	5	6	7
6	This team has earned high customer satisfaction.	1	2	3	4	5	6	7

7	This team has kept its project on schedule.	1	2	3	4	5	6	7
8	This team has excellent cost performance.	1	2	3	4	5	6	7
9	This team has performed extremely well.	1	2	3	4	5	6	7
10	This team has been highly effective.	1	2	3	4	5	6	7

Location	Source
Part 1: Q1-4	Cooperative Goal (4) (Alper, Tjosvold & Law, 1998)
Part 1: Q5-9	Cooperative Conflict Management (5) (Alper, Tjosvold &Law, 2000)
Part 2: Q1-4	Relationship Conflict (Jehn, 1995)
Part 2: Q5-8	Task Conflict (Jehn, 1995)
Part 3: Q1-4	Team Innovation (Oldham & Cummings, 1998)
Part 3: Q5-8	Team Efficiency (constructed by this study)
Part 3: Q9-10	Perceived Team Performance (Jehn et al., 1999)

Appendix C

Team Member Survey

Appendix C: Team Member Survey

Please answer all questions in this survey according to the following focal project you are participating:

_____ Project

Throughout the survey, 'Project team' or 'Team member' refers to the core team members of the focal project.

The project manager is _____
The core team members are:
_____

Part 1. Please read each statement carefully. Based on the actual situation of your project team, please select from 1 (strongly disagree) to 7 (strongly agree) to answer. There is no right or wrong answer. We are interested in your view only. 'Members' or 'Team members' here refer to the core members on your project team. Thank you!	Strongly Disagree	Disagree	Somewhat Disagree	Undecided	Somewhat Agree	Agree	Strongly Agree
1 Members encourage a 'we are in it together' attitude.	1	2	3	4	5	6	7
2 Members seek a solution that will be good for all of us.	1	2	3	4	5	6	7
3 Members treat conflict as a mutual problem to solve.	1	2	3	4	5	6	7
4 We work so that to the extent possible we all get what we really want.	1	2	3	4	5	6	7
5 Members combine the best of positions to make an effective decision.	1	2	3	4	5	6	7

Part 2. Based on the frequency of occurrence the following behaviors in your project team, please select from 1 (none) to 5 (a lot) to answer. There is no right or wrong answer. We are interested in your view only. 'Members' or 'Team members' here refer to the core members on your project team. Thank you!	Never	Rarely	Occasionally	often	Always
1 How much are personality clashes evident in your team?	1	2	3	4	5
2 How much tension is there among the members of your team?	1	2	3	4	5
3 How often do people get angry while working in your team?	1	2	3	4	5
4 How much jealousy or rivalry is there among the members of your team?	1	2	3	4	5
5 To what extent are there differences of opinion in your team?	1	2	3	4	5
6 How often do the members of your team disagree about how things should be done?	1	2	3	4	5
7 How often do the members of your team disagree about which procedure should be used to do your work?	1	2	3	4	5
8 To what extent are the arguments in your team task-related?	1	2	3	4	5

Part 3. Please read each statement carefully. Based on the actual situation of your project team, please select from 1 (strongly disagree) to 7 (strongly agree) to answer. Thank you!		Strongly Disagree	Disagree	Somewhat Disagree	Undecided	Somewhat Agree	Agree	Strongly Agree
1	Our team members 'swim or sink' together.	1	2	3	4	5	6	7
2	Our team members want each other to succeed.	1	2	3	4	5	6	7
3	The goals of team members go together.	1	2	3	4	5	6	7
4	When our team members work together, we usually have common goals.	1	2	3	4	5	6	7
5	Working with this team has been an enjoyable experience.	1	2	3	4	5	6	7
6	I would like to work with this team in the future.	1	2	3	4	5	6	7

Please input your data in blue fields:

(month) How long have you been working on this project? (please answer in months. E.g., 1 year 3 month = 15 months.)

Personal Background Information.

