Curtin Graduate School of Business

The Impact of Team Design on Team Innovations for Organisational Performance: The Case of Parallel Teams in Malaysia

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Doctor of Philosophy
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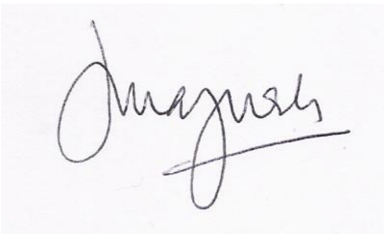
Declaration

To the best of my knowledge and belief, this dissertation contains no materials that been previously published by any other person except where due acknowledgement has been made.

This dissertation contains no material which has been accepted for the award of any other degree or diploma in any university.



Maznah Abdullah

11 November, 2014

Dedication

To my beloved family:

Rahime Bin Kasim
Rahiman Mukhriz Bin Rahime

Thank you for the love and laughter, which are so accommodating. I hope this journey inspires us to be more organised and well prepared for balanced prosperity in this world and hereafter.

To my late parents in memories:

Abdullah Bin Idris
Kamariah Binti Yaacob

Your life enthusiasm is always with me in spirit.

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Table of Content

Declaration ... i
Dedication ... ii
Acknowledgements ... iii
Table of Content ... v
List of Tables ... x
List of Figures ... xii
List of Abbreviations ... xiii
Abstract ... xiv

Chapter 1: Introduction ... 1
1.1 Research Overview ... 1
1.2 Research Background ... 3
1.3 Research Questions and Objectives ... 8
1.4 Research Significance ... 10
1.4.1 Contribution to Theory ... 10
1.4.2 Contribution to Practice ... 11
1.5 Structure of the Thesis ... 11
1.6 Summary ... 13

Chapter 2: Literature Review ... 14
2.1 Introduction ... 14
2.2 Team Innovation ... 15
2.3 Team Design ... 16
2.3.1 Team Composition ... 16
2.3.2 Task Design ... 21
2.3.3 Teams' Organisational Context ... 25
2.4 Team Climate-for-Innovation ... 32
2.5 Team Reflexivity ... 35
2.5.1 Reflexivity as a Mediating Variable ... 37
2.6 Team Innovation and Operational-Organisational Performance. ... 39
2.7 Development of Preliminary Research Model ... 40
2.8 Summary ... 41

Chapter 3: Research Methodology ... 43
3.1 Introduction ... 43
3.2 Research Paradigm ... 43
3.3 Research Design ... 45
3.3.1 Mixed-method Research Design ... 45
3.4 Research Process ... 47
3.4.1 Literature Review ... 48
3.4.2 Developing Preliminary Research Model ... 48
3.4.3 Qualitative Field-study ... 48
3.4.4 Developing Comprehensive Research Model ... 52
3.4.5 Hypotheses Development ... 53

3.4.6 Research Questionnaire Development ... 53
3.4.7 Pre-test and Pilot-test of Questionnaire. ... 53
3.4.8 Main Survey ... 55
3.4.9 Quantitative Data Analysis ... 57
3.4.10 Interpretation of the Findings ... 66
3.5 Summary ... 66

Chapter 4: Findings of the Qualitative Field Studies ... 68
4.1 Introduction ... 68
4.2 Qualitative Findings ... 69
4.2.1 Demographic Information ... 69
4.2.2 Factors and Variables ... 71
4.2.3 Expected Links Among the Factors ... 78
4.3 The Qualitative Field-study Model ... 91
4.4 Comparison Between Qualitative Field-study and Preliminary Model ... 93
4.5 Justification of Three factors that Emerged from the Qualitative Field-study. ... 93
4.5.1 Team Task Interest ... 94
4.5.2 Support from Departmental Head ... 95
4.5.3 Networking with Relevant Departments ... 97
4.6 The Comprehensive Research Model ... 98
4.7 Summary ... 99

Chapter 5: Hypotheses Development ... 101
5.1 Introduction ... 101
5.2 Hypotheses Related to Team Composition ... 101
5.2.1 Bio-demographic Diversity ... 102
5.2.2 Task-related Diversity ... 104
5.2.3 Team Interest ... 107
5.3 Hypotheses Related to Task-design. ... 108
5.3.1 Task Meaningfulness ... 108
5.3.2 Task Autonomy ... 109
5.3.3 Intra-team Coordination ... 109
5.4 Hypotheses Related to Organisational Context. ... 110
5.4.1 Team Leadership ... 110
5.4.2 Training ... 113
5.4.3 Organisational Reward and Recognition ... 114
5.4.4 Support From Head of Department ... 114
5.4.5 Networking with Relevant Departments ... 116
5.5 Hypotheses Related to Team-climate-for-innovation ... 117
5.6 Hypotheses Related to Team Reflexivity ... 119
5.7 Mediation Hypotheses ... 121
5.8 Hypotheses Related to Team Innovation and Operational-Organisational Performance. ... 125
5.9 Summary of Hypotheses ... 126
5.10 Summary ... 129

Chapter 6: Questionnaire Development 132
6.1 Introduction 132
6.2 Overview of the Questionnaire 132
6.3 Questionnaire Development Set-A: Team Members 134
6.3.1 Section A: Task Design 134
6.3.2 Section B: Organisational Context 136
6.3.3 Section C: Team Process 140
6.3.4 Section D: Team Composition 142
6.4 Questionnaire Development Set B: Departmental Managers 143
6.4.1 Section A: Team Innovation 143
6.4.2 Section B: Operational Performance 144
6.4.3 Section C: Organisational Performance 145
6.5 Questionnaire Modifications 147
6.5.1 Pre-test Outcomes 147
6.5.2 Pilot-test Outcomes 148
6.6 Summary 151

Chapter 7: Quantitative Data Analysis with PLS-based SEM 153
7.1 Overview 153
7.2 Survey Response Rate 153
7.3 Descriptive Information of the Survey Respondents 154
7.3.1 Industrial Sectors of Teams 154
7.3.2 Gender of Team Members 155
7.3.3 Age of Team Members 155
7.3.4 Team Members' Education Level 155
7.3.5 Level of Management 156
7.3.6 Organisational Tenure 156
7.4 Pre-analyses in the PLS-Graph 157
7.4.1 Aggregation of Individual-level to Team-level Data. 157
7.4.2 Diversity Calculation 158
7.5 Data Analyses in PLS-Graph 159
7.5.1 Stage 1: Assessment of the Measurement Model 160
7.5.2 Stage 2: Assessment of the Structural Model 166
7.6 Summary 181

Chapter 8: Discussion 182
8.1 Introduction 182
8.2 Discussion Related to the Influence of Team Composition 182
8.2.1 Hypothesis H1a 182
8.2.2 Hypothesis H1b 183
8.2.3 Hypothesis H2a 184
8.2.4 Hypothesis H2b 185
8.2.5 Hypothesis H3a 186
8.2.6 Hypothesis H3b 187
8.2.7 Hypothesis H3c 188
8.2.8 Hypothesis H4 189
8.3 Discussion Related to Task-design 190

8.3.1 Hypothesis H5 ... 190
8.3.2 Hypothesis H6 ... 191
8.3.3 Hypothesis H7 ... 192
8.4 Discussion Related to Organisational Context ... 193
8.4.1 Hypotheses H8a, H8b and H8c ... 193
8.4.2 Hypothesis H9 ... 194
8.4.3 Hypothesis H10 ... 195
8.4.4 Hypothesis H11 ... 196
8.4.5 Hypothesis H12 ... 196
8.5 Discussion Related to Team's Climate-for-innovation ... 197
8.5.1 Hypothesis H13 ... 197
8.5.2 Hypothesis H14 ... 198
8.5.3 Hypothesis H15 ... 199
8.6 Discussion Related to Team Reflexivity ... 199
8.6.1 Hypothesis H16 ... 199
8.6.2 Hypotheses H17 and H18 ... 200
8.7 Discussion Related to the Mediating Role of Team Reflexivity. ... 201
8.7.1 Hypotheses H19/m/a and H19/m/b ... 201
8.7.2 Hypotheses H19/m/c, H19/m/d and H19/m/e ... 202
8.7.3 Hypothesis H19/m/f ... 203
8.7.4 Hypothesis H19/m/g ... 204
8.7.5 Hypothesis H19/m/h ... 205
8.7.6 Hypothesis H19/m/i ... 206
8.7.7 Hypothesis H19/m/j ... 207
8.7.8 Hypothesis H19/m/k ... 208
8.7.9 Hypothesis H19/m/l ... 209
8.7.10 Hypothesis H19/m/m ... 210
8.7.11 Hypothesis H19/m/n ... 211
8.8 Discussion Related to the Influence of Parallel-teams' Innovation on Operational and Organisational Performance. ... 212
8.8.1 Hypotheses H20a and H20b ... 212
8.9 Summary ... 213

Chapter 9: Conclusion and Future Research ... 215
9.1 Introduction ... 215
9.2 Summary of the Research ... 215
9.3 Research Contributions ... 218
9.3.1 Theoretical Contributions ... 218
9.3.2 Practical Contributions to Malaysian Organisations ... 221
9.3.3 Implications for Manager, Team Leaders and Consultant of Malaysian Parallel-teams. ... 222
9.4 Research Limitations ... 223
9.5 Future Directions ... 224
9.6 Summary ... 226

References..227

Appendix A1: Interview Questions (FOR TEAM MEMBERS)..261
Appendix A2: Interview Questions (FOR TEAM LEADERS)...263
Appendix A3: Interview Questions (FOR DEPARTMENTAL MANAGERS)...................264
Appendix B: Individual-team Research Model...265
Appendix C1: Questionnaire Set A (For Team Member)...273
Appendix C2: Questionnaire Set B (For Departmental Manager)...279
Appendix D: Interviewee Information Sheet..281
Appendix E: Interviewee Consent Form..282
Appendix F: Questionnaire-Participant Information Sheet..283
Appendix G: Teams Diversity Values..284
Appendix H1: Item-level Discriminant Validity (1st run)...288
Appendix H2: Item-level Discriminant Validity (2nd run)..291
Appendix I: Dawson's Selection Rate..294

List of Tables

Table 1.1: Structure of the Thesis 12
Table 3.1: Mediation Types 65
Table 4.1: Demographic Information of Team Members 69
Table 4.2: Demographic Information of Team Leaders 70
Table 4.3: Demographic Information of Departmental Managers 70
Table 4.4: Factors and Variables from the Interviews 71
Table 4.5: Expected Relationships Among Factors 78
Table 4.6: Literature References for Three New Factors 94
Table 5.1: List of Direct Hypotheses 127
Table 5.2: List of Moderating and Mediating Hypotheses 128
Table 6.1: Measurement Items for Task Design 135
Table 6.2: Measurement Items for Transformational Leadership 136
Table 6.3: Measurement Items for Organisational Reward / recognition 137
Table 6.4: Measurement Items for Training 138
Table 6.5: Measurement Items for Support from Head of Department 138
Table 6.6: Measurement Items for Team Networking with Other Departments 139
Table 6.7: Measurement Items for Team Reflexivity 141
Table 6.8: Measurement Items for Team-climate-for-innovation 141
Table 6.9: Measurement Items for Team Interest 142
Table 6.10: Measurement Items for Team Innovation 144
Table 6.11: Measurement Items for Operational Performance 145
Table 6.12: Measurement Items for Organisational Performance 145
Table 6.13: Pilot-test Highlights: Measurement Item for 'Organisational Reward/Recognition' 149
Table 6.14: Pilot-test Highlights: Measurement Items for 'Team Reflexivity' 149
Table 7.1: Industrial Sector of Teams 154
Table 7.2: Gender of Team Members 155

Table 7.3: Age of Team Members 155
Table 7.4: Team members' Educational Level 156
Table 7.5: Management Level of Team Members 156
Table 7.6: Organisational Tenure of Team Members 156
Table 7.7: Mean of Inter-rater Agreement - R*wg(j) 157
Table 7.8: Item Reliability. 161
Table 7.9: Internal Consistency & AVE Values for Each Construct. 163
Table 7.10: Construct-level Discriminant Validity 165
Table 7.11: R-square Values for Endogenous Construct 166
Table 7.12: Path Coefficient (β) and T-value for Direct Hypotheses 167
Table 7.13: Moderating Effect Test Results 171
Table 7.14: Mediating Effect Test Results 172
Table 7.15: Mediation Effect Results Tested Individually 179

List of Figures

Figure 1-1: The Main Part of the Heuristic Model of Team Effectiveness 4

Figure 2-1: The Major Constructs Reviewed... 14

Figure 2-2: Preliminary Research Model.. 42

Figure 3-1: The Sequences of the Research Process 47

Figure 3-2: Main Steps in Quantitative Data Analyses 58

Figure 4-1: Qualitative field-study Research Model 92

Figure 4-2: Comprehensive Research Model 100

Figure 5-1: Direct Hypotheses 130

Figure 5-2: Moderating and Mediating Hypotheses 131

Figure 7-1: The Two-stage Analysis process.. 159

Figure 7-2: Illustration for Direct Hypotheses Results 169

Figure 7-3: Results Illustration for Moderation Analyses 171

Figure 7-4: Results Illustrations for Mediation Analyses Related to Team Composition..... 175

Figure 7-5: Results Illustrations for Mediation Analyses Related to Task Design............... 176

Figure 7-6: Results Illustrations for Mediation Analyses Related to Organisational Context 177

Figure 7-7: Result Illustration for Mediation Analyses Related to Climates Dimensions 178

List of Abbreviations

AVE: average variance extracted

ICC: innovative creative circle

IPO: input-process-outcome

MPC: Malaysia Productivity Corporation

SPSS: statistical package for social science

PLS: partial least squares

SEM: structural equation modelling

QC: quality circle

QCC: quality control circle

R&D: research and development

TMT: top management team

Abstract

Organisational theories emphasise that team design factors do not influence team innovation directly. Rather, these factors influence team innovation through emergent states and team processes, which are operationalised in this research as a team's climate-for-innovation and team reflexivity.

This research investigated how team design factors relate to a team's climate-for-innovation and team reflexivity to produce team innovation. Specifically, it explored which factors of team design are directly related to the dimensions of innovative climates and team reflexivity. The mediating role of team reflexivity was also examined. Since parallel teams have not often been used as the research context in previous studies, they became the focus of this research. This study subsequently also investigated the contribution of innovations at the parallel-team level to operational and organisational performances.

Based on a comprehensive literature review, the research focus was illustrated through a preliminary research model. The research used a mixed-method approach under the 'qual→QUAN' sequential strand which involved a minor qualitative study followed by a major quantitative study. In the qualitative phase, semi-structured interviews were conducted with twenty-eight members and eight leaders of parallel teams, as well as their eight respective departmental managers in Malaysian organisations. The results from the qualitative phase helped to fine-tune the preliminary research model in order to develop a comprehensive research model. The comprehensive research model was analysed quantitatively, based on the questionnaire responses from 188 teams. The unit of analysis was at the team-level and all the quantitative analyses were conducted by using partial least squares (PLS) based structural equation modelling (SEM).

The results supported parts of the hypotheses. Gender diversity, task meaningfulness, intra-team coordination, training, transformational leadership and support from a departmental head were found to have a robust influence on team's innovation climate and reflexivity as hypothesised. However, this research did not find evidence that team reflexivity is an interactive process that converts the benefits of team design into team innovation. The relationship between team reflexivity and team innovation was also not found to be moderated by team's climate-for-excellence. Innovation at the parallel-team level was shown to have significant influence on operational performance, which subsequently enhanced organisational performance. Overall, this research contributes to the theories by demonstrating how team design could be related to four dimensions of climate-for-innovation and reflexivity to influence innovation in a parallel-team. These information are thus practically useful to the managers and leaders in formulating a design of their parallel-teams for a higher innovation level. As this research was subject to several limitations, some recommendations for further research were developed in order to suggest ways this research could be extended in the future.

Chapter 1: Introduction[1]

1.1 Research Overview

Contemporary organisations do not only produce products and services; they must also ensure their products and services are continuously improved to retain their customers' loyalty in a competitive market. Organisational innovation is one of the core activities to improve organisations' competitiveness. Consequently, much attention has been given by researchers to identify the antecedents of innovation at the organisational level (for a review, see Hulsheger, Anderson & Salgado, 2009).

However, scholars stress that organisational innovations do not occur naturally. There must be a group of employees who exert effort to investigate problems and solutions, and to plan and implement innovations in response to these problems. Once this implementation has occurred, the results of the innovation become visible at the organisational level. Based on this, it can be argued that research focused solely on the organisational level overlooks the important role played by the team that actually engages directly with idea generation and implementation to enable organisational innovation (Hulsheger, Anderson & Salgado, 2009; Taggar, 2002). This argument has caused many organisational psychologists to shift their

[1]This chapter has been published in:

Abdullah, M, and M. Quaddus. (2011). "*The Next Little Affair in Team Innovation Research*" In World Business and Economics Research Conference, Auckland.

research focus from the organisational level to the team level (Anderson, de Drew & Nijstad, 2004). Moreover, an understanding of how a team actually develops innovations will provide a better understanding of organisational innovation (Caldwell & O'Reilly Iii, 2003).

This shift in focus has resulted in substantial findings regarding team innovation antecedents. Team composition, task structure and organisational context are the most common antecedents that have been postulated to influence team innovation (see Hulsheger, Anderson & Salgado, 2009; Stewart, 2006; Cohen & Bailey, 1997) and team effectiveness (Gladstein, 1984; Hackman, 1987; Tannenbaum, Beard & Salas, 1992; West, Borrill & Unsworth, 1998). All these factors were termed 'team design' by Cohen and Bailey (1997), who described them as the team properties that are under the immediate control of an organisation and that influence team outcomes.

It has been suggested that the influence of team design on team innovation occurs through a team's 'emergent states' and 'interaction process' which could be represented by a team's 'climate-for-innovation' and 'team reflexivity' variables. However, research that has used both variables to demonstrate the impact of team design on team innovation is still uncommon and limited to very few dimensions. Consequently, there is a gap between theory and practice in understanding how team design actually influences team innovation, especially in the parallel-team context.

Parallel teams have been widely used in many organisations to improve operational and organisational performance. However, the extent to which innovation at the parallel team level improves operational and organisational performance has never been examined. Therefore, the focus of this research was to investigate how and to what extent team design is related to dimensions of team's climate-for-innovation and team reflexivity to explain team innovation. It additionally examined the contribution of innovation within parallel teams to improve operational and organisational performance.

The research background presented in the following section details the research development of team innovation and some of the issues that inspired this research. Following this, the research objectives, significance of the research and thesis structure are specified.

1.2 Research Background

Despite various studies predicting variables related to team innovation, Antoni and Hertel (2009) highlighted that researchers should not be too preoccupied with detecting direct antecedent factors for team innovation. Instead, they advocated that researchers should demonstrate how and why these factors influence team innovation. It is important to understand how these factors may have an indirect relationship with team innovation because team innovation does not result linearly from the antecedent factors (Bain, Mann & Pirola-Merlo, 2001). Rather, the influences of team antecedents on team innovation take place via its relationships with a team's emergent states and processes (Cohen & Bailey, 1997; Marks, Mathieu & Zaccaro, 2001).

A team's emergent states were defined by Marks, Mathieu and Zaccaro (2001) as a condition in a team concerning the qualities of team members' perceptions, attitudes, values, cognitions and motivations. They are dynamic and likely to change according to the team's context and may serve as inputs to influence the execution of team processes. Marks, Mathieu and Zaccaro (2001) emphasised that emergent state is an accurate term to describe what was previously termed as the 'psychosocial trait' by Cohen and Bailey (1997). To acknowledge both these researchers' opinions, both terms were used interchangeably in this research.

Marks, Mathieu and Zaccaro (2001, p. 357) defined team process as '*members' interdependent acts that convert team inputs to outcomes through cognitive, verbal, and behavioral activities directed toward organizing task work to achieve collective goals*'. Team process describes interactions between team members that can influence team innovation (West, 2002; Marks, Mathieu & Zaccaro, 2001; Nijstad & de Dreu, 2002; Taggar, 2002). In an input-process-outcome (I-P-O) framework, Marks, Mathieu and Zaccaro (2001) viewed the team process as a mediating mechanism that links team composition with team outcomes. (In this study, team outcomes refer to team innovation).

The influence of team design on emergent states and team process to influence team innovation has been conceptually demonstrated in the main part of the heuristic framework of team effectiveness by Cohen and Bailey (1997), which is summarised in Figure 1-1.

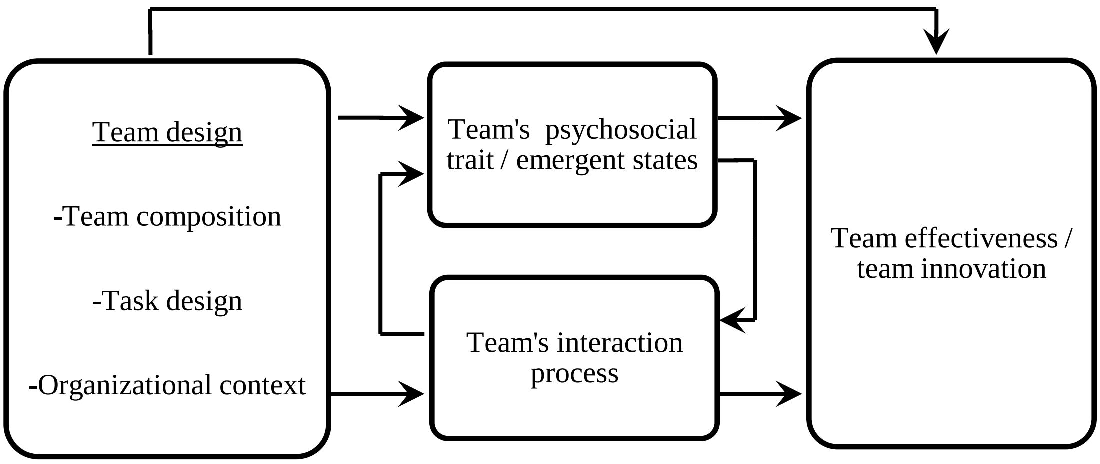


Figure 1-1: The Main Part of the Heuristic Model of Team Effectiveness
Source: adapted from Cohen and Bailey (1997).

Figure 1-1 demonstrates that team design does not only directly influence team effectiveness, but also indirectly influences it through the team's psychosocial traits and interaction process.

At the same time, a team's psychosocial traits and interaction process may influence each other. This heuristic framework has been supported and proposed by many scholars in team innovation such as Nijstad and De Dreu (2002), West et al (2004) and Antoni and Hertel (2009). The theories of team effectiveness are applicable in this research with regard to team innovation, as Cohen and Bailey (1997) highlighted team innovation is one of the dimensions of team effectiveness.

The literature suggests that a team's emergent state and interaction process can be explained by the team's climate-for-innovation (West, 1990) and reflexivity (West et al., 2004), respectively. Although many other constructs could measure the emergent state and interaction process in a team, this research only considers climate-for-innovation for the former and team reflexivity for the latter. This is because these have frequently been found to be directly related to team innovation.

A team's climate-for-innovation has generally been defined as the shared perceptions at the team level of the extent to which the condition in a team facilitates innovation (Anderson & West, 1994). West (1990) proposed that a team's climate-for-innovation could be described by the four factor climate dimensions i.e. 'vision, participation safety, climate for excellence and support for innovation'.

Vision climate is a condition that emphasises a goal that is clear, valuable, attainable and congruent with the values of team members (West, 1990). Participation safety climate is characterised by team members' perceptions of a safe and comfortable environment in which to participate, hence it affects active task-related interactions among team members. Climate for excellence describes a general commitment among team members towards high quality in task performance. It is evidenced by an emphasis in a team for evaluating and modifying performance, mutual monitoring, exploration of opposing opinions and a concern to maximise the quality of task performance (Tjosvold, 1982; West, 1990). Support for innovation climate is concerned with the practical support that is necessary for team innovation being received from team members or the organisation.

Team reflexivity refers to the extent to which team members discuss task-related issues to accomplish their team's goal and ensure their effectiveness in working together (West, 2000). Reflexivity is expected to mediate the relationship between diversity and team outcomes (Schippers, Deanne, et al., 2003; Williams & O'Reilly, 1998b). This proposition was corroborated by categorization-elaboration model (van Knippenberg, De Dreu & Homan, 2004) which asserts that every dimension of team diversity stimulates innovation through task-relevant communication among group members.

Although a team's climate-for-innovation and team reflexivity are common in team innovation research, very rarely has research considered both variables to represent emergent states and interaction process to demonstrate the impact of team design on team innovation. Antoni and Hertel (2009) and Hulsheger, Anderson and Salgado (2009) highlighted that this area has not been fully addressed even in leading studies. These are explained further next.

With regard to a team's climate-for-innovation, extant research has extensively demonstrated its relation to team innovation (for example, West & Anderson, 1996; Bain, Mann & Pirola-Merlo, 2001; Proudfoot et al., 2007; Pirola-Merlo, 2010). Climate-for-innovation has not always been tested as an antecedent for interaction process as was suggested in the framework by Cohen and Bailey (1997). For example, Curral, Forrester, Dawson, and West et al. (2001) analysed how task characteristics are associated with a team's climate-for-innovation. However they did not consider the effects that innovation climate could have on team interaction in influencing team innovation.

Team reflexivity has frequently been tested as an antecedent to team innovation (for example, West & Anderson, 1996; Hoegl & Parboteeah, 2006; Dayan & Basarir, 2010) and as being dependent on a team's contextual variables (Dayan & Basarir, 2010; Campion, Papper & Medsker, 1996). It has not always been tested as a team process that mediates the relationship between team design and team innovation. The mediating role of team reflexivity has been proven only in studies by Tjosvold et al. (2004), Schippers et al. (2003), Hammedi, van Riel, and Sasovova (2011) and Les Tien-Shang and Sukoco (2011).

None of the studies mentioned above integrated both variables or performed complete analyses to demonstrate how team design may be related to a team's climate-for-innovation, which in turn influences team reflexivity to result in team innovation. Such analyses have thus far only been identified in the study by Schippers, Den Hartog, Koopman, and Van Knippenberg (2008), which demonstrated the influence of team design on team innovation through a team's innovation climate and team reflexivity. However, this study's tests were performed on only a small fraction of team design and team innovation climate i.e. team leadership for the former and a team's vision climate for the latter.

Another concern of this research is the type of team used as the research context. Many previous studies focused more on work-teams when discussing the factors/design for team effectiveness and innovation. There has not been much research done in the context of parallel teams (for a review, see Cohen and Bailey (1997), Stewart (2006), Mathieu et al. (2008)). A parallel team is one of the team types in an organisation. It consists of people from the same or different units who gather to generate improvements or solve problems in a unit or an organisation (Cohen & Bailey, 1997). Examples of parallel teams include problem-solving teams and quality circles (QCs). Given that this is the context in which innovation is most likely to flourish (Hanna, Newman & Johnson, 2000; Barrick & Alexander, 1987), this was chosen as the focus for this research.

The next focus was the link between team outcomes and organisational performance, which the pre-existing evidence to support this link is considered inadequate (Delarue et al., 2008). Although parallel teams have been used in many organisations as a strategy to improve operational and organisational competitiveness (e.g. Glassop, 2002; Barrick & Alexander, 1987; Hanna, Newman & Johnson, 2000; Delarue et al., 2008), the relationship between team innovation, operational and organisational performance has been frequently examined only in the context of the top management team (TMT) level. This is due to a direct alignment between the functions of TMT and organisational outcomes (Mathieu et al., 2008). As an alternative, this research responded to the suggestion by Mathieu, Maynard, Rapp et al (2008) to investigate this link in different types of teams such as parallel-teams.

In view of the above, this research sought to demonstrate how team design might be related to dimensions of team’s climate-for-innovation and team reflexivity in influencing team innovation. It additionally investigated the contributions of innovation at the parallel-team level to operational and organisational performance. The next section highlights the questions and objectives of this research.

1.3 Research Questions and Objectives

As described earlier, the issue of how team design might be related to a team’s climate-for-innovation and team reflexivity to influence team innovation has not been adequately demonstrated and tested. The empirical evidence for the mediating role of team reflexivity is still vague. Additionally, the extant research that integrates team outcomes with operational and organisational performance is only limited to the TMT level, and has not been tested at the parallel-team level. Based on this, the main research questions of this study were as follows:

RQ1: How and to what extent is the team design—namely, team composition, task design and organisational context—related to a team's climate-for-innovation and team reflexivity in influencing team innovation?

RQ2: How and to what extent is innovation at the parallel-team level perceived to improve operational and organisational performance?

Specifically, the above research questions led to the following objectives:

R.O 1: To investigate *how* and *to what extent* team composition is related to a team's climate-for-innovation and team reflexivity in influencing team innovation.

R.O 2: To investigate *how* and *to what extent* task design is related to a team's climate-for-innovation and team reflexivity in influencing team innovation.

R.O 3: To investigate *how* and *to what extent* organisational context is related to a team's climate-for-innovation and team reflexivity in influencing team innovation.

R.O 4: To investigate the mediating role of team reflexivity.

R.O 5: To examine how and to what extent innovation at the parallel-team level is perceived to improve operational and organisational performance.

1.4 Research Significance

This research is both theoretically and practically significant, as it outlined in the following sections.

1.4.1 Contribution to Theory

While previous research has given more attention to work-teams, TMTs and project-teams, this research sheds light on parallel-teams. The results of this research are significant because analysis of the impact of team design on the team processes and outcomes of different types of teams—with different task structures and organisational contexts—provides core knowledge about teamwork, which is necessary to establish effective teams within organisations (Antoni & Hertel, 2009). This was emphasised by Cohen and Bailey (1997), who asserted the importance of understanding the antecedents of different type of teams.

Previous studies related to team innovation have identified team design as the prominent team input, but have not provided adequate demonstration of its interaction with a team's emergent states and interaction processes. Thus, it remains unclear how team designs are related to team's climate-for-innovation and team reflexivity in influencing team innovation. Frequently, team's climate-for-innovation and team reflexivity have been tested as a team input. However, in the IPO framework, research that performs a full test of the interaction between team design and team process is rare (Antoni & Hertel, 2009; Hulsheger, Anderson & Salgado, 2009). Therefore, in line with the IPO framework, this research delineated how team design as the team input (I) influenced team's climate-for-innovation and team reflexivity as the team process (P) to result in team innovation as the team outcome (O). Simultaneously, the inclusion of team reflexivity as team process (P) in the IPO framework informed the underlying theoretical base regarding its determinants which is still inadequately researched in previous studies (Schippers et al., 2008).

In responding to Delarue et al.'s (2008) suggestion, this research sought to empirically strengthen a theory of integration between team outcomes and organisational performance. To date, this integration has only been extensively tested primarily in the context of TMTs. Mathieu et al. (2008) highly recommended that this integration should be explored in other types of teams. Thus, this research sought to shed light on the above theory in the context of parallel-teams.

1.4.2 Contribution to Practice

In practical terms, this research sought to provide information how the design of parallel-team may influence team's climate-for-innovation and team reflexivity to result in team innovation. This information is useful for enhancing internal efficiency for innovation because it provides team leaders and managers with understandings regarding the creation of favourable conditions to allow creativity and innovation to flourish (Mumford et al., 2002). Consequently, team resources are likely to be used more effectively. Practitioners and consultants specialising in innovation within parallel teams are expected to benefit from the findings of this study.

1.5 Structure of the Thesis

This research is reported in nine chapters. Table 1.1 below summarises the structure of this thesis.

Table 1.1: Structure of the Thesis

Chapter	Description
Chapter 1	Introduction
Chapter 2	Literature review
Chapter 3	Research methodology
Chapter 4	Findings from the qualitative field-study
Chapter 5	Research hypotheses development
Chapter 6	Questionnaire development
Chapter 7	Quantitative data analysis with partial least square (PLS)
Chapter 8	Findings discussion
Chapter 9	Conclusions and suggestions for future research

Following this introductory chapter, this thesis provides a comprehensive literature review of the concepts and constructs used in this research. It also highlights the knowledge gaps that inspired this research. Based on the literature, a preliminary research model is developed to illustrate the research focus.

Chapter 3 then presents a detailed description of the research methodology. The first sections explain the paradigm and mixed-method research design used in this research. Since this research used a mixed-method design that combined qualitative and quantitative studies, all the procedures for each method—such as sampling, data collection and data analyses—are described.

Chapter 4 provides an in-depth description of the qualitative findings that were obtained from face-to-face interviews with team members, team leaders and departmental managers. This chapter specifies how the qualitative research model was developed, compared and combined with the preliminary research model to form a comprehensive research model as the main foundation for the quantitative study.

Chapter 5 provides justification and presents the development of the research hypotheses to address the research questions.

Chapter 6 then presents the two sets of questionnaires that were developed to collect the quantitative data for statistical tests of the reliability and validity of the hypotheses. The results of the questionnaire pre-test and pilot-test are also presented in this chapter.

Chapter 7 focuses on the data analyses. It begins by presenting the demographic information of the sample population, as well as simple descriptive statistics from the data set. This chapter details how PLS-based structural equation modeling (SEM) was used to analyse the data. It also presents the statistical results.

The statistical results for each hypothesis in Chapter 7 are discussed further in Chapter 8. It also presents supplementary analyses that were conducted whenever necessary for further understandings.

Finally, Chapter 9 presents a summary of this research and its limitations. The contribution of this study and suggested directions for future research are also identified.

1.6 Summary

This chapter provided the theoretical background that inspired the undertaking of this research. It also outlined the main research questions and objectives, and explained the expected contributions of this research. The final section summarised the structure of this thesis.

Chapter 2: Literature Review

2.1 Introduction

Chapter 1 established that team design can directly influence a team's climate and reflexivity, and subsequently influence team innovation, which in turn affects operational and organisational performance. Thus, it was important to conduct a relevant literature review to understand the concept of each related construct. The major constructs reviewed in this chapter were summarised in Figure 2-1.

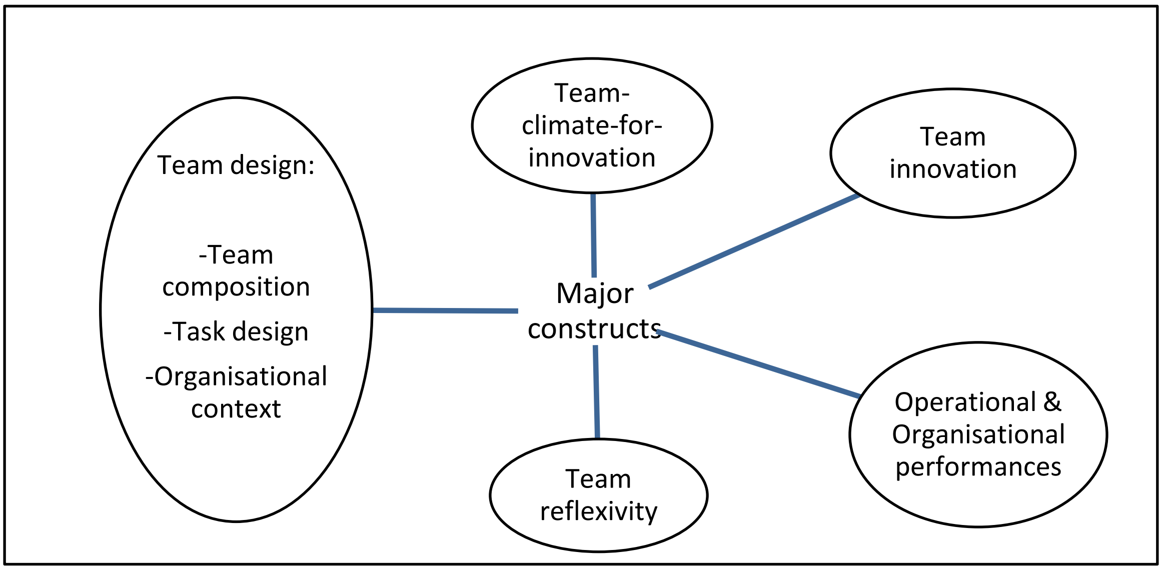


Figure 2-1: The Major Constructs Reviewed

The remainder of this chapter examines each of these constructs and highlights the gaps in the literature that inspired this research. Based on this, the research focus is established and illustrated in Figure 2-2 (provided at the end of this chapter), which acts as the preliminary research model. As team innovation is the core focus of this research, the next section begins with a description of this.

2.2 Team Innovation

Innovation involves the initiation or discovery of an idea, technology or process that is new to the organisational setting and followed by the implementation of that idea (Amabile, 1988; Dougherty & Hardy, 1996; Kanter, 1988; Klein & Sorra, 1996). To be regarded as an innovation, an idea does not have to be completely unique or distinctive. However, the idea needs to be recent to the unit or department (Zaltman, Duncan & Holbek, 1973). An idea that is adopted from outside the unit and organisation is also considered an innovation (Kanter, 1988; Van de Ven, 1986). An innovative idea can also be a new small-scale idea that is developed or adopted to improve daily work processes and work designs (Axtell et al., 2000).

A consensus has been reached around two key elements of innovation: (1) the generation of a new idea that is known as creativity; and (2) the implementation or introduction of the idea (Amabile, 1988; Woodman, Sawyer & Griffin, 1993; Wolfe, 1994; Unsworth & West, 1998; Unsworth, 1999; West & Farr, 1990a). Creativity is a subcomponent of innovation referring to idea generation. It is less complex than innovation, which consists of both creativity and implementation. However, the terms 'creativity' and 'innovation' have often been used interchangeably in previous studies (West & Farr, 1990b).

Team innovation has commonly been considered directly influenced by team design i.e. team composition, task design, and organisational context (Hulsheger, Anderson & Salgado, 2009; Stewart, 2006; Cohen & Bailey, 1997; Burpitt & Bigoness, 1997). However, the team process theory argues that team design does not always cause team innovation linearly (e.g., Bain, Mann & Pirola-Merlo, 2001; Cohen & Bailey, 1997; West & Anderson, 1996; Antoni, 2005). Rather, team design is suggested as being related to teams' emergent states and interaction processes to influence team innovation (Marks, Mathieu & Zaccaro, 2001). Although this has been highlighted more than a decade ago, not many researchers have empirically tested this theory. Previous research has focused on identifying the direct antecedents of team innovation (Antoni & Hertel, 2009). Thus, in contrast, this research sought to examine and describe how team design relates to team's climate-for-innovation and team reflexivity to influence team innovation.

2.3 Team Design

Team design was defined by Cohen and Bailey (1997, p. 243) as *" those features of the task, group and organisation that can be directly manipulated by managers to create the conditions for effective performance".* Cohen and Bailey (1997) and Stewart (2006) proposed that team design is crucial for team performance, irrespective of how the performance is measured — such as by team effectiveness, team innovation, and so forth. The literature suggests that team design is composed of three main elements: team composition, task design and organisational context.

2.3.1 Team Composition

Team composition is concerned with team members' characteristics, such as their skills, abilities, and disposition (Driskell, Hogan & Salas, 1987; Hollenbeck et al., 1995; Tesluk & Mathieu, 1999). It is about a diversity that considers the extent to which team members are demographically similar or different, such as in their gender, ethnicity, age, education and experience (Jackson, May & Whitney, 1995).

Diversity is normally described in terms of the visibility of differences. Visible diversity refers to a team's characteristics that can be understood immediately upon first viewing, such as age and gender (Hicks-Clarke & lles, 2000). Less-visible diversity refers to a team's characteristics that cannot be understood upon first viewing, such as the level of education and organisational tenure (Thatcher & Jehn, 1998; Williams & O'Reilly, 1998b; Tsui, Egan & O'Reilly, 1992). Recently, Horwitz and Horwitz (2007) labelled visible and less-visible diversity as 'bio-demographic' and 'task-related' diversity respectively.

2.3.1.1 Bio-demographic Diversity

Bio-demographic diversity is regarded as essential to trigger cognitive resources which are crucial for team innovation (see Jackson, 1992; Milliken & Martins, 1996; Williams & O'Reilly, 1998a). For example, age heterogeneity signifies the mix of knowledge and experiences gained by team members during their careers. Knowledge and experience improves team performance (e.g. Kilduff, Angelmar & Mehra, 2000) and team innovation (Cox & Blake, 1991; Pelled, 1996; Lawrence, 1988; Amabile et al., 1996; Gilson, 2001; Rogelberg & Rumery, 1996). However, in some studies, age diversity was not found to be significant (Bunderson & Sutcliffe, 2002; Simons, Pelled & Smith, 1999) and negatively influenced team performance (Ely, 2004; Leonard, Levine & Joshi, 2004; Timmerman, 2000). Social theory about conflict has theorised that diversity in bio-demographic variables deteriorated a team's ability to critically solve a problem. For example, Pelled (1996); Alagna et al. (1982); Wagner, Pfeffer and O'Reilly (1984); and Van der Vegt and Janssen (2003) highlighted that gender diversity causes high affective conflict that relates to negative effects, such as interpersonal disagreements, anger, distrust, fear and frustration (Schermerhorn et al., 1991; Eisenhardt & Bourgeois, 1994).

This is why homogeneous bio-demographic variables were once suggested to be more influential on team innovation. This was based on the fact that homogeneity produces a shared mental model that helps team members understand and consent to ideas (Mumford et al., 2001). Studies have found that team innovation is high in teams that are homogeneous in terms of gender and age (South, 1927; Kent & McGrath, 1969; Murnighan & Conlon., 1991; Cady & Valentine, 1999). However, the direct influence of gender and age on team innovation was also vague (Jehn & Katerina, 2004). Homogeneous bio-demographic variables have also been found to have negative effects on team innovation because team members of a similar age may have similar attitudes about work, which does not enhance work-related communication (Sessa & Jackson, 1995). It can be intuitively understood that similar attitudes do not promote team innovation because the team members are confined to similar ideas. Hentschel et al (2013) found that age and gender diversity was less influential on team performance if the teams have been together for longer periods of time. In some cases, bio-demographic variables have been identified as the factors which do not hinder team performance, however do not influence team performance (Jackson & Joshi, 2004); thus a direct influence of bio-demographic variables on team performance has been unclear (Jehn & Katerina, 2004).

A more recent perspective argues that team composition does not directly influence team innovation (Bain, Mann & Pirola-Merlo, 2001). Theories by Cohen and Bailey (1997) and Marks, Mathieu and Zaccaro (2001) highlighted that bio-demographic diversity influences team innovation through its relationship with teams' emergent states and interaction processes. It is reasonable to expect a relationship between bio-demographic variables and team interaction processes because the literature has explained that age diversity (Cox & Blake, 1991; Pelled, 1996; Amabile et al., 1996) and gender diversity (Hoffman & Maier, 1961) are related to task-related communication. The categorization-elaboration model (van

Knippenberg, De Dreu & Homan, 2004) corroborates this claim by emphasizing that each dimension of diversity within a group enhances group information processing.

In a team innovation context, task-related communication is reflected in team reflexivity (Schippers, Deanne, et al., 2003; Tjosvold, Tang & West, 2004; Hoegl & Parboteeah, 2006; Johnson & Johnson, 1987). Despite this possible influence, previous research has focused extensively on examining the direct influence of bio-demographics on team performance or team innovation, rather than its relationship with the interactions among team members. Thus, in contrast, this research examined the relationship between age and gender diversity, with team reflexivity as a basis to describe how they influence team innovation.

2.3.1.2 Task-related diversity

Task-related diversity is concerned with the characteristics of team members that have an immediate association with tasks (Milliken & Martins, 1996; Pelled, Eisenhardt & Xin, 1999; Cohen & Levinthal, 1990; Sessa & Jackson, 1995). Individuals' education, functional background (the department in which they work), and organisational tenure are the task-related variables frequently postulated to influence team innovation.

Task-related diversity is believed to lead to different perspectives that inspired team members with information and ideas that enhance team innovation (Amabile, 1983; Jehn, Northcraft & Neale, 1999; Northcraft et al., 1995; Kickul & Gundry, 2001; Schwenk & Cosier, 1980). For example, educational diversity among team members has been found to improve team innovation because it increases the ability for problem-solving (Cohen & Levinthal, 1990). A diverse functional background has been suggested to lead to diversity in skills, information and expertise, which leads to team innovation (Bunderson & Sutcliffe, 2002; Carpenter, 2002; Pitcher, 2000). Hoever et al (2012) found that different perspectives resulted from functional diversity was significant to the constructive discussion on ideas among team members. Organisational tenure diversity is believed to trigger experiences in solving various problems which in turn promotes team innovation.

Task-related diversity has also been posited to influence team innovation by providing a team with cognitive diversity in knowledge, values and skills leading to different perspectives that are believed to increase the likelihood of the team generating new ideas (Van der Vegt & Janssen, 2003; McGrath, Berdahl & Arrow, 1995; Perry-Smith, 2006) and solving complex problems (Bantel & Jackson, 1989; Jackson & Ruderman, 1995; Watson, Kumar & Michaelsen, 1993). Cognitive diversity has been suggested to produce premium innovative decisions through enhanced critical thinking among team members (Amason, 1996).

However, some researchers argued that task-related diversity is not perfectly associated with cognitive diversity (Bantel & Jackson, 1989; Hambrick & Mason, 1984), and the link is not linear (Kilduff, Angelmar & Mehra, 2000; Lawrence, 1997). It has been asserted that cognitive diversity can still exist when individuals have similar functional expertise backgrounds (Olson, Parayitam & Bao, 2007). Katz (1982) also highlighted that a team with long-tenured team members becomes less innovative because the habit of daily routine leads them to become less creative to generate ideas. This notion is further supported when long-tenured team members are observed to develop more homogeneous viewpoints over time (West & Anderson, 1996; Katz, 1982).

These arguments demonstrate that a direct influence of task-related diversity on team innovation is not yet confirmed. Scholars have emphasised that diversity influences team innovation through its interaction with many other factors (Williams & O'Reilly, 1998b; Bain, Mann & Pirola-Merlo, 2001). The team effectiveness theory highlights that task-related diversity influences team innovation through its relationship with emergent states or interaction processes (Cohen & Bailey, 1997; Marks, Mathieu & Zaccaro, 2001; West & Anderson, 1996). The literature also demonstrated that task-related diversity can directly influence task interaction processes (e.g. Woodman, Sawyer & Griffin, 1993; Pelled, Eisenhardt & Xin, 1999; Perry-Smith & Shalley, 2003; West, 2002; Hoever et al., 2012) that have been highlighted as team reflexivity (West, 1990). Thus, instead of focusing on whether task-related diversity has a direct influence on team innovation, this research examined whether task-related diversity has a direct influence on team reflexivity.

2.3.1.3 Team Interest

As team interest was a new factor that emerged from the qualitative field study and was not part of the preliminary research model, the literature review related to this area is located in Chapter 4. The review justifies an inclusion of this factor in the comprehensive research model.

2.3.2 Task Design

Task design makes work activities in a team different to other teams (Lawrence & Lorsch, 1967). It is seen as the principles that underlie the completion of tasks and how these tasks are coordinated (Campion, Medsker & Higgs, 1993; Cohen & Bailey, 1997; Hollenbeck et al., 1995). Task design has long been considered an important contributor to employee creativity (West & Farr, 1990b). Specifically, task design has the capacity to enhance individuals' excitement in work activities and mantain their interest in completing these activities, which eventually fosters innovation (Hackman & Oldham, 1980; Oldham &

Cummings, 1996). Stewart (2006) identified 'task meaningfulness', 'team-autonomy' and 'intra-team coordination' as the constructs of task design.

2.3.2.1 Task Meaningfulness

A task is meaningful for employees if it is characterised with 'skill variety', 'task identity' and 'task significance' (Hackman & Oldham, 1975). Skill variety concerns how much a task requires an employee to be involved in different activities. Task identity concerns opportunities for employees to be involved in the whole process of task completion, and the visibility of their effort and contribution to the final outcome. An employee is said to have a job with task identity if he or she is involved in the task from beginning to end, and is able to identify their contribution to the final product. The task has task significance if it has a positive impact on other people's work or well being.

Task meaningfulness has been commonly examined in relation to individual productivity and motivation. As a result, knowledge about the relationship between task meaningfulness and team performance was not evident until meta-analyses were undertaken by Stewart (2006). Evidence has suggested that providing individuals with meaningful tasks increases individual productivity (Fried & Ferris, 1987; Kopelman, 1986; Hackman & Oldham, 1975) because high internal motivation evolves from feeling worthwhile and important when undertaking work (Campion, Medsker & Higgs, 1993; Batt & Appelbaum, 1995). Internal motivation is believed to stimulate employees' willingness to seriously discuss their team's strategies and goals which increases task-related communication within the team.

Task design is considered important to team innovation because it helps team members be more reflexive (Lantz & Brav, 2007; West et al., 2004). This notion was supported by Cohen and Bailey (1997), who stated that task design could be directly related to a team's interaction processes. Despite of this, task meaningfulness has not been examined as a direct antecedent to team interaction processes. Thus, as a base to provide an understanding of how task meaningfulness can influence team innovation, this research examines the extent to which task meaningfulness is related to team reflexivity.

2.3.2.2 Team Autonomy

Team autonomy is concerned with the empowerment given to team members to make decisions about what, how and when their tasks should be executed (Breaugh, 1985; Evans & Fischer, 1992; Molleman, 2000). The terms 'autonomy' and 'empowerment' have been used interchangeably by many researchers (Stewart, 2006). Individual autonomy refers to the degree of freedom, independence and discretion that individuals can use when performing their tasks (Hackman & Oldham, 1975; Hackman & Oldham, 1980; Karasek, 1998), whereas team autonomy refers to the individual autonomy perceived by all the team members (Cordery, Mueller & Smith, 1991; Hackman, 1987; Kirkman & Rosen, 1999; Langfred, 2000). Although Klein and Kozlowski (2000) highlighted that constructs at the individual and team levels do not necessarily grasp the same meaning, Van Mierlo et al. (2006) showed that team autonomy was positively related to individual task autonomy.

Socio technical system theorists have also suggested that a team with a high level of task autonomy will have a high innovation level (Cooper & Foster, 1971; Emery, 1959). This is based on the premise that task autonomy makes team members experience a high self-determination (Spreitzer, 1995), which affects their attitudes and behaviours (Salancik & Pfeffer, 1977). Task autonomy, is thus considered as important to motivate employees to engage in creative and innovative behaviours (Goodman, Devadas & Hughson, 1988; Guzzo

& Dickson, 1996; Hackman, 1987; Sundstrom, DeMeuse & Futrell, 1990; Hackman & Oldham, 1980; Ramamoorthy et al., 2005).

The influence of task autonomy on team performance was empirically examined by Stewart (2006). Task autonomy has been emphasised to enhance interactions among team members thereby promoting team reflexivity (Brav, Andersson & Lantz, 2009; West et al., 2004). This aligns with theories that highlight that task design could be related to the team interaction process (Marks, Mathieu & Zaccaro, 2001; Cohen & Bailey, 1997). However, task autonomy has been frequently examined in regard to work motivation, job satisfaction, performance and psychology (Hackman & Oldham, 1975; Karasek, 1979; Warr, 1994) and other attitudinal outcomes (e.g. Argote & McGrath, 1993; Dwyer, Schwartz & Fox, 1992; Loher et al., 1985; Janz, Colquitt & Noe, 1997; Langfred, 2000; Sprigg, Jackson & Parker, 2000). As the effect of task autonomy on team reflexivity has never been examined, this research therefore explored this relationship.

2.3.2.3 Intra-team Coordination

Intra-team coordination refers to task-interdependence among team members (Saavedra, Earley & Van Dyne, 1993; Stewart, 2006; Wageman, 1995). Therefore, this research uses these two terms interchangeably wherever appropriate, according to the literature.

Teams have high intra-team coordination if team members heavily depend on each other for information, materials and reciprocal inputs during task execution (Campion, Medsker & Higgs, 1993; Emery & Trist, 1969; Van der Vegt, Emans & Van de Vliert, 1999). If task-interdependence is low, employees complete their work sharing resources largely with their colleagues (Thompson, 1967). Stewart (2006) found that high coordination was conducive for teams that deal with complex and creative work. Teams that perform routine work only require a moderate level of coordination which enables task specialisation among team members (Adler & Cole, 1993; Stewart & Barrick, 2000), provided that the task demands and environment are stable (Thompson, 1967).

Task interdependence has recently been examined as an antecedent for team innovation (Van der Vegt & Janssen, 2003). However, Bain, Mann and Pirola-Merlo (2001) argued that antecedent factors do not influence team innovation linearly. Research has shown a curvilinear relationship between intra-team coordination and team performance (e.g. Saavedra, Earley & Van Dyne, 1993; Stewart & Barrick, 2000; Wageman, 1995). Furthermore, Cohen and Bailey (1997), Antoni and Hertel (2009) and Marks, Mathieu and Zaccaro (2001) emphasised that task design might influence team innovation through its relationship with emergent states or interaction processes. Indeed, the literature has stated that intra-team coordination can improve interpersonal interaction (Johnson & Johnson, 1989), which promotes work-related communication within a team (e.g. Van der Vegt, Emans & Van de Vliert, 1999; Van der Vegt & Van de Vliert, 2002; Hulsheger, Anderson & Salgado, 2009). However, this theory has never been empirically tested. As work-related communication is important for team innovation, this research examined the relationship between intra-team coordination and team reflexivity. Thus, this research sought to demonstrate how intra-team coordination affects team innovation through team reflexivity.

2.3.3 Teams' Organisational Context

Organisational context is another important factor with which team members interact and that subsequently influences their innovative behaviour (Woodman, Sawyer & Griffin, 1993; Woodman & Schoenfeldt, 1990). Organisational context concerns the environment surrounding a team or organisation. Team leadership, training and reward are the constructs usually referenced in organisational context research (Stewart, 2006).

2.3.3.1 Team Leadership (Transformational Leadership)

Team leadership is a factor that has been found to differentiate success between teams (Bass et al., 2003). The transformational leadership style has been suggested as practical to understand how the role of the leader influences the innovative work behaviour of team members (Avolio, 1994; Bass & Riggio, 2006; Conger & Kanungo, 1992; Bass & Avolio, 1990a).

Transformational leadership was developed by Bass (1985) as being characterised by four dimensions: idealised influence, intellectual stimulation, individualised consideration and inspirational motivation (Bass & Avolio, 1994). The first three dimensions were the initial conceptualisation, while the fourth dimension was developed later (Bass & Avolio, 1990a). ‘Idealised influence’ refers to a leader’s capability to behave as a role model and be admired, respected and trusted. Idealised influence derives from a leader’s behaviour and attributions (Bass & Avolio, 1994). ‘Intellectual stimulation’ is a leader’s ability to rouse within team members an understanding of the problems with which they are working (Bass & Avolio, 1994). ‘Individualised consideration’ is a characteristic that describes a leader’s behaviour in giving attention to his team members and acknowledging the differences that exist. Through this characteristic, a leader provides team members with a desire for self-actualisation and personal growth (Bass, 1985; Bass, 1990; Felfe & Goihl, 2002). ‘Inspirational motivation’ describes a leader’s ability to create future visions that are able to inspire, motivate, convince and attract team members, which can increase team members’ efficacy (Bass, 1990; Bass & Avolio, 1994).

Previous research has provided evidence that transformational leadership is a direct antecedent to team innovation (e.g. Bass & Riggio, 2006; Burns, 1978; Tichy & Devanna, 1986; Howell & Higgins, 1990; Janssen, 2002; Keller, 2006). However, other research has found contradictory results (e.g. Jaskyte, 2004; Waldman & Atwater, 1994; Wilson-Evered, Dall & Neale, 2001; Jaussi & Dionne, 2003). Jaskyte (2004) highlighted that transformational leadership did not promote innovation because it was significantly related to cultural consensus which inhibits innovation. Additionally, Jaussi and Dionne (2003) contended that the behaviour of transformational leadership which facilitates and motivates team members by giving positive feedbacks has created a sense of overconfidence in the team, which does not encourage a team to consider a number of alternative solutions, thus negatively influence innovation.

Recently, team antecedents have been argued to have a non-linear relationship with team innovation (Bain, Mann & Pirola-Merlo, 2001; Antoni & Hertel, 2009). Therefore, the inconsistent findings in the area inspired this research to explore whether transformational leadership relates to any psychosocial and interaction processes that influence innovation, as was asserted by Cohen and Bailey (1997) and Marks, Mathieu and Zaccaro (2001). The literature highlighted that transformational leadership is related to a team's emergent states. For example, it has been evidenced to influence team outcomes by directing team members to align their values to the team's vision climate (Reuvers et al., 2008; Kark, Shamir & Chen, 2003) and to support the team's innovation climate (Eisenbeiss, van Knippenberg & Boerner, 2008; Wang et al., 2013). However, vision climate in manufacturing teams has been found to be more associated with team membership than leadership (Ingrid, Lars-Åke & Malin, 2004).

There was an empirical finding by Nembhard and Edmondson (2006) which shows that a team leader influences participation safety climate in a health care teams. Nevertheless, the finding was only in the context of leader inclusiveness which is dissimilar to transformational leadership. Leader inclusiveness refers to only behaviours that invite and appreciate others' opinions, whereas the scope of transformational leadership is beyond than that. Additionally, leader inclusiveness is directly important for a group in which power differences among members are apparent (Nembhard & Edmondson, 2006). As a context of the current study is a parallel-team, which is characterised by low power differences among members, thus this relationship was not considered as appropriate to be included in the preliminary research model.

Since previous research has examined the influences of transformational leadership on vision and innovation climates in work-team context (e.g. Eisenbeiss, van Knippenberg & Boerner, 2008; Schippers et al., 2008), this research sought to examine them in the context of parallel-teams which has thus far been neglected.

2.3.3.2 Training

Training refers to a programme that is planned and designed to equip employees with the knowledge, skills and ability to perform their jobs (Goldstein & Ford, 2002). Training can be task-oriented, teamwork-oriented or a combination of the two (Cannon-Bowers et al., 1995; Goldstein & Ford, 2002; McIntyre & Salas, 1995; Salas et al., 1992; Salas et al., 2008). Task-oriented training provides team members with the knowledge to perform their jobs in a team, while teamwork-oriented training focuses on soft skills that train team members to work together effectively, such as training in leadership or communication (Cannon-Bowers et al., 1995; Stagl, Salas & Fiore, 2007). Both training orientations are organised to enhance task work, teamwork, process improvement skills (Goldstein & Ford, 2002) and individual attitudes towards creativity (Basadur, Runco & Vega, 2000; Kabanoff & Bottger, 1991; Puccio et al., 2006).

Training has been used in various studies to enhance individual creativity and attitudes towards creativity (Basadur, Runco & Vega, 2000; Kabanoff & Bottger, 1991; Puccio et al., 2006). Firestien (1990) found that groups trained in creative problem solving generated more ideas than untrained groups. Fontenot (1993) also found that trained groups were more fluent in problem solving and problem finding than untrained groups. Various experiments have supported and demonstrated the theory that creative abilities are enhanced as a result of training (Basadur, Graen & Green, 1982; Clinton & Torrance, 1986; Feldhusen & Clinkenbeard, 1986; Guilford, 1986, 1962; Pames, 1962; Renner & Renner, 1971).

Although training is imperative to team innovation, no study has yet demonstrated how training transmits its influence. This is important because team training has been advocated to influence team innovation through its relationship with the team interaction process (Cohen & Bailey, 1997; Antoni & Hertel, 2009; Marks, Mathieu & Zaccaro, 2001). Indeed, training has been highlighted to influence team process (Orasanu & Fischer, 1997) and stimulate reflexivity (Schippers et al., 2008). The relationship between training and team reflexivity was manifested when Salas et al. (2008) found that training was most influential on the communication in a team. Despite this, a relationship between training and team reflexivity has never been investigated. Hence, this research sought to examine this relationship as a basis to demonstrate how training can influence team innovation.

