WORKPLACE CONTEXT AND ITS EFFECT ON INDIVIDUAL COMPETENCIES AND PERFORMANCE IN WORK AND PROJECT TEAMS

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A thesis submitted in partial fulfilment of the requirements for the degree of Doctor of Philosophy

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CERTIFICATE OF ORIGINALITY

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ABSTRACT

Organizations require competent and high-level performance from the employees in project teams. However, our understanding of the factors that enable and support this high performance is far from complete. Much of the previous research on team performance focuses on the behaviour of team members, their individual competence, and the effect of organizational culture on team competency. However, the effects of organizational culture, organizational climate, manager behaviour, and team members' competencies on team performance have received relatively little attention.

Meanwhile, institutions of higher education try to develop professional competencies among students, including effective teamwork. Indeed, the student workgroup context is similar to that of an industry work (project) team. Yet, most previous research on student workgroup performance focuses on the measurement of performance, rather than on the effect of team climate and social axioms on the competencies of the student groups, which ultimately determine their performance. The results of such research would not only help improve student performance, but also help institutions of higher learning create appropriate curricula to develop the competencies desired by industry.

As such, this study aims to develop a research methodology that will help improve individual competencies and performance in a work team. Furthermore, this study attempts to better understand the important factors enabling and supporting the required competencies and performance of employees on a work team. Particular attention is paid to technological companies and student groups.

This study develops a theoretical framework for building context-based competency models to guide the management of an individual team member's performance. The framework combines workplace characteristics, individual employee competencies, and performance.

The present study set the following research objectives:

(i) To establish a theoretical framework for the development of context-based competency models;
(ii) To build context-based competency models for work teams and student groups;
(iii) To explore the constructs of organizational culture, team climate, manager behaviour, and social axioms in the workplace context;
(iv) To explore the relationships between work context and individual competencies;
(v) To build quantitative models to predict competencies and performance in specific work contexts.

This study used survey-based methodology in the form of electronic self-administered questionnaires to collect quantitative data. The study was conducted in three stages. In the first stage, respondents were requested to fill out questionnaires related to their organizational culture and team climates. Then, each employee was asked to fill out questionnaire to assess their manager's behaviour while managers performed a self-assessment. Finally, in the third stage of the study, a 360 degree assessment of employee competencies was conducted. Specifically, each employee was asked to evaluate themselves and their peers by responding to a series of questions pertaining to behavioural indicators of competencies. Furthermore, the manager of each team was asked to answer questions relating to the employees under their supervision. Managers and employees were separated during data collection

Data collection among student groups took place in two stages. In the first stage, an email was sent to the subject coordinator of the Faculty of Engineering of The Hong Kong Polytechnic University with basic information about the study and asking for permission to invite students to participate. Once permission was obtained, the author of the current study went to a class, gave a short presentation about the study and invited students to participate. Students who agreed to participate listed their names and emails on the consent form. Then, in the second stage, the electronic questionnaires were emailed to participants. Each student received a unique link to a customized online questionnaire and was asked to respond to the questionnaire within a one week time frame.

Data analysis included data coding, measurement, assessment and reliability analysis, hypothesis testing, and predictive model building. Data analysis was performed using Microsoft Office Excel 2010, R language for statistical analysis, and IBM SPSS

Statistics 22. Descriptive statistics were computed to assess the overall tendencies of the collected data (including the mean, standard deviation, variance, skewness and kurtosis). Tests of normality for each variable were performed using Kolmogorov-Smirnov and Shapiro-Wilk tests. Construct validity analysis was performed via Principal Component Analysis (PCA), a technique which relates the measured variables to the latent constructs. Cronbach's alpha was used to perform a reliability analysis to assess internal consistency and the reliability of the constructs. Correlation was used to estimate the strength of each relationship studied. Furthermore, a PCA factor analysis was conducted to identify the factor structure of the data. The hypotheses regarding the effect of competencies on individual and group performance were tested using t-test statistics. Finally, linear regression and decision trees were used to build and test the predictive power of context-based competencies on both work team and student group performance.

The findings of the present study contribute to the body of knowledge concerning competencies and team performance. The two studies reported below, which clarify both employee and student perspectives, permit a deeper understanding of the role of contextual factors in group work performance. Furthermore, the employee study integrated the concepts of organizational culture, team climate and manager behaviours into one model enabling the prediction of competencies and performance of team members.

The results of the employee study suggest that team member performance is mainly affected by workplace contextual factors such as organizational culture, team climate and managerial practices. Indeed, effective team building and the strategic design of the workplace environment may enhance team member performance.

The student groups study went beyond the traditional study of academic performance by considering the behaviour of students as analogous to the behaviour of team members in industry. In addition to the originality of this study in considering contextual factors, the present study investigated social axioms as predictors of student competencies and performance. It was assumed that the role of social axioms would be similar among students and among employees in work teams. The study found evidence that competencies and social axioms play an important role in group performance.

The results generated from the study of student groups may be used in two ways. First, the models can be used to predict and improve the performance of student teams. Specifically, they can be used to predict the performance of the student teams working together over the course of a semester or to build the most effective teams based on the individual competencies of students. Further, they can also be used for assessing or developing the specific competencies required by industry. Second, the models can be used to enhance corporate performance. For example, they can be used for the purpose of predicting the effectiveness of team-based learning activities during training and development programmes. Finally, they can also be used to assess the influence of employees' social axioms on individual competencies.

LIST OF THESIS-RELATED PUBLICATIONS

Rozhkov Mikhail, Cheung, C.F. and Eric Tsui "Workplace Context and Its Effect on Individual Competencies and Performance in Work Teams, International Journal of Business Performance Management, reviewed and being revised (2015).

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Rozhkov, Mikhail, Cheung, C.F. and Tsui, Eric "How to Improve Performance in Technology and Innovation Teams?", Proceedings of International Research Conference on Engineering, Science and Management 2014 (IRCESM 2014), June 4 - June 5, Dubai, pp.126-130 (2014).

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CHAPTER 1 INTRODUCTION

1.1 Research Background and Study Rationale

Obtaining effective performance from employees in work and project teams is crucial to many organizations (Boyatzis, 1982; Kerzner & Kerzner, 2006). Effective performance can be defined either as a rate of achievement of output objectives or as the appropriate execution of a job or task (Boyatzis, 1982). The effective performance of a job means attaining the specific results (i.e., outcomes) required by the job through specific actions (i.e., performance) while maintaining or being consistent with the policies, procedures, and conditions of the organizational environment (Boyatzis, 1982). At the team level, effective performance depends not only on the individual, but on multiple team member performance and on the collaboration of these team members (Boyatzis, 1982). Accordingly, effective team performance requires the effective performance of individual team members as well as collaboration among them.

Attempts to define, assess and manage performance have required the study of the nature, and factors affective effective (i.e., high) performance in organizations. Some authors stress a link between performance and competency. Competencies are defined as characteristics or abilities of the person that "enable him or her to demonstrate the appropriate specific actions" (Boyatzis, 1982, p.12). Furthermore, understanding performance requires an understanding of employee behaviour, which depends on personal, contextual and behavioural factors be taken into account (Shein, 2010).

The model illustrated in Figure 1.1 describes the interactions among the main factors involved in effective job performance. These factors are the individual's competencies, the job's demands, and the organizational environment. The higher the consistency between specific actions and workplace context factors, the higher the likelihood of effective performance (Boyatzis, 1982). Even if only two of three components are consistent, the increased likelihood of effective performance remains (Boyatzis, 1982). Therefore, consistency between employee competencies, job demands and organizational environment (or workplace context) leads to a higher probability of effective performance.

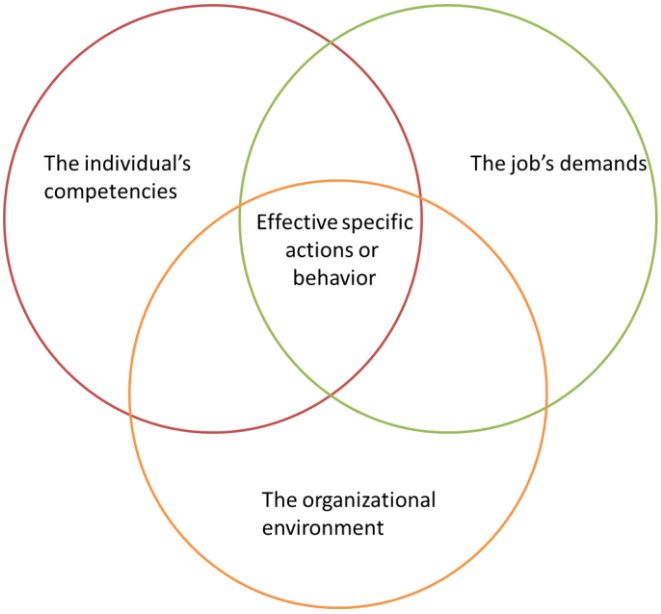

Figure 1.1 Model of effective job performance (Source: Boyatzis, 1982)

The most commonly studied and influential concepts concerning workplace context are: organizational culture, organizational climate and manager behaviour. Organizational culture is defined as a pattern of shared basic assumptions invented, discovered or developed by a given group (Schein, 2010) and integrates patterns of human behaviour including ways of thinking, speaking, and acting (Deal & Kennedy, 1982). Some scholars argue that culture has an important influence on employee competencies (Janev et al., 2010). Other researchers go further and consider competencies as manifestations of organizational culture (Spencer & Spencer, 1993a). Previous studies show that better matching between job requirements and personal competencies lead to better performance and job satisfaction (Sekiguchi & Huber, 2011). Spencer and Spencer (1993) stated that organizational contextual factors could suppress the expression of competencies.

Organizational climate describes the effect of different aspects of the organizational environment, artefacts and interactions on an individual's personal feelings and motivations (Stringer, 2002; Wiley & Brooks, 2000; Michela & Burke, 2000). Organizational climate is defined as "the feeling that is conveyed in a group by the physical layout and the way in which members of the organization interact with each other, with customers, or other outsiders" (Schein, 2010). Organizational climate is a powerful contextual factor that may change "previously 'acquired' behaviour tendencies" and "the observed behaviour patterns of the group members" (Stringer, 2002). Organizational

climate is linked to motivation and affects an individual's personal feelings about work (Stringer, 2002), as well as their concern and care for customers, conditions of group innovativeness and creativity (Wiley & Brooks, 2000; Michela & Burke, 2000). The relationship between organizational climate and employee competencies has received relatively little attention in the literature.

Manager behaviours are also important workplace context factors according to Boyatzis (1982). The behaviour of a manager affects all aspects of an employee's work, perceptions and feelings about the organization, team and job itself. As a result, managers may directly or indirectly affect employee behaviour, and encourage and support or discourage employee competencies. Previous research has studied the relationships between manager behaviour and organizational culture (Boyatzis, 1982; Denison, 1990; Chatman et al., 2012) and organizational climate (Wiley & Brooks, 2000; Stringer, 2002). However, the relationship between manager behaviour and employee competencies remains understudied.

The literature suggests a significant effect of workplace contextual factors on employee competencies and performance. Nevertheless, there is a lack of research which provides explicit evidence of these relationships, as well as their strengths and directions. Research on the effect of organizational culture, organizational climate, managers and team member competencies on individual competencies and performance has received relatively little attention. Furthermore, though these factors have been studied individually (e.g., Denison, 1990; Spencer & Spencer, 1993; Stringer, 2002) they have not been studied in combination with one another.

1.2 Problem Statement

The current understanding of the effect of workplace context factors on individual competencies and performance in a work team has been hampered by a lack of information on two questions. The first concerns uncertainty regarding the interrelationships between the different factors that constitute workplace context and their combined effects on competencies. The second question refers to the effect of those competencies on an individual's performance in work teams in different workplace contexts.

This study aims to build a methodology for developing context-based competency models for managing the performance of team members in work and project teams. Moreover, it attempts to improve the understanding of important factors encouraging and supporting the expression of competencies and the high performance of employees. In order to do so, this study considered organizational culture, organizational climate, as well as manager behaviours and team member competencies as potentially important factors in the performance in work groups.

Some basic assumptions were made in this study:

(i) The high individual performance of individual team members does not necessarily result in the high performance of the team;

(ii) It is more likely that teams with high individual performances achieve higher team performance;

(iii) High individual performance is based on a specific set of individual competencies;

(iv) The organizational environment, manager(s) and team members create a unique work context that affects the expression of individual competencies.

1.3 Objectives of the Study

This study aims to build a theoretical framework to build context-based competency models of team performance that will ultimately improve the management of the individual performance of team members. These models will incorporate workplace context factors (organizational culture, organizational climate and manager behaviour) and evaluate their effects on employee competencies. These models are particularly valuable as they allow for the prediction of employee performance.

The following is a list of the current study's research objectives:

(i) To develop a theoretical framework for developing context-based competency models;

(ii) To develop context-based competency models for work teams to explore the effects of organizational culture, team climate and manager skills on employee competencies;

(iv) To explore the relationships between organizational culture, team climate, and manager behaviours, and competencies of individuals in work teams and student groups;

(v) To build quantitative models that predict competencies and performance based on work context (organizational culture, team climate and manager skills) for work teams in industry and student groups in institutions of higher learning.

1.4 Significance of the Research

Employee competencies are crucial assets to innovative organizations. High level team performance requires a combination of the appropriate work context and the appropriate individual competencies among team members. Although a number of competency frameworks have been developed and used in previous research, they do not take into account the effect of work context on competency and performance in work teams or student groups. The outcomes of this research provide a better understanding of the relationships between individual competencies and performance and work context factors, and of their importance to competency and performance management.

Business organizations may use the findings from this study to improve team competencies and performance. Furthermore, the use of the models may provide a comprehensive understanding of the organization's management practices and their effects on team performance. Finally, these models provide an important means of revealing possible "bottlenecks" and causes of problems in team performance, thus allowing managers to make informed decisions about project teams that lead to higher levels of performance, facilitate the expression of individual competencies, and improve management practices and the organizational environment.

1.5 Structure of the Thesis

This thesis is divided into seven chapters. Chapter 1 introduces the rationale behind the research problem, and the objectives and significance of the studies. Chapter 2 presents a literature review on performance management, competency management, organizational

culture and climate, motivation and knowledge management. The literature review is accompanied by a critique of the works reviewed, specifically in terms of the inconsistencies and inadequacies of previous approaches, and research gaps. Chapter 3 presents a theoretical framework for building context-based competency models for work teams and student groups. Then, Chapter 4 describes the methods used to build the conceptual research model, the hypotheses, and the methods used to collect and analyse data. Chapter 5 presents the results of the study conducted among employees, including a discussion of the results of the pilot and main studies. Chapter 6 presents the results of the study conducted among students . Finally, a discussion of the overall results of the study is presented in Chapter 7, followed by conclusions which highlight the contributions and limitations of the present study, as well as suggestions for future research.

CHAPTER 2 LITERATURE REVIEW

This chapter reviews the theoretical background of human-related factors in an organization. It starts with approached to define competencies as the most important factors that produces high employee performance. Then, it goes on to study the organizational environment factors which form a workplace context. In particular the organizational culture, organizational climate and manager skills are reviewed.

2.1 Performance in a work and project teams

In many organizations, the work of employees is organized in project-based activities. A project is any sequence of tasks and jobs that have an explicit objective to be completed within specific restrictions. The Project Management Institute (PMI) defines a project as a temporary endeavour intended to solve a problem, seize an opportunity or respond to a mandate (Kerzner & Kerzner, 2006). A project is defined by the start and the end dates, limited finances, human resources, time, equipment, etc. (Brown & Hyer, 2010). An main issue for the project management is to manage project success and performance.

Turner (2006) proposed to distinguish the terms ‘project success’ and ‘project performance’. Project success can be measured only after project completion whereas project performance can be measured at any current state of the project. A project is considered successful if it is finished within the assigned period of time and budget, at the appropriate performance or specification level, with acceptance by the customer and/or user, within the minimum or permissible scope of changes, without disturbing the main workflow of the organization and changing the corporate culture (Kerzner & Kerzner, 2006). Lack of one or more described characteristics may indicate failure of the project (Kerzner & Kerzner, 2006). The characteristics include planning failure (non-acceptance by the customer), poor performance (actual failure) or perceived failure (actual failure + planning failure). Factors or attributes of project failure include poor morale, poor motivation, poor human relationships, poor productivity, lack of employee commitment, lack of functional commitment, delays in problem solving, too many unresolved policy issues and conflicting priorities between executives, line managers, and project managers (Kerzner & Kerzner, 2006).

Effective performance can be defined as a rate of achievement of output objectives or as the appropriate execution of a job or task (Boyatzis, 1982). Effective performance of a job is the attainment of specific results (i.e. outcomes) required by the job through specific actions while maintaining or being consistent with policies, procedures and conditions of the organizational environment (Boyatzis, 1982,). Kerzner & Kerzner (2006) stated that employees' behaviour is the most important driver of organizational performance.

2.2 Competencies

2.2.1 Evolution of the competency concept

The evolution of competency study started in America in the late 1960s. Researchers and practitioners at that time had a major interest in personality study. Unfortunately, it was proven that personality traits have low correlation coefficients (no more than 0.33) with job performance (Bassi, Russ-Eft, & American Society for Training and Development., 1997a). It made the scholars and managers anticipate looking for other manageable parameters.

In 1972, David McClelland published a paper entitled "Testing for Competence Rather Than Intelligence" which argued that traditional academic aptitude and intelligence tests don't predict job performance (McClelland, 1973). His findings for job performance prediction can be described in six principles:

(i) Criterion sampling is the best way to compare most successful and less successful people to reliable, real-job characteristics related to success.

(ii) Tests should be sensitive to important changes of people's competencies (e.g. experience, skills, etc.) since human traits can be changed or trained.

(iii) The way to improve the characteristic tested should be clear. By using the criterion behaviour that has a direct connection to the assessed behaviour, the faking of a high score is almost impossible.

(iv) The competencies can be tested in clusters related to occupational, social or personal outcomes such as leadership, communication skills, patience, etc.

(v) Identification of what a person thinks (Operant Thoughts) and does (Behaviour) should be done in unstructured and open-ended situations (without restrictions imposed by the researcher or assessment procedure).

(vi) Tests should be focused on operant thought patterns (thought codes).

In 1972, McClelland and Daily developed a Behavioural Event Interview (BEI) technique based on Flanagan's Critical Incident Interview (CII) and the Thematic Apperception Test (TAT). The major difference between CII and BEI is that CII focuses on task-related features of the job and BEI focuses on the features of people "who did a job well" (Bassi, Russ-Eft, & American Society for Training and Development., 1997a). Spencer gives an explanation that if supervisors spend 42 percent of their time in meetings, the BEI results show superior scores higher in nonverbal sensitivity (Bassi, Russ-Eft, & American Society for Training and Development., 1997a). As a result, BEI discovered a direct relation between people's characteristics and job performance.

The further development of competency methodology in the 1970s was supported by its implementation in a few government-related projects in the USA (Bassi, Russ-Eft, & American Society for Training and Development., 1997a). The results and applications of one project research of the American Management Association (AMA) were presented in 1982 in The Competent Manager by Richard Boyatzis (Boyatzis, 1982). This book identifies and explains 19 competencies related to successful management performance based on the results of assessing over 2000 managers from 12 organizations (Boyatzis, 1982).

In 1993, Competence at Work (Spencer & Spencer, 1993a) was first published which summarized 20 years' experience of competency methodology applications. The book presents a competency dictionary, a methodology for the development of competency models and generic competency models for some job positions. It has influenced the worldwide research on competency management which remains popular up to now.

2.2.2 Definitions of Competency

A number of reviewed studies in competency management show differences in usage of the concept of competency. Figure 1.1 outlines two basic approaches to describe

competencies based on the distinction regarding the subject of interest. For the first approach, the competency can be described by the type of entity it characterizes (personality or behaviour) while the second approach describes the competency based on its explicitness. For the first approach, some researchers consider "competence" or "competency" at the organizational level (Enders, 2004). This approach emanates from Penrose's resource-based theory. He stated that "A firm may achieve rents not because it has better resources, but rather the firm's core competencies involve making better use of its resources" (Penrose, 1959, 2009). The resource-based approach states that success or failure of organizations is primarily determined by their core competencies (Enders, 2004).

The second approach to define competency makes use of the terms "competence" or "competency" for individual features of employees (Boyatzis, 1982; Spencer & Spencer, 1993; Cooper, 2000; Crowl et al., 2007; Simon, 2010; Woodruffe, 1993; Kurz & Bartram, 2002, 2008a). Hence, all definitions and terms are considered from and applied to this point of view. There are two terms used in the literature that are appropriate for the present study, which are "competence" and "competency". Both terms are used to describe human behaviour or context characteristics in the workplace.

Kenneth Carlton Cooper in *Effective Competency Modelling & Reporting* (Cooper, 2000) introduces the terms "competent" and "competence" to discuss competency. A competent is defined as an employee (actor) who is qualified to meet the standards of the job performance in terms of time, lack of defects and acceptable customer satisfaction. Competence is defined as a "condition or state of being competent" (Cooper, 2000). In comparison with previous work by other researchers, he distinguishes competence from personal traits, people's capabilities or abilities and motivational attitudes (competency).

2.2.2.1 Competencies as characteristics of personality

Personal characteristics included in competency concepts (Ennis, 2008) include mental, intellectual, cognitive, social, emotional, attitudinal, physical and psychomotor features of personality. Competency can be considered as a cluster of related knowledge, attitudes, and skills that affects a major part of one's job that correlates with the performance on the job. It can be measured and improved (Cooper, 2000).

Knowledge as a competency includes intellectual and information capital of an organization as a set of facts, data, procedures, etc. Attitudes are different from motivational attitudes which refer to "beliefs and the formal and informal organizational culture". Attitudes link competencies with organization context factors (i.e. organizational culture and organizational climate). Skills are considered "demonstrated competency" which are required to meet the minimum standards of performing activities (Cooper, 2000).

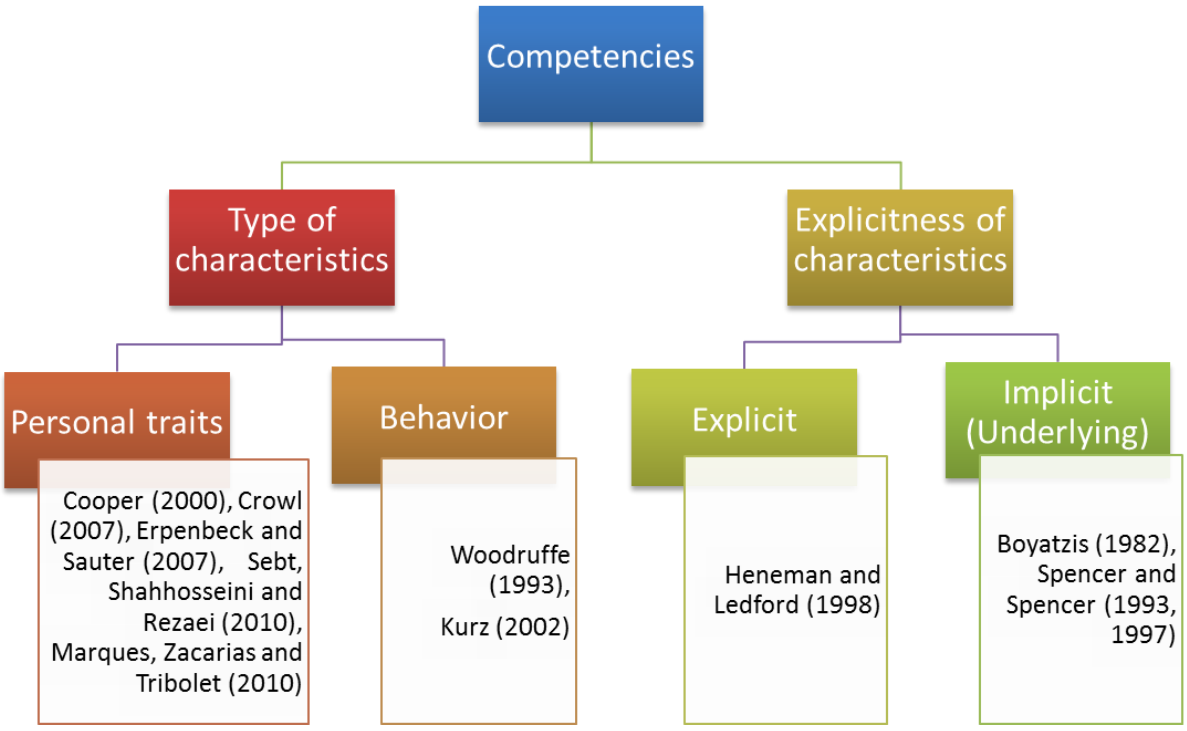

Figure 2.1 Approaches to definition of competencies

Crowl et al. (2007) used the term competence to define personal characteristics as the ability "to perform tasks according to expectations". Ability is considered in terms of appropriate qualifications or training, skills, physical and mental capabilities, knowledge, understanding, behaviour and attitude that an employee possesses. This broad definition covers various personal qualities that help employees to achieve the expected performance level. The term "ability" is used as a synonym for the capability or capacity to perform a task.

Sebt, Shahhosseini, & Rezaei (2010) narrowed the list of personal characteristics and made use of the term "competency" to generalize a cluster of attitudes including knowledge, skills and other features that meet the following requirements:

(i) Competency affects a major part of job related tasks,
(ii) Competency is associated with roles and responsibilities;
(iii) Competency can be correlated with the performance level;
(iv) Competency can be measured against standards;
(v) Competency can be improved and detailed.

Marques, Zacarias, & Tribolet (2010) consider competency as capabilities held by humans and they distinguish two specific features of competencies, i.e. actions and resources. They attempted to model the dynamic process of human resources allocation in organizations (Sebt et al., 2010). Other consider competencies as personal abilities to act which are supplemented by context factors such as rules, norms and attitudes (Simon, 2010). They stress the importance of the context factors and their effect on competencies.

Some researchers argue against the inclusion of personality traits in the definition of competencies due to the fact that they considered that competencies are difficult to be changed and trained. They suppose not to include the personal traits such as confidence, loyalty, honesty, innovation, valuing people, influence, results orientation, problem orientation, openness, change orientation, commitment, team orientation, flexibility, etc. Motivational attitudes are related to human personality and they are neither developed nor considered as a part of competence (Cooper, 2000). In accordance with Cooper's argument, competence includes how an employee actually needs to be competent but not his potential. On this basis, he refutes "capability" and "ability" as competencies and argues that people's capabilities and abilities do not guarantee performance. He compares capability with "workplace capacity" and associates ability with personal capacity (as a reflection of talent) to perform. As a result, abilities do not guarantee future performance, but only propose its potential likelihood. This argument is neither clear enough nor convincing due to his other argument which states that "competencies cannot guarantee that workers will perform adequately" (Cooper, 2000). The weakness of Cooper's approach to the competency definition is related to the high context of sensitivity of competencies. If some knowledge, attitude or skill of an employee in a specific organization does not influence performance, it cannot be correlated to a competency. This approach limits the applicability of the competency model to a constant (stable) organizational environment including processes, people, culture, climate and other factors.

2.2.2.2 Competencies as behaviour characteristics

Spencer's definition of competency is that competency specifies ways of behaving, thinking and is stable for long periods of time (Spencer and Spencer, 1993). Some authors consider competency as a set of "behaviour patterns" or "actions" that people use in a job to perform it with competence (Woodruffe, 1993; Kurz & Bartram, 2002, 2008a). Therefore, Woodruffe (1993) excludes elements of work performance such as technical skills, knowledge and abilities from the definition of competency. Kurz and Bartram (2002; 2008a) suggest that competencies are not what people possess ("He has lots of leadership"), but what people exhibit in their behaviour ("He provides lots of leadership").