_____Your functional role on this project team:
1) architect 2) consultant 3) development 4) testing specialist 5) operation support
6) engagement manager/ sales specialist 7) technical specialist/support
8) project office administrator 9) others (please fill in):_____

_____Your division: 1) ITS 2) BCS 3) SO 4) AMS 5) IGS Sales 6) Brand 7) CDL & CRL 8) TSS
9) Sales/Marketing/Client 10) Other dept in focal company:_____
11) Contractor 12) Customer

_____How long have you been working for focal company (in years)?

_____Your age (in years)

_____Your sex: 1) Male 2) Female

_____Your education: 1) High School or below 2) University 3) Master 4) Ph.D.

_____What is your cultural background? (Pick the one you identify with most)
1) Mainland 2) Hong Kong 3) Taiwan 4) Australia 5) ASEAN 5) others:
_____

This survey has been completed. Thank you very much for your kind help.

Location	Source
Part 1: Q1-5	Cooperative Conflict Management (5) (Alper, Tjosvold &Law, 2000)
Part 2: Q1-4	Relationship Conflict (4) (Jehn, 1995)
Part 2: Q5-8	Task Conflict (4) (Jehn, 1995)
Part 3: Q1-4	Cooperative Goal (4) (Alper, Tjosvold & Law, 1998)
Part 3: Q5-6	Member Satisfaction (2) (Priem et al., 1995)

Appendix D

Ethic Approval

Appendix D: Ethic Approval

Vicki Allen
<Vicki.Allen@unisa.edu.au>

08/28/2003 04:52 AM

To: Patty_Farh@yahoo.com
cc: Margaret Patrickson <Margaret.Patrickson@unisa.edu.au>, Sachiko Hidaka <Sachiko.Hidaka@unisa.edu.au>
Subject: Ethics Protocol P188/03 IGSM "Capitalising on diversity in project teams: a study of an IT multinational firm in China, Hong Kong and Taiwan"

Dear Patty (Ching-Ping FARH - PhD Student Hong Kong)

Re: Ethics Protocol P188/03 IGSM "Capitalising on diversity in project teams: a study of an IT multinational firm in China, Hong Kong and Taiwan"

Thank you for providing the amendments and/or additional information requested by the Human Research Ethics Committee (letter dated 1 August 2003).

I am pleased to advise that your protocol has been approved. However, would you please add the following statement to the Information Sheet: "The researcher will take every care to remove responses from any identifying material as early as possible. Likewise individual's responses will be kept confidential by the researcher and not be identified in the reporting of the research. However the researcher cannot guarantee the confidentiality or anonymity of material transferred by email or the internet." Please provide me with a copy of the amended Information Sheet as well as a copy of the Consent Form that you have amended so that we may have a final copy of both for our records.

Please regard this email as formal notification of approval.

Ethics approval is always made on the basis of a number of conditions detailed in the attachment; it is important that you are familiar with, and abide by, these conditions. It is also essential that you conduct all research according to UniSA guidelines, which can be found at <http://www.unisa.edu.au/orc/ethics/index.htm>.

Best wishes for your research.

Regards, Vicki

Vicki Allen
Ethics Officer
Research Services
University of South Australia
Mawson Lakes Campus
Mawson Lakes Boulevard
Mawson Lakes SA 5095
Telephone: + 61 8 8302 3118
Fax: +61 8 8302 3921
Email: vicki.allen@unisa.edu.au

Appendix E

Diversity and Conflict in IT Project Teams in China

Appendix E: Diversity and Conflict in IT Project Teams in China

Farh, C.P. (2004, October 11)
Paper presented at the ProMAC 2nd International Conference
on Project Management, Tokyo Bay Area, Japan

Diversity and Conflict in IT Project Teams in China

Ching-Ping Patty Farh*

Project teams have higher capacity than traditional cross-functional teams in solving complex business problems because their members' different expertise allows them to tap a broader range of external information and create innovative knowledge and solutions. However, the combination of individuals with different expertise can also bring along conflict due to team members' diverse backgrounds. People have more difficulty in understanding each other as their backgrounds are more diverse. Existing diversity literatures has mainly studied teams with members from the same functional unit or from different units within the same company at the same location. Few studies have examined IT project teams whose life cycle is relative short and whose operation is often virtual. The current study attempts to verify whether findings from Western research on team diversity and conflict apply to IT project teams in China. 75 project managers and team members from the China branch of a major IT multinational was interviewed about their perceptions of the relationship between diversity and conflict. The results showed that participants attributed team conflict to deep-level diversity (e.g., differences in personality and goals) more than to surface-level diversity (e.g., differences in gender and age). Results are discussed in terms of their implications for future research and practices on how to manage conflict in IT project teams.