2.3.3.3 Organisational Reward and Recognition

Reward systems have been used by management in organisations as the main instrument to influence the behaviour of individuals or team members to attain the company's expected efficiency (Lawler & Cohen, 1992). Rewards given to employees can be in either monetary or non-monetary form. Monetary rewards have an economic value, such as a yearly cash bonus, pay rise or free travel package, whereas non-monetary rewards are a formal or informal recognition given in response to employees' efforts, such as praise, an award of excellence or a personalised letter of acknowledgement. These types of rewards are also known as either contingent or extrinsic reward (Fairbank & Williams, 2001; Frese, Teng & Wijnen, 1999; Van Dijk & Van den Ende, 2002).

Contingent rewards have been postulated to influence individuals' creativity (Eisenberger, 1992; Eisenberger, Armeli & Pretz, 1998; Eisenberger & Rhoades, 2001; Amabile, 1996), innovative behaviour (Eisenberger & Cameron, 1996) and team performance (Cohen, Ledford & Spreitzer, 1996). This is based on the premise that rewards and recognition have informational value in recognising individuals' competencies (Eisenberger & Armeli, 1997; Eisenberger, 1992). However, the research findings on this issue have been mixed. Some studies have found that extrinsic rewards have an insignificant effect on employee's creativity (Hennessey & Amabile, 1998; Joussemet & Koestner, 1999) and team performance (Campion, Medsker & Higgs, 1993; Magjuka & Baldwin, 1991; Cohen, Ledford & Spreitzer, 1996). The insignificant relationship have been associated to a claim which asserts that extrinsic rewards reduce individuals' intrinsic motivation (Amabile, Hennessey & Grossman, 1986; Kruglanski, Friedman & Zeevi, 1971; Amabile, 1996) and redirect focus to those benefits, rather than encouraging innovative activities (Amabile et al., 1996; Deci & Ryan, 1985). This subsequently would diminish innovation.

The inconsistent findings about the relationship between rewards/recognition and team performance inspired this research to explore whether rewards and recognition are related to other variables to influence team innovation. Scholars have advocated the need for a demonstration of how team design (in which organisational reward is one of the components) is related to teams' emergent states or interaction processes (see Cohen & Bailey, 1997; Marks, Mathieu & Zaccaro, 2001).

The literature has suggested that rewards and recognition influence team members' motivations, which enhances the support and commitment given to a team's goal (Pritchard et al., 2002; Kerrin & Oliver, 2002; Eisenberger & Armeli, 1997). According to the team innovation climate theory, support and commitment among team members are reflected in a support-for-innovation climate (West, 2002; West, 1990). Moreover, recognition and reward are the practical elements that cause a support-for-innovation climate to evolve (Ingrid, Lars-Åke & Malin, 2004; Cohen & Levinthal, 1990; Scott & Bruce, 1994; Woodman, Sawyer & Griffin, 1993; West, 2002; West, 1990). Therefore, this research examined the relationship between reward and recognition and support-for-innovation climate in team. As previous research has usually focused on the influence of reward and recognition on motivation and creativity, this research sought to contribute to the literature by examining whether reward and recognition relate to the support-for-innovation climate to influence team innovation.

2.3.3.4 Support from a Departmental Head

This was a new factor that was discovered during the qualitative part of this research and was again not included in the preliminary research model. Therefore, the literature related to this factor is presented in Chapter 4, right after the qualitative findings. Further discussion to justify the inclusion of this factor in the comprehensive research model is also presented at that point.

2.3.3.5 Networking with Relevant Departments

This was a new factor that was discovered during the qualitative part of this research and was again not included in the preliminary research model. Therefore, the literature related to this factor is presented in Chapter 4, right after the qualitative findings. Further discussion to justify the inclusion of this factor in the comprehensive research model is also presented at that point.

2.4 Team Climate-for-Innovation

The concept of a team's climate-for-innovation has generally been defined as a team's shared perception of the extent to which the climate in a team supports and facilitates innovation (Anderson & West, 1994). West (1990) proposed a four-factor model of group innovation climate: 'vision', 'participation safety', 'support for innovation' and 'climate for excellence'.

Vision is a *'valued outcome which represents a higher order goal and a motivating force at work'* (West, 1990, p. 310). West asserted that a vision climate is comprised of four components: 'clarity, visionary nature, attainability and sharedness'. 'Clarity' refers to the degree to which a vision is understood by team members. 'Visionary nature' depicts the extent to which a vision has a valued outcome to the team members, and thus engenders their commitment to team's goals. 'Attainability' is a feature of the vision that should be realistic to achieve. 'Sharedness' refers to the extent to which the visions are congruent with individuals' values within the team. Vision climate has been reported to be present in manufacturing teams because these teams focus on production objectives that are usually clearly pre-determined by upper management (Ingrid, Lars-Åke & Malin, 2004). Teams with clearly defined objectives are more likely to develop appropriate methods of working because their efforts have focus and direction.

Participation safety climate describes an active involvement in-group interaction that involves trust and support. West (1990,p.311) asserted that: *"participativeness and safety are characterised as a single psychological construct in which the contingencies are such that involvement in decision making is motivated and reinforced while occurring in an environment which is perceived as interpersonally non-threatening".* Previous studies have demonstrated that team innovation increases when members perceive their work environment as being safe to participate in decision making, and when they feel they are able to voice their ideas openly (Claxton, 1998).

Support-for-innovation climate entails '*the expectation, approval and practical support of attempts to introduce new and improved ways of doing things in the work environment'* (West, 1990, p. 318). It is concerned with practical support from team members or the organisation for group innovation. Support can be given verbally through encouragement, recognition and reward, or in the form of time spent and resources allocated to teams through such things as personnel, facilities and funding (Ingrid, Lars-Åke & Malin, 2004; Cohen & Levinthal, 1990; Scott & Bruce, 1994; Woodman, Sawyer & Griffin, 1993). According to Amabile et al. (1996), this sort of support influences employees' psychological perceptions of their work environment, which subsequently influences their creative work. In this climate, team members demonstrate behaviours that foster innovation such as. sharing new ideas and resources, spending more time on activities, and cooperating in implementing new ideas

(Eisenbeiss, van Knippenberg & Boerner, 2008), thereby promoting team innovation (Scott & Bruce, 1994; Anderson & West, 1998).

A climate for excellence describes the intensity of team members' concern towards high quality task performance (West, 1990). This climate is evidenced by a team's emphasis on control systems that evaluate and modify performance, appraisal of performance and ideas, exploration of opposing opinions, constructive controversy and maximisation quality of task performance (Tjosvold, 1991, 1998).

Each of these four dimensions of a team's climate-for-innovation have been frequently evidenced to directly influence team innovation (Agrell & Gustafson, 1996; King & Anderson, 1990; West, 1990; West & Anderson, 1996; Bain, Mann & Pirola-Merlo, 2001; Proudfoot et al., 2007; Pirola-Merlo, 2010; West et al., 2003).

Scholars have argued that psychosocial processes could be related to interaction processes that influence team innovation (Cohen & Bailey, 1997). This concept was reiterated by Marks, Mathieu and Zaccaro (2001) and Antoni and Hertel (2009). This concept is feasible, given that the climate theory draws attention to its influence on team reflexivity. For example, clear vision has been emphasised as stimulating team reflexivity (Weldon & Weingart, 1993; Locke & Latham, 1990) and was evidenced in a study by Schippers et al. (2008). Antoni and Hertel (2009) and West et al. (2004) suggested that support-for-innovation climate could influence team reflexivity; however, this has never been empirically examined. Although participation safety climate is important for team reflexivity (West et al., 2004; Edmondson, 1999; Kozlowski & Bell, 2003), a meta- analyses by Hulsheger, Anderson and Salgado (2009) did not support this and suggested that intragroup safety hinders independent thinking, which inhibits interactions.

While vision, participation safety and support for innovation climates have been theorised as having a direct influence on team reflexivity, a climate for excellence has been suggested to be influenced by team reflexivity. This is based on the premise that the actions of evaluating procedures, outcomes and constructive controversy are stimulated by task-related communication among team members (Hacker, 2003). This notion is acceptable, given that Cohen and Bailey (1997) highlighted that a team's interaction process may influence emergent states. In addition, a climate for excellence has not been highlighted as being specifically related to team innovation, but does reflect team members' concerns about the high quality of task performance (Anderson & West, 1998). However, the relationship between team reflexivity and a climate for excellence has never been examined.

As the influence of a team-climate-for-innovation on team interaction process is only an emerging idea that has not been clearly demonstrated, this became a focus of this research. This research examined the influences of vision, participation safety and support for innovation climates on team reflexivity, and tested whether a climate for excellence derives an influence from team reflexivity. It thus sought to demonstrate of how these climate dimensions are related to the team process that influence team innovation.

2.5 Team Reflexivity

Team reflexivity describes '*the extent to which group members overtly reflect upon, and communicate about the group's objectives, strategies [e.g. decision-making] and processes [e.g. communication]and adapt them to current or anticipated circumstances"* (West, 2000,p.3). Questioning, analysis, planning and learning are the main behaviours embedded in team reflexivity (West, 1996). It is a task process that describes the interactions among team members to accomplishing their team's goal (Hoegl & Parboteeah, 2006). Discussions about task-related and team effectiveness issues are the main interactions captured in team reflexivity (Schippers, Deanne, et al., 2003; Tjosvold, Tang & West, 2004). Actions of reflexivity are actually associated only with the content, not the rate of communication among team members (Schippers, Den Hartog, et al., 2003). Reflexivity can occur at the individual or team level. Reflexivity at the team level requires discussion between team members because it is a relational activity (Barge, 2004).

Reflexivity has been identified as a factor for team effectiveness and innovation because it aids teams' awareness of their current performance, which enables them to gain new insight to improve their strategies and methods (Carter & West, 1998; Hoegl & Parboteeah, 2006; Schippers, Deanne, et al., 2003; Den Hartog, De Hoogh & Keegan, 2007; De Dreu, 2002; Schippers, Den Hartog & Koopman, 2001, 2002; Hirokawa, 1990). Reflexive team members voice their views on problems, thus stimulating communication and idea sharing (Johnson & Johnson, 1987). This provides a team with detailed information for team planning and decision making (West, 2000), which also promotes organisational change, even at the shop-floor level (North, Friedrich & Lantz, 2006). In turn, detailed information is likely to ensure well-managed implementation (Frese & Zapf, 1993; Gollwitzer, 1996).

De Dreu (2002) argued that in a low reflexivity team, team members also discuss their work methods and working effectiveness, but probably do not strive to evaluate and select the most promising decisions for implementation. While team reflexivity is concerned with task-related communication among team-members, a climate for excellence is more related to the quality of the ideas generated (Burningham & West, 1995). When team decisions are based on high quality planning, excellent innovations are more likely to occur (Frese & Zapf, 1993; Gollwitzer, 1996). Moreover, in a normal situation, people tend to behave in a habitual routine in which they do not seriously evaluate the quality of choices (Gersick & Hackman, 1990). Therefore, climate for excellence in team (Anderson & West, 1998; West, 1990) could moderate the influence of team reflexivity on team innovation.

As team reflexivity has been extensively examined in the past as a direct antecedent to team innovation (Campion, Papper & Medsker, 1996; West & Anderson, 1996; Hoegl & Parboteeah, 2006; Dayan & Basarir, 2010), this research instead sought to contribute to the literature by examining whether the influences of team reflexivity on team innovation are moderated by a climate for excellence.

2.5.1 Reflexivity as a Mediating Variable

Recent reviews have advocated that team reflexivity has a mediating role in that it is one of the process variables (Antoni & Hertel, 2009). Team process has previously been proposed as a mediating variable that converts a team's properties into outcomes. Marks, Mathieu and Zaccaro's (2001, p: 357) taxonomy defined team process as *"members' interdependent acts that convert team inputs to outcomes through cognitive, verbal, and behavioural activities directed toward organizing taskwork to achieve collective goals"*. This highlights that team process occurs when team members interact with each other to accomplish their task. Marks, Mathieu and Zaccaro (2001) explained that, in an I-P-O framework, team process was viewed as a mediating mechanism that links the characteristics of the members, teams and organisation with the team outcomes. They made clear that team process is the vehicle that transforms team inputs into team outcomes.

Despite this, only a few studies have examined the mediating role of team reflexivity in transmitting the influence of team design on team outcomes. For example, the effects of team diversity on team outcomes were confirmed as being mediated by team reflexivity (Jehn, Northcraft & Neale, 1999; O'Reilly III, Caldwell & Barnett, 1989; Pelled, 1996; Schippers, Deanne, et al., 2003). This supported a process model of diversity by Williams and O’Reilly (1998b). More recently, team reflexivity was evidenced to mediate the effects of task-related diversity on product innovation (Les Tien-Shang & Sukoco, 2011). Tjosvold, Tang, and West (2004) also provided evidence that team reflexivity was a mediator between a team’s goal interdependence and team innovation. Zaccaro et al.’s (2001) suggestion that team leadership and team effectiveness should be mediated by team reflexivity was recently further supported in a study by Hammedi, van Riel, and Sasovova (2011). Interestingly, studies have also demonstrated that team reflexivity is mediated by the influence of a team-climate-for-innovation on team innovation (e.g. Schippers et al., 2008).

However, all the studies mentioned above were conducted on only a small fraction of team design factors and climate-for-innovation dimensions, in one study at a time. In many studies, team reflexivity was frequently tested as an antecedent (Campion, Papper & Medsker, 1996; West & Anderson, 1996; Hoegl & Parboteeah, 2006; Dayan & Basarir, 2010) and as being dependent on a team’s contextual variables (Dayan & Basarir, 2010). Examination of the mediating role of team reflexivity is still infrequent and not fully addressed, even in leading studies (Antoni & Hertel, 2009; Hulsheger, Anderson & Salgado, 2009). Thus far, the mediating role of team reflexivity has been tested only against team composition, task design and team leadership. Thus, this research sought to contribute to the literature by examining the mediating role of team reflexivity to convert the effects of team design and a climate-for-innovation into team innovation.

2.6 Team Innovation and Operational-Organisational Performance.

Barrick and Alexander (1987) suggested that the problem-solving procedures involved in a parallel team's activities could modify the work processes, thereby influencing productivity and operational performance. The main activities emphasised in QCs are to address productivity problems and implement solutions to improve both the quality and quantity of services or products provided. Hanna, Newman and Johnson (2000) proposed that QCs have a strong influence on operational performance. Steel and Shane (1986) also highlighted that QCs are designed to influence work performance. Delarue et al. (2008) believed that the introduction of teams can cause a 'performance chain', in which team outcomes generate positive effects on operational performance and subsequently contribute to organisational performance. Mohrman and Ledford (1985) argued that teams can improve operational performance to achieve better organisational performance. Moreover, Delarue et al. (2008) emphasised that operational performance is included in almost every study to measure the link between teamwork outcomes and organisational performance. The relationship between operational and organisational performance has also been well modelled by several authors (Skinner, 1974; Hayes & Wheelwright, 1984; Porter, 1980).

The above literature suggested the outcomes of parallel teams i.e. QCs, are able to improve operational and organisational performances. However, the relationship between team outcomes and operational-organisational performance has primarily been examined in the context of top management teams (TMTs). In addition, Hanna, Newman and Johnson (2000) highlighted that the use of QCs does not guarantee that a firm will attain operational improvements or excellence. Therefore, this research examined the extent to which team innovation at the parallel-team level improves operational and organisational performance.

2.7 Development of Preliminary Research Model

The main objectives of this research were to explore whether team design — namely, team composition, task design and organisational context — relate to a team's climate-for-innovation and team reflexivity to influence team innovation in the context of parallel teams. Additionally, it sought to examine the extent to which innovation in parallel team can improve operational and organisational performance.

Based on the theories and empirical evidence of previous studies, the focus of this research is illustrated in an Input-Process-Output (I-P-O) model in Figure 2-2. The I-P-O model conceptualises the interactions between elements that influence team innovation (McGrath, 1984; Guzzo & Shea, 1992) and has been used extensively in leading research (e.g. West et al., 2004; West & Anderson, 1996; Schippers et al., 2008; Schippers, West & Dawson, 2010; Cohen & Bailey, 1997).

Input (I) refers to team design factors. Based on the literature, all of the variables under team composition and task design are theoretically linked directly to team reflexivity. Transformational leadership, under organisational context, is shown to be related directly to vision climate. Both transformational leadership and recognition/reward are depicted to influence support for innovation climate, which subsequently influences team reflexivity and team innovation. Similar to team composition and task design, training is theorised to be related directly to team reflexivity.

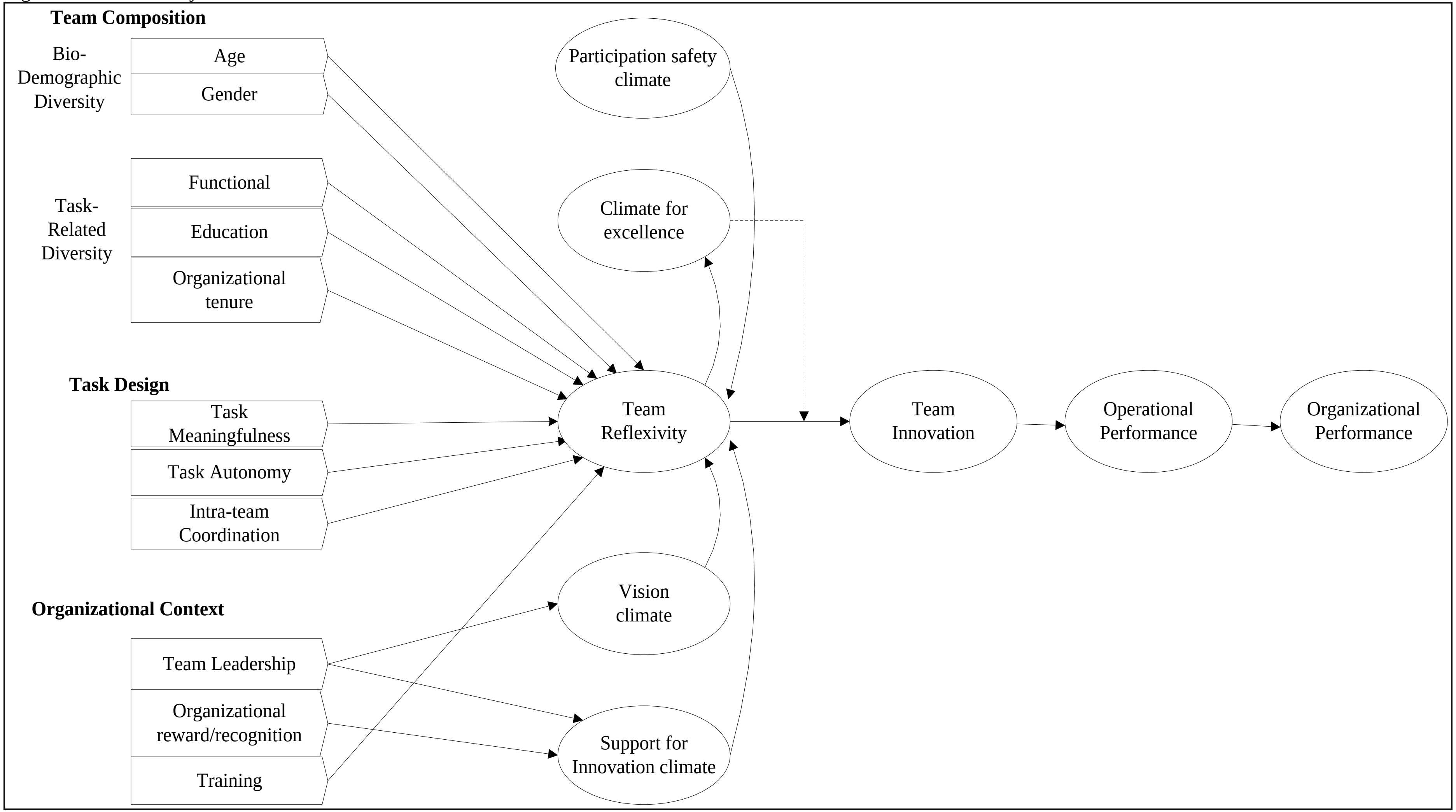
Process (P) refers to a team's climate-for-innovation and team reflexivity, which respectively represent a team's emergent states and interaction process (Marks, Mathieu & Zaccaro, 2001; Antoni & Hertel, 2009; Cohen & Bailey, 1997). Based on the literature, all of the climate dimensions are related to team reflexivity, except for the excellence climate, which is theorised as being influenced by team reflexivity. An excellence climate is expected to moderate the relationship between team reflexivity and innovation. A participation safety climate is linked directly towards team reflexivity; however, the review of the literature could not identify which team design factors are related to a participation safety climate.

Output (O) refers to the innovation of a parallel-team. Team innovation is depicted as influencing operational and organisational performance sequentially (Delarue et al., 2008; Mohrman & Ledford, 1985; Hanna, Newman & Johnson, 2000).

2.8 Summary

This chapter provided a comprehensive review of the theoretical foundations of each of the constructs included in this study. Based on the theories and extant research, the gaps of knowledge that inspired this research were highlighted. The research focus was also identified and illustrated in the preliminary research model in Figure 2-2.

Figure 2-2: Preliminary Research Model



Chapter 3: Research Methodology

3.1 Introduction

The methods used in this study are detailed in three main sections in this chapter. The first section explains the paradigm of this research. The second section explains in detail the design of this research which utilised a mixed-method approach. The remaining sections are comprised mainly of explanations of the processes and procedures for both the qualitative and quantitative studies used. It covers topics such as sample selection, data collection and analyses.

3.2 Research Paradigm

Positivist and interpretivist are the two broad philosophical approaches within the social sciences (Remenyi et al., 1998). Positivist researchers emphasise to the importance of an objective scientific method (Remenyi et al., 1998) and believe that a research idea can be objectively measured and observed (Hessler, 1992). They assume that reality is independent from the knower (Smith, 1983) and see reality as ‘being’ rather than ‘becoming’. Positivists elaborate research questions based on theoretical background and previous studies, then analyse the data by using statistical techniques to make generalisations and conclusions.

In contrast, interpretivist researchers try to obtain an understanding about phenomena (Smith, 1983) and to see all things as ‘becoming’. As interpretivists are more concerned with understanding individuals’ perceptions about phenomena, they assume that the personal nature of social constructs can be extracted and refined through interaction between the researcher and the research subject (Lincoln & Guba, 1985). Qualitative research gives more emphasis to the words, observations and meanings and not as much to facts and numbers (Creswell, 1994).

To determine the paradigm of this research, the research objectives were reflected. The research objectives were not only to explore how team design impacts innovation via team's climates and reflexivity, but also to prove statistically the strength of the impacts. The way team design impacts innovation via team's climates and reflexivity has been illustrated on the pre-liminary research model. The illustrations have been developed largely based on the extant empirical research in the context of work-team. As the context of this research is a parallel-team, the first phase of qualitative study is needed to explore if the model is also applicable to describe how team design impacts innovation in a parallel-team. Afterwards, the quantitative approach is needed to measure quantitatively the strength of the impacts. Therefore, this research utilises qualitative and quantitative approaches. As each approach has its own strengths to provide relevant data, the combination of the qualitative and quantitative approaches provides further opportunity for cohesive and coherent outcomes (Hohental, 2006). Greene, Caracelli and Graham (1989) also stated that the combination of results from each approach will enhance the overall accuracy of the inferences made.

Although the results from the qualitative phase assisted this research to fine tune the preliminary research model, the research objectives were answered, interpreted and concluded largely based on quantitative analyses. Therefore, this research was mainly operationalised under the positivist paradigm.

3.3 Research Design

Although the paradigm of this research is positivist which analyses the findings largely based on quantitative analyses, the results from the qualitative phase assisted this research to fine tune the preliminary research model. According to Tashakkori and Teddlie (2003, p. 11), research uses a mixed-method research design if it uses “qualitative and quantitative data collection and analyses techniques in either a parallel or sequential phase”. Tashakkori and Creswell (2007, p.4) also highlighted that mixed-method research is “research in which the investigator collects and analyses data, integrates the findings and draws inferences using both qualitative and quantitative approaches or methods in a single study or program of inquiry”. Similarly, Greene, Caracelli and Graham (1989) defined mixed-method studies as “studies that include at least one quantitative method (designed to collect numbers) and one qualitative method (to collect words), where neither type of method is inherently linked to any particular inquiry paradigm” (p.254). Therefore, the mixed-method approach was designed for this research. The next section details further the mixed-method design for this research.

3.3.1 Mixed-method Research Design

This research used a sequential mixed-method design under the ‘dominant - less dominant’ priority which is conducted within a single dominant paradigm (positivist), with a small portion of information drawn from an alternative approach (see Tashakkori & Creswell, 2007; Tashakkori & Teddlie, 2003). The mixed-method approach of this research was represented by using the notation suggested by Morse (1991):

‘qual→QUAN’

The arrow '→' represents the sequential design. Uppercase letters are used for the dominant method in the research (the quantitative method) and the lowercase letters are used for the less-dominant method (the qualitative method). In this study, new factors and perceived relationships discovered from the qualitative study were combined with the preliminary research model to produce a comprehensive research model. Later, the comprehensive model was analysed quantitatively to address the research questions.

Mixed-method approach is necessary in this research for the following reasons:

1. Prior to the quantitative analysis, preliminary research model was built based on the empirical findings which usually use work-team as a research context. As the context of this research is different i.e. parallel-team, qualitative study is useful to explore if the model is also applicable to describe how team design impacts innovation in the context of parallel-team. Furthermore, researches that focus on the indirect influences of team design on team innovation via team reflexivity and team's climate are limited. Thus, qualitative study was valuable for further justification and strengthening the ground of pre-liminary research model development. Greene, Caracelli and Graham (1989) emphasised that the combination of results from each approach will enhance the overall accuracy of the inferences made.
2. As the extant research in team innovation has been largely conducted quantitatively, this research which has a small portion of qualitative study was expected to reveal other relevant dimension of team design which specifically could impact innovation in a parallel-team particularly. It is necessary because in certain types of teams, some variables are not significant. For example, transformational leadership has been found as not important in manufacturing teams (Ingrid, Lars-Åke & Malin, 2004).

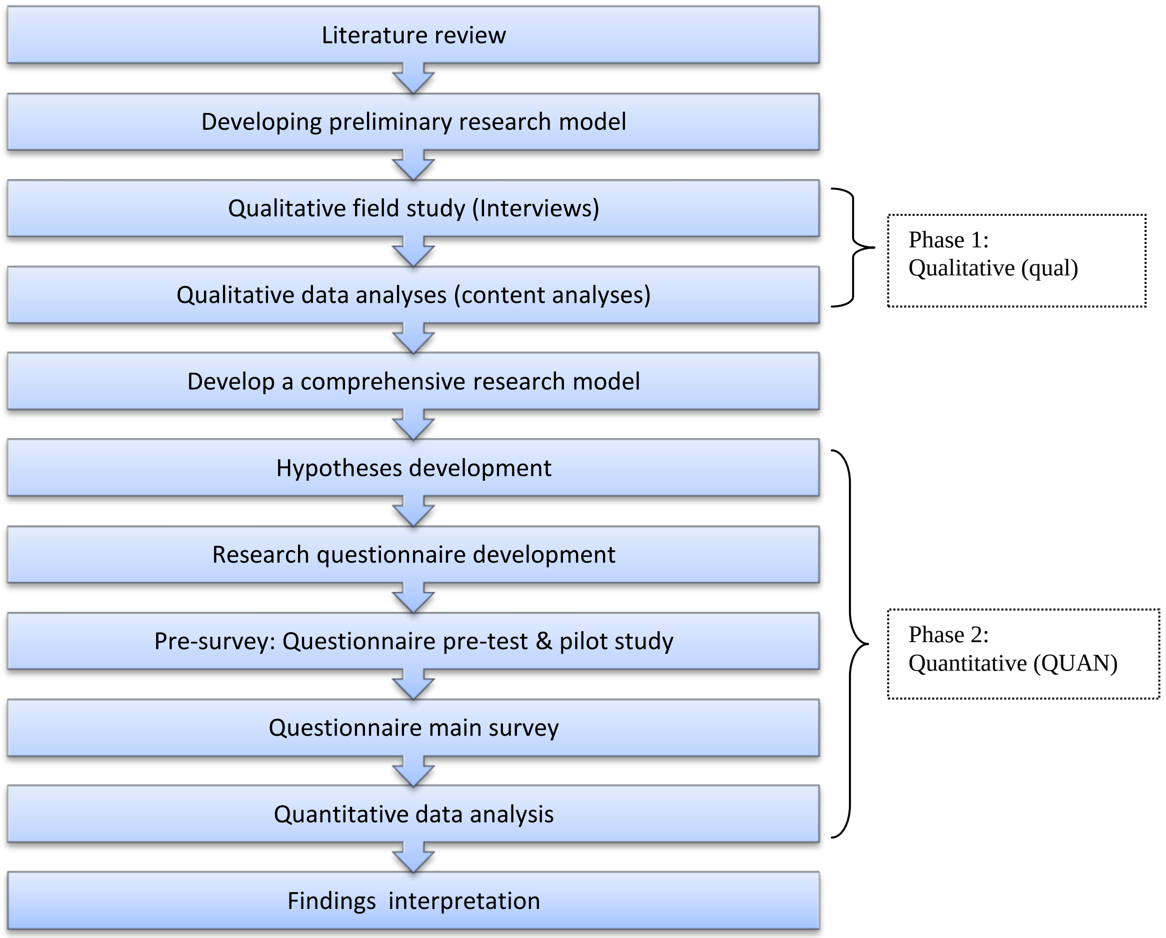
3. All the measurements of variables were adapted from the context of work-team. Hence, qualitative study is useful to explore if all the measuring items are relevant in the context of parallel-team. The results from the qualitative study were expected to refine the measuring items.

3.4 Research Process

This section details the execution of the research.

Figure 3-1 summarises the steps of the research process.

Figure 3-1: The Sequences of the Research Process



3.4.1 Literature Review

This research began with a review of relevant theories and empirical studies related to the research topic. This was undertaken to understand the concept of each construct involved, and to identify possible gaps as the foundation for the research questions and objectives.

3.4.2 Developing Preliminary Research Model

Based on the gaps identified from the literature review, a preliminary research model was developed. Presented in Figure 2-2, this model illustrates the focus of this research.

3.4.3 Qualitative Field-study

Following the development of the preliminary model, a qualitative field study was conducted based on a semi-structured interview. The sample selection and data collection for the qualitative study were executed as follows.

3.4.3.1 Sample Selection for Qualitative Study

The samples for the interviews were members and leaders of Malaysian Innovative Creative Circle (ICC) and departmental managers to whom the respective circles/teams reported directly.

In 1982, an ICC in Malaysia was known as a ‘Quality Control Circle’ (QCC) (MPC., n.d). The notion of the ICC was introduced based on the concept of a Quality circle (QC), which was categorised as a parallel team by Cohen and Bailey (1997) or a problem-solving team by Glassop (2002). A QC is a small group of employees usually from the same department who volunteer to meet regularly to discuss ways of improving work-related problems (Ishikawa, 1985; Millson & Kirk-Smith, 1996; Thompson, 1982). An ICC's main activities are similar to those of a QC: they identify work-related problems and analyse these by using statistical and problem-solving techniques, and they propose solutions to management to enable them to make decision and implement changes (Greenbaum, Kaplan & Metlay, 1988; Barrick & Alexander, 1992; Ramsing & Blair, 1982). All these activities are central to team innovation.

To search for approachable parallel teams, the Malaysia Productivity Corporation (MPC) was contacted. The MPC is a Malaysian government body that introduced ICC to Malaysian organisations. MPC also organizes annual ICC conventions at the state, regional and national levels. The participation of ICCs in the conventions gives them the opportunity to share their innovative activities, so that they can learn from each other about ways to nurture innovativeness in the enterprises (MPC., August 21, 2008).

All of the ICCs which participated in the conventions were actively improving performances of their departments through innovation. Based on the list of participating ICCs in the conventions, MPC suggested eight parallel teams from three organisations to be contacted for interview purposes. All of the participating ICCs had been operating for more than one year. This aligned with Pereira and Osburn's (2007) recommendation that team members with experience of more than a year have enough information to discuss their team experiences.

3.4.3.2 Interview Questions

The interview questions were structured based on the preliminary research model. Three sets of interview questions were developed for the three groups of respondents mentioned earlier. For the team members, the questions were developed to gauge general information relating to:

1. Their perceptions about the importance of team design, as depicted in the preliminary research model;
2. Their opinions relating to the specific relationships between team design, team innovation climate and team reflexivity as depicted in the preliminary model.

The respondents were also prompted with further questions whenever necessary. The questions for the team leaders were developed to gauge information relating to the influences of team reflexivity on team innovation. In addition, they were asked how they assess the degree of innovation of their team.

The questions developed for departmental managers were used to gauge general perceptions about how the innovations of the ICC contributed to operational and organisational performance.

These three sets of questions are provided in Appendix A1. Since the interviews were planned to be conducted in the Malaysian language, the questions were translated from English to the Malaysian language by the researcher. Following this, two individuals who were fluent in both the English and Malaysian language read the translation, to ensure both versions had the same meaning. The questions were then approved by the Curtin University Ethics Committee.

Prior to the interviews, the questions were pre-tested with four ICC members, two ICC leaders and two departmental managers who participated in the state ICC Convention that was held at the Petaling Jaya Hilton Hotel, Kuala Lumpur in April 2010. The questions were found to be appropriate and comprehensible in the pre-test.

3.4.3.3 Qualitative Data collection

With help from the MPC, the quality departments in the three organisations were contacted. The interviews took place between 14th until 18th August 2010 and were scheduled according to the convenience of each team in order to minimise disruptions during the business operation. All of the interviews were conducted individually with each respondent. Each interview took almost one hour and was recorded by a micro-audio recorder with the permission of the interviewee. The interviews ended with twenty-one team members, eight team leaders and eight departmental managers of the respective teams from eight ICCs.

The interview transcripts were then prepared by the researcher. The transcripts were later translated into English by a certified translator from The Institute of Language and Literature in Malaysia. The translations were read carefully by the researcher to ensure that they conveyed similar meanings to the original version.

3.4.3.4 Qualitative Data Analysis

Since this qualitative-study was more exploratory than confirmatory in nature, 'content analysis' was chosen to analyse the interview transcripts (Berg, 2001). The QSR NUD*IST Vivo (NVivo) software was used to manage the qualitative data. NVivo is an analysis tool for "recording and linking many ways, and for searching and exploring the pattern of data and ideas" (Richards, 1999, p.4). The content analysis was completed in two stages. The first stage dealt with a single interview transcript of each team, while the second stage dealt with cross-interview transcripts of all teams (Miles & Huberman, 1994). Although the interviews were individually conducted with each respondent, the findings were summarised and reported based on each team.

In the first stage, each individual transcript from each team was read line by line to produce themes and any associated variables (inductive process). Each theme was represented by a node created in NVivo and each node was labelled with a name that appropriately reflected the theme and variables within. A raw table of factors and variables discovered in each team was developed. Following this, all individual transcripts in each team were reviewed again to grasp the relationships among the factors. These relationships for each team were illustrated in eight models (please refer to Appendix B).

The second stage of the content analysis was primarily aimed at integrating all the factors, variables and relationships identified in each team to produce a model that illustrated the overall findings of the qualitative field-study. By using the concept of 'union', the same factors, variables and links for each team from the first stage were integrated in one model — qualitative field-study model. The qualitative field-study model was then compared with the preliminary research model. The new factors and variables discovered from the qualitative study were justified based on the existing literature. The results of these analyses are reported in Chapter 4.

3.4.4 Developing Comprehensive Research Model

The preliminary research model was compared, fine-tuned and merged with the qualitative field study to produce a comprehensive research model. The discussion of this is presented in Chapter 4.

3.4.5 Hypotheses Development

Based on the comprehensive model, research hypotheses were constructed. The research hypotheses are discussed in detail in Chapter 5.

3.4.6 Research Questionnaire Development

To quantitatively test the hypotheses, two sets of questionnaires were developed. Set-A was for the team members and Set-B was for the departmental managers. The Set-A questionnaire was designed to obtain perceived information regarding the constructs of team composition, task design, organisational context, team's climate-for-innovation and reflexivity. The Set-B questionnaire was designed to measure the constructs of team innovation, operational and organisational performance.

As there was a significant amount of information relating to the questionnaire development, Chapter 6 is dedicated to explaining this part of the process in detail.

3.4.7 Pre-test and Pilot-test of Questionnaire.

Before distribution to the respondents, the questions were pre-tested and pilot-tested, as outlined in the following sections.

3.4.7.1 Questionnaire Pre-test

Dillman (2000) suggested that questionnaires should be reviewed by people who are well-informed about the context. This is to ascertain that the questions are understandable and clear with regard to context, as this can influence the accuracy of the feedback given by the respondents. For this purpose, a consultant in the MPC and an ICC coordinator in an organisation were considered appropriate. Consultants in the MPC work directly with the ICCs to provide practical advice and knowledge. ICC coordinators are officers, usually in a quality department, who plan, administer and monitor activities for ICCs in their organisation. Hence, three consultants from the MPC and two ICC coordinators from two organisations were contacted to be involved in the pre-test. The objectives of the pre-test were made clear to these participants. The outcomes of this pre-test are detailed in Chapter 6.

3.4.7.2 Questionnaire Pilot-test

After the pre-test, a pilot-test was conducted to ensure the questions were measuring the constructs intended for this research, and to examine the questionnaire's face validity, reliability and factorial validity (Cavana, Delahaye & Sekaran, 2001). For this purpose, one manufacturing organisation was selected from the list provided by the MPC. The ICC coordinator was contacted and the research objectives were made clear. The coordinator agreed to permit 10 ICCs to participate in the pilot test. Therefore, 10 packs of envelopes, on which each team's name was printed, were mailed to the ICC coordinator, who distributed theses to the leaders of each team. Each pack of envelopes contained five sets of questionnaires: four Set-A questionnaires for the team members and one Set-B for the team's departmental manager. Each pack also included a support letter from the MPC and written guidelines of how to administer the questionnaires.

Each team leader selected four team members who had been in the team for more than one year to respond to the Set-A questionnaires, and gave the Set-B questionnaire to one departmental manager who was directly informed about the team's innovation projects. The four team members responded to questions related to team design, reflexivity and team climate. The departmental manager responded to questions related to the team's innovation and its impact on operational and organisational performance. These data were then analysed using a simple descriptive analysis. The results of this pilot-test are detailed in Chapter 6.

3.4.8 Main Survey

This research involved a survey method to collect the quantitative data because this allowed respondents time to think about their answers and enabled a sense of anonymity. Moreover, this method is quick, inexpensive, simple to administer and provides a precise means of assessing information about the population (Gosselin, 1997; Zikmund, 2003; Haslam & McGarty, 2003). The following sections explain how the main survey was executed.

3.4.8.1 Sample Selection and Response Rate for the Main Survey

The population for this study was the members of parallel teams (as defined in the literature review) and the departmental managers who were directly informed about each team's innovation. All of these were from Malaysian organisations. As there was no database that listed parallel-teams in Malaysia, a sampling frame was not available for this research. Thus, this research used convenience sampling to choose the sample from the population under study. The sample was based on the list of participating ICCs in the 2009 ICC National Convention. This list was obtained from the MPC main office. The justification of ICC as a parallel team was made earlier in Section 3.4.3.1.

The list provided 178 ICCs from 89 organisations in the four main economic sectors in Malaysia: manufacturing, services, public and electric sectors. All the ICC coordinators from the 89 organisations were contacted via e-mail with an initial research invitation. The objectives of the research were made clear. Out of 89, 43 organisations responded to the e-mail and agreed to participate. To increase the number of teams from each organisation, each coordinator was encouraged to suggest a few more ICCs from her or his organisation to be respondents. Information such as the team's name and total number of team members of each team was obtained. Finally, the study obtained the complete information of 249 ICCs from only 33 organisations. The other 10 organisations did not respond within a reasonable time frame and were thus withdrawn from the research.

To determine an adequate response rate for this research, which used PLS as an analysis tool, the suggestions by Barclay, Higgins and Thomsom (1995) were followed. These suggested that the sample size should be 10 times the number of measurement items in the most complex formative latent construct or the most complex dependent construct with the largest number of independent constructs impacting it. In this research, the most complex construct was team reflexivity with six measurement items, impacted by 13 independent constructs. Thus, the minimum response rate required was 6 x 10 —a total of 60 teams or equivalent to 24 per cent of the 249 teams.

Realising that it is unrealistic to be able to collect data from everyone within each team of different sizes, Dawson's (2003) selection rate was calculated for each team to justify that number of responses from each team are sufficient for a quantitative analysis. It was calculated based on number of responses per group (n) and group size (N). A team with higher selection rate than a cut-off point would be excluded from this research.

$$\text{Dawson's Selection rate: } ([N - n]/Nn)$$

3.4.8.2 Main Survey Data Collection

For the data collection, a formal application was made to the Director of MPC to provide this research with a support letter, which was later enclosed with each questionnaire sent to the respondents. Another application was made to use the MPC's logo on the front page of every questionnaire. The use of the support letter and the MPC's logo in the data collection process was expected to enhance the commitment of respondents to complete the questionnaires and acknowledge the practical support given by the MPC to this research. In response to these requests, the MPC generously provided 300 printed support letters and permitted the use of their official logo. Hence, 249 packs of envelopes that contained questionnaires corresponding to the number of team members in each team and one questionnaire for the team's departmental manager were prepared. To facilitate the distribution process, each envelope was labelled with the team's name. These were mailed to the ICC coordinators in the quality department of each organisation, who then distributed the packs of questionnaires to the leader of each ICC. Each team leader was provided with guidelines about how to administer the questionnaires. The coordinators were also informed of the guidelines, so they could follow up the process.

Each team leader was requested to collect the completed questionnaires from the team members and departmental manager after one week, and to return these to the researcher by using the provided pre-paid and self-addressed envelope. To ensure the teams engaged in these actions smoothly, the coordinator in each organisation was also contacted via phone for progress updates. The findings of this main survey are reported in Chapter 7.

3.4.9 Quantitative Data Analysis

The quantitative data from the survey were entered into Statistical Package for Social Science (SPSS).

Since the unit of analysis was at the team-level, the Likert-scale data of individual team members were aggregated to form the team-level data. This aggregation was justified by the rate of agreement: $R^*wg_{(j)}$ (James, Demaree & Wolf, 1984). Following this, diversity values for age, gender, functional, educational and organisational tenure variables were calculated manually for each team by using an entropy index formula on a Microsoft Excel worksheet. These were then transferred into SPSS. The data were analysed by using the PLS-graph (Chin & Newsted, 1999) to test the hypotheses. Figure 3-2 summarises the steps conducted for the quantitative data analyses, which are explained in detail in the following sections.

Figure 3-2: Main Steps in Quantitative Data Analyses

Step 1: Data aggregation from individual to team-level (for the latent constructs only). The aggregation was justified with: - In-group agreement :- $R^*wg_{(j)}$
Step 2: Calculated diversity value for diversity variables of each team (for bio-demographic and task- related variables only) by using: - The entropy index
Step 3: Two stages of data analyses in PLS-graph: - Assessment of the measurement model (for the latent constructs only) - Assessment of the structural model (hypotheses testing)

3.4.9.1 Data Aggregation from the Individual to Team-level.

Since the unit of analysis for this research was at the team -level, individual responses in each team were aggregated to obtain a response value at the team-level. The constructs involved in this aggregation process were team interest, task design, organisational context, team reflexivity and team climate-for-innovation. The constructs of team innovation, operational and organisational performance were not aggregated because they were based on the responses of the individual departmental managers for each team. The constructs under bio-demographics and task-related diversity were also not aggregated because the diversity was computed based on the compilation concept, not the aggregation (Bliese, 2000).

Before the data were aggregated, sufficient agreement among team members need to be displayed (Chan, 1998; Klein, Dansereau & Hall, 1994). This agreement was checked through the $R^*wg_{(j)}$ index (James, Demaree & Wolf, 1984). This index was computed in the SPSS syntax, guided by the syntax code formulations by Le Breton and Senter (2008).

$R^*wg_{(j)}$ is the index of within-group agreement for multiple items (James, Demaree & Wolf, 1984). $R^*wg_{(j)}$ is calculated by comparing the observed variance of a set of items in a group to the variance that would be expected if the group members responded randomly. $R^*wg_{(j)}$ is sufficient to represent satisfactory agreement if the value is 0.70 or higher (James, Demaree & Wolf, 1984; George, 1990). In the previous studies, $R^*wg_{(j)}$ was normally reported in average for every construct. Below is the formula of R*wg(j) by Lindell, Brandt and Whitney (1999):

$$R * wg(j) \qquad = \qquad 1 - \frac{\bar{S}^2 x}{S^2{}_{EU}}$$

where:

$\bar{S}^2 x$ = mean of observed variances on items

$S^2{}_{EU}$ = expected variance under uniform distribution $(A^2–1)/12$: where A = alternatives in response scale.

3.4.9.2 Diversity Calculation

Since all the bio-demography and task-related data were in categorical form, the diversity value was measured by using the entropy index as suggested by Taagepera and Lee Ray (1977), Teachman (1980) and Ancona and Caldwell (1992b). This index measures how group members are distributed across the possible categories of a diversity variable. The sizes of teams involved in this research —which varied from three to ten team members—were appropriate for a diversity calculation (Bettenhausen, 1991; Goodman, Ravlin & Argote, 1986). The formula used was as follows:

$$\text{Entropy Index} \quad = \quad -\sum_{i=1}^{s} \text{Pi}\ (\ln \text{Pi})$$

where:

P	=	the fractional share of team members assigned to a particular grouping within a given characteristic
I	=	the number of different categories represented in a team
ln	=	natural log

3.4.9.3 Data Analysis: PLS-based SEM.

This research used a PLS-based SEM technique. While there are several analytical tools for PLS-based SEM such as PLS-PC and LV-PLS, the PLS-graph (Chin, 1998) was used for this research. This was chosen due to the complexity of the model in this research to be tested with only 188 teams. The PLS-graph has been advocated for use in research with a complex model (Hulland, 1999) and small sample size (Chin, 1998; Compeau & Higgins, 1995; Thong, Yap & Raman, 1996). Examples of research with a small sample size that have successfully used PLS to develop research models include Quaddus (2004): Chin, Marcolin and Newsted (1996): and Barclay, Higgins and Thompson (1995), which respectively used 129, 250 and 270 valid survey responses.

PLS is able to assess the reliability and validity of research constructs, estimate the relationships among constructs (Barclay, Higgins & Thompson, 1995) and analyse all dependent variables simultaneously (Barclay, Higgins & Thompson, 1995; Fornell & Bookstein, 1982; Gefen, Straub & Boudreau, 2000). PLS has been used in diverse study areas, including social science, marketing education, strategy and management information systems (Fornell & Cha, 1994; Hulland, 1999; Chin, 1998; Johansson & Yip, 1994). PLS allows path-hypotheses of the research model to be analysed (Chin, 1998; Gefen, Straub & Boudreau, 2000) and is also applicable to investigating a new measurement (Barclay, Higgins & Thompson, 1995).

Unlike the covariance-based SEM technique that is appropriate only for reflective variables, PLS is applicable for both reflective and formative variables. A formative variable is an indicator that forms a latent construct, whereas a reflective variable reflects the latent construct (Gefen, Straub & Boudreau, 2000).

The data analysis in PLS was conducted in two different stages, as outlined by Barclay, Higgins and Thompson (1995), and Santosa, Wei and Chan (2005). These two stages are the assessment of the measurement model and the assessment of the structural model. When assessing the measurement model, the individual item reliability, internal consistency and discriminant validity are examined. Assessment of the structural model involves a significance test of the path loading and variance explained for each dependent construct. The following section details the procedures involved in both these stages for this study.

3.4.9.3.a Assessment of Measurement Model

This stage focused on the relationship between the indicators and their corresponding constructs. It involved an examination of individual measurement item reliability, internal consistency and discriminant validity (Barclay, Higgins & Thompson, 1995; Santosa, Wei & Chan, 2005).

Item Reliability

Item reliability indicates how well each measurement item is related to its corresponding construct. Statistically, it is also known as a 'simple correlation'. In PLS, item 'loading' indicates the reliability for reflective indicators, while a 'weight' is a formative indicator (Barclay, Higgins & Thompson, 1995; Santosa, Wei & Chan, 2005; Chin, 1998).

Convergent Validity

Convergent validity was evaluated based on internal consistency and average variance extracted (AVE). Internal consistency reflects the reliability of a construct (Fornell & Larcker, 1981; Barclay, Higgins & Thompson, 1995). For this study, it was considered superior to Cronbach's alpha —a traditional measure of consistency. PLS does not weigh all indicators equally and not influenced by the number of indicators (Chin, 1998). Chin (1998) and Nunnally and Bernstein (1994) explained that 0.7 indicates an acceptable value for internal consistency. Fornell and Larcker (1981) proposed the following equation to measure internal consistency:

$$\frac{\left(\sum \lambda_{yi}\right)^2}{\left(\sum \lambda_{yi}\right)^2 + \sum Var(\varepsilon_i)}$$

where:
λ = component loading to an indicator
y = construct
i = item
$Var(\varepsilon_i) = 1 - \lambda_{yi}^2$

The second value to assess convergent validity is the AVE for each construct. This measure reflects the amount of variance in the item that is explained by the construct. AVE was suggested to be at least 0.5 to indicate the convergent validity. Fornell and Larcker (1981) recommended the following equation to measure the AVE:

$$\frac{\sum \lambda_{yi}^{2}}{\sum \lambda_{yi}^{2} + \sum Var(\varepsilon_i)}$$

where:

λ = component loading to an indicator

y = construct

i = item

$Var(\varepsilon_i) = 1 - \lambda_{yi}^{2}$

Discriminant Validity

Discriminant validity assesses the degree that each construct differs from the others (Barclay, Higgins & Thompson, 1995). This was undertaken to ensure that the measurement items of the construct did not share variance with the measurement items of other constructs more than with their corresponding construct. To examine the discriminant validity, cross-loadings were executed at the construct and item levels.

At the construct level, discriminant validity was examined by comparing the square root of the AVE to the correlation between the constructs. Discriminant validity is fulfilled if the square root of the AVE is larger than the correlation between the constructs (Barclay, Higgins & Thompson, 1995). The item can be discarded from the model if it does not conform to this requirement.

At the item level, the cross loading matrix of items within a construct should be greater than the loading of any other item within the same column (Barclay, Higgins & Thompson, 1995; Gefen, Straub & Boudreau, 2000).

3.4.9.3.b Assessment of Structural Model

This stage focused on hypotheses testing. The structural model was evaluated by examining the R^2 (amount of the variance explained), followed by hypotheses testing through the path coefficient (*ß*), the statistical significance of the t-values, a mediating test and a moderating test.

<u>R-square (R^2)</u>

The model's explanatory power was assessed using the R^2 values of the endogenous variables. The R^2 of a structural model is similar to the R^2 values in regression analyses which give some information about the goodness of fit of a model (Fornell & Larcker, 1981).

<u>Hypotheses testing</u>

To test the hypotheses in this research, three testing methods were used:

- *Path coefficient and t-value*

A significance test (t-statistic) of all paths was performed by using the bootstrapping resampling method (Chin & Newsted, 1999).

- *Mediation test*

To examine the mediation effect, the following three-step procedure by Baron and Kenny (1986) was followed:

1) Demonstrate the relationship between the antecedent and mediator variable;
2) Demonstrate the relationship between the antecedent and dependent variable;
3) Demonstrated the relationships of the antecedent and mediator with the dependent variable.

The results from the above procedures were interpreted based on Table 3.1 below.

Table 3.1: Mediation Types

Mediation type	Step 1 Antecedent v. mediator	Step 2 Antecedent v. dependent	Step 3 i) Antecedent v.dependent ii) Mediator v. dependent
No mediation	Not significant	Not significant	Relationship between mediator and dependent is NOT significant
Partial mediation	Significant	Significant	If the relationship between antecedent and dependent is significant
Full mediation	Significant	Significant	If the relationship between antecedent and dependent variable is NOT significant

No mediation exists if any result in Step 1 and 2 or the relationship between mediator and dependent in Step 3 is not significant.

The results provide evidence for partial mediation if all relationship in Step 1, 2 and 3 are significant.

Full mediation is demonstrated if the relationship in step 1 is significant, but the relationship between antecedent and dependent in Step 2 becomes insignificant in Step 3.

The results in Step 2 were not relied much for the interpretation. However, they provide supporting evidence for the mediation effects. For example, if the standardised beta coefficient for the significant relationship tested in step 2 was greater than that in step 3, this provided evidence that the mediation effect was likely to exist.

- *Moderation Test*

For the moderating-effect analysis, the indicators of the 'interaction factors' were calculated. This was done by multiplying each measurement item in the antecedent by the moderating variable. The results of this multiplication were considered a new variable, named 'interaction factor'. This interaction factor, together with the antecedent and moderating variables was regressed towards the dependent variable. If there was a significant relationship found between the interaction factor and dependent variable, the moderating effect was present.

3.4.10 Interpretation of the Findings

Upon the completion of statistical analyses, the findings were interpreted in the light of a further review of the literature. The detailed results of the quantitative analyses are reported in Chapter 7 and discussed further in Chapter 8.

3.5 Summary

This chapter provided details of all the processes and procedures undertaken to meet the research objectives. This study used a mixed-method approach, in which a qualitative study was conducted prior to the quantitative study to help fine-tune the preliminary research model. The procedures for sampling and data collection for both methods were specified. Interview transcripts for the qualitative study were managed through use of NVivo software and analysed based on content-analyses procedures. As the unit of analysis for the quantitative analyses was at the team-level, the data of individual team member were aggregated to form team-level data. Diversity values were also calculated for the bio-demographic and task-related variables. As this study used the PLS approach to analyse the quantitative data, the two-stage assessment used was also detailed. The path coefficient, mediation and moderating test, which were used mainly to examine the research hypotheses, were also described in detail.

Chapter 4: Findings of the Qualitative Field Studies[2]

4.1 Introduction

This chapter discusses in detail the findings from the qualitative field-study. As explained earlier in the research method chapter, the qualitative field-study was undertaken to test the applicability of the preliminary research model. It was also intended to discover any other relevant issues that were important to the respondents, but that might not have been acknowledged in the preliminary conceptual framework. At the same time, attention was also given to discover any new construct dimensions that could be used to improve the accuracy of the measuring constructs to the research context.

The qualitative field-study was executed by conducting face-to-face and one-to-one interviews, based on semi-structured interview questions. However, the findings were summarised and reported in a team-based form. The research sample for the interviews was explained in the research methodology chapter. This chapter mainly presents the findings and

[2] Parts of this chapter have been published in the following publication:

Abdullah, M. And M. Quaddus, 2011. *Investigating indirect influences of team composition on team innovation: Qualitative evidence from parallel teams in Malaysian organisations*. In 25th Annual Australian and New Zealand Academy of Management Conference, Wellington, New Zealand.

the ways these were used to fine tune the preliminary research model to produce a comprehensive research model.

4.2 Qualitative Findings

The findings are reported in three main sections. The first section reports the demographic information of the respondents involved in the qualitative field-study. The second and third sections present the factors and variables and their expected links or influences. These factors and expected links were firstly summarised in a table and then illustrated in the qualitative research model. Findings of new factors and their influences were highlighted and utilized in the comprehensive research model.

4.2.1 Demographic Information

The three tables below present the demographic information of the respondents in the interviews.

Table 4.1 presents the demographic information of the team members. There were 21 participants from eight teams. Five members were from service organisations, eight from a manufacturing organisation (motor vehicle production) and eight from a public organisation (public education services). All participants had been actively involved in their team for more than one year. The majority of participants were male.

Table 4.1: Demographic Information of Team Members

Respondent	Gender	Team tenure (years)	Organisational tenure (years)	Team	Industry
1	Male	< 2 yrs	< 2 yrs	A	Service
2	Male	< 2yrs	< 2 yrs	A	Service
3	Male	3 yrs	3 yrs	B	Service
4	Male	< 2 yrs	3 yrs	B	Service
5	Male	< 3 yrs	<3 yrs	B	Service
6	Male	2 yrs	23 yrs	C	Manufacturing

7	Male	2 yrs	13 yrs	C	Manufacturing
8	Male	<1 yrs	15 yrs	C	Manufacturing
9	Male	4 yrs	20 yrs	D	Manufacturing
10	Male	4 yrs	25 yrs	D	Manufacturing
11	Male	4 yrs	4 yrs	E	Manufacturing
12	Male	4 yrs	<25yrs	E	Manufacturing
13	Male	4 yrs	15 yrs	E	Manufacturing
14	Female	3 yrs	30 yrs	F	Public
15	Male	3 yrs	3 yrs	F	Public
16	Male	6 yrs	10 yrs	F	Public
17	Male	<1 yrs	<1 yrs	G	Public
18	Male	4 yrs	23 yrs	G	Public
19	Female	4 yrs	8 yrs	H	Public
20	Male	2 yrs	20 yrs	H	Public
21	Female	6 yrs	10 yrs	H	Public

Tables 4.2 and 4.3 below present the demographic information of the corresponding teams' leaders and departmental managers. Information about the teams and organisational tenure of these two groups of respondents was not obtained because this was not relevant to the issues being analysed.

Table 4.2: Demographic Information of Team Leaders

Team leaders	Gender	Team	Industry
1	Male	A	Service
2	Male	B	Service
3	Female	C	Manufacturing
4	Male	D	Manufacturing
5	Male	E	Manufacturing
6	Male	F	Public
7	Male	G	Public
8	Female	H	Public

Table 4.3: Demographic Information of Departmental Managers

Departmental managers	Gender	Team	Industry
1	Male	A	Service
2	Male	B	Service
3	Male	C	Manufacturing
4	Male	D	Manufacturing
5	Male	E	Manufacturing
6	Male	F	Public
7	Female	G	Public
8	Male	H	Public

4.2.2 Factors and Variables

Table 4.4 below summarises the factors and variables discovered from the content analyses. Altogether, there were 22 factors and 35 variables. The factors were classified into seven main categories: team composition, task-design, organisational context, emergent states (team-climate-for-innovation), team process (team reflexivity), team output (team innovation) and operational-organisational performance. For example, age was the important factor identified in teams A, B, C, E and G which was indicated with tick (√). However, dashes (-) for age factor in teams D, F and H indicated that the analyses did not discover age factor in the respective teams.