2.2.2.3 Explicit characteristics

Heneman & Ledford (1998) define competencies as demonstrable characteristics of a person including knowledge, skills and behaviour that enable performance. As a result, along with Cooper (2000), they require that competencies should be only demonstrable, i.e. explicitly shown and detectable.

2.2.2.4 Underlying characteristics

Boyatzis (1982) and Fogg (1999) extend the definition of competency, distinguishing internal and external constraints, and environmental and relationship factors significant to the job (Ennis, 2008). Boyatzis (1982) defines competency as"an underlying characteristic of a person which results in effective and/or superior performance in a job. It means that these characteristics can be subconscious to the person, or appear explicitly and vary in some behaviour (actions). As a result, people's specific behaviour (performing an act) is under the influence of a set of characteristics and can produce different results (outcomes) at each cycle of repeated action. These non-linear correspondences are due to the influence of context factors such as demand and the requirements of a specific task (job) and particular organizational environment. Spencer & Spencer (1993a) also emphesise competencies as underlying characteristics (fairly deep, integral parts of personality) that are causally related to and can predict behaviour and performance based on a criterion-referenced approach (based on specific criteria or standards).

This approach to define competency proposes its changeability and context-dependability. It raises methodological problems for assessing and applying competency concepts to different jobs, in different organizations at different times. It means that people need to specify what action happened, what was its place in a system, what was the sequence of actions, what results (effect) it produced, and what were the initial intents and meanings of the actions and results in order to define a competency more precisely (Boyatzis, 1982). Boyatzis (1982) states that competency concepts reflect people's capability (what they can do) and not necessarily what they really do, regardless of the context.

All approaches to competencies definitions describe different characteristics of human personality and behaviour. Spencer (1997a) said that competency is "*any* individual characteristic that can be measured reliably and that distinguishes superior performance from average performance, or effective from ineffective performance, at a statistical level of significance". Competency characteristics are classified as operant or respondent traits (e.g. motives, self-concepts, attitudes, values or occupational preferences), declarative knowledge (e.g. content knowledge) and procedural skills (e.g. cognitive or behavioural). Figure 2.2 illustrates these levels of competencies. The iceberg shows that the competency concept covers easily observable and trained skills and knowledge competencies and implicit underlying human characteristics as values, motivation, and personal traits. The bigger part of the iceberg is difficult to be changed and managed. To prove his point, he refers to McClelland & Winter (1971) who discussed the possibility to change even motives and traits.

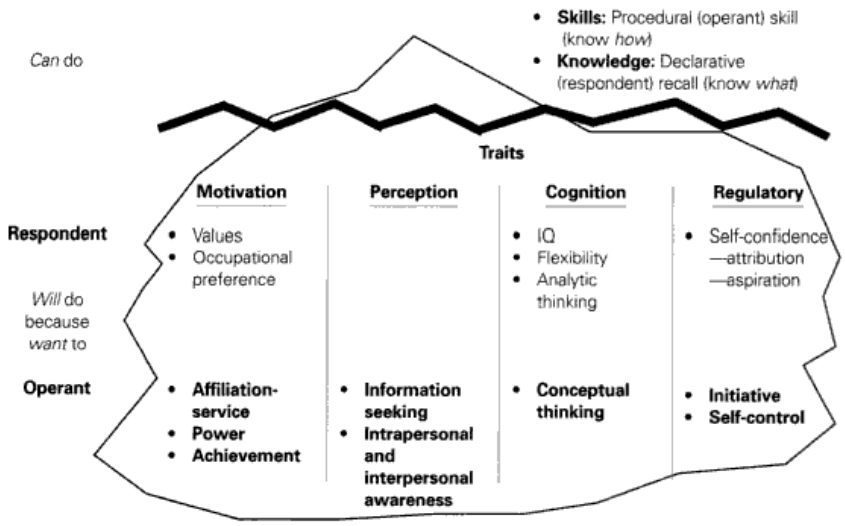

Figure 2.2 Iceberg level of competencies (Source: Spencer, 1997b)

2.2.3 Competency models

This chapter describes different competency models, and development and application competency models in an organization. A competency model organizes is "a group of related competencies that are grouped together to describe successful performance for a particular job or role, or in a particular organization" (Radsma, 1999). Competency models should be matched with the nature and complexity of work, the organizational culture and the values (Bozkurt, 2009). The competency model of an organization is stable over time. In spite of changes in methods and tasks that are accomplished, core competencies (e.g. motivational, interpersonal and cognitive) that determine a high level of performance remain the same (Spencer & Spencer, 1993b).

2.2.3.1 Types of competency models

There are two types of competency models which include generic and organization-specific. The generic competency model includes a broad range of competencies appropriate for the professional area or positions. This approach is based on the proposition that there are universal competencies, which can be applied in all contexts in any organization (Rees, 2003). Generic models are applicable to any job or broad type of work (job family) and designated behaviour that leads to high performance, including specific knowledge and skills, and have a detailed hierarchy of categories and sub-categories (Rees, 2003; Bozkurt, 2009).

The organization specific approach is based on the uniqueness of each organization. Every organization has a distinct internal environment, people, practices and culture that define specific contexts for job implementation. As a result, a competency model should be developed in accordance with specific contexts and performance indicators (Rees, 2003; Spencer & Spencer, 1993a). The job competency models are organization-specific. These models propose different competencies for different organizations and units within organizations such as sales, marketing, IT, etc. Job competency models are applicable to specific positions such as jobs and roles and can be aligned with work unit objectives and relate to an organization's vision and strategy (Rees, 2003; Bozkurt, 2009). Organization specific competency models propose a sensitivity to the work context. Shippman (2000)

stated that the number of competencies included in a competency model is dependent on the workplace and organizational environment (Ennis, 2008).

Some authors combine these two approaches in a single model. Taylor (2007) proposed that there are (1) universal competencies (applicable for any jobs, i.e. interpersonal skills, oral communication, etc.), (2) occupational competencies (applicable to specific jobs or family of jobs), and (3) relational competencies (as needed in a particular job, depending on the job settings and context).

Competency models can be developed in three steps (Simon, 2010). The first step is an analysis which defines the needs and goals of the competency model while the second step is intervention which includes the design and realization of the competency model. The third step is evaluation which includes assessing the success of the competency model. The three methods are most popular for the development of competency models. The criterion samples method proposes to use performance criteria to define a criterion sample so as to study the most important competencies. The expert panel method makes use of expert panels to define performance criteria and competencies. Studying experts' opinion and analogue jobs to define job-related competencies are more appropriate for single, unique or future jobs (Spencer & Spencer, 1993b).

2.2.3.2 Methods for Competencies Assessment

Competency assessment methods evolved from applying methods and techniques from psychology, sociology, and mathematics and computer science. The most popular and validated methods for competencies assessment are (1) behavioural event interview (BEI), (2) expert panel, (3) survey, (4) job task or function analysis, (5) observation, (6) assessment and development centres, and (7) computer-based methods.

(i) Behavioural Event Interview (BEI)

The Behavioural Event Interview (BEI) was developed by David C. McClelland and McBer based on Flanagan's critical incident method, the Thematic Apperception Test (TAT) and CAVE method for motivation measurement (Spencer & Spencer, 1993a). The BEI uses detailed stories of employees about their job. It focuses on the differences between how superiors and average performers think and act, and how they behave in critical situations (Spencer & Spencer, 1993b; Bassi, Russ-Eft, & American Society for

Training and Development, 1997b). The BEI also makes use of fashions of short-stories to describe the daily work of participants in terms of three peak successes and three major failures. Coded BEI records have shown an interrater reliability of 0.8 to 0.9 (Boyatzis, 1982). Competency scores from BEIs alone have shown criterion validities from 0.4 to 0.6 to as high as 0.9 for groups of related competencies (Spencer, 1993b; Bassi, Russ-Eft, & American Society for Training and Development, 1997b).

The results of BEI assessment have high validity which are able to identify new competencies or competency-related events (behaviour), precisely express competencies in the work process, as well as identify behaviour algorithms and patterns that are not biased by racial, gender, and cultural differences (Spencer & Spencer, 1993a). BEI description of competencies can be used for assessment, training, and career planning, as well as manifest organizational culture and work contexts (Spencer & Spencer, 1993a).

However, application of the BEI consumes a lot of time and money. Moreover, a high level of expertise to conduct interviews and analyze data is also vital. On the other hand, the BEI does not match competencies with job tasks and is inappropriate for the exploration of many jobs and worldwide studies (Spencer & Spencer, 1993a).

(ii) Expert panel Method

Expert panel methods involve experienced respondents (experts) to define (Spencer & Spencer, 1993b; Bassi, Russ-Eft, & American Society for Training and Development, 1997b) what competencies are required for average performance (i.e. threshold competencies), and what competencies "distinguish superior performers" (i.e. differentiating competencies), key accountabilities, results measures and career paths.

The accuracy of the expert panel method is usually around 50 percent. The expert panel method is a fast and cost efficient approach for an initial competency study. It also provides useful information for further research and assessment such as the purpose and content of the job/job family, career path, and competency requirements (Bassi, Russ-Eft, & American Society for Training and Development, 1997b). However, the expert panel method could identify common facts and knowledge that are not related to competencies and not distinguish superior and average performers, or it could overlook important

competency indicators due to lack of psychological or technical terminology used by the panel members (Spencer & Spencer, 1993b).

(iii)Survey Questionnaires

A survey asks respondents to indicate the extent to which people exhibit specific behaviour (i.e. against competency dimension scales). One type of survey is called the 360 degree feedback survey (Fletcher, 1998). This technique allows the measurement of competency from different perspectives of self-assessment of employees, peers, supervisors, subordinates and clients. The 360 degree feedback survey provides good quality data. Competencies coded from the BEI are correlated to competencies as rated by the 360 survey from r=.84 to r=.97 (Bassi, Russ-Eft, & American Society for Training and Development, 1997b). It is proven that the 360 degree survey method gives good validity at less than the costs for the BEI method.

Other survey-based methods are used to study various aspects of competencies and other constructs. Robertson and Kinder (1993) used Psychological methods (Occupational Personality Questionnaire) to study the relationships between personality and range of competencies (Bassi, Russ-Eft, & American Society for Training and Development, 1997b). Lewis (1993) studied the relationships between psychological types and competencies (Rees, 2003). Arnold and Davey (1992) used a statistical study of the variations of self-rating and supervisor ratings of competencies.

Survey methods are quick and low cost which provide suitable data for statistical analysis (Rees, 2003). However, survey methods are unable to identify new competencies or competency-related events (behaviour), limited items to response and can be not useful enough (Spencer & Spencer, 1993b).

(iv) Job task or function analysis

The job task or function analysis method identifies requirements, behaviour and attributes needed to accomplish a job/task. It may produce very detailed job descriptions, deduce needed competencies and validate or elaborate on data collected by other methods (Spencer & Spencer, 1993b). However, it focuses on the description of the job but not the person who accomplishes a high level of performance. As a result, it can be too detailed but is unable to distinguish important tasks from routine tasks (Spencer & Spencer, 1993b).

(v) Observation

The observation method can be used in real or simulated work situations. During observations, a researcher observes employee behaviour and codes it against chosen indicators of competencies. The disadvantage of this method is that it is expensive (in terms of money and time) (Spencer & Spencer, 1993b). Observations are good for observing and comparing employees' behaviour against indicators of items from the developed competency model (Bassi, Russ-Eft, & American Society for Training and Development, 1997b). However, they can be expensive in time and money or inefficient for observing critical incidents (Spencer & Spencer, 1993b).

(vi) Assessment/development centers

Assessment/development centres are specific approaches to identify competencies, using different techniques to identify employee competencies from different perspectives (Parry, 1996; Taylor, 2007). Assessment centres produce highly valid results. However, assessment centres are complicated and can be very expensive in time and money (Spencer & Spencer, 1993b).

(vii) Computer-based methods

In the past two decades, computer-based methods have been more widely used for the generation and analysis of competency-related data. Wu & Fang (2011) used fuzzy theory to analyze collected data on competencies. Acock and Clarke (1990) widely used statistical-based methods to evaluate correlations between personal competence and political trust (Wu & Fang, 2011). Buscema et al. (2006) used Artificial Neural Networks to analyze competencies and preferences for professional development and to facilitate Knowledge Management (KM) and e-Learning. Computer-based methods make use of the data of previous studies, and are efficient and quick (Wu & Fang, 2011). However, the results depend on the accuracy of previously gathered data, they are not able to identify new competencies or competency-related events (behaviour) and can be very expensive (Spencer & Spencer, 1993b).

2.2.4 Role of Competencies in Individual and Team Performance at Work

Competency models can be used in a range of management activities to achieve high effectiveness of the workforce (Spencer & Spencer, 1993b; Crowl, Attwood, & American Institute of Chemical Engineers, 2007). The most frequent purposes of usage are (1) selection and hiring of personnel, (2) assessment and development of personnel, (3) improving team performance.

2.2.4.1Selection and Hiring

Application competency models for hiring and selection should be followed by the questions: is it possible that new hires have these competencies (Spencer & Spencer, 1993b)? If YES, can these competencies be included in the selection process? If NO, they cannot be used for the selection process and the company should focus on entry-level or advanced training. The other question to answer is: Does this distinguish competency? If YES, this competency should be looked for during the selection process. The main issues regarding this are related to matching job task requirements and employees' competencies (Simon, 2010), and anticipating future requirements and important competencies for employees in the future (Marques, Zacarias, & Tribolet, 2010). The main idea of job-person matching is to provide an optimal ratio between the level of competencies and the job (task) requirements. For this purpose, it's important to understand that lower performance could be due to lack or excess of competency than the job requires. Spencer & Spencer (1993) give an explanation: "people with more competence than a job requires will pay attention to the wrong aspects of the job. For example, a supervisory engineer possesses too high level in achievement orientation will spend his or her time solving interesting engineering problems instead of managing" (Spencer & Spencer, 1993b).

2.2.4.2Assessment and development

Competencies assessment plays a vital role in analyzing the work patterns of employees, and helps to make margining decisions on their appraisal, promotions and assignment to a development programme. Many studies support the idea that competencies can be taught: "even core motive competencies such as achievement orientation and traits such as self-confidence (i.e. "learned optimism", reduction in depressive explanatory style, and fear of failure) can be modified" (Spencer & Spencer, 1993b). Competency models can be used for the purpose of building new programmes of

professional development for competencies that cannot be possessed by new hires (job or company specific), can be developed by learning and training, can be distinguished by superior and average performers, and are critical for employees to have them.

2.2.4.3Improving employees' work performance

Boyatzis (1982) proposed causal relationships between competencies and job performance. By knowing the competencies of a person, specific actions can be predicted. He also distinguishes threshold competency as a competency that is essential to perform a job (i.e. knowledge, trait, skill, etc.), but not efficient in having a causal impact on superior performance. Spencer and Spencer (1993) distinguish competencies as having causal impacts on criterion-referenced effective and/or superior performance in a job (task) (Spencer & Spencer, 1993a). Superior performance means the top 10-14 percent of performers in a job, with known economic value added by performance deviation (from up to 48 percent of increased productivity in a non-sales job and up to 120 percent in a sales job), explicit approach to benchmark and development (Bassi, Russ-Eft, & American Society for Training and Development, 1997a). The competency approach may help to encourage innovation and the creativity of employees (Sicilia, García-Barriocanal, & Alcalde, 2005). Some competency models include innovation orientation and creative thinking-related dimensions and variables that could be assessed and developed (Spencer & Spencer, 1993a).

2.2.5 The role of competencies in enhancing the learning experience of student groups

The important role of universities in educating people in developing competencies as required by the business context (Hart, et. al., 1999) has drawn a lot of research attention. Those competencies include generic competencies such as interpersonal skills, leadership skills, teamwork and innovative skills (Quek, 2005). Some authors (Hart, et. al., 1999) have put effort into the research of the development of students' competencies during undergraduate and graduate studies. They are concerned with the development of industry standards guiding higher education, career advisors and students (Hart, et. al., 1999). The most suitable approach to develop students' competencies required by industry is to enhance the learning process by the well-designed group work assignments and projects (Livingstone & Lynch, 2002).

Group (team) learning concepts are applied by a 'double-loop learning' approach and they suggest experiential learning via group work activities, reflexive discussions of these activities, and participative learning based on a diverse background and previous experience of students (Livingstone & Lynch, 2002). Conflicts and difficulties which arise from team-based learning are as difficult as they are likely to be when encountered in real work situations (Livingstone & Lynch, 2002). As a result, this may require a wide range of students' skills, attitudes and other characteristics, which are similar to employees' competencies so as to achieve high performance and success.

Institutions of higher education emphasize the importance of students' professional competencies including critical thinking, problem solving, effective communication and teamwork (Hunter, 2009). Especially, this is important for engineering students who should be prepared to solve unstructured real world problems in teams (Hunter, 2009). Both cooperative and collaborative learning approaches identify the similarities of a student team with a work team such as (1) interdependence of goals, roles, resources and rewards, (2) collective intellectual activities, social conversation and reflective thinking, (3) emotional and cultural bonds among team members, and (4) guidance and assistance from tutors (Livingstone & Lynch, 2002, Hunter, 2009).

As a result, the student group context includes similar factors as a work team. Accordingly, the competency models may be applied to student groups so as to study the relationships between the competencies and the student performance, improving learning processes, and achieving learning outcomes as desired by industry.

2.3 Organizational Culture

2.3.1 Definition of Organizational Culture

Corporate culture is defined by Denison (1990) as a pattern of shared basic assumptions invented, discovered or developed by a given group as it learns to cope with its problems of external adaptation and internal integration that have worked well enough to be considered valid. As a result, new members can be taught the correct way to perceive, think and feel in relation to those problems. Culture (in Webster's New

Collegiate Dictionary) is defined as “the integrated pattern of human behaviour that includes thought, speech, action, and artifacts and depends on man’s capacity for learning and transmitting knowledge to succeeding generations” (Schein, 2010).

Beyer, Hannah and Milton (2000) explain cultural patterns as programmes that provide a template or blueprint for the organization of social and psychological processes, such as genetic systems providing a template for the organization of organic processes (Deal & Kennedy, 1982).

Beyer, Hannah, & Milton (2000) refer to culture as “the underlying values, beliefs, and principles that serve as a foundation for an organization’s management system as well as the set of management practices and behaviour that both exemplify and reinforce those basic principles”. Denison (1990) explains that culture allows an organization to survive, grow and adapt to the business environment and integrate all internal resources for good-functioning and self-reproduction. If employees of the organization share the view of what to look for and how to evaluate results, they are likely to make the right common decision.

Martin (1995) distinguished integration, differentiation and fragmentation perspectives through which culture should be considered in cultural studies (Denison, 1990). The integration perspective assumes that people in organizations have shared a set of values, norms and beliefs. It emphasizes harmony and homogeneity (Payne, 2000). The differentiation perspective is based on the different social and ethnic backgrounds of people who have different motives and goals. As a result, various communities, teams and units form their own subculture within a general organization’s culture. The fragmentation perspective is considered to be an extreme form of differentiation which takes into account the shifting identities and multiple interpretations of culture (Kilduff & Corley, 2000).

The term ‘organizational culture’ is used to cover a number of cultural and symbolic phenomena (Alvesson, 2011). Alvesson (2011) outlines that culture refers to shared orientation to social reality created through the negotiation of meaning and the use of symbolism in social interactions. This system of common symbols and meanings govern cognitive and affective aspects of membership in organizations, and the means whereby they are shaped and expressed (Alvesson, 2011). This perspective proposes that culture is a result of people’s interaction and communication. It is different from the approaches

focused on cultural values (Alvesson, 2011) and pay attention to the meanings that refer to the method of object interpretation and understanding and symbols which intensify the idea of meaning (Alveson, 2011).

2.3.2 Culture levels and elements

Culture is a complex concept. Different levels of culture are distinguished in order to increase the visibility and observability of the concept. The most visible levels of culture are artefacts, traditions, rituals and myths. Less visible levels of culture are values, beliefs and norms. Schemas and underlying assumptions are the least visible and difficult to observe and interpret for cultural level. Table 2.1 describes the characteristics of organizational culture elements.

Table 2.1 Characteristics of organization culture elements (Adapted from Denison, 1990; Stringe, 2002; Deal & Kennedy, 1982; Schein, 2010)

Level	Description
Artefacts	• physical features of organization shared by employees • verbal, behavioural, and physical characteristics • language, stories, myths
Traditions and rituals	• repetitive significant events • systematic and programmed routines
Values, beliefs and social axioms	• initial base for evaluating and judging situations, acts, objects, and people • reflect employees goals, ideals, ideologies and standards • manifest people's preferred means to solve problems
Norms	• socially created standards, • help to interpret and understand organizational events and actions, • significant to a group of people, • lead people interactions and objectives ordering.
Schemas	• shared cognitive frame, • guides the perceptions, thoughts, and language of a group, • translated to new members during the early socialization process,
Assumptions	• underlie beliefs that people hold about themselves and others, their relationships to other people, and the nature of the organization

Artefacts include visible and tangible structures and processes, and observed behaviour (Kilduff & Corley, 2000). Artefacts in organizational culture include the physical environment, language, technology and products, style (i.e. embodied in clothing, manners of address, emotional displays), myths and stories told about organizations, published lists of values, observable rituals, and ceremonies. Myths are the stories or legends about organizations, their leaders and heroes, core values, and history (Schein,

2010). Heroes are people that personify the culture's values who provide tangible role models for employees to follow (Stringer, 2002).

Traditions refer to repetitive significant events in an organization including such rituals as welcoming luncheons, promotion celebrations, special awards, retirement parties and others (Schein, 2010). Rituals (or rites) are systematic and programmed routines of day-to-day life in the company (Stringer, 2002). Schein emphasizes that rituals reflect important values and guide the principles shared by group members (Deal & Kennedy, 1982). Values are reflected in various definitions of organizational culture and have influence over a variety of employee behaviour (Denison, 1990). Values are considered to be the ways for employees to evaluate or assess certain traits, qualities, activities or behaviour to be good or bad, productive or wasteful (Michela & Burke, 2000). Values can be reflected in different organizational aspects such as logos, mottos, missions, policies or procedures (Stringer, 2002). Values are used to define "success" in concrete terms for employees and they help to establish standards of achievement within an organization (Stringer, 2002; Deal & Kennedy, 1982; Schein, 2010). If employees have the "right" values, which are congruent with a specific organization activity or quality (state), they will tend to behave in the "right" way (Deal & Kennedy, 1982).

Beliefs are frequently unstated, implicit understandings of how things around people work or behaviour patterns that are useful to get specific outcomes (Michela & Burke, 2000). For example, "innovation is the way to win" and "customer relations are our competitive advantage" (Stringer, 2002). Schein makes use of the term "shared meaning" to describe similar concepts and emphasizes that this is a result of people's interaction within a group (Stringer, 2002).

Social axioms are referred to be generalized beliefs about people, social groups, social institutions, the physical environment or the spiritual world as well as about events and phenomena in the social world (Leung & Bond, 2004). The generalized beliefs are encoded in the form of an assertion about the relationship between two entities or concepts (Leung & Bond, 2004). Social axioms are results of human socialization experience, context-free and the facilitation of the attainment of important goals (Leung & Bond, 2004). Differences between social axioms and values are manifested in their structure. Social

axioms have structure, i.e. “A is related to B” where A and B are any entities linked together by causal or correlation relationships. The structure of values has the form of “A is good/desirable/important” in which A describes a value or goal) (Leung & Bond, 2004). The importance of considering social axioms is based on high correlations between them and different psychological indicators as shown in Table 2.2. There are five individual-level axiom dimensions that have been identified.

Table 2.2 Correlated Social Axioms (Individual level) with Psychological Indicators at the Societal Levels (Adapted from Leung & Bond, 2004)

Variable	N	Social Axioms				
		Social Cynicism	Social Complexity	Rewards for Application	Religiosity	Fate Control
Life satisfaction	21	**-0.69***				
Job satisfaction	21					-0.55
Satisfaction toward company	21	-0.51				**-0.60***
Pace of life	19	**0.73***			-0.53	0.50
Extraversion	25					-0.52
Conscientiousness	25			0.49	**0.59***	
Work ethic - Enjoyment of working hard	22					-0.54
Achievement via conformity	22	**-0.62***				
Sources of guidance - Vertical (superiors)	32			**0.49***		
View on leadership - Team-oriented	28	-0.48				**-0.72***
In-group disagreement	18	0.50				
Other-referenced performance motive -compared with others' performance	22		**-0.60***	**0.68***	**0.67***	0.49

Norms are the informal (unwritten) rules about various sides of organizational life including dress code, work habits, work hours and interpersonal communication (Wong, 2007b; Schein, 2010). Michela uses the term *norm* in two ways which include (1) typical behaviour (i.e. what people do) and (2) shared understanding of this behaviour (i.e. what people are supposed to do), based on how people think that typical behaviour is correct (Stringer, 2002). As a result, a person converts “what others do” to “what I ought to do”. Norms can manifest values and explain corresponding behaviour. For example, the norm “cooperation” can imply values of “information sharing” (Michela & Burke, 2000). Chatman, Caldwell, O’Reilly and Doerr consider norms as shared expectations about

appropriate behaviour that emerges from an organization's values (Michela & Burke, 2000).

A schema is a mental framework or structure for identifying or understanding things, actors, events and situations (Schein, 2010). Other terms used to describe similar concepts are habits of thinking, mental models and/or linguistic paradigms (Michela & Burke, 2000; Hofstede & Hofstede, 2001; Senge et. al., 1994). The importance of schemas is their ability to bind cultural elements. Michela, Killman and Spencer emphasize the schematic nature of organizational changes and learning concepts (Schein, 2010). There are different means to form, share and change a person's schemas including graphical (i.e. organizational maps, flow charts, etc.), textual or audial (i.e. leader stories, etc.).

Underlying assumptions are unconscious, taken-for-granted beliefs and values which determine behaviour, perception, thought, and feeling. Basic underlying assumptions include theories-in-use; rules of what to pay attention to or how to react to situations, and what actions are required to be taken in these situations; macro culture assumptions; occupation assumptions.

2.3.3 Models and Frameworks for Culture Study

There are different methods to classify organizational culture. Because of the uniqueness of culture in an organization and the differences in research methodologies, it is difficult to compare cultures of different organizations. However, some researchers have developed models (typologies) of organizational cultures. Some of these models are discussed in this section.

Organizational culture typologies are simplified models used to describe cultural phenomena and make management decisions. There are pros and cons about their usefulness, reliability and validity. Drawbacks of developed typologies of organizational culture are indicated by some researchers. For example, culture types are too abstract to describe a particular organizational culture; some scores that are used for describing the culture dimension (type) do not measure a culture itself (Deal & Kennedy, 1982) but only a reliable measure of employee perceptions and beliefs, etc.