Keywords & Phrases: project team, diversity, team conflict, virtual teams
* University of South Australia

Introduction:

Increasing levels of competition caused by the globalization of markets and continually changing technologies, such as the Internet, that shorten long distances have pushed businesses to continually innovate the services and speed their delivery. They are expected to do so within a budget and a time frame. In response to these changes, organizational structures have become more flexible. Horizontal organizational structures and temporal project teams have formed to meet these specific business objectives, aided by advanced technology especially in the information technology (IT) industry. This has lead to an increasing emphasis on far-flung, distributed, 'virtual' teams as work units. Townsend and colleagues (1998) define virtual teams as 'groups of geographically and/or organizationally dispersed coworkers that are assembled using a combination of telecommunications and IT infrastructure to accomplish an organizational task'.

In IT industries, project teams increasingly have adopted the 'virtual team' format and pull in different expertise from anywhere to tap a broad range of external information and

create innovative solutions. IT project teams may have team members drawn from different functional units and may not be located on the same worksite. Yet, they work together just like traditional functional teams. Frequently, team members work in different cities, speak different languages, live in different time zones and may come from different organizations (Prasad & Akhilesh, 2002). This revolution had occurred because apparent barriers that existed in the past have been broken down by the advances in technology and the pressure for globalization. Such global virtual teams have higher capacity than their traditional counterparts because their members' different expertise allows them to tap a broad range of external information and create innovative knowledge and solutions to solve more complex business problems. However, the combination of individuals with different expertise can also bring with it team members' different background. People have more difficulty in understanding each other when their backgrounds are more diverse. Research on team diversity found that misunderstandings and conflicts often occur in demographically and functionally diverse teams (See Williams and O'Reilly, 1998 for a review). The major sources of diversity have been identified as differences in age, gender, race, tenure, functional background, goals and interests.

Social categorization theory and similarity-attraction theory propose that people develop and recognize identity mainly from the social categories to which they belong (Tajfel & Turner, 1986). People are more attracted to others who share the same social categories (in-group) than to those (out-group) who do not. From this perspective, diversity is proposed to result in increased conflict and communication difficulties, and consequently lower team performance (Pelled, Eisenhardt & Xin, 1999).
Given such a range of backgrounds diversity in a team can potentially increase team conflict. We know little about the operation of these features in Asia as most of the diversity research has been undertaken by Western scholars in a Western organizational context. Very little diversity research has been done in China; none has been conducted on IT project teams in China. The purpose of this study is to fill this gap by examining the relationship between diversity sources and team conflict in IT project teams in China.

The literature has suggested that the various diversity variables may be grouped into two levels: surface level versus deep level. Diversity variables that are highly visible and can be easily observed and measured, are called 'surface level' diversity' which includes gender, age, tenure, and race (Jackson, May, & Whitney, 1995). On the other hand, the 'deep-level' (Harrison, Price, & Bell, 1998) or less apparent diversity variables are based on psychological features of the team members. The 'deep-level' diversity variables include individual differences in personality traits (Barsade, Ward, Turner, & Sonnenfeld, 2000) and values (Jehn, Chadwick, & Thatcher, 1997).

The current study tried to answer the following three research questions:
1. Which type of diversity contributes more to team conflict in Chinese IT project teams?
2. Are they the same as or different from those reported in the Western literature?

3. Does deep-level diversity contribute to team conflict more than surface-level diversity in Chinese IT project teams?

Method

Sample

The study's sample was drawn from four groups of participants in project management (PM) courses in the China branch of an IT multinational firm. This company relies heavily on IT project teams to deliver services to customers in its China operation. Project managers are treated as one of the key professionals in the firm, critical to its effort in delivering IT services to customers. Due to double digit growth in China, the company needs to train hundreds of its project managers and team leaders every year. Only experienced employees (those who have had several years of working experiences in IT project teams) recommended by management are eligible to participate in these PM classes.