Table 4.4: Factors and Variables from the Interviews

	TEAM A	TEAM B	TEAM C	TEAM D	TEAM E	TEAM F	TEAM G	TEAM H
Team composition								
Bio-demographic diversity: 1) Age 2) Gender	 √ √	 √ √	 √ -	 - √	 √ -	 - √	 √ √	 - √
Task- related diversity: 3) Educational 4) Functional 5) Organisational tenure	 √ √ √	 √ √ √	 √ √ √	 √ √ √	 √ √ √	 √ - √	 √ √ √	 √ √ √
6) Team interest: -Willingness to spend more time on team activities.	√	√	√	√	√	√	√	√
Team task-design								
7) Task meaningfulness: -Skill variety -Task identity -Task significance	 √ √ √	 √ √ √	 √ √ √	 √ √ √	 √ √ √	 √ √ √	 √ √ √	 √ √ √
8) Team-autonomy (empowerment): -Opportunity to decide how to accomplish tasks -Opportunity to plan & execute decisions.	 √ √	 √ √	 √ √	 √ √	 √ √	 √ √	 √ √	 √ √
9) Intra-team coordination: -Task interdependence (depend on each other to complete task)	√	√	√	√	√	√	√	√

Table 4.4: (continued)

	TEAM A	TEAM B	TEAM C	TEAM D	TEAM E	TEAM F	TEAM G	TEAM H
Organisational context								
10) Team leadership: -Intellectual stimulation -Inspirational motivation	 √ -	 √ √	 √ √	 √ √	 √ √	 √ √	 √ √	 √ √
11) Training: -Broaden knowledge, skills and perspectives -Facilitate communication	 √ √	 √ √	 √ √	 √ √	 √ √	 √ √	 √ √	 √ √
12) Organisational recognition/reward: -Monetary -Appreciation -Authorisation to attend convention.	 √ √ √	 √ √ √	 √ √ √	 √ √ √	 √ √ √	 √ √ √	 √ √ √	 √ √ √
13) Networking with other departments: -Problem definition -Problem solutions	 √ √	 - -	 √ √	 - -	 √ √	 √ √	 - -	 - -
14) Support from head of department: -Ideas development -Consent for a team discussion hour -Provision of facilities -Liaise with other departments to facilitate problem solving and solution implementation.	 - - - -	 √ √ √ -	 √ √ √ √	 - - - -	 √ √ √ √	 √ √ √ √	 √ √ √ -	 √ √ √ -
Emergent states (Team-climate-for-innovation)								
15) Team vision: -Clear goals -Commitment towards goals	 √ √	 √ √	 √ √	 √ √	 √ √	 √ √	 √ √	 √ √
16) Support for innovation: -Cooperation and effort from team members to search for and offer innovative ideas	√	√	√	√	√	√	√	√
17) Safe participation climate: -Feel comfortable to voice ideas	√	√	√	√	√	√	√	√
18) Climate for excellence: -Monitoring the quality of implementation	√	√	√	√	√	√	√	√
Team interaction process								
19) Team reflexivity -Discussion of methods used to complete work. -Discussion of team effectiveness	 √ √	 √ √	 √ √	 √ √	 √ √	 √ √	 √ √	 √ √

...continued on next page

Table 4.4: (continued)

	TEAM A	TEAM B	TEAM C	TEAM D	TEAM E	TEAM F	TEAM G	TEAM H
Team output	Leader1	Leader2	Leader3	Leader4	Leader5	Leader6	Leader7	Leader8
20) Team innovation -Team generates appropriate and usable ideas for improvement -Proper plan and schedule for idea implementation	√ √	√ √	√ √	√ √	√ √	√ √	√ √	√ √
Operational/organisational performances	Mgr 1	Mgr 2	Mgr 3	Mgr 4	Mgr 5	Mgr 6	Mgr 7	Mgr 8
21) Operational performance: -Solve work-related problems -Productivity -Cost saving -Quality of services/products	√ - √ -	√ √ √ -	√ - - √	√ √ - -	√ √ - √	√ - - -	√ - - √	√ √ - -
22) Organisational performance: -Customer satisfaction -Company's reputation/image	√ √	√ √	√ √	√ √	√ √	√ -	√ √	√ √

As is evident in Table 4.4, for bio-demographic diversity, five teams considered that age is important for team innovation. For example, a member from Team G emphasised that younger individuals were associated with innovative ideas: *"...youngsters, they can give their fresh ideas and share among the team. The senior employees have an advantage in the sense of their wide experiences but might have lack of knowledge on new materials..."*A member from Team H said that gender diversity could benefit the team because women were normally more detail-oriented than men: *"...ladies normally are very meticulous, which will be very useful to my team, especially when we do planning. Sometimes, in certain aspects we need people with great attention to every detail..."*

With regard to the variables of task-related diversity, educational background was mentioned by all teams as important. For example, a member from Team A highlighted that individuals with different educational backgrounds helped their team achieve its outcomes: *"...those who come from training institutions that are exposed to the practical side, whereas some are from institutions that focus on the theory side. Therefore, we combine both the theory and practical* *knowledge to get ideas to solve problem..."* Both functional and organisational tenure were also important for almost all teams. For example, a member from Team C said that functional diversity supplies teams with various skills: *"…we would like to have team members from various departments so that we have various skills and knowledge...."* One member from Team G said that organisational tenure which could reflect experience also plays a role in team innovation: *"even though some of us are half- educated, they are backed by their working experiences"*.

All teams added that team interest was another important characteristic that promotes innovation. Team interest was evidenced by the willingness of team members to spend more time undertaking team activities. For example, one team member said: "*...with our interest, God willing, we are able to learn...due to our interest we are willing to spend extra time without the extra pay"* (Team D).

For the team task-design category, all teams agreed that task meaningfulness, task autonomy and task interdependence are important for innovation. Task meaningfulness was characterised by three variables i.e. skill variety, task identity and task significance. All teams described that their tasks were meaningful because they have opportunity to learn and perform various skills (skill variety). For example, a member from Team A said*"…To be a good team member, I need to learn and understand many methods. We learn among ourselves in the team during the discussion. A good team member needs knowledge to implement the methods…"* All teams also highlighted that they have task identity because they feel their contributions were visible. For example, a member from team B said *"My team always tries to do the best because a success of implementation reflects on me and my team's hard work".* A variable of task significance was identified when all teams were proud about the positive influence they had on their department. For example, a member from team F said *"…Our contribution was significant because it involved the whole organisation's system to apply what was proposed and implemented by our team. It is our pride (with an intense tone)…the system is very effective and it helps to simplify everybody's work"*

All teams stated that they had team autonomy to plan, make minor decisions and execute decisions. For example, a member of Team A said *"when there is specific distribution of duties, I can decide how to do and complete the task because it is my responsibility to get it done"*.

With regard to intra team coordination, it was identified in all teams that task-interdependent among team members would spark innovation. For instance, a member from Team D said *"…in team, we need information from each member to do problem analyses. We were individually assigned to our task and it is our responsibility to give input to the team. We will not be able to complete the project should any of us fail to deliver their work..."*

For organisational context, team leaders who were able to stimulate thinking (intellectual stimulation) and motivate (inspirational motivation) were essential for almost all teams. For instance, a member from Team C said: *"…He [team leader] always encourages us to have creative thinking and to look at problem in every aspect possible. He leads the direction of this team..."*

The importance of training and organisational reward/recognition was also identified in all teams. Interestingly, aside from monetary reward and appreciation, all teams highlighted that authorisation from their organisations to allow their participation in the ICC convention organised by the MPC was regarded as recognition. For example, a member from Team C said *"in October this year, we are invited to participate in the international convention in India. We had requested the management to release everyone in the team to attend. Otherwise there will just be three of us attending. If everyone is allowed to go, we take this as the highest appreciation given to us by the company...to win in the convention is another objectives of our team to achieve that really motivates us to do the best..."*

Teams also stated that their networking with other departments and support from a head of department are the important factors for team innovation because it helps them to define and solve problems. For example, a member from Team C said *"Prior to any changes, we will discuss with the respective department regarding the problems involved"*. Support from a departmental head was equally useful for team innovation, as this helped the team with idea generation and access to facilities. The departmental head was also important to liaise and connect the team with other departments if needed. For instance, a member of Team F said "*...He (departmental head) also assists us in the discussion that involves other parties from other departments. Other departments would give their full commitment if the communication was made by our division head and not by any of the members..."*

A team's climate-for-innovation was identified in all teams as being important for team innovation. Climate for innovation is characterised by four main climates i.e. team vision, support for innovation, safe participation climate and climate for excellence. Clear and commitment towards goals were the two variables used to describe a team's vision climate. Cooperation and effort from team members to search and generate ideas were identified as being variables for support-for-innovation climate. All teams mentioned that safe participation climate is important to make them feel comfortable to voice ideas. To achieve excellence, all teams said quality monitoring of their project implementation is crucial. For example one member said *"We follow up on the actions taken from time to time. If there is any dissatisfaction, we will make improvements. Otherwise, our innovation plan will be ruined without the monitoring..."* (Team D).

Team reflexivity is an interaction process mentioned by all teams as important to achieve innovation. For instance, one member said *"...we use the suitable methods and tools to evaluate the priority of problems to be solved..."* (Team A).

With regard to team innovation, the information was gathered from team leaders. Interviews with all the team leaders revealed that the usefulness of ideas and proper implementation of ideas were the two criteria used to evaluate team innovativeness. For example, the leader of Team G said *"...Yes, they are innovative. So far, they are very committed to search ideas which will be screened and evaluated thoroughly before the implementation. They are able to implement the project that benefits the client, because from the study they did, they understand the clients' position..."*

The innovation made by parallel team has been mentioned by departmental managers as being effective in solving work-related problems in a department, such as problems relating to productivity, cost saving and the quality of products and services. This subsequently improved organisational performance by increasing customers' satisfaction and the company's image. For instance, the departmental manager for Team F said *"...the improvement not only has simplified the work process but has captured the interest of other departments to learn our system...without the improvement, the process will be slow and time consuming. With the ICC innovation, it helps to accelerate the work and satisfies the clients due to the fast and accurate service provided..."*

4.2.3 Expected Links Among the Factors

Table 4.5 below summarises the 23 causal links proposed to exist between team design, team-climate-for-innovation, team reflexivity, team innovation and operational and organisational performance. These perceived causal links were extracted from the interview transcripts via content analysis. Column one of Table 4.5 highlights the pairs of factors and their corresponding links. For example, the first link under team composition is 'BIOage→ PSAFE', which represents that the age factor under bio-demographic diversity (BIOage) impacts 'participation safety' (PSAFE). That link was identified in Teams A,B,C,E and G.

Table 4.5: Expected Relationships Among Factors

LINK BETWEEN FACTORS	TEAM A	TEAM B	TEAM C	TEAM D	TEAM E	TEAM F	TEAM G	TEAM H
Related to team composition								
BIOage→ PSAFE	√	√	√	-	√	-	√	-
BIOgend→ PSAFE	√	√	-	√	-	√	√	√
TRLTEDfunc→ REFLX	√	√	√	√	√	√	√	√
TRLTEDedu→ REFLX	√	√	√	√	√	√	√	√
TRLTEDten→ REFLX	√	√	√	√	√	√	√	√
INTRST → REFLX	√	√	√	√	√	√	√	√
Related to task-design								
TMNG → REFLX	√	√	-	√	√	√	√	-
AUT → REFLX	√	√	√	√	√	√	√	√
COOR → REFLX	√	√	√	√	√	√	√	√
Related to organisational context								
TLDR → PSAFE	√	√	-	-	√	√	√	√
TLDR → VISS	√	√	√	√	-	-	√	√
TRAI → REFLX	√	√	√	√	√	√	√	√
ORGREW → SUPP	-	-	-	-	√	√	-	-
HEAD → SUPP	-	√	√	-	-	-	√	√
NETW →REFLX	√	-	√	-	√	√	-	-
Related to team innovation climate								
PSAFE → REFLX	√	√	√	√	√	√	√	√
SUPP → REFLX	√	√	√	√	√	√	√	√
VISS → REFLX	√	√	√	√	√	√	√	√
EXCL moderates REFLX → INN	√	√	√	√	√	√	√	√
Related to team reflexivity								
REFLX → INN	√	√	√	√	√	√	√	√
REFLX → EXCL	√	-	-	√	√	-	-	-

Related to team innovation								
INN → OPP	√	√	√	√	√	√	√	√
Related to operational-organisational performance.								
OPP → OGP	√	√	√	√	√	√	√	√

Note: AUT-Team autonomy; PSAFE-Participation safety; REFLX-Team Reflexivity; BIOD-Bio-demographic diversity; COG-Cognitive diversity; INTRST-Team interest; COOR-Intra-team coordination; EXCL-Climate for excellence; SUPP-Support for innovation; HEAD- Support from head of department; NETW-Networking with other department; ORGREW-Organisational reward; INN-Team Innovation; TLDR-Team leadership; VISS-Vision climate; TMNG-Task meaningfulness; TRAI-Training; TRLTED-Task-related diversity.

All these links are elaborated in conjunction with the qualitative data in the next section. This section is divided into seven sections to report the links related to team composition, task design, organisational context, team-climate-for-innovation, team reflexivity, team innovation and operational-organisational performance.

4.2.3.1 Links Related to Team Composition

This section discusses the links related to the three main dimensions of team composition: bio-demographic diversity, task-related diversity and team interest.

4.2.3.1.a Bio-demographic diversity

1) BIO*age*→PSAFE: This is the first link related to age. The respondents provided clues about the relationship between age-homogeneity and participation-safety climates. This relationship was determined by statements from respondents in Teams A,B,C,E and G. For example, a member from team A explained that he thus far has no problems working in age-homogeneous team because it provides a friendly environment:

> *"…It is good to have team members who are about the same age when it comes to giving out good ideas, because sometimes it makes me feel easy to befriend. So far…there has been no problem in the discussion process....".*

However, this relationship was not identified in Teams D, F and H: *"whether we are youngsters or elderly, it's not important..."(Team D)*, "*age is nothing*" (Team F) and *"age gap does not make any difference"* (Team H).

2) BIOgend→ PSAFE: With regard to gender diversity, respondents from Teams A,B,D,F,G and H implied its relationship with participation-safety climate. For instance, a member from Team F perceived that gender homogeneity enables a comfortable environment for idea generation: *"I don't mind to have female team members, but I feel more comfortable when making discussion with my male members. It's easy to talk to the same sex category. Ladies sometimes are too fussy..."*. In contrast, no relationship was supported for gender heterogeneity by members of Teams C and E: *"working with opposite gender does not affect anything in this group. It will be the same as if you are working with the same gender" (Team C)* and *"it's nothing"* (Team E).

All teams had their own opinions about the influence of age and gender diversity on team participation safety climate. Thus, the links were highlighted as BIOage→PSAFE and BIOgend→ PSAFE.

4.2.3.1.b Task-related Diversity

In all of the teams, all dimensions of task-related diversity were considered to be directly related to team reflexivity.

3) TRLTEDfunc→ REFLX: For example, with regard to a functional background, a member from Team C for example stated that cross-functional members provided their team with various skills and knowledge, and thus enhanced task-related interaction:

> *"…In the future, we would like to have team members from various departments so that we have various skills and knowledge. It will facilitate this team to be more capable of identifying and solving work-related problems ..."*

Interestingly, a member from Team F highlighted that skill diversity does not have to be extensive to make their team reflexive, because they only work on a small scope of problems in their department that require specific relevant knowledge:

> *"...If we are from the same department, everyone will understand and is fully aware of the work process and problems. We have good knowledge on what and how the work is done, so we can come out with many solutions as we are familiar with the methods. If the team members are from different department, we need to explain and get them to understand the work involved..."*

Similarly, a member of Team F highlighted another shortcoming of functional diversity: *"…we used to have a cross functional team but the attendance was poor.."*.

4) TRLTEDedu→ REFLX: For educational diversity, members from Teams A and H for example, implied that it plays a role for team reflexivity, because individuals with diverse educational backgrounds can combine their varied knowledge during discussions:

> *…"We come from different educational backgrounds. We have Certificate and Diploma holders. There are those who come from training institutions that are exposed to the practical side, whereas some are from institutions that focus on the theory side. Therefore, we combine both the theory and practical knowledge to get ideas to solve problem..."*

A member from Team H said:

> *…"We were thinking on the ideas and coincidently one of our team members was an IT graduate. I might not have a good computer skill but I have some ideas and that's what counts. We put our heads together and we think on how to approach it...."*

5) TRLTEDten→REFLX: In relation to organisational tenure, Team G implied that this directly contributed to their team reflexivity because organisational tenure triggered work experience which was useful during the discussion. For example, a member of Team G said:

> *...“a clerk that has been with the company for 15 years gives a more creative idea. He has a lot of improvement ideas and he is good with the organisation system. It is good when we do analyses to solve work-related problems....”*

A member of Team E highlighted that organisational tenure enhanced experience and compensated for a low education level, which was valuable during task-related discussions:

> *“...A few of us are university graduates. It is good to have a mixture of different backgrounds. Everyone has contributed to the team in various ways in solving work-related problems. Even though some of us are half educated, they are backed by their working experiences. Different people contribute differently to the project. It’s very useful when we try to understand the problems and find solutions...”*

4.2.3.1.c Team Interest

6) INTRST→REFLX: When the issue of how team composition influences team reflexivity was considered, respondents stated that the interest level of team members was another important factor during team discussions. This factor was constantly mentioned in all teams. For example:

> *“...the desire to do the best cannot be forced because it comes from our interest. The ICC is a challenge. I try to do my best in the team because it is my interest and I like the challenge of solving the work-related problem in my department...” (Team C).*

> *“...It has been my interest to be involved in the ICC activities. As for me, nothing is achievable without having interest...” (Team D).*

4.2.3.2 Links Related to Task-Design

This section reports about the links that are related to task meaningfulness, team autonomy and intra-team coordination.

4.2.3.2.a Task Meaningfulness

7) TMNG→REFLX: This represents a relationship between task meaningfulness and team reflexivity. For example, a member of Team G said that the tasks themselves motivate team members to be reflexive:

> *"…We feel satisfied to be able to contribute to the improvement of the department. It gets a bit stressful during the brainstorming session for ideas. But that is just for a while because when the project starts it is less stressful as we will be eager to finish the project. Upon completion, when we experience the changes due to the improvement made, we will be very happy and satisfied..."*

4.2.3.2.b Team Autonomy

8) AUT → REFLX: Almost all teams suggested that they had a moderate level of autonomy in the sense that they had the opportunity to make minor decisions and execute project implementation according to their plans. This relationship was identified in all teams. For instance, a respondent in Team H said that he was allowed to make the best decision in his capacity of how to execute the tasks delegated to him; however, the team's approval was still the required. Thus, this made the team reflexive because each member had to return to the team for discussion and approval:

> *"...I always make my own decision and I will inform my team of the changes. They give their comment and inform whether they agree or otherwise. The project decision is done by the leader and the management. But I am free to think what the best is and how to deliver my work for the project. If any of the members disagree, we will discuss and make amendments appropriately (Team H)…"*

4.2.3.2.c Intra-team Coordination

9) COOR→REFLX: This suggests a link between intra-team coordination and team reflexivity. All teams had the opinion that interdependence among team members leads a team to be reflexive. For example, a member of Team C said:

> *"…We all have our own task to complete. Some are responsible in finding data, some will be doing testing and so on. During our meeting everybody will present and highlight any updates regarding our tasks. We will find ideas and help those who have problems in completing their work..."*

This quotation offered clues that the interdependence of team members for information activated the team's interaction, thus opening wider opportunity to discuss task-related issues.

4.2.3.3 Links Related to Organisational Context

The following section presents quotations that demonstrated links related to organisational context.

4.2.3.3.a Team Leadership (transformational leadership)

There were two relationships found that originated from team leaders. One was the team leader's relationship with participation safety climate (TLDR → PSAFE), and the other was with the team vision climate (TLDR → VISS).

10) TLDR → PSAFE: This proposed a link between a team's transformational leadership and participation safety climate. When asked what made them feel comfortable when voicing ideas, even conflicting ones, respondents from Teams A, B, E, F, G and H associated their answers with their team leader's role. For example, members from Teams A and B

associated their comfort with their leader’s attention and ability to manage conflict. They said:

“...He listens to what we say and gives his feedback. All of us have ideas and he always has time for us. That’s why I don’t feel doubt to say what I want…”(Team A).

“...He will admonish and advise us if there is conflict or mistakes done and the way he does it motivates us, and makes me feel secure to voice my feelings...”(Team B).

11) TLDR → VISS: The second finding concerned the teams’ transformational leadership and its direct influence on the team’s vision climate. The participants stated that the team leader was crucial in motivating and inspiring team members to achieve the team’s objective. This relationship was discernible in Teams A,B,C,D,G and H. For example:

“...We together as a team determine the vision and mission. The leader plays an important role in this matter, along with the team’s cooperation...” (Team A).

“...He is responsible to determine the objective. He will supervise our work, our target, are we achieving it and how do we plan to achieve it. If the objective is not set, the project may deviate from the topic or scope and we are left with no principle…” (Team G).

4.2.3.3.b Training

12) TRAI → REFLX: The content analysis identified a link in all teams for the relationship between training and team reflexivity. For example, a respondent in Team B said that training impacted the way he prioritised work. Knowledge gained from the training made him competent and able to improve relationships within their team:

“I have attended many workshops because it is easy to get exemption to go for courses. From there we are able to identify what we need to prioritize in every project to make it more systematic. Training has an impact on my relationship with

the team members. I gained more knowledge after attending the workshop which makes it easier for us to work as a team...” (Team B).

As task-related communication escalated when team members were equipped with knowledge, training thus was expected to stimulate team reflexivity.

4.2.3.3.c Organisational Reward and Recognition

13) ORGREW → SUPP: There was expected to be a relationship between organisational reward/recognition and support for innovation because the analysis identified suggestions of this from respondents in Teams E and F. For example, Team E implied that a promised organisational reward inspired team members to be cooperative to achieve the team’s goal. One participant stated:

> *“…Usually those who are involved in the ICC will have a bigger chance to be promoted. I was awarded as an outstanding worker as a result of my involvement in the ICC. It is not easy to get the reward. This will inspire other team members to give their best during the team’s activities…” (Team E).*

4.2.3.3.d Support from a Head of Department

14) HEAD → SUPP: This link was identified in Teams B,C,G and H. These team members implied that the support received from their departmental heads was crucial to motivate all members to cooperate and to generate commitment to achieving the team’s goals. Thus, support from a departmental head was assumed to have an influence on support for innovation climate. For example, a member of Team B said:

> *“...The main factor that inspires me to stay in the ICC is our division head. He is the person that determines the existence of the ICC. If he gives his full support, the team will be active and able to stay long. He supports us by providing the needs of the team...”.*

4.2.3.3.e Networking with Relevant Departments

15) NETW → REFLX: This proposed a link between team networking and team reflexivity, which was identified in Teams A, C, E and F. Respondents in these teams highlighted networking with other departments facilitated problems definition and generating appropriate solutions, which prompted discussion about alternative decisions. For example:

> *"..During our meeting, everybody will present their work and we will contact the respective unit if we are unclear of some facts because they are the expert in their field. We will try to understand and solve the problem. Therefore, to get a clearer idea on that matter, we will cooperate with the other units. During the testing exercise also, we cooperate with the respective departments. We communicate not only among team members, but also with the R&D (research and development) unit and others who are involved...." (Team E).*

4.2.3.4 Links Related to Team-climate-for-innovation

The three links with team reflexivity originated from participation safety, support for innovation and vision climates, whereas the climate for excellence was identified as moderating a relationship between team reflexivity and team innovation.

16) PSAFE → REFLX: This link proposes that participation safety climate influences team reflexivity. This was identified in all teams. Respondents said they reflected on the ideas generated in their teams because they felt free and safe to voice their opinions. For example, a member of Team A said:

> *"...So far, we are free to give out ideas...with this team we say what we want to say without feeling uncomfortable. We do give ideas and sometimes we waffle but we do not trifle, just expressing what we feel and maybe it can be of some use and lead to any better ideas..."*

17) SUPP → REFLX: This link proposes that support for innovation climate influences team reflexivity. Respondents said that cooperation among team members helped their teams become reflexive. All teams implied a similar pattern. For example, a respondent from Team C said:

> *"...During the discussion, everyone gives their ideas and this enables us to learn more because there are things beyond our knowledge and those ideas make us understand the problems better. It also sparks better solutions..."*

18) VISS → REFLX: This link represents the influence of vision climate on team reflexivity. It was identified in all teams. Respondents emphasised that a clear vision climate helped them stay focused and maintain work priorities, which thus promoted discussions about alternative strategies and decisions. For instance, one participant said:

> *"...Anywhere we work, it is the same but to have an objective is important to keep us focused on strategising our team project. Team objectives will guide all the analyses and decisions..." (Team C).*

19) EXCL *moderates* REFLX → INN: For this link, climate for excellence did not show a direct effect on any factor; rather, it was identified to moderate the REFLX → INN relationship. The respondents implied that their team did not develop high quality innovative projects if they merely re-evaluated alternative strategies and decisions without ensuring they were of the highest quality. High quality was achieved through a 'climate for excellence' that emphasised constructive arguments about ideas, as well as close monitoring during the implementation stage. For example:

> *"...We can generate decent ideas and implement it. But, without attention to detail and quality, the outcomes will be just under par-value. Time to time monitoring is important to ensure everything goes as planned..." (Team A).*

4.2.3.5 Links Related to Team Reflexivity

Team reflexivity was identified as influencing team innovation and climate for excellence.

20) REFLX → INN: This link presents a relationship between team reflexivity and team innovation as implied by team leaders. The team leaders agreed that reflexive teams that actively re-evaluate ideas during discussions produced innovative decisions and results. This relationship was identified in all teams. For example, a leader from Team G said:

> *"..Yes, they are innovative. So far, they are very committed to search ideas which will be screened and evaluated thoroughly before the implementation. They are able to implement the project that benefits the client, because from the study they did, they understand the clients' position..."*

21) REFLX →EXCL: This link presents the influence of team reflexivity on team climate for excellence. Respondents said that an active re-evaluation of alternative strategies and decisions had caused debates among team members, which is an element of climate for excellence. These debates made team members accountable during project implementation, which was evidenced through monitoring. This link was implied by three team leaders. For example, a leader of Team E said:

> *"...We will voice our ideas and evaluate them. When there are many heads, of course during the process there will be some criticism when we reason out our ideas. This situation allows us to choose the best decisions based on the arguments which arose. This also happens during the implementation..."*

4.2.3.6 Links Related to the Impact of Innovation by a Parallel-team on Operational and Organisational performance.

This section reports the links related to innovation at the parallel-team level, and its impacts on operational and organisational performance. As explained in the research method chapter, this information was attained from the departmental managers. Two links were identified from the information obtained, as explained below.

22) INN → OPP: This link was concerned with the influence of team innovation on operational performance. All managers emphasised that the innovations implemented by a parallel team in their departments had improved operational performance by solving work-related problems, improving productivity, reducing operational costs and improving products and services. For example, the departmental manager of Team A said:

> *"...We also managed to overcome the shortage of equipment with a low cost. It was also reported that there was a saving on the usage of labours and vehicles. With the increasing demand from our client who is chasing time for trips for their customers, we must provide the fastest service to ensure that our client's business remains unaffected. We accomplished our mission with the innovation that was created by our team.."*

Similarly, the manager of Team E emphasised the positive impacts of innovation on productivity:

> *"...the work has become more systematic. For example, in terms of productivity, it has been increased from a production of 38 units per hour to 48 units per hour. The impact is on the cost. I could not recall how much was the cost, but the project has really reduced the repair cost. It also reduced the rejections and the time cost..."*

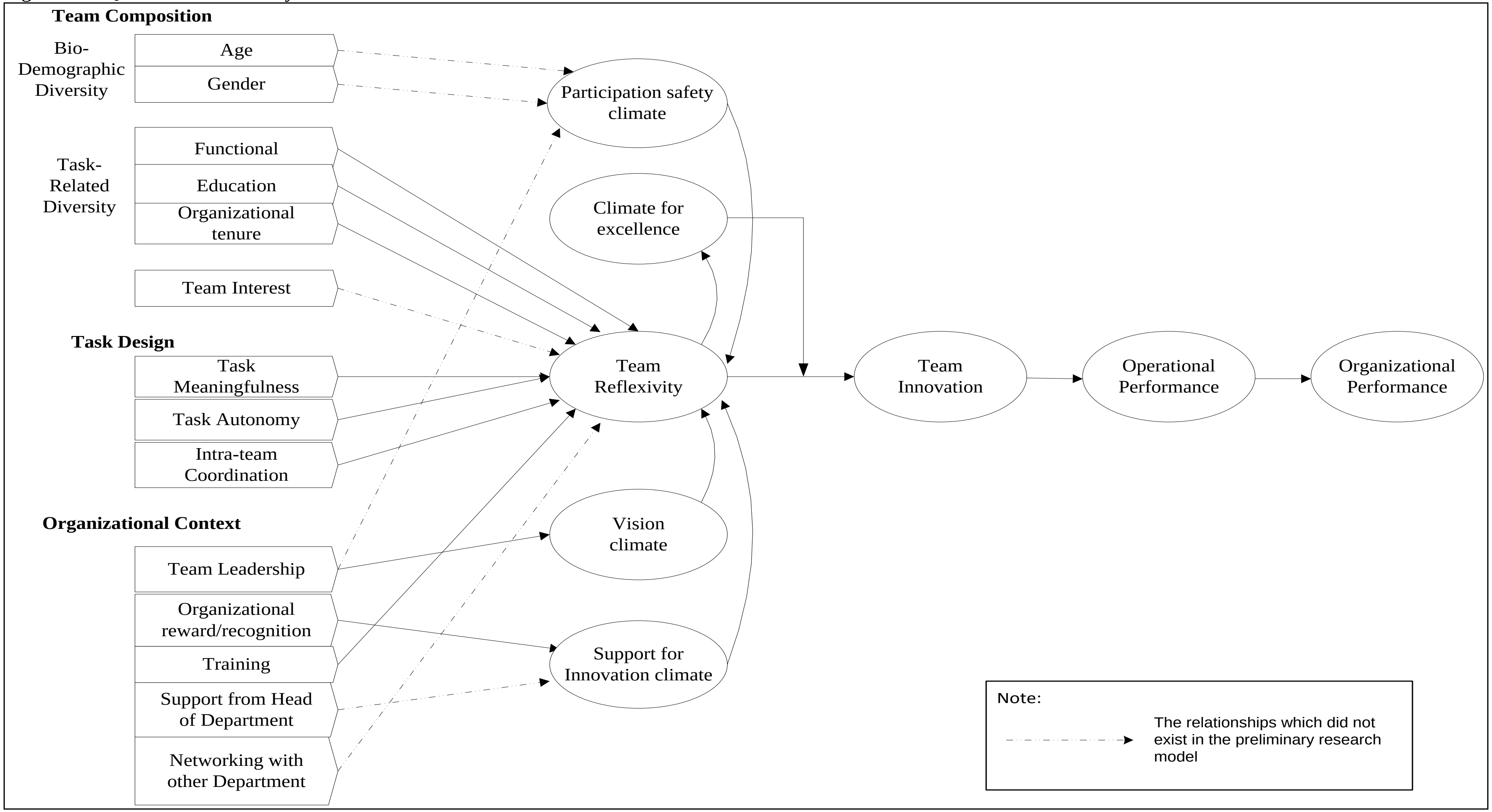
23) OPP → OGP: This link suggests that operational performance that improved by the parallel teams' innovations contributed to organisational performance. An improvement in operational performance had enhanced organisational performance by improving customers' satisfaction and the organisation's image and reputation. All managers demonstrated a similar pattern. For example, the manager of Team C stated:

"...The first project is on product improvement, which helps the company's image and reduces its warranty claim. It had positively impacted the company. It does not only involve the company in Malaysia, but also the branch in Australia. The idea of restoration has been used in Australia until now. It prevents dust from getting into our product. As a result, the sales went up. If the problems remained unsolved and the consumer constantly complaining, it will give a bad impression of the product thus affecting the company's image..."

4.3 The Qualitative Field-study Model

To illustrate the findings from the qualitative field study, a model was developed for each team. This produced eight models for the eight teams, which can be referred to in Appendix B. These eight models were combined to develop the qualitative field-study model. All the relationships presented in the Table 4.5 were transformed into a qualitative field-study model (Figure 4-1).

Figure 4-1: Qualitative field-study Research Model



4.4 Comparison Between Qualitative Field-study and Preliminary Model

The qualitative field-study model shown in Figure 4-1 was different to the preliminary research model in two ways. First, there was an increment in the number of factors. The qualitative field-study model was developed based on 22 factors, while the preliminary model was developed based on 19 factors. Three new factors were detected from the qualitative field-study: team interest, support from a departmental head and networking with relevant departments. Second, the qualitative field-study model had 23 relationships, while the preliminary model had only 20. Interestingly, the qualitative field-study model contained six relationships that were not discovered in the preliminary model. These six relationships were highlighted with a dashed line.

4.5 Justification of Three factors that Emerged from the Qualitative Field-study.

Since three new factors with corresponding variables were identified from the qualitative field-study i.e. team interest, support from a departmental head and networking with relevant departments, the relevant literature is reviewed in this section to justify the inclusion of these three new factors in the comprehensive research model. Table 4.6 below summarises the names of the researchers whose research was used to justify the importance of these three new factors and their corresponding variables. Each factor and variable is then discussed in the following sections.

Table 4.6: Literature References for Three New Factors

Factors	Reference	Variables	Reference
Team task interest	Amabile (1997;1996) Ford (1992) Lepper & Henderlong (2000) Renninger (2000) Ryan & La Guardia (1999) Locke & Latham (1990)	1. Willingness to spend more time on team activities	Dawn D. Hitt, Richard G. Marriott & James K. Esser (1992) Hidi (2000)
Supports from departmental head	Pinnington & Hammersley (1997) French (1998) Goh (2000) Davis et al. (2003) Stevenson (2007)	1. New idea development	Tierney, Farmer, & Graen (1999)
		2. Consent for a team discussion hour	Amabile & Gryskiewicz (1987).
		3. Provision of facilities	Katz & Allen (1988) Drazin et al.(1999)
		4. Liaise with other departments to facilitate problem solving and solution implementation.	Hongseok, Labianca & Myung-Ho (2006) Brass (1984) Seibert, Kraimer & Liden (2001)
Networking with other departments	Shalley & Gilson (2004) Mumford et al. (2002) Hansen (1999) Tsai (2001)	1. Facilitate problem definition	Hensley & Griffin (1986) McCauley (1989) Moorhead & Montanari (1986)
		2. Facilitate implementation of problem solutions	Brass (1992) Brass & Burkhardt (1992) Perry-Smith & Shalley (2003)

4.5.1 Team Task Interest

Task interest has long been established as an important predictor of actual performance (Ryan & La Guardia, 1999; Lepper & Henderlong, 2000; Ford, 1992; Renninger, 2000). Interest was associated with focused attention, cognitive functioning, and persistence (Hidi, 2000) which are likely to enhance performance (Locke & Latham, 1990; Ford, 1992). The cognitive evaluation theory (Deci, Cascio & Krusell, 1975) states that intrinsically motivated behaviour is behavior that allows a person to feel competent and self-determining. A person will invest less effort in their work if their expertise is not complemented by task interest. A person without skills, but with a great interest in the work is more willing to acquire skills by learning them from many sources (Amabile, 1997).

Task interest sometimes is known as intrinsic motivation. Intrinsic task motivation has been observed to reside in a person's personality (Amabile, 1997), which has been categorised as a deep-level composition variable (Bell, 2007). Previous research has suggested that deep-level composition variables are important for team performance (Harrison et al., 2002; Hollenbeck, DeRue & Guzzo, 2004). However, task interest so far has been a common research topic in a psychological field. Many of psychologists have examined the influence of task interest on performance especially among individual student or employee (e.g. Van Yperen, 2003; Merriman, Clariana & Bernardi, 2012). Many also examined its relationship with intrinsic motivation (e.g. Hitt, Marriott & Esser, 1992). Despite of the highlights the importance of task interest for team innovation, this relationship has never been examined.

In this research therefore, task interest is examined at a team-level. In contrast to the previous research which only proved the importance of task interest for performance, this research elaborates how team task-interest influences team innovation through team's climate and reflexivity.

4.5.2 Support from Departmental Head

Commitment and support from top, middle and first-line managers have been found to be central for the successful implementation of QC programmes (Pinnington & Hammersley, 1997; French, 1998; Goh, 2000; Davis, Aquilano & Chase, 2003; Stevenson, 2007). In the context of this research (parallel teams), the heads of departments were considered important because they act as facilitators who closely monitor every innovation project under the QC.

Tierney, Farmer, and Graen (1999) emphasised that encouragement and support from supervisors enhance team innovation. Manager can support their teams by allowing members to be involved in discussions within normal working hours. This support is important because it allows sufficient time to think, explore different perspectives and play with ideas, which are important to promote creativity (Amabile & Gryskiewicz, 1987). Managers can also support team innovation by ensuring that employees have access to a reasonable amount of the necessary resources to perform their job (Drazin, Glynn & Kazanjian, 1999; Katz & Allen, 1988). If the team's innovation project is connected with the operation of other departments, managers play important roles in liaising with other departmental heads to foster this process. This is important to influence the focal group (Hongseok, Labianca & Myung-Ho, 2006) and to facilitate access to required resources (Seibert, Kraimer & Liden, 2001; Brass, 1984) because departmental heads have the ability to act more quickly and with broader autonomy (Hongseok, Labianca & Myung-Ho, 2006).

Although theories have emphasised its importance on team innovation, support from departmental head only has been empirically proven as one of the factors for a successful implementation of parallel-team (quality circles) in organizations (e.g. Ismail, 2009; Sillince & Sykes, 1996; Steel et al., 1985). This variable has never been examined to elaborate how and the extent to which it influences the level of innovation in a parallel-team (see Hulsheger, Anderson & Salgado, 2009). In contrast to the previous findings which focused too much on investigating this variable as a predictor for a successful parallel-team implementation, this research investigates if a support from departmental head is related to team's climate and reflexivity to promote innovation in a parallel-team.

4.5.3 Networking with Relevant Departments

The theory of group social capital asserts that a team that communicates frequently with different people in outside groups has greater access to actual and potential resources outside the group (Hansen, 1999; Tsai, 2001). This is important because, as found by Shalley and Gilson (2004), individuals may need access to other individuals with varying expertise to gain the information needed to pursue creative activities. The development and implementation of creative ideas often requires input and support from multiple individuals or groups (Mumford et al., 2002). Team members that communicate with employees from other department obtain various forms of information that lead them to have a broader way of thinking (Hulsheger, Anderson & Salgado, 2009; Perry-Smith & Shalley, 2003; West, 2002).

Teams without connections to people outside the teams are said to have homogeneous ideas, and thus reduce the overall decision-making capacity (Hensley & Griffin, 1986; McCauley, 1989). Without networking with other departments, the group depends heavily on a small number of members to interpret external information and resources from other parts of the organisation, which leads to fewer alternatives in decision making (Moorhead & Montanari, 1986). Team networking with other departments is also encouraged because it triggers authority in other departments, which facilitates project implementation and provides resources and assistance whenever necessary (Brass, 1992; Brass & Burkhardt, 1992). It also aids a team's ability to engage lower-level workers from other groups when needed (Perry-Smith & Shalley, 2003).

In spite of the above, team's networking has received much attention from the researchers in the area of team performance in general. There is limited research that has provided evidence about the influence of team's networking on team innovation particularly (Keller, 2001;

Ancona & Caldwell, 1992b; Andrews & Smith, 1996). However, these extant researches are inadequate to delineate how team's networking influences team innovation. Additionally, the extant research only examined the influences in the context of cross-functional teams such as research and product development teams. None of the extant research has examined the influences in the context of parallel-team which is not mainly characterised by cross-functional membership. Since the findings from the qualitative stage discovered this variable as important for parallel-team, this research investigates if team's networking is related to team's climates and reflexivity for team innovation. Thus, this research does not only provide evidence the influence of team's networking on team innovation, rather it provides more information of how the influences take place.

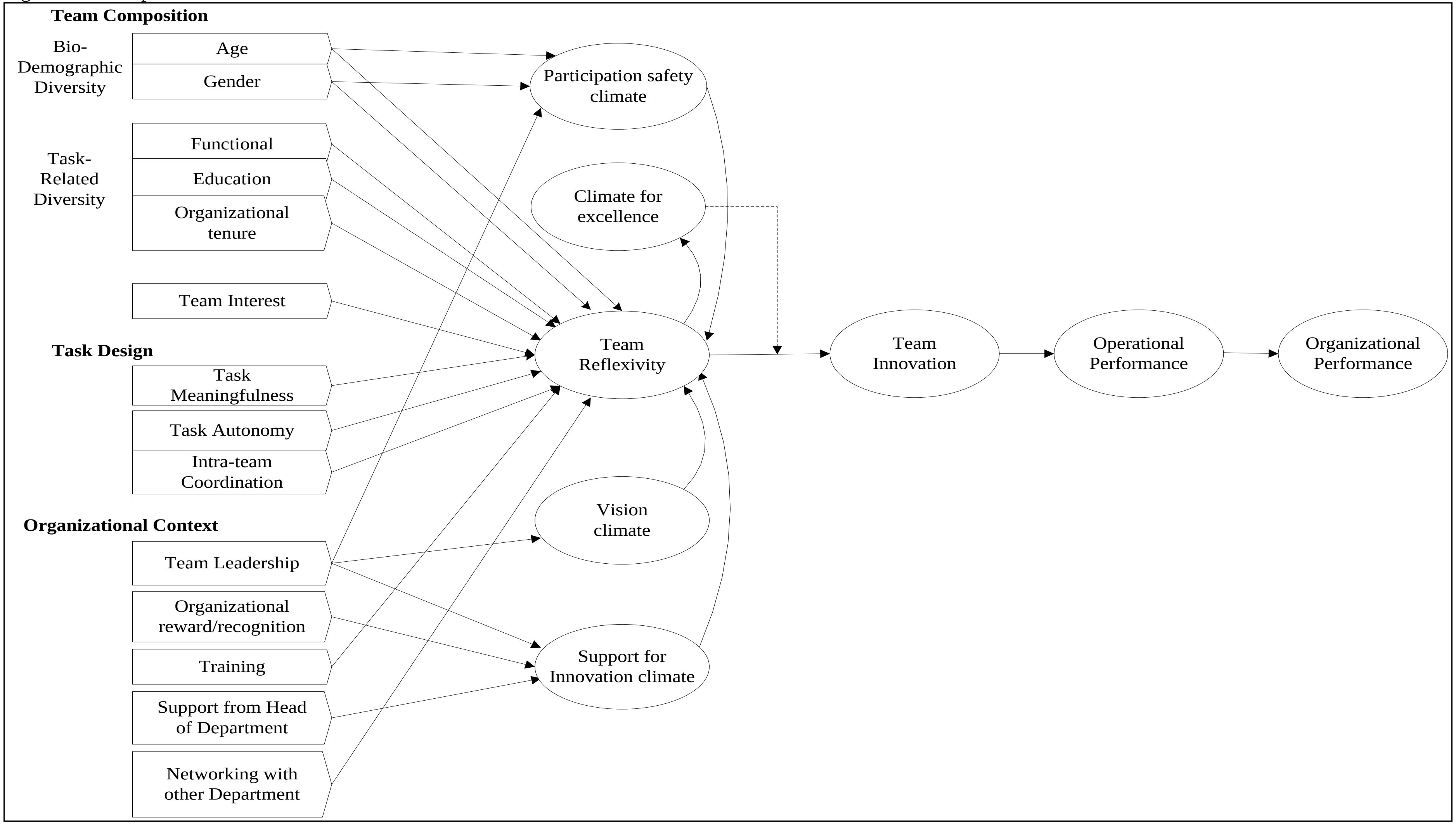
4.6 The Comprehensive Research Model

Since that all of the new factors that emerged from the qualitative field-study were justified by the literature, they were included in the comprehensive research model (Figure 4-2). To produce the comprehensive research model, the qualitative field-study model was combined with the preliminary research model. The comprehensive research model illustrated how team design could relate to team-climate-for-innovation and team reflexivity to cause team innovation, which in turn contributes to operational and organisational performance. This model was essentially similar to the preliminary model, but was extended due to the further findings from the qualitative field-study. Three factors, team interest, supports from departmental manager and networking with other departments, with six new relationships among the factors were added to the model. Based on this comprehensive model, a quantitative study was undertaken to examine the proposed relationships.

4.7 Summary

This chapter presented the findings from the qualitative field-study, which were analysed using content analysis. The data were collected through semi-structured interviews with 21 team members of eight parallel teams, eight team leaders and departmental managers from three Malaysian industrial sectors. Although the interviews were conducted one-to-one with all the respondents, the findings were reported and summarised in team-based data. The main objective of the qualitative study was to test the applicability of the preliminary research model, which was developed based on the extant literature. During the content analyses of the qualitative data, attention was also given to the emergence of new relevant factors and variables on the focal topic that might not have been acknowledged in the preliminary research model. Consequently, three new factors, team interest, support from a head of department and networking with relevant departments, were identified and justified with the literature. All the findings were illustrated in the qualitative field-study model. The final section of this chapter presented the comprehensive research model that resulted from the combination of the preliminary and qualitative field-study models. The comprehensive model was a foundation for the quantitative study, which is presented in the next chapter.

Figure 4-2: Comprehensive Research Model



Chapter 5: Hypotheses Development

5.1 Introduction

As stated in Chapter 1, the first three main research objectives were to investigate how and to what extent team design encompassing team composition, task design and organisational context can indirectly influence team innovation through team innovation climate and team reflexivity. The fourth objective was to examine the mediating role of team reflexivity. The final objective was to investigate how and to what extent innovation at the parallel-team level is perceived to improve operational and organisational performance in Malaysian companies.

To address the research objectives, this chapter presents hypotheses based on the existing theories, empirical studies and findings from the qualitative study. The hypotheses were arranged into six sections relating to: 1) team composition 2) task design 3) organisational context 4) team-climate-for-innovation 5) team reflexivity, and 6) team innovation and operational-organisational performances.

5.2 Hypotheses Related to Team Composition

There were three factors relating to team composition upon which hypotheses were developed: bio-demographic diversity, task-related diversity and team interest.

5.2.1 Bio-demographic Diversity

The literature showed that bio-demographic variables can directly cause a team to be reflexive, which is conducive to team innovation. The first justification was based on literature that articulated that employees' experiences evolve as their ages increase. Individuals with more experience normally demonstrate greater knowledge in solving various problems. Thus, an older individual is more likely to reflect on numerous creative ideas (Amabile et al., 1996), which improves team decisions and enhances team innovation (Cox & Blake, 1991; Pelled, 1996). Furthermore, experience in a field is necessary to give a sense of familiarity, which is needed for individuals to solve problems (Weisberg, 1999). Therefore, in this study, a team with age diversity was expected to be more reflexive because team members have broader knowledge and ideas. Although Zenger and Lawrence (1989) argued that age heterogeneity does not increase work-related communications in team, the majority of the literature supports this notion. Therefore, age was hypothesised as:

H1a: Age diversity is positively related to team reflexivity.

Gender was also reported as being influential on team reflexivity. For example, Hoffman and Maier (1961) reported that mixed-gender teams result in higher task conflict and better quality problem solutions than single-gender teams. However, Pelled (1996) highlighted that gender diversity leads to high affective conflict such as interpersonal disagreements associated with anger, distrust, fear, frustration and other negative interactions (Schermerhorn et al., 1991; Eisenhardt & Bourgeois, 1994). A study by Alagna et al. (1982) found that gender-heterogeneous teams have more interpersonal disagreements, greater stress and lower levels of friendliness and respect than do gender-homogeneous teams. Communication problems, escalated conflict which increases individual's social identity, favouritism, stereotyping and high employee turnover are some of the consequences associated with team heterogeneity (Wagner, Pfeffer & O'Reilly, 1984).

It has also been asserted that individuals prefer to work with others who are similar to them, so that they feel part of the team, which strengthens their group identity, communication, thoughts and interactions (Turner, 1987; Pfeffer, 1983; McPherson, Smith-Lovin & Cook, 2001). However, again the weight of existing evidence appears to support the hypothesis that:

H1b: Gender diversity is negatively related to team reflexivity.

The literature has proposed that bio-demographic variables enhance behaviours among team members (Tsui, Egan & O'Reilly, 1992). Theories in social categorisation and similarity-attraction supported this notion by emphasising that individuals who work with others who are similar to them feel a sense of belonging, which strengthens their group identity (McPherson, Smith-Lovin & Cook, 2001; Turner, 1987; Pfeffer, 1983).

Bio-demographic homogeneity has also been observed to enhance behaviour because it generates similar work attitudes (Pelled, 1996). This notion was supported by Tajfel (1982) who highlighted that employees are usually comfortable working with people who have similar characteristics to themselves, including age (Avery, McKay & Wilson, 2008; McPherson, Smith-Lovin & Cook, 2001; Tsui, Egan & O'Reilly, 1992). This is because people with the same characteristics tend to form similar thoughts about work (Perretti & Negro, 2007), thus increasing effective communication and team cohesion (Horwitz & Horwitz, 2007). Similar attitudes towards work are thus advantageous for social relationships because they improve social relations, trust, communication and cohesiveness within the group (Tsui, Xin & Egan, 1995; Berscheid, 1985). Recently, Hentschel et al (2013) found that perceived diversity among team members negatively associated with emotional value that attach team members together.

Since the literature has suggested that low bio-demographic diversity contributes to the relationships among team members, this infers that bio-demographic diversity would have an inverse effect on a team's participation safety climate. This research presumed that similar thoughts and high cohesion resulting from bio-demographic homogeneity would evolve to form a participation safety climate, in which team members would be more likely to feel comfortable and secure to participate in discussions, even when voicing dissenting ideas.

This notion was identified earlier in the qualitative field study presented in Chapter 4. The respondents implied that bio-demographic factors played a role in increasing the comforting variable in a team. Information about the influence of age and gender homogeneity on creating participation safety climate was noted in five teams. Thus, the following two hypotheses were developed for bio-demographic variables:

H2a: Age diversity is negatively related to team participation safety climate.

H2b: Gender diversity is negatively related to team participation safety climate.

5.2.2 Task-related Diversity

Information-processing theory asserts that task-related diversity is beneficial for a team because it increases accessibility to varied information for problem solving (Ancona & Caldwell, 1992b; Winquist & Larson, 1998; Wittenbaum & Stasser, 1996). Moreover, functional diversity triggers external networks (Joshi & Jackson, 2003), which provide diverse perspectives, knowledge and information (Ancona & Caldwell, 1998; Reagans &

Zuckerman, 2001) that contribute to a team's social and knowledge-based capital (Tsai & Ghoshal, 1998).

Functional background diversity fosters varied ideas and thus promotes team innovation (Carpenter, 2002; Pitcher, 2000). Hoever et. al (2012) found that different perspectives resulted from functional diversity was significant to the team's creativity as it fosters constructive discussion of ideas among team members. However, functional diversity has also been reported to have a negative relationship with internal group communication (Keller, 2001). For example, a study by Bunderson and Sutcliffe (2002) observed that functional diversity led team members to have difficulty communicating and relating to one another. The negative influence of functional diversity on team reflexivity seems to correspond with the qualitative findings of this research. The results from the qualitative study in Chapter 4 showed disagreement regarding high functional diversity. Some teams disagreed because their teams' main activities were to solve operational problems that were specific only to their department. They stated that team members from different departments were always constrained by other priorities and could not be present during most discussions, which inhibited work-related communications. In addition, much time was occupied in making sure all team members from different departments understood the problems being discussed. For these participants, team members from the same department facilitated their work-related communication, as everyone was already aware of the root problems.

Based on the above, it can be seen that functional diversity does trigger various skills and information. However, in the context of parallel-teams, high functional diversity might not be conducive for task-related communication because these teams' tasks are generally confined to specific departments' working operation. Thus, this research hypothesised that:

H3a: Functional diversity is negatively related to team reflexivity.

Educational and organisational tenure diversities are associated with a wide range of knowledge, expertise and perspectives that facilitate complex cognitive tasks that require multiple perspectives (Hoffman, 1959; Hoffman & Maier, 1961; Damon, 1991; Cohen & Levinthal, 1990). Scholars have emphasised that task-related diversity stimulates cognitive diversity (Perry-Smith, 2006), which determines the quality of discussions and debates in task-related communication (Amason, 1996; Amason & Schweiger, 1994; Fiol, 1994; Jehn, 1995). Previous studies have suggested that educational diversity provides varied sources of knowledge and promotes the spread of information among team members (Harrison & Klein, 2007). The findings from the qualitative part of this research also showed that team members appreciated educational and organisational tenure diversity, which promoted work-related communication. However, other studies have observed that team members from various tenures interact less in order to avoid conflicts, and thus reduce task-related communication in teams (Tsui & O'Reilly, 1989).

Organisational tenure homogeneity has been empirically proven to influence task communication (Ancona & Caldwell, 1992b), due to similar perspectives regarding events and technology in organisations (Zenger & Lawrence, 1989). However, it has been highlighted that homogeneous long-tenured team members become less innovative because their daily routines foster homogeneous viewpoints (West & Anderson, 1996; Katz, 1982), thus reducing team reflexivity. While task-related diversity has been suggested to influence work-related communication, reflexivity has been used frequently in many studies to describe work-related communication in teams (Ancona & Caldwell, 1992b). Thus, given the overall tenor of the discussions, in the context of the parallel team, educational and organisational tenure diversities were hypothesised as follows:

H3b: Educational diversity is positively related to team reflexivity.

H3c: Organisational tenure diversity is positively related to team reflexivity.

5.2.3 Team Interest

Amabile's (1997) componential theory suggests that team interest is conducive to team creativity. It has also been found to be an important predictor of actual performance (Ryan & La Guardia, 1999; Lepper & Henderlong, 2000; Ford, 1992; Renninger, 2000).

Based on the earlier findings from the qualitative field study presented in Chapter 4, it appears that team interest may influence team reflexivity. The qualitative findings showed that interest in a task stimulates team members to be more serious during task-related communication.

This notion has been supported by several studies. Task interest has been associated with focused attention, enhanced cognitive functioning and persistence (Hidi, 2000), which are likely to enhance performance (Ford, 1992; Locke & Latham, 1990). Furthermore, the cognitive evaluation theory (Deci et al., 1975) posits that a person with task interest normally feel competent, self-determined and has a high willingness to acquire skills by learning them from various sources (Amabile, 1983). Based on the aforementioned elements that result from task interest, it is suggested that team interest directly influences team members' intensity in communications regarding the existing strategies and decisions. Moreover, team interest is inherent in individual personality, which is one of the deep-level composition variables that have been suggested to influence team performance (Bell, 2007). Based on this, in the context of parallel-teams, the below hypothesis was developed:

H4: Team interest is positively related to team reflexivity.

5.3 Hypotheses Related to Task-design.

This section discusses hypotheses development for task meaningfulness, autonomy and intra-team coordination.

5.3.1 Task Meaningfulness

The theory of how task meaningfulness influences team performance was clearly demonstrated in the Job Diagnostic Survey by Hackman and Oldham (1975). Medsker, and Higgs (1993) suggested that task meaningfulness provides team members with a high level of internal motivation ,which evolves from feeling worthwhile and important in their work, and subsequently increases performance.

Findings from the qualitative field study of this research revealed that task meaningfulness had reinforced the interest of team members to be involved in team activities. This idea was supported by Amabile (1996), who emphasised that tasks that are interesting and meaningful contribute to the motivation to be involved seriously in a job. The current study proposed that when individuals in a team take a job seriously, they will be more active in reviewing their strategies and solutions to ensure that goals are achieved. According to the team innovation theory, task design has long been suggested as a key influencing variable on team innovation by enhancing team reflexivity (Lantz & Brav, 2007; West et al., 2004). Thus, the following hypothesis was developed for task meaningfulness:

H5: Task meaningfulness is positively related to team reflexivity

5.3.2 Task Autonomy

Team autonomy is proposed to be positively correlated with team reflexivity. This is because task autonomy promotes high internal work motivation (Hackman & Oldham, 1980; Hackman & Oldham, 1976). This motivation encourages team members to be intensely involved in discussions to ensure their decisions and strategies are effective. Moreover, autonomy makes discussions among team members meaningful because they feel they have the capacity to make their own decisions, which thus promotes more discussion and reflection (Brav, Andersson & Lantz, 2009). Additionally, team autonomy influences team reflexivity which describes task-related communication and interaction among team members (West et al., 2004).

The above notion was further supported by the findings from the qualitative field study, which identified this link in all studied teams. The respondents highlighted that they have reasonable autonomy, although they return to their team for discussion and approval. If team members have too high a level of autonomy, they might not return to their team for discussions. Based on the above theories, teams' task- autonomy is hypothesised as follow:

H6: Team task-autonomy is positively related to team reflexivity.

5.3.3 Intra-team Coordination

Intra-team task coordination has been suggested to influence the quality of interpersonal interaction among team members (Johnson & Johnson, 1989). This proposition was further strengthened by research in organisational theories (Wageman, 1995; Shea & Guzzo, 1987; Wageman, 2001; Saavedra, Earley & Van Dyne, 1993), sociological research (Lindenberg, 1997) and social psychological research (Rosenbaum et al., 1980) aspects. Interpersonal interaction requires collective action from team members (Van der Vegt, Emans & Van de Vliert, 1999; Van der Vegt & Van de Vliert, 2002; Wageman, 1995) and provides opportunities for team members to exchange ideas, debate about diverse ideas to create high-quality products, and suggest innovation to improve work procedures (Hulsheger, Anderson & Salgado, 2009). Interpersonal interaction among team members to accomplish tasks has been described as team reflexivity (West et al., 2004). Indeed, task interdependence has been found to influence reflexivity within groups (Lantz & Brav, 2007; West et al., 2004).

Additionally, the findings from the qualitative study of this research supported this notion because the interdependence of team members to execute tasks, encouraged team members to interact, and thus created wider opportunities to discuss task-related issues. Hence, it is hypothesised that:

H7: Intra-team coordination is positively related to team reflexivity.

5.4 Hypotheses Related to Organisational Context.

This section presents the hypotheses development for team leadership, training, organisational reward/recognition, support from a head of department and networking with relevant departments.

5.4.1 Team Leadership

Gersick and Hackman (1990) proposed that a team leader can promote team reflexivity. Transformational leadership theory also highlights that a leader with intellectual-stimulation characteristic may motivate team members to reconsider existing ideas and approaches to solve particular problems (Bass, 1985).

However, transformational leadership's effect on team reflexivity is not straightforward. Rather, it is associated with a team's vision climate. This was based on the fact that the transformational leader is responsible for ensuring teams have clear objectives; hence enhancing team members' understanding of what to do and increasing the likelihood of team members reconsidering existing decisions and strategies (Bass, 1985; Bass, 2000; Bass & Riggio, 2006; Berson et al., 2001). A study by Schippers et al. (2008) observed that transformational leadership promotes a team's shared vision climate. However, in manufacturing teams, team leadership has been found to be unrelated to vision climate (Ingrid, Lars-Åke & Malin, 2004) because these teams usually focus on the production objectives, which are pre-determined by upper management. Despite these mixed views, again the weight of evidence supports a positive relationship. The findings in the qualitative part of this research also identified this link in six teams. Hence, the hypothesis for transformational leadership in the context of parallel team was:

H8a: Team transformational-leadership is positively related to vision climate.

Other than vision climate, team leadership was also advocated to promote supportive behaviour among team members to achieve the team's goal. Further, transformational leaders normally encourage team members to develop a collective interest (Bass et al., 2003), which leads to a high commitment to team performance (Bass & Riggio, 2006). This supportive behaviour has been described as support-for-innovation climate (Bain, Mann & Pirola-Merlo, 2001; West & Anderson, 1996). The influence of transformational leadership on support-for-innovation climate has been evidenced in work-teams (Wang et al., 2013) and also companies (Eisenbeiss, van Knippenberg & Boerner, 2008). As the qualitative findings of this research also identified the same link, it was sensible to hypothesise that:

H8b: Team transformational-leadership is positively related to support-for-innovation climate.

Transformational leadership theory also stated that a team leader has the capacity to influence participation-safety climate. It was based on the grounds that a team leader can influence the environment within which a team works (Blumberg & Pringle, 1982). Team leaders can facilitate the environment in a team by either building effective relationships between members (Hill, 1982) or resolving conflicts among members (Piczak & Hauser, 1996).