Table 2.3 Summary of different cultural dimensions

Author(-s)	Culture's dimensions
Denison (2011)	External-Internal focus: • Internal dynamics: involvement and consistency • External dynamics: adaptability and mission Flexibility – Stability focus: • Flexibility and change: involvement and adaptability • Stability: consistency and mission
Schein (2010)	External adaptation (Mission and Strategy, Goals, Means, Measurement, Correction) Internal Integration (Distributing power, authority, and status, Creating a common language and conceptual categories, Defining a group boundaries and criteria for inclusion and exclusion, Developing norms of trust, intimacy, friendship, and love, Defining and allocating of rewards and punishments, Explaining the unexplainable)
Cameron and Quinn (1999)	Internal Focus and Integration – External Focus and Differentiation Stability and Control – Flexibility and Discretion
O'Reilly, Chatman and Caldwell, Doerr (1991, 2012)	1991: Innovation, Stability, Respect for People, Outcome Orientation, Attention to Detail, Team Orientation, Aggressiveness 2012: Adaptability, Collaborative, Results-Oriented, Integrity, Customer-Oriented, Detail-Oriented, Transparency
Cooke (1988)	Constructive cultures (Achievement, Self-actualizing, Humanistic-encouraging, Affiliative) Passive/defensive cultures (Aggressive/defensive cultures, Oppositional, Power, Competitive, Perfectionistic)
Arnold and Capella (1985)	Strong – Weak Internal – External focus
Deal and Kennedy (1983)	High – Low speed of feedback High – Low degree-of-risk
Hofstede (1980)	Power distance, Uncertainty avoidance, Individualism, Masculinity

Researchers use typologies because of the high complexity and multidimensional nature of organizational cultural phenomena. It is impossible to ever include every relevant factor to diagnose and assess organizational culture (Schein, 2010). However, it is possible to build an appropriate framework based on an empirically validated set of factors of some dimensions. Table 2.3 shows a summary of different cultural dimensions used in the organizational culture models. It is interesting to note that similar dimensions are used in different approaches. The details of models and dimensions of the cultural models developed by Schein, Denison and Cameron and Quinn are considered in the following sections.

2.3.3.1 Shein's Model of Organizational Culture

The Shein approach assumes three dimensions of human activities (Cameron & Quinn, 1999) which include "doing", "being" and "being-in-becoming" orientation. Doing orientation proposes that people are pragmatic, oriented on control and manipulation of the surrounding environment, aim for perfection, and focus on their job, on efficiency, and on

discovery. Their driving mottos include “we can do it”, “getting things done”, “let’s do something about it”, “impossible just takes a little longer”, “doing the right things”, etc. (Schein, 2010). Organizations strive for growth and domination in the market.

Being orientation proposes that people are subservient to nature, cannot be influenced by or change it. As a result, people must accept and agree what they get. People focus on the here and now, enjoyment, and acceptance of whatever comes. Organizations strive for a way to survive, and try to adapt to the external business environment. Being-in-becoming orientation combines approaches of “doing” and “being” trying to achieve harmony by self-development so as to achieve perfect union with the environment.

Schein's model of organizational culture consists of external and internal vectors. Each vector contains dimensions that describe it (Schein, 2010). External adaptation includes mission and strategy, goals, means, measurement and correction dimensions. Mission and strategy deal with capturing a collective understanding of organizational mission and strategy. They provide reasons to be and answer questions such as “who are we” and “where are we going” (Schein, 2010). Goals dimension defines a consensus on goals and objectives within the organization. Means reflect agreement on the methods and tools to be used to achieve the goals such as the organizational structure, reward system, management practices (Schein, 2010) and assumptions about “how things should be done, how the mission is achieved, and how goals are met” (Schein, 2010). The measurement dimension defines an agreement on the success criteria and way to measure them (i.e. information and control system) (Schein, 2010). The correction dimension proposes an agreement in suitable corrective activities to be used if goals are not being met (Schein, 2010).

The internal integration vector includes a dimension that defines distribution, power, authority and status; creating a common language and conceptual categories; a group of boundaries and criteria for inclusion and exclusion; norms of trust, intimacy, friendship and love; defining and allocating rewards and punishments (i.e. heroic and sinful behaviour, consensus on “what is a reward and what is a punishment” (Schein, 2010); explain the unexplainable by sharing meaning of myth, stories, and important events in an organization to deal with “the unexplainable and uncontrollable” (Schein, 2010).

Stringer (Schein, 2010) underlines the depth of analysis, and systematic thoroughness of Shein's approach. However, Shein's model tends to separate culture levels and it is hard to find linkage between them. From his point of view, the importance of the "artefacts" level is diminished (Stringer, 2002). In reality, people deal with "artefacts" that manifest espoused values and basic underlying assumptions most of the time. As a result, a better understanding of visible "artefacts" leads to a better understanding of other "levels" of organizational culture (Denison, 2001).

2.3.3.2 Denison's Model of Organizational Culture

Daniel Denison proposed a model based on external-internal and flexibility-stability focuses of organizational culture as shown in Figure 2.4. Denison's model takes different perspectives into consideration which include involvement, adaptability, mission and consistency.

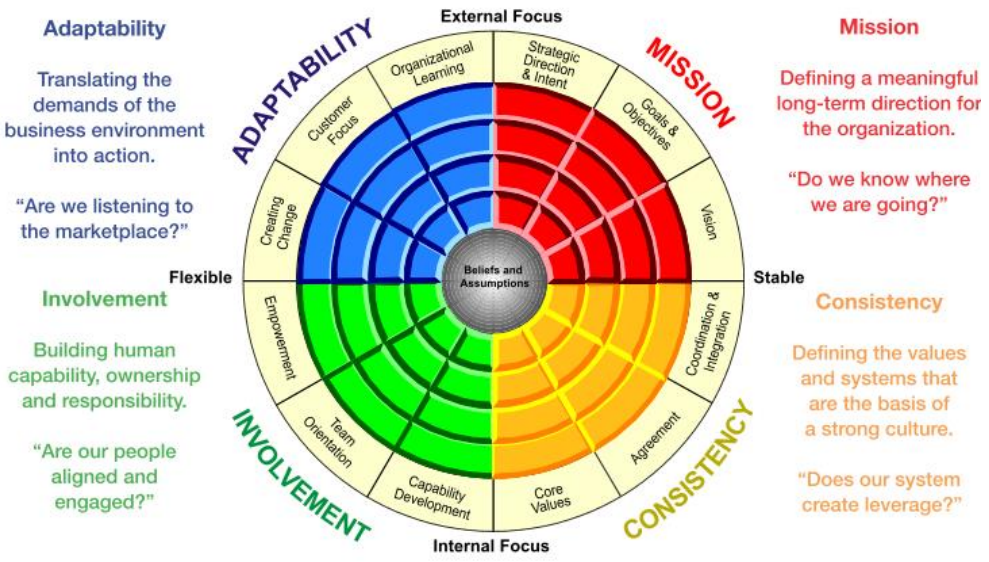

Figure 2.3 Denison's Model of Organizational Culture (Source: Denison, 2001)

(i) Involvement Perspective

Denison proposed the "involvement hypothesis" which is that employees' involvement and participation influence organizational effectiveness (Denison, Janovics, Young, & Cho, 2006). Involvement is proposed so that employees have a sense of ownership and personal responsibility for self-action outcomes and organization well-being, and they show self-management and a high level of commitment. It is supposed to

need lower levels of control and operational interventions. High-involvement organizations tend to be "clannish" and informal rather than bureaucratic and formal (Denison, 1990).

Many studies have shown that effective organizations empower and engage their people, build their organization around teams, and develop human capability at all levels (Denison, 1990). Involvement provides employees with commitment to their job and a sense of ownership. High involvement organizations don't need formal, explicit, bureaucratic control systems and can be managed in an informal way. Involvement measures include empowerment, team orientation and capability development dimensions. Empowerment proposes that employees have the authority, initiative and ability to manage their own work. Team orientation measures how much an organization relies on team effort to get work done. Capability development measures the organization's efforts in the development of employees' skills in order to maintain their competitiveness and meet the ongoing business needs (Denison et al., 2006).

(ii) Consistency Perspective

The consistency perspective proposes that employees understand and share organizational values, beliefs and rules, and incorporate them into daily activities and decision-making. As a result, consistency plays the role of an implicit control system that regulates people's behaviour.

The influence of shared beliefs and values on organizational effectiveness is emphasized in many studies. Shared values and beliefs create a common basis for communication and understanding about symbols and phenomena. High levels of agreement about these symbols and meaning enhance the communication process that improves formal and informal information flow (Denison et al., 2006). Consistency measures include three dimensions including core values shared by employees; agreement on critical organizational issues; and coordination and integration of work for different functions and units in an organization (Denison, 1990).

(iii) Adaptability Perspective

Adaptability implies the ability of an organization to change its state or behaviour in response to external or internal environmental stimuli. Shein (1985) said that culture "consists of the collective behavioral responses that have proven to be adaptive in the past"

(Denison et al., 2006). There are three dimensions of adaptability. Creating change measures the ability to respond to the external environment and future changes. Customer focus measures the ability to respond to customers' needs. Organizational learning dimension measures the ability to gain knowledge, and develop capabilities, processes, behaviour and structure of the organization, and encourage innovations (Denison, 1990).

(iv) Mission Perspective

Mission provides the purpose and meaning to what an organization does, its importance and clear direction to meet organizational goals. It helps people to state their own goals, roles and behaviour in the context of organizational goals (Denison et al., 2006). There are three dimensions of mission including strategic direction and intent, goals and objectives, and vision (i.e. shared view on future organizational state) (Denison et al., 2006).

Denison's model of organizational culture describes organizational culture in terms of how culture is realized, how culture affects employees' activities and assumptions, and what terminal assumptions and beliefs employees have. In general, it describes how strong the culture is.

2.3.3.3 Cameron and Quinn's Model of Organizational Culture

The Cameron and Quinn organizational cultural approach is based on a Competing Values Framework that is empirically derived and validated. It integrates many cultural dimensions. John Campbell (1974) and his colleagues created a list of organizational effectiveness indicators which were analyzed and used for statistical analysis. The indicators were organized in two clusters based on dimensions (Denison et al., 2006) including flexibility – stability (i.e. flexibility, discretion and dynamism vs. stability, order and control); internal – external (i.e. internal orientation, integration, unity vs. external orientation, differentiation and rivalry).

As shown in Figure 2.5, the derived sets of indicators form four quadrants that identify a specific culture type and depicts "what people value about an organization's performance" in terms of core values, what is appropriate, right or wrong (Cameron & Quinn, 1999, p.31). Cameron and Quinn found that "*effective way to coordinate*

organization activity is to make certain that all employees share the same values, beliefs, and goals" (Cameron & Quinn, 1999).

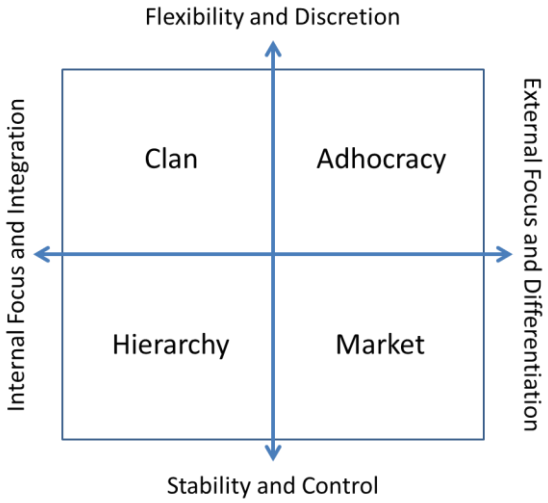

Figure 2.5 Competing Values Framework

Structured characteristic features of organizations with different culture types are summarized in Table 2.4. A hierarchical type of culture focuses on efficient, reliable and predictable output. It is characterized by a formalized and structured place to work, following formal rules, procedures, and policies that govern what people do, and long-term concerns on stability, predictability, and efficiency (Cameron & Quinn, 1999).

A market type of culture focuses on transactions with suppliers, customers, contractors, etc., to create competitive advantage in a results-oriented workplace. Leaders in organizations with a market type of culture are hard-driven by producers and competitors, focus on long-term period goals and competitive actions, and emphasize competition and winning (Cameron & Quinn, 1999).

A clan type of culture is characterized by shared values and goals, cohesion, teamwork, participation, consensus, employee involvement programmes and corporate commitment to employees. Organizations with a clan culture have a friendly place to work where people share a lot themselves like an extended family. Leaders are thought of as mentors who emphasize long-term individual development with high cohesion and morale, and internal climate and concern for people as a basis for success (Cameron & Quinn, 1999).

Table 2.4 Culture types characteristics (Adapted from Cameron & Quinn, 1999)

Characteristics	Culture type			
	Hierarchy	Market	Clan	Adhocracy
Leader type	Coordinator, organizer	Hard-driver, competitor, producer	Facilitator, mentor or parent	Innovator, entrepreneur or visionary
Effectiveness criteria	Efficiency, timeliness, smooth functioning	Market share, goal achievement, beating competitors	Cohesion, morale, development of human resource	Cutting-edge output, creativity, growth
Management Theory	Control fosters efficiency	Competition fosters productivity	Participation fosters commitment	Innovativeness fosters new resources
TQM (Quality strategies)	Error detection, measurement, press control, systematic problem solving, applying quality tools	Measuring customer preferences, improving productivity, creating partnerships, enhancing competitiveness, involving customers and suppliers	Empowerment, teambuilding, employee involvement, human resource development, open communication	Surprise and delight, create new standards, anticipate needs, continuous improvement, creative solution finding
Examples	McDonalds, Ford,	Philips Electronics, General Electric	People Express Airlines	Major start-ups

An adhocracy type of culture fosters adaptability, flexibility, and creativity where uncertainty, ambiguity, and/or information-overload are typical. It highly emphasizes individuality, risk taking, and anticipating the future exists, as almost everyone in an adhocracy becomes involved with production, clients and R&D. Organizations with an adhocracy culture have a dynamic, entrepreneurial, and creative workspace that strives to be at the leading edge of new knowledge, products and services (Cameron & Quinn, 1999). An adhocracy type of culture is more appropriate for small companies or start-ups. However, it may exist in larger organizations with a dominant culture of a different type as a subunit (Cameron & Quinn, 1999).

2.3.4 Culture Assessment methods

Schein (2000) follows a qualitative approach for culture measurement. Qualitative methods allow an organization to reconstruct its history, find out more information about the leaders and executives, analyze critical events in organizational development and use common experience and events to derive sets of shared assumptions. Rousseau (1990a) and Schein (1990) agree that the deepest levels of organizational culture can be measured

only by using qualitative methods including focused interviews and the involvement of employees in self-analysis (Ashkanasy, 2000).

Quantitative research of organizational culture is often criticized due to the higher abstraction of organizational culture (Chatman, & Caldwell, 1991a) and "monomethod bias in the field" based on "either/or" choices (Ashkanasy et al., 2000). Questionnaires are the most popular method for quantitative data gathering in organizational culture studies. Reichers & Schneider (2000) and Rousseau (1990a) claim that questionnaires are very important in organizational culture analysis. Based on the consideration that culture is something that an organization "has", they have adopted Schein's typology of organizational culture as a framework for a quantitative assessment approach (Ashkanasy et al., 2000). Moreover, Deal and Kennedy (1982) proposed that all levels of organizational culture are mutually dependent and unified. It infers that these levels should be congruent and reflect similar cultural characteristics (Ashkanasy et al., 2000).

Based on this framework, they proposed that the scope of quantitative measurement of organizational culture is limited to the first two levels of Schein's topology, i.e. patterns of behaviour, beliefs and values. These levels are more explicit, observable and measurable expressions of culture and appropriate for analysis using a structured and quantitative approach (Ashkanasy et al., 2000). Ashkanasy, Broadfoot and Falkus state that surveys represent an efficient and standardized means of tapping the shallower levels of Schein's typology (Ashkanasy et al., 2000). The other advantage of surveys is that they allow the retention of a record and the use data on respondents' perception of the organizational environment which influences people's behaviour and attitudes (Ashkanasy et al., 2000).

Moreover, the use of quantitative methods (Ashkanasy et al., 2000) not only gives a possibility for replication and comparative studies but also provides a basis for data understanding and interpretation, supports initiatives for culture change initiatives in organizations and easily interprets the results using statistical methods for data analysis.

In the present study in this thesis, a quantitative approach was used. The Organizational Culture Assessment Instruments (OCAI) from Cameron & Quinn (1999) was adapted as an instrument for the organizational culture assessment. This OCAI has been validated and provides a multi-dimensional description of the organizational culture.

OCAI measures six dimensions of organizational culture including dominant characteristics, organizational leadership, management of employees, organizational glue (bonding mechanism), strategic emphases and criteria of success (Cameron & Quinn, 1999).

2.3.5 The role of culture in individual and team performance

The purpose of studying organizational culture for many researchers is to prove the relationship between meaning and consequences of organizational culture influence on organizational performance. Interest in the relations between culture and high performance organizations emerged in the 1970s. Researchers from Harvard, Stanford, MIT and McKinsey started to explore the factors, directions, and impacts of culture on effective performance. In general, organizational culture has an impact on a person's "mental, emotional and attitudinal stated that precede effective employee performance" (Ashkanasy et al., 2000). Ott (1989) showed that the link between culture and effective performance is provided via (1) shared patterns that follow employees' interpretations and ways to behave, (2) from an emotional sense of involvement and commitment to organizational values to job commitment and involvement. Lodahl and Kejner define involvement as "the degree to which a person's work performance affects his self-esteem" (Cartwright, Cooper, & Earley, 2001), (3) learned responses and understanding for problems and actions, and (4) control systems (Sparrow, 2001).

Kotter and Heskett (1992) assumed that culture strength is the most predictive factor of organizational performance regardless of the culture type (Denison, 1990; Sparrow, 2001). In strong cultures, managers have shared values, leading to goal alignment, strong motivation and self-controlling behaviour (Payne, 2000). However, some researchers found that organizations characterized by a 'strong culture' are inclined to have larger adherence to procedures and behavioural homogeneity and become less effective in dynamic environments (Sparrow, 2001).

Denison (Chatman et al., 2012) proposed that organization effectiveness is a function of parameters which include values and beliefs of organization members, used policies and practices, consistent transformation of the core values and beliefs into policies and practices and interrelation (fit) between them on the one hand and business

environment on the other. This approach proposes that the relationship between parameters and functions are causal. Figure 2.6 shows a framework of causal relationships for studying organizational culture.

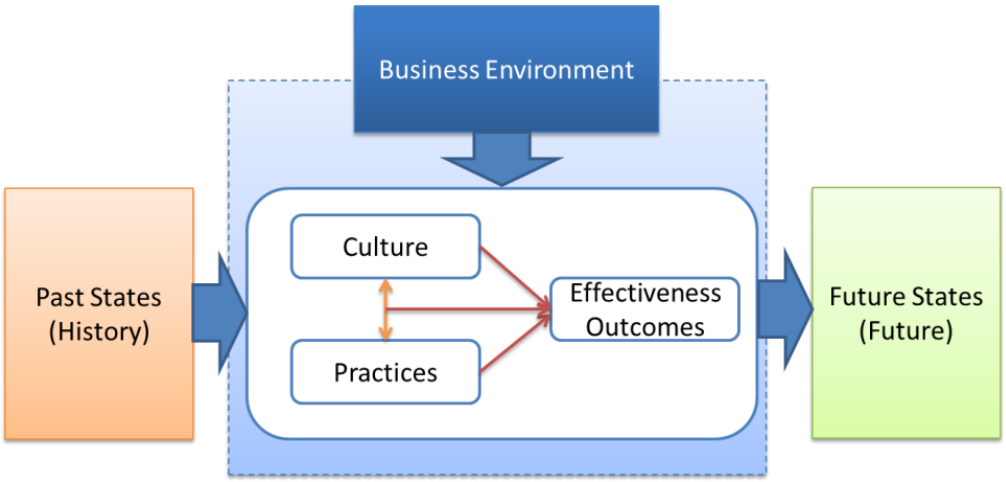

Figure 2.6 Framework for studying organizational culture (Source: Denison, 1990)

Employees' values represent the basis for understanding relations between organizational culture and performance. Sparrow said that values reflect collective interpretations and help a better understanding of the ways of perceiving, thinking and feeling (i.e. group understanding of appropriate problem solving), the norms, beliefs and justifying ideologies (i.e. the system-sanctioned behaviour), and the espoused management style and assumptions (i.e. the shared meanings) (Cameron & Quinn, 1999).

Matching of individual and corporate values is correlated significantly to job outcomes, such as individual productivity, job satisfaction and commitment (Sparrow, 2001). Sparrow (Denison, 1990) states that an employee's perception of organization functioning has an important impact on performance. Sparrow (2001) mentioned that there is a difference between domains that are predictive of performance and domains that are useful for facilitating understanding. He focuses on analyses of relations between performance and culture values, culture manifestations (in HR management policies and practices) and such phenomena as commitment, justice, and organizational support.

Chatman, Caldwell, O'Reilly and Doerr (Sparrow, 2001) indicate that the link between organizational culture and performance is not yet well understood and the previous research results fail to recognize the multidimensional nature of organizational

culture. Using Kotter and Heskett's (1992) data, Sørensen (2002) stated that a strong culture supports consistent financial performance in a stable business environment and becomes unreliable in dynamic environments (Chatman et al., 2012).

One of the latest research studies on the topic of culture-performance relationships was conducted by Chatman et al. (2012). They considered distinctive cultural dimensions such as cultural content, consensus and intensity. Based on their approach, they predicted and proved that neither intensity of the adaptability norm nor overall consensus about the culture separately predicted changes in net income, and operating cash flow. However, the joint influences of these factors were significantly related to net income, revenue and operating cash flow over a three-year period. They claimed that a strong culture can positively influence organizational performance and financial results in dynamic environments if it is characterized by a high consensus about a comprehensive set of norms and that intensely emphasizes a norm of adaptability (Chatman et al., 2012).

2.4 Organizational Climate

2.4.1 Definitions of Organizational Climate

The history of organizational climate studies started in the 1930s with Kurt Lewin's psychological climate research (Stringer, 2002; Schein, 2010). Lewin found that behaviour is a product of the interaction between an individual (person) and the context (environment) (Denison, 1990). Moreover, the climate functionally links person and environment (Denison, 1990). In 1968, Gorge Litwin and Robert Stringer in their report of Motivation and Organizational Climate discussed that the climate itself is proved more powerful than previously 'acquired' behaviour tendencies, and it was able to change the observed behaviour patterns of the group members (Stringer, 2002).

The term 'organizational climate' emerged in the 1960s in Tagiuri's essay "The Concept of Organizational Climate" which mentioned that a person's behaviour depends on his personal features and conditions in which he acts (Stringer, 2002). Many authors emphasize the link between organizational culture and organizational climate (Ashkanasy, and others 2000; Schneider, 1990; Tagiuri and Litwin, 1968, Dennison, 1990). Schein considers climate as the manifestation of culture and defines it as the feeling that is

conveyed in a group to be the physical layout and the way in which members of the organization interact with each other, with customers, or other outsiders (Michela & Burke, 2000).

Tagiuri and Litwin defined the organizational climate as a relatively enduring quality of the internal environment of an organization that (a) is experienced by its members, (b) influences their behaviour, and (c) can be described in terms of the values of a particular set of characteristics (or attitudes) of the organization (Denison, 1990). As a result, the organizational climate concept combines both objective and subjective characteristics of the work environment that can be perceived or experienced by employees. It is an objectively measurable expression of people's subjective perceptions of their work environment (Denison, 1990).

The concept of organizational climate assumes that people's feelings about their work have a powerful influence on how they work. Organizational climate determines the performance of an organization and it directly affects motivation (Stringer, 2002).

2.4.2 Organizational Climate dimensions and determinants

Organizational climate dimensions and determinants are shown in Figure 2.7. Climate dimensions are specific characteristics of organizations, business processes and work environments that directly interact with employees. Climate dimensions characterize organizational climate.

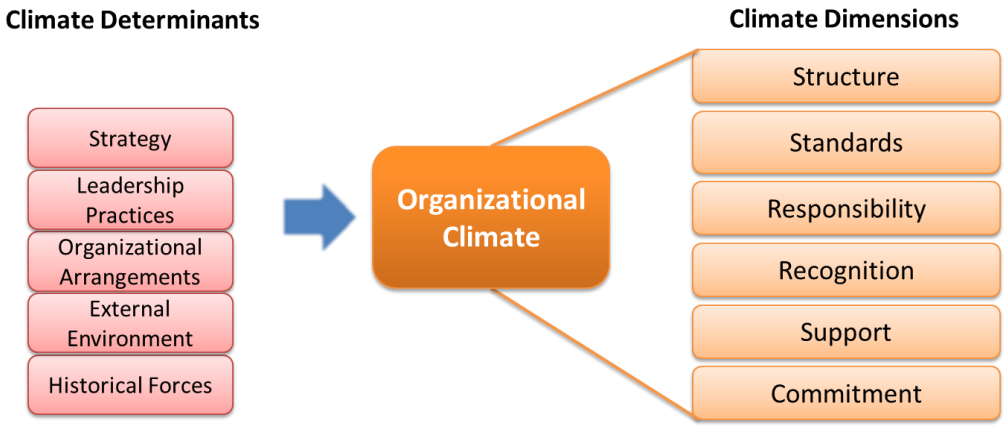

Figure 2.7 Organizational climate dimensions and determinants

(i) Structure Dimension

A high structure dimension defines the sense about the work process as being well organized with a clear definition of roles and responsibilities. A low structure means that employees are confused about who is responsible for what tasks and who makes the decisions. A sense of appropriate structure has an impact on people's aroused motivation and performance (Stringer, 2002).

(ii) Standards

Standards measure the feeling of pressure to improve performance and the degree of pride employees have in doing a good job (Stringer, 2002). High standards describe a climate where employees are always striving for a high level of performance and looking for ways to improve it (Stringer, 2002).

(iii) Responsibility

Responsibility characterizes employees' feelings by "being their own boss", taking responsibility for their job and the redundancy of double-checking their decisions with others. High responsibility means that employees are encouraged to solve problems on their own.

(iv) Recognition

Recognition reflects a sense of appropriate reward for a job. Recognition distinguishes reward, criticism or punishment. A good balance between reward and criticism provides high-recognition climates (Stringer, 2002).

(v) Support

Support indicates trust and mutual support within a team or work group. High support would make the employees feel that they are part of a team and they can get help and support from their peers and supervisor. Low support reflects feelings of being lonely and isolated. Stringer (2002) emphasizes the importance of this dimension in e-business models.

(vi) Commitment

Commitment indicates a feeling of pride in belonging to the organization and its goals. High commitment reflects a high level of personal loyalty. Low commitment is associated with indifference to the organization and its goals (Stringer, 2002).

Climate is determined by many factors. The most important of them are called determinants (Stringer, 2002) including leadership practices, strategy, organizational arrangements, external environment and historical forces.

(i)Leadership Practices

Leadership practices are the most important which describe the behaviour of the leaders in the organization. Managers influence their subordinates, control rewards and punishments, assign tasks and delegate authority, set rules and performance standards, and influence group norms and values. It is interesting to note that the quickest way to change the climate of an organization is to change the way the managers manage things (Stringer, 2002, p.12).

(ii) Organizational Arrangements

Organizational arrangements are formal characteristics of an organization's practices, policies and processes that define design tasks and jobs, the reward systems and workplaces. Organizational arrangements have important impacts on information flow in an organization (Stringer, 2002).

(iii) Strategy

Strategy can affect employees' feelings about opportunities, rewards, success and sources of satisfaction in an organization. The organizational climate reflects the strategic priorities and communicates them within and outside the organization.

(iv) External Environment

The external environment includes government regulations, the economic environment, competitors, market and technology trends, clients, etc. All these factors have an impact on an organization's strategy and processes, what managers and employees say and how they feel about the external environment (Stringer, 2002).

(v) Historical Forces

Historical forces are reflections of past events and their extrapolation to the present situation and future expectations. Historical forces include perceptions of how critical situations were overcome, ways to achieve success and get reward or promotion, and patterns of doing business and investing (Stringer, 2002).