Participants in this study were recruited from four PM classes conducted in Beijing in 2004. 25 participants from one PM class participated in a pilot study and 75 participants from three other PM classes participated in the main study. All participants in this study were either project managers or team leaders who have had a lot of working experience in IT project teams.

Pilot Study

The purpose of the pilot study was to gather information on which types of diversity were considered as sources of conflict in IT project teams in China. Participants were presented with a list of diversity variables drawn from the diversity literature and asked them to discuss to what extent these types of diversity contributed to conflict in their teams, and what additional types of diversity they thought might be important but not yet included in the list. The format was a focus group style interview. Initial list of diversity variables included age, gender, tenure, race, function, and personality. The participants pointed out that race was not a relevant diversity for them because most team members came from one race (Han). They did suggest dialects/languages be included as a source of conflict because Chinese often prefer to speak their own dialects. Although the written language is the same in China, there are several dozens of region-based dialects spoken in China. Chinese who speak different dialects often could not understand each other. The participants also wanted me to include goal difference as source of conflict because their teams often included customers and contractors as members who may not readily identify with the team goal.

Main Study

Based on the pilot study results, 7 diversity variables were included in survey (i.e., gender, age, tenure, dialects/languages, goal, personality, and function). 75 participants were asked to report the extent to which they believed difference in each type of diversity was a source of conflict for their project teams on a five-point rating scale (1 = strongly disagree, 2 = disagree, 3 = neutral, 4 = agree, 5 = strongly agree). Table 1 listed the seven survey items.

Table 1: Items for Diversity and Conflict

1.Difference in members' tenure in the company is a source of conflict in my project team

2.Difference in members' languages /dialects is a source of conflict in my project team

3.Difference in members' age is a source of conflict in my project team

4.Difference in members' sex is a source of conflict in my project team

5. Difference in members' goal is a source of conflict in my project team.

6.Difference in members' personality is a source of conflict in my project team

7.Members from different functions is a source of conflict in my project team

In addition, participants were asked to list the characteristics of the project teams which they were presently a member or in which they had participated most recently, to test whether these team characteristics had influenced participants' perception of sources of conflict. The project team characteristics included team size, % of female members in the team, number of different functional units members came from, and number of different dialects/languages spoken by members. All participants in the main study were first instructed to fill out the survey individually. Then summarized results were presented to the participants, and followed up with a group discussion. In the group discussion session, the group was split into 5 tables and each table was asked to give examples of how each diversity variable had contributed to conflict in their project teams.

Result

Intercorrelations among diversity variables

Table 2 lists the intercorrelations among the 7 diversity sources as contributors to team conflict. From Table 2, it can be seen that age, gender, and tenure as sources of conflict were significantly positively correlated ($r = .37$ to $.40$, $p < .01$). All three represent surface-level diversity. This suggests a tendency that if participants believed that one surface-level variable was a source of conflict, they also tended to believe that the other surface-level variables were sources of conflict and vice versa. There was also a trend that deep-level diversity (i.e., function, personality, and goal) tended to be positively correlated. But these correlations were smaller ($r = .16$ to $.39$) and not always significant. In addition, there were two significant correlations between surface-level and deep-level diversity (i.e., between gender and personality, between age and goal). These findings suggest that deep-level diversity may be related to surface-level diversity. Dialects/language did not correlate with any other diversity.

Relationships between team characteristics and diversity

Table 3 shows the intercorrelations between team characteristics and contribution of type of diversity to conflict. Out of the 28 correlations, only the correlation between # of dialect/language and goal was significant. Thus, participant's team characteristics did not influence their view about the extent to which various diversity sources contributed to conflict.