Further, transformational leaders usually give adequate attention to their team members, and facilitate team members' interactions by enhancing two-way open communication, mutual respect and trust (Burke et al., 2006). Open communication, respect and trust have been identified as the pre-conditions for development of a participation safety climate (West, 1990). Furthermore, a transformational leader is characterised by 'idealised influence', which describes the leader's capability to behave as a role model, thus being respected and trusted by team members (Bass & Avolio, 1994). It can be intuitively presumed that this type of leader will make team members feel less threatened when voicing ideas, even if those ideas conflict with those of the majority.

Common responses from respondents in the qualitative study of this research also supported this notion. Interviewees associated their active discussions with their team leaders who have acted openly by encouraging varieties of ideas from team members, and know how to resolve conflicts. Thus, an additional hypothesis for team leadership was developed as follow:

H8c: Team transformational-leadership is positively related to team participation-safety climate.

5.4.2 Training

Training motivates team members to acquire and practise new behaviours (Lu, Tjosvold & Shi, 2010). This is why team effectiveness theories suggest that training influences team innovation by enhancing the team process (Cohen & Bailey, 1997; Antoni & Hertel, 2009; Marks, Mathieu & Zaccaro, 2001). Training has been considered as a mechanism to enhance team process because it equips team members with knowledge, skills and attitudinal competencies (Salas & Cannon-Bowers, 1997; Salas & Cannon-Bowers, 2000), which are important in enhancing decision-making. The influence of training on team processes was manifested when Salas et al. (2008) identified training as being influential on teams' task-related communication e.g. coordination, strategy development, self-correction, assertiveness, decision making and situation assessment.

As team process and task-related communications have been described as team reflexivity, this research proposed a positive relationship between training and team reflexivity. Indeed, training has been suggested as a direct method to stimulate team reflexivity (Schippers et al., 2008), but has not yet been empirically tested.

The findings from the qualitative study of this research also supported the above notion. They showed that the team process to identify the best strategies improved when members were equipped with adequate knowledge and information. Hence, the hypothesis developed for training was:

H9: Organisational training is positively related to team reflexivity.

5.4.3 Organisational Reward and Recognition

Reward is effective to promote cooperation, commitment and communication among team members (Kerrin & Oliver, 2002). Furthermore, reward acts as a stimulus that draws the attention and effort of team members towards their shared responsibilities, and thus motivates the team interaction process (Chen & Kanfer, 2006).

When a reward is offered in response to a team's goal achievement, team members were observed to be more focused and to invest more effort to attain the goal (Locke et al., 1980; Staw, 1977). The effort of individual team members collectively forms cooperation within team, as suggested by Chen and Kanfer (2006). Subsequently, 'motivational states' are triggered by the offer of reward, which encourages team members' to focus on cooperation and interaction to achieve the team's goal (Pearsall, Christian & Ellis, 2010; De Dreu, Nijstad & Van Knippenberg, 2008; De Dreu, 2007).

As team members' focus, cooperation and support to achieve their team's goal develop support for innovation climate (Anderson & West, 1998; West, 1990), this research therefore proposed a positive relationship between organisational reward/recognition and this climate. Additionally, the suggested influence was practically rational as the qualitative study of this research presented in Chapter 4 found a link between these two variables. Therefore, organisational reward/recognition was hypothesised as follows:

> ***H10: Organisational reward and recognition is positively related to support-for-innovation climate.***

5.4.4 Support From Head of Department

Buckingham and Coffman (1999/2001) asserted that a relationship with an immediate supervisor is the most influential factor on employees' performance. In this research, the interviewed departmental managers acted as supervisors for the parallel-teams as they monitor closely the teams' activities and projects.

A departmental manager can support a team by providing consent for team members to discuss their innovation projects within working hours. This is essential to provide sufficient time for thinking, exploring different perspectives and examining ideas to generate creativity (Amabile & Gryskiewicz, 1987). As teams require access to relevant and sufficient resources for their innovation activities (Drazin, Glynn & Kazanjian, 1999; Katz & Allen, 1988), departmental managers' role are important in providing facilities such as laptop computers, the internet, printers, meeting rooms, telephones and faxes (Seibert, Kraimer & Liden, 2001; Brass, 1984).

Departmental manager can connect a team with other departmental heads whenever required to foster the innovation process, and exercise power to obtain other employees' cooperation. The liaison-role of the departmental head is important because it can help a team to solicit a prompt response from out-team employees (Hongseok, Labianca & Myung-Ho, 2006).

As previous scholars have emphasised that team factors do not influence team innovation directly (e.g. Antoni & Hertel, 2009), this research suggested that a departmental head can directly influence the support-for-innovation climate in team. Support from a departmental head was believed to psychologically arouse a sense of commitment among team members, as occurs in a support-for-innovation climate. It was based on the fact that this climate evolves when team members are given practical support, such as verbal support, time and resources (Ingrid, Lars-Åke & Malin, 2004). In addition, the findings from the qualitative part of this research identified a link between support from a head of department and support-for-innovation climate. Respondents in the interviews emphasised that the support received from their departmental head motivated members to cooperate and commit to achieving the team's goals. Therefore, support from a head of department was hypothesised as:

> ***H11: Support from a head of department is positively related to support-for-innovation climate in team.***

5.4.5 Networking with Relevant Departments

Group social capital theory emphasised that a team that communicates with people from other departments has greater access to actual and potential resources (Hansen, 1999; Tsai, 2001). This is important, because individuals need to contact others with varying expertise to gain the information required for creative activities (Shalley & Gilson, 2004). Moreover, the development and implementation of creative ideas often requires input and support from multiple individuals or groups (Mumford et al., 2002). Team members that communicate with employees from other departments will obtain varied types of information leading to broader thinking (Perry-Smith & Shalley, 2003; Hulsheger, Anderson & Salgado, 2009; West, 2002).

The information obtained from the team's networking with other departments is important for team reflexivity because it generates more ideas during discussions (Barge, 2004). Furthermore, team reflexivity escalates when planning and decisions are characterised with detailed information (West, 2000). Without networking, the team depends on internal members to interpret information, leading to fewer alternatives in decision making (Moorhead & Montanari, 1986). The interviewees in the qualitative part of this research also highlighted that networking helped refining the teams' decisions and strategies.

Thus, it is suggested that a team's networking has a positive influence on team reflexivity. Hence, it was hypothesised that:

H12: A team's networking with a relevant department is positively related to team reflexivity.

5.5 Hypotheses Related to Team-climate-for-innovation

Previous studies have demonstrated that team innovation increases when the work environment enables team members to feel safe to participate in decision making and voice their ideas openly (Anderson & West, 1998). Within the participation safety climate, team members feel free to discuss and share views, which makes them more committed to the final decision (Erez, Earley & Hulin, 1985). In this situation, open discussions among team members are more likely to occur and encourage them to participate more actively. Although open discussions can generate disagreements that can lead to conflicts, the opportunity to debate the issues actually increases team members' commitment to the team projects (Amason, 1996).

As participation safety climate promotes active participation and idea arguments, it is proposed that participation safety climate directly influences team reflexivity. Team reflexivity is more likely to occur in an environment that encourages team members' participation in discussions (West, 1990). Moreover, the qualitative part of this research discovered the same influences, with interviewees stating that this climate engendered many ideas during discussions, assisting teams to refine strategies and decisions. It was therefore hypothesised that:

H13: Participation safety climate is positively and significantly related to team reflexivity.

Within a team's shared vision climate, members were observed to be more motivated to work together to attain goals (Guzzo & Dickson, 1996; West, 2000; Bass, 1985). High vision climate encourages a team to communicate about what they should be doing to achieve their team goals. This climate encourages discussions reflecting up the team's operation and performance. Once a goal is clear, they are more likely to cultivate ideas to improve their operation and performance (Locke & Latham, 1990). In a similar vein, Weldon and Weingart (1988) and Weldon, Jehn and Pradhan (1991) provided evidence that a clear vision shared by the team encouraged performance monitoring among team members. A clear vision has also been emphasised to stimulate communication in a team (Weldon & Weingart, 1993; Locke & Latham, 1990).

The above theories demonstrate that a team's shared vision climate promotes motivation among team members to engage in task-related discussions and performance monitoring, with which team reflexivity is concerned. Therefore, this study proposed that vision climate has a positive relationship with team reflexivity. This notion was further supported by Locke and Latham (1990), who advocated that a team with clear objectives had broader thoughts and stimulated team reflexivity. Schippers et al. (2008) demonstrated that team vision climate in work-teams influenced team reflexivity. Therefore, in the parallel-team context, the vision climate was hypothesised as:

H14: Team vision-climate is positively related to team reflexivity.

Support-for-innovation climate is concerned with conditions in a team where the members support each other and cooperate to ensure team innovation occurs. It is therefore suggested that this climate enhances team reflexivity. Team members are more likely to share new ideas and resources, spend more time on activities and cooperate to implement new ideas (Eisenbeiss, van Knippenberg & Boerner, 2008). When team members engage in these behaviours, they are more likely to persist and thus ensure their target is achieved.

Consequently, it encourages team members to reflect on what they have achieved and how well they have been working. If this reflection signals deviation from their goal, they will fine tune their strategies or decisions. In the interaction theory, these actions are described as team reflexivity (Carter & West, 1998). Furthermore, supportive behaviour has been highlighted as essential for team reflexivity (West et al., 2004; Antoni & Hertel, 2009). Therefore, this research hypothesized that:

H15: Team support-for-innovation climate is positively related to team reflexivity

5.6 Hypotheses Related to Team Reflexivity

This study proposed that a climate for excellence evolves from team reflexivity. This was based on the premise that reflexive team members voice their views on problems and review their current work effectiveness and progress (Johnson & Johnson, 1987). This results in constructive conflicts about dissenting opinions (Tjosvold, 1998). The more intensely team members are involved in task-related communication to evaluate alternatives and decisions, the more likely constructive conflicts will occur. Moreover, Hacker (2003) highlighted that concern about the quality of strategies and decisions is stimulated by interactions among team members. The climate theory highlights that a team's emphasis on quality by exploring opposing opinions, constructive controversy and a concern to maximise the quality of task performance are characteristics of a climate-for-excellence (Tjosvold, 1982). Thus, this research suggested a relationship between team reflexivity and team climate-for-excellence, in the following hypothesis:

H16: Team reflexivity is positively related to a team's climate-for-excellence

Scholars have suggested that interaction among team members is one source of team innovation (Woodman, Sawyer & Griffin, 1993; Woodman & Schoenfeldt, 1990; Hackman, 1990; Tannenbaum, Salas & Cannon-Bowers, 1996). Team reflexivity is regarded as a key process for team innovation (Carter & West, 1998; De Dreu, 2002; Schippers, Den Hartog & Koopman, 2001, 2002) because reflexive teams normally practise self-reflection and self-awareness, which are important for finding better solutions. Research has showed that teams that constantly review their thinking find new ways of looking at situations and are more likely to be adept at problem solving (Schwenk, 1988; Hirokawa, 1990) thus sparkling innovation. Similarly, team innovation is predicted to occur in reflexive teams, because team members have better communication and ideas as team members constantly express their views on problems (Johnson & Johnson, 1987).

In the context of a parallel team, support for this notion could be seen in the findings of the qualitative field study presented in Chapter 4. Therefore, another hypothesis for team reflexivity was developed as:

H17: Team reflexivity is positively related to team innovation.

While the literature stated that team reflexivity is positively related to creativity and team performance (Carter & West, 1998; De Dreu, 2002; Schippers, Den Hartog & Koopman, 2001, 2002), this relationship was suggested to be moderated by a team's climate-for-excellence, based on the following theories.

De Dreu (2002) highlighted that team members in a low reflexive team also voice their ideas and evaluated their strategies and decisions. However, the information is not taken seriously into further discussions and the team probably does not invest the maximum effort to carefully select the most promising decisions and strategies. If a team is reflexive but not concerned with their work quality, the influence of team reflexivity on team innovation might be marginal.

A climate for excellence is largely concerned with excellence of the task performed (Anderson & West, 1998; West, 1990). It is more related to the quality, rather than quantity of ideas generated (Burningham & West, 1995). Team members in a climate for excellence are said to have a high degree of willingness to perform to their greatest ability (West, 1990), and are thus willing to be involved in constructive debate to select the most appropriate ideas and invest effort to manage hindrances that appear during idea implementation (Eisenbeiss, van Knippenberg & Boerner, 2008). When team decisions are well planned, excellent innovations are likely to occur (Frese & Zapf, 1993; Gollwitzer, 1996).

Therefore, this study suggested that team reflexivity significantly influences high-quality innovations only under a high climate for excellence. Therefore, a moderating hypothesis was developed for the relationships between team reflexivity and team innovation:

> ***H18: A team climate-for-excellence moderates the relationship between team reflexivity and team innovation.***

5.7 Mediation Hypotheses

Bio-demographic diversity has been theorised to influence team innovation (Jackson, 1992; Milliken & Martins, 1996; Williams & O'Reilly, 1998a). For example, age triggers various knowledge and experience, which improves team decision quality and enhances team innovation (Cox & Blake, 1991; Pelled, 1996; Lawrence, 1988). In a similar vein, gender heterogeneity has been observed to produce higher levels of creativity Gilson (2001).

In hypotheses H1a and H1b, age and gender were hypothesized directly related to team reflexivity. Scholars have argued that the positive influence of diversity is marginal if team members are not intensely involved in team reflexivity. Team reflexivity has been highlighted as a mediator that converts the effects of team properties into outcomes (Marks, Mathieu & Zaccaro, 2001; Antoni & Hertel, 2009; West, 2002; Cohen & Bailey, 1997; Olson, Parayitam & Bao, 2007; West, Borrill & Unsworth, 1998). The effects of team diversity on team innovation have been confirmed to be mediated by team reflexivity (Jehn, Northcraft & Neale, 1999; O'Reilly III, Caldwell & Barnett, 1989; Pelled, 1996; Schippers, Deanne, et al., 2003). Therefore, in relation to age and gender, team reflexivity was hypothesised as:

H19/m/a: Team reflexivity mediates the impact of age diversity on team innovation.

H19/m/b: Team reflexivity mediates the impact of gender diversity on team innovation.

Task-related diversity has been suggested as being favourable to team innovation (Woodman, Sawyer & Griffin, 1993) because it provides teams with diverse perspectives, knowledge and information (Ancona & Caldwell, 1998; Reagans & Zuckerman, 2001; Tsai & Ghoshal, 1998). This promotes task-conflict (Pelled, Eisenhardt & Xin, 1999) and influences a team's ability to innovate (Ancona & Caldwell, 1992a).

Earlier, all dimensions of task-related diversity were hypothesised to have a direct influence on team reflexivity. Scholars have long advocated that team reflexivity is a mediating variable that transmits the effects of team characteristics into team outcomes (Marks, Mathieu & Zaccaro, 2001; Antoni & Hertel, 2009; West, 2002; Cohen & Bailey, 1997; Olson, Parayitam & Bao, 2007; West, Borrill & Unsworth, 1998). Task-related diversity does not have significant effects on team innovation if a team is not reflexive. Thus far, team reflexivity has been evidenced to mediate the effects of skill and knowledge diversities on product innovation (Les Tien-Shang & Sukoco, 2011). Therefore, in relation to task-related dimensions, team reflexivity was hypothesised as:

H19/m/c: Team reflexivity mediates the influence of functional diversity on team innovation.

H19/m/d: Team reflexivity mediates the influence of educational diversity on team innovation.

H19/m/e: Team reflexivity mediates the influence of organisational tenure diversity on team innovation.

H19/m/f: Team reflexivity mediates the influence of team interest on team innovation.

Task-design is considered important for team innovation because of the relationship with intrinsic motivation, which sparks creative ideas in employees (West & Farr, 1990b; Hackman & Oldham, 1980; Oldham & Cummings, 1996). Task-meaningfulness (Campion, Medsker & Higgs, 1993; Batt & Appelbaum, 1995), autonomy (Goodman, Devadas & Hughson, 1988; Guzzo & Dickson, 1996; Hackman, 1987; Sundstrom, DeMeuse & Futrell, 1990) and task interdependence (Van der Vegt & Janssen, 2003) have been found to be critical factors to enhance team innovation.

However, scholars have also advocated that task-design does not have a significant influence on team innovation if team members do not adequately engage in team reflexivity. Team reflexivity has therefore been highlighted as a mediating variable in many studies (Marks, Mathieu & Zaccaro, 2001; Antoni & Hertel, 2009; West, 2002; Cohen & Bailey, 1997; Olson, Parayitam & Bao, 2007; West, Borrill & Unsworth, 1998). Tjosvold, Tang, and West (2004) manifested the theory that team reflexivity mediates the impact of a team's goal interdependence on team innovation. As all task-design dimensions were earlier hypothesised to directly influence team reflexivity, the following mediation hypotheses were developed:

H19/m/g: Team reflexivity mediates the influence of team task-meaningfulness on team innovation.

H19/m/h: Team reflexivity mediates the influence of team task-autonomy on team innovation.

H19/m/i: Team reflexivity mediates the influence of intra-team coordination on team innovation.

Training and team networking were hypothesised in an earlier section to directly influence team reflexivity. These two organisational variables have been identified as important for team innovation. Training has been advocated to engender team innovation because it has been observed to enhance individual creativity (Basadur, Runco & Vega, 2000; Kabanoff & Bottger, 1991; Puccio et al., 2006; Firestien, 1990; Fontenot, 1993). The team's networking triggers actual and potential resources outside the group (Hulsheger, Anderson & Salgado, 2009; Perry-Smith & Shalley, 2003; West, 2002; Tsai, 2001; Shalley & Gilson, 2004; Mumford et al., 2002).

As these have been theorised to be related to team reflexivity, their impacts on team innovation was expected to be mediated by team reflexivity. This is due to the fact that team reflexivity is a variable that converts team inputs into team outcomes (Marks, Mathieu & Zaccaro, 2001; Antoni & Hertel, 2009; West, 2002; Cohen & Bailey, 1997; Olson, Parayitam & Bao, 2007; West, Borrill & Unsworth, 1998). This supposes that a team does not attain potential benefit from training and networking if team members are not reflexive. Hence, the following hypotheses were developed:

H19/m/j: Team reflexivity mediates the influences of organisational training on team innovation.

H19/m/k: Team reflexivity mediates the influences of team's networking on team innovation.

Vision, participation safety and support for innovation climates have been frequently evidenced to directly influence team innovation (Agrell & Gustafson, 1996; King & Anderson, 1990; West, 1990; West & Anderson, 1996; Bain, Mann & Pirola-Merlo, 2001; Proudfoot et al., 2007; Pirola-Merlo, 2010; West et al., 2003). However, it is argued that these climates do not directly engender high team innovation. The implication is that team members must engage intensely in team reflexivity to attain the benefits of these climates in their team outcomes. Team reflexivity has been frequently highlighted as a key variable that mediates the effects of the team condition on team innovation (Marks, Mathieu & Zaccaro, 2001; Antoni & Hertel, 2009; West, 2002; Cohen & Bailey, 1997; Olson, Parayitam & Bao, 2007; West, Borrill & Unsworth, 1998). A study by Schippers et al. (2008) proved that team reflexivity mediated the influence of vision climate on team innovation. Therefore, the following mediation hypotheses were developed:

H19/m/l: Team reflexivity mediates the influence of participation safety climate on team innovation.

H19/m/m: Team reflexivity mediates the influence of vision-climate on team innovation.

H19/m/n: Team reflexivity mediates the influence of support-for-innovation climate on team innovation.

5.8 Hypotheses Related to Team Innovation and Operational-Organisational Performance.

Barrick and Alexander (1987) suggested that problem-solving activities in a parallel-team, such as a quality circle (QC), can improve work processes, thereby influencing productivity and operational performance. Steel and Shane (1986) and Hanna, Newman and Johnson (2000) also highlighted that QCs improved operational performance. It was based on the fact that the main activities in QCs are to address productivity problems to improve both the quality and quantity of products or services provided.

An improvement in operation has been suggested to contribute to organisational performance. Delarue (2008) confirmed that there was a ‘performance chain’ between operational and organisational performance. This relationship was also implied by Mohrman and Ledford (1985), who argued that a team’s effectiveness in initiating organisational improvements depends on their ability to enhance the operational performance. Moreover, Delarue et al. (2008) highlighted that operational performance is the middle part of previous studies to display the link between teamwork and organisational performance. In addition, the relationship between operational and organisational performances has been long well demonstrated (Skinner, 1974; Hayes & Wheelwright, 1984; Porter, 1980).

In the context of this research, the influence of innovations by parallel-teams on operational and organisational performance was supported by the findings from the qualitative part of this research. The interview responses from all departmental managers showed that parallel-teams had improved operational and organisational performance through their innovations. Thus, it was hypothesised that:

> ***H20a: Team innovation at the parallel-team level is positively related to operational performance.***
>
> ***H20b: Operational performance that is improved by the innovation of a parallel-team is positively related to organisational performance.***

5.9 Summary of Hypotheses

The above hypotheses consist of three types i.e. direct, mediating and moderating hypotheses. All of the direct hypotheses are listed in Table 5.1 (page 127) on page 127, while the moderating and mediating hypotheses are listed in Table 5.2 (page 128). All of these hypotheses were illustrated accordingly on the Figure 5-1 and Figure 5-2 provided at the end of this chapter.

Table 5.1: List of Direct Hypotheses

Hypothesis	Link	Direction	Description
H 1a	DIVage→ REFLX	+ve	Age diversity is positively related to team reflexivity
H 1b	DIV gend→ REFLX	-ve	Gender diversity is negatively related to team reflexivity.
H 2a	DIVage→ PSAFE	-ve	Age diversity is negatively related to a team participation safety climate.
H 2b	DIVgend→ PSAFE	-ve	Gender diversity is negatively related to a team participation safety climate.
H 3a	DIVfunc→ REFLX	-ve	Functional diversity is negatively related to team reflexivity.
H 3b	DIVedu→ REFLX	+ve	Educational diversity is positively related to team reflexivity.
H 3c	DIVtenure→ REFLX	+ve	Organisational tenure diversity is positively related to team reflexivity.
H 4	INT → REFLX	+ve	Team interest is positively related to team reflexivity.
H 5	MNG → REFLX	+ve	Task meaningfulness is positively related to team reflexivity
H 6	AUTO → REFLX	+ve	Team task-autonomy is positively related to team reflexivity
H 7	INTRA → REFLX	+ve	Intra-team coordination is positively related to team reflexivity.
H 8a	LEAD → VISS	+ve	Team transformational-leadership is positively related to vision climate.
H 8b	LEAD → SUPP	+ve	Team transformational-leadership is positively related to support-for-innovation climate.
H 8c	LEAD → PSAFE	+ve	Team transformational-leadership is positively related to team participation-safety climate.
H 9	TRAIN → REFLX	+ve	Organisational training is positively related to team reflexivity
H 10	RECOG → SUPP	+ve	Organisational reward/recognition is positively related to support-for-innovation climate.
H 11	HEAD → SUPP	+ve	A support from a head of department is positively related support-for-innovation climate in team.
H 12	NETW → REFLX	+ve	A team's networking with relevant departments is positively related to team reflexivity.
H 13	PSAFE → REFLX	+ve	Participation safety climate is positively related to team reflexivity.
H 14	VISS → REFLX	+ve	Team vision-climate is positively related to team reflexivity.
H 15	SUPP → REFLX	+ve	Team support-for-innovation climate is positively related to team reflexivity.
H 16	REFLX → EXCL	+ve	Team reflexivity is positively related to the team climate-for-excellence.
H 17	REFLX → INN	+ve	Team reflexivity is positively related to team innovation.

H 20a	INN → OPR	+ve	Team innovation at the parallel-team level is positively related to operational performance.
H 20b	OPR → OGPR	+ve	Operational performance that is improved by the innovation of a parallel-team is positively related to organisational performance.

Table 5.2: List of Moderating and Mediating Hypotheses

Hypothesis	Mediating Link	Description
H 18	REFLX → INN ↑ EXCL	Team climate-for-excellence moderates the relationship between the team reflexivity and team innovation.
H 19/m/a	DIVage→ REFLX → INN	Team reflexivity mediates the relationship between age diversity and team innovation.
H 19/m/b	DIVgend→ REFLX → INN	Team reflexivity mediates the relationship between gender diversity and team innovation.
H 19/m/c	DIVfunc→ REFLX → INN	Team reflexivity mediates the relationship between functional diversity and team innovation.
H 19/m/d	DIVedu→ REFLX → INN	Team reflexivity mediates the relationship between educational diversity and team innovation.
H 19/m/e	DIVtenure→REFLX→ INN	Team reflexivity mediates the relationship between organisational tenure diversity and team innovation.
H 19/m/f	INT → REFLX → INN	Team reflexivity mediates the relationship between team interest and team innovation.
H 19/m/g	MNG → REFLX → INN	Team reflexivity mediates the relationship between task meaningfulness and team innovation.
H 19/m/h	AUTO → REFLX → INN	Team reflexivity mediates the relationship between team task-autonomy and team innovation.
H 19/m/i	INTRA → REFLX → INN	Team reflexivity mediates the relationship between intra-team coordination and team innovation.
H 19/m/j	TRAIN → REFLX → INN	Team reflexivity mediates the relationship between training and team innovation.
H 19/m/k	NETW → REFLX → INN	Team reflexivity mediates the relationship between team networking and team innovation.
H 19/m/l	PSAFE → REFLX → INN	Team reflexivity mediates the relationship between team participation safety climate and team innovation.
H 19/m/m	VISS → REFLX → INN	Team reflexivity mediates the relationship between team vision-climate and team innovation.
H 19/m/n	SUPP → REFLX → INN	Team reflexivity mediates the relationship between support-for-innovation climate and team innovation.

5.10 Summary

Based on the literature and the findings from the qualitative part of this research, 40 hypotheses were developed. Twenty-five of these were direct hypotheses, fourteen were mediating hypotheses and one was a moderating hypothesis. The research models that illustrate these hypotheses are provided at the end of this chapter. Each of these hypotheses is examined in Chapter 7 through application of the relevant statistical procedures according to the hypothesis type.

Figure 5-1: Direct Hypotheses

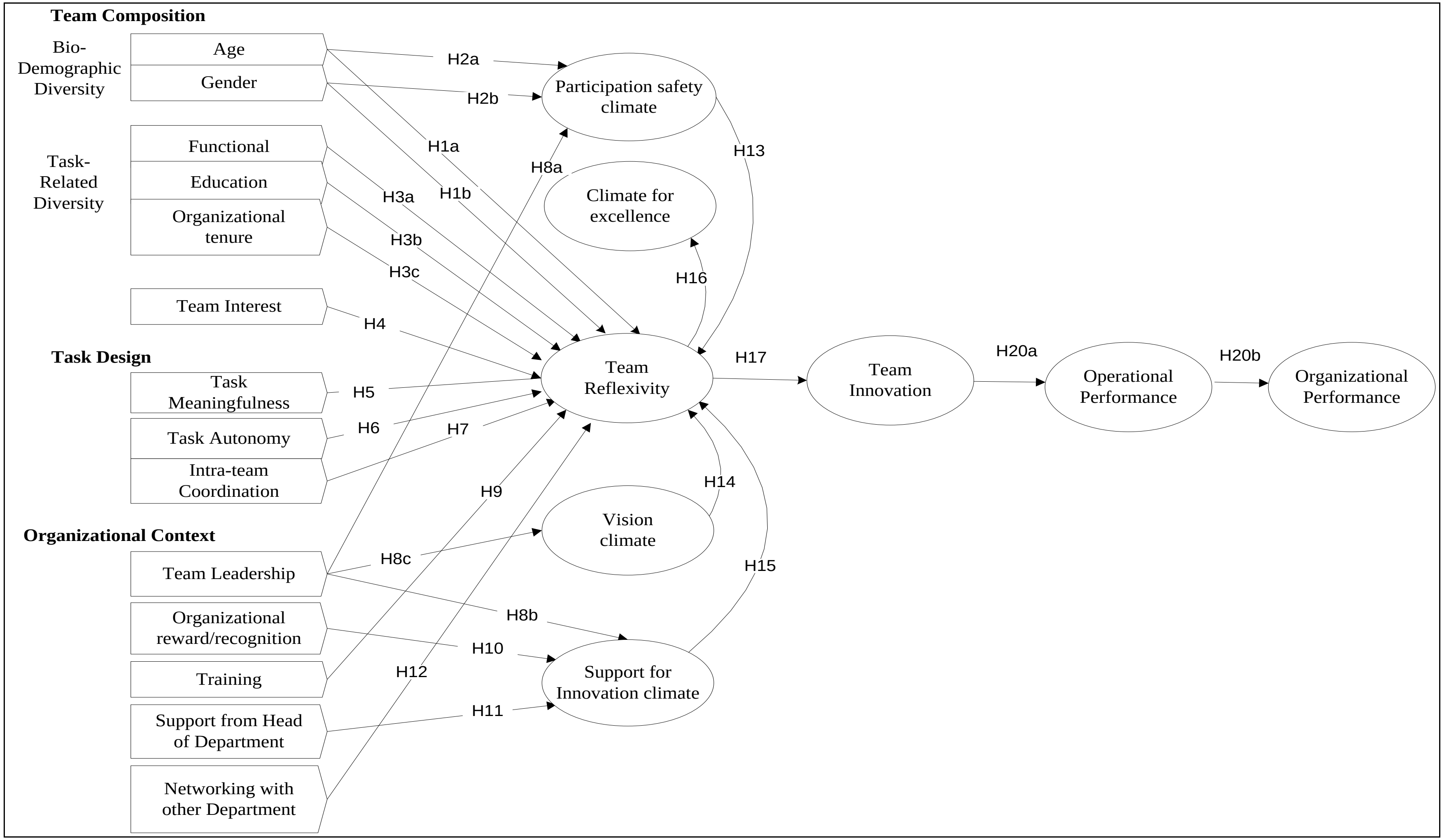
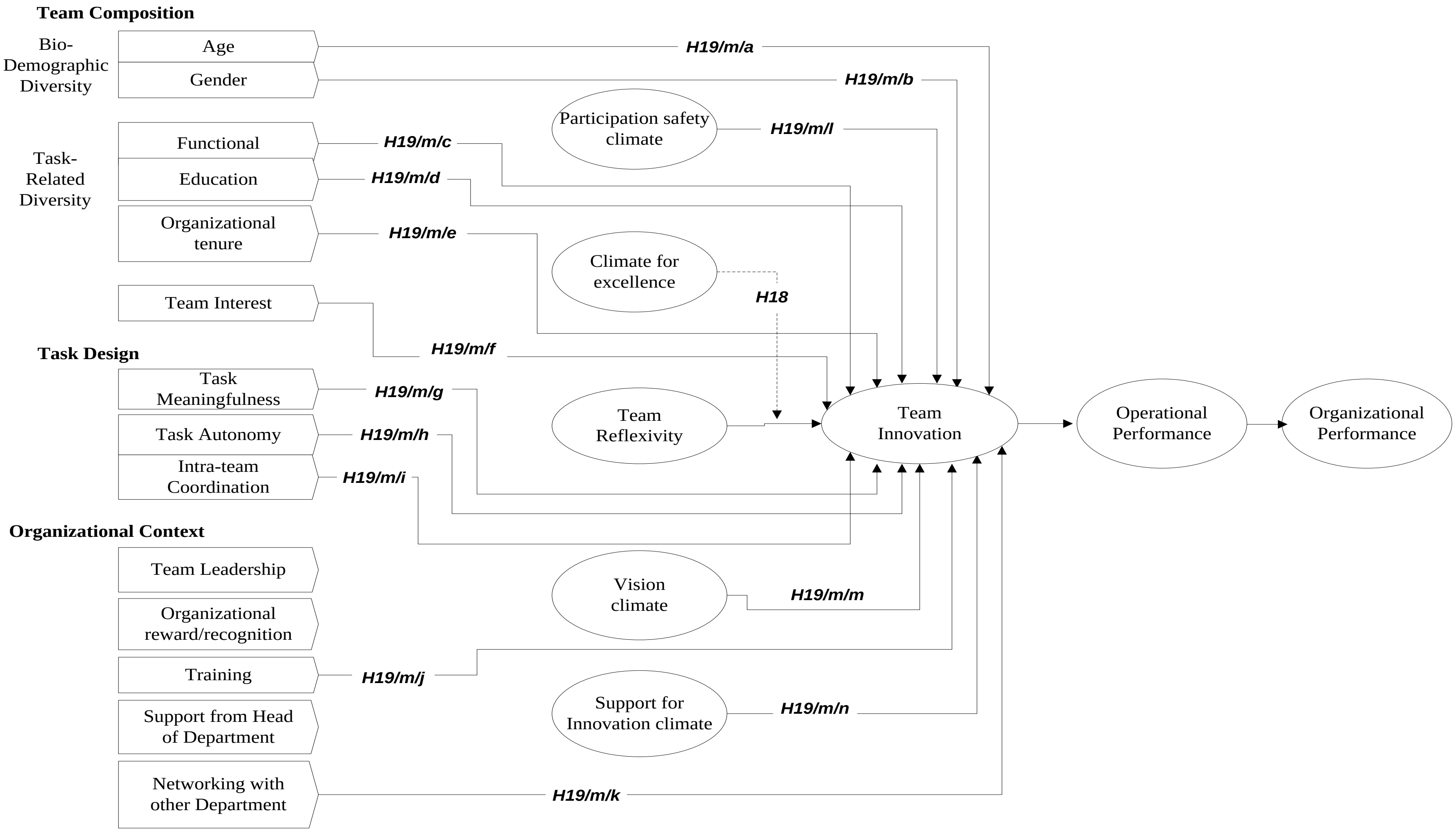


Figure 5-2: Moderating and Mediating Hypotheses



Chapter 6: Questionnaire Development

6.1 Introduction

This chapter provides detailed information with regard to questionnaire development. It also presents the outcomes of the questionnaire pre-test and pilot-test, upon which the questionnaire modifications were based.

6.2 Overview of the Questionnaire

Two sets of questionnaires were developed. Set-A was designed for team members, while set-B was for each team's departmental manager. The Set-A questionnaire was designed to obtain information regarding perceived relationships among team composition, task design, organisational context, team-climate-for-innovation and reflexivity. The Set-B questionnaire was designed to obtain information about team innovation and the extent to which the innovations were perceived to improve operational and organisational performance. Each questionnaire from a departmental manager was identifiable; thus, the responses could be linked to the specific team.

This research used two respondent groups to measure different variables in order to avoid a common method bias, which can cause measurement errors in the observed relationships (see Podsakoff et al., 2003). Although this method requires additional time and effort, it was used to reduce "acquiescent" tendencies among respondents (Podsakoff et al., 2003).

In the Set-A questionnaire, respondents' demographic information, such as gender and work department, were obtained in a nominal data form, while age, education and organisational tenure were sought in an ordinal form. Other than these, all questions in both sets used a six-point Likert-scale, ranging from one (strongly disagree) to six (strongly agree). The six-point Likert scale was used as a precaution to eliminate the middle-scale alternative in a five-point Likert scale that can lead to a 'central tendency' problem. Central tendency reduces information about the direction in which the response lie (Converse & Presser, 1986). The omission of the middle alternative was also to overcome the issue of 'not sure' or 'do not know' responses (Zikmund 2003) which was observed as apparent among Asian respondents (Hussein, Karim & Selamat, 2007). As this research was conducted in Malaysia, the use of a six-point Likert scale was therefore justified.

The questionnaires measured the relevant constructs by adapting the measurement items from the extant literature as well as those identified in the qualitative field study. As a result, the construct measurement items were relevant to the context.

Both questionnaire sets were developed in English. As members of the ICC usually consist of employees from the shop-floor who are usually not fluent in English, the Set-A questionnaire was translated into the Malaysian language through a decentring process of back translation (Brislin, 1976). This involved translating an English version of the questionnaire into the Malaysian language by a certified translator from The Institute of Language and Literature of Malaysia. Following this, the translator translated the Malaysian language questionnaire version into English. Both versions were then compared. A few discrepancies were identified and corrected. Upon the completion of both sets of questionnaires, ethical consent was obtained from the Curtin University Ethics Committee.

6.3 Questionnaire Development Set-A: Team Members

The questionnaire begins with questions that measure task design, followed by questions on organisational context, team reflexivity, team-climate-for innovation and team composition. Team composition which collects demographic information was placed at the end of the questionnaire as this section did not require a heavy cognitive load: it was felt this would give respondents a sense of relief to end the long questionnaire with simple questions. The Set-A questionnaire is presented in Appendix C1.

6.3.1 Section A: Task Design

This section collected information about team task-design, which measured team members' perceptions on task-meaningfulness, autonomy and intra-team coordination. Table 6.1 below summarises all of the measurement items used. All statements asked respondents to respond according to a six-point Likert scale, which ranged from one (strongly disagree) to six (strongly agree).

Task meaningfulness was measured by the nine items adapted from Idaszak and Drasgow (1987), who revised the Hackman and Oldham's (1975) Job Diagnostic Survey (JDS). Hackman and Oldham (1975) postulated that tasks are meaningful to employees if characterised by skill variety, task identity and task significance. Hence, in Table 6.1, the three items for task meaningfulness measure task variety, task identity and task significance. A construct for team autonomy was measured by three items, also adapted from Idaszak and Drasgow (1987), whereas intra-team coordination was measured by using five items adapted from Van der Vegt and Janssen (2003).

Table 6.1: Measurement Items for Task Design

Item	Dimensions	Statements	References
Task Meaningfulness			
MNG1	Task variety	My job in this team requires me to use a number of complex or high level skills.	Idaszak & Drasgow (1987)
MNG2	Task variety	My job in this team gives me the opportunity to do a number of different things.	Idaszak & Drasgow (1987)
MNG3	Task variety	My job in this team gives me the opportunity to learn and use a wide variety of equipment and procedures to get my job done.	Idaszak & Drasgow (1987)
MNG4	Task identity	In this team, the job is arranged so that I can do an entire piece of work from beginning to end.	Idaszak & Drasgow (1987)
MNG5	Task identity	My job in this team provides me the chance to completely finish the pieces of work I start.	Idaszak & Drasgow (1987)
MNG6	Task identity	I do a piece of work; there are others involved too, but my contribution is clear in final result.	Idaszak & Drasgow (1987)
MNG7	Task significance	My job in this team is one where a lot of people can be affected by how well the work gets done.	Idaszak & Drasgow (1987)
MNG8	Task significance	The job itself is very significant and important in the broader scheme of things.	Idaszak & Drasgow (1987)
MNG9	Task significance	What I do in this team affects the well-being of other people in very important ways	Idaszak & Drasgow (1987) Field study
Task autonomy			
MNG10	Complete responsibility	The job in this team gives me almost complete responsibility for deciding how and when the work is done.	Idaszak & Drasgow (1987) Field study
MNG11	Considerable freedom	The job in this team gives me considerable opportunity for independence and freedom in how I do the work	Idaszak & Drasgow (1987)
MNG12	Personal initiative	The job gives me a chance to use my personal initiative and judgment in carrying out the work.	Idaszak & Drasgow (1987) Field study
Intra-team coordination			
MNG13	Information needed	I need information and advice from team members to perform my job well	Van der Vegt & Janssen (2003)
MNG14	Cooperation with team members	I have a one-person job; however it is necessary for me to coordinate or cooperate with team members.	Van der Vegt & Janssen (2003)
MNG15	Collaboration	I need to collaborate with my team members to perform my job well.	Van der Vegt & Janssen (2003) Field study
MNG16	Information interdependence	Team members need information and advice from me to perform their jobs well.	Van der Vegt & Janssen (2003)
MNG17	Communication	I have to communicate regularly with team members about work-related issues.	Van der Vegt & Janssen (2003) Field study

6.3.2 Section B: Organisational Context

The second section measured each team's organisational context: transformational leadership, reward/recognition system, training, support from a head of department and team networking with other departments.

6.3.2.1 Transformational Leadership

Transformational leadership is usually measured using a 'multifactor leadership questionnaire' (MLQ) by Bass and Avolio (1990b), which is quite lengthy. Considering that this questionnaire had many constructs to be responded to by working employees who were busy during business operation, this research instead used six items that were adapted from Den Hartog et al. (1997). This was a shorter version of the transformational leadership measurement that has been used in several studies (e.g. De Hoogh, Den Hartog & Koopman, 2005; Den Hartog, De Hoogh & Keegan, 2007; Waldman, Siegel & Javidan, 2006). This version was formulated to serve a context in which a lengthy questionnaire was not appropriate (Schippers et al., 2008). These six items are displayed in Table 6.2. They cover the three main dimensions of transformational leadership: inspirational motivation, charisma and intellectual stimulation.

Table 6.2: Measurement Items for Transformational Leadership

Item	Dimension	Statement	Reference
LDR1	Inspirational motivation	My team leader serves as a role model for me	Den Hartog et al. (1997)
LDR2	Inspirational motivation	My team leader makes me aware of strongly held values, ideals, and aspirations which are shared in common.	Den Hartog et al. (1997)
LDR3	Charisma	I have complete confidence in my team leader	Den Hartog et al. (1997)
LDR4	Charisma	In my mind, my team leader is a symbol of success and accomplishment	Den Hartog et al. (1997)
LDR5	Intellectual stimulation	My team leader shows us how to look at problems from new angles	Den Hartog et al. (1997)
LDR6	Intellectual stimulation	My team leader stimulates me to back up my opinions with good reasoning	Den Hartog et al. (1997)

6.3.2.2 Organisational reward/recognition system

The second organisational context was an organisational reward/recognition system as perceived by team members. This construct measured the extent to which the reward/recognition system in the studied organisations recognised the innovative efforts and behaviour of a team. All measurement items are displayed in Table 6.3 below.

Table 6.3: Measurement Items for Organisational Reward / recognition

Item	Dimension	Statement	Reference
REW1	Encouragement	The reward/recognition system here encourages team innovation.	Scott & Bruce (1994)
REW2	Internal publicity	This organisation publicly recognizes innovative teams.	Scott & Bruce (1994)
REW3	Benefit	The reward system here benefits mainly those who don't rock the boat.*	Scott & Bruce (1994)
REW4	Financial reward	This organisation rewards people financially for developing unique ideas for work-related improvement.	Field study, Baer, Oldham & Cummings (2003)
REW5	Authorize participation in convention	This organisation authorizes innovative teams to participate in convention, to get recognition from external parties on the implemented innovation.	Field study, Brun & Dugas (2008)

* negative statements

The first three items were adapted from Scott and Bruce (1994). The statement with an asterisk (*) was negatively worded. The fourth item was concerned with financial rewards, which was mentioned in all teams during the qualitative interviews presented in Chapter 4, and was supported by Baer, Oldham and Cummings (2003). Thus, this was added to this measurement. The last item concerns to a permission given to a team to attend a yearly convention organized by MPC as explained in the methodology chapter. This item was added into this construct measurement because all interviewees perceived that opportunity or permission to attend the ICC conference as recognition for their innovation to be acknowledged by external parties. This item is sensible because Brun and Dugas (2008) stated that authorising employees to attend a conference is one form of recognition. By participating in such a conference, a team obtains feedbacks from external constituencies such as management intellectuals, consultants, senior leaders in other organisation and academics about their innovations. This thus provides a team with recognition from external boundaries (Guillén, 1994).

6.3.2.3 Training

The training received by a team was measured with four items adapted from Strubler and York (2007). The items TRA2 and TRA3 emerged from the qualitative field-study. All items are displayed in Table 6.4 below.

Table 6.4: Measurement Items for Training

Item	Dimension	Statement	Reference
TRA1	Useful to work in team	This organisation provides me with useful training to work in this team.	Strubler & York (2007)
TRA2	Improve problem solving approach	This organisation has provided me with training, which has improved my approach to problem solving at work.	Strubler & York (2007) Field study
TRA3	Improve problem analysis approach	This organisation has provided me with training, which has improved my approach to analyzing problems at work.	Strubler & York (2007) Field study
TRA4	Improve team effectiveness	This organisation has provided me with training, which has improved the way I work in this team.	Strubler & York (2007)

6.3.2.4 Support from Head of Department

Table 6.5 below presents the six items used to measure perceived support from a head of department. The first five items were adapted from Scott & Bruce (1994). The last item was included based on the findings in the qualitative part, in which almost all team members mentioned that liaising with other departments initiated by their departmental head was one of the important supports that enhanced their team innovation. This item was considered acceptable because Brass (1984) and Seibert, Kraimer and Liden (2001) emphasised the importance of a team's relationship with their line-manager in order to ensure timely access to necessary resources.

Table 6.5: Measurement Items for Support from Head of Department

Item	Dimension	Statement	Reference
SUP1	Support new ideas development	My head of department gives my team assistance in developing new ideas	Scott & Bruce (1994) Field study
SUP2	Provision of adequate resource	My head of department provides my team with adequate resources that support	Scott & Bruce (1994) Field study

		innovation in this department.	
SUP3	Permit adequate time	My head of department gives my team adequate time to pursue creative ideas.	Scott & Bruce (1994)
SUP4	Provision of adequate finding	My head of department will provide my team with adequate funding to investigate and pursue creative ideas.	Scott & Bruce (1994)
SUP5	Permission of discussion period	My head of department permits my team to have an allocated period, to discuss about our team's innovation project.	Scott & Bruce (1994) Field study
SUP6	Develop a liaison with other department	My head of department will develop networking with heads from other departments, which facilitates problem solving and its implementation.	Field study Brass (1984) Seibert, Kraimer & Liden (2001)

6.3.2.5 Team Networking with Other Department

This construct was measured with a series of four statements, as displayed in Table 6.6 below. All the statements were developed based on the findings of the qualitative study, which were reported in Chapter 4. A team's networking with other relevant departments is important for team innovation as Joshi (2006) asserted a team does not function by itself in a vacuum.

Table 6.6: Measurement Items for Team Networking with Other Departments

Item	Dimension	Statement	Reference
NETW1	Networking to define a problem.	My team discusses/communicates with other related departments in defining a work problem in hands.	Field study Hensley & Griffin (1986) McCauley (1989) Moorhead & Montanari (1986)
NETW2	Networking to solve a problem.	My team works with other related departments in finding the best solutions for a problem in view.	Field study Hensley & Griffin (1986) McCauley (1989) Moorhead & Montanari, (1986)
NETW3	Networking that facilitates innovation implementation.	My team always has strong cooperation with other related departments to facilitate project implementation.	Field study Brass (1992) Brass & Burkhardt (1992)
NETW4	Successful innovation project	My team's networking with other departments has made my team's improvement project successful.	Field study Perry-Smith & Shalley (2003)

The first pair of statements was concerned with the extent to which a team worked with other departments to interpret a problem and find a solution. This was important because this connection invites alternative ideas that can increase a team's decision-making capacity (Hensley & Griffin, 1986; McCauley, 1989). Without networking with other departments, a team tends to make decisions based on limited alternatives, which inhibits innovation (Moorhead & Montanari, 1986). The second pair of statements sought information about whether a team's networking with other departments had facilitated the implementation of their innovation project. These statements were included because, as Hansen (1999) and Tsai (2001) asserted, networking with other departments provides a team with access to required resources, which can aid the implementation of an innovation. In addition, networking provides teams with contact to authority (Brass, 1992; Brass & Burkhardt, 1992), which enables cooperation from lower-level employees of other departments whenever necessary (Perry-Smith & Shalley, 2003).

6.3.3 Section C: Team Process

This section reviews the measurement of two main constructs: team reflexivity and team-climate-for-innovation.

6.3.3.1 Team Reflexivity

Whether team performance is measured subjectively or objectively, reflexivity has been constantly concluded to have a positive relationship with team performance (Carter & West, 1998; Somech, 2006; Schippers, Deanne, et al., 2003; Tjosvold, Tang & West, 2004). This research measured team reflexivity by using a shortened-version of the questionnaire developed by Carter and West (1998). This shortened version was chosen due to the restriction by the MPC that the questionnaire should not to contain too many questions that would possibly interrupt their customers' business operations. Table 6.7 below lists the six items used in this section of the questionnaire. The last pair of items is denoted with asterisk to indicate that the statements were negatively worded.

Table 6.7: Measurement Items for Team Reflexivity

Item	Dimension	Statement	Reference
REFLX1	Reflection on team's objectives	My team often reviews its objectives.	Carter and West (1998)
REFLX2	Reflection on the methods	The methods used by my team to get the job done are often discussed.	Carter and West (1998)
REFLX3	Reflection on team effectiveness	We regularly discuss whether the team is working effectively together.	Carter and West (1998)
REFLX4	Adaptation to changes	In this team, we modify our objectives in light of changing circumstances.	Carter and West (1998)
REFLX5	Changes in strategies	My team strategies are rarely changed *	Carter and West (1998)
REFLX6	Changes in decision-making approach.	The way decisions are made in this team is rarely altered.*	Carter and West (1998)

* negative statement

6.3.3.2 Team-climate-for-innovation

A team's climate-for-innovation comprises four sub-constructs i.e. participation safety climate, climate for excellence, vision and support for innovation climates. All climates were measured by using 14 items adapted from the shortened version by Kivimaki and Elovainio (1999). This short version was based on the original Team Climate Inventory (TCI) by Anderson and West (1994), which consisted of 38 items. All the items used are presented in Table 6.8.

Table 6.8: Measurement Items for Team-climate-for-innovation

Item	Dimension	Statement	Reference
PSAFE1	Participation safety	Members in this team have a 'we are in it together' attitude.	Anderson & West (1994) Kivimaki & Elovainio (1999)
PSAFE2	Participation safety	Team members keep each other informed about work-related issues in the team.	Anderson & West (1994) Kivimaki & Elovainio (1999)
PSAFE3	Participation safety	Team members feel understood and accepted by each other.	Anderson & West (1994) Kivimaki & Elovainio (1999)
PSAFE4	Participation safety	Team members put real attempts to share information throughout the team.	Anderson & West (1994) Kivimaki & Elovainio (1999)
EXCL5	Climate for excellence	My team members prepared to question the basis of what the team is doing.	Anderson & West (1994) Kivimaki & Elovainio (1999)
EXCL6	Climate for excellence	My team members critically appraise potential weaknesses in what it is doing in order to achieve the best possible outcome.	Anderson & West (1994) Kivimaki & Elovainio (1999)
EXCL7	Climate for excellence	My team members build on each other's ideas in order to achieve the best possible outcome.	Anderson & West (1994) Kivimaki & Elovainio (1999)
VISS8	Vision climate	I am in agreement with my team's objectives.	Anderson & West (1994) Kivimaki & Elovainio (1999)
VISS9	Vision climate	My team's objectives are clearly understood by team members.	Anderson & West (1994) Kivimaki & Elovainio (1999)
VISS10	Vision climate	My team's objectives can actually be	Anderson & West (1994)

		achieved.	Kivimaki & Elovainio (1999)
VISS11	Vision climate	My team's objectives are worthwhile to the organisation.	Anderson & West (1994) Kivimaki & Elovainio (1999)
SUPP12	Support for innovation	My team members are always searching for fresh and new ways of looking at problems.	Anderson & West (1994) Kivimaki & Elovainio (1999)
SUPP13	Support for innovation	My team takes the time needed to develop new ideas	Anderson & West (1994) Kivimaki & Elovainio (1999)
SUPP14	Support for innovation	Team members co-operate in order to help develop and apply new ideas.	Anderson & West (1994) Kivimaki & Elovainio (1999)

6.3.4 Section D: Team Composition

The last section of this questionnaire measured team interest and team composition.

6.3.4.1 Team Interest

Team interest was measured with five items, as displayed in Table 6.9 below. The first four items were adapted from a study by Van Yperen (2003). The last item about 'time spent' was included based on the qualitative part of this study, which found that this item was present in all teams. This item was reasonable to be added because Deci (1971) used it as a behavioural indication to measure task interest.

Table 6.9: Measurement Items for Team Interest

Item	Dimension	Statement	Reference
INT1	Enjoyment	Did you enjoy doing your team's activities?	Van Yperen (2003)
INT2	Attention	Did you take interest in doing your team's activities?	Van Yperen (2003)
INT3	Interest	Are you interested in doing your team's activities?	Van Yperen (2003)
INT4	Pleasantness	Did you feel pleasant while you were doing your team's activities?	Van Yperen (2003)
INT5	Time spending	Are you willing to spend more time on your team's activities?	Field study Deci (1971)

6.3.4.2 Team diversity

The last part of the questionnaire was designed to measure each team's diversity. The diversities measured were bio-demographic and task-related. Information on respondents' gender and age were used to measure bio-demographic diversity, while the department where a respondent currently worked, organisational tenure and educational level were used to measure task-related diversity. The gender and department were designed to be responded to in a nominal data form, while age, education and organisational tenure were sought in ordinal form. Since these data were all categorical, a diversity value for each variable was measured by using an 'entropy index' (Taagepera & Lee Ray, 1977; Teachman, 1980; Ancona & Caldwell, 1992b), as detailed in the methodology chapter.

6.4 Questionnaire Development Set B: Departmental Managers

The questionnaire Set-B (refer Appendix C2) was designed to measure each team's departmental manager's perception of: 1) the innovation level of their team, 2) the impact of their team's innovation on operational performance 3) the impact of the operational performance improved by their teams on organisational performance. Thus, this questionnaire measured three constructs i.e. team innovation, operational performance and organisational performance.

6.4.1 Section A: Team Innovation

To measure team innovation, it was necessary to consider both idea generation and idea implementation (West, 1990; West, 2002), as well as quality of the innovation (Eisenbeiss, van Knippenberg & Boerner, 2008; Anderson & West, 1996). This research measured team innovation based on the seven items displayed in Table 6.10. Items INN1 to INN3 were adapted from Anderson and West (1996; 1998) and cover idea generation and implementation elements. To measure the quality of innovation, the four items from INN4 to INN7 were adapted from Anderson and West (1996). These cover four quality aspects i.e. 'magnitude', 'radicalness', 'novelty' and 'benefits'. Magnitude describes the perception on the positive consequences. Radicalness measures the influence of the innovation on the present situation. Novelty measures how new the innovation is to the department. Benefit describes how beneficial the innovation has been to the department.

Table 6.10: Measurement Items for Team Innovation

Item	Dimension	Statement	Reference
INN1	Ideas generation	This team generates many new ideas, methods, or procedures to improve work-related problems in this department.	Anderson & West (1996;1998)
INN2	Alternatives consideration	This team always considers new and alternative methods and procedures to improve work-related problems in this department.	Anderson & West (1996;1998)
INN3	Ideas implementation	This team implements new ideas that improve work-related problems in this department.	Anderson & West (1996;1998)
INN4	Magnitude	This team implements new ideas that have positive consequences for this department.	Anderson & West (1996)
INN5	Radicalness	This team implements new ideas that change the present situation.	Anderson & West (1996)
INN6	Novelty	This team generates very unique ideas.	Anderson & West (1996)
INN7	Benefit	This team implements changes that benefit this department.	Anderson & West (1996)

6.4.2 Section B: Operational Performance

Five items were used to measure the extent to which operational performance has been improved by the innovations of the parallel-teams. All the items displayed in the Table 6.11 were developed based on the findings from the qualitative field-study and the literature review. The literature review highlighted that activities in a parallel-team such as a QC can modify work processes, thereby influencing productivity and operational performance (Barrick & Alexander, 1987). This has been strongly rationalized by Steel and Shane (1986), Hanna, Newman and Johnson (2000), Millson and Kirk-Smith, (1996) and Davis et al. (2003), who asserted that QCs function to improve operational performance by identifying, investigating, analysing and solving work-related problems in their departments. QCs are also designed to achieve the operational goals of minimising costs, improving quality and increasing productivity (Ebrahimpour & Ansari, 1988; Banker et al., 1996; Zailani, 1998; Canel & Kadipasaoglu, 2002).

Departmental managers were required to indicate the extent to which their team's innovations had significantly solved work-problems, improved operational productivity, improved the quality of products/services, minimised operational costs and improved overall operational performance in their department.

Table 6.11: Measurement Items for Operational Performance

Item	Dimension	Statement	Reference
OP1	Improvement in work-related problems	Innovations by this team have improved work-related problem in my department	Field study Millson & Kirk-Smith (1996) Davis et al. (2003)
OP2	Improvement in operational productivity	Innovations by this team have improved operational productivity of my department	Field study Banker et al. (1996) Zailani (1998) Canel & Kadipasaoglu (2002) Ebrahimpour & Ansari (1988)
OP3	Improvement in product/service quality	Innovations by this team have improved quality of product/service in my department**.**	Field study Banker et al. (1996) Zailani (1998) Canel & Kadipasaoglu (2002) Ebrahimpour & Ansari (1988)
OP4	Cost minimization	Innovations by this team have minimized operational cost in my department.	Field study Zailani (1998) Canel & Kadipasaoglu (2002) Ebrahimpour & Ansari (1988)
OP5	Overall operational performance	Innovations by this team have improved operational performance of my department	Barrick& Alexander (1987) Steel & Shane (1986) Hanna, Newman & Johnson (2000)

6.4.3 Section C: Organisational Performance

Error! Reference source not found. below displays the five items used to measure epartmental managers' perceptions of the ways the operational performance that had been improved by their parallel-team had contributed to organisational performance.

Table 6.12: Measurement Items for Organisational Performance

Item	Dimension	Statement	Reference
OGP1	Organisation's mission and vision	Innovations by this team have improved operational performance of this department, which contributed to the organisation's vision and mission.	Richard et al (2009)
OGP2	Management expectation	Innovations by this team have improved operational performance of this department, thus meeting management expectation.	Richard et al (2009)
OGP3	Customers' satisfaction	Innovations by this team have improved operational performance of this	Field study Delaney & Huselid (1996)

		department, which contributed to customers' satisfaction.	Piczak (1988) Harris (1995) Hill (1996) Pinnington & Hammersley (1997) Olberding (1998) Goh (2000) Canel & Kadipasaoglu (2002) Konidari & Abernot (2006) Stevenson (2007)
OGP4	Organisation's image	Innovations by this team have improved operational performance of this department, which contributed to the organisation's image.	Field study Labianca et al. (2001) Gioia & Thomas (1996) Whetten & Mackey (2002)
OGP5	Overall company performance	Innovations by this team have improved operational performance of this department that contributed to the overall company performance.	Field study

Measurement of organisational performance varies depending on what the context considers to be performance within the organisation. Thus, the measures should be appropriate and relevant to the context's operation (Richard et al., 2009). Richard et al (2009) suggested that organisational performance can be measured by comparing a company's performance with the expectations of its management or some other benchmark. Therefore, the first pair of statements required respondents to rate whether the team's innovations in their department had contributed to their organisation's mission and had met management's expectation.

Organisational performance should also capture important elements such as customer satisfaction (Delaney & Huselid, 1996; Piczak, 1988; Harris, 1995; Hill, 1996; Pinnington & Hammersley, 1997; Olberding, 1998; Goh, 2000; Canel & Kadipasaoglu, 2002; Konidari & Abernot, 2006; Stevenson, 2007). Based on this and on the findings from the qualitative field-study, the element of customer satisfaction was included in the third statement.

According to the qualitative field-study presented in Chapter 4, enhanced organisational image was another benefit attained from the innovations of parallel-teams. Organisational image relates to: i) the perception of internal stakeholders of how their organisation is perceived by external stakeholders (Labianca et al., 2001), ii) characteristics that the organisation wishes to be associated with (Gioia & Thomas, 1996), iii) how top management wants the organisation to be perceived by external stakeholders (Whetten & Mackey, 2002). Hence, organisational image was used in the fourth statement. The fifth statement was also included, which presented a general statement about overall organisational performance.