2.4.3 Assessment Methods for Climates

There is also a qualitative approach for organizational climate assessment. As a result, Schneider proposed the experience-based description of organizational study about how employees experience their work organizations (Michela & Burke, 2000). This method is conducted in two stages. In the first stage, employees describe their experience and things around them, in such terms as cheap, adventurous, innovative, service oriented, and employee centred (Climate). Then employees describe their understanding of "why they think these things happen in their organization" in terms of stories, myths, attributions of management beliefs and values (Culture).

The most studied quantitative measurement tools related to organizational climate include The Organizational Climate Questionnaire (OCQ), Creativity Climate – The Situational Outlook Questionnaire (SOQ), Industrial Relations Climate Questionnaire (IRCQ), Safety Climate Questionnaire (SCQ), Service Climate Measure, Team Climate Inventory (TCI) and Business and Organizational Climate Index (Hersen, 2004).

For the purpose of this study, the climate questionnaire designed and validated by Stinger (2002) was used. A questionnaire was designed to collect data about how people feel about their jobs, how they are managed, and how things work in this organization. The questionnaire measured six dimensions of the organizational climate including structure, standards, responsibility, recognition, support and commitment.

2.4.4 Organizational Climate and Performance

The link between the climate and performance has been studied by many researchers. Johnson (1996) evaluated a correlation between employee perceptions of the service climate and customer satisfaction (Wiley & Brooks, 2000). He found that climate-for-service elements are significantly related to the aspects of customer satisfaction

including seeking and sharing information about customers, training in delivering quality service, as well as rewarding and recognizing excellent service. Schneider et al. (1998) found a causal link between climate for service and customer perceptions (Wiley & Brooks, 2000). Customer perceptions of service quality more frequently arise in organizations where management and leadership practices support listening to customers and creating conditions to meet customer needs and expectations (Wiley & Brooks, 2000).

Guion et al. (2006) argue that organization climate and job satisfaction are strongly correlated and actually measure the same construct (Schneider, 2011). However, Schneider (2011) objects to that strong correlation and he argued that there is no evidence of the identity of the constructs. He also stated that climate describes external characteristics of the context, while job satisfaction items are more evaluative and personal in their focus (Schneider, 2011). Climate items are appropriately more descriptive of the context and not of feelings about the context, the internal evaluation of experience or the ways in which the context treats an individual (Schneider, 2011).

It is important to separate descriptive items of climate from the evaluating items of job satisfaction in a survey. Climate items should be written in a less personal and affective tone, by using descriptive wording. The respondents' opinions should be asked for Job satisfaction items (Schneider, 2011). Another way to distinguish climate and satisfaction is to distinguish focus of the analysis to these concepts. The job satisfaction describes individual employee opinions about the job. The climate deals with group, unit or organization level. Schneider (2011) states that the importance of such climate strength measure is considered as a level of agreement within a group or unit. Strong climate helps to understand the behaviour of a unit member (Schneider, 2011). The latest studies showed evidence that when climate strength is weak, the relationship between climate and the associated outcomes is also weak. As a result, strength appears to have a moderating effect on the relationships of interest (Schneider, 2011, p.35). Burningham and West (1995) distinguished the following climate-related factors of group innovativeness: participative safety in giving ideas and suggestions in the innovation process as well as climate for excellence leading to innovation through seeking of new ideas and approaches (Wiley & Brooks, 2000). Along with the positive influence on innovation, some climate factors can resist and inhibit the innovation process. Lack of cooperation and the real value of

innovation and creativity are often mentioned as factors resisting innovation (Michela & Burke, 2000).

2.4.5 Organizational Culture and Organizational Climate

Both organizatinoal culture and organizational climate define ways in which individuals make sense of their organization and provide the context for organizational behaviour (Schneider, 2000). Schneider (2000) states two constructs that are linked conceptually and practically (Cartwright et al., 2001). Denison derives that both concepts of culture and climate focus on a wide range of organizational characteristics trying to explain employee behaviour and affecting organizational effectiveness (Svyantek & Bott, 2004).

On the other hand, these two concepts are very different. Stringer (Denison, 1990) emphasized that culture is more about unspoken assumptions, whereas climate is about more accessible and perceived organizational characteristics. He also stressed the direct impact of climate on performance through arousing motivation. Michela states that culture influences people's orientations to one another, to work and the environment (Stringer, 2002), while climate reflects feelings experienced through actions and interactions. Another point is the difficulty and time that are needed to make organizational changes. Organizational culture changes are extremely difficult and slow. An organization's culture is conservative by nature and conserve is what a culture does (Michela & Burke, 2000). It could take up to 10 to 15 years (Stringer, 2002). Organizational climate is more easily assessed and changed. Moreover, one way to change corporate culture is to focus on changing the organizational climate (Stringer, 2002). The third distinguishing point between culture and climate is the methodological one. In organizational culture, qualitative research methods prevail, while studying of organizational climate is based on quantitative research tools (Stringer, 2002; Schneider, 2000; Payne, 2000).

Based on the similarities and differences concepts of culture and climate, it can be concluded that it is crucial to consider both of them when studying organizational performance. Michela, Anderosn, King, Nystrom and other researchers have drawn similar conclusions. Moreover, specific configurations or patterns of culture and climate factors and their impact on the performance should be considered

(Schneider, 2000).

Schneider (Stringer, 2002) reveals the strength of the research and thinking about both concepts that can complement each other in complex organizational studies. He proposed an interesting relationship that climate causes culture, but the reverse is also true (Svyantek & Bott, 2004). Schein (2000) shows the importance of considering both concepts of culture and climate. It is interesting to note that climate can be changed only to the degree that the desired climate is congruent with underlying assumptions (Schein, 2000) including:

(i) a climate of teamwork and cooperation is impossible if the cultural assumptions force individuality and competitiveness,

(ii) a climate of participation and empowerment is impossible if the cultural assumptions support employees to do exactly what their boss tells them to do and expects them to do,

(iii) a climate of openness is impossible if there were incidents with punishment for those who brought "bad" news in past organizational history.

2.5 Manager Skills and Practices

Management practices such as leadership practices, strategy, organizational arrangements, and HRM policies and practices are specific activities which are rooted in organization culture and manifest it (its past states). They stem from and reinforce the dominant values and beliefs of the organization (Chatman et al., 2012). Denison (1990) with reference to Anthony Giddens (1979) proposed that management practices and concrete policies by themselves have value (matter) and exist only in conjunction with their meaning for individuals based on core values and beliefs.

Each manager possesses his/her own behaviour model and management philosophy based on assumptions, generalizations of previous experience and hypotheses made (Boyatzis, 1982). With the use of a behaviour model, the managerial skills, knowledge and personal characteristics are competencies that constitute the unique management style of a manager. Managers communicate values, norms and beliefs regarding organization, its mission and goals, clients, partners, and workers. This may or may not be consistent with

the “official” organizational culture. As a result, a manager’s communication affects how organizational culture and its strength are perceived and shared by employees.

Moreover, managers influence team climate. They may support, energize, inspire or push, punish and frustrate subordinates (Stringer, 2002). Their behaviour affects employees’ feelings about themselves, team members, managers and third parties. They create an emotional atmosphere, which affects employees in a team. The behaviour of a manager affects all aspects of employees’ work, perceptions and feelings about an organization, team and job itself. As a result, managers may directly or indirectly affect employees’ behaviour, and enable and support or disable some competencies of employees.

2.6 Summary of the Literature Review

In this chapter, a review of the relevant literature was conducted to study the different concepts related to performance of employees in work and project teams. This study was grounded on considering the individual competencies of the team members as the main predictor of the team performers. However, competencies are highly affected by workplace context factors, such as organizational culture, team climate and managers’ skills, etc. These concepts should be considered so as to build up the theoretical framework of a conceptual model of individual competencies and performance in a work (project) team which is described in Chapter Three.

CHAPTER 3 THEORETICAL FRAMEWORK FOR THE DEVELOPMENT OF CONTEXT-BASED COMPETENCY MODELS

This chapter presents the theoretical framework underlying the current thesis, based on the theoretical and empirical information reviewed in the preceding chapter. The framework integrates the core constructs of competencies, performance, and workplace context factors, and explains the relationships among them.

3.1 Research Paradigm and Assumptions

The research paradigm considers advanced assumptions about reality and its investigation and encompasses theories, methods, problems, solutions and criteria for establishing proof (Schein, 2010). There are two paradigms distinguishing research approaches and philosophy: the qualitative and the quantitative. The quantitative paradigm is rooted in the positivist and empiricist traditions of Mill et al. (Chatman et al., 2012) and aims to describe reality by measuring and analysing variables with numbers. The qualitative paradigm arises from the post-positivist and postmodern approaches, and attempts to describe reality using words, based on the detailed views of the individuals involved in the study.

The present work adopts the quantitative approach, as reflected in the following methodological assumptions. First, the study attempts to explain the processes and results of human interactions with the organizational context through the ontological perspective. The interactions in this study are defined as a set of job-related actions and their influences on people, objects, and situations which serve to achieve an organization’s goals. The organizational context here refers to a set of factors (internal and external) that influence these interactions. The assumption is that nature, and therefore the relationships among these factors, follows the rules of scientific determinism and can be revealed using the scientific method.

Through the epistemological perspective, the study considered the researcher to be independent and removed from the researched subject. As such, the study assumes no effect of the researcher on the object of study; the research is assumed to remain

"objective" by choosing a systematic sample for investigation (Oxford University Press, 2012; Gray 2004; Creswell, 1994). The axiological assumptions of the research tend to satisfy the quantitative paradigm. The researcher's values and biases are minimized via the data collection and analysis. Furthermore, this study uses formal, impersonal language, based on facts and arguments that are derived from the data (Gray, 2004).

The language of this study is based on pre-defined concepts, terms and variables. The relationships between variables are described in formal, impersonal language, using mathematical formulas and symbols (Gray, 2004). The research methodology is based on a quantitative perspective which proposes to test the hypotheses via correlation analyses. The theoretical contributions of the study are made via the generalizations of the results, which provide explanations of the relationships among factors and their influence on employee performance. Thus, the accuracy of the information presented and the results of the analyses are based on the validity and reliability of data collection (Creswell, 1994; Gray, 2004).

Despite the importance of qualitative methodology in research on social entities, it is not used in this study. A qualitative approach requires the intervention of the researcher into the research process during data collection and interpretation, which may bias the results of the study. This bias would be magnified in the case of the present study as the researcher and the participants speak different native languages. The researcher uses English as a second language and participants either use English as a second language or do not speak English at all. As a result, a quantitative approach minimizes the potential biasing effects of the language barrier on the research outcomes. The questionnaires were administered in both English and Chinese to minimize data losses and inconsistency. As such, the study limited itself to the use of the quantitative approach.

Additional reasons for choosing a quantitative paradigm include the nature of the relationships studied. Previous research was conducted mainly using the quantitative approach. Furthermore, the study aims require quantitative data. As a result, qualitative methods are inappropriate in this study.

3.2 Developing a Theoretical Framework for Context-Based Competency Models

Existing work on the constructs of employees performance, competencies, and workplace contexts have formed the theoretical foundation of the present research. This framework consists of constructs (factors) which are linked together based on existing theory and some previous research, as described below. The subsections below discuss each of these constructs in detail, as well as their interrelationships.

3.2.1 Employee Performance

Employee performance refers to the achievement of specific job outcomes through specific actions or behaviour (Boyatzis, 1982; Kerzner & Kerzner, 2006). Accordingly, employee behaviour must be consistent with the policies, procedures and conditions of the organizational environment (Boyatzis, 1982). Employee performance is affected by competencies (McClelland, 1973; Boyatzis, 1982; Spencer & Spencer, 1993, 1997a; Crowl et al., 2007; Marques, Zacarias, and Tribolet, 2010).

Although individual employee performance is an important factor in team performance (Boyatzis, 1982), a good understanding of the collaboration between employees on a team, as well as of the conditions of the organizational environment is also required to understand team performance (Schein, 2010). For the purpose of this study, the terms ‘performance’ and ‘effectiveness’ are used synonymously to define the quality of execution of actions, operations, or processes and the competence of a person or group in performing said actions.

3.2.2 Employee Competencies

Employee competencies are individual characteristics (including skills and knowledge) that are manifested in the behaviour of employees, and that are causally related to individual performance. These characteristics may include:

(i) the ability (or capability) to perform tasks according to desired outcomes as a result of appropriate qualifications or training, or as a result of the possession of required

skills, physical and mental capabilities, knowledge, understanding, behaviour, and attitudes (Crowl et al., 2007; Marques, Zacarias, & Tribolet, 2010);

(ii) personal traits (i.e., motivation, self-concept, attitudes, values or occupational preferences), declarative knowledge (i.e., content knowledge) and cognitive or behavioural procedural skills (Heneman & Ledford, 1998; Cooper, 2000; Sebt, Shahhosseini, & Rezaei, 2010);

(iii) behavioural patterns that employees adopt in a work situation to perform according to expectations (Woodruffe, 1993; Kurz & Bartram, 2002, 2008);

(iv) underlying characteristics such as motives, skills or knowledge, which result in effective and/or superior performance (Boyatzis, 1982; Spencer & Spencer, 1993; Spencer, 1997).

Employee competencies affect individual performance by leading to effective (or ineffective) behaviour in an employee in a given situation (Boyatzis, 1982; Spencer & Spencer, 1993; Spencer, 1997). The individual characteristics of an employee only manifest as competencies when activated and demonstrated via specific behaviours that benefit job performance (Heneman and Ledford, 1998; Cooper, 2000).

3.2.3 Workplace Context

To understand the manifestation of specific behaviours, it is important to consider the personal, contextual and behavioural factors that operate in a given situation (Schein, 2010). Employees in organizations are not isolated agents; rather, they interact with other employees, managers, the workplace, as well as with organizational rules and procedures. All elements of an organizational environment affect employee motivation, behaviour, and performance. These elements taken together are called “the organizational or workplace context”. As shown in Figure 3.1, a number of interactions between employees and the organizational context have been studied. The research suggests that “matching” (or fitting) employees to the specific context yields the best performance. For example, the concept of *person-environment (P-E)* fit is based on the interactionist theory’s proposition that employee behaviour is a function of themselves (the person) and the environment (Sekiguchi, 2004). Furthermore, the *Person-Organization (P-O)* fit relates to “the compatibility between a person and the organization, emphasizing the extent to which a person and the organization share similar characteristics and/or meet each other’s needs”

(Kristof, 1996; Sekiguchi, 2004). Many researchers (e.g., Boxx, 1991; Bretz & Judge 1994; Chatman, 1991; Downey, Hellriegel, & Slocum, 1975) studied the correlations between P-O matching and work attitudes, including job satisfaction and organizational commitments (Sekiguchi & Huber, 2011), and found significant correlations between them.

Figure 3.1 Person-context fit factors

Based on the research of Bray, Campbell, and Grant (1974) and of Jacobs and McClelland (1994), Spencer & Spencer (1993) showed that the self-control competency predicts superior performance in large bureaucratic organizations. In such organizations, individuals need to follow the rules. Those with low self-control end up more frequently quitting their jobs in large organizations, and looking for smaller organizations with more freedom to work in (Sekiguchi & Huber, 2011).

The *Person-Job (P-J)* fit is defined as "the match between the abilities of a person and the demands of a job or the desires of a person and the attributes of a job" (Edwards, 1991; Sekiguchi, 2004). Borman and Motwidlo (1993) argue "that task performance and contextual performance should be distinguished" from one another. Person-Job (P-J) fit should focus on factors associated with organizational effectiveness which are broader than the P-J fit (Bassi, Russ-Eft, & American Society for Training and Development, 1997b).

Many previous studies show that a better matching between job requirements and individual competencies results in better job performance and satisfaction (Locke, 1976;

Mowday, Porter, & Steers, 1982; Caldwell, 1991; Sekiguchi & Huber, 2011). Furthermore, Spencer and Spencer (1993) stated that organizational context factors (organization management, structure or cultural factors) can suppress the expression of competencies.

Workplace context factors refer to factors of the organizational environment which affect employee behaviours, feelings, and ways of thinking. Workplace context is made up of the combination of the conditions of the organizational environment and may vary over time, and depend on the type of job, the industry or even among the different departments of an organization. The most studied and influential factors in the workplace context are the organizational culture, organizational climate and manager behaviours. The following section describes these constructs in more depth.

3.2.4 Organizational Culture

Among these factors, the most commonly studied and influential is the organizational culture. Some argue that culture has an important influence on the competencies of employees (Janev et al., 2010). Others go further and consider competency to be a manifestation of organizational culture (Spencer & Spencer, 1993a).

Organizational culture is defined as a pattern of shared basic assumptions invented, discovered or developed by a given organization (Schein, 2010), and contains many patterns of human behaviour, including ways of thinking, speaking and acting (Deal & Kennedy, 1982). Organizational culture influences employee behaviour by influencing the mental, emotional and attitudinal state, ultimately affecting an employee's performance (Sparrow, 2001). Organizational culture further influences the shared patterns that shape employees' interpretations of their observations, as well as their ways of behaving and their control systems (Beyer, Hannah & Milton, 2000; Cartwright, Cooper & Earley, 2001).

3.2.5 Team Climate Factors

Organizational climate is defined as the feelings that are conveyed to a group by its physical layout and by the ways in which group members interact with one another, with customers and with outsiders (Schein, 2010). Organizational climate is a powerful

contextual factor that can change behavioural tendencies and the behavioural patterns of group members (Stringer, 2002).

Organizational climate is linked to motivation and affects an individual's feelings about their work (Stringer, 2002), as well as their concern and care for customers' conditions and group innovativeness and creativity (Wiley & Brooks, 2000; Michela & Burke, 2000). In this study, the concept of organizational climate was used at the team level. As a result, the term "team climate" is used throughout the thesis.

3.2.6 Manager Behaviours

Each manager possesses a behavioural model and management philosophy based on assumptions, hypotheses, and generalizations of previous experiences (Boyatzis, 1982). Managerial skills, knowledge and personal characteristics are competencies that constitute the unique management style of each manager. Managers communicate values, norms, and beliefs regarding the organization, its mission and goals, and its clients, partners, and workers. The manager's views may or may not be consistent with those of the official organizational culture. As a result, each one of a manager's communications affects how the organizational culture and its strength are perceived among its employees. Moreover, managers influence team climate by supporting, energizing, inspiring or pushing, punishing and frustrating subordinates. Their behaviour affects employees' feelings about themselves, their team members, their managers and third parties. Managers create an emotional atmosphere which affects employees in a team. The behaviour of a manager affects all aspects of an employee's work, perceptions and feelings about the organization, the team and the job itself. As a result, managers may directly or indirectly affect employees' behaviours, and encourage and support or discourage some of the competencies of employees.

3.3 Relationships among the Constructs in the Theoretical Framework

This section discusses the hypothesized effects of workplace contextual factors on employees' competencies and performance. The hypothesized relationships describe the interconnections proposed among the theoretical constructs in the framework. Based on

the discussion in Chapter 2, workplace contextual factors (including organizational culture, team climate and manager skills) are generally expected to influence employees' competencies and performance (Boyatzis, 1982; Denison, 1990; Spencer & Spencer, 1993).

These relationships are of crucial importance in the present study. The relationships between contextual factors and employees' individual competencies and performance are illustrated in Figure 3.2.

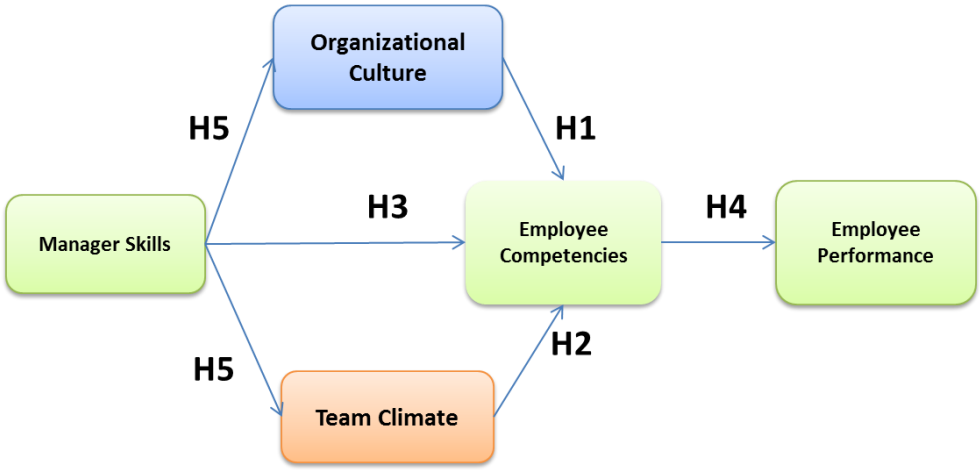

Figure 3.2 Conceptual Model of the Context-Based Competency Model

Organizational culture integrates patterns of human behaviour, including ways of thinking, speaking, and acting (Deal & Kennedy, 1982). Organizational culture influences employee behaviour by impacting the mental, emotional and attitudinal states that affect not only performance (Sparrow, 2001), but also the shared patterns that shape employee interpretations of observations as well as their behaviour and their control systems (Beyer, Hannah and Milton, 2000; Cartwright, Cooper and Earley, 2001). The first hypothesis derived from the theoretical framework is as follows:

Hypothesis H1. Organizational culture has a strong effect on employee competencies.

Moreover, team climate may change previously acquired behaviour tendencies and observed behaviour patterns among group members (Stringer, 2002). Team climate is linked to motivation and affects an individual's feelings about their work (Stringer, 2002), as well as their concern and care for customers and conditions of group innovativeness and

creativity (Wiley & Brooks, 2000; Michela & Burke, 2000). As a result, the second general hypothesis of this study is:

Hypothesis H2. Team climate has a strong effect on employee competencies.

Furthermore, the behaviour of a manager affects all aspects of an employee's work, perceptions and feelings about the organization (Stringer, 2002), the team, and the job itself. As a result, managers may directly or indirectly affect employee behaviour, by enabling and supporting competencies or by suppressing them competencies. The third general hypothesis that this study aims to test is given as follows:

Hypothesis H3. Manager behaviour has a strong effect on employee competencies.

Also, it is clear that competencies distinguish superior performance from average performance or effective from ineffective performance (Spencer, 1997). Superior performance refers to the top 10-14% of job performers. There is a known economic value added by superior performance, from up to 48% increased productivity in a non-sales job and up to 120% in a sales job, and an explicit approach to benchmarking and developing (Bassi, Russ-Eft, & American Society for Training and Development, 1997a). As a result, the fourth general hypothesis of this study is as follows:

Hypothesis H4. Employees with higher scores on key competencies have more effective performance.

Finally, the research framework and literature propose that manager communications affect how the organizational culture and its strength are perceived and shared by employees. Moreover, managers affect team climate and all aspects of an employee's work, perceptions and feelings about the organization, the team and the job itself. As the result, the fifth general hypothesis is given as follows:

Hypothesis H5. Manager behaviour has a strong effect on organizational culture and team climate.

3.4 The Proposed Context-based Competency Model for Employees in a Work Team

3.4.1 Dependent variables

The model's dependent variables include employee performance and employee competencies. Employee performance refers to a level of achievement of specific job outcomes through specific actions or behaviours related to the execution of a job or task. Employee competencies are individual characteristics (including skills and knowledge) manifested in the behaviour of employees that are causally linked to individual performance. Employee can be categorised into seven competencies as described in Table 3.1. First of all, the competencies of achievement orientation (ACH), concern for order and quality (CO), information seeking (INFO) and initiative (INT) derive from an achievement orientation cluster identified by Spencer & Spencer (1993). The innovation orientation (INNOV) competency used in this study is based on a combination of behavioural indicators related to innovation orientation from a generic competency model developed by Spencer & Spencer (1993) as well as the competency model developed by Microsoft (2013). Second, teamwork (TW) and team leadership (TL) are critical and important competencies for teamwork.

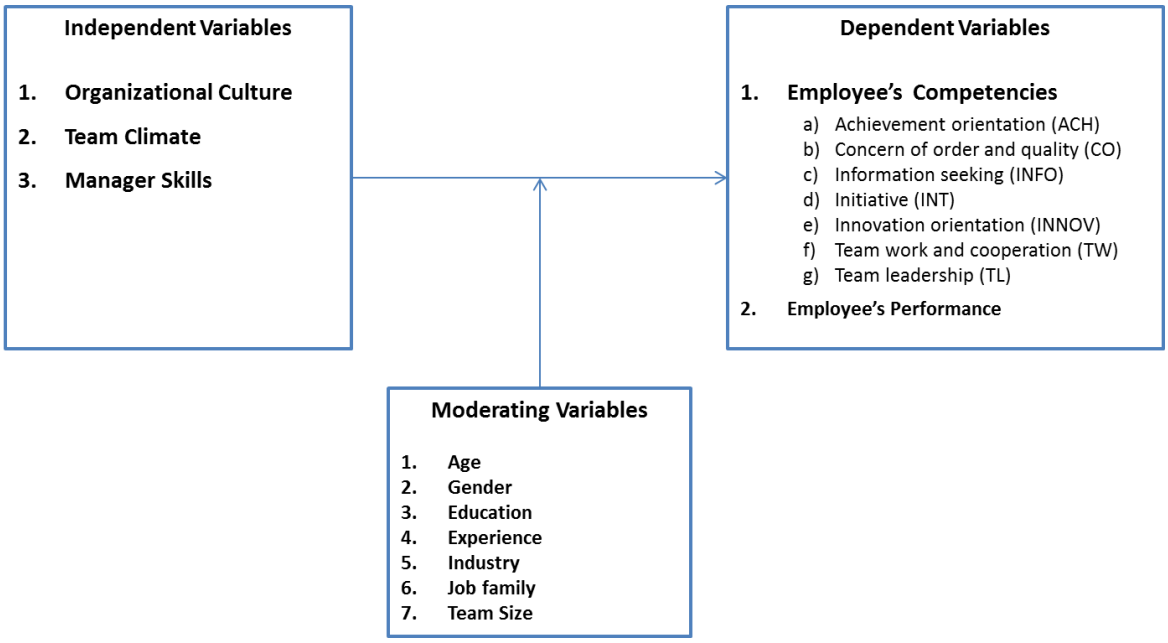

Figure 3.3 Context-based competency model for employees in a work team

As a result, the model includes two sub-groups of competencies: those related to performance achievement and those related to teamwork.The proposed context-based competency model for employees in a work team (i.e., Model 1) was derived from the theoretical framework presented above. It consists of the dependent, independent and moderating variables shown in Figure 3.3.

Table 3.1 Dependent variables in the context-based competency model for work teams

Variable name	Description
Achievement orientation	A value for doing good work or competing against a standard of excellence
Concern for order and quality	An underlying drive to reduce uncertainty in the surrounding environment
Information seeking	A desire to know more about things, people or issues; the willingness to make an effort to obtain more information
Initiative	A preference for taking action; doing more than is required or expected in the job, doing things that no one has requested
Innovation orientation	Initiating, supporting, sponsoring, and implementing changes and innovations; helping others innovate successfully
Team work and cooperation	The sincere intention to work cooperatively with others, to be a part of a team, to work together
Team leadership	The intention to take on the role of leader in a team or group; a desire to lead others
Employee Performance	An indicator of the effectiveness of employees' job-related behaviours

3.4.2 Independent variables

The independent variables of the model include organizational culture, team climate and manager skills. Organizational culture is a pattern of shared basic assumptions and behaviours which are invented, discovered or developed by a team, and which include ways of thinking, speaking, and acting. Organizational culture consists of four different types of culture which act as separate variables within the model, and are described in Table 3.2.