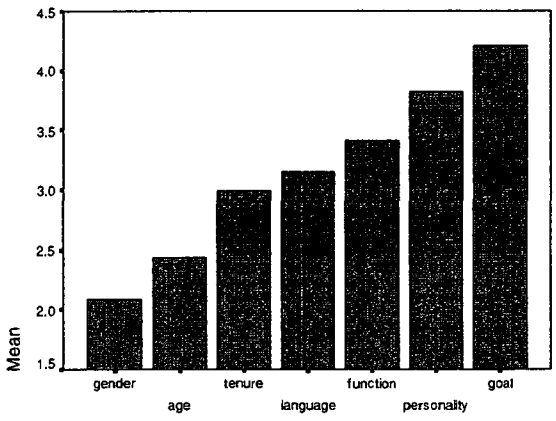
Mean comparisons among diversity sources

Table 4 lists the means of diversity contribution to conflict by sources. The higher the mean for a diversity source, the greater that source is perceived as a contributor to conflict. Since I used a five point scale (1 = strongly disagree, 5 = strongly agree), a mean score of around 2.0 indicates that most participants think that diversity is not a source of conflict, whereas a mean score of around 4.0 indicates that participants think that diversity is indeed a source of conflict. I conducted paired t-tests to see if the

mean differences among these diversity sources were statistically significant. As shown in Table 4, all pairwise comparisons were statistically significant except the mean difference between tenure and dialect/language, which is non-significant.

Figure 1 gives a graphic presentation of the means of contribution to conflict by type of diversity. Goal difference is by far the biggest contributor to conflict, followed by personality, function, dialect/language, tenure, age, and gender. Among the seven diversity types, gender difference was not considered a source of conflict (mean = 2.09). Most participants also did not consider age difference as a source of conflict (mean = 2.41).

Figure 1. Diversity Sources and Conflict



Discussion

The lack of impact of age diversity on conflict may be explained by the lack of age variance in IT project teams. Members of IT project teams are typically young. Not also gender difference perceived as a source of conflict even though average teams had 25% of female members.

Examples of goal diversity as a source of team conflict were provided by focus groups. IT project team may use outside vendors as subcontractors to deliver part of key modules either because the subcontractors have the project required skills or the subcontractors are less expensive. However, the subcontractors have their own company interest and goal which may conflict with the team goal. Regarding the personality differences, some members are very task oriented and others are very interpersonal, they may not agree with each other on how the team should make decisions. Regarding functional unit differences, each member's functional unit may have different priority than the team's priority, which can cause the conflict. Regarding the tenure diversity to conflict, some newcomers, especially those who joined the company via acquisition or outsourcing, may prefer a different way of doing things than old-timers. The new comers may bring their old company cultures to their new jobs.

This study found that surface level diversity, such as gender, age and tenure were related and may be considered as one set of factors to impact team conflict. On the other hand, the deep level diversity, such as function, personality and goal were bound to be another set of factors that impact team conflict. These differences verified the usefulness of the distinction between surface level and deep level diversity in IT project teams in China. The interesting part is dialect/language, which stands between the surface level and deep level diversity factors. In the focus group, the participants gave examples how dialect/language influences the team conflicts. For instance, two Hong Kong people get together, and they would prefer to speak in Cantonese. This also applies to other dialects such as Shanghainese and Taiwanese. However, the rest of the

Chinese team members can speak Mandarin only and some overseas fly-ins can speak English only. The multilingual environment can impact the team communication which can divide the team into in-group and out-group on a surface level. However, the different dialects/languages may also imply people's different cultural background which can divide the team into in-group and out-group at a deeper level. Therefore, this can help explain why dialects/languages are located in the middle between surface and deep level diversity. . It would seem that the Chinese project teams have their unique diversity variables, dialect/language, which is not captured in existing western studies.

Conclusion

The current study discovered that the major sources of team conflicts in China are Goal diversity, Personality diversity, Functional diversity, Dialect/Language diversity, and Company tenure diversity. The first three are considered as deep level diversity and the last one is considered as surface level diversity. A unique diversity variable, dialect/language, is another category located in the middle between surface and deep level diversity. The current study found that the deep level diversity contributed to more conflict than surface level diversity. To some extent, this may be explained by the company culture that encourages diversity and professionalism so that the surface level diversity has been smoothed out but not the deep level diversity.

The current study didn't link the different diversity factors to project team performance, team morale or member satisfaction. Future studies should explore how IT project teams manage their conflicts which are generated from the diversities of goal, personality, functional unit, dialect/language, tenure and subsequently how this impacts project team outcomes.