6.5 Questionnaire Modifications

As explained in the methodology chapter, before administering the questionnaires to the respondents, both sets of questionnaires were pre-tested and pilot-tested. The procedures for both tests were explained in the research method chapter. The following section reports only the outcomes of the pre-test and pilot-test and the modifications subsequently made to the questionnaires.

6.5.1 Pre-test Outcomes

Two weeks after the questionnaires were e-mailed to the three consultants from the MPC and two ICC coordinators from two organisations, these participants replied to state that the overall questions were understandable; however, they had the following suggestions:

a) The cover letter to the team member should be translated into the Malaysian language.

b) The phrase 'if necessary' should be added to the front of all measurement items under 'networking with other departments'. This was because, not all teams at all times solved work-related problems that involved other departments within their organisation. The phrase was to ensure teams that were not dealing with other departments rated the measurement items reasonably. This suggestion was also made for measurement items ‘d’ and ‘f’ under the construct of ‘support from a head of department’.

c) The words of ‘publicly recognize’ in measurement item ‘b’ under the construct of ‘reward/recognition’ might be misunderstood by respondents as referring to an organisation making recognition known to the public (outsiders). Thus, it was suggested that the statement be rephrased to make clear that ‘publicly recognize’ referred to recognition that was made known to all people within the organisation.

Based on the above suggestions, the questionnaire was amended as can be seen in Appendices C1 and C2.

6.5.2 Pilot-test Outcomes

The pilot questionnaire responses were keyed into SPSS. All the negatively-worded items were re-coded accordingly. There were no peculiar responses for respondent’s demographic information. For the latent constructs in both sets of questionnaire, the mean and standard deviation were obtained for every measurement item. The response for every item in the same latent construct was expected to be in the same range of rating to indicate high consistency, especially with a negatively worded (reverse-coded) item. Nevertheless, three negatively worded items were identified to have a mean value which distinctively conflicted with their family items. The first item was identified in ‘organisational reward/recognition’, while the other two were in the ‘team reflexivity’ construct. Both constructs were in questionnaire Set-A.

Table 6.13 below displays the mean value for the measurement items of ‘organisational reward/recognition’. The mean value for the third item ‘CcRECOGreversed’ was on the ‘disagreement’ side, which was opposite to the other family items, which were on the ‘agreement’ side. The same was observed for items five and six under the ‘team reflexivity’ construct as shown in Table 6.14.

Table 6.13: Pilot-test Highlights: Measurement Item for 'Organisational Reward/Recognition'

Items	N	Minimum	Maximum	Mean	Std. Deviation
CaRECOG	40	1.00	6.00	4.8000	1.13680
CbRECOG	40	1.00	6.00	5.0250	1.02501
CcRECOGreversed	40	1.00	6.00	2.5500	1.15359
CdRECOG	40	1.00	6.00	4.5500	1.10824
CeRECOG	40	3.00	6.00	5.1500	0.86380

Table 6.14: Pilot-test Highlights: Measurement Items for 'Team Reflexivity'

	N	Minimum	Maximum	Mean	Std. Deviation
DaREFLX	40	3.00	6.00	4.8000	0.72324
DbREFLX	40	3.00	6.00	4.8000	0.82275
DcREFLX	40	3.00	6.00	5.0000	0.81650
DdREFLX	40	3.00	6.00	4.9250	0.91672
DeREFLXreversed	40	1.00	6.00	2.7250	1.32021
DfREFLXreversed	40	1.00	6.00	2.6750	1.22762

The above problem has been discussed in the literature as a ‘misresponse’. A misresponse occurs when a respondent rates a positively and negatively worded item in a similar way (Swain, Weathers & Niedrich, 2008). This type of respondent is known as being ‘acquiescent’. An acquiescent respondent is attentive when answering statements in a questionnaire, but they respond without carefully reading the content of the statement. A theory of acquiescence has been connected to the dual-stage ‘Spinozan’ model of belief by Gilbert (1991). According to this theory, acquiescent respondents are said to form an initial understanding of a statement’s content based on the first few statement items, and then miss any contradicting statements thereafter (Knowles & Condon, 1999; Krosnick, 1999). This leads to a careless response (Nunnally, 1978; Schmitt & Stuits, 1985) and mindless consistency (Drolet & Donald, 2001).

This research is aware that the purposes of a negatively worded item are to attract the attention of respondents (Drolet & Donald, 2001; Nunnally, 1978) and to reduce bias in scale scores because of acquiescent respondents (Ray, 1983; Watson, 1992). However, the use of a negatively worded item in a questionnaire has been reported to affect factor structures (Schmitt & Stuits, 1985; Babakus & Boller, 1992), weaken the reliability of scale (Herche & Engelland, 1996; Bentler, Jackson & Messick, 1971) and confuse respondents, especially those from East-Asia (Wong, Rindfleisch & Burroughs, 2003). Reflecting on these issues, a decision was made to reverse all negatively-worded items to positive, including the measurement items 'n' for 'task design' in the Set-A questionnaire. This action was taken for the following reasons:

1) Negative statements are not suitable for respondents with low education (Greenleaf, 1992), low income (Krosnick, 1999) and low social status (Winkler, Kanouse & Ware, 1982), because these are the main groups who have 'misresponse' problems. The respondents for this research were members of the ICC who were mostly from the non-management level, which could possibly mean they had lower education, income and social status.

2) Negative statements that lead to 'misresponse' problems can cause the appearance of single factor comprises only of negative items in factors analysis. Ten percent of careless respondents are enough to cause this problem (Schmitt & Stuits, 1985). Moreover, the respondents of this research were working employees who had busy daily working schedules and might thus have been subject to carelessness in reading and answering the statements in the questionnaire. Furthermore, negative statements are confusing and difficult to process (Netemeyer, Bearden & Sharma, 2003).

3) Negative statements are one of the sources of method variance, which causes measurement errors in behavioural research (Podsakoff et al., 2003). Measurement error can interrupt the validity of the relationships between constructs, has been identified as comprising random and serious systematic measurement errors (Bagozzi & Yi, 1991; Spector, 1987; Nunnally, 1978) and have the serious potential to affect research findings (Podsakoff et al., 2003).

4) In general, measurement items that are mixed with positive and negative statements are problematic if used in research in East-Asian countries, where the culture is polite (Hui & Triandis., 1983; Suzuki, Kohji & Kazuhiro, 2000; Wong & Aaron, 1995). Moreover, linguists have suggested that some counterfactual statements in English may not be accommodated easily with East-Asian languages (Bloom, 1981).

5) A study of the Job Diagnostic Survey (JDS) by Idaszak and Drasgow (1987) have showed evidence that negatively-worded items are the main source of response inconsistencies. These inconsistencies caused an artifactual factor to appear, which merely consists of negatively-worded items. However, the artifactual factor vanished when negatively-worded items in the JDS were re-worded in positive way.

6.6 Summary

All of the construct measurement questions were adapted from the established literature and from the findings of the qualitative part of this research. In this chapter, each statement used in the questionnaire was provided in full, together with its references. Some of the questions were modified and rephrased according to the outcomes of the questionnaire pre-test and pilot-test. The pilot-test outcomes did not encourage the use of negative statements in the questionnaires. Based on the literature, the negative statements were reworded. After these amendments, the main survey was executed. Chapter 7 details the findings based on the responses from participants.

Chapter 7: Quantitative Data Analysis with PLS-based SEM[3]

7.1 Overview

This chapter reports the findings of the quantitative analyses from the main survey. The findings are reported in four main sections. The first section addresses the response rate received from the survey. The second section presents the general statistical descriptions of the sample background. The third section presents the results on data aggregation and diversity calculation. The fourth section focuses on the results of the data analyses by using the PLS-based of SEM.

7.2 Survey Response Rate

The sets of team-based questionnaires were distributed to the 249 teams. Within four months, 229 team-based questionnaires were returned and keyed into SPSS. However, only 188 team-based questionnaires were usable, which reflected a response rate of 75 per cent. Questionnaire sets from 51 teams were rejected because they were not returned together with the responses from their departmental managers to justify the team's innovation; thus they could not be used for further analysis.

As explained in the methodological chapter, based on the guidelines by Chin (1998) for PLS-based SEM, the minimal response rate required for this research was 24 per cent of the total

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[3] Parts of this chapter have been published in the following publication:

Abdullah, M., and M. Quaddus. 2012. *Does Bio-Demographic Diversity Influence Team Innovation through Participation Safety Climate and Team Reflexivity?* In International Conference on Behavioral and Psychological Sciences, 27 - 28 June: Paris, France.

team-respondents, which was equivalent to 60 teams. Therefore, the response rate of 75 per cent received was considered sufficient for this research.

As explained in research methodology chapter, to assess that the proportion of respondents in each team of different team sizes are sufficient for quantitative analysis, Dawson's (2003) selection rate was calculated for each team (Appendix I). This research uses the cut-off point of .32 which has been used by Richter et al (2006). Team size in this research ranged from 4 to 15. Dawson's selection rate for each team shows a value less than 0.32 (ranged from 0 to 0.17). Therefore, all responses from 188 teams were justified as sufficient for further quantitative analysis.

7.3 Descriptive Information of the Survey Respondents

This section provides the background information with regard to team members. The information covers the industrial sector, team size, gender, age, educational-level, post-level and organisational tenure.

7.3.1 Industrial Sectors of Teams

Table 7.1 below reports the industrial background of the 188 teams. Half of the teams were from the manufacturing sector, and the remaining teams were from the service, public and electrical sectors.

Table 7.1: Industrial Sector of Teams

Sector	Number of teams	Percentage (per cent)
Manufacturing	96	51
Service	43	23
Public	33	18
Electrical	16	8
Total	188	100

7.3.2 Gender of Team Members

Table 7.2 shows that 90 per cent of the 1,168 team members from 188 teams were male. This domination of male respondents could possibly have resulted from the large number of teams from the manufacturing sector, which is mainly occupied by male employees.

Table 7.2: Gender of Team Members

Gender	Frequency	Percentage (per cent)
Male	1051	90
Female	117	10
Total	1168	100

7.3.3 Age of Team Members

Table 7.3 shows that 83.8 per cent of the respondents were between 20 to 40 years of age. Team members who were aged less than 20 and more than 40 comprised less than 2.6 per cent and 13.6 per cent respectively.

Table 7.3: Age of Team Members

Age	Frequency	Percentage (per cent)
Less than 20 yrs	30	2.6
More than 20 to 30 yrs	645	55.2
More than 30 to 40 yrs	334	28.6
More than 40 to 50 yrs	141	12.1
More than 50 to 60 yrs	18	1.5
Total	1168	100.0

7.3.4 Team Members' Education Level

Table 7.4 displays information regarding the educational background of the team members. Nearly 80 per cent of the team members were educated up to secondary level of high school and had skills certificate. Only 20 per cent were educated from a tertiary institution and were granted with a Diploma, Bachelor's Degree, Master's Degree and PhD. Team members with a Master's Degree and PhD only comprised 10 per cent. Most tertiary-educated team members had Diplomas or Bachelor's Degrees.

Table 7.4: Team members' Educational Level

Education-level	Frequency	Percentage (per cent)
High school certificate	602	51.5
Skills certificate	332	28.4
Diploma	155	13.3
Bachelor's Degree	67	5.7
Master's Degree	8	.7
PhD	4	.3
Total	1168	100.0

7.3.5 Level of Management

Table 7.5 below displays the management level at which the team members were currently located within their organisation. The team members were mostly from non-management position. This statistic was unsurprising because the function of the QC is always at the operational level, which is mainly operated by non-management employees.

Table 7.5: Management Level of Team Members

Level	Frequency	Percentage (per cent)
Management	168	14.4
Non-management	1000	85.6
Total	1168	100.0

7.3.6 Organisational Tenure

Table 7.6 shows the period that team members had been working in their organisation. 70 per cent of team members had been with their current organisation for at least one year, but less than 10 years. The other 30 per cent comprised team members with an organisational tenure of more than 10 years.

Table 7.6: Organisational Tenure of Team Members

Organisational tenure range (years)	Frequency	Percentage (per cent)
1 to 5 yrs	489	41.9
More than 5 to 10 yrs	332	28.4
More than 10 to 15 yrs	155	13.3
More than 15 to 20 yrs	110	9.4
More than 20 yrs	82	7.0
Total	1168	100.0

7.4 Pre-analyses in the PLS-Graph

Prior to the analyses in the PLS-graph software, data were prepared in a way that was appropriate to the unit of analysis of this study i.e. team-level. This research formed team-level data based on the responses from the individual team members. Thus, the Likert-scale data were aggregated into the team-level. As this study also analysed diversity for bio-demographic and task-related variables, the diversity values were calculated for the variables of each team.

7.4.1 Aggregation of Individual-level to Team-level Data.

All the Likert-scale data provided by individual team-members were aggregated to form team-level data. To justify that the aggregation was appropriate, the R*wg(j) (James, Demaree & Wolf, 1984) of each construct for each team was calculated in the SPSS syntax, and their means were summarised, as shown in Table 7.7 below.

Table 7.7: Mean of Inter-rater Agreement - R*wg(j)

Construct		Mean R*wg(j)
Team Interest		0.7360 SD=0.25680
Task varieties		0.7727 SD=0.18622
Task identity	Task meaningfulness	0.7662 SD=0.20424
Task significance		0.7910 SD=0.20592
Task autonomy		0.7345 SD= 0.23785
Intrateam coordination		0.7795 SD= 0.15153
Team leadership		0.7898 SD=0.18542
Organisational reward/recognition		0.7301 SD=0.22406
Training		0.7620 SD=0.22026
Support from a head of department		0.6763 SD=0.28871

Networking with other departments	0.7568 SD=0.22415
Participation safety climate	0.7810 SD=0.19326
Vision climate	0.8037 SD=0.18146
Support for innovation climate	0.7688 SD=0.23955
Climate for excellence	0.7790 SD=0.19821
Team reflexivity	0.7637 SD=0.17308

SD: Standard deviation

Only 14 constructs as listed in the Table 7.7 above were involved in the assessment of R*wg(j) and the data aggregation process. The Likert-scale data which that were provided by departmental managers to measure team innovation, operational and organisational performances were not involved in this process because they were measured based on the individual managers of each team.

As detailed in the methodological chapter, R*wg(j) is sufficient to represent satisfactory agreement if the average value is 0.70 or higher (James, Demaree & Wolf, 1984; George, 1990). Overall, the R*wg(j) values for these 14 constructs were higher than 0.70, except for the construct ‘support from a head of department’ which was lower than the cut-point value by only 0.0237. Thus, all the constructs were justified for data aggregation.

7.4.2 Diversity Calculation

There were five variables for which the diversity value needed to be calculated i.e. age, gender, functional background, education and organisational tenure. As detailed in methodology chapter, the diversity values for the 188 teams were calculated manually in Microsoft Excel application by using the entropy index (Ancona & Caldwell, 1992b; Teachman, 1980; Taagepera & Lee Ray, 1977) and transferred into the SPSS. The diversity values of each variable for each team are displayed in Appendix G. An example of the gender diversity calculation is as follows. For team 1, which had 8 male and 2 female team members, based on the entropy index, gender diversity was calculated as follows:

Male	H = -(8/10) x natural log (8/10) = 0.1785
Female	H = -(2/10) x natural log (2/10) = 0.3219
Gender diversity score for Team 1	*= 0.5004*

7.5 Data Analyses in PLS-Graph

As detailed earlier in the methodology chapter, the quantitative analyses were conducted by using SEM. There are two approaches to SEM: covariance-based and component-based. Component-based SEM which uses a partial-least-squares (PLS) approach was chosen for this research because it is appropriate for predicting causality and variation and for complex problem exploration (Joreskog & Wold, 1982) in research with a small sample size (Chin, 1998).

The data were analysed in a two-stage process as detailed by Barclay, Higgins and Thompson (1995), Santosa and Chan (2005) and Venkatesh et al. (2003). Figure 7-1 below illustrates the process, which began with assessment of the measurement model, followed by assessment of the structural model.

Figure 7-1: The Two-stage Analysis process

STAGE 1: Assessment of the measurement model
Step 1: Item reliability assessment
Step 2: Convergent validity assessment
Step 3: Discriminant validity assessment
STAGE 2: Assessment of the structural model
Step 1: Test each construct for the amount of variance explained by the model(R^2)
Step 2: Test relationships for statistical significance (hypotheses testing)

The assessment of the measurement model focused on examining item reliability, convergent validity and discriminant validity on the constructs indicators. The assessment of the structural model focused on examining the variance explained (R^2) and statistical significance of the t-values in all the hypotheses testing.

7.5.1 Stage 1: Assessment of the Measurement Model

To assess the measurement model, three tests were conducted for all the latent constructs as detailed in the following sections.

7.5.1.1 Item Reliability

In PLS, ‘loading’ indicates reliability for reflective indicators, while ‘weight’ is for formative indicator (Barclay, Higgins & Thompson, 1995; Chin, 1998; Santosa, Wei & Chan, 2005). Since this research had only a reflective indicator, only the ‘loading’ values were meaningful and reported. The arguments below guided this research to determine the accepted loading value.

Carmines and Zeller (1979) and Hulland (1999) recommended a rule of thumb to retain items with a loading greater than or equal to 0.7, which indicates that 50 per cent of the construct is explained by the variances. Items with a loading lower than 0.7 should be discarded from further analysis; otherwise the true relationships estimated between the constructs could be lessened (Nunnally, 1978). However, due to the exploratory nature of study, Fornell and Larcker (1981) retained items with a loading below 0.7. Further, Chin (1998) emphasised that an item with a loading of 0.5 or 0.6 is acceptable “if there are additional indicators in the block for comparison basis” (p.325). Thus, this research took 0.6 as the minimum cut-off loading value, as applied by Moores and Chang (2006).

The first loading score for all the latent constructs generated from the PLS-graph is presented in Table 7.8 below. All indicators had loading score values higher than 0.6; therefore, they were sufficient for further analysis.

Table 7.8: Item Reliability.

Construct	Measurement item	PLS loading
Team interest (INT)	EaINT	0.9418
	EbINT	0.9585
	EdINT	0.9572
	EcINT	0.9289
	EeINT	0.9331
Task varieties (VAR)	AaVAR	0.7374
	AbVAR	0.9043
	AcVAR	0.8873
Task significance (SIGF) Task Meaningfulness	AgSIGF	0.8917
	AiSIGF	0.9072
	AhSIGF	0.9132
Task identity (IDNTY)	AdIDNTY	0.9271
	AfIDNTY	0.9154
	AeIDNTY	0.9144
Team autonomy (AUTO)	AjAUTO	0.8196
	AkAUTO	0.9386
	AlAUTO	0.8897
Intra-team coordination (INTRA)	AmINTRA	0.8812
	AnINTRA	0.8002
	AoINTRA	0.8632
	ApINTRA	0.6657
	AqINTRA	0.9010
Team leadership (LEAD)	BaLEAD	0.9251
	BbLEAD	0.9329
	BcLEAD	0.9358
	BfLEAD	0.8869
	BeLEAD	0.9005
	BdLEAD	0.9151
Training (TRAIN)	CaTRAIN	0.9387
	CbTRAIN	0.9623
	CcTRAIN	0.9525
	CdTRAIN	0.9478
Organisational reward/recognition (RECOG)	CaRECOG	0.9357
	CbRECOG	0.9256
	CcRECOG	0.8661
	CeRECOG	0.8434
	CdRECOG	0.8619
Support from a departmental head (HEAD)	CaHEAD	0.9508
	CbHEAD	0.9488
	CcHEAD	0.9473
	CdHEAD	0.9411
	CeHEAD	0.9239
	CfHEAD	0.9464
Team networking (NETW)	CaNETW	0.9290
	CbNETW	0.9597

Construct	Measurement item	PLS loading
	CcNETW	0.9354
	CdNETW	0.9377
Participation safety climate (PSAFE)	DaPSAFE	0.9396
	DbPSAFE	0.9312
	DcPSAFE	0.9303
	DdPSAFE	0.9402
Support for innovation climate (SUPcL)	DlSUPcL	0.9378
	DmSUPcL	0.8978
	DnSUPcL	0.9400
Vision climate (VISS)	DhVISS	0.9295
	DiVISS	0.9249
	DjVISS	0.9196
	DkVISS	0.9403
Climate for excellence (EXCL)	DeEXCL	0.9398
	DfEXCL	0.9422
	DgEXCL	0.9182
Team reflexivity (REFLX)	DaREFLX	0.9032
	DbREFLX	0.9030
	DcREFLX	0.9280
	DdREFLX	0.8923
	DeREFLX	0.7879
	DfREFLX	0.6877
Team innovation (INNOV)	AaINNOV	0.8924
	AbINNOV	0.8924
	AcINNOV	0.9133
	AdINNOV	0.9182
	AeINNOV	0.9078
	AgINNOV	0.8440
	AfINNOV	0.8827
Operational performance (OPR)	OPRa	0.9176
	OPRb	0.9309
	OPRc	0.9266
	OPRd	0.9103
	OPRe	0.9234
Organisational performance (ORGP)	ORGPa	0.8982
	ORGPb	0.9277
	ORGPc	0.8736
	ORGPd	0.9190
	ORGPe	0.9127

7.5.1.2 Convergent Validity

The convergent validity for each construct was examined based on two assessments: 1) Internal consistency, and 2) Average Variance Extracted (AVE). Chin (1998) and Nunnally and Bernstein (1994) explained that 0.7 indicates an acceptable value for internal consistency, while a minimum of 0.50 is sufficient for AVE (Fornell & Larcker, 1981).

Table 7.9 shows the results of internal consistency and AVE generated from the PLS. All the internal consistency and AVE values were higher than 0.70 and 0.50 respectively; thus they meet the requirement.

Table 7.9: Internal Consistency & AVE Values for Each Construct.

Construct	Internal consistency	AVE
Team interest (INT)	0.976	0.891
Task varieties (VAR)	0.883	0.716
Task significance (SIGF)	0.931	0.817
Task identity (IDNTY)	0.942	0.845
Team autonomy (AUTO)	0.914	0.781
Intra-team coordination (INTRA)	0.914	0.683
Team leadership (LEAD)	0.969	0.839
Training (TRAIN)	0.974	0.903
Organisational reward/recognition (RECOG)	0.949	0.787
Support from a departmental head (HEAD)	0.980	0.889
Team networking (NETW)	0.968	0.885
Participation safety climate (PSAFE)	0.965	0.875
Support for innovation climate (SUPcL)	0.947	0.856
Vision climate (VISS)	0.962	0.862
Climate for excellence (EXCL)	0.953	0.871
Team reflexivity (REFLX)	0.941	0.730
Team innovation (INNOV)	0.965	0.798
Operational performance (OPR)	0.966	0.850
Organisational performance (ORGP)	0.958	0.822

7.5.1.3 Discriminant Validity

The discriminant validity was examined to test the degree of variance shared among the measurement items and constructs in the model. This assessment was conducted at the construct and item level.

At the construct level, the discriminant validity was evaluated by comparing the square root of the AVE of each construct with the correlation between all the constructs. Table 7.10 displays the square root of the AVE in diagonal and bold font. The non-diagonal values are the correlation matrix between constructs in the corresponding columns and rows. The discriminant validity was met if the square root of the AVE was larger than all the correlations between the constructs (Barclay, Higgins & Thompson, 1995). It should be discarded if it did not conform to this requirement. All the AVEs in Table 7.10 were observed to be higher than the between-construct correlation values; thus, all the constructs were different from the others.

At the item level, the cross loading of each item was compared across all other items of different constructs. Appendix H1 displays the cross loading value for all items. Each item should have higher loading value for its respective construct than for any of the others (Chin, 1998; Barclay, Higgins & Thompson, 1995). For example, EaINT, EbINT, EcINT, EdINT and EeINT are the measurement items for team interest (INT). These items had cross-loading values that were higher than the items for the other constructs in the same column; thus, that met the requirements for further analyses.

All items in Appendix H1 were observed to satisfy the requirement except, four items i.e. AaVAR, ApINTRA, DeREFLX, and DfREFLX. These items are highlighted with an oval shape, and were discarded from further analyses. Following this, the cross-loading was run a second time. Appendix H2 displays the 2nd run of the cross-loading values. These values were observed to cross-load into their respective constructs distinctively. Therefore, data without these four items were analysed further in the structural model assessment.

Table 7.10: Construct-level Discriminant Validity

	INT	*VAR*	*SIGN*	*IDNTY*	*AUTO*	*INTRA*	*LEAD*	*TRAIN*	*RECOG*	*HEAD*	*NETW*	*PSAFE*	*SUPPcl*	*VISS*	*EXCL*	*REFLX*	*INNOV*	*OPR*	*ORGP*
INT	**0.944**																		
VAR	0.588	**0.928**																	
SIGN	0.667	0.836	**0.904**																
IDNTY	0.669	0.827	0.858	**0.919**															
AUTO	0.574	0.724	0.730	0.745	**0.884**														
INTRA	0.662	0.769	0.770	0.702	0.571	**0.881**													
LEADER	0.685	0.693	0.734	0.727	0.583	0.758	**0.916**												
TRAIN	0.578	0.495	0.580	0.531	0.540	0.501	0.589	**0.950**											
RECOG	0.590	0.584	0.576	0.564	0.582	0.580	0.603	0.753	**0.887**										
HEAD	0.391	0.364	0.411	0.454	0.436	0.277	0.384	0.681	0.597	**0.943**									
NETW	0.663	0.534	0.633	0.628	0.578	0.514	0.618	0.735	0.699	0.699	**0.941**								
PSAFE	0.769	0.631	0.692	0.734	0.597	0.716	0.795	0.578	0.568	0.446	0.680	**0.935**							
SUPPcl	0.764	0.633	0.699	0.743	0.632	0.690	0.760	0.597	0.567	0.481	0.679	0.851	**0.925**						
VISS	0.768	0.684	0.746	0.750	0.645	0.768	0.799	0.555	0.521	0.402	0.630	0.878	0.877	**0.928**					
EXCL	0.724	0.628	0.668	0.724	0.626	0.675	0.732	0.516	0.565	0.400	0.630	0.895	0.857	0.840	**0.933**				
REFLEX	0.773	0.709	0.777	0.779	0.637	0.749	0.753	0.656	0.633	0.464	0.710	0.858	0.836	0.827	0.827	**0.931**			
INNOV	0.415	0.325	0.384	0.413	0.372	0.344	0.367	0.340	0.278	0.190	0.325	0.365	0.390	0.387	0.391	0.361	**0.893**		
OPR	0.364	0.366	0.384	0.391	0.404	0.342	0.352	0.360	0.337	0.208	0.337	0.320	0.374	0.336	0.377	0.337	0.850	**0.922**	
ORGP	0.342	0.364	0.378	0.390	0.366	0.328	0.342	0.349	0.284	0.198	0.312	0.321	0.390	0.355	0.379	0.340	0.850	0.877	**0.907**

7.5.2 Stage 2: Assessment of the Structural Model

This section discusses the second stage of the PLS-SEM analysis. This stage focused on the relationship testing between the constructs as hypothesised. The structural model was evaluated based on: i) the R^2 (amount of the variance explained), and ii) hypothesis testing through the Path coefficient (*ß*) and the t-value.

7.5.2.1 Amount of Variance Explained (R^2)

The R^2 was examined for each endogenous construct to indicate how much it was explained by the exogenous construct. The R^2 was interpreted in a similar way to the traditional multiple regression analysis. The R^2 for each endogenous construct should be at least 0.10, as suggested by Santosa, Wei and Chan (2005) and Falk and Miller (1992). In this research model, there were eight endogenous constructs. All of the R^2 values for these endogenous constructs are listed in Table 7.11 below, with the lowest value being 0.130. Therefore, the entire endogenous construct were sufficiently explained by their respective exogenous constructs.

Table 7.11: R-square Values for Endogenous Construct

Endogenous construct	(R^2)
Team reflexivity (REFLX)	0.841
Participation safety climate (PSAFE)	0.642
Support for innovation climate (SUPPcl)	0.621
Vision climate (VISS)	0.638
Climate for excellence (EXCL)	0.684
Team innovation (INN)	0.130
Operational performance (OPR)	0.723
Organisational performance (OGP)	0.769

7.5.2.2 Hypotheses Testing

This research had three types of hypotheses to be tested: direct, moderating and mediating. Hence, the following section presents the results of the hypotheses testing in three sections: (1) path coefficient (β) and t-value (2) moderating-effect testing (3) mediating-effect testing.

7.5.2.2.a Path Coefficient (ß) and T-value

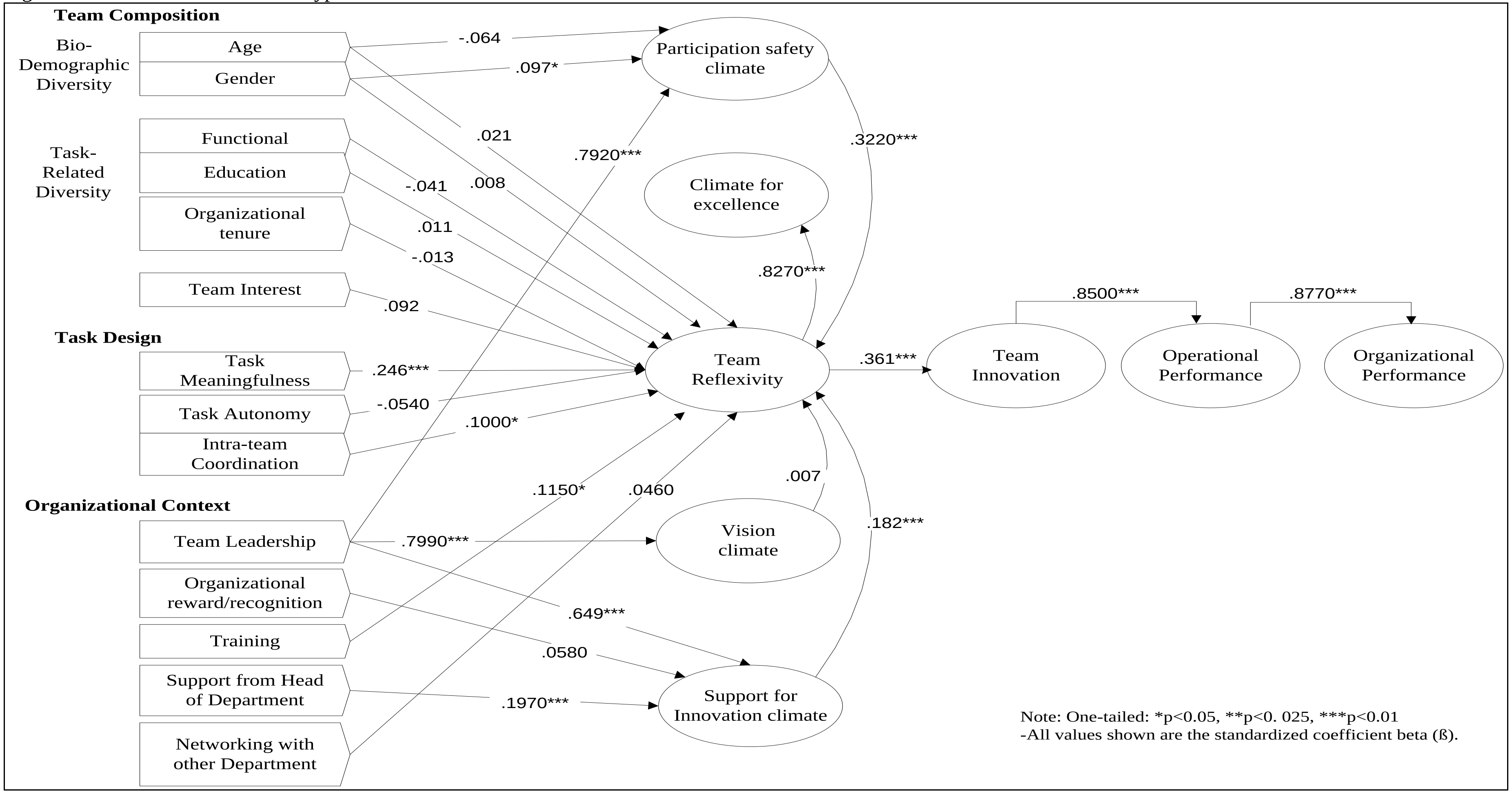
Table 7.12 lists the path coefficients (ß) and t-values for each direct hypothesis. Out of 25 direct hypotheses, only 13 direct relationships were statistically significant. The remaining 12 relationships displayed low t-values, and were not strong enough for the relationships to be considered statistically significant. These relationships are illustrated in Figure 7-2.

Table 7.12: Path Coefficient (β) and T-value for Direct Hypotheses

Hypothesis	Link	Path coefficient	T-value	Result
H1a	DIVage→ REFLX	0.021	1.4929	Not supported
H1b	DIV gend→ REFLX	0.008	1.2760	Not supported
H2a	DIVage→ PSAFE	-0.064	1.3615	Not supported
H2b	DIVgend→ PSAFE	0.097	1.7497*	Not Supported
H3a	DIVfunc→ REFLX	-0.041	1.1648	Not supported
H3b	DIVedu→ REFLX	0.011	0.3226	Not supported
H3c	DIVtenure→ REFLX	-0.013	0.3036	Not supported
H4	INT → REFLX	0.092	1.5603	Not supported
H5	MNG → REFLX	0.246	2.3585***	Supported
H6	AUTO → REFLX	-0.0540	1.0359	Not supported
H7	INTRA → REFLX	0.1000	1.6943*	Supported
H8a	LEAD → VISS	0.7990	30.4309***	Supported
H8b	LEAD → SUPP	0.649	14.4545***	Supported
H8c	LEAD → PSAFE	0.7920	25.2216***	Supported
H9	TRAIN → REFLX	0.1150	1.8523*	Supported
H10	RECOG → SUPP	0.0580	0.6748	Not supported
H11	HEAD → SUPP	0.1970	2.7608***	Supported
H12	NETW → REFLX	0.0460	0.8201	Not supported
H13	PSAFE → REFLX	0.3220	4.5018***	Supported
H14	VISS → REFLX	0.007	0.0730	Not supported
H15	SUPP → REFLX	0.182	2.5038***	Supported
H16	REFLX → EXCL	0.8270	27.1559***	Supported
H17	REFLX → INN	0.361	5.2135***	Supported
H20a	INN → OPR	0.8500	29.8591***	Supported
H20b	OPR → OGPR	0.8770	42.4403***	Supported

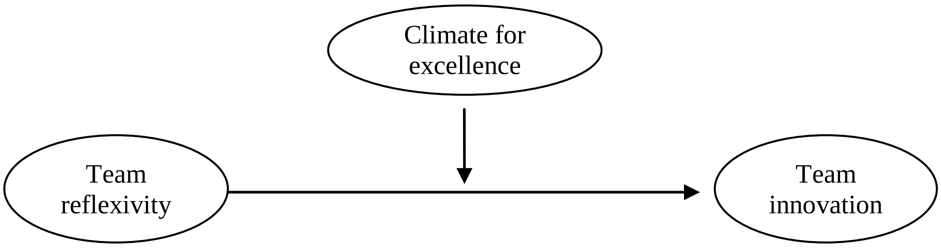
*One-tailed: *p<0.05, **p<0. 025, ***p<0.01*

Figure 7-2: Illustration for Direct Hypotheses Results

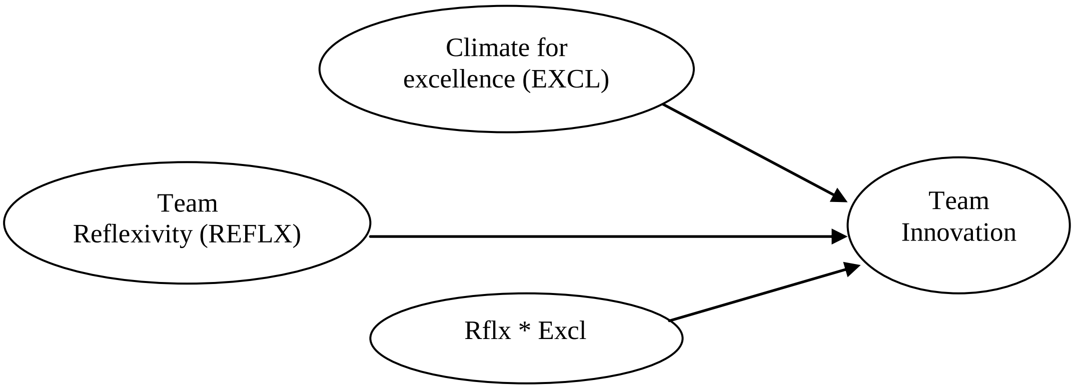


7.5.2.2.b Testing for Moderating Effects

There was only one moderating hypothesis to be tested i.e. H18. This hypothesis expected climate for excellence (EXCL) to moderate the relationship between team reflexivity (REFLX) and team innovation (INN).



For the purpose of the moderating-effect analyses, the indicators of the interaction factors needed to be calculated by multiplying each measurement item of team reflexivity and climate for excellence. Team reflexivity and climate for excellence had four and three measurement items, respectively. Thus, there were 12 indicators of the interaction factors. These 12 indicators were assigned into a new construct named ‘Rflx * Excl’. The figure below shows how this was tested. If the entire antecedent constructs including the Rflx * Excl were statistically significant to team innovation, climate for excellence was validated to moderate the RFLX→INN relationship.



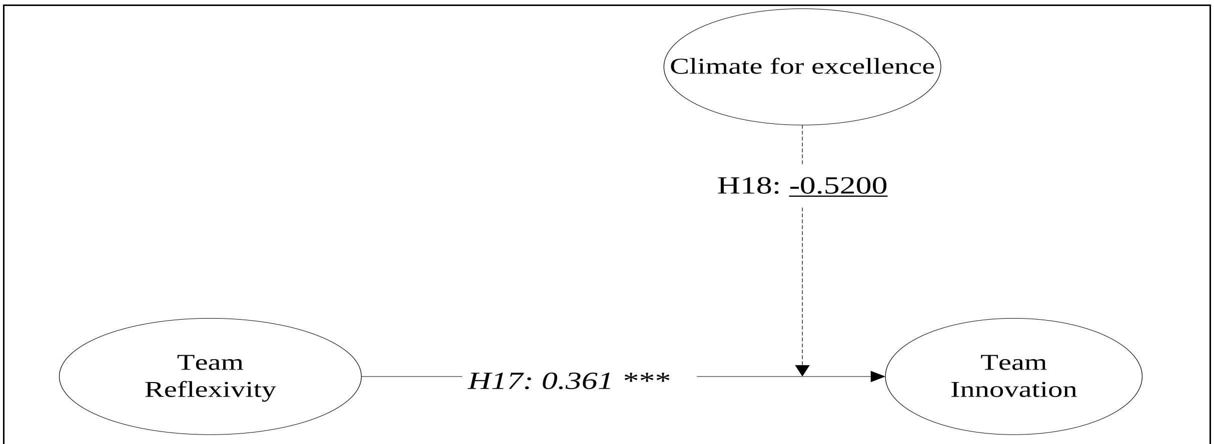
The moderating-test results are presented in Table 7.13 below. All three relationships showed that a relationship did exist; however, this relationship was not significant enough to be statistically validated. Therefore, it was concluded that climate for excellence (EXCL) does not moderate the RFLX → INN relationship. The moderation results are illustrated in Figure 7-3.

Table 7.13: Moderating Effect Test Results

Link	Path coefficient	T-statistics	Result
REFLX → INN	0.3940	0.7807	Not significant
EXCL → INN	0.5610	1.1970	Not significant
Rflx*Excl→ INN	-0.5200	0.5751	Not significant

*One-tailed: *p<0.05, **p<0. 025, ***p<0.01*

Figure 7-3: Results Illustration for Moderation Analyses



*Note: One-tailed: *p<0.05, **p<0. 025, ***p<0.01*
-All values shown are the standardized coefficient beta (ß).
-Non-shade values are the results for direct hypotheses
- Underlined value (H18) is the result from the indicator of interaction factor in moderating-effect analyses.

7.5.2.2.c Testing for Mediation Effects

To examine the mediation effect, the three-step procedure and interpretation by Baron and Kenny (1986) was followed. These steps were explained in detail under the research methodology section in Chapter 3. All the mediation hypotheses were run simultaneously. Table 7.14 displays all the mediation testing results for the 14 mediating hypotheses. The values underneath beta are the t-values of one-tailed test.

For example, hypothesis H19/m/a supposed that team reflexivity would mediate the impact of age diversity on team innovation. In the first and second step, the relationship of age diversity with team reflexivity and team innovation were found to be insignificant (ß = 0.021 and ß = 0.0212). In the third step, when the link between reflexivity and team innovation was added into the model, the beta value for the main relationship between age diversity and innovation reduced from ß = 0.0212 to ß = 0.0180. As there were no significant relationships found in step 1, 2 and 3, the mediation effects did not exist in the relationships.

Table 7.14: Mediating Effect Test Results

H	Variable	Step1	Step 2	Step 3	Interpretation
H19/m/a		Team reflexivity	Team innovation	Team innovation	No mediation effect
	Age diversity	ß= 0.021 (1.4929)	ß= 0.0212 (0.1190)	ß= 0.0180 (0.2009)	
	Team reflexivity	-	-	ß= -0.1830 (1.0005)	
H19/m/b		Team reflexivity	Team innovation	Team innovation	No mediation effect
	Gender diversity	ß= 0.008 (1.2760)	ß= 0.1300 (1.6124)	ß= 0.1300 (1.6385)	
	Team reflexivity	-	-	ß= -0.1830 (1.0005)	
H19/m/c		Team reflexivity	Team innovation	Team innovation	No mediation effect
	Functional diversity	ß= -0.041 (1.1648)	ß= -0.0390 (0.5757)	ß= -0.0470 (0.6767)	
	Team reflexivity	-	-	ß= -0.1830 (1.0005)	
H19/m/d		Team reflexivity	Team innovation	Team innovation	

H	Variable	Step1	Step 2	Step 3	Interpretation
	Educational diversity	ß= 0.011 (0.3226)	ß= -0.0210 (0.2677)	ß= -0.0210 (0.2671)	
	Team reflexivity	-	-	ß= -0.1830 (1.0005)	No mediation effect
H19/m/e		Team reflexivity	Team innovation	Team innovation	
	Organisational tenure diversity	ß= -0.013 (0.3036)	ß= 0.0120 (0.1389)	ß= 0.0070 (0.0805)	
	Team reflexivity	-	-	ß= -0.1830 (1.0005)	No mediation effect
H19/m/f		Team reflexivity	Team innovation	Team innovation	
	Team interest	ß= 0.092 (1.5603)	ß= 0.2490 (2.1275)**	ß= 0.2640 (2.2791)**	
	Team reflexivity	-	-	ß= -0.1830 (1.0005)	No mediation effect
H19/m/g		Team reflexivity	Team innovation	Team innovation	
	Task meaningfulness	ß= 0.246 (2.3585)***	ß= 0.0540 (0.3004)	ß= 0.1000 (0.5786)	No mediation effect
	Team reflexivity	-	-	-0.1830 (1.0005)	
H19/m/h		Team reflexivity	Team innovation	Team innovation	
	Task autonomy	ß= -0.0540 (1.0359)	ß= 0.1400 (1.0928)	ß= 0.1290 (1.0223)	
	Team reflexivity	-	-	-0.1830 (1.0005)	NoMediation effect
H19/m/i		Team reflexivity	Team innovation	Team innovation	
	Intra-team coordination	ß= 0.1000 (1.6943)*	ß= 0.0270 (0.1683)	ß= 0.0450 (0.2656)	NoMediation effect
	Team reflexivity	-	-	ß= -0.1830 (1.0005)	
H19/m/j		Team reflexivity	Team innovation	Team innovation	
	Training	ß= 0.1150 (1.8523)*	ß= 0.1150 (1.2863)	ß= 0.1360 (1.4329)	
	Team reflexivity	-	-	-0.1830 (1.0005)	No mediation effects
H19/m/k		Team reflexivity	Team innovation	Team innovation	
	Team's networking	ß= 0.0460 (0.8201)	ß= -0.0760 (0.5950)	ß= -0.0670 (0.5249)	
	Team reflexivity	-	-	ß= -0.1830 (1.0005)	No mediation effect
H19/m/l		Team reflexivity	Team innovation	Team innovation	
	Participation safety climate	ß= 0.3220 4.5018***	ß= -0.0510 (0.2378)	ß= 0.0070 (0.0301)	
	Team reflexivity	-	-	-0.1830 (1.0005)	No Mediation effect
H19/m/m		Team reflexivity	Team innovation	Team innovation	

H	Variable	Step1	Step 2	Step 3	Interpretation
	Vision climate	ß= 0.007 (0.0730)	ß= -0.0220 (0.0871)	ß= -0.0210 (0.0819)	No mediation effect
	Team reflexivity	-	-	-0.1830 (1.0005)	
H19/m/n		Team reflexivity	Team innovation	Team innovation	No mediation effect
	Support-for-innovation climate	ß= 0.182 (2.5038)***	ß= 0.0860 (0.5897)	ß= 0.1190 (0.7411)	
	Team reflexivity	-	-	-0.1830 (1.0005)	

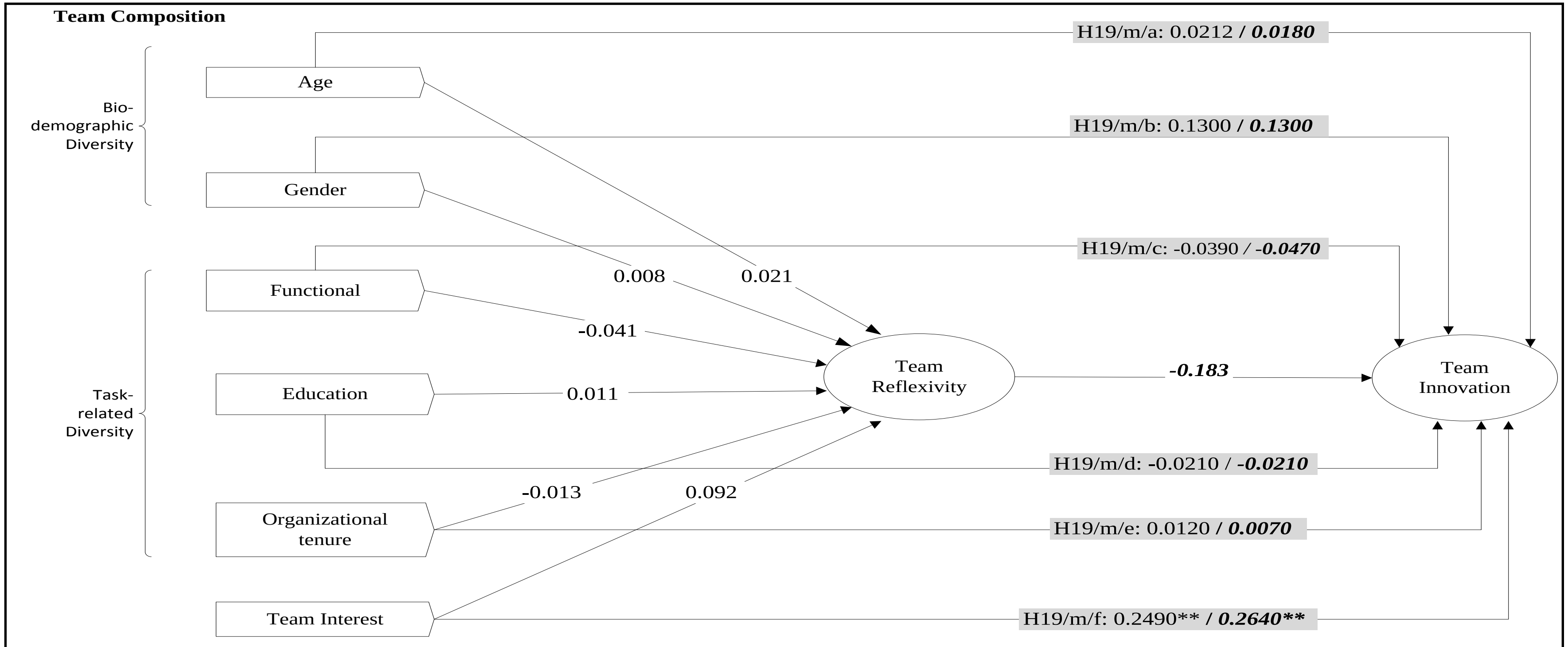
*One-tailed: *p<0.05, **p<0. 025, ***p<0.01.*
(T-values are in parentheses)

As shown in Table 7.14, none of the mediating hypotheses in this research were supported. The main reason for this was due to the insignificant relationship between the antecedent and mediator in Step 1, as well as the mediator and team innovation in Step 3.

All the results for the mediation analyses were illustrated in four figures i.e. Figure 7-4, Figure 7-5, Figure 7-6 and Figure 7-7 for team composition, task design, organisational context and innovation climates, respectively. The values shaded in grey are the results of the mediation hypotheses. The values in bold and italics are the mediation-test results after including the relationship between team reflexivity and team innovation into the model. The significant relationship is represented by an asterisk to the beta value.

Figure 7-4 illustrates all the hypotheses results relating to team composition (H19/m/a to H19/m/f). For example, in hypothesis H19/m/a, team reflexivity was hypothesised to mediate the impact of age diversity on team innovation. This mediation hypothesis was rejected because the relationships between age diversity and team reflexivity and team innovation were both insignificant (*ß* = 0.021 and *ß* = 0.0212). Furthermore, when the relationship between team reflexivity and team innovation was added to the model, the influence of age diversity on team innovation decreased (beta changed from 0.0212 to ***0.0180***), whereas team reflexivity was insignificant with team innovation (*ß* = -0.183).

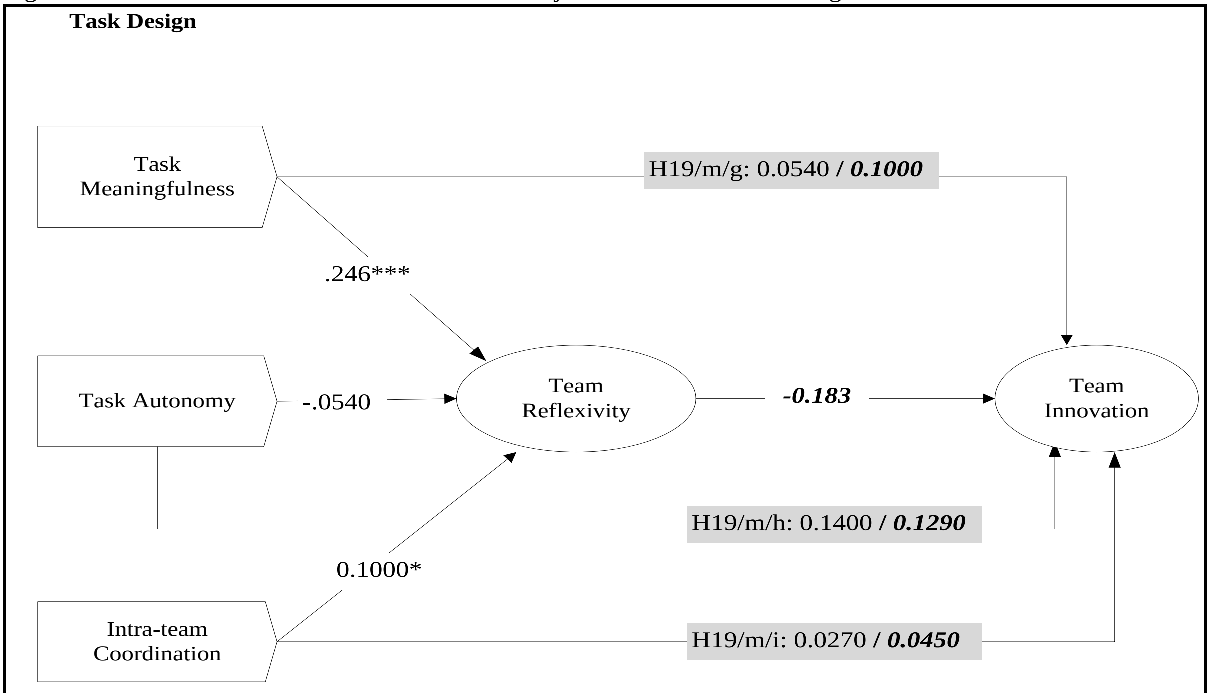
Figure 7-4: Results Illustrations for Mediation Analyses Related to Team Composition



Note: One-tailed: *p<0.05, **p<0. 025, ***p<0.01
-All values shown are the standardized coefficient beta (ß).
-Values shaded in grey are the results for the mediating hypotheses. Values in bold and italics are the results including the connecting mediator.

Figure 7-5 below illustrates the mediation results for H19/m/g to H19/m/i, which relate to task design. For example, H19/m/g expected team reflexivity to mediate the benefits of task meaningfulness on team innovation. In Step 1, task meaningfulness was significantly related to team reflexivity (*ß* = 0.246, p < 0.01). However, task meaningfulness was not significant to team innovation in Step 2 (*ß* = 0.0540). When the relationship between team reflexivity and team innovation was added into the model (*ß* = -0.183), the influence of task meaningfulness on team innovation reduced from *ß* = 0.0540 to *ß* = 0.1000. As task meaningfulness and team reflexivity were not significantly related to team innovation, team reflexivity therefore did not convert the effect of task meaningfulness into team innovation.

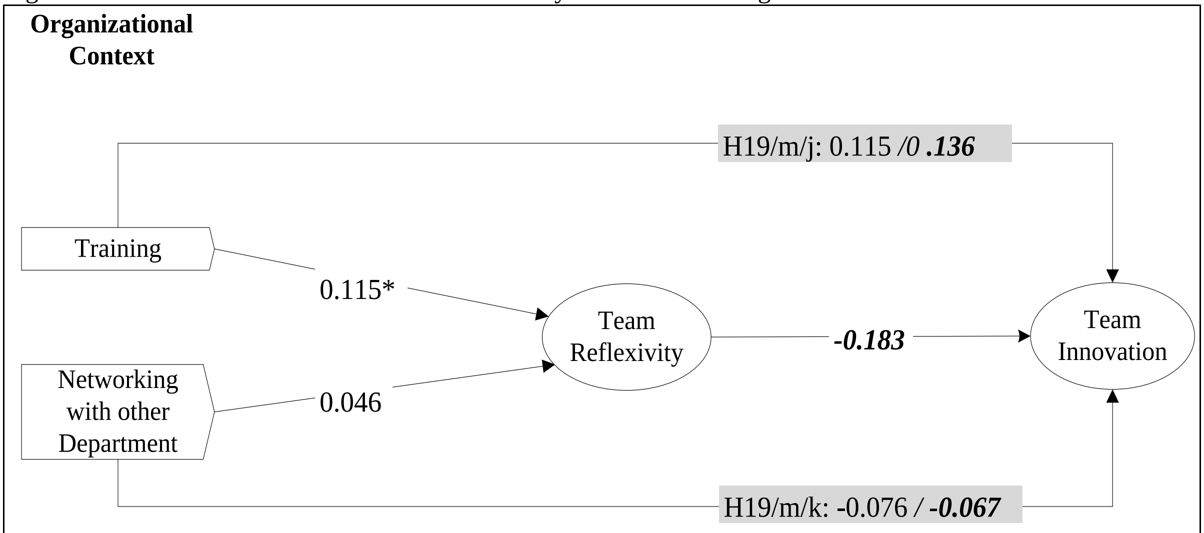
Figure 7-5: Results Illustrations for Mediation Analyses Related to Task Design



Note: One-tailed: *p<0.05, **p<0. 025, ***p<0.01
-All values shown are the standardized coefficient beta (ß).
-Values shaded in grey are the results for the mediating hypotheses. Values in bold and italics are the results including the connecting mediator.

Figure 7-6 illustrates the results of the mediation analyses related to the variables under organisational context (H19/m/j to H19/m/k). For example, hypothesis H19/m/j expected team reflexivity to mediate the effect of training on team innovation. In Step 1, training was significantly related to team reflexivity (*ß* = 0.115, p < 0.05), but not significant to team innovation in Step 2 (*ß* = 0.115). When the relationship of team reflexivity and team innovation was added into the model (*ß* = -0.183), the influence of training on team innovation reduced to *ß* = 0.136. Since no significant relationships were found between team reflexivity and team innovation in Step 3 (*ß* = -0.183), team reflexivity thus was not a mediator between training and team innovation.

Figure 7-6: Results Illustrations for Mediation Analyses Related to Organisational Context



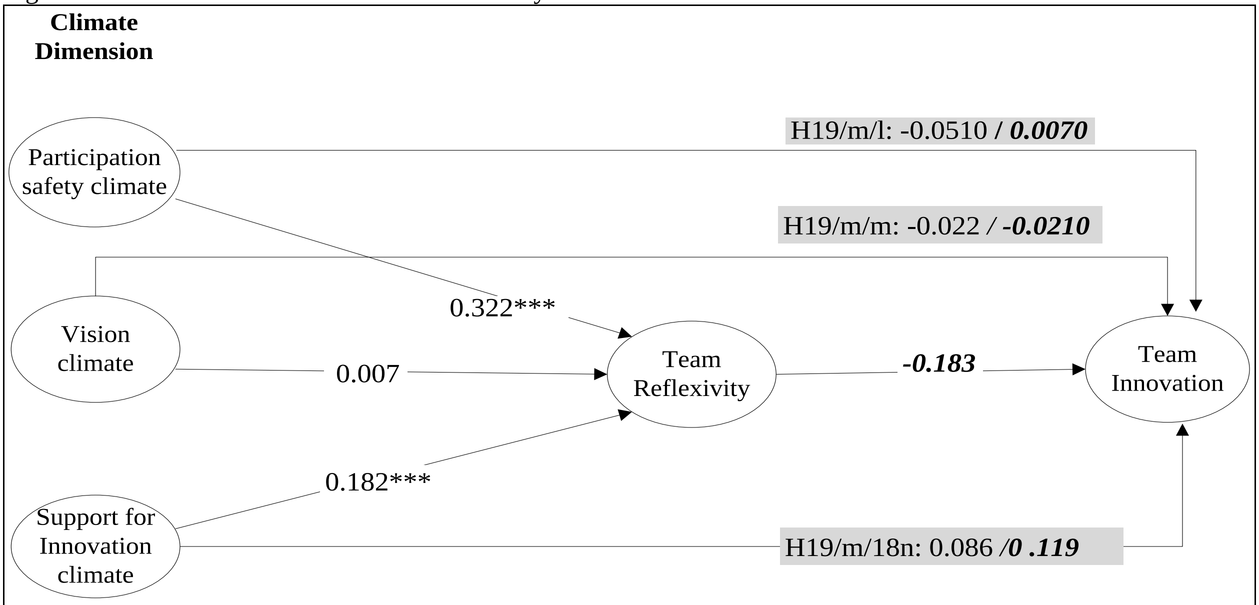
Note: One-tailed: *p<0.05, **p<0. 025, ***p<0.01

-All values shown are the standardized coefficient beta (ß).
-Values shaded in grey are the results for the mediating hypotheses. Values in bold and italics are the results including the connecting mediator.

Figure 7-7 illustrates the results of the mediation analyses related to a team's climate dimensions. For example, hypothesis H19/m/l expected team reflexivity to mediate the impact of participation safety climate on team innovation. Although there was a significant relationship between participation safety climate and team reflexivity in Step 1 (*ß* = 0.3220, p

< 0.01), the relationship between participation safety climate and team innovation was insignificant (ß = -0.0510) and even decreased to ß = ***0.0070*** when the relationship of team reflexivity and team innovation was added into the model. Team reflexivity was also not significant to team innovation when regressed together with participation safety climate (ß = -0.183). Thus, team reflexivity did not mediate the impact of participation safety climate on team innovation.