Team climate is defined as the feeling conveyed to a team by its physical space and by the way team members interact with each other, with customers or with outsiders. The team climate consists of six dimensions which are characteristic of organizations that directly interact with employees. Team climate dimensions are used as independent variables in the model, and are described in Table 3.3

Table 3.2 Organizational culture variables in the context-based competency model for work teams. Adapted from Cameron & Quinn (1999)

Variable name	Description
Hierarchy	The degree to which organizational culture is characterized by formality and structure or the need to follow formal rules, procedures and policies; long-term concerns about stability, predictability and efficiency; a focus on efficient, reliable and predictable output.
Market	The degree to which organizational culture is characterized by leaders who are hard-driven by producers and competitors, stretch goals and targets; emphasis on competition and winning; focus on creating competitive advantage; results-oriented.
Clan	The degree to which organizational culture is characterized by shared values and goals, and values cohesion, teamwork, participation, consensus, employee involvement programmes and corporate commitment to employees; the organization is a friendly place to work where people share a lot of themselves as in an extended family.
Adhocracy	The degree to which organizational culture is characterized by an emphasis on individuality, risk-taking, and anticipating the future; almost everyone in an adhocracy becomes involved with production, clients, and R&D; the organization is dynamic, entrepreneurial, and creative, and strives to be at the leading edge of new knowledge, products and services.

Table 3.3 Team climate-related variables in the context-based competency model for work teams. Adapted from Stringer (2002)

Variable name	Description
Structure	The feeling conveyed as to the work process organization. High structure dimension means that the work processes feel well-organized, with clear definition of roles and responsibilities; low structure means that employees are confused about who is responsible for what and who makes decisions.
Standards	The feeling of pressure to improve performance and the pride employees take in their own work. High standards describe a climate where employees always strive for a high-level of performance and look for ways to improve.
Responsibility	The feeling of responsibility for a job. High responsibility means that employees are encouraged to solve problems on their own.
Recognition	The feeling that the reward for a job is appropriate, and that reward, criticism and punishment are well-applied. A balance between reward and criticism is the hallmark of a high-recognition climate.
Support	The feeling of trust and mutual support within a team. High support describes employees who feel that they are part of a team and can get support from their peers and supervisors when needed; low support reflects feelings of loneliness and isolation.
Commitment	Measures the feelings of pride in belonging to an organization and adherence to its goals. High commitment reflects a high level of personal loyalty; low commitment is associated with indifference to the organization and to its goals.

Manager behaviour is defined as the manager's behavioural model and management philosophy based on their assumptions and hypotheses about a situation, as well as their previous experience. Manager behaviours are described by the twelve variables described in Table 3.4.

3.4.3 Moderating variables

The moderating variables in this model include age, gender, education, experience, industry, job family and team size. These variables may affect the relationships between the independent and dependent variables, and should be controlled for during the study.

Table 3.4 Manager behaviours in the context-based competency model for work teams. Adapted from Cameron & Quinn (1999)

Variable name	Description
Managing Innovation (ADH)	The ability to encourage employees to generate new ideas and solutions; support employees by gaining necessary resources and implementing their ideas; create vision and an environment supporting experimentation and creativity.
Managing the Future (ADH)	The ability to create a clear vision of the future and of its possibilities, to explain the role of each team member in this future and build emotional commitment.
Managing Continuous Improvement (ADH)	The ability to encourage employees to improve processes, products, and procedures in an organization to facilitate personal commitment; to support continuous improvements.
Managing Competitiveness (MAR)	The ability to encourage employees to provide services and/or products that surprise and delight customers and achieve world-class competitive performance; to monitor and communicate standards of excellence; and a sense of competitiveness.
Energizing Employees (MAR)	The ability to motivate and energize others, to establish ambitious goals and to insist on intense hard work to achieve high performance; to create a climate where individuals in a unit want to perform better than the competition.
Managing Customer Service (MAR)	The ability to sustain frequent personal contact with customers to assess their needs and expectations; to improve the practice of service provision by involving customers in the unit's operation.
Managing Coordination (HIER)	The ability to coordinate job related communication between employees and with other units in an organization; to maintain a system for information gathering; to simplify sharing across functional boundaries; to communicate with other units.
Managing the Control System (HIER)	The ability to establish and use a control system that consistently monitors both work processes and outcomes; to keep a close track of quality, service, cost and the unit’s performance to analyze decisions.
Managing Acculturation (HIER)	The ability to help employees become socialized and integrated into the culture of the organization; to make certain that all employees are clear on policies, values, and objectives; to clarify expectations from employees on important organizational issues.
Managing the Development of others (CLAN)	The ability to discover and create opportunities for personal and professional growth among employees; to facilitate peer-to-peer learning; to coach subordinates for advancement.
Managing Interpersonal Relationships (CLAN)	The ability to communicate in a supportive way; to foster trust and openness; to listen openly and to provide regular feedback; to foster employee self-improvement.
Managing Teams (CLAN)	The ability to build cohesive, committed teams to facilitate effective information sharing, problem solving and collaboration.

3.4.4 A context-based competency model for employees in a work team

The hypothesized relationships in a context-based competency model for employees in a work and project team extend the hypotheses presented in Section 3.3 (first-level hypotheses). The hypotheses proposed below describe the relationships expected between specific dimensions (variables) of the theoretical constructs (second-level hypotheses).

The specific hypotheses were coded by first-level hypothesis and the competency in question. They were further indexed by number. For example, the code "*H1. ACH-1"* refers to general hypothesis H1 and the achievement orientation (ACH) competency. The index "1" refers to this being the first hypothesis for the ACH competency under the H1 general hypothesis. The different specific hypotheses are presented below.

3.4.4.1 Hypothesized relationships between organizational culture and employee competencies

The first-level hypothesis H1 stated: "The organizational culture has a strong effect on employee competencies". According to Cameron and Quinn (1999), the market type organizational culture: (1) supports a result-oriented workplace; (2) has leaders who are hard-driving producers and competitors; (3) is concerned with competitive actions and achieving stretch goals and targets in the long term. The ACH competency emphasizes the values of winning, action orientation, being demanding, receiving high pay for good performance, being results- and achievement-oriented, and high performance expectations (Chatman, Caldwell, & Doerr, 2012). The hypothesized relationships are as follows:

H1. ACH-1: The market type organizational culture is positively related to individual scores of ACH

Concern for order and quality (CO) is highly important in large organizations with a dominant hierarchical culture with formalized and structured workplaces, and well-defined formal procedures, rules and policies (Cameron & Quinn, 1999). However, this competency is important even for small organizations. To support CO, organizational culture may cultivate specific sets of values emphasizing quality, being highly organized and analytical, paying attention to detail, being careful, precise, and predictable, and being demanding and rules-oriented. The hypothesized relationships are given as follows:

H1.CO-1: The hierarchy type organizational culture is positively related to individual scores of CO

The information seeking (INFO) competency is an important factor in a knowledge management culture and is more likely in market and adhocracy type organizations. The nature and values of these types of cultures engage people to seek information about markets, technologies, competitors and customers and likely emphasize the importance of being analytical, paying attention to detail, being careful and precise, listening to customers, and being predictable. The hypothesized relationships are given as follows:

H1.INFO-1: The market type organizational culture is positively related to individual scores of INFO

H1.INFO-2: The adhocracy type organizational culture is positively related to individual scores of INFO

The initiative (INT) competency is very unlikely to be supported in hierarchy type cultures since many rules and restrictions exist in these types of cultures. However, INT is an important factor for success in market and adhocracy type organizations as it not only drives organizations to gain a competitive advantage, but also helps develop new products and technologies. Action orientation, being fast-moving, taking advantage of opportunities, taking risks and initiative all support the INT competency. The hypothesized relationships are given as follows:

H1.INT-1: The hierarchy type organizational culture is negatively related to individual scores of INT

H1.INT-2: The market type organizational culture is positively related to individual scores of INT

H1.INT-3: The adhocracy type organizational culture is positively related to individual scores of INT

The innovation orientation (INNOV) competency is important for organizations with market and adhocracy culture types. The nature and values of these types of cultures engage people to make changes and improvements to achieve success. Values that may support INNOV include a willingness to experiment, being innovative and quick to take advantage of opportunities, taking risks, having security of employment, and being highly organized. The hypothesized relationships are as follows:

H1. INNOV-1: The market type organizational culture is positively related to individual scores of INNOV

H1. INNOV-2: The adhocracy type organizational culture is positively related to individual scores of INNOV

The team work and cooperation (TW) competency is important for many organizations. However, the clan culture type describes better conditions for supporting teamwork and cooperation. It proposes shared values (i.e., working in collaboration and cooperation with others, having integrity, being team oriented, respecting others, and sharing information freely) and goals, as well as cohesion. The hypothesized relationships are as follows:

H1.TW-1: The clan type organizational culture is positively related to individual scores of TW

Team leadership (TL) is an important competency for any culture type. However, it has different styles and thus its style should be consistent with the culture of the organization. Nevertheless, leadership, customer orientation, autonomy, and supportive and team oriented values are important to support this competency. As a result, the TL is most appropriate for organizations with market and adhocracy cultures. The hypothesized relationships are given as follows:

H1.TL-1 The market type organizational culture is positively related to individual scores of TL

H1.TL-2 The adhocracy type organizational culture is positively related to individual scores of TL

3.4.4.2 Hypothesized relationships between team climate and employee competencies

The first-level hypothesis H2 is: “The team climate has a strong effect on employee competencies”. ACH requires a supportive team climate in that it may require: (i) well organized work processes with a clear definition of roles and responsibilities (i.e., structure), (ii) clearly defined high standards of performance (i.e., standards), (iii) feelings of responsibility among employees for their jobs (i.e., responsibility), and (iv) appropriate

reward and recognition (i.e., recognition). The hypothesized relationships are given as follows:

H2.ACH-1: The structure dimension of team climate is positively related to individual scores of ACH

H2.ACH-2: The standards dimension of team climate is positively related to individual scores of ACH

H2.ACH-3: The responsibility dimension of team climate is positively related to individual scores of ACH

H2.ACH-4: The recognition dimension of team climate is positively related to individual scores of ACH

From a team climate perspective, employees should feel that the workplace is well organized with a clear definition of roles and responsibilities, and with recognition and commitment of others to such behaviour. The hypothesized relationships are given as follows:

H2.CO-1: The structure dimension of team climate is positively related to individual scores of CO

H2.CO-2: The recognition dimension of team climate is positively related to individual scores of CO

H2.CO-3: The commitment dimension of team climate is positively related to individual scores of CO

Team climate characteristics that may support the INFO competency include responsibility, support, and commitment. The hypothesized relationships are given as follows:

H2.INFO-1: The responsibility dimension of team climate is positively related to individual scores of INFO

H2.INFO-2: The support dimension of team climate is positively related to individual scores of INFO

H2.IFNO-3: The commitment dimension of team climate is positively related to individual scores of INFO

Team climate characteristics that may support the INT competency include the feelings of support for risk taking and action orientation from managers and team members,

as well as a commitment to achieving company goals. The hypothesized relationships are given as follows:

H2.INT-1: The support dimension of team climate is positively related to individual scores of INT

H2.INT-2: The commitment dimension of team climate is positively related to individual scores of INT

Team climate characteristics that may support INNOV include feeling supported for taking risks and an action orientation among managers and team members. Feeling that others are also committed to taking risks to further the company goals may also support INNOV, as would the recognition of the importance of innovative behaviour via appropriate rewards. The hypothesized relationships are given as follows:

H2.INNOV-1: The support dimension of team climate is positively related to individual scores of INNOV

H2. INNOV-2: The recognition dimension of team climate is positively related to individual scores of INNOV

H2. INNOV-3: The commitment dimension of team climate is positively related to individual scores of INNOV

High levels of support build feelings of trust and mutual support within a group (Stringer, 2002). As such, a team climate that supports feelings of responsibility among the team members is likely to have a positive effect on TW. The hypothesized relationships are given as follows:

H2.TW-1: The responsibility dimension of team climate is positively related to individual scores of TW

H2. TW-2: The support dimension of team climate is positively related to individual scores of TW

H2. TW-3: The commitment dimension of team climate is positively related to individual scores of TW

Team climate characteristics that may support the TL competency include the feelings of responsibility and commitment to organizational goals. The recognition of efforts and successes, high standards and clear organizational structure may also support TL. The hypothesized relationships are given as follows:

H2.TL-1: The responsibility dimension of team climate is positively related to individual scores of TL

H2. TL-2: The recognition dimension of team climate is positively related to individual scores of TL

H2. TL-3: The commitment dimension of team climate is positively related to individual scores of TL

H2. TL-4: The standards dimension of team climate is positively related to individual scores of TL

H2. TL-5: The structure dimension of team climate is positively related to individual scores of TL

3.4.4.3 Hypothesized relationships between manager behaviours and employee competencies

The first-level hypothesis H3 states that: "Manager behaviour has a strong effect on employee competencies". Manager behaviour and management style have direct influences on employees, as reviewed above. However, more information is needed on the effect of different management practices on employee competencies. Managers may adopt behaviours that elicit the ACH competency by: (i) establishing clear and specific performance goals, (ii) clarifying who is responsible for what within the team, (iii) providing clear and thorough explanation of tasks and ensure that subordinates understand what is required of them, (iv) maintaining a positive and personal commitment to achieving goals, (v) providing feedback to subordinates on their job performance (Stringer, 2002). As a result, manager practices that support employees in the ACH competency include Managing Competitiveness (MAR), Energizing Employees (MAR), Managing Customer Service (MAR) and Managing Continues Improvement (ADH). The hypothesized relationships are given as follows:

H3.ACH-1: Managing Competitiveness (MAR) is positively related to individual scores of ACH

H3.ACH-2: Energizing Employees (MAR) is positively related to individual scores of ACH

H3.ACH-3: Managing Customer Service (MAR) is positively related to individual scores of ACH

H3.ACH-4: Managing Continues Improvement (ADH) is positively related to individual scores of ACH

To support the CO competency, a manager may (i) formulate a standard set of procedures and policies that help team members get work done, (ii) make certain that all team members know why they are working on a task, how it benefits the team and the company, and the customers as well, (iii) help employees build a work map of their roles and responsibilities, and (iv) demonstrate their own CO competency by using "to do" lists, prioritizing tasks and team management, and aligning own work and team work with the organizational mission, vision and strategy. The hypothesized relationships are given as follows:

H3.CO-1: Managing Coordination (HIER) is positively related to individual scores of CO

H3.CO-2: Managing the Control System (HIER) is positively related to individual scores of CO

H3.CO-3: Managing Acculturation (HIER) is positively related to individual scores of CO

To support the INFO competency, a manager may (i) keep track of the best competitors' performance, analyze market and technology trends, and benchmark solutions, (ii) strive to provide world-class quality products and services, and engage employees to contribute their best efforts towards this goal (iii) frequently communicate vision of the future, and (4) invite people to challenge that vision and traditional approaches, and to brainstorm solutions. The hypothesized relationships are given as follows:

H3.INFO-1: Managing the Future (ADH) is positively related to individual scores of INFO

H3.INFO-2: Managing Continues Improvement (ADH) is positively related to individual scores of INFO

H3.INFO-3: Managing Competitiveness (MAR) is positively related to individual scores of INFO

H3.INFO-4: Managing Innovation (ADH) is positively related to individual scores of INFO

To support the INT competency, a manager may (i) make note of which employees are proactive and take initiative to solve problems, and recognize and thank employees for taking responsible risks, (ii) measure improvement, not just task accomplishment, and (iii) continually improve a key feature of the culture in their unit. The hypothesized relationships are given as follows:

H3.INT-1: Managing the Control System (HIER) is negatively related to individual scores of INT

H3.INT-2: Managing Continues Improvement (ADH) is positively related to individual scores of INT

H3.INT-3: Managing Innovation (ADH) is positively related to individual scores of INT

H3.INT-4: Managing the Development of others (CLAN) is positively related to individual scores of INT

To support the INNOV competency, a manager may (i) ask employees to generating innovative ideas as part of their job description, (ii) support brainstorming and idea-sharing, (iii) reward innovative idea generation and implementation, (iv) encourage action learning, (v) pilot and experiment with new ideas in uncertain environments, and (vi) celebrate even small wins. The hypothesized relationships are given as follows:

H3. INNOV-1: Managing Innovation (ADH) is positively related to individual scores of INNOV

H3. INNOV-2: Managing the Future (ADH) is positively related to individual scores of INNOV

H3. INNOV-3: Managing Continues Improvement (ADH) is positively related to individual scores of INNOV

To support the TW competency, a manager may (i) establish clear roles, goals and missions for the team, (ii) maintain a free flow of communication, (iii) stand up for their team and praise them publicly, (iv) communicate caring about team members and their interests, (v) allocate time for team building events, and (vi) be supportive and helpful to team members. The hypothesized relationships are given as follows:

H3.TW-1: Managing Coordination (HIER) is positively related to individual scores of TW

H3.TW-2: Managing Acculturation (HIER) is positively related to individual scores of TW

H3.TW-3: Managing Teams (CLAN) is positively related to individual scores of TW

H3.TW-4: Managing Interpersonal Relationships (CLAN) is positively related to individual scores of TW

H3.TW-5: Managing the Development of others (CLAN) is positively related to individual scores of TW

To support the TL competency, a manager may (i) support taking risks and responsibility, (ii) delegate authority, (iii) provide opportunities for a team to learn new tasks, (iv) take on the responsibility of caring for the team, (iv) encourage employees to participate in setting goals and making important decisions, and (v) encourage team members to take on tasks they think are important. The hypothesized relationships are given as follows:

H3.TL-1: Managing Innovation (ADH) is positively related to individual scores of TL

H3.TL-2: Managing the Future (ADH) is positively related to individual scores of TL

H3.TL-3: Managing Continues Improvement (ADH) is positively related to individual scores of TL

H3.TL-4: Energizing Employees (MAR) is positively related to individual scores of TL

H3.TL-5: Managing the Development of others (CLAN) is positively related to individual scores of TL

3.4.4.4 Hypothesized relationships between employee competencies and performance

First-level Hypothesis H4: Employees with higher scores for the key competencies have higher performance levels.

H4.ACH-1: Higher ACH competency scores among employees correlates with higher employee performance

H4.CO-1: Higher CO competency scores among employees correlates with higher employee performance

H4.INFO-1: Higher INFO competency scores among employees correlates with higher employee performance

H4.INT-1: Higher INT competency scores among employees correlates with higher employee performance

H4.INNOV-1: Higher INNOV competency scores among employees correlates with higher employee performance

H4.TW-1: Higher TW competency scores among employees correlates with higher employee performance

H4.TL-1: Higher TL competency scores among employees correlates with higher employee performance

A summary of the hypothesized relationships is shown in Table 3.5.

Table 3.5 List of hypothesized relationships in the context-based competency model for a work (project) team

Hypothesis H1. The organizational culture has a strong effect on employee competencies.
H1.ACH-1: The market type of organizational culture is positively related to individual scores of ACH competency. *H1.CO-1: The hierarchy type of organizational culture is positively related to individual scores of CO competency.* *H1.INFO-1: The market type of organizational culture is positively related to individual scores of INFO competency.* *H1.INFO-2: The adhocracy type of organizational culture is positively related to individual scores of INFO competency.* *H1.INT-1: The hierarchy type of organizational culture is negatively related to individual scores of INT competency.* *H1.INT-2: The market type of organizational culture is positively related to individual scores of INT competency.* *H1.INT-3: The adhocracy type of organizational culture is positively related to individual scores of INT competency.* *H1. INNOV-1: The market type of organizational culture is positively related to individual scores of INNOV competency.* *H1. INNOV-2: The adhocracy type of organizational culture is positively related to individual scores of INNOV competency.* *H1.TW-1: The clan type of organizational culture is positively related to individual scores of TW competency.* *H1.TL-1: The market type of organizational culture is positively related to individual scores of TL competency.* *H1.TL-2: The adhocracy type of organizational culture is positively related to individual scores of TL competency.*
Hypothesis H2. The team climate has a strong effect on employee competencies.
H2.ACH-1: The structure dimension of team climate is positively related to individual scores of ACH

competency.
H2.ACH-2: The standards dimension of team climate is positively related to individual scores of ACH competency.
H2.ACH-3: The responsibility dimension of team climate is positively related to individual scores of ACH competency.
H2.ACH-4: The recognition dimension of team climate is positively related to individual scores of ACH competency.
H2.CO-1: The structure dimension of team climate is positively related to individual scores of CO competency.
H2.CO-2: The recognition dimension of team climate is positively related to individual scores of CO competency.
H2.CO-3: The commitment dimension of team climate is positively related to individual scores of CO competency.
H2.INFO-1: The responsibility dimension of team climate is positively related to individual scores of INFO competency.
H2.INFO-2: The support dimension of team climate is positively related to individual scores of INFO competency.
H2.IFNO-3: The commitment dimension of team climate is positively related to individual scores of INFO competency.
H2.INT-1: The support dimension of team climate is positively related to individual scores of INT competency.
H2.INT-2: The commitment dimension of team climate is positively related to individual scores of INT competency.
H2.INNOV-1: The support dimension of team climate is positively related to individual scores of INNOV competency.
H2.INNOV-2: The recognition dimension of team climate is positively related to individual scores of INNOV competency.
H2.INNOV-3: The commitment dimension of team climate is positively related to individual scores of INNOV competency.
H2.TW-1: The responsibility dimension of team climate is positively related to individual scores of TW competency.
H2.TW -2: The support dimension of team climate is positively related to individual scores of TW competency.
H2.TW-3: The commitment dimension of team climate is positively related to individual scores of TW competency.
H2.TL-1: The responsibility dimension of team climate is positively related to individual scores of TL competency.
H2.TL-2: The recognition dimension of team climate is positively related to individual scores of TL competency.
H2.TL-3: The commitment dimension of team climate is positively related to individual scores of TL competency.
H2.TL-4: The standards dimension of team climate is positively related to individual scores of TL competency.
H2.TL-5: The structure dimension of team climate is positively related to individual scores of TL competency.

Hypothesis H3. Manager skills have a strong effect on employee competencies

H3.ACH-1: Managing Competitiveness (MAR) is positively related to individual scores of ACH competenc.
H3.ACH-2 Energizing Employees (MAR) *is positively related to individual scores of ACH competency.*
H3.ACH-3: Managing Customer Service (MAR) *is positively related to individual scores of ACH competency.*
H3.ACH-4: Managing Continues Improvement (ADH) *is positively related to individual scores of ACH competency.*
H3.CO-1: Managing Coordination (HIER) is positively related to individual scores of CO competency.
H3.CO-2: Managing the Control System (HIER) is positively related to individual scores of CO competency.
H3.CO-3: Managing Acculturation (HIER) is positively related to individual scores of CO competency.
H3.INFO-1: Managing the Future (ADH) is positively related to individual scores of INFO competency.
H3.INFO-2: Managing Continues Improvement (ADH) is positively related to individual scores of INFO competency.

H3.INFO-3: Managing Competitiveness (MAR) is positively related to individual scores of INFO competency. *H3.INFO-4: Managing Innovation (ADH) is positively related to individual scores of INFO competency.* *H3.INT-1: Managing the Control System (HIER) is negatively related to individual scores of INT competency.* *H3.INT-2: Managing Continues Improvement (ADH) is positively related to individual scores of INT competency.* *H3.INT-3: Managing Innovation (ADH) is positively related to individual scores of INT competency.* *H3.INT-4: Managing the Development of others (CLAN) is positively related to individual scores of INT competency.* *H3.INNOV -1: Managing Innovation (ADH) is positively related to individual scores of INNOV competency.* *H3.INNOV -2: Managing the Future (ADH) is positively related to individual scores of INNOV competency.* *H3.INNOV-3: Managing Continues Improvement (ADH) is positively related to individual scores of INNOV competency.* *H3.TW-1 Managing Coordination (HIER) is positively related to individual scores of TW competency.* *H3.TW-2 Managing Acculturation (HIER) is positively related to individual scores of TW competency.* *H3.TW-3 Managing Teams (CLAN) is positively related to individual scores of TW competency.* *H3.TW-4 Managing Interpersonal Relationships (CLAN) is positively related to individual scores of TW competency.* *H3.TW-5 Managing the Development of others (CLAN) is positively related to individual scores of TW competency.* *H3.TL-1 Managing Innovation (ADH) is positively related to individual scores of TL competency.* *H3.TL-2 Managing the Future (ADH) is positively related to individual scores of TL competency.* *H3.TL-3 Managing Continues Improvement (ADH) is positively related to individual scores of TL competency.* *H3.TL-4 Energizing Employees (MAR) is positively related to individual scores of TL competency.* *H3.TL-5 Managing the Development of others (CLAN) is positively related to individual scores of TL competency.*
Hypothesis H4. Employees with higher scores for the key competencies have higher performance levels.
Hypothesis H5. Manager skills have a strong effect on organizational culture and team climate.

3.5 The Proposed Context-based Competency Model for Students in a Student Work Groups

Students' behaviours in academic work groups are regulated by similar contextual factors. Student group performance may be determined by the same factors as that of work groups in organizations. Student groups consist of small numbers of students (3 to 7 people) with different educational, professional and cultural backgrounds (i.e., diversity) and common goals (i.e., the group assignment). The time limit for a student group's existence is 3-4 months. These features are very similar to those of project teams in companies. This study assumes that relationships between contextual factors in student groups are similar to those in work teams in companies.

The context-based competency model (i.e., Model 2) for student groups is illustrated in Figure 3.4 which is different from the competency model for a work (project) team in a company. There is no manager in a student group. As a result, the management factors were removed from the competency model for student groups. The construct of organizational culture also does not apply to student groups. However, team culture does exist based on individual students' values, beliefs and norms.

As a result, social axioms (Leung & Bond, 2004) were used to conceptualize the cultural aspects of student groups. Team climate, student competencies and team performance constructs remain in the model. However, the responsibility dimension of team climate was removed. The rationale for this model is presented in section 3.5.1, and further includes the measurement of variables in a competency model for student groups.

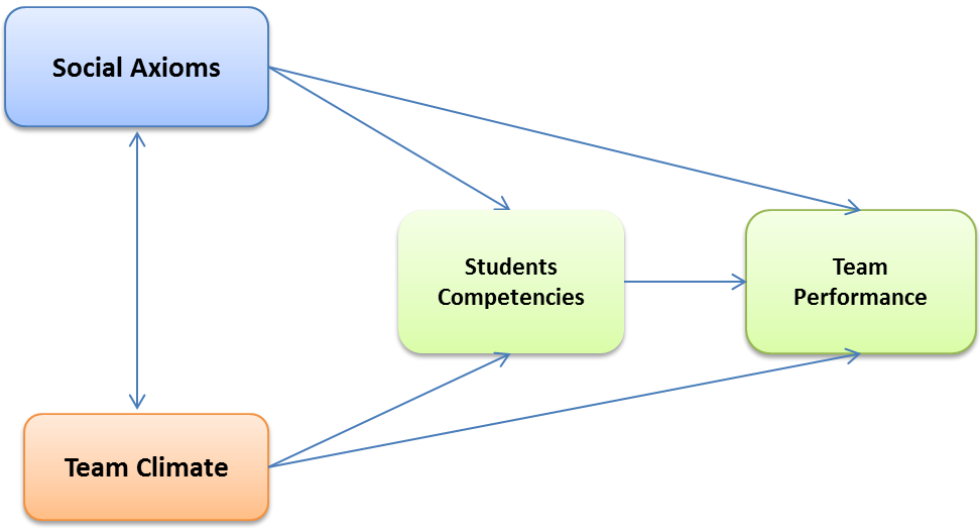

Figure 3.4 Main constructs of the context-based competency model for student groups

The proposed context-based competency model for a student group consists of dependent, independent and moderating variables as shown in Figure 3.5.