References

Barsade, S.G., Ward, A.J., Turner, J.D.F., & Sonnenfeld, J.
2000 "To your heart's content: A model of affective diversity in top management teams". Administrative Science Quarterly, 45: 802-936.

Harrison, D.A., Price, K.H., & Bell, M.P.
1998 "Beyond relational demography: Time and the effects of surface- and deep- level diversity on work group cohesion". Academy of Management Journal, 41: 96-107.

Jackson, S.E., May, K.E., & Whitney, K
1995 'Understanding the dynamics of diversity in decision making teams". In R.A. Guzzo & E. Salas (Eds.), Team decision-making effectiveness in organizations: 2004-261. San Francisco: Jossey-Bass.

Jehn, K.A., Chadwick, C., & Thatcher, S.M.B.
1997 "To agree or not to agree: The effects of value congruence, individual demographic dissimilarity, and conflict on workgroup outcomes". International Journal of Conflict Management, 8: 287-305.

Krishna Prasad, K B Akhilesh
2002 "Global virtual teams: What impacts their design and performance?" Team Performance Management, 8, 5/6, pp. 102-112

Pelled, L. H., Eisenhardt, K. M., & Xin, K. R.

1999 "Exploring the black box: An analysis of work group diversity, conflict, and performance." Administrative Science Quarterly, 44: 1-28

Tajfel, H. and J. C. Turner
1986 "The Social Identity Theory of Intergroup Behavior," in S. Worchel and W. G. Austin (Eds.), Psychology of Intergroup Relations, Chicago, IL: Nelson-Hall, 7-24.

Townsend, A.M., DeMarie, S.M., & Hendrickson, A.R.
1998 "Virtual teams: Technology and the workplace of the future". Academy of Management Executive, 12, 17-29.

William, Katherine Y., and Charles A. O'Reilly
1998 "Demography and diversity in organizations". In Barry M. Staw and Robert M. Sutton (eds.), Research in Organizational Behavior, 20: 77-140. Stamford, CT: JAI Press.

Table 2. Inter-correlations among Diversity Sources as Contributors to Conflict (N = 73 – 75)

Diversity Sources	Gender	Age	Tenure	Language	Function	Personality
Gender	1.00					
Age	0.40**	1.00				
Tenure	0.37**	0.38**	1.00			
Language	0.05	0.11	0.12	1.00		
Function	0.21	0.09	0.14	0.08	1.00	
Personality	0.24*	0.05	0.03	-0.12	0.39**	1.00
Goal	0.14	0.30**	0.06	0.01	0.16	0.24*

*p < .05; ** p < .01

Table 3. Means and Standard Deviations of Group Composition, and its Correlations with Diversity Contribution to Conflict (N = 55 ~ 71)

Group Composition		Diversity Sources as Contribution to Conflict						
	Mean (Std dev)	Gender	Age	Tenure	Language	Function	Personality	Goal
Team size	15.21 (12.87)	0.02	0.06	0.04	0.06	-0.01	-0.09	-0.18
% female	24.52 (19.46)	0.07	-0.08	-0.14	0.18	0.12	0.13	0.05
#of languages/ dialects	2.06 (1.09)	0.05	0.16	0.06	0.22	0.00	0.03	0.24*
# of functional units	2.79 (1.56)	-0.12	-0.02	-0.16	0.22	-0.10	-0.15	0.16

*p < .05; ** p < .01

Table 4. Diversity Sources as Contributors to Conflict (N = 73 – 75)

Diversity sources	Contribution to Conflict		Pairwise Contrasts					
	Mean	Std. De	Age	Tenure	Language	Function	Personalit	Goal
Gender	2.09	0.808	-0.32**	-0.88**	-1.00**	-1.33**	-1.74**	-2.11**
Age	2.41	0.917		-0.56**	-0.68**	-1.01**	-1.38**	-1.79**
Tenure	2.97	1.09			-0.12	-0.45**	-0.84**	-1.23**
Language	3.09	1.055				-0.33*	-0.67**	-1.11**
Function	3.43	0.947					-0.41**	-0.77**
Personality	3.82	0.805						-0.38**
Goal	4.20	0.678						

*p < .05; ** p < .01

PARC