Figure 7-7: Result Illustration for Mediation Analyses Related to Climates Dimensions



*Note: One-tailed: *p<0.05, **p<0. 025, ***p<0.01*
-All values shown are the standardized coefficient beta (ß).
-Values shaded in grey are the results for the mediating hypotheses. Values in bold and italics are the results including the connecting mediator.

In considering the above, it was felt that the insignificant results of all mediation-effect testing were influenced by other relationships within the research model. Thus, for exploration, each mediation hypothesis was tested individually and separately from the research model. The results are summarised in Table 7.15 (below).

When tested in isolation from the research model, the results showed that team reflexivity was a mediator for the impacts of gender diversity (H19/m/b), team autonomy (H19/m/h), intra-team coordination (H19/m/i), training (H19/m/m) and team's networking (H19/m/n) on team innovation. For example, in the meditation test for hypothesis H19/m/b, gender diversity had a significant relationship with team reflexivity (*ß* = 0.1180, $p < 0.025$) in Step 1. The relationship between gender diversity and team innovation without the presence of team reflexivity in Step 2 was also significant (*ß* = 0.1760, $p < 0.025$). When team reflexivity was regressed together with gender diversity on team innovation in Step 3, both variables were still significant to team innovation (*ß* = 0.1270, $p < 0.025$ and *ß* = 0.3500, $p < 0.01$). Thus, team reflexivity partially mediated the relationship between age diversity and team innovation.

Table 7.15: Mediation Effect Results Tested Individually

Hypothesis	Variable	Step1	Step 2	Step 3	Interpretation
H 19/m/a		Team reflexivity	Team innovation	Team innovation	No mediation effect
	Age diversity	0.0500 (0.4437)	0.0750 (0.6066)	0.0570 (0.8718)	
	Team reflexivity	-	-	0.3630 (5.8187)***	
H 19/m/b		Team reflexivity	Team innovation	Team innovation	Partial mediation effect
	Gender diversity	0.1180 (2.1110)**	0.1760 (2.2842)**	0.1270 (2.0725)**	
	Team reflexivity	-	-	0.3500 (5.4399)***	
H 19/m/c		Team reflexivity	Team innovation	Team innovation	No mediation effect
	Functional diversity	-0.0410 (0.4241)	-0.1970 (1.2827)	0.0030 (0.0445)	
	Team reflexivity	-	-	0.3640	

Hypothesis	Variable	Step1	Step 2	Step 3	Interpretation
				(5.7461)***	
H 19/m/d		Team reflexivity	Team innovation	Team innovation	No mediation effect
	Educational diversity	0.0710 (0.5726)	0.0530 (0.4505)	0.0150 (0.1872)	
	Team reflexivity	-	-	0.3630 (5.2491)***	
H 19/m/e		Team reflexivity	Team innovation	Team innovation	No mediation effect
	Organisational tenure diversity	0.0890 (0.9726)	0.1080 (1.1210)	0.0610 (1.0269)	
	Team reflexivity	-	-	0.3590 (5.8785)***	
H 19/m/f		Team reflexivity	Team innovation	Team innovation	No mediation effect
	Team interest	0.7750 (20.7380)***	0.4220 (7.2208)***	0.3520 (3.6773)***	
	Team reflexivity	-	-	0.0910 (0.9021)	
H 19/m/g		Team reflexivity	Team innovation	Team innovation	No mediation effect
	Task meaningfulness	0.8040 (32.5831)***	0.4040 (5.7815)***	0.3170 (2.7438)***	
	Team reflexivity	-	-	0.1080 (0.9777)	
H 19/m/h		Team reflexivity	Team innovation	Team innovation	Partial mediation effect
	Team autonomy	0.6390 (13.0447)***	0.3800 (5.6785)***	0.2500 (2.7138)***	
	Team reflexivity	-	-	0.2060 (2.1463)**	
H 19/m/i		Team reflexivity	Team innovation	Team innovation	Full mediation effect
	Intra-team coordination	0.7510 (23.5213)***	0.3500 (5.5797)***	0.1750 (1.3380)	
	Team reflexivity	-	-	0.2320 (2.0009)**	
H 19/m/j		Team reflexivity	Team innovation	Team innovation	Partial mediation Effect
	Training	0.6560 (13.7348)***	0.3430 (6.1334)***	0.1810 (2.4272)***	
	Team reflexivity	-	-	0.2440 (2.6708)***	
H 19/m/k		Team reflexivity	Team innovation	Team innovation	Full mediation effect
	Team’s networking	0.7120 (16.1764)***	0.3270 (5.9515)***	0.1380 (1.4196)	
	Team reflexivity	-	-	0.2660 (2.8290)***	
H 19/m/l		Team reflexivity	Team innovation	Team innovation	No mediation effect
	Participation safety climate	0.8590 (39.2782)***	0.3670 (6.3177)***	0.2100 (1.5127)	
	Team reflexivity	-	-	0.1830 (1.4059)	

Hypothesis	Variable	Step1	Step 2	Step 3	Interpretation
H 19/m/m		Team reflexivity	Team innovation	Team innovation	No mediation effect
	Vision climate	0.8270 (29.7814)***	0.3890 (5.4164)***	0.2800 (2.3537)***	
	Team reflexivity	-	-	0.1310 (1.2483)	
H 19/m/n		Team reflexivity	Team innovation	Team innovation	No mediation effect
	Support-for-innovation climate	0.8370 (32.3296)***	0.3920 (5.3755)***	0.2960 (2.8551)***	
	Team reflexivity	-	-	0.1150 (1.2640)	

*One-tailed: *p<0.05, **p<0. 025, ***p<0.01*

7.6 Summary

Before the SEM analyses in the PLS-graph, the diversity values for gender, age, function, education and organisational tenure were calculated by using the entropy index. The Likert-scale data at the individual-level were aggregated to form team-level data, which were justified with the R*wg(j) coefficient. The analyses of PLS-based SEM were executed through two stages: measurement model assessment and structural model assessment. In the measurement model assessment, four measurement items were discarded from further structural analyses. In the structural model assessment, the results for direct hypotheses were mixed. The moderating effect of climate for excellence was also not supported. Team reflexivity was not found to mediate any variables as hypothesised. However, when each mediation hypothesis was tested individually and separately from the research model, the results indicated that team reflexivity was a mediator of the impacts of gender diversity, team autonomy, intra-team coordination, training and team networking on team innovation. Hence, in reality where team innovation is subject to many team factors, team reflexivity was not an interactional process that should be focused in parallel teams to convert the benefits of team design on team innovation.

Chapter 8: Discussion

8.1 Introduction

This chapter interprets and discusses each hypothesis in more detail in conjunction with the statistical results from Chapter 7. It examines the influences of the team design of the parallel-teams on teams' innovation climate and team reflexivity to produce team innovation, which eventually improves operational and organisational performance.

The discussion is broken into seven main sections. The first section discusses the findings related to team composition. This is followed by task design, organisational context, team-climate-for-innovation, team reflexivity, the mediating role of team reflexivity and the influences of parallel teams' innovation on operational-organisational performance.

8.2 Discussion Related to the Influence of Team Composition

This section discusses the result of each hypothesis relating to bio-demographic diversity, task-related diversity and team interest.

8.2.1 Hypothesis H1a

Hypothesis H1a anticipated a positive relationship between age and team reflexivity. Although the results showed a positive relationship, this hypothesis was not supported because the t-value was not significant enough ($ß$ = 0.021) to indicate that team reflexivity was influenced by age diversity.

It was thought that this result may have been influenced by other relationships in the research model that were tested simultaneously towards team reflexivity. Thus, this relationship was tested again independently. However, the results still showed an insignificant relationship (*ß* = 0.0500).

The results thus did not support the theories which highlighted that team members' knowledge which is useful for team reflexivity increases with their age (Amabile et al., 1996) which improves team decision and enhances team innovation (Cox & Blake, 1991; Pelled, 1996). Instead, this finding supports the theories that emphasised bio-demographic variables such as age does not enhance critical discussion or communication among team members (Tsui, Egan & O'Reilly, 1992; Simons, Pelled & Smith, 1999; Bunderson & Sutcliffe, 2002; Zenger & Lawrence, 1989). Similarly, the findings from the qualitative field-study of this research could not identify an influence of age diversity on team reflexivity.

In the context of parallel-teams in Malaysian organisations, the results therefore suggest that age diversity does not play important role in teams' discussions. A previous study highlighted that the positive effect of age diversity was not as obvious in Asian firms as in Western firms because the culture in Asian organisation prioritised rewards and promotion being given to older employees; thus, discouraged younger employees from questioning older employees' opinions or decisions (Li et al., 2011).

8.2.2 Hypothesis H1b

Hypothesis H1b anticipated a negative relationship between gender diversity and team reflexivity. However, the results showed a positive relationship and demonstrated that gender was not significantly related to team reflexivity (*ß* = 0.008). This result is in contrast with the theories that advocated negative influence of gender diversity on interaction process (Turner, 1987; Pfeffer, 1983; McPherson, Smith-Lovin & Cook, 2001; Schermerhorn et al., 1991; Eisenhardt & Bourgeois, 1994; Pelled, 1996).

Similar to H1a, it was thought that this result may have been influenced by other relationships in the research model that were tested simultaneously towards team reflexivity. Therefore, this relationship was explored further separately from the research model with the result demonstrating that gender diversity was positively and significantly related to reflexivity (*ß* = 0.1180, $p < 0.05$). A contrast results found in the separate analyses indicate that gender diversity has limited influence on team reflexivity because it showed a significant t-value only when other variables were not present.

Therefore, for Malaysian parallel-teams, gender diversity was only important to escalate team interactions if other team factors did not intervene. Its influence was limited because it diminished when other team factors interfered. In reality, where a team is always subject to other factors, gender diversity thus was not an important factor for managers and team leaders to consider when planning for the success of a team.

8.2.3 Hypothesis H2a

The results showed that age diversity was negatively related to participation safety climate as hypothesised, but was not significant enough for the hypothesis to be accepted (*ß* = -0.064). This relationship was further explored in independent regression and was again found to be insignificant (*ß* = -0.1010).

The negative direction of the relationship was in line with the theories and earlier qualitative findings of this research that suggested team members were comfortable to criticise when they work with team members of similar age. However, the insignificant result of the relationship could not support the theories that age homogeneity promoted a comfortable climate for team members to voice and argue current decisions and strategies (Avery, McKay & Wilson, 2008; McPherson, Smith-Lovin & Cook, 2001; Tsui, Egan & O'Reilly, 1992). Moreover, it has been highlighted that the benefits of age diversity is not dominant in Asia as the firms always prioritize rewards to older employees (Li et al., 2011).

In the context of the parallel-team, if a team needs to enhance the participation safety climate, the age of the team members is not an important factor for managers and leaders to address. However, the negative direction of the result implies that managers and team leaders need to be aware that a team comprised of members of various ages could potentially reduce a team's participation safety climate.

8.2.4 Hypothesis H2b

Hypothesis 2b expected gender diversity to have a significant negative relationship with team's participation safety climate. However, the results showed a significant positive t-value ($ß = 0.097$, $p < 0.05$).

The result therefore could not support the theories that advocate a negative influence of bio-demographic diversity on work attitude (Pelled, 1996), shared thoughts (Perretti & Negro, 2007), increased team cohesion and improved social relationships (Horwitz & Horwitz, 2007; Tsui, Xin & Egan, 1995; Berscheid, 1985) which inhibit participation safety climate in a team. Instead, the results suggest that participation safety climate is improved as gender diversity increases. This positive direction could be due to better chemistry evolving from the different behaviour of the two genders. Theories have highlighted that men are usually more competition-oriented (Babcock & Laschever, 2003; Tannen, 1994), aggressive (Cook & Sloane, 1985; Gneezy, Niederle & Rustichini, 2003; Niederle & Vesterlund, 2007, 2008), less cooperative (Walters, Stuhlmacher & Meyer, 1998; Eckel, deOliveira & Grossman, 2008) and like to argue with each other (Poynton, 1985). In contrast, women have a greater tendency to maintain relationships (Tannen, 1994), be less aggressive (Cook & Sloane, 1985; Gneezy, Niederle & Rustichini, 2003; Niederle & Vesterlund, 2007, 2008), more cooperative (Walters, Stuhlmacher & Meyer, 1998; Eckel, deOliveira & Grossman, 2008), not favour highly competitive situations (Babcock & Laschever, 2003) and have better listening skills (Coulmas, 1997; Lakoff, 2001; Coates, 2003). These theories imply that if a team is occupied by only men, the team climate might become overly competitive and uncooperative, thus reducing a safe climate within which team members can voice opinions or debate ideas.

The implication is that, managers and team leaders should mix gender to improve the participation safety climate.

8.2.5 Hypothesis H3a

Hypothesis H3a expected functional diversity to be negatively significantly related to team reflexivity. The results did show a negative relationship; however, this relationship was not statistically significant enough to be considered valid (*ß* = -0.0410). This result remained unchanged in the independent regression analysis (*ß* = -0.0410).

This result therefore did not support the theories that suggest that functional diversity provides a source of diverse perspectives, knowledge, and information (Ancona & Caldwell, 1998; Reagans & Zuckerman, 2001) and improves a team's social and knowledge-based capital (Tsai & Ghoshal, 1998) thereby enhancing team's reflection on current strategies and decisions. Although the result was insignificant, the negative direction of the relationship corresponded to the findings of Keller (2001) and Bunderson and Sutcliffe (2002), who reported a negative influence of functional diversity on communication within teams. The negative influence of functional diversity was also discernible in the respondent quotations presented in Chapter 4.

Reflecting on the context of the parallel-team, this insignificant result is rational because functional diversity among team members might not be important for parallel-teams to be reflexive. Parallel-teams only solve work-related problems that are narrow in scope and limited to the internal problems of their department. Team members from various departments might not understand the root-problems faced by the team members in the host-department, which could lessen team reflexivity. Thus, managers and team leaders of parallel teams should not be too enthusiastic about functional diversity, because it could potentially harm task-related communications within a team.

8.2.6 Hypothesis H3b

The results for hypothesis H3b did not significantly support the notion that educational diversity enhances team reflexivity (*ß* = 0.011). An independent regression analysis for educational diversity and team reflexivity also showed an insignificant relationship (*ß* = 0.0710).

Therefore, this result did not support the theories that have advocated educational diversity for task-related communication in teams (Amason, 1996; Amason & Schweiger, 1994; Fiol, 1994; Jehn, 1995).

In the context of the parallel-team, educational diversity might not be important for team reflexivity because the team focuses only on innovation projects within their department that require local experience and understanding of the department's internal operations. Hence, if the team's performance depends on team members' reflection on current strategies, then educational diversity is not a concern for managers and team leaders.

8.2.7 Hypothesis H3c

This hypothesis, which anticipated a significant positive relationship between organisational tenure and team reflexivity, was rejected because the results showed a negative relationship with a low t-value ($ß$ = -0.013, t = 0.3036).

This result therefore did not support the theories that highlight a positive influence of tenure-diversity on teams' perspectives and viewpoints (West & Anderson, 1996; Katz, 1982), thereby enhancing team reflexivity. Although the relationship was not significant, the negative direction of the relationship at least corresponded with the theories suggesting a negative relationship between organisational-tenure diversity and task-related communication within teams (Ancona & Caldwell, 1992b; Zenger & Lawrence, 1989).

This insignificant result is supported by Ng and Feldman (2010), who observed that the positive effects of organisational tenure were more noticeable in highly-educated employees because of their long exposure to complex decision-making in more senior positions. As the parallel-teams in this research encompassed employees from the shop-floor level, who normally had limited educations and managed routine jobs, this may explain why organisational tenure did not play an important role in team reflexivity. The implication of the above discussion is that, organisational tenure diversity is not an important factor for managers and leaders of parallel-teams to consider to improve team reflexivity.

8.2.8 Hypothesis H4

This hypothesis, which predicted a significant positive relationship between team interest and team reflexivity, was not supported ($ß = 0.092$). However, the results from the independent regression analysis showed that this relationship was very significant ($ß = 0.7750$, $p = < 0.01$). Therefore, this indicates that the influence of team interest on team reflexivity diminished and became unimportant when other variables intervened.

As the results between team interest and team reflexivity were unsteady, they did not fully support the findings of the qualitative part of this research, nor did they support the theories that associate task interest with focused attention, cognitive functioning, and persistence (Hidi, 2000), which are likely to enhance team reflexivity.

Therefore, to ensure team reflexivity, managers and leaders should not base their team member-selection process only on task interest because this factor is vulnerable to other team factors. This result is logical based on the creativity componential theory by Amabile (1983, 1997), which highlights that an individual's level of interest can easily be affected by social and environmental variables.

8.3 Discussion Related to Task-design

All the results relating to team's task meaningfulness, task autonomy and intra-team coordination are further discussed under this section.

8.3.1 Hypothesis H5

This hypothesis, which anticipated a significant positive relationship between a team's task meaningfulness and team reflexivity, was supported ($ß = 0.246$, $p = <.01$). Thus, this supports the theories which suggest that team-members' perceptions of tasks impacts on their motivation to become seriously involved with a job (Amabile, 1996; Hackman & Oldham, 1975; Campion, Medsker & Higgs, 1993), thus enhancing team reflexivity (Lantz & Brav, 2007; West et al., 2004).

This result therefore informs managers and leaders of parallel teams of the importance of the project characteristics undertaken by the team. To increase team reflexivity, they should strengthen team-members' perceptions about task-meaningfulness. These perceptions can be strengthened by communicating to team members the important effect or positive changes that their project could bring to the organisation. They can also be further manifested if the company's policy recognises the team's and individual's contribution through reward and recognition, thereby conveying information to team members that their tasks are meaningful to the organisation. Perceived task-meaningfulness can also be promoted by providing opportunities for team members to learn new skills and obtain experience.

8.3.2 Hypothesis H6

This hypothesis, which expected a significant positive relationship between team task autonomy and team reflexivity, was not statistically supported. The result showed a negative relationship and a low t-value ($ß$ = -0.0540, t = 1.0359). However, a significant positive relationship was found in the independent regression ($ß$ = 0.6390, $p < 0.01$). This indicated that the significant influence of task autonomy on team reflexivity diminished and up to one point, became insignificant with a negative influence when other factors were involved.

As a consequence, the result did not fully support the theories that suggest autonomy can increase meaningful discussion and reflection (West et al., 2004; Brav, Andersson & Lantz, 2009).

In a real team scenario, which is subject to many factors, autonomy seems not to be an important factor for reflexivity in parallel teams. This result is logical because high autonomy reduces team members' dependence on the team's decision approval, which thus lessens the focal element of team reflexivity i.e. communication about decisions and strategies. Instead, members of parallel team need to communicate frequently during the task execution because tasks in parallel teams are not highly structured. Moreover, team reflexivity is a relational activity which requires interactions between team members. Additionally, respondents in the qualitative study Chapter 4 highlighted that they did not have complete autonomy because their innovation project required team members' opinions and consent from management. Hence, there is no need for managers and leaders of parallel-teams to emphasise team autonomy for team reflexivity.

8.3.3 Hypothesis H7

The result supports this hypothesis which anticipated a significant positive relationship between intra-team coordination and team reflexivity ($ß = 0.1000$, $p < 0.05$).

The results indicated that team reflexivity increased if the team members depended on each other for resources and information to complete a task. Hence, this supports the theory which asserts that high intra-team coordination promotes communication channels and esprit de corps (Stewart, 2006), which in turn influences team reflexivity (Lantz & Brav, 2007; West et al., 2004).

Managers and leaders of parallel teams may apply this factor to cultivate members' communication about decisions and strategies. Task interdependence can be increased by distributing tasks to team members according to their skills and experience. This strategy will create a sequential process in which team members cannot complete their role until other team members complete their tasks (Wageman, 1995). However, task interdependence should be promoted sparingly because too much task interdependence could divert a team's energy into coordinating and regulating the collective behaviour of team members (Johnson & Johnson, 1989). Management can also play a role in cultivating task interdependence among team members by rewarding team performance rather than individual performance (Mesch, Johnson & Johnson, 1988); thus promote dependence among team members for team success (Van der Vegt, Emans & Van de Vliert, 2000, 2001; Wageman, 1995).

8.4 Discussion Related to Organisational Context

This section further discusses the results relating to team's transformational leadership, training, reward and recognition, support from a departmental head and team networking with relevant departments.

8.4.1 Hypotheses H8a, H8b and H8c

These three hypotheses relate to the team's transformational leadership. Team leadership style was hypothesised to have a direct influence on three climates i.e. vision (H8a), support-for-innovation (H8b) and participation safety climates (H8c). In this research, these three hypotheses were strongly supported by the results.

Hypothesis H8a was supported to suggest a strong influence of team transformational leadership on team's vision climate ($ß$ = 0.7990, $p < 0.01$). This finding is congruent with those of Bass (1985), Bass and Riggio (2006), Berson (2001) and Schippers, Den Hartog, Koopman et al. (2008).

In hypothesis H8b, the transformational-leadership style of a team leader was found to be significantly related with support-for-innovation climate ($ß$ = 0.649, $p < 0.01$). This result indicates that team transformational-leadership has a positive influence on the cooperative level among team members. Thus, this supports the theories that advocate the importance of transformational leadership in shaping supportive behaviour among team members (Bain, Mann & Pirola-Merlo, 2001; West & Anderson, 1996).

Hypothesis H8c was also supported because a team's transformational-leadership style was found to be significantly related with participation-safety climate ($ß$ = 0.7920, $p < 0.01$).

Hence, this result supported the qualitative field-study, as well as the theory which suggests that transformational leaders usually give adequate attention to their team members, and therefore cultivate two-way communication, mutual respect and trust among team members (Burke et al., 2006). These are the factors upon which participation-safety climate evolved (West, 1990).

These significant results suggest the importance of transformational leadership qualities in a parallel-team to improve the three climates i.e. vision, support for innovation and participation safety climates. Managers of parallel teams thus should not take for granted a person-job-fit issue in assigning a leader to the team. It is relevant to consider leadership style. If a person with the required capabilities is not available, the transformational leadership capability can be polished through leadership training and development programme.

8.4.2 Hypothesis H9

This hypothesis, which anticipated a significant positive influence of training on team reflexivity, was supported. The result indicated that training given to team members is capable of encouraging task-related communication among them, thus leading towards team reflection on existing decisions, strategies and work effectiveness.

This result corresponds with the theory by Schippers et al. (2008), Salas and Cannon-Bowers (1997; 2000) that training advances team processes and provides another empirical evidence to the research findings by Salas et al. (2008).

Therefore, training can be used by managers and leaders of parallel teams to further activate team reflexivity. Skill-oriented training equips team-members with technical knowledge of work procedures, while soft-skill oriented training improves social behaviour and motivation. Both are useful because knowledge, skills and motivated behaviour are important for team reflexivity. Additionally, in relation to the significant results in hypotheses H8b and H8c, leadership training could also improve leader's capability to influence support and safety climates, which are significant for team reflexivity in hypotheses H13 and H15.

8.4.3 Hypothesis H10

This hypothesis, which anticipated a significant positive relationship between organisational reward/recognition with support-for-innovation climate was not supported (*ß* = 0.0580). Nevertheless, a separate regression test for only these two variables showed a significant relationship (*ß* = 0.5680, $p < 0.01$). The influence of reward/recognition was thus weaker on this climate as it became insignificant when other factors interfered. The result therefore did not support the theories that suggested reward/recognition promotes cooperation, commitment and communication among team members (Kerrin & Oliver, 2002), which in turn is claimed to contribute to developing a support-for-innovation climate (Chen & Kanfer, 2006).

Managers and leaders are thus not advised to use reward/recognition as the main mechanism to increase support-for-innovation climate in a parallel-team. Furthermore, the literature highlighted that rewards only engender team members' cooperation, particularly in teams with intensive task interdependence (Wageman & Baker, 1997; Mesch, Johnson & Johnson, 1988). In the context of a parallel-team, in which task interdependence is hybrid (Wageman, 1995) where team members combine interdependent and independent tasks to achieve the team's goal, rewards/recognition are not a significant factor to boost cooperation. In addition, the effects of rewards on team members' cooperation are contingent on the reward structure and how the reward is distributed (Bamberger & Levi, 2009).

8.4.4 Hypothesis H11

The results supported this hypothesis, which anticipated a significant positive relationship between support from a departmental head and support-for-innovation climate in a team ($ß = 0.1970$, $p < 0.01$).

This link, which emerged from the qualitative study in Chapter 4, therefore manifested and upheld the theories that presume team members are psychologically aroused to be more committed and co-operative when they receive practical support from their immediate supervisor (Ingrid, Lars-Åke & Malin, 2004). This support includes things such as encouragement, time and resources (Seibert, Kraimer & Liden, 2001; Brass, 1984) and liaising teams with relevant department (Hongseok, Labianca & Myung-Ho, 2006). For this reason, departmental managers should act accordingly to provide practical support to the parallel teams under their supervision.

8.4.5 Hypothesis H12

This hypothesis expected a significant positive relationship between team networking and team reflexivity. However, the result showed an insignificant relationship ($ß = 0.0460$). In contrast, the independent regression result showed a very significant relationship ($ß = 0.7120$, $p < 0.01$). The influence of team networking on team reflexivity was thus weak because the correlation reduced and became insignificant when other factors existed.

Although this link was discovered from the qualitative field study presented in Chapter 4, it was not statistically proven and could not fully support the theories which suggest that various information and resources can be gained from the team networking (Hulsheger, Anderson & Salgado, 2009; Perry-Smith & Shalley, 2003; West, 2002), thereby escalating team reflexivity (West, 2000).

This finding states that networking with other departments is not the key for a parallel team to be reflexive. This could be due to the nature of parallel-teams, which usually work on daily work-related problems only within their department. Networking might be important for reflexivity in parallel teams when they work on operational problems originating from other departments. Scholars have also highlighted that team members will develop networking to learn more information when their project is more challenging than usual and the skills and knowledge within their team are not sufficient to ensure the project's success (Bandura, 1986). Hence, in the context of parallel teams, the importance of networking for team reflexivity is presumed to be contingent on the nature of the project and the subsequent resources required.

8.5 Discussion Related to Team's Climate-for-innovation

The results relating to participation safety, vision and support-for-innovation climates are discussed under this section.

8.5.1 Hypothesis H13

This hypothesis is supported ($ß = 0.3220$, $p < 0.01$), which suggested that participation safety climate is positively related to team reflexivity.

Hence, this provides evidence for theories advocating that a non-threatening climate encourages team members to be involved in discussions about decisions and strategy effectiveness (Erez, Earley & Hulin, 1985; Anderson & West, 1998; West, 1990). This finding encourages managers and leaders of parallel-teams to secure a participation safety climate to motivate team members to be intensely involved in task-related discussions. In relation to the hypothesis H8c, this climate can be enhanced by team leaders who act as a gatekeeper for open and unthreatening communication. It is also important for team leaders to respect ideas and avoid favouritism.

8.5.2 Hypothesis H14

This hypothesis, which anticipated a significant positive relationship between a team's vision climate and team reflexivity, was not supported ($ß = 0.007$). However, the independent regression analysis found a significant positive relationship ($ß = 0.8270$, $p < 0.01$). This indicates that team vision climate is not important to team reflexivity when other factors are present. This finding is not congruent to Schippers et al. (2008) and does not support Weldon and Weingart (1988) and Weldon, Jehn and Pradhan (1991).

This insignificant finding could perhaps be explained by the activities within parallel-teams. As Revilla and Rodriguez (2011) highlighted, the influences of a team's vision on team members behaviour is more obvious in teams that need highly integrated of knowledge from cross-functional team members. A parallel-team is usually formed by team members from the same department; thus, the need for integration of different viewpoints might be low or moderate. Thus, vision climate is not one of the more effective factors, available to managers and leaders to enhance team reflexivity.

8.5.3 Hypothesis H15

The anticipation that a support-for-innovation climate has a significant positive influence on team reflexivity was supported (*ß* = 0.182, $p < 0.01$). This finding is congruent with those of Antoni (2004) and West, Hirst, Richter et al (2004), who suggested that members in a team with support-for-innovation climate are more likely to share new ideas and resources, spend more time on activities, and cooperate in implementing new ideas, thereby stimulating reflexivity (Eisenbeiss, van Knippenberg & Boerner, 2008).

For this reason, managers and leaders of parallel-teams can enhance team reflexivity by developing a stronger support-for-innovation climate. Based on the significant findings in the hypotheses H8b and H11, a team's transformational leadership style and departmental manager can be directly responsible for enhancing a support climate, thereby boosting team reflexivity.

8.6 Discussion Related to Team Reflexivity

This section presents discussions related to team reflexivity, which was hypothesised to influence climate for excellence and team innovation. This section also discusses the moderating role of climate for excellence on the relationship between team reflexivity and team innovation.

8.6.1 Hypothesis H16

Hypothesis H16, which expected team reflexivity to have a significant positive influence on team's climate-for-excellence was supported (*ß* = 0.8270, $p < 0.01$).

This result holds up the theory advocating that reflexive team members who always voice their views on problems and review their current work effectiveness and progress (Johnson & Johnson, 1987) will create constructive task conflicts that lead to higher quality decisions, thereby developing a climate-for-excellence (Tjosvold, 1998; Hacker, 2003).

Hence, when a team has too many alternative strategies and decisions, a team leader should provoke higher reflexivity to promote a climate for excellence that will support the team in addressing alternative strategies to enhance decision quality.

8.6.2 Hypotheses H17 and H18

Hypothesis H17, which proposed a significant positive relationship between team reflexivity and team innovation, was supported ($ß = 0.361$, $p < 0.01$). This result corresponds with the theories that state team reflexivity is a key process in team innovation (Carter & West, 1998; De Dreu, 2002; Schippers, Den Hartog & Koopman, 2001, 2002).

In hypothesis H18, the relationship between team reflexivity and team innovation was expected to be moderated by climate-for-excellence. However, the interaction indicators showed an insignificant relationship with team innovation ($ß = -0.5200$). Hence, this research could not support the theory which suggests that high innovation is contingent on a climate for excellence (Frese & Zapf, 1993; Gollwitzer, 1996; De Dreu, 2002).

As the climate for excellence is central to the debate that leads to higher decision quality, it might not be significant in parallel-team because these teams usually innovate around daily operational problems, for which alternative solutions are not overly complex. When compared with other type of teams such as medical research and development R & D and product development teams that produce high-end innovation through comprehensive quality assessment, members of parallel teams deal with less complex idea alternatives that may be solved without going through a high degree of constructive conflicts. Hence, these findings provide general information to managers and leaders of parallel teams that team reflexivity directly influences team innovation. However, this influence does not depend on a team's climate-for-excellence.

8.7 Discussion Related to the Mediating Role of Team Reflexivity.

Based on the literature, team reflexivity was hypothesised as a mediator between the antecedents and team innovation. Since 14 variables were hypothesised as directly relating to team reflexivity, 14 mediating hypotheses were developed accordingly. In the following, these hypotheses are discussed further.

8.7.1 Hypotheses H19/m/a and H19/m/b

These two hypotheses expected that the effects of age and gender diversity on team innovation would be mediated by team reflexivity. However, in Step 1, age and gender diversity were not shown to be related to team reflexivity (*ß* = 0.021 and *ß*= 0.008), which did not suggest a mediating effect of team reflexivity. The independent mediation test also could not support H19/m/a, as age diversity was not significant to team reflexivity (*ß* = 0.0500). However, a partial mediation effect of team reflexivity was identified in the independent mediation test for H19/m/b when the results in the three steps all showed significant relationships. The relationship between gender diversity and team innovation was still significant even after team reflexivity was added to the model (*ß* = 0.1270, $p < 0.025$). Thus, in relation to bio-demographic variables, team reflexivity was a mediator to gender diversity only when other team factors did not interfere.

These findings do not align with previous studies that have confirmed the mediating role of team reflexivity between team diversity and team innovation (Jehn, Northcraft & Neale, 1999; O'Reilly III, Caldwell & Barnett, 1989; Pelled, 1996; Schippers, Deanne, et al., 2003).

This finding informs managers and leaders of parallel-teams, that team reflexivity is not an interactional activity that converts the benefits of bio-demographic diversity on team innovation. Hence, team reflexivity is not the main interactional activity that should be emphasised by managers and leaders of parallel teams to reap the benefits of bio-demographic diversity for team innovation. The main reasons for this lack of mediation are the insignificant influences of age and gender diversity on team reflexivity, which were discussed earlier in the hypotheses H1a and H1b.

8.7.2 Hypotheses H19/m/c, H19/m/d and H19/m/e

H19/m/c, H19/m/d and H19/m/e were mediation hypotheses related to the variables under task-related diversities: functional, educational and organisational tenure diversities. The effects of these variables on team innovation were expected to be mediated by team reflexivity.

In Step 1 of the mediation effect test (Baron & Kenny, 1986), these variables were found to be not significant to team reflexivity (functional: *ß* = -0.041, educational: *ß* = 0.011 and organisational tenure: *ß* = -0.013). These results strongly showed that there was no mediation effect played by team reflexivity between task-related diversity and team innovation. Each of these hypotheses was explored further in independent mediation tests isolated from the research model. However, the relationships were still insignificant (functional: *ß* = -0.0410, educational: ß = 0.0710 and organisational tenure: ß = 0.0890), thus no mediation effects were shown in each hypothesis.

These findings did not align with those of Schippers et al. (2003) and Tjosvold et al. (2004) who found evidence that team reflexivity is a mediating variable between team diversity and team performance.

Hence, in the parallel team context, managers and leaders do not have to focus on team reflexivity as an interactional process to convert the benefits of task-related diversities for team innovation. The main reasons for this lack of mediation are the insignificant relationships between task-related diversity and team reflexivity, which were discussed earlier under hypotheses H3a, H3b and H3c.

8.7.3 Hypothesis H19/m/f

This hypothesis anticipated that team reflexivity mediated a relationship between team interest and team innovation. The mediation test results did not support this hypothesis. The first main reason for this was that there was insignificant relationship was found between team interest and team reflexivity in Step 1 (ß= 0.092). This hypothesis was run again in an independent mediation test separate from the research model. As a result, team interest and team reflexivity were highly correlated in Step 1 (ß = 0.7750, $p < 0.01$). However, the relationship between team reflexivity and team innovation became insignificant in Step 3 when regressed together with team interest (ß = 0.0910). To satisfy the condition for the partial mediation effect, the relationship between team reflexivity and team innovation had to be significant. Although team interest was shown to be significantly related with team innovation in both analyses, ($ß$ = 0.2490, $p < 0.025$) and ($ß$ = 0.4220, $p < 0.01$), team reflexivity was confirmed as a non-mediator for team interest.

Despite the theories advocating that team reflexivity is a team process that mediates the team's properties into team outcomes (Marks, Mathieu & Zaccaro, 2001; Antoni & Hertel, 2009; West, 2002; Cohen & Bailey, 1997; Olson, Parayitam & Bao, 2007), this research did find evidence to support this. These results somewhat correspond with the framework by Cohen and Bailey (1997), which states that team variables might have a direct impact on team innovation.

In parallel-teams, team reflexivity is not an interactional process that converts the benefits of team interest into team innovation because team interest alone is strong enough to ensure team innovation. Additionally, in a real situation where team performance is subject to many factors, team interest does not influence team reflexivity, as was discussed under H4.

8.7.4 Hypothesis H19/m/g

This hypothesis expected the effect of task meaningfulness on team innovation to be mediated by team reflexivity. In Step 1 of the mediation test (Baron & Kenny, 1986), task meaningfulness was found to be significant to team reflexivity ($ß$ = 0.246, $p < 0.01$). However, in Steps 2 and 3, task meaningfulness and team reflexivity were not significant to team innovation ($ß$ = 0.0540 and $ß$ = -0.1830, respectively). This mediation hypothesis was explored further in an independent test. This showed different results, with task meaningfulness being significant to team reflexivity and team innovation in Steps 1, 2 and 3. However, the relationship between team reflexivity and team innovation was still not significant in Step 3 ($ß$ = 0.1080). Hence, both analyses showed that team reflexivity was not a mediator — mainly because of the insignificant relationship between the mediator and team innovation. Although in the hypothesis H16, team reflexivity and team innovation were found to be very significantly related, the relationship became insignificant when regressed together with task meaningfulness.

In the context of parallel-teams, this indicates that team reflexivity has limited influence that is not strong enough to convert the benefits of task meaningfulness into team innovation. This appears logical because West (1996) highlighted that team reflexivity was strongly influential in complex decision-making teams (CDM) that are highly subject to uncertain and unpredictable changing circumstances and environments. As a parallel-team usually deals with daily operational problems that are normally less complex, this might indicate why the influence of team reflexivity on team innovation is limited and not robust.

8.7.5 Hypothesis H19/m/h

This hypothesis anticipated that team reflexivity would mediate the effect of task autonomy on team innovation. However, the three-step mediation testing showed no relationship between task autonomy and team reflexivity with team innovation ($ß$ = -0.0540 and $ß$ = 0.1400); thus, no mediation effect was observed. However, when this hypothesis was explored further in an independent mediation test, task autonomy was found to be significant to team reflexivity ($ß$ = 0.6390, $p < 0.01$), as well as team reflexivity and team innovation ($ß$ = 0.2060, $p < 0.025$). When team reflexivity was regressed on team innovation, the relationship between task autonomy and team innovation was still strongly correlated ($ß$ = 0.2500, $p < 0.01$), which indicated a partial mediating role of team reflexivity (Baron & Kenny, 1986).

As seen in the above, team reflexivity was a mediator between task autonomy and team innovation only when tested separately from the research model. The main underlying reason for this was the limited influence of task autonomy on team reflexivity in parallel-teams because it diminished and became insignificant when other factors came in. The insignificant relationship between task autonomy and team reflexivity was discussed earlier under hypothesis H6.

Hence, this provides information for managers and leaders of parallel-teams that task autonomy is not strongly functional in the team interaction process, which is why team reflexivity is not a process that converts the benefits of task autonomy into team innovation.

8.7.6 Hypothesis H19/m/i

This hypothesis, which expected that the effect of intra-team coordination on team innovation would be mediated by team reflexivity was not supported. The main reason underlying this was the insignificant relationship between intra-team coordination and team innovation in Step 2 ($ß = 0.0270$).

However, the independent mediation test results showed that team reflexivity acted as a full-mediator between intra-team coordination and team innovation. In Steps 1 and 2, intra-team coordination was significantly related to team reflexivity ($ß = 0.7510$, $p < 0.01$) and team innovation ($ß = 0.3500$, $p < 0.01$). When team reflexivity was regressed on team innovation, it showed a significant relationship ($ß = 0.2320$, $p < 0.25$); however, the significant relationship between intra-team coordination and team innovation disappeared. This change satisfied the rules for the full-mediation effect by Baron and Kenny (1986).

The above contrary results showed that team reflexivity fully mediated the effects of intra-team coordination on team innovation only if other team factors did not interfere. When other factors were present, the influence of intra-team coordination on team innovation became insignificant. This could have been caused by the function of intra-team coordination, which is more relevant in promoting and encouraging communication among team members, but is not strongly related to team innovation.

In the context of this research, in which teams do not operate in a vacuum, intra-team coordination is only influential for team reflexivity, and is not robust for team innovation. This is why team reflexivity is not a process that converts the benefits of intra-team coordination into team innovation.

8.7.7 Hypothesis H19/m/j

This hypothesis anticipated that team reflexivity would mediate the effects of training on team innovation. However, the three-step analysis showed no evidence for this. While there was a significant influence of training on team reflexivity ($ß = 0.1150$, $p < 0.05$), the main reason for the lack of mediation effect was the insignificant relationship found between training and team innovation in Step 2 ($ß = 0.1150$). Team reflexivity was also not related to team innovation in Step 3 when regressed together with training as an antecedent variable to team innovation. Although team reflexivity showed a significant direct relationship with team innovation in the hypothesis H17, this effect disappeared as other factors were considered. However, when this hypothesis was tested again in an independent analysis that was separate from the research model, the results showed significant relationships in all three steps, which indicated a partial mediation effect of team reflexivity (Baron & Kenny, 1986).

The main underlying reason for the lack of mediation in the presence of all factors was the insignificant influence of training on team innovation. In this research, training influenced team reflexivity, but did not directly influence team innovation. This finding could be rationalised by the literature that has highlighted that training improves teamwork-oriented skills (Cannon-Bowers et al., 1995; Goldstein & Ford, 2002; McIntyre & Salas, 1995; Salas et al., 1992; Salas et al., 2008), which enhances team processes.

Therefore, in real situations where teams face many organisational factors, team reflexivity is not a team process which converts the benefits of training into team innovation because training is influential only on team reflexivity but not on team innovation. In the context of parallel teams, although training is influential on team reflexivity, team reflexivity is not a team process to be addressed by managers and leaders to reap the benefits of training for team innovation. There might be other team process which is more effective in utilising the benefits of training to enhance team innovation.

8.7.8 Hypothesis H19/m/k

This hypothesis, which anticipated that team reflexivity would mediate the effects of team networking on team innovation, was not supported. The main underlying reason for this was that no significant relationship existed between team networking and team reflexivity ($ß$ = 0.0460). However, when this hypothesis was run separately from the research model, the results presented completely different conclusions. While team networking had a strong influence on team reflexivity and team innovation, its influence on team innovation became insignificant when tested at once with team reflexivity in Step 3, and satisfied for the conditions for full mediation effect (Baron & Kenny, 1986).

As the relationship between team networking with team reflexivity was not significant, this research could not support the theories that suggest team reflexivity as a variable that converts team inputs in to team outcomes (Marks, Mathieu & Zaccaro, 2001; Antoni & Hertel, 2009; West, 2002; Cohen & Bailey, 1997; Olson, Parayitam & Bao, 2007; West, Borrill & Unsworth, 1998).

Therefore, in reality, where parallel-teams are surrounded by many organisational factors, team reflexivity is not a mechanism that converts the benefits of team networking into team innovation, because team networking does not play an important role in team reflexivity. The insignificant relationship between team networking and team reflexivity was discussed under hypothesis H12.

8.7.9 Hypothesis H19/m/l

This hypothesis anticipated that team reflexivity would mediate the benefits of participation safety climate on team innovation. However, this was not supported by the results because participation safety climate was only significant to team reflexivity ($ß = 0.3220$, $p < 0.01$), not to team innovation ($ß = -0.0510$). However, in the independent mediation test the climate was significant to team reflexivity and team innovation ($ß = 0.8590$, $p < 0.01$ and $ß = 0.3670$, $p < 0.01$). When the climate and team reflexivity were regressed simultaneously on team innovation, team reflexivity was insignificant to team innovation ($ß = 0.1830$). There was no evidence for a mediating role of team reflexivity in either analyses.

These findings indicate that in a real situation where a team is surrounded by many influencing factors, a team's participation safety climate functions only to facilitate team reflexivity, but does not have a direct effect on team innovation. Thus, team reflexivity is not a team interactional process that converts the benefits of participation safety climate into team innovation.

8.7.10 Hypothesis H19/m/m

This hypothesis, which anticipated that team reflexivity would mediate the benefits of vision climate on team innovation was not supported. The main underlying reason for this was the insignificant relationship between vision climate and team reflexivity (*ß* = 0.007). However, in the independent mediation test, vision climate was significant to team reflexivity (*ß* = 0.8270, $p < 0.01$) and team innovation (*ß* = 0.3890, $p < 0.01$), but mediation effect was still not observed as team reflexivity and team innovation was not significantly correlated (*ß*=0.1310) when regressed together with vision climate. The results in both the non-independent and independent mediation analyses did not show a mediation effect of team reflexivity between vision climate and team innovation. The main reason for this related to the insignificant influence of vision climate on team reflexivity in the presence of other factors in the research model.

The finding does not align with the study by Schippers et al. (2008), which found that team reflexivity mediated the impact of vision climate on team innovation. This research also could not support the theories of a mediating role of team reflexivity between team properties and team innovation (Marks, Mathieu & Zaccaro, 2001; Antoni & Hertel, 2009; West, 2002; Cohen & Bailey, 1997; Olson, Parayitam & Bao, 2007; West, Borrill & Unsworth, 1998).

Hence, in the context of a team which in reality does not operate in vacuum, team reflexivity is not a vehicle that transforms the benefits of vision climate into team innovation because vision climate is not robust for team reflexivity. The relationship between vision climate and team reflexivity has been discussed under H14.

8.7.11 Hypothesis H19/m/n

In this hypothesis, the effect of support-for-innovation climate on team reflexivity was expected to be mediated by team reflexivity. In the three-step mediation test, support climate was highly correlated with team reflexivity ($ß = 0.182$, $p < 0.01$). However, the mediating role of team reflexivity was not evidenced because the support climate was not significant to team innovation ($ß = 0.0860$). The insignificant relationship between support climate and team innovation was similar to the studies by Wilson-Evered et al. (2001). This could be due to a scenario where under this climate, team members do not critically assess the quality of ideas (West, 1990).

The mediating role of team reflexivity was explored further in separate mediation analyses that were independent from the research model. Support climate was significantly correlated to team reflexivity and team innovation in Steps 1, 2 and 3. However, the mediation effect did not exist as team reflexivity became insignificant to team innovation when regressed together with support climate ($ß = 0.1150$). Team reflexivity was significantly correlated with team innovation in H17; however, it had limited influence as it became insignificant to team innovation when other factors were considered, as was discussed under H19/m/g.

The non-independent and independent mediation analyses above did not support the theories advocating the mediating role of team reflexivity (Marks, Mathieu & Zaccaro, 2001; Antoni & Hertel, 2009; West, 2002; Cohen & Bailey, 1997; Olson, Parayitam & Bao, 2007; West, Borrill & Unsworth, 1998).

Therefore, in the context of this research, where team performance in reality is subject to many factors, team reflexivity is not an interactional process that transforms the benefits of support climate into team innovation. The main underlying reason for this is the role of support climate which was shown to be influential only on team reflexivity, and not on team innovation.

8.8 Discussion Related to the Influence of Parallel-teams' Innovation on Operational and Organisational Performance.

This section further discusses the results relating the influences of innovations by parallel-teams on operational and organisational performance.

8.8.1 Hypotheses H20a and H20b.

Hypothesis 20a suggested that innovations by parallel-teams are positively significantly related to operational performance in the department where the innovations are implemented. The test results significantly supported this hypothesis and corresponded to the findings of Barrick and Alexander (1987), Steel and Shane (1986) and Hanna, Newman and Johnson (2000), who found that the problem-solving activities of parallel-teams can improve work processes, thereby influencing productivity and operational performance.

Hypothesis 20b anticipated a significant contribution of operational performance that was improved by parallel - teams on organisational performance. This hypothesis was also supported. This finding supports the link between operational and business performance which has been well modelled and extensively studied by several authors (Skinner, 1974; Hayes & Wheelwright, 1984; Porter, 1980). A significant finding for both hypotheses strengthened the theory of the ‘performance chain’ by Delarue (2008), which states that the introduction of teams can influence operational performance, which in turn contributes to improved organisational performance.

Therefore, innovations by parallel-teams have improved not only departmental operations, but also organisational performance. The utilization of a parallel-team as a management strategy for organisational performance has thus been successful in Malaysia.

8.9 Summary

This chapter discussed each hypothesis in conjunction with the statistical results from Chapter 7. Wherever necessary, insignificant relationships found in the analyses were explored further in an individual regression analyses that were independent from the research model.

For team composition, only gender diversity showed a significant influence on team climate (that is, participation safety climate). However, this significant relationship was in a positive direction, which contradicted with the hypothesis that anticipated a negative direction. The other bio-demographic and task-related diversities did not show a significant influence on team reflexivity and participation safety climate. In the discussions, these findings were rationalized based on the Malaysian parallel-team perspective.

With regard to task design, task meaningfulness and intra-team coordination were found to significantly influence team reflexivity directly. Team autonomy was not found important for team reflection, as intra-team coordination in parallel-teams was hybrid in nature, which required team members to combine interdependent and independent tasks during project execution.

For organisational context, only transformational leadership and support from a head of department showed a significant effect on team's climate. Transformational leadership was found to be influential on vision, support-for-innovation and participation safety climates, while support from a departmental head was significant for support-for-innovation climate. Training was significantly found to directly influence team reflexivity.

Support-for-innovation and participation safety climates in teams were statistically significant to team reflexivity, whereas vision climate had a limited capacity in influencing team reflexivity because it became insignificant when other factors interfered. The results supported the influence of team reflexivity on climate-for-excellence and team innovation. However, the role of team reflexivity as a mediator in the research model was not evidenced. A team's climate for excellence also did not moderate the impact of team reflexivity on team innovation. Ultimately, the results demonstrated that the innovation accomplished by parallel-teams on operational performance is capable of enhancing organisational performance.

Chapter 9: Conclusion and Future Research

9.1 Introduction

This study has demonstrated how the team design would influence team innovation through team climate for innovation and reflexivity. Additionally, this study also provided evidence that innovation by parallel teams contributed to operational and organisational performances. The study has discussed clear guidelines regarding the conditions of team design most likely to enhance innovation within parallel teams, including the means of creating the appropriate team climate and ensuring reflective practice.

After briefly revisiting the specific elements involved in the above, the remainder of this chapter revisits the initial motivations for the study, touches again on the underlying methodology and research design, highlights the specific contribution to research and practice and concludes with acknowledgement of the limitations and proposes directions for future study.

9.2 Summary of the Research

Previous studies have examined team design, namely team composition, task design and organisational context as direct antecedent factors for team innovation. However, theories have emphasised that team design does not influence team innovation directly. Rather, they influence team innovation through emergent states and team processes. In literature, team's climates for innovation and team reflexivity are the two constructs that have been identified to explain team emergent state and team process. However, team's climates for innovation and team reflexivity have been frequently examined in previous research as direct antecedents to team innovation.

A review of the literature identified that some aspects of team design have the capacity to directly influence a team's climate for innovation and team reflexivity. While a team's climate for innovation was theorised to influence team reflexivity, there was an emphasis on team reflexivity as a mediator that transforms the effects of team design and climate on team innovation. As the influence of team design on team's climate for innovation and reflexivity had not been adequately addressed in previous studies, this became one of the areas for this research. The mediating role of team reflexivity was also examined.

Another gap in the literature was the application of the literature to parallel team. Parallel teams are equally important to other teams in organisations in order to improve operational and organisational performance. Despite this, evidence about the extent to which innovations by parallel-teams have contributed to operational and organisational performance are still not available in Malaysia. Therefore, these relationships were investigated in this research.

A preliminary research model, which illustrated the focus of this research, was then developed. A mixed-method approach was then enacted that combined a qualitative and quantitative method. The qualitative method was applied through semi-structured interviews with twenty-eight members and eight leaders of parallel-teams in Malaysian organisations. In addition, eight departmental managers were interviewed to justify the contributions of parallel-teams to operational and organisational performance. The main purpose of the interviews was to refine the applicability of the preliminary research model. At the same time, any new factors and variable dimensions emerged during the interviews were given adequate attention. The qualitative data were managed by using NVivo software and analysed based on content analysis procedures. The results of the content analyses were illustrated in the qualitative field-study research model. Different to the preliminary research model, the qualitative field-study model had three additional factors: team interest, support from a departmental head and networking with relevant departments. New links between bio-demographic diversity and participation safety climate were also discovered from the interviews, which were not identified in the preliminary research model.

Finally, both of the preliminary and qualitative research models were combined to produce a comprehensive research model. Basically, the comprehensive model was similar to the preliminary one, except for minor modifications based on the findings from the qualitative field study. The comprehensive model had an additional three factors i.e. team interest, support from a departmental manager and networking with other departments, and five new relationships among factors. This comprehensive model was then tested in the quantitative study.

In preparation for the quantitative study, each relationship depicted in the comprehensive model was theoretically explained and a hypothesis was developed. Overall, 40 hypotheses were proposed. The quantitative data collection involved the development of two sets of questionnaire. One set was for team members and the other was for team leaders. Prior to the survey, both questionnaire sets were pre-tested, pilot-tested and then modifications were made accordingly. Finally, the team-based questionnaire sets were distributed to 249 parallel teams, and 229 team-based questionnaires were received in return. However, only 188 team-based questionnaires were usable. All the data measurement and structural analyses were examined by using PLS-based SEM.

The results supported only parts of the hypotheses. Bio-demographic diversity, task-related diversity and team interest were not influential neither on participation safety climate nor team reflexivity. Some of the task design and organisational factors were shown to be influential on team reflexivity and climate dimensions. In the context of this research, team reflexivity was not an interactional process that converted the benefits of team design into team innovation because the direct influence of team reflexivity on team innovation became insignificant when other factors appeared in the mediation analyses. Nevertheless, the innovations made by a parallel team showed a significant improvement on operational performance, which then enhanced overall organisational performance.

9.3 Research Contributions

The findings of this research contribute to the pre-existing theoretical perspectives within this field of study. These are outlined in the following sections.

9.3.1 Theoretical Contributions

The theoretical contributions of this research hinged on a demonstration of how team design could be related to four dimensions of team's climate-for-innovation and team reflexivity to influence innovation, exclusively in Malaysian parallel-teams.

While previous research has highlighted direct influences of team composition on team innovation, this research added to the theory regarding the influence of team composition on the team emergent state and team process that are essential for team innovation. In this research, team emergent state and team process were represented by team climate-for-innovation and team reflexivity. In the context of parallel-teams, this research found that only gender diversity was significantly related to team climate (that is, participation safety climate). Commonly, the literature has implied that gender diversity influences team participation safety climate negatively because employees are more comfortable working with the same gender. In contrast, this research found a positive relationship, which indicates that participation safety climate was enhanced when the genders of team members were mixed. This finding was rationalized as personality theory highlights that all-male teams can result in aggressive and uncooperative climates; thus, the presence of female behaviour in the team could be beneficial to moderate the uncooperative climate. This has been highlighted in the discussion for hypothesis H2b.

This research also added new perspectives to the literature by discussing possible reasons why age, gender, functional, educational and organisational tenure diversity, as well as team interest, were not significantly related to reflexivity in parallel-teams.

As task meaningfulness, team autonomy and intra-team coordination have been frequently evidenced previously in terms of motivation and productivity, this research in contrast demonstrated their influence on team reflexivity. This research found that only task meaningfulness and intra-team coordination were significantly related to team reflexivity. Task autonomy was not significantly related to team reflexivity because the members of parallel-teams do not have absolute autonomy, as their decisions need approval from management. These findings therefore added a new perspective to the literature relating to the impact of task design on reflexivity in the perspective of parallel-teams.

Despite examining the direct influence of organisational factors on team innovation, this research added further theoretical evidence of their influence on a team's climate-for-innovation and reflexivity. Transformational leadership of a team was found to be influential on vision climate, support-for-innovation climate and participation safety climate, whereas support from a departmental head was shown to have a significant influence on team's support-for-innovation climate. Training was also influential with regard to team reflexivity. In addition, possible reasons were also presented as to why rewards/recognition and team networking were not significantly related to support-climate and reflexivity in parallel-teams.

Evidence was then presented, demonstrating that a support-for-innovation climate and participation safety climate are significantly related to team reflexivity, while a vision climate has limited capacity to influence team reflexivity in parallel-teams. Thus, this information enriched the literature relating to the role of team climate-for-innovation in team reflexivity.

The findings also added empirical evidence to the literature relating to the mediating role of team reflexivity. Although previous researchers have found evidence that team reflexivity mediates the benefits of team properties on team innovation, their results were based on a small number of antecedents, normally up to only two factors. In this research, the mediating role of team reflexivity was examined simultaneously for fourteen constructs. This allowed a more realistic study because teams do not operate in a vacuum.

The mediating role of team reflexivity was not evidenced in this research, mainly because of the limited influence of team reflexivity on team innovation. Although team reflexivity showed a significant relationship with team innovation in a direct relationship test, this relationship became insignificant when other factors were present in the mediation test against 14 constructs simultaneously. This result led to the assumption that the effect of team reflexivity on innovation in parallel-teams might not be as robust as the effect in teams that deal with more complex decision making. This may be why, in parallel-teams, team reflexivity was not an interactional process that converts the benefits of team properties into team innovation.

Another theoretical contribution of this research is the use of a parallel-team, which has previously been inadequately addressed as a research context. In previous research, work teams and TMTs have been commonly studied to examine their contribution to performance at the operational and organisational levels. Since many organisations have seriously undertaken strategies to improve their operational and organisational performance through parallel-teams, this research has provided evidence that innovation generated and implemented by parallel-teams is capable of improving operational performance, which subsequently enhances organisational performance.

9.3.2 Practical Contributions to Malaysian Organisations

In practical term, this research provided information that gender diversity, transformational leadership and departmental head support are important factors to ensure a sufficient climate-for-innovation, whereas team members' perception about their task meaningfulness, intra-team coordination and training are influential for team reflexivity. Indeed, climate-for-innovation and team reflexivity are essential for team innovation.

It is important also for an organisation to realise that with regard to the organisational context i.e. training, departmental head support and transformational leadership are factors under management's control. Thus, these factors can be utilized as motivational tools to improve the innovation-climate and reflexivity in a team. At the same time, the awareness of managers in organisations should not only be limited to the organisational context, but expanded to the understanding that intra-team coordination and team members' perceptions about task meaningfulness are also important for team reflexivity. Gender diversity should not be taken for granted as it can also influence the participation safety climate for team reflexivity.

Finally, this research provided empirical evidence that innovation at the parallel-team level is capable of advancing operational and organisational performance. This result should persuade managers of the benefits of using parallel-teams, given their effectiveness in improving operational and organisational performance.

9.3.3 Implications for Manager, Team Leaders and Consultant of Malaysian Parallel-teams.

Participation safety climate and support for innovation climate are influential on team reflexivity, which subsequently affects the innovation of parallel-team. Hence, this research provided managers and leaders with an understanding of how these climates and reflexivity can be managed through altering team design.

To enhance innovation in a parallel-team, this study suggests that managers and leaders to plan the team composition by mixing up the gender of team members because the finding indicates the significance of gender diversity in fostering a participation safety climate.

Task design also can be used by managers and leaders as a lever to enhance team reflexivity, because team members' perceptions of their task meaningfulness and intra-team coordination strongly influence task-related communications within a team. Communication between managers and team leaders with team members is important to enhance perceptions regarding task meaningfulness. Managers and leaders should highlight information to the teams regarding the manner in which the team's innovations have positively enhanced performance at the operational and organisational levels. This information can also be conveyed through organisational rewards or recognition given to the team's contributions. In addition to this perception, tasks should be delegated among team members, because this creates dependency among team members for information and materials, which thus engenders task-related communication and boosts team reflexivity.

With regard to the organisational context, training was found to be very influential on team reflexivity, whereas support from a departmental head had a strong influence on support-for-innovation climate. As training and support from a departmental head are under management's control, managers should ensure that relevant organisational policies and people development are improved to bring strategies about these benefits relating to teams climate and reflexivity. Other than that, the role of transformational leadership was found to be dominant on three team climates: vision, support-for-innovation and participation safety climates. Hence, this is a factor to four leadership development and leader selection.

9.4 Research Limitations

The findings of this research were subject to several limitations. Cohen and Bailey (1997) suggested in the main part of their heuristic model that a team's interaction process, which in the current study translated as team reflexivity may have a reciprocal effect on psychological process/emergent states (team innovation climate). However, this reciprocal effect was not considered in this research. This research only investigated the influences of three dimensions of team innovation climate i.e. participation safety, vision and support-for-innovation on team reflexivity. The possible influence of team reflexivity on these three climate dimensions was not explored.