3.5.1 Dependent variables

As shown in Figure 3.5, the dependent variables in Model 2 are almost the same as those in Model 1. They are described in Table 3.6.

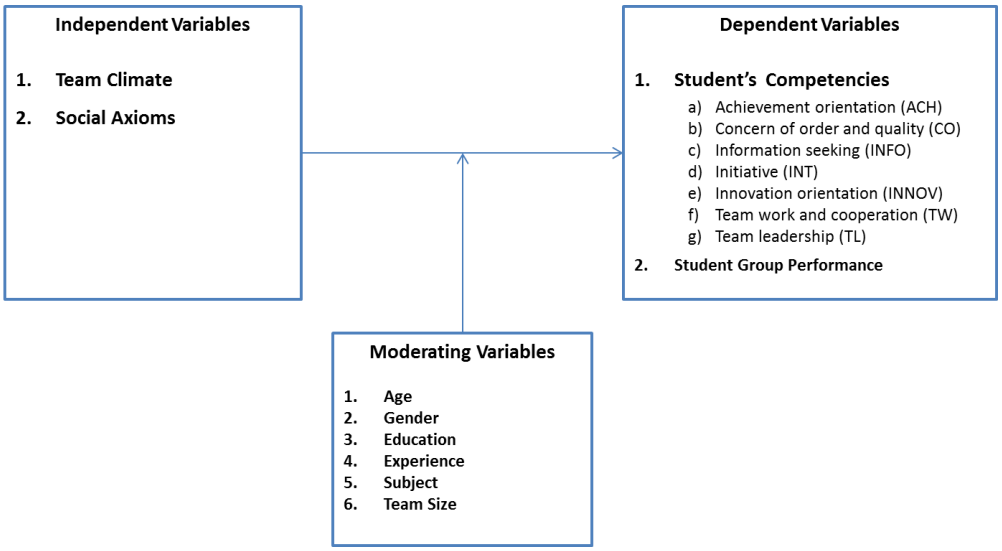

Figure 3.5 The context-based competency model for student groups

Table 3.6 Dependent variables in the context-based competency model for student groups

Variable name	Description
Achievement orientation	Concern for working well or competing against a standard of excellence
Concern for order and quality	An underlying drive to reduce uncertainty in the surrounding environment
Information seeking	Making efforts to obtain more information; a desire to know more about things, people, or issues
Initiative	A preference for taking action; doing more than is required or expected in the task, doing things that no one has requested.
Innovation orientation	Initiating, supporting, sponsoring, and implementing changes and innovations; helping others to successfully innovate
Team work and cooperation	A genuine intention to work cooperatively with others, to be part of a team, to work together.
Team leadership	An intention to take on the role of leader of a team or other group. Implies a desire to lead others.
Student Group Performance	Final mark on group assignment

3.5.2 Independent variables

The independent variables of the competency model for students including team climate (Stringer, 2002) and social axioms (Leung & Bond, 2004) are described in Table 3.6 and Table 3.7 respectively.

Table 3.6 Team Climate related variables in the context-based competency model for student groups. Adopted from Stringer (2002)

Variable name	Description
Structure	Measures the feeling about the group work process, functions and responsibilities distribution. A high structure dimension defines the sense about the work process as being well organized with a clear definition of roles and responsibilities. A low structure means that group members are confused about who is responsible for what task and who makes the decisions.
Standards	Measures the feeling of level of performance and the degree of pride students have for their own work. High standards describe a climate where group members are always striving for a high level of performance and looking for ways to improve it.
Recognition	Measures the feelings of fairness and appropriateness of a reward for students' task performance.
Support	Measures the feelings of trust and mutual support within a student group. High support describes group members who feel that they are part of a team and can get help and support from their peers. Low support reflects feelings of being lonely and isolated.
Commitment	Measures the feelings of commitment and loyalty to the group and its goals. High commitment reflects a high level of personal loyalty. Low commitment is associated with indifference to the group and its goals.

Table 3.7 Social axioms in the context-based competency model for student groups. Adapted from Leung & Bond (2004).

Variable name	Description
Social cynicism	A personality corrupted by power, with biased views against certain groups of people, a mistrust of social institutions, and a disregard for ethics in the means used to achieve an end.
Social complexity	A personality that assumes there are no rigid rules in life, but rather multiple ways of achieving a given goal; and, that apparent inconsistency in human behaviour is common.
Reward for application	A personality that assumes that effort, knowledge, careful planning and hard work will lead to positive results and help avoid negative ones.
Fate control	A personality that assumes that life events are pre-determined but that there are ways people can influence these events.

3.5.3 Hypothesized relationships in the context-based competency model for student groups

The hypothesized relationships describe the proposed interconnections between the theoretical constructs presented above in the context-based competency model for student groups, depicted in Figure 3.4. The hypotheses are organized in two levels. First-level hypotheses (general hypotheses) describe the proposed relationships between the theoretical constructs in the framework. The second-level hypotheses (specific hypotheses)

describe the relationships expected between the specific dimensions (variables) of these theoretical constructs.

The specific hypotheses were coded using the general hypothesis and the name of competency. They were then indexed by number. For example, the hypothesis code "*H1. ACH-1"* refers to the specific hypothesis based on general hypothesis H1, which relates to the achievement orientation (ACH) competency. The index "1" means that this is the first hypothesis for the ACH competency under the H1 general hypothesis. A summary of the hypotheses is presented in Table 3.8.

3.5.3.1 Hypothesized relationships between social axioms and student competencies

Social axioms refer to generalized beliefs and assumptions about the social world (Leung & Bond, 2004). Social axioms have significant correlations with different psychological indicators related to behavioural characteristics (Leung & Bond, 2004). As a result, the first general hypothesis that this study aimed to test was:

Hypothesis H1. Social axioms have a strong effect on student competencies.

Previous research suggests a moderate positive correlation (r = 0.49) between fate control and the other-reference performance motive (Leung & Bond, 2004) and a negative correlation (r = -0.54) between fate control and work ethic (Leung & Bond, 2004). High social cynicism also seems to be related to a poor work ethic (Leung & Bond, 2004). High social complexity may be related to high ACH, as seeing many ways of achieving a goal may encourage a student to try some (Leung & Bond, 2004). Therefore, the hypothesized relationships are given as follows:

H1.ACH-1: Social cynicisms axioms are negatively related to individual scores of ACH

H1.ACH-2: Social complexity axioms are positively related to individual scores of ACH

H1.ACH-3: Fate control axioms are negatively related to individual scores of ACH

The social axiom of reward for application has a moderate positive correlation with conscientiousness (r = 0.49) and with guidance from superiors (r = 0.49; Leung & Bond, 2004). As a result, the following hypothesized relationships were proposed:

H1.CO-1: Rewards for application axioms are positively related to individual scores of CO

It is proposed that the reward for application axiom predicts high INFO due to a person's belief that effort, knowledge, careful planning and hard work will lead to positive results (Leung & Bond, 2004). On the other hand, fate control may be negatively related to INFO due to beliefs regarding predetermined events and outcomes (Leung & Bond, 2004). As a result, the following hypothesized relationships were proposed:

H1. INFO-1: Reward for application axioms are positively related to individual scores of INFO

H1. INFO-2: Fate control axioms are negatively related to individual scores of INFO

The INT competency may have similar predictors as the INFO competency. Moreover, INT may require some level of in-group disagreement which is positively correlated with social cynicism (r = 0.500; Leung & Bond, 2004). As a result, the following hypothesized relationships were proposed:

H1.INT-1: Reward for application axioms are positively related to individual scores of INT

H1.INT-2: Fate control axioms are negatively related to individual scores of INT

H1.INT-3: Social cynicism axioms are positively related to individual scores of INT

TW and TL competencies could also be affected by social axioms. Previous research showed a positive correlation (r = 0.500) between social cynicism axioms and in-group disagreement, and a negative correlation (r = -0.48) between social cynicism and team-oriented leadership (Leung & Bond, 2004). Therefore, the TW and TL competencies may also require a high-level understanding of social complexity and of the many factors affecting behaviour. Fate control axioms may have a negative effect on TW and TL competencies due to beliefs regarding predetermined events and outcomes (Leung & Bond, 2004). As a result, the following hypothesized relationships were proposed:

H1.TW-1: Social Cynicisms axioms are negatively related to individual scores of TW

H1.TW-2: Fate Control axioms are negatively related to individual scores of TW

H1.TW-3: Social Complexity axioms are positively related to individual scores of TW

H1.TL-1: Social Cynicisms axioms are negatively related to individual scores of TL

H1.TL-2: Social Complexity axioms are positively related to individual scores of TL

H1.TL-3: Fate Control axioms are negatively related to individual scores of TL

4.2.1.2 Hypothesized relationships between team climate and employee competencies

Team climate may change previously acquired behavioural tendencies and behaviour patterns of group members (Stringer, 2002). It is linked to motivation and affects personal feelings about work (Stringer, 2002). As a result, the second general hypothesis that this study aimed to test was:

Hypothesis H2. The team climate has a strong effect on student competencies.

ACH behaviour requires a supportive team climate. It may require (i) well organized work processes with a clear definition of roles and responsibilities (i.e., structure), (ii) clearly defined standards of performance (i.e., standards), and (iii) reward and recognition (i.e., recognition). Thus, the hypothesized relationships are given as follows:

H2.ACH-1: The structure dimension of team climate is positively related to individual scores of ACH

H2.ACH-2: The standards dimension of team climate is positively related to individual scores of ACH

H2.ACH-3: The recognition dimension of team climate is positively related to individual scores of ACH

From a team climate perspective, students should feel that the team is well organized with clear definitions of roles and responsibilities, and that the team provides recognition of good work. Students should furthermore feel a commitment from others to the group. The hypothesized relationships are given as follows:

H2.CO-1: The structure dimension of team climate is positively related to individual scores of CO

H2.CO-2: The recognition dimension of team climate is positively related to individual scores of CO

H2.CO-3: The commitment dimension of team climate is positively related to individual scores of CO

Team climate characteristics that may support the INFO competency include feelings of responsibility, support, and commitment from all the team members. The hypotheses are as follows:

H2.INFO-1: The support dimension of team climate is positively related to individual scores of INFO

H2.IFNO -2: The commitment dimension of team climate is positively related to individual scores of INFO

Team climate characteristics that may support the INT competency include feelings of support for risk taking and their commitment to the team. The hypothesized relationships are as follows:

H2.INT-1: The support dimension of team climate is positively related to individual scores of INT

H2.INT-2: The commitment dimension of team climate is positively related to individual scores of INT

Team climate characteristics that may support the INNOV competency include feeling supported for risk taking and feeling a commitment among team members. Furthermore, a feeling of being recognised for innovative behaviours by rewards and praise is also likely to support the INNOV competency. The hypothesized relationships are given as follows:

H2.INNOV-1: The support dimension of team climate is positively related to individual scores of INNOV

H2. INNOV-2: The recognition dimension of team climate is positively related to individual scores of INNOV

H2. INNOV-3: The commitment dimension of team climate is positively related to individual scores of INNOV

The team climate should support feelings of responsibility for the team and from the team and the commitment of team members to the team's goals to have a positive effect on

TW. Support builds feelings of trust and mutual support within a group (Stringer, 2002). The hypothesized relationships are the following:

H2.TW-1: The support dimension of team climate is positively related to individual scores of TW

H2. TW-2: The commitment dimension of team climate is positively related to individual scores of TW

Team climate characteristics that may support the TL competency include feelings of responsibility for the team, commitment to organizational goals, and recognition of leadership. Furthermore, high standards and clear structure within the student group may further support the leadership competency. The hypothesized relationships are provided below:

H2.TL-1: The recognition dimension of team climate is positively related to individual scores of TL

H2. TL-2: The commitment dimension of team climate is positively related to individual scores of TL

H2. TL-3: The standards dimension of team climate is positively related to individual scores of TL

H2. TL-4: The structure dimension of team climate is positively related to individual scores of TL

3.5.3.2 Hypothesized relationships between student competencies and group performance

Competencies distinguish superior performance from average performance, or effective from ineffective performance at the workplace (Spencer, 1997). Based on the conclusions drawn in Chapter 2 on the role of competencies in student teams, a wide range of students' skills, attitudes and other characteristics play a similar role to employee competencies in the achievement of success. The third general hypothesis in this study is:

Hypothesis H3. The higher the scores for students' competency the higher the group performance level.

3.5.3.3 Hypothesized relationships between social axioms and workplace context

Social axioms refer to generalized beliefs about the social world (Leung & Bond, 2004). Social axioms have significant correlations with different psychological indicators at the social level (Table 2.2; Leung & Bond, 2004). These psychological indicators relate to the emotional aspects of team climate. As a result, the fifth general hypothesis is:

Hypothesis H4. Social axioms have a strong effect on team climate.

A summary of the hypothesized relationships is shown in Table 3.8

Table 3.8 List of hypothesized relationships in the context-based competency model for a student group

Hypothesis H1. The social axioms have a strong effect on student competencies.
H1.ACH-1: Social Cynicisms axioms are negatively related to individual scores of ACH competency.
H1.ACH-2: Social Complexity axioms are positively related to individual scores of ACH competency.
H1.ACH-3: Fate Control axioms are negatively related to individual scores of ACH competency.
H1.CO-1: Rewards for Application axioms are positively related to individual scores of CO competency.
H1.INFO-1: Rewards for Application axioms are positively related to individual scores of INFO competency.
H1.INFO-2: Fate Control axioms are negatively related to individual scores of INFO competency.
H1.INT-1: Rewards for Application axioms are positively related to individual scores of INT competency.
H1.INT-2: Fate Control axioms are negatively related to individual scores of INT competency.
H1.TW-1 Social Cynicisms axioms are negatively related to individual scores of TW competency.
H1.TW-1 Fate Control axioms are negatively related to individual scores of TW competency.
H1.TW-1 Social Complexity axioms are positively related to individual scores of TW competency.
H1.TL-1 Social Cynicisms axioms are negatively related to individual scores of TL competency.
H1.TL-2 Social Complexity axioms are positively related to individual scores of TL competency.
H1.TL-2 Fate Control axioms are negatively related to individual scores of TL competency.
Hypothesis H2. The team climate has a strong effect on student competencies.
H2.ACH-1: Structure dimension of team climate is positively related to individual scores of ACH competency.
H2.ACH-2: Standards dimension of team climate is positively related to individual scores of ACH competency.
H2.ACH-3: Recognition dimension of team climate is positively related to individual scores of ACH competency.
H2.CO-1: Structure dimension of team climate is positively related to individual scores of CO competency.
H2.CO-2: Recognition dimension of team climate is positively related to individual scores of CO competency.

H2.CO-3: Commitment dimension of team climate is positively related to individual scores of CO competency. *H2.INFO-1: Support dimension of team climate is positively related to individual scores of INFO competency.* *H2.IFNO-2: Commitment dimension of team climate is positively related to individual scores of INFO competency.* *H2.INT-1: Support dimension of team climate is positively related to individual scores of INT competency.* *H2.INT-2: Commitment dimension of team climate is positively related to individual scores of INT competency.* *H2.INNOV-1: Support dimension of team climate is positively related to individual scores of INNOV competency.* *H2. INNOV-2: Recognition dimension of team climate is positively related to individual scores of INNOV competency.* *H2. INNOV-3: Commitment dimension of team climate is positively related to individual scores of INNOV competency.* *H2.TW-1: Support dimension of team climate is positively related to individual scores of TW competency.* *H2. TW-2: Commitment dimension of team climate is positively related to individual scores of TW competency.* *H2.TL-1: Recognition dimension of team climate is positively related to individual scores of TL competency.* *H2. TL-2: Commitment dimension of team climate is positively related to individual scores of TL competency.* *H2. TL-3: Standards dimension of team climate is positively related to individual scores of TL competency.* *H2. TL-4: Structure dimension of team climate is positively related to individual scores of TL competency.*
Hypothesis H3. The higher scores for student's competency the higher group performance level.
Hypothesis H4. Social axioms have a strong effect on team climate.

3.6 Summary

This chapter established the theoretical framework for the context-based competency models. The framework incorporates elements of the organizational culture, team climate and manager behaviour as independent variables hypothesised to affect employee competencies and performance. According to the framework, different competencies require different combinations of contextual factors. Moreover, the framework suggests there is an optimal set of contextual factors that support individual competencies in different teams, organizations and for different tasks.

The framework can be used to build models of competencies. The context-based competency model for a work team was built to better understand the relationships between competencies and contextual factors in corporate environments. The context-based competency model for a student group was designed to investigate similar factors in student groups. The two models were used in the following chapters to study work teams and student groups. The next chapter describes the methodology of these studies, including research design, hypothesized relationships among variables, and the procedures for data collection and analysis.

CHAPTER 4 RESEARCH METHODOLOGY

This chapter aims to describe the research design, case study research models and methodology used for data collection and data analysis. The chapter starts with the development of the conceptual models which are developed based on theoretical framework for context-based competency models. The following sections provide detailed descriptions of the research design, sample and data collection procedures. Finally, the measurement of variables and the data analysis techniques used in this research are also discussed.

4.1 Research Design

This section contains the theoretical and empirical considerations about the methods and the techniques that are used to answer the proposed research questions and study the hypothesized relatioships.

4.1.2 Research Design of the study

The research assumptions given in the previous sections provide an important means for formulating the research design of the study. The present quantitative approach of the study employed cross-sectional and correlational design methods. Cross-sectional research designs are the most widely used designs in social research relating to the assessment of the determinants of human behaviour (Davies, 1994). It allows data to be handled based on many variables from a large number of people (Judd, Smith, & Kidder, 1991; O'Sullivan & Rassel, 1989).

The correlational design aims to examine the relationships between a number of variables so as to identify the underlying patterns and relationships among variables. It also allows the prediction of a phenomenon using a set of predictor variables (Brewerton & Millward, 2001). The results of a correlational design can be generalized to a wider population because of a stronger external validity (Kerlinger, 1978).

The present study intended to test the proposed competency models for work teams and student groups. Two different survey-based studies were conducted and each had its own hypotheses, sample and questionnaires.

4.1.3 Variables

The following approach and notation were used to define the data structure in this study. A question or statement in a questionnaire is called an "item". A group of questions that measure the same factor is called "dimensions". One or more dimensions describe a "construct" – a theoretical entity that is used in the research model. Constructs are the first-level factors of the research model. Dimensions are the second-level factors in the research model. They are called "variables".

A variable is defined as a discrete phenomenon that can be measured or observed in two or more categories (Creswell, 1994). An independent (i.e. predictor) variable is a variable that is manipulated by the researcher in order to measure its effect on some outcome (i.e. dependent variable) (Creswell, 1994). A dependent variable is an outcome of manipulation which is affected by the independent variable (Panter & Sterba, 2011). A dependent variable can also be called an outcome, response or criterion variable. Moderator variables are variables that can intensify, weaken or reverse the effects of another variable (Mitchell & Jolley, 2007; Sommer & Sommer, 2001, p.594). The controlled moderating variables such as organizational characteristics (e.g. industry, size), unit characteristics (e.g. type of unit, unit size) and employees' characteristics (e.g. age, gender, education, occupation, professional experience) were measured and managed in this study.

4.1.4 Sampling design

4.1.4.1 Population and samples

The target population of the study consisted of teams in manufacturing and technology-related companies in Hong Kong and Mainland China as well as student groups at university. For the study of the teams in manufacturing and technology-related companies, the subjects of the study included project teams, work teams (groups) and departments of the companies. The size of the selected teams ranged from three to seven

members, who had worked together on a day-to-day basis for at least 1 month. The unit of analysis was an employee who was a member of the work and project team. Data were collected from employees and managers of the selected teams.

For the study of the student groups, subjects of the Faculty of Engineering of the Hong Kong Polytechnic University were considered as the target population. A list of subjects which proposed group work assignments and projects during the semester was used to select a sample of the subjects. A total of 14 subjects were considered as the target population.

4.1.4.2 Sampling method

Due to the high complexity of the proposed conceptual model with the number of factors and dimensions, it was impossible to outline samples with high generalization power over all relationships among the variables. Moreover, due to the uniqueness of each organization, the probability samples in one organization would not allow for generalized research outcomes to other organizations (i.e. beyond the population of samples being sampled) (Mitchell & Jolley, 2007). This study stated the intention to generalize its outcomes only within the studied population which included: organizations and units (project or departments) or study groups that participated in the research. However, the findings of the study are proposed for further research for generalization purposes.

Companies that participated in the study were both manufacturing and technology-related companies and study groups were selected based on a convenience sampling method. The convenience sampling method is a non-probability sampling technique. Subjects were selected because of their convenient accessibility and proximity to the study. This method was used due to practical applicability.

The entire population of subjects with group assignments was invited to participate in the study. Emails with invitations to participate in the study were sent to teachers of the subjects. A total of seven teachers agreed to contribute to the study. For each sample of subjects, information about the study and invitations to contribute were given to the students during a short (5 minutes) in-class presentation of the study. Students groups

which agreed to participate signed the form and inserted the names and emails of each team member into the form.

4.1.5 Ethical considerations

The ethical considerations regarding the study are defined and discussed in this section. The research methodology was based on quantitative methods. Hence, the author's understanding of the research problem and his skills influenced the validity of the research outputs. Application of the research results in organizations or study groups may impact decisions regarding respondents (i.e. employees or students). The following ethical issues regarding methodological problems were derived which include: (i) wrong research assumptions, (ii) wrong research design and methods used, (iii) wrong conclusions (unrelated to the real problem), and (iv) wrong research outputs (application biased and potentially harmful results in practice).

These ethical issues may lead the author along the wrong path due to fundamental and systematic problems. This may be a potential cause of a situation in which neither the research purposes nor outcomes would contribute to human society and even could be harmful. This violates the fidelity, non-maleficence, beneficence and ethical justice principles. To understand the possible ethical issues and prevent them, they are discussed in Table 4.1.

Table 4.1 Potential ethical issues regarding methodological problems, causes and actions required to prevent them

Ethical Issue (Ethics principles could be violated)	Possible Causes	Required action to avoid them
Wrong research assumptions (Fidelity)	1) lack of understanding the research problem 2) lack of basic knowledge and research specific skills	1. Thoroughly study the research-related problems, scientific approach for assumption making 2. Thoroughly study the research-related subjects and previous research 3. Communication and consultation with research field experts
Wrong research design and used methods (Fidelity and Justice)	1) lack of knowledge in research methodology 2) using inappropriate methods	1. Study previous research 2. Study new methodological approaches 3. Consider experts' reviews of the used methods in studying the specific research problem 4. Participate in and discuss the study at scientific conferences and workshops

Ethical Issue (Ethics principles could be violated)	Possible Causes	Required action to avoid them
		5. Conduct a pilot study
Wrong conclusions unrelated to the real problem (Fidelity, Non-maleficence, Beneficence and Justice)	1) wrong data collected 2) wrong methods used for derivation	1. Build a clear and justified research design 2. Use correct techniques for derivation and conclusion making for the specific data
Wrong research outputs and applications biased and potentially harm results in practice (Fidelity, Non-maleficence, Beneficence and Justice)	1) lack of good and strict revision of research outputs 2) lack of honesty and fear to recognize the failures in hypothesis testing and research process	1. Work closer and collaboratively with supervisor and external experts 2. Be ready for negative results 3. Consider negative results as potentially valuable results

The study required the collection of data based on psychological and sociological information about people in the organization (i.e. employees and managers). Hence, there are potential ethical issues that need to be taken into account as sunmarizedn in Table 4.2. The most important ethical issues for human-related information gathering are included in the professional ethics standards. The present study followed the Code of Ethics and Conduct Guidance published by the Ethics Committee of the British Psychological Society by The British Psychology Society (2009) as a guide for ethical issues.

Table 4.2 Potential ethical issues, causes and required actions regarding information gathering

Ethical Issue (Ethics principles could be violated)	Causes	Required action to avoid them
Privacy and confidentiality (Autonomy, Non-maleficence, Fidelity, Confidentiality)	1) wrong research design and information requirements 2) incorrect design for information gathering and analysis processes 3) unreasoned information disclosure policy	1. Keep only appropriate records 2. Inform respondents about privacy and confidentiality policy 3. Obtain previous consent for intended information processing 4. Restrict the scope of information disclosure 5. Remove the raw data after coding
Ethical decision making (Autonomy, Non-maleficence, Fidelity, Confidentiality)	1) lack of competence in study-related fields 2) misunderstanding and misinterpretation of the study results by managers	1. Continue improvement-related knowledge and skills 2. Seek professional expertise and supervision 3. Be responsible for making decisions and care about people

Due to avoiding ethical issues related to the data collection, all respondents were informed about the study aims and procedures, as well as confidentiality policy. All information related to respondents was kept strictly confidential. All responses were combined in a database, aggregated and analyzed at the organization-scale level. Neither manager nor peers nor any third party had access to the data collected from the respondents. All personal identification of the data was removed after adding the data to the database. Respondents had a right to withdraw from the study before or during the measurement without penalty of any kind.

The project was approved by the Human Subjects Ethics Sub-committee (HSESC) (or its Delegate) of The Hong Kong Polytechnic University (HSESC Reference Number: HSEARS20130509003).

4.1.6 Validity of study results

To obtain justifiable results and conclusions during the research, the internal, construct and external validity was validated as follows:

(i) Internal validity demonstrates the cause-effect relationships between the independent and dependent variables. In psychology, internal validity is defined as the degree to which a study establishes that a factor causes a difference in behaviour (Chatman et al., 2012) or the treatment causes a change in behaviour (Bozkurt, 2009). To handle possible problems with internal validity, it's necessary to try to define all possible factors (i.e. other than those manipulated) that could affect the dependent variables, exclude these factors or minimize their variability during the study.

(ii) onstruct validity accurately names the used measures and constructs which assures that they are measured and/or manipulated by what the researcher claims they do (Chatman et al., 2012).

(iii) *Construct* here is a mental state such as love, intelligence, hunger, and aggression that cannot be directly observed or manipulated with our present technology (Mitchell & Jolley, 2007). For the purposes of this research, constructs were considered as individual characteristics of people, such as mental states, abilities, intentions, etc. (Mitchell & Jolley, 2007).

(iv) External validity is the degree to which the results of a study can be generalized to other participants, settings and times (Mitchell & Jolley, 2007).

4.2 Data Collection Tools and Procedures

4.2.1 Design of Data collection procedures for the study of an context-based competency model for work (project) teams

Data collecting processes aim to allow data to be collected in a reliable and valid manner and they are discussed in this section. Survey-based research was chosen as the method to achieve the aims and objectives of this study. Self-administered questionnaires in electronic form were used to collect the quantitative data in the present study.

For the purpose of the study, a three-stage survey based on self-administered questionnaires was conducted. The data collection processes and tools for managers and employees were separate. In the first stage of the survey, the respondents were requested to answer the questionnaire with questions related to organizational culture and team climate. In the second stage of the survey, each employee was asked to assess the behaviour of a manager. Managers were asked to conduct self-assessment. In the third stage of the survey, a 360-degree assessment of employees' competencies was conducted. Each employee was asked to assess behaviour indicators that describe competencies of himself/herself and his/her peers. The manager of each team was asked to answer questions about employees under his/her supervision.

4.2.2 Data collection procedures design for study of an context-based competency model for student groups

The data collection processes for the study of an context-based competency model for student groups consisted of two stages. In the first stage, an email was sent to the subject coordinator. It contained basic information about the study and asked for permission to invite students to participate in the survey. After permission was given, the author came to the class, gave a short presentation of the study and asked students to participate. Students who agreed to join the study wrote down their names and emails on the consent form.