Another limitation of this study was the measurement used for several constructs. These were based on shorter version questionnaire, due to the requirements by the MPC. This was done to ensure that the organisations involved would not perceive that their employees were distracted from their daily tasks. The constructs that were measured by short version questionnaire were transformational leadership, team reflexivity and all four dimensions of team's climate-for-innovation. The use of the short version questionnaire could have influenced the accuracy of the constructs measured and might have affected the quantitative findings with regard to the relationship significance level.

The number of teams involved in this research could also be considered a limitation. As described in Chapter 7, the quantitative analyses were based on 188 teams, which was small but adequate to be analysed through a non-parametric of PLS-based SEM. Therefore, this research did not test how well the hypothesised model fit the data as the parametric of covariance-based SEM (COV-SEM) does through LISREL or AMOS software. The small sample size of this research was inappropriate to use COV-SEM approach, as this requires a larger sample size. This small sample size was due to the small number of Malaysian parallel-teams that could be traced from the list of participants in the conventions.

9.5 Future Directions

The findings and limitations of this study also point the way for future research.

First, as described in the research limitations section, this research did not consider the reciprocal effect of team reflexivity on team's climate-for-innovation. Thus, future research should consider this reciprocal effect in order to demonstrate how reflexivity can also influence a team's climate (Cohen & Bailey, 1997).

The second limitation in the above section led to the suggestion that future research should consider using a full version questionnaire to measure the constructs and thus enhance the findings.

Third, the team compositions considered in this research only comprised surface-level factors, except team interest. Thus, this research suggests that future research includes other team composition factors that exist at a deeper and more enduring level. Deep-level composition variables relate to individuals' internal psychological characteristics. Harrison et al. (2002) and Hollenbeck, DeRue and Guzzo (2004) suggested that deep-level composition factors can have a more powerful influence than surface-level factors on team performance. Bell (2007) identified three reliable enduring deep-level composition factors such as personality factors, values, and attitudes. Stewart (2006) found preliminary support for the relationship between 'team member personality' and team performance.

Future research should also deal with extensive serial mediation and moderated mediation tests which involves a generation of bootstrapped confidence intervals to supplement PLS SEM (Preacher & Hayes, 2004; Preacher, Rucker & Hayes, 2007).

Last, while team reflexivity is strongly recommended to be treated as a mediating variable, a team's climate-for-innovation was reported by Antoni (2005) as having a mediating effect between task structure and team innovation. Schippers et al. (2008) provided evidence that shared vision climate and team reflexivity sequentially mediate a transformational leadership effect on team performance. Based on the capacity of team's climate-for-innovation and team reflexivity as mediating variables, it is recommended that future research considers these sequential mediating effects in demonstrating the influence of team properties on team innovation.

9.6 Summary

The main contents of this research were summarised at the beginning of this chapter. From there, the contributions of this research to theory and its practical implications were highlighted. The findings of this research enhanced the field with regard to theories on how team design could be related to team's climate-for-innovation innovation climate and team reflexivity, particularly in Malaysian parallel-teams. In addition, this research provided further evidence concerning the extent to which innovation at the parallel-team level contributes to operational and organisational performance. From a practical perspective, the findings of this research provided information to managers, practitioners and team consultants regarding how team composition, task design and organisational context can be designed to produce the desired team innovation climates and reflexivity within parallel-teams. While this research was subject to several small limitations, overall it has provided a significant contribution to both scholarly knowledge of the field in question as well as to practitioners in increasingly competitive environment.

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- Start off by **thanking** the participant for taking part in the research.
- Explain that everything discussed in this interview is **confidential** and any evidence published from the interview will not make any connection to the participant's name or business.
- The interview can be **paused or terminated** at any time without prejudice.
- Any statements that the participant does not want to be **recorded** can be omitted from the tape.

Objective 1: To understand the team composition

i) How many members in your team? How many male and female? Age range? How many races?

ii) How long have you been working i) in this company (organisational tenure) ii) in the team (team tenure)? What about other team members?

iii) Do your team members come from the same department? Do your team members have different skills, knowledge or expertise? Could you please give example? Do your team members come from different educational level/background? Do they always have different opinion in giving ideas and making decisions? Examples? Is it good for your team? Why?How does your team ensure team members work together effectively? Examples?

Objective 2: To understand the task design

i) Task meaningfulness (Task variety, task identity & task significance)
What do you do in ICC? How does your team analyse problems and solutions?
Probe: Does it require you to know many methods or procedures? How does your team ensure that the methods are appropriate to analyse problems? Examples? How does your team learn from the past activities? Examples? Do you get involved in the task process from the beginning to the end (implementation & follow up)? Has your team made a substantial impact on work of other people? Examples? Are you happy to be part of this team? Why? How does this motivate you to involve actively in team discussion?

ii) Intra-team coordination (task and goal interdependence)
How is decision made in your team? Examples? How frequent your team members communicate with each other when there is decision to be made? Why? How do you communicate?
Probe: Do you need information and advice from other team members to perform well? Why? How do you feel when your team achieves desired goal? Why do you feel that? Does it reflect your success? How does this motivate you to involve actively in team discussion?

iii) Team-level autonomy
In what situation you can make your own decision on what, when and how? Can you give example? *Probe:* Can your team implement solution without management's approval? How supportive is management to your team's effort so far? Examples?Does this motivate you to involve actively in team discussion?

Objective 3: To understand relations between team composition, task design, and reflexivity

(a) How does your team composition facilitate interaction among yourselves?

Appendix A1: (continued)

(b) *Probe if necessary:*During interaction, what would happen on your team motivation if:

- the task is NOT meaningful? Why?
- members DO NOT have freedom to accomplish task? Why?
- members DO NOT dependon each other to accomplish task and to achieve goal? Why?

Objective 4: To understand the team's organisational context and its influences on reflexivity.

i) Team leadership

Could you describe what type of qualities does your leader posses in leading the team?

Probe:

Does he/she show you how to look at problems from new angles? How?How cooperative are your team members in searching for new ways of looking at problems?

How does your leader encourage team members to contribute new ideas?

Do you have complete confidence in him/her in leading your team? Why? Examples?

How cooperative your team members in generating and implementing new ideas? Do you feel comfortable/free in giving ideas? Is everyone's view listened? *Probe*: If you feel unsafe to give ideas (worried that idea will be criticized and misjudged), how would you react? Why?

Do your team members always debate and discuss on the ideas generated and the way it is implemented to achieve the best possible outcome? How does your team evaluate the results of decision implemented? Examples?

If team members did not co-operate, what your leader did? How these affect your motivation to involve in team discussion?

Could you describe briefly your team's objective? How did your team set objective? What is your leader's role in setting objective?Do you think the team leader is strongly responsible to set clear goals for team? Why?

ii) Training

What training did you attend that related to your role in ICC? How important was that training to you? How the training changed your approach to problem solving at work? How the training affects the way you work in team? How does it help you to involve actively in team discussion?

iii) Recognition reward

If your team performs well, works hard or show high effort, what your company will do to appreciate your team?Examples?How does it help you to involve actively in team discussion?

Close:

Thank you again for assisting with this research project. Would it be possible for me to give you a call if I need some clarification on what has been discussed today? Let me check that I've got your correct phone number.

- Start by **thanking** the participant for taking part in the research.
- Explain that everything discussed in this interview is **confidential** and any evidence published from the interview will not make any connection to the participant's name or business.
- The interview can be **paused or terminated** at any time without prejudice.
- Any statements that the participant does not want to be **recorded** can be omitted from the tape

Questions:

1) How innovative is your team? Why do you think so?
   Probe:
   Does your team have a high-level of cooperation in developing new solutions to problems? Why do you think so?
   Does your team always come out with solutions that are appropriate to the problems in view? Why do you think so? Examples?
   How do you make sure that the team members come out with appropriate ideas or good solutions to problems?
   Is your team really concerned about the quality of their ideas to the problem in view? Why do you think so?
   Does your team adjust strategies to achieve desired goal?

2) How does your team implement new ideas/solutions?
   Probe: Any processes to follow? Does your team really cooperate at the implementation stage? How do you know? How do you make sure that the team implements solutions properly? Is your team really concerned about the consequences of their actions during the implementation stage? Example?

3) What is the best thing about this team? What this team needs to improve to be more innovative?

Close:
Thank you again for assisting with this research project. Would it be possible for me to give you a call if I need some clarification on what has been discussed today? Let me check that I've got your correct phone number.

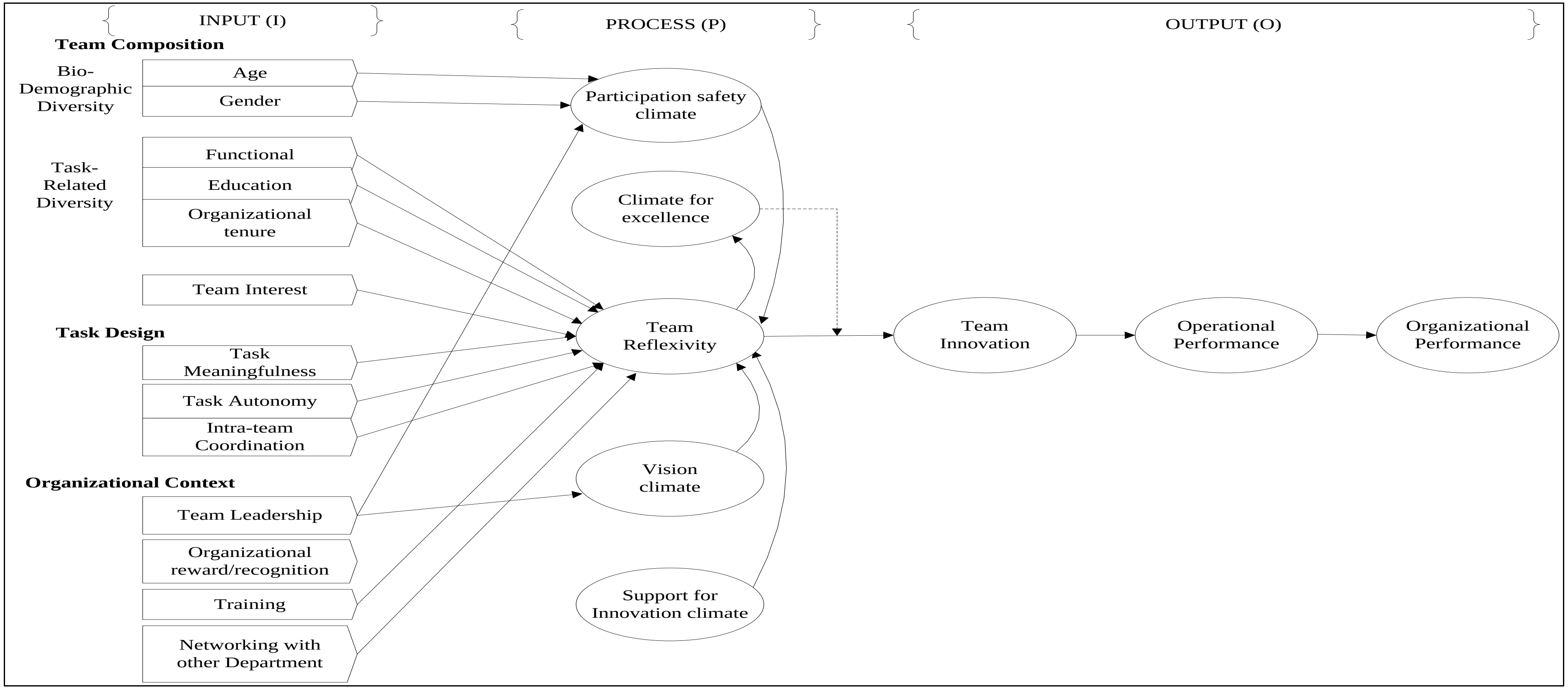
- Start by **thanking** the participant for taking part in the research.
- Explain that everything discussed in this interview is **confidential** and any evidence published from the interview will not make any connection to the participant's name or business.
- The interview can be **paused or terminated** at any time without prejudice.
- Any statements that the participant does not want to be **recorded** can be omitted from the tape

Questions:

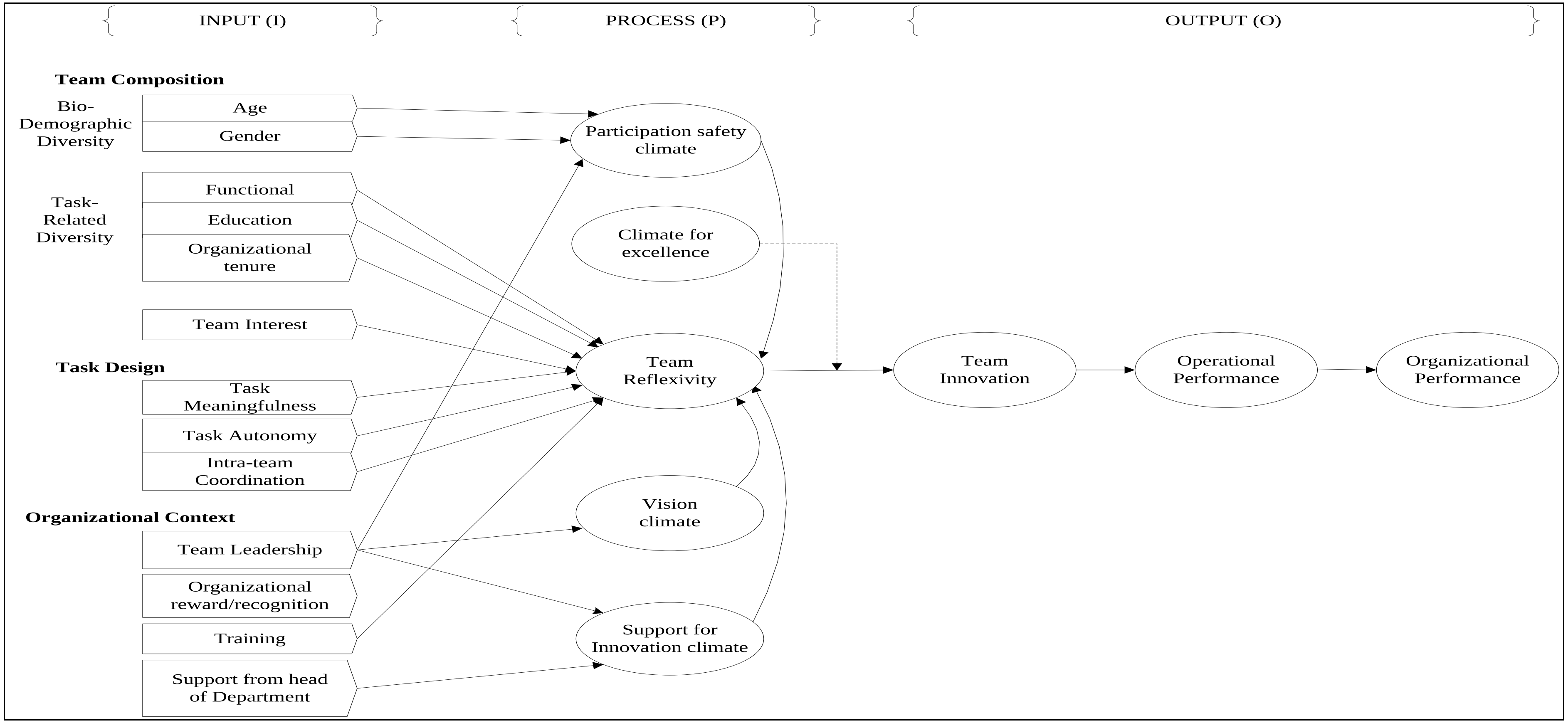
1) Could you please tell me what innovation has ICC done in your department?
2) Do you think that innovation by ICC is important to your department? Why? Example.
3) Could you please tell me how ICC has improved operational performance in your department?
4) In what ways ICC innovation has contributed towards organisational performance? Example.
5) What if ICC did not exist? What would happen?
6) Do you have any recommendation to ICC for their better performance in the future? What makes you suggest that?

Close:
Thank you again for assisting with this research project. Would it be possible for me to give you a call if I need some clarification on what has been discussed today? Let me check that I've got your correct phone number.

Team A

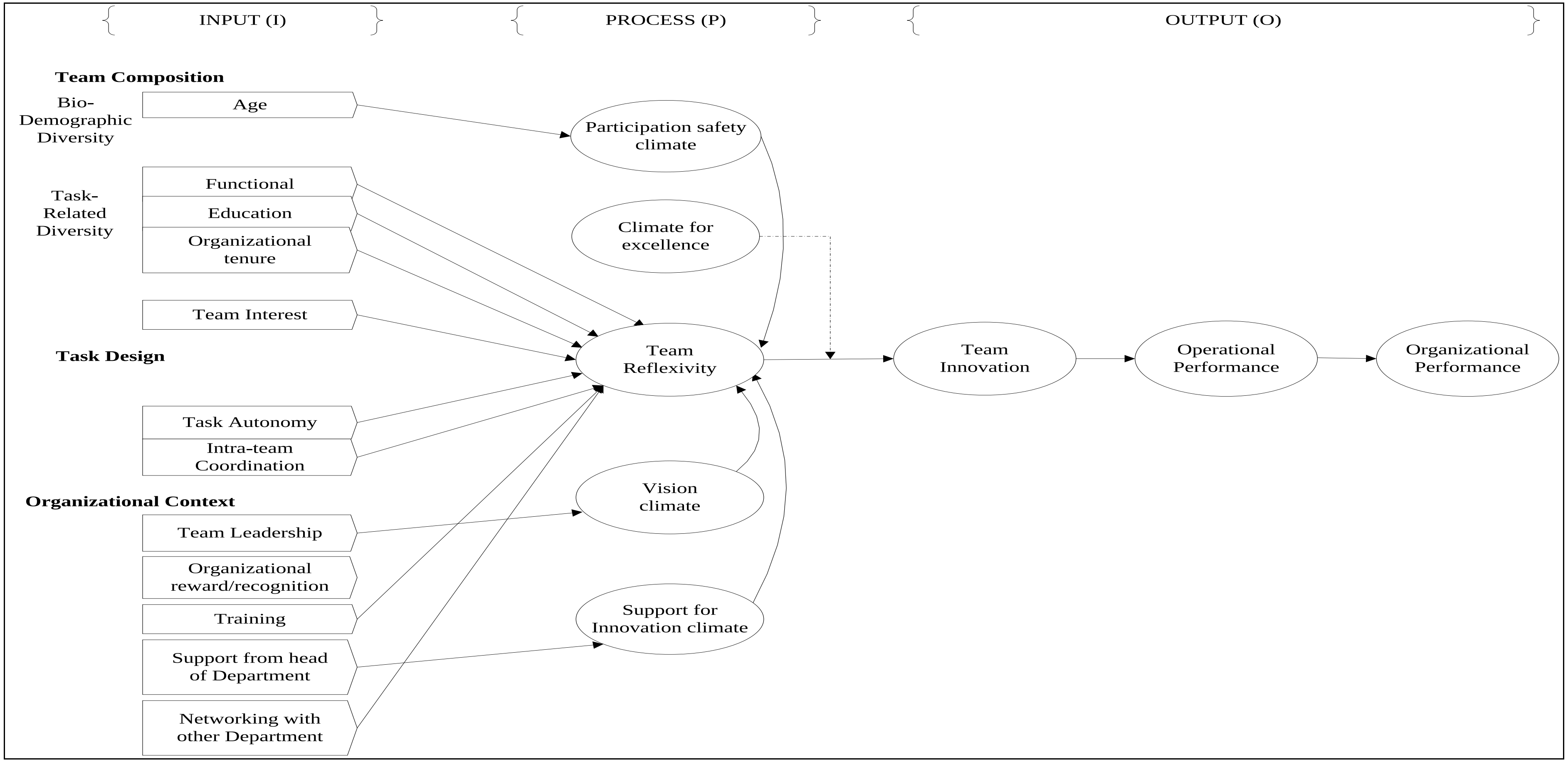

INPUT (I)
PROCESS (P)
OUTPUT (O)
Team Composition
Bio-Demographic Diversity
Age
Gender
Task-Related Diversity
Functional
Education
Organizational tenure
Team Interest
Task Design
Task Meaningfulness
Task Autonomy
Intra-team Coordination
Organizational Context
Team Leadership
Organizational reward/recognition
Training
Networking with other Department
Participation safety climate
Climate for excellence
Team Reflexivity
Vision climate
Support for Innovation climate
Team Innovation
Operational Performance
Organizational Performance

Team B


INPUT (I)
PROCESS (P)
OUTPUT (O)
Team Composition
Bio-Demographic Diversity
Age
Gender
Task-Related Diversity
Functional
Education
Organizational tenure
Team Interest
Task Design
Task Meaningfulness
Task Autonomy
Intra-team Coordination
Organizational Context
Team Leadership
Organizational reward/recognition
Training
Support from head of Department
Participation safety climate
Climate for excellence
Team Reflexivity
Vision climate
Support for Innovation climate
Team Innovation
Operational Performance
Organizational Performance

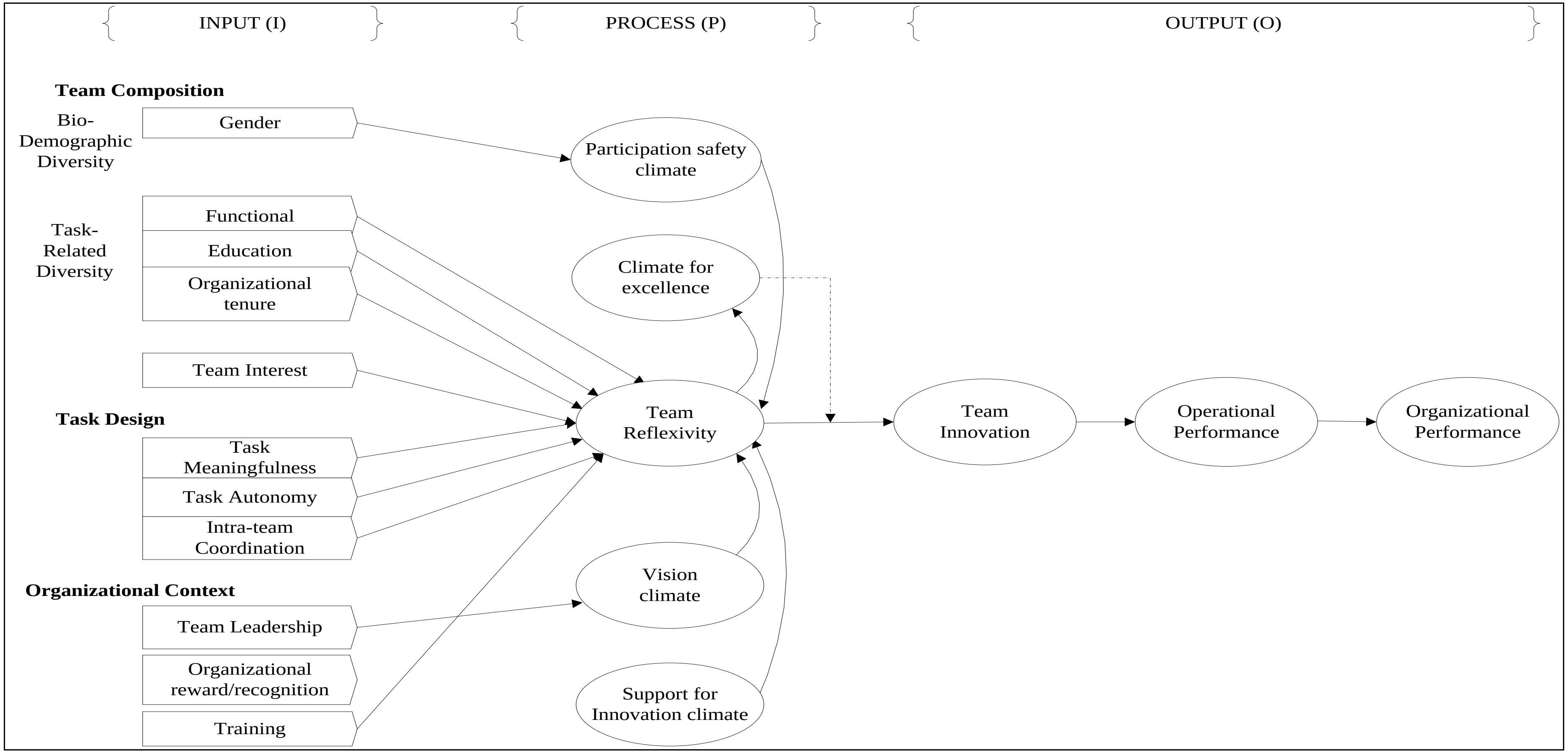
Appendix B: (continued)

Team C



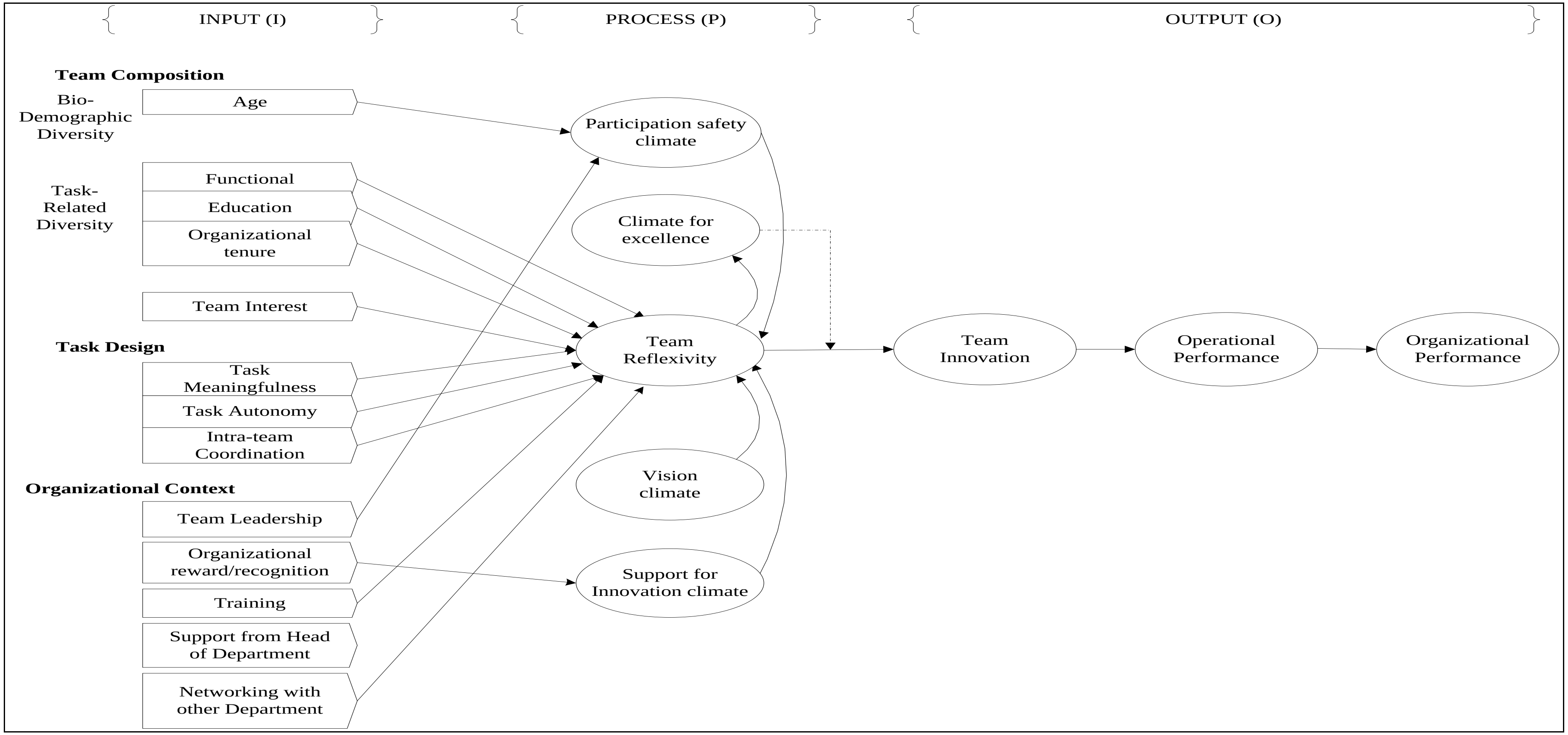
Appendix B: (continued)

Team D



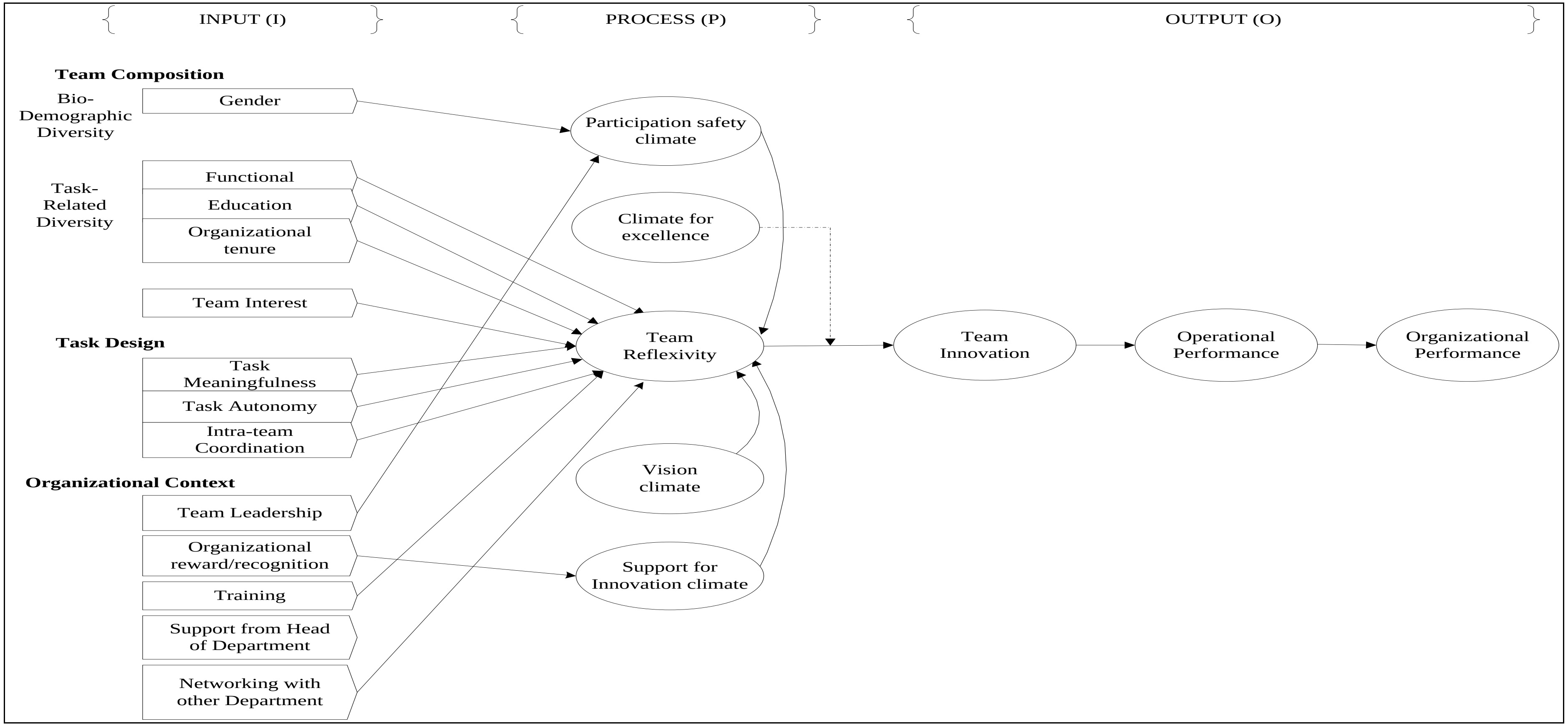
Appendix B: (continued)

Team E



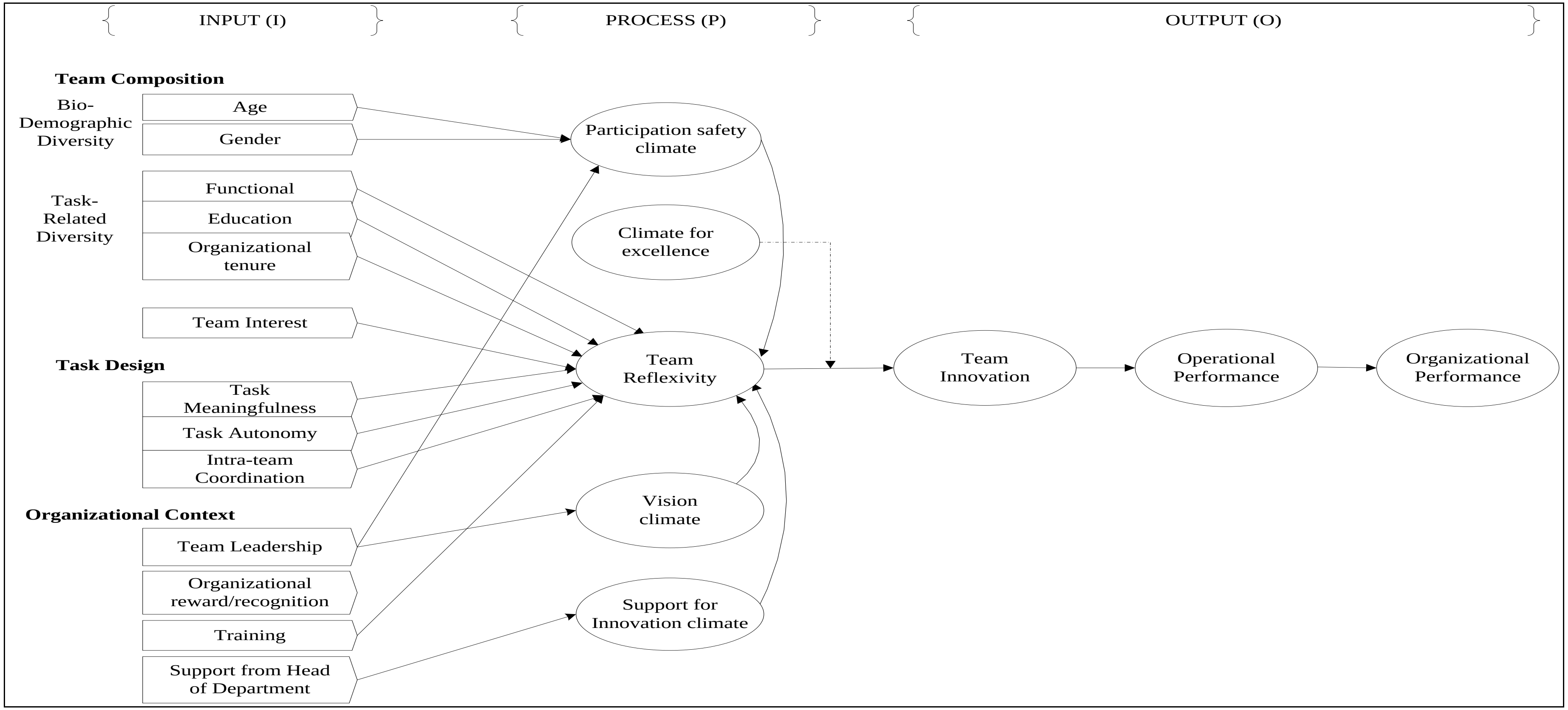
Appendix B: (continued)

Team F



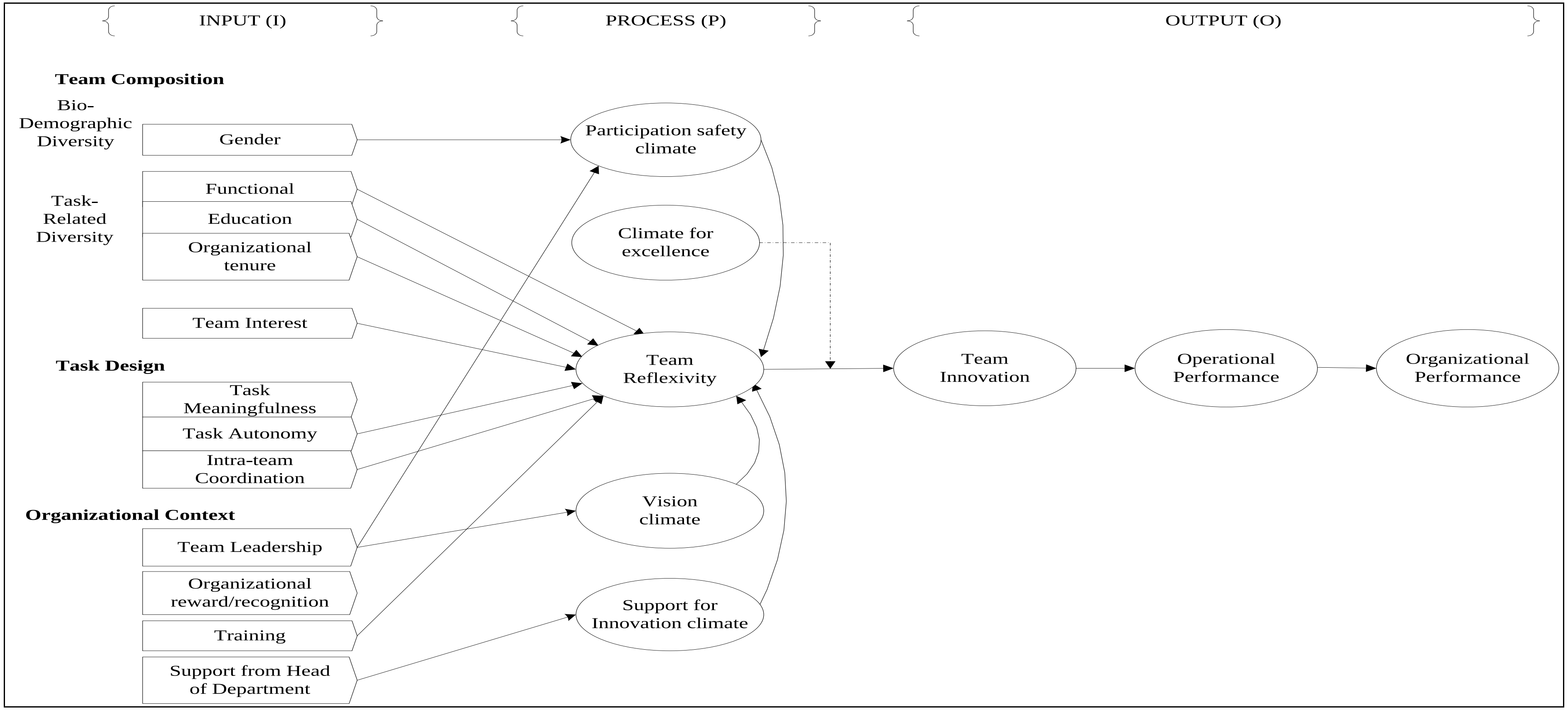
Appendix B: (continued)

Team G



Appendix B: (continued)

Team H



Instructions to a respondent.

1. This questionnaire has four (4) sections to be answered. The survey may take you about 25 minutes to complete.
2. The word “team” refers to your Innovative Creative Circle (ICC).
3. Please answer all the questions. Most of the questions require your perceptionsas representedby six-point scale. There are no right or wrong answers to the questions. It only seeks your own perceptions onthe topic.
4. **Once you have finished, please put the questionnaire back into its original envelope and seal it to ensure its confidentiality.**
5. **Return it to your team leader.**
6. Thank you for your kind assistance in completing this questionnaire.

SECTION A: This sectionseeks your perceptions concerning **tasks**you performed in the ICC. Please **CIRCLE** the number that best matches your perceptions for every statement below.
(Where: 1 = Strongly DISagree and 6 = Strongly agree).

Statements	Strongly disagree					Strongly agree
	☹	☹	☹	☺	☺	☺
a) My job in this team requires me to use a number of complex or high level skills.	1	2	3	4	5	6
b) My job in this team gives me the opportunity to do a number of different things.	1	2	3	4	5	6
c) My job in this team gives me the opportunity to learn and use a wide variety of equipment and procedures to get my job done.	1	2	3	4	5	6
d) In this team, the job is arranged so that I can do an entire piece of work from beginning to end.	1	2	3	4	5	6
e) My job in this team provides me the chance to completely finish the pieces of work I start.	1	2	3	4	5	6
f) I do a piece of work; there are others involved too, but my contribution is clear in final result.	1	2	3	4	5	6
g) My job in this team is one where a lot of people can be affected by how well the work gets done.	1	2	3	4	5	6
h) The job itself is very significant and important in overall work activities.	1	2	3	4	5	6
i) What I do in this team affects the well-being of other people in very important ways	1	2	3	4	5	6
j) The job in this team gives me almost complete responsibility for deciding how and when the work is done.	1	2	3	4	5	6
k) The job in this team gives me considerable opportunity for independence and freedom in how I do the work	1	2	3	4	5	6
l) The job gives me a chance to use my personal initiative and judgment in carrying out the work.	1	2	3	4	5	6
m) I need information and advice from team members to perform my job well	1	2	3	4	5	6
n) Wedon’t have a one-person job; it is necessary to coordinate or cooperate with team members.	1	2	3	4	5	6

o) I need to collaborate with my team members to perform my job well	1	2	3	4	5	6
p) Team members need information and advice from me to perform their jobs well	1	2	3	4	5	6
q) I have to communicate regularly with team members about work-related issues.	1	2	3	4	5	6

SECTION B: This section seeks your perceptions concerning your **team leader**. Please **CIRCLE** the number that best matches your perceptions for every statement below.
(Where 1 = Strongly DISagree and 6 = Strongly agree).

Statements	Strongly disagree					Strongly agree
	☹	☹	☹	☺	☺	☺
a) My team leader serves as a role model for me	1	2	3	4	5	6
b) My team leader makes me aware of strongly held values, ideals, and aspirations which are shared in common.	1	2	3	4	5	6
c) I have complete confidence in my team leader	1	2	3	4	5	6
d) In my mind, my team leader is a symbol of success and accomplishment	1	2	3	4	5	6
e) My team leader shows us how to look at problems from new angles	1	2	3	4	5	6
f) My team leader stimulates me to back up my opinions with good reasoning	1	2	3	4	5	6

SECTION C: ORGANISATIONAL CONTEXT

1. This section seeks your perceptions concerning **reward/recognition**system in your organisation. Please **CIRCLE** the number that best matches your perceptions for every statement below.
(Where 1 = Strongly DISagree and 6 = Strongly agree).

Statements	Strongly disagree					Strongly agree
	☹	☹	☹	☺	☺	☺
a) The reward/recognition system here encourages team innovation.	1	2	3	4	5	6
b) This organisation openly recognizes innovative teams; thus all employees in my organisation know about the recognition.	1	2	3	4	5	6
c) The reward system here benefits mainly those who made innovative change.	1	2	3	4	5	6

d) This organisation rewards people financially for developing unique ideas for work-related improvement	1	2	3	4	5	6
e) This organisation authorizes innovative teams to participate in convention, to get recognitionfrom external parties on the implemented innovation.	1	2	3	4	5	6

2. This section seeks your perceptions concerning **training**provided to you in your organisation. Please **CIRCLE** the number that best matches your perceptions for every statement below.
(Where 1 = Not at all and 6 = To a very large extent).

Statements	Not at all					To a very large extent
	☹	☹	☹	☺	☺	☺
a) This organisation provides me with useful training to work in this team.	1	2	3	4	5	6
b) This organisation has provided me with training, which has improved my approach to problem solving at work.	1	2	3	4	5	6
c) This organisation has provided me with training, which has improved my approach to analyzing problems at work.	1	2	3	4	5	6
d) This organisation has provided me with training, which has improved the way I work in this team.	1	2	3	4	5	6

3. This section, seeks your perceptions concerning **support from your head of department**to your ICC. Please **CIRCLE** the number that best matches your perceptions for every statement below.
(Where 1 = Strongly DISagree and 6 = Strongly agree).

Statements	Strongly Disagree					Strongly agree
	☹	☹	☹	☺	☺	☺
a) My head of department gives my team assistance in developing new ideas	1	2	3	4	5	6
b) My head of department provides my team with adequate resources that support innovation in this department.	1	2	3	4	5	6
c) My head of department gives my team adequate time to pursue creative ideas.	1	2	3	4	5	6
d) If necessary, my head of department will provide my team with adequate funding to investigate and pursue creative ideas.	1	2	3	4	5	6

e) My head of department permits my team to have anallocated period, to discuss about our team's innovation project.	1	2	3	4	5	6
f) Whenever necessary, my head of department will develop networking with heads from other departments, which facilitates problem solving and its implementation.	1	2	3	4	5	6

4. This section seeks your perceptions concerning your **team's networking with other departments**. Please **CIRCLE** the number that best matches your perceptions for every statement below.
(where 1 = Strongly DISagree and 6 = Strongly agree).

Statements	Strongly DISagree					Strongly agree
	☹	☹	☹	☺	☺	☺
a) If necessary, my team will discuss/communicate with other related departments in defining a work problem in hands.	1	2	3	4	5	6
b) If necessary, my team will work with other related departments in finding the best solutions for a problem in view.	1	2	3	4	5	6
c) Whenever necessary, my team will always have strong cooperation with other related departments to facilitate project implementation.	1	2	3	4	5	6
d) If work-related problem involves other department, my team's networking with other departments has made my team's improvement project successful.	1	2	3	4	5	6

SECTION C: TEAM PROCESS

1. This section seeks your perceptions concerning **reflexivity**(the extent to which your team members interact to reviewteam'sobjectives, decisions, methods used& strategies)in your ICC. Please **CIRCLE** the number that best matches your perceptions for every statement below.
(where 1 = Strongly DISagree and 6 = Strongly agree).

Statements	Strongly Disagree					Strongly agree
	☹	☹	☹	☺	☺	☺
a) My team often reviews its objectives.	1	2	3	4	5	6
b) The methods used by my team to get the job done are often discussed.	1	2	3	4	5	6
c) We regularly discuss whether the team is working effectively together.	1	2	3	4	5	6
d) In this team, we modify our objectives in light of	1	2	3	4	5	6

changing circumstances.						
e) My team strategies are always changed.	1	2	3	4	5	6
f) The way decisions are made in this team is always altered.	1	2	3	4	5	6

2. This section seeks perceptions concerning **climate** in your ICC. Please **CIRCLE** the number that best matches your perceptions for every statement below.
(where 1 = strongly DISagree and 6 = Strongly agree).

Statements	Strongly Disagree					Strongly agree
	☹	☹	☹	☺	☺	☺
a) Members in this team have a 'we are in it together' attitude.	1	2	3	4	5	6
b) Team members keep each other informed about work-related issues in the team.	1	2	3	4	5	6
c) Team members feel understood and accepted by each other.	1	2	3	4	5	6
d) Team members put real attempts to share information throughout the team.	1	2	3	4	5	6
e) My team members prepared to question the basis of what the team is doing.	1	2	3	4	5	6
f) My team members critically appraise potential weaknesses in what it is doing in order to achieve the best possible outcome.	1	2	3	4	5	6
g) My team members build on each other's ideas in order to achieve the best possible outcome.	1	2	3	4	5	6
h) I am in agreement with my team's objectives.	1	2	3	4	5	6
i) My team's objectives are clearly understood by team members.	1	2	3	4	5	6
j) My team's objectives can actually be achieved.	1	2	3	4	5	6
k) My team's objectives are worthwhile to the organisation.	1	2	3	4	5	6
l) My team members are always searching for fresh and new ways of looking at problems.	1	2	3	4	5	6
m)My team takes the time needed to develop new ideas	1	2	3	4	5	6
n) Team members co-operate in order to help develop and apply new ideas.	1	2	3	4	5	6

SECTION D: TEAM COMPOSITION

1. This section seeks your perceptions concerning your **team's interest**. Please **CIRCLE** the number that best matches your perceptions for every statement below. **(where 1 = Not at all and 6 = Very much).**

Statements		Not at all					Very much
		☹	☹	☹	☺	☺	☺
a)	Did you enjoy doingyour team's activities?	1	2	3	4	5	6
b)	Did you take interest in doingyour team's activities?	1	2	3	4	5	6
c)	Are you interested in doing your team's activities?	1	2	3	4	5	6
d)	Did you feel pleasant while you were doing your team's activities?	1	2	3	4	5	6
e)	Are you willing to spend more time on your team's activities?	1	2	3	4	5	6

2. The followings are some ***demographic information needed for statistical purposes only.*** Please tick your answers in the appropriate boxes.

Gender: Male ☐ Female ☐

From which department are you from? (please write down) ____________________________

Your age:

	Less than 20 yrs
	More than 20 – 30 yrs
	More than 30 – 40 yrs
	More than 40 – 50 yrs
	More than 50 yrs

Your education:

	SPM
	Certificate
	Diploma
	Bachelor
	Master
	Phd

How long have you been working in this organisation?

	Less than 5 yrs
	More than 5 - 10 yrs
	More than 11 – 15 yrs
	More than 15 – 20 yrs
	More than 20 yrs

Thank you for your kind assistance in completing this questionnaire.

Guidelines to a respondent.

1. This questionnaire has three (3) sections to be answered. The survey may take you about 15 minutes to complete.
2. Please answer all the questions. Most of the questions only require your perceptionsas representedby six-point scale. There are no right or wrong answers to the questions. It only seeks your own perceptions onthe topic.
3. **Once you have finished, please <u>put the questionnaire back into its original envelope</u> and <u>seal it</u> to ensureconfidentiality.**
4. **<u>Return</u> it to the team's leader.**
5. Thank you for your kind assistance in completing this questionnaire.

The Innovative Creative Circle (ICC) being referred to in this questionnaire is:

………………………………………………….. (Please write the team's name)

SECTION A: TEAM INNOVATION

This section seeks your perceptions concerning **<u>innovation by the above-mentioned ICC</u>**. Please **<u>CIRCLE</u>** the number that best matches your perceptions for every statement below.
(Where: 1 = Strongly DISagree and 6 = Strongly agree).

	Statements	Strongly Disagree					Strongly agree
		☹	☹	☹	☺	☺	☺
a)	This team generates many new ideas, methods, or procedures to improve work-related problems in this department.	1	2	3	4	5	6
b)	This team always considers new and alternative methods and procedures to improve work-related problems in this department.	1	2	3	4	5	6
c)	This team implements new ideas that improve work-related problems in this department.	1	2	3	4	5	6
d)	This team implements new ideas that have positive consequences for this department.	1	2	3	4	5	6
e)	This team implements new ideas that change the present situation.	1	2	3	4	5	6
f)	This team generates very unique ideas.	1	2	3	4	5	6
	This team implements changes that benefit this department.	1	2	3	4	5	6

SECTION B: OPERATIONAL PERFORMANCE

This section seeks your perceptions concerning to which extent the innovations made by the above-mentioned team, have improved **operational performance in your department**. Please **CIRCLE** the number that best matches your perceptions for every statement below.**(Where 1 = strongly DISagree and 6 = strongly agree).**

	Statements	Strongly DISagree					Strongly agree
		☹	☹	☹	☺	☺	☺
a)	Innovations by this team have improved work-related problem in my department	1	2	3	4	5	6
b)	Innovations by this team have improved operational productivity of my department	1	2	3	4	5	6
c)	Innovations by this team have improved quality of product/service in my department**.**	1	2	3	4	5	6
d)	Innovations by this team have minimized operational cost in my department.	1	2	3	4	5	6
e)	Innovations by this team have improved operational performance of my department	1	2	3	4	5	6

SECTION C: ORGANISATIONAL PERFORMANCE

This section seeks your perceptions concerning to which extent the operational performance that were improved by the above-mentioned team, contribute to theorganisation's performance. Please **CIRCLE** the number that best matches your perceptions for every statement below. **(where 1 = Strongly DISagree and 6 = Strongly agree).**

.	Statements	Strongly DISagree					Strongly agree
		☹	☹	☹	☺	☺	☺
a)	Innovations by this team have improved operational performance of this department, which contributed to the organisation's vision and mission.	1	2	3	4	5	6
b)	Innovations by this team have improved operational performance of this department, thus meeting management expectation.	1	2	3	4	5	6
c)	Innovations by this team have improved operational performance of this department, which contributed to customers' satisfaction.	1	2	3	4	5	6
d)	Innovations by this team have improved operational performance of this department, which contributed to the organisation's image.	1	2	3	4	5	6
e)	Innovations by this team have improved operational performance of this department that contributed to the overall company performance.	1	2	3	4	5	6

THE END

Thank you for your kind assistance in completing this questionnaire.

Kindly **seal** this questionnaire in its**original envelope** and **return** to the team's leader.

Thank you for agreeing to participate in this research. The research is being conducted as part of a PhD program in the Graduate School of Business at Curtin University of Technology. The aim of this research is to study how the team interaction and climate influence team design's impact on team innovation. This study is being supervised by Professor Mohammed Quadduswho can be contacted at +61-8-9266 2862/7147 or mohammed.quaddus@gsb.curtin.edu.au.

The findings from this study will be beneficial to the context of Innovative Creative Circle, as it willprovide practical information to Malaysian ICCs particularly, in enhancing their internal teams' efficiency towards innovation for operational and organisational performances. Consequently, their team resources will be effectively utilized.

As part of this research, each leader, members of selected ICC and relevant departmental managers where ICC innovation had been implemented will be interviewed in one to one interview about their experience in the Innovative Creative Circle (ICC) for about 30 minutes. Participation in this study is voluntary, and you may terminate your participation during the interview at any time. The interview will be recorded on audiotape, and the tape will be transcribed verbatim into a document file. This file will then be analysed with the assistance of qualitative data management software. When the interview is transcribed, all names will be omitted and the file will be identified by a number only. The content of the interview will remain confidential to the researcher, Maznah Abdullah, and the results of the research will be reported in general terms only. Any direct quotes from interviewees used in the thesis will not be identified by name, either by person or by agency in which they are employed.

At the completion of the research, the tapes will be destroyed. The transcripts of the interviews will be retained in an electronic format at the Graduate School of Business, at Curtin University of Technology for five years. This research complies with the guidelines set by Curtin University, including compliance to the National Health and Medical Research Council's statement on Ethical Conduct in Research involving humans.

For any enquiries or complaint on ethical grounds, contact the Secretary of Human Research Ethics Committee, Office of Research and Development, Curtin University of Technology, GPO Box U1987, Perth WA 6845. Phone: +61-8-9266 2784.

Thank you.
Maznah Abdullah, PhD Student,
Graduate School of Business,
Curtin University of Technology, Western Australia.

CONSENT FORM

1) I understand the purpose and procedures of the study
2) I have been provided with the participation information sheet
3) I understand that the procedure itself may not directly benefit me
4) I understand that my involvement is voluntary and that I can withdraw at any time without prejudice
5) I understand that no personal identifying information like my name and address will be used and that all information will be securely stored for five years before being destroyed.
6) I have been given the opportunity to ask questions
7) I agree to participate in the study outlined to me.

Name:..

Signature:..

Date:...

Thank you for agreeing to participate in this research. The research is being conducted as part of a doctoral program in the Graduate School of Business at Curtin University of Technology. The aim of this research is to study how the team interaction and climate influence team design's impact on team innovation. This study is being supervised by Professor Mohammed Quaddus, who can be contacted at +61-8-9266 2862/7147 or mohammed.quaddus@gsb.curtin.edu.au.

This study is approved and supported by Malaysia Productivity Corporation (MPC). Verification of approval can be obtained by contacting Encik Mustapha Sufa'at at Mustapha@mpc.gov.my or telephone 03-79557266.

As part of this research, you will be interviewed about your experience in the Innovative Creative Circle (ICC) for about 30 minutes. Participation in this study is voluntary, and you may terminate your participation in the study at any time. The interview will be recorded on audiotape, and the tape will be transcribed verbatim into a document file. This file will then be analysed with the assistance of qualitative data management software. When the interview is transcribed, all names will be omitted and the file will be identified by a number only. The content of the interview will remain confidential to the researcher, Maznah Abdullah, and the results of the research will be reported in general terms only. Any direct quotes from interviewees used in the thesis will not be identified by name, either by person or by agency in which they are employed.

This study is beneficial to your team, as it willprovide practical information to Malaysian ICCs particularly, in enhancing their internal efficiency towards innovation for operational and organisational performances. Consequently, their team resources will be effectively utilized.

At the completion of the research, the tapes will be destroyed. The transcripts of the interviews will be retained in an electronic format at the Graduate School of Business, at Curtin University of Technology for five years. This research complies with the guidelines set by Curtin University, including compliance to the National Health and Medical Research Council's statement on Ethical Conduct in Research involving humans.

This study has been approved by the Curtin University Human Research Ethics Committee. If needed, verification of approval can be obtained by either writing to the Human Research Ethics Committee, Office of Research and Development, Curtin University of Technology, GPO Box U1987, Perth WA 6845 or telephone +61-8-9266 2784.

Thank you.

Maznah Abdullah, PhD Student,
Graduate School of Business,Curtin University of Technology, Western Australia.

Team	Gender Diversity	Age Diversity	Functional Diversity	Educational Diversity	Organisational tenure Diversity
1	0.5004	1.2799	0.0000	0.9404	1.2799
2	0.6109	1.0496	0.0000	1.0443	1.5048
3	0.6870	0.8487	0.0000	1.4648	1.5230
4	0.0000	0.9503	0.0000	0.6730	0.6730
5	0.0000	0.5004	0.9503	0.6730	1.0549
6	0.5623	0.5623	1.0397	1.0397	1.0397
7	0.5297	1.0609	1.4271	0.9369	1.3689
8	0.0000	0.9557	0.0000	0.4101	1.2770
9	0.0000	1.0397	0.0000	1.3863	1.0397
10	0.0000	1.3297	0.4506	1.0114	1.3297
11	0.4101	1.1537	0.0000	0.9557	1.4751
12	0.0000	0.5004	0.9503	0.9503	0.9503
13	0.5004	1.0549	0.6730	0.5004	0.9503
14	0.0000	0.6730	0.5004	0.9503	0.5004
15	0.6931	0.6365	0.0000	0.0000	0.6365
16	0.6365	0.6870	0.0000	0.9369	0.3488
17	0.3768	0.9003	1.2130	1.4942	1.2130
18	0.0000	0.9503	0.5004	1.0549	1.3322
19	0.5623	1.0397	0.0000	1.3863	1.0397
20	0.6931	0.6931	1.0397	1.0397	1.0397
21	0.0000	1.0397	0.0000	1.0397	0.5623
22	0.5983	0.7963	0.0000	0.0000	0.9557
23	0.6730	1.0549	0.9503	1.0549	1.0549
24	0.5004	0.6730	0.0000	1.0549	1.0549
25	0.6829	1.0790	1.1537	1.2770	0.9557
26	0.5623	0.0000	0.0000	1.3863	0.5623
27	0.6931	1.0397	0.0000	1.0397	1.0397
28	0.0000	0.6365	0.0000	0.6365	0.0000
29	0.0000	1.0549	1.3322	0.9503	1.3322
30	0.6870	0.9369	0.9650	0.6870	1.0609
31	0.6829	1.2770	0.5983	1.2770	0.7963
32	0.6931	0.6931	0.0000	0.8979	0.8018
33	0.6730	1.3322	0.5004	1.0549	0.9503
34	0.3768	1.0822	0.3768	0.6616	1.0397
35	0.6931	1.0397	0.0000	1.3863	1.3863
36	0.6365	1.2730	0.0000	1.0027	1.0609
37	0.6730	0.6730	0.5004	1.0549	0.9503
38	0.5983	1.0042	0.0000	0.4101	1.1537
39	0.6616	0.6616	0.0000	0.0000	0.9743
40	0.6931	0.5623	0.0000	1.0397	1.0397
41	0.0000	1.0397	0.0000	1.3863	1.3863
42	0.5983	0.9557	0.0000	0.0000	1.0790
43	0.4506	1.3297	0.0000	0.0000	1.0114
44	0.5623	1.0397	0.0000	0.0000	1.3863
45	0.0000	1.0397	0.0000	1.0397	1.0397
46	0.0000	0.5983	0.0000	0.6829	0.5983
47	0.0000	0.5004	0.0000	0.5004	0.6730

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Team	Gender Diversity	Age Diversity	Functional Diversity	Educational Diversity	Organisational tenure Diversity
48	0.0000	0.0000	0.9503	0.9503	0.5004
49	0.0000	0.6365	0.6365	0.6365	0.6365
50	0.0000	0.6730	0.0000	0.9503	0.9503
51	0.4506	0.4506	0.4506	0.8676	0.8676
52	0.0000	0.6931	0.0000	0.5623	1.0397
53	0.0000	0.5623	0.0000	0.0000	1.0397
54	0.0000	0.0000	0.0000	0.0000	0.5004
55	0.0000	0.5004	0.0000	0.6730	1.0549
56	0.0000	0.5004	0.0000	0.5004	0.0000
57	0.1519	0.4506	0.0000	1.0114	0.0000
58	0.4101	0.6829	0.0000	0.4101	1.0790
59	0.0000	0.0000	0.0000	0.6931	0.5623
60	0.0000	0.4506	0.0000	0.4506	1.0114
61	0.0000	0.0000	0.0000	0.6616	0.3768
62	0.0000	0.0000	0.0000	0.5623	0.3768
63	0.0000	0.0000	0.0000	0.5623	0.6931
64	0.0000	0.6365	0.0000	0.6365	0.8676
65	0.0000	0.6365	0.0000	0.4506	0.0000
66	0.0000	0.9003	0.0000	0.3768	1.2555
67	0.0000	0.3768	0.0000	0.6616	0.3768
68	0.0000	0.4506	0.6365	0.4506	1.0114
69	0.0000	0.0000	0.3768	0.3768	0.6616
70	0.0000	0.0000	0.0000	0.0000	0.0000
71	0.0000	0.5623	0.0000	0.6616	0.5623
72	0.0000	0.4101	0.4101	0.9557	0.7963
73	0.0000	0.5623	1.6675	0.7356	1.3863
74	0.0000	0.3768	0.3768	0.3768	0.9003
75	0.0000	0.3768	0.0000	0.6931	0.3768
76	0.0000	0.7356	0.0000	0.5623	0.5623
77	0.0000	0.0000	0.0000	0.0000	0.0000
78	0.0000	0.0000	0.6829	0.0000	0.6829
79	0.0000	0.5623	0.0000	0.3768	0.7356
80	0.0000	0.0000	0.0000	0.5983	0.5983
81	0.0000	0.5623	0.0000	0.6616	0.6931
82	0.0000	0.3768	0.7356	0.9743	0.5623
83	0.0000	0.0000	0.0000	0.6931	0.6365
84	0.0000	0.6837	0.0000	1.3855	0.6837
85	0.0000	0.0000	0.0000	1.0609	0.6870
86	0.0000	0.5004	0.0000	0.5004	0.5004
87	0.0000	0.0000	0.0000	1.0549	0.0000
88	0.0000	0.3768	0.0000	0.9743	0.6616
89	0.0000	0.3768	0.0000	1.3209	1.2130
90	0.0000	0.6616	0.0000	0.6931	0.6616
91	0.0000	0.0000	0.0000	0.7356	0.6616
92	0.0000	0.0000	0.0000	0.6616	0.5623
93	0.0000	0.7356	0.0000	0.5623	0.5623
94	0.0000	0.0000	0.0000	0.6365	0.6365
95	0.0000	0.5983	0.0000	0.9557	0.5983
96	0.0000	0.4101	0.0000	0.6829	0.9557

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Team	Gender Diversity	Age Diversity	Functional Diversity	Educational Diversity	Organisational tenure Diversity
97	0.0000	0.7356	0.0000	0.9003	0.5623
98	0.0000	0.7963	0.0000	0.6829	0.5983
99	0.0000	0.0000	0.0000	0.6616	0.6616
100	0.0000	0.5623	0.0000	0.3768	0.7356
101	0.0000	0.0000	0.0000	0.5983	0.0000
102	0.0000	0.0000	0.0000	0.0000	0.3768
103	0.0000	0.0000	0.0000	0.5983	0.0000
104	0.0000	0.3768	0.0000	0.6616	0.3768
105	0.0000	0.3488	0.0000	0.5297	0.6365
106	0.0000	0.9003	0.0000	0.9003	0.9003
107	0.0000	1.0397	0.0000	0.6616	0.3768
108	0.0000	0.0000	0.0000	0.4506	1.0114
109	0.0000	0.0000	0.0000	1.0790	0.0000
110	0.0000	0.7356	0.0000	0.0000	0.9003
111	0.0000	0.5983	0.0000	1.0042	1.0042
112	0.0000	0.3768	0.0000	0.6616	0.5623
113	0.0000	0.3768	0.0000	0.9743	0.6931
114	0.0000	0.3768	0.0000	0.9743	0.9743
115	0.0000	0.3768	0.0000	0.9743	0.5623
116	0.0000	0.9003	0.0000	0.5623	1.2130
117	0.0000	0.5623	0.0000	1.2555	0.5623
118	0.0000	0.3768	0.0000	0.9003	0.9003
119	0.0000	0.3768	0.0000	1.0822	0.7356
120	0.0000	0.3768	0.7356	0.6931	0.3768
121	0.6730	1.0889	0.8979	0.9503	1.3662
122	0.6365	1.2149	0.6837	0.6837	1.0609
123	0.0000	0.5004	0.0000	0.9503	1.0549
124	0.0000	0.5004	0.5004	0.0000	1.3322
125	0.0000	0.6730	0.5004	0.9503	1.0549
126	0.0000	0.5623	0.0000	0.6931	0.5623
127	0.0000	0.5623	0.5623	0.5623	1.0397
128	0.0000	0.6365	0.0000	0.4506	1.0114
129	0.0000	0.0000	0.0000	0.6931	0.0000
130	0.0000	1.0549	0.0000	0.0000	0.9503
131	0.0000	0.4506	0.0000	1.0114	0.8676
132	0.0000	0.0000	0.0000	0.2158	0.0000
133	0.0000	1.0114	0.0000	0.0000	0.0000
134	0.0000	1.0397	0.0000	0.6931	1.0397
135	0.0000	0.0000	0.0000	0.0000	1.3863
136	0.0000	0.6365	0.0000	1.0114	0.6365
137	0.0000	0.5623	0.0000	0.0000	1.0397
138	0.0000	0.6931	0.0000	0.0000	0.6931
139	0.0000	1.0114	0.6365	0.0000	1.0114
140	0.0000	1.0397	0.0000	0.0000	1.0397
141	0.0000	1.0114	0.0000	0.0000	0.6365
142	0.0000	0.4506	0.4506	1.0114	0.8676
143	0.0000	0.0000	0.0000	0.5004	0.1785
144	0.0000	0.6730	0.9503	0.6730	0.9503
145	0.0000	0.5004	0.0000	0.6730	0.9503

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Team	Gender Diversity	Age Diversity	Functional Diversity	Educational Diversity	Organisational tenure Diversity
146	0.0000	1.0397	0.0000	0.5623	1.0397
147	0.0000	0.0000	0.0000	0.5623	1.0397
148	0.0000	0.0000	0.0000	0.0000	0.1785
149	0.0000	0.0000	0.5623	0.5623	1.0397
150	0.5623	0.5623	0.0000	0.0000	1.0397
151	0.0000	0.6365	0.0000	1.0114	0.4506
152	0.0000	0.0000	0.0000	0.6931	0.6931
153	0.0000	0.6931	0.0000	0.6931	0.0000
154	0.0000	0.6931	0.0000	0.0000	0.6931
155	0.0000	0.5983	0.0000	0.0000	1.2770
156	0.0000	1.2555	0.0000	0.9743	1.5596
157	0.0000	0.0000	0.5297	0.0000	0.6365
158	0.0000	0.6829	0.0000	0.5983	1.2770
159	0.0000	1.0986	0.0000	0.6365	1.0114
160	0.0000	1.0114	0.0000	0.0000	0.8676
161	0.0000	0.6829	0.0000	0.0000	0.6829
162	0.0000	0.5623	0.0000	0.0000	0.6616
163	0.0000	0.6616	0.0000	0.0000	0.9743
164	0.0000	0.5623	0.0000	0.0000	0.6065
165	0.0000	0.5623	0.0000	0.0000	0.5623
166	0.0000	0.6931	0.0000	0.6931	0.6931
167	0.0000	0.0000	0.0000	1.0397	0.5623
168	0.0000	1.0397	0.0000	0.6931	1.0397
169	0.0000	1.0397	0.0000	0.5623	0.5623
170	0.0000	0.5623	0.0000	0.6931	0.0000
171	0.0000	0.5623	0.0000	0.6931	0.5623
172	0.0000	0.0000	0.0000	1.0397	1.0397
173	0.0000	1.0397	0.0000	0.5623	0.5623
174	0.0000	0.0000	0.0000	0.0000	0.5623
175	0.0000	0.5623	0.0000	1.0397	0.6931
176	0.0000	1.0397	0.0000	0.6931	1.0397
177	0.0000	0.0000	0.0000	0.5623	0.0000
178	0.0000	1.0397	0.0000	1.0397	0.6931
179	0.0000	0.0000	0.0000	0.0000	0.5623
180	0.0000	0.6931	0.0000	0.6931	0.6931
181	0.0000	0.5623	0.0000	0.0000	1.0397
182	0.0000	0.5623	0.0000	0.0000	0.5623
183	0.0000	0.0000	0.0000	0.0000	0.0000
184	0.6931	0.4506	0.0000	0.6365	0.8676
185	0.0000	0.4506	0.0000	0.6931	1.0114
186	0.0000	0.0000	0.0000	0.0000	0.5004
187	0.3251	0.6931	1.3592	1.0549	0.8979
188	0.4506	0.6365	0.4506	0.8676	1.3297

	INT	VAR	SIGN	IDNTY	AUTO	INTRA	LEAD	TRAIN	RECOG	HEAD	NETW	PSAFE	SUPPcl	VISS	EXCL	REFLEX	INNOV	OPR	OPRG
EaINT	**0.9418**	0.5851	0.6692	0.6406	0.5569	0.6845	0.6483	0.5526	0.5655	0.3531	0.6340	0.7421	0.7379	0.7590	0.6853	0.7603	0.4465	0.3831	0.3736
EbINT	**0.9585**	0.5774	0.6563	0.6535	0.5548	0.6755	0.6617	0.5848	0.5714	0.4000	0.6488	0.7440	0.7476	0.7522	0.7114	0.7613	0.3944	0.3649	0.3418
EcINT	**0.9572**	0.5882	0.6558	0.6620	0.5666	0.6867	0.6604	0.5567	0.5678	0.3681	0.6123	0.7351	0.7219	0.7388	0.6913	0.7368	0.3737	0.3382	0.3169
EdINT	**0.9289**	0.5257	0.5952	0.5980	0.5401	0.6118	0.6386	0.5438	0.5466	0.3980	0.6517	0.7050	0.7003	0.6940	0.6491	0.7244	0.3102	0.2583	0.2356
EeINT	**0.9331**	0.4998	0.5665	0.6019	0.4862	0.6113	0.6206	0.4874	0.5307	0.3260	0.5800	0.6987	0.6941	0.6773	0.6795	0.6931	0.4321	0.3711	0.3427
AaVAR	0.3850	**0.7374**	0.4981	0.5359	0.5287	0.3993	0.4310	0.3632	0.4085	0.3870	0.3858	0.4136	0.4320	0.3579	0.4326	0.4832	0.1747	0.2204	0.2302
AbVAR	0.5427	**0.9043**	0.7545	0.7816	0.7004	0.7193	0.6276	0.4328	0.5464	0.2987	0.4747	0.5911	0.5649	0.6087	0.5948	0.6428	0.3032	0.3347	0.3303
AcVAR	0.5495	**0.8873**	0.7970	0.7541	0.6441	0.7634	0.6587	0.4857	0.5376	0.3772	0.5172	0.5806	0.6110	0.6609	0.5704	0.6423	0.3002	0.3443	0.3449
AgSIGF	0.5520	0.7498	**0.8916**	0.7611	0.5811	0.7817	0.6496	0.5281	0.5399	0.3096	0.5120	0.6023	0.6083	0.6648	0.5700	0.6784	0.2870	0.3258	0.3087
AhSIGF	0.5992	0.7496	**0.9073**	0.8012	0.7121	0.6975	0.6826	0.4915	0.4964	0.4198	0.5957	0.6235	0.6396	0.6758	0.6239	0.6838	0.3727	0.3816	0.3724
AiSIGF	0.6588	0.7309	**0.9133**	0.7636	0.6861	0.7064	0.6577	0.5550	0.5278	0.3828	0.6072	0.6512	0.6486	0.6815	0.6167	0.7175	0.3811	0.3336	0.3433
AdIDNTY	0.5994	0.7599	0.7838	**0.9270**	0.6703	0.6814	0.6787	0.4544	0.4913	0.3966	0.5611	0.6920	0.6996	0.7150	0.6755	0.7012	0.3692	0.3349	0.3483
AeIDNTY	0.6253	0.7714	0.7677	**0.9155**	0.7070	0.6677	0.6825	0.5150	0.5563	0.4498	0.6091	0.7113	0.7012	0.6940	0.6952	0.7222	0.3775	0.3406	0.3579
AfIDNTY	0.6209	0.7497	0.8131	**0.9144**	0.6781	0.6817	0.6440	0.4958	0.5072	0.4056	0.5620	0.6210	0.6491	0.6583	0.6258	0.6789	0.3928	0.4008	0.3678
AjAUTO	0.3700	0.5626	0.6227	0.5787	**0.8196**	0.4942	0.4719	0.4187	0.3995	0.2781	0.4725	0.4526	0.4702	0.4964	0.4569	0.4796	0.3332	0.3418	0.3428
AkAUTO	0.5566	0.6941	0.6693	0.6860	**0.9386**	0.6372	0.5530	0.5328	0.5610	0.4088	0.5228	0.5733	0.6103	0.6028	0.6109	0.6422	0.3746	0.4027	0.3713
AlAUTO	0.5690	0.6991	0.6477	0.7018	**0.8897**	0.5982	0.5181	0.4719	0.5611	0.4499	0.5363	0.5468	0.5812	0.6020	0.5747	0.6288	0.2830	0.3278	0.2634
AmINTRA	0.5908	0.6941	0.7448	0.6672	0.6012	**0.8812**	0.6579	0.4638	0.5256	0.2714	0.5305	0.6470	0.6632	0.7260	0.6137	0.6672	0.3063	0.3230	0.2968
AnINTRA	0.5359	0.5658	0.6118	0.5647	0.4086	**0.8002**	0.6538	0.4121	0.4382	0.2372	0.4000	0.6085	0.5687	0.6401	0.5699	0.5688	0.2648	0.2629	0.2479
AoINTRA	0.5433	0.5969	0.6318	0.5676	0.4492	**0.8632**	0.6150	0.3857	0.4784	0.1873	0.3711	0.5593	0.5335	0.6396	0.5358	0.5481	0.3380	0.3190	0.3218
ApINTRA	0.5248	0.6027	0.6012	0.5576	0.7022	**0.6657**	0.5316	0.5741	0.6036	0.4357	0.5412	0.5261	0.5634	0.5212	0.5771	0.5980	0.3219	0.3674	0.3429
AqINTRA	0.6518	0.6665	0.7128	0.6625	0.5314	**0.9010**	0.7374	0.4924	0.5886	0.2720	0.4886	0.6974	0.6503	0.6929	0.6482	0.6771	0.3042	0.2987	0.2916
BaLEAD	0.6071	0.6421	0.7015	0.6891	0.5184	0.7393	**0.9252**	0.5227	0.5293	0.3273	0.5545	0.7142	0.6764	0.7229	0.6328	0.6517	0.3460	0.3250	0.3031
BbLEAD	0.6327	0.6446	0.6897	0.6892	0.5603	0.7505	**0.9331**	0.5916	0.5709	0.4071	0.6145	0.7596	0.7475	0.7764	0.7063	0.7099	0.3488	0.3677	0.3432
BcLEAD	0.6304	0.6206	0.6911	0.6852	0.5486	0.7103	**0.9358**	0.4996	0.5133	0.3405	0.5617	0.7372	0.7012	0.7446	0.6781	0.6614	0.3022	0.2663	0.2712
BdLEAD	0.5831	0.5378	0.5941	0.5640	0.4867	0.6098	**0.8865**	0.4792	0.5206	0.3273	0.5198	0.6550	0.6250	0.6274	0.6188	0.6095	0.3073	0.3147	0.3023

	INT	VAR	SIGN	IDNTY	AUTO	INTRA	LEAD	TRAIN	RECOG	HEAD	NETW	PSAFE	SUPPcl	VISS	EXCL	REFLEX	INNOV	OPR	OPRG
BeLEAD	0.6465	0.6412	0.6400	0.6410	0.5297	0.6604	**0.9004**	0.5787	0.6046	0.3647	0.5718	0.7027	0.6820	0.6848	0.6545	0.7066	0.3473	0.3273	0.3118
BfLEAD	0.6588	0.6797	0.7062	0.7136	0.5558	0.7892	**0.9152**	0.5558	0.5727	0.3409	0.5707	0.7891	0.7316	0.8153	0.7202	0.7478	0.3610	0.3301	0.3465
CaTRAIN	0.5507	0.4866	0.5540	0.4871	0.5341	0.5639	0.5760	**0.9387**	0.7160	0.6259	0.6837	0.5655	0.5626	0.5606	0.4867	0.6383	0.3165	0.3334	0.3511
CbTRAIN	0.5641	0.4890	0.5663	0.5247	0.5324	0.5449	0.5622	**0.9623**	0.7329	0.6369	0.7164	0.5468	0.5637	0.5447	0.4710	0.6469	0.3335	0.3394	0.3318
CcTRAIN	0.5228	0.4665	0.5288	0.4906	0.4896	0.5052	0.5194	**0.9526**	0.7115	0.6619	0.6833	0.5163	0.5421	0.4750	0.4790	0.6247	0.2984	0.3333	0.3054
CdTRAIN	0.5604	0.4886	0.5562	0.5167	0.4963	0.5416	0.5782	**0.9478**	0.7015	0.6654	0.7109	0.5682	0.6003	0.5292	0.5245	0.6612	0.3423	0.3626	0.3382
CaRECOG	0.5316	0.5417	0.4940	0.5046	0.5517	0.5731	0.5289	0.6709	**0.9357**	0.5699	0.6301	0.5310	0.5380	0.4758	0.5411	0.5970	0.2735	0.3245	0.2721
CbRECOG	0.5759	0.5512	0.5647	0.5492	0.5659	0.5785	0.5683	0.7123	**0.9256**	0.5674	0.6980	0.5569	0.5326	0.5036	0.5310	0.6255	0.3327	0.3514	0.3216
CcRECOG	0.4509	0.5395	0.5206	0.5156	0.5586	0.5593	0.5160	0.6864	**0.8661**	0.5661	0.6432	0.4877	0.5042	0.4449	0.4916	0.5873	0.1742	0.2683	0.1801
CdRECOG	0.3878	0.3722	0.3145	0.3086	0.3932	0.3919	0.3645	0.5972	**0.8434**	0.4498	0.5038	0.3187	0.3290	0.2725	0.3521	0.4235	0.1360	0.2187	0.1696
CeRECOG	0.6200	0.5759	0.5940	0.5567	0.4758	0.6835	0.6353	0.6576	**0.8618**	0.4783	0.5927	0.5591	0.5511	0.5461	0.5378	0.6263	0.2720	0.3045	0.2843
CaHEAD	0.3949	0.4198	0.4330	0.4514	0.4286	0.3401	0.3763	0.6708	0.5868	**0.9509**	0.6856	0.4331	0.4899	0.4013	0.3990	0.4877	0.1410	0.1753	0.1666
CbHEAD	0.3520	0.3549	0.3551	0.3837	0.3912	0.2588	0.2979	0.6154	0.5150	**0.9488**	0.6267	0.3696	0.3889	0.3212	0.3063	0.4078	0.1347	0.1564	0.1530
CcHEAD	0.4382	0.4451	0.4532	0.4989	0.4779	0.3808	0.4185	0.7112	0.5826	**0.9473**	0.6909	0.4573	0.5205	0.4450	0.4048	0.5121	0.2077	0.2158	0.2079
CdHEAD	0.3023	0.3289	0.3000	0.3519	0.3481	0.2759	0.3026	0.5874	0.5619	**0.9411**	0.6186	0.3622	0.3741	0.2880	0.3367	0.3976	0.1711	0.1900	0.1569
CeHEAD	0.3252	0.3526	0.3663	0.4047	0.4032	0.3242	0.3593	0.6231	0.5446	**0.9239**	0.6316	0.4217	0.4438	0.3992	0.3779	0.4319	0.2131	0.2185	0.2253
CfHEAD	0.3748	0.3978	0.3821	0.4459	0.3966	0.3285	0.3892	0.6232	0.5778	**0.9464**	0.6810	0.4537	0.4696	0.3848	0.4144	0.4767	0.2004	0.2153	0.1989
CaNETW	0.6490	0.5424	0.6028	0.6211	0.5490	0.5427	0.6114	0.6342	0.6420	0.6578	**0.9290**	0.6648	0.6243	0.6203	0.6052	0.6619	0.2944	0.2901	0.2745
CbNETW	0.6222	0.5208	0.5853	0.5846	0.5540	0.5320	0.5689	0.6798	0.6536	0.6875	**0.9597**	0.6645	0.6547	0.6213	0.6256	0.6949	0.3093	0.3328	0.3054
CcNETW	0.5868	0.4849	0.5742	0.5614	0.5140	0.5210	0.5675	0.7358	0.6798	0.6381	**0.9354**	0.6154	0.6132	0.5466	0.5702	0.6504	0.3097	0.3133	0.2933
CdNETW	0.6355	0.5082	0.6176	0.5965	0.5582	0.5495	0.5797	0.7177	0.6551	0.6442	**0.9377**	0.6147	0.6605	0.5805	0.5677	0.6799	0.3091	0.3325	0.2997
DaPSAFE	0.6924	0.5890	0.6446	0.6760	0.5567	0.6805	0.7084	0.5352	0.5246	0.3914	0.6018	**0.9396**	0.7656	0.7978	0.8289	0.7835	0.3304	0.2756	0.2827
DbPSAFE	0.7443	0.6210	0.6436	0.7059	0.5646	0.7105	0.7304	0.5170	0.5431	0.4362	0.6254	**0.9312**	0.7744	0.8372	0.8111	0.7860	0.3389	0.3074	0.3150
DcPSAFE	0.6891	0.5657	0.6230	0.6622	0.5525	0.6664	0.7720	0.5325	0.5137	0.4132	0.6364	**0.9303**	0.7870	0.7986	0.8251	0.7636	0.3192	0.2817	0.2840
DdPSAFE	0.7475	0.5908	0.6763	0.7012	0.5609	0.7142	0.7649	0.5766	0.5423	0.4261	0.6801	**0.9402**	0.8544	0.8504	0.8816	0.8253	0.3760	0.3303	0.3170
DlSUPcL	0.7356	0.6226	0.6714	0.7212	0.5993	0.7166	0.7490	0.5682	0.5477	0.4648	0.6389	0.8579	**0.9378**	0.8796	0.8444	0.7965	0.3899	0.3697	0.3924
DmSUPcL	0.6481	0.5821	0.6112	0.6345	0.5893	0.6262	0.6514	0.5493	0.5350	0.4606	0.5959	0.6947	**0.8979**	0.7222	0.7434	0.7258	0.3250	0.3407	0.3392
DnSUPcL	0.7331	0.5718	0.6571	0.7049	0.5667	0.6725	0.7051	0.5406	0.4919	0.4113	0.6486	0.8032	**0.9400**	0.8260	0.7868	0.7830	0.3656	0.3279	0.3486
DhVISS	0.7158	0.6103	0.6838	0.6921	0.5663	0.7263	0.7552	0.4913	0.4632	0.3402	0.5770	0.8508	0.7995	**0.9295**	0.7977	0.7429	0.3531	0.2646	0.2983

	INT	VAR	SIGN	IDNTY	AUTO	INTRA	LEAD	TRAIN	RECOG	HEAD	NETW	PSAFE	SUPPcl	VISS	EXCL	REFLEX	INNOV	OPR	OPRG
DiVISS	0.6745	0.6162	0.6888	0.6738	0.6023	0.7126	0.7457	0.4982	0.4815	0.3729	0.5841	0.8249	0.7867	**0.9250**	0.8039	0.7401	0.3599	0.3214	0.3380
DjVISS	0.7329	0.6125	0.6868	0.7123	0.6366	0.7240	0.7334	0.5061	0.4701	0.4017	0.5785	0.7915	0.8356	**0.9196**	0.7526	0.7556	0.3536	0.3266	0.3145
DkVISS	0.7308	0.6034	0.7104	0.7069	0.5922	0.7503	0.7339	0.5670	0.5211	0.3783	0.6004	0.7946	0.8354	**0.9403**	0.7649	0.7501	0.3711	0.3370	0.3674
DeEXCL	0.6686	0.6157	0.6346	0.6753	0.6106	0.6749	0.6725	0.5066	0.5748	0.4227	0.6134	0.8183	0.7745	0.7453	**0.9398**	0.7867	0.3591	0.3635	0.3439
DfEXCL	0.7175	0.5960	0.6170	0.6752	0.5847	0.6657	0.6648	0.4719	0.5217	0.3835	0.5816	0.8340	0.8153	0.7845	**0.9422**	0.7664	0.3623	0.3446	0.3593
DgEXCL	0.6415	0.5678	0.6183	0.6773	0.5553	0.6689	0.7127	0.4662	0.4825	0.3110	0.5678	0.8556	0.8104	0.8241	**0.9182**	0.7490	0.3743	0.3479	0.3575
DaREFLX	0.7077	0.6680	0.7482	0.7480	0.5643	0.7388	0.7293	0.6240	0.6022	0.4634	0.6896	0.7958	0.7800	0.7656	0.7594	**0.9033**	0.3433	0.3070	0.3335
DbREFLX	0.6848	0.6641	0.7354	0.7418	0.5985	0.7559	0.7178	0.6085	0.5773	0.4099	0.6237	0.7903	0.7912	0.7735	0.7768	**0.9030**	0.3203	0.3216	0.3381
DcREFLX	0.7490	0.6617	0.7302	0.7393	0.6139	0.7422	0.6990	0.6265	0.6011	0.4402	0.6506	0.8285	0.8109	0.7930	0.8001	**0.9281**	0.3625	0.3472	0.3337
DdREFLX	0.7376	0.5985	0.6746	0.6681	0.5960	0.6489	0.6556	0.5807	0.5738	0.4131	0.6812	0.7794	0.7274	0.7438	0.7396	~~**0.8924**~~	0.3167	0.2774	0.2569
DeREFLX	0.5660	0.5196	0.5327	0.5092	0.5604	0.4807	0.5367	0.5276	0.5470	0.3691	0.5171	0.5905	0.5922	0.5394	0.5965	**0.7879**	0.2557	0.2647	0.2334
DfREFLX	0.5151	0.4572	0.4455	0.4282	0.4908	0.3648	0.4229	0.4929	0.4567	0.3967	0.4674	0.4690	0.4975	0.4223	0.4805	**0.6876**	0.1967	0.2304	0.2164
AaINNOV	0.4190	0.3026	0.3775	0.4121	0.3349	0.3719	0.3400	0.3225	0.2356	0.1793	0.3124	0.3594	0.3677	0.3781	0.3704	0.3497	**0.8924**	0.7398	0.7348
AbINNOV	0.3406	0.2778	0.3430	0.3797	0.3251	0.3127	0.3292	0.2938	0.2187	0.1343	0.3051	0.3168	0.3049	0.3017	0.3356	0.3146	**0.8924**	0.7351	0.7581
AcINNOV	0.3541	0.2588	0.3030	0.3442	0.2910	0.3409	0.3405	0.3170	0.2461	0.1797	0.2583	0.3130	0.3287	0.3355	0.3196	0.2834	**0.9133**	0.7905	0.7628
AdINNOV	0.3859	0.2944	0.3707	0.3861	0.3852	0.3523	0.3060	0.2683	0.2256	0.1841	0.2703	0.3271	0.3715	0.3767	0.3716	0.3220	**0.9181**	0.7483	0.7717
AeINNOV	0.3700	0.2745	0.3340	0.3654	0.3496	0.3419	0.3431	0.2946	0.2704	0.1722	0.2832	0.3340	0.3528	0.3495	0.3494	0.3102	**0.9078**	0.7715	0.7552
AfINNOV	0.3729	0.2509	0.3187	0.3353	0.3245	0.2513	0.3179	0.3392	0.2601	0.1900	0.3131	0.3199	0.3644	0.3473	0.3459	0.3572	**0.8440**	0.7485	0.7631
AgINNOV	0.3503	0.3041	0.3553	0.3630	0.3152	0.3538	0.3153	0.2883	0.2775	0.1489	0.2895	0.3138	0.3483	0.3302	0.3524	0.2922	**0.8827**	0.7781	0.7654
OPRa	0.3603	0.3278	0.3711	0.3706	0.3722	0.3538	0.2986	0.3592	0.2989	0.1905	0.3245	0.3118	0.3820	0.3274	0.3747	0.3328	0.7850	**0.9176**	0.8160
OPRb	0.3274	0.3602	0.3632	0.3861	0.3896	0.3443	0.3469	0.3208	0.3060	0.1874	0.3219	0.3072	0.3785	0.3203	0.3660	0.3152	0.7804	**0.9309**	0.8191
OPRc	0.3579	0.3388	0.3702	0.3485	0.3869	0.3422	0.3391	0.3137	0.2898	0.1762	0.3156	0.2804	0.3429	0.3090	0.3323	0.3066	0.7685	**0.9266**	0.8003
OPRd	0.3185	0.3136	0.3360	0.3492	0.3829	0.3398	0.3156	0.3315	0.3335	0.1984	0.3145	0.2863	0.3025	0.2935	0.3396	0.3122	0.7959	**0.9103**	0.7919
OPRe	0.3136	0.3217	0.3300	0.3453	0.3317	0.3755	0.3204	0.3348	0.3254	0.2077	0.2790	0.2887	0.3188	0.2996	0.3252	0.3172	0.7879	**0.9234**	0.8137
ORGPa	0.3606	0.3414	0.3803	0.3730	0.3715	0.3482	0.3150	0.3239	0.2681	0.1823	0.3106	0.3215	0.3833	0.3558	0.3781	0.3511	0.7522	0.7927	**0.8982**
ORGPb	0.3405	0.3465	0.3823	0.3670	0.3711	0.3381	0.3469	0.3598	0.2768	0.2320	0.3309	0.3331	0.3794	0.3391	0.3561	0.3606	0.7698	0.8062	**0.9277**
ORGPc	0.2382	0.2807	0.3136	0.3323	0.2736	0.2767	0.2662	0.3171	0.2380	0.1758	0.2260	0.1995	0.2585	0.2474	0.2795	0.2310	0.7439	0.7762	**0.8736**
ORGPd	0.3337	0.3393	0.3318	0.3522	0.3333	0.3454	0.3343	0.3303	0.2718	0.1997	0.3161	0.3278	0.3944	0.3428	0.3783	0.3182	0.8217	0.8186	**0.9189**
ORGPe	0.2734	0.3315	0.3036	0.3406	0.3049	0.3381	0.2869	0.2492	0.2316	0.1039	0.2261	0.2679	0.3475	0.3205	0.3209	0.2701	0.7615	0.7793	**0.9127**

	INT	VAR	SIGN	IDNTY	AUTO	INTRA	LEAD	TRAIN	RECOG	HEAD	NETW	PSAFE	SUPPcl	VISS	EXCL	REFLEX	INNOV	OPR	ORGP
EaINT	**0.9418**	0.5942	0.6692	0.6406	0.5569	0.6574	0.6483	0.5526	0.5655	0.3531	0.6340	0.7421	0.7379	0.7590	0.6853	0.7605	0.4465	0.3831	0.3736
EbINT	**0.9585**	0.5798	0.6563	0.6535	0.5548	0.6450	0.6617	0.5848	0.5714	0.4000	0.6488	0.7440	0.7476	0.7522	0.7114	0.7621	0.3944	0.3649	0.3418
EcINT	**0.9572**	0.5909	0.6558	0.6620	0.5666	0.6567	0.6604	0.5567	0.5678	0.3681	0.6123	0.7351	0.7219	0.7388	0.6913	0.7345	0.3737	0.3382	0.3169
EdINT	**0.9289**	0.5050	0.5952	0.5980	0.5401	0.5742	0.6386	0.5438	0.5466	0.3980	0.6517	0.7050	0.7003	0.6940	0.6491	0.7033	0.3102	0.2583	0.2356
EeINT	**0.9331**	0.4987	0.5665	0.6019	0.4862	0.5851	0.6206	0.4874	0.5307	0.3260	0.5800	0.6987	0.6941	0.6773	0.6795	0.6852	0.4321	0.3711	0.3427
AbVAR	0.5427	**0.9283**	0.7545	0.7816	0.7004	0.6870	0.6276	0.4328	0.5464	0.2987	0.4747	0.5911	0.5649	0.6087	0.5948	0.6432	0.3032	0.3347	0.3303
AcVAR	0.5495	**0.9284**	0.7970	0.7541	0.6441	0.7410	0.6587	0.4857	0.5376	0.3772	0.5172	0.5806	0.6110	0.6609	0.5704	0.6724	0.3002	0.3443	0.3449
AgSIGF	0.5520	0.7880	**0.8916**	0.7611	0.5811	0.7831	0.6496	0.5281	0.5399	0.3096	0.5120	0.6023	0.6083	0.6648	0.5700	0.6959	0.2870	0.3258	0.3087
AhSIGF	0.5992	0.7446	**0.9073**	0.8012	0.7121	0.6450	0.6826	0.4915	0.4964	0.4198	0.5957	0.6235	0.6396	0.6758	0.6239	0.6892	0.3727	0.3816	0.3724
AiSIGF	0.6588	0.7342	**0.9133**	0.7636	0.6861	0.6629	0.6577	0.5550	0.5278	0.3828	0.6072	0.6512	0.6486	0.6815	0.6167	0.7211	0.3811	0.3336	0.3433
AdIDNTY	0.5994	0.7701	0.7838	**0.9270**	0.6703	0.6624	0.6787	0.4544	0.4913	0.3966	0.5611	0.6920	0.6996	0.7150	0.6755	0.7281	0.3692	0.3349	0.3483
AeIDNTY	0.6253	0.7606	0.7677	**0.9155**	0.7070	0.6273	0.6825	0.5150	0.5563	0.4498	0.6091	0.7113	0.7012	0.6940	0.6952	0.7363	0.3775	0.3406	0.3579
AfIDNTY	0.6209	0.7497	0.8131	**0.9144**	0.6781	0.6467	0.6440	0.4958	0.5072	0.4056	0.5620	0.6210	0.6491	0.6583	0.6258	0.6836	0.3928	0.4008	0.3678
AjAUTO	0.3700	0.5407	0.6227	0.5787	**0.8196**	0.4100	0.4719	0.4187	0.3995	0.2781	0.4725	0.4526	0.4702	0.4964	0.4569	0.4471	0.3332	0.3418	0.3428
AkAUTO	0.5566	0.6773	0.6693	0.6860	**0.9386**	0.5607	0.5530	0.5328	0.5610	0.4088	0.5228	0.5733	0.6103	0.6028	0.6109	0.6207	0.3746	0.4027	0.3713
AlAUTO	0.5690	0.6870	0.6477	0.7018	**0.8897**	0.5259	0.5181	0.4719	0.5611	0.4499	0.5363	0.5468	0.5812	0.6020	0.5747	0.6018	0.2830	0.3278	0.2634
AmINTRA	0.5908	0.7551	0.7448	0.6672	0.6012	**0.8915**	0.6579	0.4638	0.5256	0.2714	0.5305	0.6470	0.6632	0.7260	0.6137	0.7081	0.3063	0.3230	0.2968
AnINTRA	0.5359	0.5923	0.6118	0.5647	0.4086	**0.8418**	0.6538	0.4121	0.4382	0.2372	0.4000	0.6085	0.5687	0.6401	0.5699	0.6106	0.2648	0.2629	0.2479
AoINTRA	0.5433	0.6553	0.6318	0.5676	0.4492	**0.8841**	0.6150	0.3857	0.4784	0.1873	0.3711	0.5593	0.5335	0.6396	0.5358	0.5992	0.3380	0.3190	0.3218
AqINTRA	0.6518	0.6957	0.7128	0.6625	0.5314	**0.9074**	0.7374	0.4924	0.5886	0.2720	0.4886	0.6974	0.6503	0.6929	0.6482	0.7091	0.3042	0.2987	0.2916
BaLEAD	0.6071	0.6669	0.7015	0.6891	0.5184	0.7340	**0.9252**	0.5227	0.5293	0.3273	0.5545	0.7142	0.6764	0.7229	0.6328	0.6749	0.3460	0.3250	0.3031
BbLEAD	0.6327	0.6507	0.6897	0.6892	0.5603	0.7260	**0.9331**	0.5916	0.5709	0.4071	0.6145	0.7596	0.7475	0.7764	0.7063	0.7257	0.3488	0.3677	0.3432
BcLEAD	0.6304	0.6287	0.6911	0.6852	0.5486	0.6912	**0.9358**	0.4996	0.5133	0.3405	0.5617	0.7372	0.7012	0.7446	0.6781	0.6767	0.3022	0.2663	0.2712
BdLEAD	0.5831	0.5217	0.5941	0.5640	0.4867	0.5720	**0.8865**	0.4792	0.5206	0.3273	0.5198	0.6550	0.6250	0.6274	0.6188	0.5930	0.3073	0.3147	0.3023
BeLEAD	0.6465	0.6158	0.6400	0.6410	0.5297	0.6305	**0.9004**	0.5787	0.6046	0.3647	0.5718	0.7027	0.6820	0.6848	0.6545	0.6872	0.3473	0.3273	0.3118
BfLEAD	0.6588	0.7067	0.7062	0.7136	0.5558	0.7903	**0.9152**	0.5558	0.5727	0.3409	0.5707	0.7891	0.7316	0.8153	0.7202	0.7647	0.3610	0.3301	0.3465
CaTRAIN	0.5507	0.4758	0.5540	0.4871	0.5341	0.4996	0.5760	**0.9387**	0.7160	0.6259	0.6837	0.5655	0.5626	0.5606	0.4867	0.6221	0.3165	0.3334	0.3511

	INT	VAR	SIGN	IDNTY	AUTO	INTRA	LEAD	TRAIN	RECOG	HEAD	NETW	PSAFE	SUPPcl	VISS	EXCL	REFLEX	INNOV	OPR	ORGP
CbTRAIN	0.5641	0.4826	0.5663	0.5247	0.5324	0.4853	0.5622	**0.9623**	0.7329	0.6369	0.7164	0.5468	0.5637	0.5447	0.4710	0.6372	0.3335	0.3394	0.3318
CcTRAIN	0.5228	0.4482	0.5288	0.4906	0.4896	0.4364	0.5194	**0.9526**	0.7115	0.6619	0.6833	0.5163	0.5421	0.4750	0.4790	0.5970	0.2984	0.3333	0.3054
CdTRAIN	0.5604	0.4732	0.5562	0.5167	0.4963	0.4824	0.5782	**0.9478**	0.7015	0.6654	0.7109	0.5682	0.6003	0.5292	0.5245	0.6357	0.3423	0.3626	0.3382
CaRECOG	0.5316	0.5266	0.4940	0.5046	0.5517	0.5063	0.5289	0.6709	**0.9357**	0.5699	0.6301	0.5310	0.5380	0.4758	0.5411	0.5755	0.2735	0.3245	0.2721
CbRECOG	0.5759	0.5481	0.5647	0.5492	0.5659	0.5155	0.5683	0.7123	**0.9256**	0.5674	0.6980	0.5569	0.5326	0.5036	0.5310	0.6127	0.3327	0.3514	0.3216
CcRECOG	0.4509	0.5123	0.5206	0.5156	0.5586	0.4991	0.5160	0.6864	**0.8661**	0.5661	0.6432	0.4877	0.5042	0.4449	0.4916	0.5510	0.1742	0.2683	0.1801
CdRECOG	0.3878	0.3509	0.3145	0.3086	0.3932	0.3255	0.3645	0.5972	**0.8434**	0.4498	0.5038	0.3187	0.3290	0.2725	0.3521	0.3898	0.1360	0.2187	0.1696
CeRECOG	0.6200	0.5935	0.5940	0.5567	0.4758	0.6578	0.6353	0.6576	**0.8618**	0.4783	0.5927	0.5591	0.5511	0.5461	0.5378	0.6185	0.2720	0.3045	0.2843
CaHEAD	0.3949	0.3740	0.4330	0.4514	0.4286	0.2770	0.3763	0.6708	0.5868	**0.9509**	0.6856	0.4331	0.4899	0.4013	0.3990	0.4722	0.1410	0.1753	0.1666
CbHEAD	0.3520	0.2960	0.3551	0.3837	0.3912	0.1951	0.2979	0.6154	0.5150	**0.9488**	0.6267	0.3696	0.3889	0.3212	0.3063	0.3858	0.1347	0.1564	0.1530
CcHEAD	0.4382	0.4072	0.4532	0.4989	0.4779	0.3138	0.4185	0.7112	0.5826	**0.9473**	0.6909	0.4573	0.5205	0.4450	0.4048	0.4962	0.2077	0.2158	0.2079
CdHEAD	0.3023	0.2744	0.3000	0.3519	0.3481	0.2108	0.3026	0.5874	0.5619	**0.9411**	0.6186	0.3622	0.3741	0.2880	0.3367	0.3665	0.1711	0.1900	0.1569
CeHEAD	0.3252	0.3278	0.3663	0.4047	0.4032	0.2684	0.3593	0.6231	0.5446	**0.9239**	0.6316	0.4217	0.4438	0.3992	0.3779	0.4139	0.2131	0.2185	0.2253
CfHEAD	0.3748	0.3501	0.3821	0.4459	0.3966	0.2776	0.3892	0.6232	0.5778	**0.9464**	0.6810	0.4537	0.4696	0.3848	0.4144	0.4594	0.2004	0.2153	0.1989
CaNETW	0.6490	0.5261	0.6028	0.6211	0.5490	0.4990	0.6114	0.6342	0.6420	0.6578	**0.9290**	0.6648	0.6243	0.6203	0.6052	0.6628	0.2944	0.2901	0.2745
CbNETW	0.6222	0.5052	0.5853	0.5846	0.5540	0.4737	0.5689	0.6798	0.6536	0.6875	**0.9597**	0.6645	0.6547	0.6213	0.6256	0.6932	0.3093	0.3328	0.3054
CcNETW	0.5868	0.4859	0.5742	0.5614	0.5140	0.4703	0.5675	0.7358	0.6798	0.6381	**0.9354**	0.6154	0.6132	0.5466	0.5702	0.6501	0.3097	0.3133	0.2933
CdNETW	0.6355	0.4927	0.6176	0.5965	0.5582	0.4894	0.5797	0.7177	0.6551	0.6442	**0.9377**	0.6147	0.6605	0.5805	0.5677	0.6645	0.3091	0.3325	0.2997
DaPSAFE	0.6924	0.5795	0.6446	0.6760	0.5567	0.6637	0.7084	0.5352	0.5246	0.3914	0.6018	**0.9396**	0.7656	0.7978	0.8289	0.7958	0.3304	0.2756	0.2827
DbPSAFE	0.7443	0.6196	0.6436	0.7059	0.5646	0.6951	0.7304	0.5170	0.5431	0.4362	0.6254	**0.9312**	0.7744	0.8372	0.8111	0.8061	0.3389	0.3074	0.3150
DcPSAFE	0.6891	0.5705	0.6230	0.6622	0.5525	0.6329	0.7720	0.5325	0.5137	0.4132	0.6364	**0.9303**	0.7870	0.7986	0.8251	0.7676	0.3192	0.2817	0.2840
DdPSAFE	0.7475	0.5910	0.6763	0.7012	0.5609	0.6872	0.7649	0.5766	0.5423	0.4261	0.6801	**0.9402**	0.8544	0.8504	0.8816	0.8396	0.3760	0.3303	0.3170
DlSUPcL	0.7356	0.6240	0.6714	0.7212	0.5993	0.6803	0.7490	0.5682	0.5477	0.4648	0.6389	0.8579	**0.9378**	0.8796	0.8444	0.8068	0.3899	0.3697	0.3924
DmSUPcL	0.6481	0.5509	0.6112	0.6345	0.5893	0.5849	0.6514	0.5493	0.5350	0.4606	0.5959	0.6947	**0.8979**	0.7222	0.7434	0.7175	0.3250	0.3407	0.3392
DnSUPcL	0.7331	0.5808	0.6571	0.7049	0.5667	0.6461	0.7051	0.5406	0.4919	0.4113	0.6486	0.8032	**0.9400**	0.8260	0.7868	0.7938	0.3656	0.3279	0.3486
DhVISS	0.7158	0.6338	0.6838	0.6921	0.5663	0.7167	0.7552	0.4913	0.4632	0.3402	0.5770	0.8508	0.7995	**0.9295**	0.7977	0.7608	0.3531	0.2646	0.2983
DiVISS	0.6745	0.6295	0.6888	0.6738	0.6023	0.6923	0.7457	0.4982	0.4815	0.3729	0.5841	0.8249	0.7867	**0.9250**	0.8039	0.7541	0.3599	0.3214	0.3380
DjVISS	0.7329	0.6339	0.6868	0.7123	0.6366	0.7019	0.7334	0.5061	0.4701	0.4017	0.5785	0.7915	0.8356	**0.9196**	0.7526	0.7764	0.3536	0.3266	0.3145
DkVISS	0.7308	0.6428	0.7104	0.7069	0.5922	0.7412	0.7339	0.5670	0.5211	0.3783	0.6004	0.7946	0.8354	**0.9403**	0.7649	0.7796	0.3711	0.3370	0.3674
DeEXCL	0.6686	0.6038	0.6346	0.6753	0.6106	0.6308	0.6725	0.5066	0.5748	0.4227	0.6134	0.8183	0.7745	0.7453	**0.9398**	0.7782	0.3591	0.3635	0.3439

	INT	VAR	SIGN	IDNTY	AUTO	INTRA	LEAD	TRAIN	RECOG	HEAD	NETW	PSAFE	SUPPcl	VISS	EXCL	REFLEX	INNOV	OPR	ORGP
DfEXCL	0.7175	0.5784	0.6170	0.6752	0.5847	0.6094	0.6648	0.4719	0.5217	0.3835	0.5816	0.8340	0.8153	0.7845	**0.9422**	0.7602	0.3623	0.3446	0.3593
DgEXCL	0.6415	0.5747	0.6183	0.6773	0.5553	0.6504	0.7127	0.4662	0.4825	0.3110	0.5678	0.8556	0.8104	0.8241	**0.9182**	0.7775	0.3743	0.3479	0.3575
DaREFLX	0.7077	0.6765	0.7482	0.7480	0.5643	0.7200	0.7293	0.6240	0.6022	0.4634	0.6896	0.7958	0.7800	0.7656	0.7594	**0.9370**	0.3433	0.3070	0.3335
DbREFLX	0.6848	0.6905	0.7354	0.7418	0.5985	0.7429	0.7178	0.6085	0.5773	0.4099	0.6237	0.7903	0.7912	0.7735	0.7768	**0.9398**	0.3203	0.3216	0.3381
DcREFLX	0.7490	0.6686	0.7302	0.7393	0.6139	0.7145	0.6990	0.6265	0.6011	0.4402	0.6506	0.8285	0.8109	0.7930	0.8001	**0.9473**	0.3625	0.3472	0.3337
DdREFLX	0.7376	0.5994	0.6746	0.6681	0.5960	0.6083	0.6556	0.5807	0.5738	0.4131	0.6812	0.7794	0.7274	0.7438	0.7396	**0.8965**	0.3167	0.2774	0.2569
AaINNOV	0.4190	0.3157	0.3775	0.4121	0.3349	0.3639	0.3400	0.3225	0.2356	0.1793	0.3124	0.3594	0.3677	0.3781	0.3704	0.3655	**0.8924**	0.7398	0.7348
AbINNOV	0.3406	0.2887	0.3430	0.3797	0.3251	0.2885	0.3292	0.2938	0.2187	0.1343	0.3051	0.3168	0.3049	0.3017	0.3356	0.3240	**0.8924**	0.7351	0.7581
AcINNOV	0.3541	0.2798	0.3030	0.3442	0.2910	0.3158	0.3405	0.3170	0.2461	0.1797	0.2583	0.3130	0.3287	0.3355	0.3196	0.2990	**0.9133**	0.7905	0.7628
AdINNOV	0.3859	0.2991	0.3707	0.3861	0.3852	0.3159	0.3060	0.2683	0.2256	0.1841	0.2703	0.3271	0.3715	0.3767	0.3716	0.3180	**0.9181**	0.7483	0.7717
AeINNOV	0.3700	0.2833	0.3340	0.3654	0.3496	0.3127	0.3431	0.2946	0.2704	0.1722	0.2832	0.3340	0.3528	0.3495	0.3494	0.3185	**0.9078**	0.7715	0.7552
AfINNOV	0.3729	0.2617	0.3187	0.3353	0.3245	0.2267	0.3179	0.3392	0.2601	0.1900	0.3131	0.3199	0.3644	0.3473	0.3459	0.3390	**0.8440**	0.7485	0.7631
AgINNOV	0.3503	0.3037	0.3553	0.3630	0.3152	0.3240	0.3153	0.2883	0.2775	0.1489	0.2895	0.3138	0.3483	0.3302	0.3524	0.2945	**0.8827**	0.7781	0.7654
OPRa	0.3603	0.3390	0.3711	0.3706	0.3722	0.3198	0.2986	0.3592	0.2989	0.1905	0.3245	0.3118	0.3820	0.3274	0.3747	0.3296	0.7850	**0.9176**	0.8160
OPRb	0.3274	0.3614	0.3632	0.3861	0.3896	0.2976	0.3469	0.3208	0.3060	0.1874	0.3219	0.3072	0.3785	0.3203	0.3660	0.3102	0.7804	**0.9309**	0.8191
OPRc	0.3579	0.3267	0.3702	0.3485	0.3869	0.3027	0.3391	0.3137	0.2898	0.1762	0.3156	0.2804	0.3429	0.3090	0.3323	0.2993	0.7685	**0.9266**	0.8003
OPRd	0.3185	0.3138	0.3360	0.3492	0.3829	0.3059	0.3156	0.3315	0.3335	0.1984	0.3145	0.2863	0.3025	0.2935	0.3396	0.3002	0.7959	**0.9103**	0.7919
OPRe	0.3136	0.3442	0.3300	0.3453	0.3317	0.3479	0.3204	0.3348	0.3254	0.2077	0.2790	0.2887	0.3188	0.2996	0.3252	0.3153	0.7879	**0.9234**	0.8137
ORGPa	0.3606	0.3378	0.3803	0.3730	0.3715	0.3221	0.3150	0.3239	0.2681	0.1823	0.3106	0.3215	0.3833	0.3558	0.3781	0.3475	0.7522	0.7927	**0.8982**
ORGPb	0.3405	0.3348	0.3823	0.3670	0.3711	0.3080	0.3469	0.3598	0.2768	0.2320	0.3309	0.3331	0.3794	0.3391	0.3561	0.3570	0.7698	0.8062	**0.9277**
ORGPc	0.2382	0.2959	0.3136	0.3323	0.2736	0.2460	0.2662	0.3171	0.2380	0.1758	0.2260	0.1995	0.2585	0.2474	0.2795	0.2365	0.7439	0.7762	**0.8736**
ORGPd	0.3337	0.3407	0.3318	0.3522	0.3333	0.3072	0.3343	0.3303	0.2718	0.1997	0.3161	0.3278	0.3944	0.3428	0.3783	0.3175	0.8217	0.8186	**0.9189**
ORGPe	0.2734	0.3379	0.3036	0.3406	0.3049	0.3024	0.2869	0.2492	0.2316	0.1039	0.2261	0.2679	0.3475	0.3205	0.3209	0.2790	0.7615	0.7793	**0.9127**

Team	Size (N)	Responder (n)	N - n	Nn	Dawson's SR ((N-n) / Nn)
1	10	10	0	100	0.00
2	10	10	0	100	0.00
3	9	9	0	81	0.00
4	6	5	1	30	0.03
5	5	5	0	25	0.00
6	5	4	1	20	0.05
7	9	9	0	81	0.00
8	7	7	0	49	0.00
9	5	4	1	20	0.05
10	6	6	0	36	0.00
11	7	7	0	49	0.00
12	5	5	0	25	0.00
13	13	5	8	65	0.12
14	10	5	5	50	0.10
15	10	6	4	60	0.07
16	10	9	1	90	0.01
17	8	8	0	64	0.00
18	10	5	5	50	0.10
19	6	4	2	24	0.08
20	7	4	3	28	0.11
21	7	4	3	28	0.11
22	7	7	0	49	0.00
23	11	5	6	55	0.11
24	11	5	6	55	0.11
25	7	7	0	49	0.00
26	6	4	2	24	0.08
27	6	4	2	24	0.08
28	6	3	3	18	0.17
29	5	5	0	25	0.00
30	10	9	1	90	0.01
31	7	7	0	49	0.00
32	10	10	0	100	0.00
33	8	5	3	40	0.08
34	9	8	1	72	0.01
35	7	4	3	28	0.11
36	9	9	0	81	0.00
37	8	5	3	40	0.08
38	7	7	0	49	0.00

Team	Size (N)	Responder (n)	N - n	Nn	Dawson's SR ((N-n) / Nn)
39	8	8	0	64	0.00
40	5	4	1	20	0.05
41	4	4	0	16	0.00
42	10	7	3	70	0.04
43	7	6	1	42	0.02
44	5	4	1	20	0.05
45	6	4	2	24	0.08
46	7	7	0	49	0.00
47	6	5	1	30	0.03
48	6	5	1	30	0.03
49	5	3	2	15	0.13
50	8	5	3	40	0.08
51	6	6	0	36	0.00
52	4	4	0	16	0.00
53	4	4	0	16	0.00
54	8	5	3	40	0.08
55	5	5	0	25	0.00
56	5	5	0	25	0.00
57	11	6	5	66	0.08
58	7	7	0	49	0.00
59	8	8	0	64	0.00
60	6	6	0	36	0.00
61	8	8	0	64	0.00
62	14	8	6	112	0.05
63	9	8	1	72	0.01
64	8	6	2	48	0.04
65	8	6	2	48	0.04
66	8	8	0	64	0.00
67	8	8	0	64	0.00
68	7	6	1	42	0.02
69	8	8	0	64	0.00
70	7	7	0	49	0.00
71	8	8	0	64	0.00
72	9	7	2	63	0.03
73	8	8	0	64	0.00
74	8	8	0	64	0.00
75	8	8	0	64	0.00
76	8	8	0	64	0.00
77	6	6	0	36	0.00
78	7	7	0	49	0.00

Team	Size (N)	Responder (n)	N - n	Nn	Dawson's SR ((N-n) / Nn)
79	8	8	0	64	0.00
80	7	7	0	49	0.00
81	8	8	0	64	0.00
82	8	8	0	64	0.00
83	6	6	0	36	0.00
84	10	9	1	90	0.01
85	12	9	3	108	0.03
86	10	5	5	50	0.10
87	15	5	10	75	0.13
88	8	8	0	64	0.00
89	8	8	0	64	0.00
90	8	8	0	64	0.00
91	8	8	0	64	0.00
92	16	8	8	128	0.06
93	8	8	0	64	0.00
94	6	6	0	36	0.00
95	8	7	1	56	0.02
96	7	7	0	49	0.00
97	9	8	1	72	0.01
98	7	7	0	49	0.00
99	8	8	0	64	0.00
100	8	8	0	64	0.00
101	9	7	2	63	0.03
102	10	8	2	80	0.03
103	7	7	0	49	0.00
104	12	8	4	96	0.04
105	10	9	1	90	0.01
106	8	8	0	64	0.00
107	8	8	0	64	0.00
108	6	6	0	36	0.00
109	9	7	2	63	0.03
110	8	8	0	64	0.00
111	7	7	0	49	0.00
112	8	8	0	64	0.00
113	8	8	0	64	0.00
114	8	8	0	64	0.00
115	8	8	0	64	0.00
116	9	8	1	72	0.01
117	10	8	2	80	0.03
118	8	8	0	64	0.00

Team	Size (N)	Responder (n)	N - n	Nn	Dawson's SR ((N-n) / Nn)
119	8	8	0	64	0.00
120	8	8	0	64	0.00
121	10	10	0	100	0.00
122	9	9	0	81	0.00
123	6	5	1	30	0.03
124	6	5	1	30	0.03
125	7	5	2	35	0.06
126	5	4	1	20	0.05
127	6	4	2	24	0.08
128	7	6	1	42	0.02
129	7	6	1	42	0.02
130	8	5	3	40	0.08
131	7	6	1	42	0.02
132	6	4	2	24	0.08
133	7	6	1	42	0.02
134	6	4	2	24	0.08
135	6	4	2	24	0.08
136	7	6	1	42	0.02
137	5	4	1	20	0.05
138	4	4	0	16	0.00
139	7	6	1	42	0.02
140	6	4	2	24	0.08
141	7	6	1	42	0.02
142	7	6	1	42	0.02
143	7	5	2	35	0.06
144	7	5	2	35	0.06
145	7	5	2	35	0.06
146	7	4	3	28	0.11
147	7	4	3	28	0.11
148	7	5	2	35	0.06
149	6	4	2	24	0.08
150	5	4	1	20	0.05
151	7	6	1	42	0.02
152	6	4	2	24	0.08
153	5	4	1	20	0.05
154	8	6	2	48	0.04
155	9	7	2	63	0.03
156	8	8	0	64	0.00
157	9	9	0	81	0.00
158	7	7	0	49	0.00

Team	Size (N)	Responder (n)	N - n	Nn	Dawson's SR ((N-n) / Nn)
159	6	6	0	36	0.00
160	8	6	2	48	0.04
161	9	7	2	63	0.03
162	9	8	1	72	0.01
163	9	8	1	72	0.01
164	9	8	1	72	0.01
165	9	8	1	72	0.01
166	9	4	5	36	0.14
167	10	4	6	40	0.15
168	8	4	4	32	0.13
169	8	4	4	32	0.13
170	8	4	4	32	0.13
171	8	4	4	32	0.13
172	9	4	5	36	0.14
173	8	4	4	32	0.13
174	8	4	4	32	0.13
175	8	4	4	32	0.13
176	9	4	5	36	0.14
177	8	4	4	32	0.13
178	8	4	4	32	0.13
179	8	4	4	32	0.13
180	4	4	0	16	0.00
181	8	4	4	32	0.13
182	9	4	5	36	0.14
183	5	5	0	25	0.00
184	6	6	0	36	0.00
185	6	6	0	36	0.00
186	8	5	3	40	0.08
187	10	10	0	100	0.00
188	7	6	1	42	0.02