In the second stage, student emails were used to distribute the questionnaire. Each student was sent a unique link to the customized questionnaire online. The time allowed for students to complete the questionnaire was one week.

4.2.3 Questionnaires development for study of an context-based competency model for work (project) teams

Questionnaires were prepared in electronic form using the QuestionPro software. Links to the questionnaires were distributed by email to the team managers and team members via managers or survey administrators in the company (under previously reached agreements). The questionnaires were cautiously constructed in a user-friendly way. Each emailed questionnaire had a covering letter with information on the importance of the subject issue, format of the questionnaire, procedures and deadline for the survey. The respondents had 1 week to complete the questionnaire at each stage of the survey.

4.2.3.1 Questionnaires for Employees (design and administration)

Basically, the questionnaires for employees were divided into three phases, i.e. Phase E1, Phase E2 and Phase E3 (Appendix A).

(i) Phase E1 of the questionnaire

Phase E1 of the questionnaire included four main parts. The first part of the questionnaire was an introduction. The introduction section included information on the importance of the subject issue, confidentiality policy, format of the questionnaire, procedures and deadline for the survey. To start answering the questionnaire, respondents had to check the checkbox indicating that he/she agreed to participate in the study.

The second part of the questionnaire was called Employee General Information. It intended to collect data regarding general personal and professional information of the respondents. It consisted of eight closed-ended questions about general demographic and professional characteristics of the employees. This information was needed for statistical analysis.

The third part of the questionnaire included questions about Organizational Culture. It was designed based on "The Organizational Culture Assessment Instrument (OCAI)" developed by Cameron and Quinn (1999). It reveals data to describe the culture type of an organization.

In the third part, the Organizational Climate was observed. It was designed and validated by Stringer (2002). Employees were asked to answer the Organizational Climate Survey to assess the organizational climate in terms of how people feel about their job, how they are managed and how things work in their organization. For this purpose, the Organizational Climate questionnaire developed by Stringer (2002) was used.

At the end of the questionnaire, the respondents were asked to indicate his/her given name, family name and email address. This information was used to match the answers of the respondents through all phases of the questionnaires. This information was removed as soon as the data were aggregated, coded and stored in the database.

(ii) Phase E2 of the questionnaire

Phase E2 of the questionnaire included two main parts. The introduction part included information on the importance of the subject issue, confidentiality policy, format of the questionnaire, procedures and deadline for the survey. To start answering the questionnaire, the respondents had to check the checkbox indicating that he/she agreed to participate in this study.

The second part of the questionnaire included questions about manager skills and practices. The respondents were asked to assess the practices of his manager - the person to whom he/she reports directly. The respondents indicated their agreement on the proposed statements based on a 5-point scale (i.e. from "Strongly Disagree" to "Strongly Agree"). At the end of the questionnaire, the respondents were asked to indicate his/her given name, family name and email address.

(iii) Phase E3 of the questionnaire

Phase E3 of the questionnaire included two parts. The introduction part included information on the importance of the subject issue, confidentiality policy, format of the questionnaire, procedures and deadline for the survey. To start answering the questionnaire,

the respondents had to check the checkbox indicating that he agreed to participate in the study.

The second part of the questionnaire included questions about the competencies of the respondent (self-assessment) and his/her peers. The number of behaviour indicators for each competency was used. The respondents were asked to check the boxes for himself/herself and his/her peer against indicators, which describe him-self/herself and/or his/her peers' behaviour on a day-to-day basis during the last 3-6 months or more. If some items did not fit an employee's behaviour or he/she could not assess them, he/she should leave the boxes unchecked. At the end of the questionnaire, the respondents were asked to indicate his/her given name, family name and email address.

4.2.3.2 Questionnaires for Managers (design and administration)

Basically, the questionnaires for employees were divided into three phases, i.e. Phase M1, Phase M2 and Phase M3 (Appendix A).

(i) Phase M1 of the questionnaire

Phase M1 of the questionnaire included three main parts. The first part of the questionnaire was an introduction section. The introduction included information on the importance of the subject issue, confidentiality policy, format of the questionnaire, procedures and deadline for the survey. To start answering the questionnaire, the respondent had to check the checkbox indicating that he/she agreed to participate in the study.

The second part of the questionnaire included questions on general information about the organization, managed unit (where the team works) and the manager's personal and professional information. It consisted of 11 closed-ended questions. This information was needed for statistical analysis only. The manager was also asked to indicate the performance level of his/her employees in the recent 3-6 months based on a 3-point scale which includes "top 20%", "average" and "bottom 20%".

The third part of the questionnaire included questions about Organizational Culture. It was designed based on "The Organizational Culture Assessment Instrument (OCAI)'

developed by Cameron and Quinn (1999). Data were revealed to describe the culture type of the organization.

(ii) Phase M2 of the questionnaire

Phase M2 of the questionnaire included two main parts. The introduction part included information on the importance of the subject issue, confidentiality policy, format of the questionnaire, procedures and deadline for the survey. To start answering the questionnaire, the respondents had to check the checkbox indicating that he/she agreed to participate in the study.

The second part of the questionnaire included questions about manager skills and practices. The manager was asked to assess his own skills and practices used. The manager indicated his agreement on proposed statements based on a 5-point scale from "Strongly Disagree" to "Strongly Agree").

(iii) Phase M3 of the questionnaire

Phase M3 of the questionnaire included two parts. The introduction part included information on the importance of the subject issue, confidentiality policy, format of the questionnaire, procedures and deadline for the survey. To start answering the questionnaire, the respondent had to check the checkbox indicating that he/she agreed to participate in the study.

The second part of the questionnaire included questions about the competencies of employees. A number of behaviour indicators for each competency was used. The manager was asked to check the boxes against indicators, which describe his/her subordinates' behaviour on a day-to-day basis during the last 3-6 months or more. If some items did not fit an employee's behaviour or he/she could not assess them, he/she should leave the boxes unchecked.

4.2.4 Development of questionnaires for the study of an context-based competency model for student groups

The survey was designed based on a set of self-administered questionnaires (Appendix B). The questionnaires were developed and distributed using the QuestionPro

software. The first part of the questionnaire was an introduction section. The introduction section included information related to the importance of the subject issue, confidentiality policy and the format of the questionnaire. To start answering the questionnaire, the respondents had to check the checkbox that indicated his/her agreement to participate in the study. The second part of the questionnaire contained questions concerning general information about the students. It asked questions about the general demographic information, group and GPA. This information was used for statistical analysis only. The third part of the questionnaire included questions about the competencies of the students in groups. A number of behaviour indicators for each competency were used. The respondent was asked to put into the box a mark that indicated who from his team members behaved in specific ways. If some items did not fit a team member's behaviour or he/she could not assess them, he/she should leave the boxes unchecked. Questions about Team Climate were included in the Fourth part. The questionnaire was similar to the questionnaire that was designed and validated by Stringer (2002). Some questions from the original questionnaire were removed in accordance with section 4.5.1 related to the measurement of variables in the competency model for student groups. The Fifth part assessed the personal Social Axioms of the respondents.

4.2.5 Procedures for missing data management

For the data collected from the respondents from companies, missing values in the Organizational Culture and Team Climate data were substituted by a group means base. The grouping was made on a team basis. For cases when there was no score for group mean (i.e. NA), missing values were substituted by the variables' mean values. Missing values in Employee Competency and Manager Skills data were substituted by the variables' means. For data collected from students, missing data was substituted by the means of the item scores in each student group (team).

4.3 Measurement of variables

4.3.1 Measurement of variables in a competency model for work (project) teams

4.3.1.1 Measurement of Competencies

During the study, seven employees' competencies were assessed. Employees' competencies were measured by a set of behaviour indicators as shown in Tables 4.3 to Table 4.9. Each behaviour indicator $Comp_{ind}$ can be measured as "1" which is demonstrated by the employee on a day-to-day basis or "0" which is not demonstrated by the employee. Competencies may have a few dimensions. Competencies consist of a few behaviour indicators which describe different levels of competency development ($Comp_{level}$). Numerical levels of values were used as weights to calculate a numeric score for each competency. The list of behaviour indicators was based on behaviour indicators designed by Spencer & Spencer (1993). The levels of competency development ($Comp_{level}$) were also derived from the generic competency framework by Spencer & Spencer (1993).

Competency score ($Comp_{score}$) for each assessed respondent was calculated by Eq. (4.1) as follows

$$Comp_{score} = \frac{\sum_N \sum lev_{ind} Comp_{ind} * Comp_{level}}{N * \ lev_{ind} * Comp_{level}^{\max}} \quad (4.1)$$

where:

- N - number of assessed the respondents' competency (including himself/herself)
- lev_ind - number of the levels of competency indicated (assigned) for the assessed respondent
- $Comp_{level}^{max}$ -the maximum level of the competency (used to scale $Comp_{score}$ from -1 or 0 to 1).

Table 4.3 Measurement of Achievement Orientation (ACH) construct

Items	Level (weight)	Description	Sources
ACH_01	-1	Shows no special concern with work, does only what is required	Spencer & Spencer (1993)
ACH_02	0	Works hard, but gives no evidence of a standard of excellence for work outputs.	Spencer & Spencer (1993)
ACH_03	1	Works toward implicit standards of excellence. Tries to do job well or right.	Spencer & Spencer (1993)
ACH_04	2	Works to meet a standard set by management (e.g. manages to a budget, meet sales quotas, quality requirements).	Spencer & Spencer (1993)
ACH_05	3	Uses his or her own specific methods of measuring outcomes against a standard of excellence (not imposed by management); e.g. $ spent, grades, outperforming others, time spent, scrap rates, beating the competition, etc.	Spencer & Spencer (1993)

Items	Level (weight)	Description	Sources
ACH_06	4	Makes specific changes in the system or in own work methods to improve performance. (e.g., does something better, faster, at lower cost, more efficiently; improves quality, customer satisfaction, morale revenues), without setting any specific goal.	Spencer & Spencer (1993)
ACH_07	5	Sets and acts to reach challenging goals for self or others (e.g. "to improve sales/quality/productivity by 15% in 6 month").	Spencer & Spencer (1993)
ACH_08	6	Makes decisions, sets priorities, or chooses goals on the basis of explicit consideration of potential profit, return on investment, or cost benefits analysis.	Spencer & Spencer (1993)
ACH_09	7	Commits significant resources and/or time to improve performance, try something new, reach a challenging goal (e.g., starts new product or services), while also taking action minimize the risks involved (e.g., does market research, lines up customers in advance, etc.).	Spencer & Spencer (1993)
ACH_10	8	Takes numerous, sustained over time entrepreneurial efforts, overcome obstacles	Spencer & Spencer (1993)

For the Team Leadership (TL) competency, $Comp_{level}^{max}$ is equal to the number of competency levels (10) because each level score is equal to 1. The meaning of Eq. (4.1) is similar to the meaning of the weighted arithmetic mean formula. $Comp_{level}$ describes the weight (level) of the competency development. It also takes into account the number of respondents assessed with the demonstrated competency for employees. The larger number of assessments for competency, the lower the uncertainty regarding whether an employee possesses competency or not.

Table 4.4 Measurement of Concern for Order, Quality, and Accuracy (CO) construct

Items	Level (weight)	Description	Sources
CO_01	-1	Lack of concern with order, despite problems caused by disorder.	Spencer & Spencer (1993)
CO_02	0	Active order keeping is not needed, or it is done by someone else, or a lack of concern for order is noticed but does not cause problems.	Spencer & Spencer (1993)
CO_03	1	Maintains an orderly workspace with desk, files, tools and so on in good order.	Spencer & Spencer (1993)
CO_04	2	Works for clarity – wants roles, expectations, tasks, data crystal-clear and preferably in writing.	Spencer & Spencer (1993)
CO_05	3	Double-checks the accuracy of information or own work	Spencer & Spencer (1993)
CO_06	4	Monitors quality of other's work. checks to ensure procedures are followed. Or keeps clear, detailed records of own or other's activities.	Spencer & Spencer (1993)

Items	Level (weight)	Description	Sources
CO_07	5	Monitors progress of a project against milestones or deadlines. Monitors data, discovers weaknesses or missing data, and seeks out information to keep order; general concern for increasing order in existing systems.	Spencer & Spencer (1993)

Table 4.5 Measurement of Information Seeking (INFO) construct

Items	Level (weight)	Description	Sources
INFO_01	0	Does not seek additional information about a situation, other than what has been given	Spencer & Spencer (1993)
INFO_02	1	Asks direct questions of immediately available people (or people who are directly involved in the situation even if not physically present), consults available resource	Spencer & Spencer (1993)
INFO_03	2	Gets out personally investigation of a problem. Questions those closest to the problem.	Spencer & Spencer (1993)
INFO_04	3	Asks a series of probing questions to get at the root of a situation or a problem, below the surface presentation.	Spencer & Spencer (1993)
INFO_05	4	Calls on others, who are not personally involved, to get their perspective, background information, experience	Spencer & Spencer (1993)
INFO_06	5	Makes a systematic effort over a limited period of time to obtain needed data or feedback; or does formal research through newspaper, magazines, or other resources.	Spencer & Spencer (1993)
INFO_07	6	Has personally established ongoing systems or habits for various kinds of information gathering (may include "management by walking around," regular informal meetings)	Spencer & Spencer (1993)
INFO_08	7	Involves others who would not normally be involved and gets them to seek out information	Spencer & Spencer (1993)

Table 4.6 Measurement of Initiative (INT) construct

Items	Level (weight)	Description	Sources
Time dimension (INT_A)			
INT_01	-1	Thinks Only of the Past. Misses or fails to act on clear opportunities.	Spencer & Spencer (1993)
INT_02	0	Not Applicable or Does Not Take Initiative	Spencer & Spencer (1993)
INT_03	1	Persists – takes two or more steps to overcome obstacles or rejection	Spencer & Spencer (1993)
INT_04	2	Recognizes and acts on present opportunities or addresses present problems (usually completed within 1 or 2 days).	Spencer & Spencer (1993)
INT_05	3	Acts quickly and decisively in a crisis	Spencer & Spencer (1993)
INT_06	4	Creates opportunities or minimizes potential problems by a unique extra effort (new program, special travel, etc.) occurring within a time frame of 1 to 2 months.	Spencer & Spencer (1993)

Items	Level (weight)	Description	Sources
INT_07	5	Anticipates and prepares for a specific opportunity or problem that is not obvious to others' Takes action to create an opportunity or avoid future crisis, looking ahead 3-12 months.	Spencer & Spencer (1993)
Self-motivation, Amount of discretionary (INT_B)			
INT_12	-1	Avoids Required Work	Spencer & Spencer (1993)
INT_13	0	Requires constant supervision	Spencer & Spencer (1993)
INT_14	1	Completes assigned without constant supervision	Spencer & Spencer (1993)
INT_15	2	Works extra hours, nights, weekends, etc. as needed to complete work when not required to do so.	Spencer & Spencer (1993)
INT_16	3	Exceeds job description, e.g., takes on extra tasks.	Spencer & Spencer (1993)
INT_17	4	Starts and carries through new projects	Spencer & Spencer (1993)
INT_18	5	Acts without formal authority, takes personal risks, bends the rules to get the job done (emphasis must be on meeting the needs of the job, not on defiant norm breaking)	Spencer & Spencer (1993)
INT_19	6	Gets others involved in unusual extra efforts (e.g., enlists family, co-workers, community members, usually on a volunteer basis).	Spencer & Spencer (1993)
Initiative (INT)			
INT		Calculated as arithmetic mean of INT_A and INT_B	

Table 4.7 Measurement of Innovation Orientation (INNOV) construct

Items	Level (weight)	Description	Sources
Degree of Innovation (INNOV_A)			
INNOV_01	0	Does Not Do New Things	Spencer & Spencer (1993)
INNOV_02	1	Does things (to improve performance) that have not been done in the job before, but that may have been done elsewhere in the organization.	Spencer & Spencer (1993)
INNOV_03	2	Improves performance by doing something new and different (that has not been done in the company, not necessarily new to the industry)	Spencer & Spencer (1993)
INNOV_04	3	Improves performance by doing things that are unique, cutting-edge, new to the industry	Spencer & Spencer (1993)
INNOV_05	4	Does things that are so new and effective the transform an industry (e.g., Apple's transformation of the personal computer industry, Schockley's development of transistors, leading to the electronic industry, Henry Ford's transformation of the auto manufacturing industry).	Spencer & Spencer (1993)

Items	Level (weight)	Description	Sources
Ideas Assessment (INNOV_B)			
INNOV_06	1	Assesses which creative ideas and suggestions may work; can plan and operationalize the innovative ideas	Microsoft (2013)
INNOV_07	2	Accurately assesses the value of creative ideas and suggestions; can plan and operationalize innovative ideas	Microsoft (2013)
INNOV_08	3	Anticipates future trends accurately	Microsoft (2013)
INNOV_09	4	Regarded as a proven and respected consultant to groups and organizations in the midst of complex and challenging change	Microsoft (2013)
Support innovations of others (INNOV_C)			
INNOV_10	1	Helps others in the creative thinking and brainstorming processes. Builds on other people's ideas.	Microsoft (2013)
INNOV_11	2	Manages the creative process of others, bringing their ideas to bear, and projects how potential ideas may play out.	Microsoft (2013)
INNOV_12	3	Recognizes viable creative ideas of others and brings them to the table and to those in a position to implement them	Microsoft (2013)
INNOV_13	4	Creates competitive and breakthrough strategies and plans; generates an attitude of enthusiastic expectancy in others regarding change and challenge	Microsoft (2013)
Innovation Orientation (INNOV)			
INNOV		Calculated as arithmetic mean of INNOV_A, INNOV_B and INNOV_C	

Table 4.8 Measurement of Teamwork (TW) construct

Items	Level (weight)	Description	Sources
TW_01	-1	Uncooperative	Spencer & Spencer (1993)
TW_02	0	Neutral, passive, does not participate, or is not a member of any team.	Spencer & Spencer (1993)
TW_03	1	Participates willingly, supports team decisions, is a “good team player”, does his or her share of the work.	Spencer & Spencer (1993)
TW_04	2	Keeps people informed and up to date about the group process, shares all relevant or useful information.	Spencer & Spencer (1993)
TW_05	3	Express positive expectations of others. Speaks of team members in positive terms. Shows respect for other’s intelligence by appealing to reason.	Spencer & Spencer (1993)
TW_06	4	Genuinely values other’s input and expertise, is willing to learn from others. Solicit ideas and opinions to help from specific decisions or plans. Invites all members of a group contribute to a process.	Spencer & Spencer (1993)

Items	Level (weight)	Description	Sources
TW_07	5	Publicly credits others who have performed well. Encourages and empowers others, makes them feel strong or important.	Spencer & Spencer (1993)
TW_08	6	Acts to promote a friendly climate, good morale, and cooperation (holds parties and get-togethers, creates symbols of group identity).	Spencer & Spencer (1993)
TW_09	7	Brings conflict within the team into the open and encourages or facilitates a beneficial resolution of conflicts.	Spencer & Spencer (1993)

Table 4.9 Measurement of Team Leadership (TL) construct

Items	Level (weight)	Description	Sources
TL_01	1	Manages meetings – states agendas and objectives, controls time, make assignments, etc.	Spencer & Spencer (1993)
TL_08	1	Successfully mediates conflict between individuals and groups	Microsoft (2013)
TL_11	1	Moves quickly to resolve issues to prevent bitterness	Microsoft (2013)
TL_13	1	Can organize people into teams	Microsoft (2013)
TL_17	1	Builds trust and leads teams, encouraging others to step out of their comfort zones to form new interpersonal relationships	Microsoft (2013)
TL_18	1	Encourages collaboration and easily gains trust and support of others	Microsoft (2013)
TL_19	1	Actively recruits people from diverse backgrounds to work together in groups	Microsoft (2013)
TL_21	1	Creates a climate that treats interface between diverse people and groups as the norm	Microsoft (2013)
TL_22	1	Actively seeks and integrates diverse thoughts and perspectives in order to develop more robust plans and solutions	Microsoft (2013)
TL_23	1	Fosters a climate of inclusion, where diverse thoughts are freely shared and integrated to develop plans and solutions that are best suited to circumstances	Microsoft (2013)

4.3.1.2 Culture types dimensions

The organizational culture was measured by using *the Organizational Culture Assessment Instrument (OCAI)* (Cameron and Quinn, 1999). This study followed the approach of Cameron and Quinn and proposed four variables (i.e. dominant types) of organizational culture which include 1) hierarchy, 2) market, 3) clan and 4) adhocracy.

Items were grouped by four items describing different existing (Now) and preferred (Preferred) features of an organization. Each item in a group described one of four types of culture. A 100-point scale was used. The respondents were asked to distribute the 100

points between the statements. The statements that more accurately described the organization received more points. The sum of all the distributed points between statements should be equal to 100. This scale and statements used were part of the Organizational Culture Assessment Instrument (OCAI) by Kim Cameron and Robert Quinn (Cameron & Quinn, 1999). A summary of the items describing each culture type is presented in Table 4.10.

Table 4.10 Measurement of Organizational Culture construct. Adapted from Cameron & Quinn (1999)

Variable name	Items	Description
Clan (CLAN)	W11	The organization is a very personal place. It is like an extended family. People seem to share a lot of themselves.
	W21	The organization emphasizes human development. High trust, openness, and participation.
	W31	The organization defines success on the basis of the development of human resources, teamwork, employee commitment, and concern for people.
	W41	The glue that holds the organization together is loyalty and mutual trust. Commitment to this organization runs high.
	W51	The management style in the organization is characterized by teamwork, consensus, and participation.
	W61	The leadership in the organization is generally considered to exemplify mentoring, facilitating, or nurturing.
Adhocracy (ADH)	W12	The organization is a very dynamic and entrepreneurial place. People are willing to stick their necks and take risks.
	W22	The organization emphasizes acquiring new resources and creating new challenges. Trying new things and prospecting for opportunities are valued.
	W32	The organization defines success on the basis of the development of having the most unique or newest products. It is a product leader and innovator.
	W42	The glue that holds the organization together is commitment to innovation and development. There is an emphasis on being on the cutting edge.
	W52	The management style in the organization is characterized by individual risk-taking, innovation, freedom, and uniqueness.
	W62	The leadership in the organization is generally considered to exemplify entrepreneurship, innovating, or risk-taking.
Market (MAR)	W13	The organization is very results oriented. A major concern is with getting the job done. People are very competitive and achievement oriented.
	W23	The organization emphasizes competitive actions and achievement. Hitting stretch targets and winning in the marketplace are dominant.
	W33	The organization defines success on the basis of the development of winning in the marketplace and outpacing the competition. Competitive market leadership is key.

Variable name	Items	Description
	W43	The glue that holds the organization together is the emphasis on achievement and goal accomplishment. Aggressiveness and winning are common themes.
	W53	The management style in the organization is characterized by hard-driving competitiveness, high demands, and achievement.
	W63	The leadership in the organization is generally considered to exemplify a non-sense, aggressive, results-oriented focus.
Hierarchy (HIER)	W14	The organization is a very controlled and structured place. Formal procedures generally govern what people do.
	W24	The organization emphasizes permanence and stability. Efficiency, control and smooth operations are important.
	W34	The organization defines success on the basis of the development of efficiency. Dependable delivery, smooth scheduling, and low-cost production are critical.
	W44	The glue that holds the organization together is formal rules and policies. Maintaining a smooth-running organization is important.
	W54	The management style in the organization is characterized by security employment, conformity, predictability, and stability in relationships.
	W64	The leadership in the organization is generally considered to exemplify coordinating, organizing, or smooth-running efficiency.

4.3.1.3 Team Climate dimensions

Team Climate was measured by using a questionnaire purposely designed and validated by Stringer (2002) for organizational climate assessment. As shown in Table 4.11, a set of 24 items was evaluated in accordance with the extent to which a respondent agreed or disagreed with it using a 5-item Likert scale including: “Strongly Agree” (5 points), “Agree” (4 points), “Neither agree nor disagree” (3 points), “Disagree” (2 points) and “Strongly Disagree” (1 point). The total score for each dimension of the team climate was calculated as the arithmetic mean of the item scores.

Table 4.11 Measurement of Team Climate construct (Adapted from Stringer, 2002)

Variable name	Items	Description
Commitment	Clim11	11. Generally, I am highly committed to the goals of this organization.
	Clim15	15. Around here we take pride in belonging to this organization.
	Clim21	21. I don’t really care what happens to this organization.
	Clim23	23. As far as I can see, there isn’t much personal loyalty to the organization.
Recognition	Clim1	01. In this organization, the rewards and encouragements you get usually outweigh the threats and the criticism

Variable name	Items	Description
	Clim5	05. In this organization, people are rewarded in proportion to the excellence of their job performance.
	Clim17	17. There is not enough reward and recognition given in this organization for doing good work.
	Clim19	19. We have a promotion system here that helps the best person rise to the top.
Responsibility	Clim4	04. Around here management resents your checking everything with them. If you think you've got the right approach, you just go ahead
	Clim13	13. We don't rely too heavily on individual judgment in this organization; almost everything is double-checked.
	Clim18	18. Our philosophy emphasizes that people should solve their problems by themselves.
	Clim22	22. You don't get ahead in this organization unless you stick your neck out and try things on your own.
Standards	Clim7	07. In this organization we set very high standards for performance.
	Clim10	10. Our management believes that no job is so well done that it couldn't be done better.
	Clim12	12. Around here I there is a feeling of pressure to continually improve our personal and group performance.
	Clim24	24. In this organization people don't seem to take much pride in their performance.
Structure	Clim3	03. In some of the projects I've been on, I haven't been sure exactly who my boss was.
	Clim6	06. The jobs in this organization are clearly defined and logically structured.
	Clim9	09. In this organization, it is sometimes unclear who has the formal authority to make a decision.
	Clim20	20. Our productivity sometimes suffers from lack of organization and planning.
Support	Clim2	02. I feel that I am a member of a well-functioning team.
	Clim8	08. People in this organization don't really trust each other enough.
	Clim14	14. You don't get much sympathy from higher-ups in this organization if you make a mistake.
	Clim16	16. When I am on a difficult assignment, I can usually count on getting assistance from my boss and co-workers.

4.3.1.4 Measurement of Manager Behaviour

Manager behaviour has a direct influence on employees. Manager behaviour was measured by using the Manager Skill Assessment Instrument (MSAI) as developed by Cameron and Quinn (1999) as shown in Table 4.12. Each variable score was calculated as the arithmetic mean of item scores. Items were measured using a 5-item Likert scale with the variants including: "Strongly Agree" (5 points), "Moderately Agree" (4 points),

"Slightly Agree and/or Slightly Disagree" (3 points), "Moderately Disagree" (2 points) and "Strongly Disagree" (1 point).

Table 4.12 Measurement of Manager Skills construct (Adapted from Cameron & Quinn,1999)

Variable name	Items	Question
ADH_Managing Continuous Improvement	MSAI26	26. I regularly come up with new, creative ideas regarding processes, products, or procedures for my organization.
	MSAI29	29. I am always working to improve the processes we use to achieve our desired output.
	MSAI44	44. I facilitate a climate of continuous improvement in my unit.
	MSAI52	52. I encourage everyone in my unit to constantly improve and update everything they do.
	MSAI53	53. I encourage all employees to make small improvements continuously in the way they do their job.
ADH_Managing Innovation	MSAI02	02. I encourage others in my unit to generate new ideas and methods.
	MSAI08	08. I generate, or help others obtain, the resources necessary to implement their innovate ideas.
	MSAI27	27. I constantly restate and reinforce my vision of the future to members of my unit.
	MSAI45	45. I have developed a clear strategy for helping my unit successfully accomplish my vision in the future.
	MSAI51	51. I create an environment where experimentation and creativity are rewarded and recognized.
ADH_Managing the Future	MSA0I9	09. When someone comes up with a new idea, I help sponsor them to follow through on it.
	MSAI14	14. I articulate a clear vision of what can be accomplished in the future.
	MSAI28	28. I help others visualize a new kind of future that includes possibilities as well as probabilities.
	MSAI46	46. I capture the imagination and emotional commitment of others when I talk about my vision of the future.
	MSAI59	59. I help my employees strive for improvement in all aspects of their lives, not just in job-related activities.
CLAN_Managing Interpersonal Relationships	MSAI01	01. I communicate in a supportive way when people in my unit share their problems with me.
	MSAI13	13. I give my subordinates regular feedback about how I think they're doing.
	MSAI23	23. When giving negative feedback to others, I foster their self-improvement rather than defensiveness or anger.
	MSAI48	48. I listen openly and attentively to others who give me their ideas, even when I disagree.
	MSAI50	50. I foster trust and openness by showing understanding for the point of view of individuals who come to me with problems or concerns.
CLAN_Managing Teams	MSAI12	12. I build cohesive, committed teams of people.
	MSAI18	18. I facilitate effective information sharing and problem solving in my group.
	MSAI21	21. I create an environment where involvement and participation in

Variable name	Items	Question
		decision are encouraged and rewarded.
	MSAI22	22. In groups I lead, I make sure that sufficient attention is given to both task accomplishment and to interpersonal relationships.
	MSAI49	49. When leading a group, I ensure collaboration and positive conflict resolution among group members.
CLAN_Managing the Development of Others	MSAI05	05. I regularly coach subordinates to improve their management skills so they can achieve higher levels of performance.
	MSAI20	20. I make sure that others in my unit are provided with opportunities for personal growth and development.
	MSAI24	24. I give others assignments and responsibilities that provide opportunities for their personal growth and development.
	MSAI25	25. I actively help prepare others to move up in the organization.
	MSAI47	47. I facilitate a work environment where peers as well as subordinates learn from and help develop one another.
HIER_Managing Acculturation	MSAI10	10. I make certain that all employees are clear about our policies, values, and objectives.
	MSAI34	34. I provide experiences for employees that help them become socialized and integrated into the culture of our organization.
	MSAI40	40. I clarify for members of my unit exactly what is expected of them.
	MSAI56	56. I establish ceremonies and rewards in my unit that reinforce the values and culture of our organization
	MSAI58	58. I initiate cross-functional teams or task forces that focus on important organizational issues.
HIER_Managing Coordination	MSAI11	11. I make certain that others have a clear picture of how their job fits with others in the organization.
	MSAI17	17. I interpret and simplify complex information so that makes sense to others and can be shared throughout the organization.
	MSAI37	37. I coordinate regularly with managers in other units in my organization.
	MSAI38	38. I routinely share information across functional boundaries in my organization to facilitate coordination.
	MSAI57	57. I maintain a formal system for gathering and responding to information that originates in other units outside my own.
HIER_Managing the Control System	MSAI04	04. I keep close track of how my unit is performing.
	MSAI16	16. I assure that regular reports and assessment occur in my unit.
	MSAI19	19. I foster rational, systematic decision analysis in my unit (e.g., logically analyzing component parts of problems) to reduce the complexity of important issues.
	MSAI36	36. I have established a control system that assures consistency in quality, service, cost and productivity in my unit.
	MSAI39	39. I use a measurement system that consistently monitors both work processes and outcomes.
MAR_Energising Employees	MSAI03	03. I motivate and energize others to do a better job.
	MSAI06	06. I insist on intense hard work and high productivity from my subordinates.
	MSAI07	07. I establish ambitious goals that challenge subordinates to achieve performance levels above the standard.

Variable name	Items	Question
	MSAI31	31. By empowering others in my unit, I foster a motivational climate that energizes everyone involved.
	MSAI60	60. I create a climate where individuals in my unit want to achieve higher levels of performance than the competition.
MAR_Managing Competitiveness	MSAI15	15. I foster a sense of competitiveness that helps members of my work group perform at higher level than members of other units.
	MSAI30	30. I push my unit to achieve world-class competitive performance in service and/or products.
	MSAI35	35. I increase the competitiveness of my unit by encouraging others to provide services and/or products that surprise and delight customers by exceeding their experctations.
	MSAI42	42. I facilitate a climate of aggressiveness and intensity of my unit.
	MSAI43	43. I constantly monitor the strengths and weaknesses of our best competition and provide my unit with information on how we measure up.
MAR_Managing Customer Services	MSAI32	32. I have consistent and frequent personal contact with my internal and my customers.
	MSAI33	33. I make sure that we assess how well we are meeting our customers' expectations.
	MSAI41	41. I assure that everything we do is focused on better serving our customers.
	MSAI54	54. I make sure that my unit continually gathers information on our customer's needs and preferences.
	MSAI55	55. I involve customers in my unit's planning and evaluation.

4.3.1.5 Measurement of performance variables

Employees with higher performance ("best employees") were identified by managers by question such as "Please indicate the performance level of the following employees in the recent 3-6 months". Managers assigned each employee into one of three groups, "Top 20%", "Average" and "Bottom 20%".

4.3.2 Measurement of variables in a competency model for student groups

4.3.2.1 Measurement of competencies for student groups

Student's competencies were measured in a similar way as for employee competencies. Each competency was measured by a set of behaviour indicators. Each behaviour indicator $Comp_{ind}$ could be measured as "1" which is demonstrated by the employee on a day-to-day basis or "0" which is not demonstrated by the employee.

Competencies may have a few dimensions. Competencies consist of a few behaviour indicators which describe different levels of competency development ($Comp_{level}$). Numerical levels were used as weights to calculate a numeric score for each competency. The list of behaviour indicators was based on the behaviour indicators designed by Spencer & Spencer (1993). The levels of competency development ($Comp_{level}$) were also derived from the generic competency framework by Spencer & Spencer (1993). The competency score ($Comp_{score}$) for each assessed respondent was calculated by Eq. (4.1). For the Team Leadership (TL) competency, $Comp_{level}^{max}$ was equal to the number of competency levels (10) because each level score is equal to 1.

Items used to assess students' competencies were adjusted for the conditions of the student groups. Codes and descriptions of items were the same as the items described in section 4.5.1 Measurement of variables in a competency model for work (project) teams. Some items were removed due to their applicability and wording for the organizational context only. The list of items used to describe students' competencies is presented in Table 4.13.

4.3.2.2 Measurement of team Climate dimensions for student groups

The team climate was measured by using a questionnaire purposely designed and validated by Stringer (2002) for organizational climate assessment. A set of 24 items was evaluated in accordance with the extent to which a respondent agreed or disagreed with it using a 5-item Likert scale which included: "Strongly Agree" (5 points), "Agree" (4 points), "Neither agree nor disagree" (3 points), "Disagree" (2 points) and "Strongly Disagree" (1 point). The total score for each dimension of the team climate was calculated by the arithmetic mean of the item scores.

Items used to assess team climate in student groups were adjusted for the conditions of the student groups. Some items were removed due to their applicability and wording for the organizational context only. The list of items used to describe students' competencies is presented in Table 4.14. The responsibility dimension of team climate was removed.

Table 4.13 Measurement of Student competency construct

Construct	Name of variable (dimension)	Items
Achievement Orientation (ACH)	Achievement Orientation (ACH)	ACH_01, ACH_02, ACH_03, ACH_07
Concern of Order and Quality (CO)	Concern of Order and Quality (CO)	CO_01, CO_02, CO_04, CO_05, CO_06, CO_07
Initiative (INT)	Time dimension (INT_A)	INT_02, INT_03, INT_04, INT_05
	Self-motivation, Amount of discretionary (INT_B)	INT_12, INT_13, INT_14, INT_15, INT_16, INT_19
	Initiative (INT)	Calculated as arithmetic mean of INT_A and INT_B
Information Seeking (INFO)	Information Seeking (INFO)	INFO_01, INFO_02, INFO_03, INFO_05, INFO_06
Innovation Orientation (INNOV)	Degree of Innovation (INNOV_A)	INOV_01, INOV_02
	Ideas Assessment (INNOV_B)	INOV_06, INOV_07, INOV_09
	Support innovations of others (INNOV_C)	INOV_10, INOV_11, INOV_12
	Innovation Orientation (INNOV)	Calculated as arithmetic mean of INNOV_A, INNOV_B and INNOV_C
Team Working (TW)	Team Working (TW)	TW_01, TW_02, TW_03, TW_04, TW_05, TW_06, TW_07, TW_08
Team Leadership (TL)	Team Leadership (TL)	TL_01, TL_08, TL_11, TL_13, TL_17, TL_18, TL_19, TL_21, TL_22, TL_23

4.3.2.3 Social Axioms dimensions for student groups

Social axioms (SAX) were measured by using a questionnaire purposely designed and validated by Leung & Bond (2004). However, the "Religiosity" dimension was removed from the questionnaire. The rationale behind this was due to two reasons. Firstly, the analysis of previous research on the correlation between social axioms and different variables related to teamwork is shown in Table 2.5. Table shows less significance in comparison with other dimensions. Secondly, a number of questions were used in the questionnaire for students. A set of 24 items was evaluated in accordance with the extent to which a respondent agreed or disagreed with it using a 5-item Likert scale including: "Strongly Agree" (5 points), "Agree" (4 points), "Neither agree nor disagree" (3 points), "Disagree" (2 points) and "Strongly Disagree" (1 point). The total score for each dimension of the team climate was calculated as the arithmetic mean of the item scores.

Table 4.14 Measurement of Team Climate construct. Adapted from Stringer (2002)

Variable name	Items	Description
Commitment	Clim11	Generally, I am highly committed to the goals of this group.
	Clim21	I DID NOT really care what happens to this group.
	Clim23	As far as I could see, there WAS NOT much personal loyalty to the group.
Recognition	Clim5	In our group, students are rewarded in proportion to the excellence of their job performance.
Standards	Clim7	In our group we set very high standards for performance.
	Clim12	Around here I feel a pressure to continually improve our personal and group performance.
	Clim24	In this group people DO NOT seem to take much pride in their performance.
Structure	Clim3	In our group, I have been sure exactly who was a team leader.
	Clim6	The jobs in our group were clearly defined and logically structured.
	Clim20	Our productivity sometimes suffers from lack of organization and planning.
Support	Clim2	I feel that I am a member of a well-functioning team.
	Clim8	People in our group DO NOT really trust each other enough.
	Clim16	When I am on a difficult assignment, I can usually count on getting assistance from my team members.

Table 4.15 Measurement of the Social Axioms construct (Adapted from Leung & Bond, 2004).

Name of variable (dimension)	Items	Description
Fate Control	Sax_02	There are certain ways for people to improve their destiny.
	Sax_03	Fate determines a person's success in life
	Sax_05	Matters of life and death are determined by fate
	Sax_09	There are ways for people to find out about their fate.
	Sax_14	The people whom a person will love in his or her life is determined by fate.
	Sax_15	Individual characteristics, such as appearance and birthday, can reveal ones fate
	Sax_17	Luck can be enhanced by certain tactics.
	Sax_25	Fate determines one's successes and failures
Reward for Application	Sax_01	One will succeed if he/she really tries
	Sax_04	Success requires strong willpower
	Sax_07	Building the way step by step leads to success
	Sax_16	Adversity can be overcome by effort
	Sax_20	Difficult problems can be overcome by hard work and persistence

Name of variable (dimension)	Items	Description
	Sax_23	Hard working people will achieve more in the end
	Sax_28	Endurance and determination are key to achieving goals.
	Sax_29	Hard-working people are well rewarded
Social Complexity	Sax_11	There is usually more than one good way to handle a situation
	Sax_12	A persons behaviour is influenced by many factors.
	Sax_13	People can suddenly lose everything they have.
	Sax_18	Many issues appear far more complicated than they really are
	Sax_24	People with different opinions can all be correct
	Sax_27	People may have opposite behaviours on different occasions
	Sax_30	A bad situation can suddenly change for the better
	Sax_32	One has to deal with matters according to the specific circumstances
Social Cynicism	Sax_06	People create hurdles to prevent others from succeeding
	Sax_08	People dislike others who succeed in life
	Sax_10	Powerful people tend to exploit others
	Sax_19	People who become rich and successful forget the people who helped them along the way
	Sax_21	Kind-hearted people usually suffer losses
	Sax_22	Opportunities for people to get wealthy promote dishonesty
	Sax_26	Kind-hearted people are easily bullied
	Sax_31	The only way to get ahead is to take advantage of others

4.3.2.4 Performance variables

Performance variables include GPA - individual student's GPA and Group Performance - average mark for the group work during the semester.

4.4 Methods for Data Analysis

As shown in Figure 4.1, the data analysis processes comprised data coding, measurement, assessment and reliability analysis, hypothesis testing, and predictive model building. Its purpose was to interpret data and relationships between concepts and test the data quality as well as validate the hypotheses in the study. The data analysis was conducted using the data processing functions in Microsoft Office Excel 2010, R language for statistical analysis as well as IBM SPSS Statistics 22.

Items used to assess team climate in student groups were adjusted for the conditions of the student groups. Some items were removed due to their applicability and wording for the organizational context only. The list of items used to describe students' competencies is shown in Table 4.15. The responsibility dimension of team climate was removed.

4.4.1 Data Coding and Preprocessing

Data coding and preprocessing were performed by Microsoft Office Excel 2010 software. The data were organized in one spreadsheet table. Items of raw data were stored in columns while cases were stored in rows.

Variables for Organizational Culture, Team Climate, Manager Skills and Social Axioms constructs were calculated by arithmetic means function of item answers and aggregated by using variable (dimension) scales. For this purpose, customized scripts for R programming language were written. Variable scores were calculated by scripts and stored in the appropriate tables for further analysis. Scripts of the programs are shown in Appendix C.

4.4.2 Descriptive Analysis

4.4.2.1 Descriptive Statistics

Descriptive statistics, such as Mean, Standard Deviation, Variance, Skewness and Kurtosis were derived to identify the overall tendencies of the collected data. IBM SPSS Statistics 22 was used to calculate the descriptive statistics.

4.4.2.2 Test of Normality

Test of normality for each variable was also performed using Kolmogorov-Smirnov and Shapiro-Wilk tests. IBM SPSS Statistics 22 was used to calculate and test normality statistics.

4.4.3 Construct Validity and Reliability Analysis

4.4.3.1 Construct Validity Analysis

Construct validity analysis was used to assess the degree to which the test measured what was claimed, or reports being measured (Brown, 196). Construct validity analysis was performed by using the Principal Component Analysis (PCA) technique which aims at assessing the measurement model relating the measured variables and latent constructs. PCA was used to confirm a theoretical measurement model for each variable. It was performed using IBM SPSS Statistics 22. The lead threshold level was 0.4, cross-loading levels on other factors were less than 0.3 and an eigenvalue for each factor was over 1.0.

4.4.3.2 Cronbach's Alpha based Reliability Analysis

Cronbach's alpha-based reliability analysis was performed to assess the internal consistency and reliabilities of the constructs. Cronbach's Alpha coefficients were calculated using IBM SPSS Statistics 22.

4.4.4 Correlation and Regression Analysis

(i) Correlation Analyses

Correlational analysis was conducted using correlation coefficients as calculated for each studied relationship. Correlation coefficients were significant at $p < .05$ level. Missing data were removed in a case wise manner.

(ii) Factor Analysis

Factor analysis based on Principal Component Analysis (PCA) was also conducted to identify the combinations of variables with a higher percentage of explained variance. The rotated component matrix helped with grouping and interpretation of the role of factors (i.e. groups of variables) of the research models.

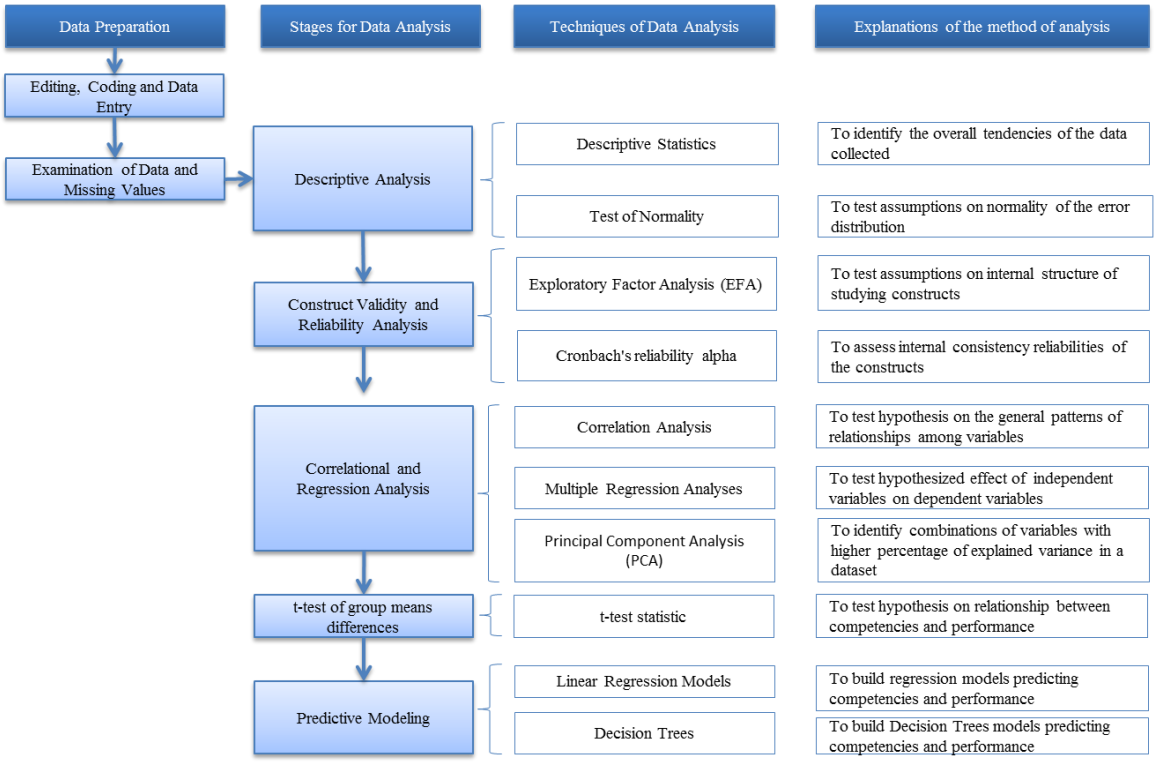

Figure 4.1 Procedures and Techniques of Data Analysis

4.4.5 t-test of group means differences

The hypothesized proposed influence of competencies on individual and group performance were tested using the t-test statistics. Hypotheses were tested at $\alpha = .05$ significance level.

4.4.6 Predictive Modelling

Predictive models were built to improve the management decisions related to the performance of work teams and student groups. As a result, they should have predictive power to be applicable in practice. Statistical techniques such as Linear Regression modelling and Decision Trees were used to build and test the predictive power of the achievement oriented competencies models for work (project) teams and student groups.

(i) Linear Regression Models

Linear Regression Models were built by using IBM SPSS Statistics 22 software. F-test statistics were used to determine the goodness of fit of the model for the data. The

significance level used was 0.05. Finally, the equations for the regression lines were built for predicting the competencies.

(ii) Decision Trees

Decision Trees models were built by using IBM SPSS Statistics 22 software. The Classification and Regression Trees (CART) growing method was used. CART performs binary splitting of the data into segments attempting to maximize within-node homogeneity with respect to the dependent variable (Ma, 2005). Starting from the root node (entire sample), each explanatory variable was examined regarding how well it splits a sample into two child nodes. An impurity measure was used by the CART method to guide the splitting (Ma, 2005). As a result, CART provided the homogeneity of a terminal node. Due to the small sample size, the cross-validation (i.e. number of sample folds was 10) was selected as a validation method for the trees. The minimum number of cases for parent nodes was 10 and for child nodes was 5. Ordered Twoing was selected as an impurity measure for decision tree bulging because it splits categories of the dependent variable into two subclasses and only adjacent categories may be grouped. Due to the fact that the studied dependent variables were ordinal, this method provided more clear and interpretable terminal nodes. For the purpose of building decision trees, the data were converted into the ordinal scale with 3 values which included 1 (Low), 2 (Medium) and 3 (High). The intervals for converting the data are presented in Appendix D and Appendix E. For the purpose of analysis and interpretation of the decision tree results, the cutoff requirements were applied for terminal nodes. The selected terminal node should meet a response percentage higher than 30% and an index percentage higher than 100% for the target category ("high" level of analyzed competency). The percentage of cases of the specified target category in the node is called response (SPSS, 2004). The higher the response, the higher the homogeny and predictive power of the node. Index is the ratio of the node response percentage for the target category to the overall target category response percentage for the root node (entire sample) (SPSS, 2004). The higher the index, the higher the probability of the target category in the node in comparison with the root node. If the index of the target category in the terminal node is higher than 100%, then it has a higher probability than in the root node.

4.5 Summary

This chapter described the theoretical framework, research design and methodology, measurement and validation of the constructs, characteristics of respondents, and statistical techniques that were employed to test the research hypotheses offered in this study. The next chapters provides and discuss the detailed results of the data analysis as described in the study.

CHAPTER 5. A STUDY OF THE CONTEXT-BASED COMPETENCY MODEL FOR WORK (PROJECT) TEAMS

5.1 Background of study

To realize the capability of the framework for building comtex-based competency model, a pilot study was conducted at seven technology-based companies in Hong Kong and China. Each company provided one to five teams to participate in the study. Each team had a manager and two to five team members. A total of 56 respondents in 17 teams participated in the study. The pilot study was conducted in a quality department of a large manufacturing company in China. Since the company has few factories, the author was able to study the data from four small teams. For the purpose of the study, a two-stage survey based on self-administered questionnaires was conducted. In the first stage of the survey, the respondents were requested to answer a questionnaire with questions related to organizational culture, team climate and personal values. In the second stage of the survey, each employee was asked to assess behaviour indicators that describe competencies of himself/herself and his/her peers. The manager of each team was asked to answer questions about the employees under his/her supervision.

5.1.1 Participants of the pilot study

Electronic questionnaires were distributed among 24 respondents with the assistance of the department head. A total of 24 questionnaires were received. There were nine managers and 15 employees involved in the study. Four incomplete questionnaires from employees were excluded due to missing values. A total of 20 questionnaires were validated and used for data analysis. Most of the managers were male, aged 36-55 years old (89%) and had bachelor's degrees (55%). Twenty-two percent of them had more than 5 years of working experience in a management position and more than 77% had 10 or more years of management experience. Most of the employees were female, aged 26-45 years old (88%) and had bachelor's degrees (53%). All of them were full-time workers. Twenty-nine percent of them had less than 5 years of total professional experience and 47% had more than 10 years of professional experience.

5.1.2 Results and Discussion of the pilot study

5.1.2.1 H1. The Organizational culture and Organizational Climate have high effect on Employee Competencies.

Table 5.1 shows the results of testing hypothesis H1. The result showed that only a few correlations between the considered dimensions of the organizational environment and employee competencies were statistically significant. Team Work (TW) and Team Leadership (TL) competencies had a high positive correlation (r = 0.71 and 0.73 respectively) with Clan culture type at $p < 0.05$ level. A comparison between the Best and Average employees showed that this was true only for Average employees. Moreover, average employees had a high positive correlation (r = 0.76) between Team Leadership and Clan culture type at $p < 0.05$ level. However, there was no significant correlation between competencies scores for the Best employees and their scores for culture type.

Table 5.1 Correlation coefficients between employee competencies and different dimensions of organizational culture and team climate

	ACH	CO	INFO	INT	INNOV	TW	TL
Organizational Culture dimensions							
CLAN	0.27	0.4	0.42	0.38	0.27	**0.71***	**0.73***
Adhocracy	0.3	0.33	0.39	0.29	-0.05	0.43	0.46
Market	0.04	0.09	0.16	0.07	-0.11	0.39	0.41
Hierarchy	0.07	0.19	0.3	0.14	0.2	0.59	0.56
Organizational Climate dimensions							
Commitment	0.27	0.15	0.22	0.21	0.12	0.04	0.06
Recognition	0.06	-0.01	0.07	-0.04	0.02	0.08	0.06
Responsibility	-0.45	-0.48	-0.51	-0.4	-0.41	-0.25	-0.22
Standards	0.07	0.19	0.09	0.11	0.25	0.14	0.08
Structure	-0.12	-0.22	-0.1	-0.13	-0.16	-0.05	-0.02
Support	0.01	-0.07	-0.07	0.05	0.15	0.03	0.06

*correlation significant at $p < 0.05$ level

As a result, H1 was partially supported for Organizational Culture. Two important conclusions can be drawn as follows:

(i) For Average employees, the higher the score for Clan type of organizational culture, the higher the Team Work competency score;

(ii) For Average employees, the higher the score for Clan and/or Adhocracy types of organizational culture, the higher the Team Work and Team Leadership competencies score.

No significant correlation was found between organizational climate and employee competencies. However, a separate analysis for the best and average employees showed that there were significant correlations between competencies scores and climate dimensions for the best employees.

As a result, for the best employees, the Achievement Orientation (ACH) competency had a high negative correlation ($r = -1$) with the Responsibility dimension of organizational climate at $p < 0.05$ level. The (Concern for Order and Quality) CO competencies and the Information seeking (INFO) competencies both had high positive correlations ($r = 1$) with the Commitment dimension of organizational climate at $p < 0.05$ level. Innovation orientation (INNOV), Team work (TW) and Team Leadership (TL) competencies had high positive correlations ($r = 1$) with the Standards dimension of organizational climate at $p < 0.05$ level. As a result, H1 was also partially supported for Organizational Climate.

5.1.2.2 H2. Manager skills have strong effect on Organizational Climate.

Table 5.2 shows the results of testing hypothesis H2. The result shows that the correlation between manager skills dimension, Managing Innovation and Commitment dimension of the Organizational Climate ($r = 0.6$) was statistically significant at $p < 0.05$ level. Energizing Employees had a high positive correlation with the Recognition dimension ($r = 0.58$, $p < 0.05$). Managing Customer Services had a high positive correlation with the Recognition, Structure and Support dimensions ($r = 0.66, 0.73, 0.68$ respectively, $p < 0.05$). Managing the Control System had a high positive correlation with Structure and Support dimensions ($r = 0.62, 0.62$ respectively, $p < 0.05$). Managing Interpersonal Relationships had a high negative correlation with the Responsibility and Standards dimensions ($r = -0.64, -0.71$ respectively, $p < 0.05$). Managing Teams had a high positive correlation with the Recognition dimension ($r = 0.66$, $p < 0.05$). As a result, H2 was partially supported.

Table 5.2 Correlations among factors contributing to manager skills and organizational climate

	Commitment	Recognition	Responsi-bility	Standards	Structure	Support
Managing Innovation (ADH)	**0.6***	0.49	-0.01	0.4	0.45	0.31
Managing the Future (ADH)	0.35	0.48	-0.17	0.18	0.29	0.05
Managing Continuous Improvement (ADH)	0.37	0.53	0.08	0.35	0.45	0.47
Managing Competitiveness (MAR)	0.37	0.46	-0.04	0.23	0.35	0.33
Energising Employees (MAR)	0.32	**0.58***	-0.01	0.32	0.35	0.21
Managing Customer Services (MAR)	0.38	**0.66***	0.36	0.49	**0.73***	**0.68***
Managing Coordination (HIER)	0.11	0.53	0.35	0.4	0.58	0.46
Managing the Control System (HIER)	0.28	0.55	0.38	0.47	**0.62***	**0.62***
Managing Acculturation (HIER)	0.3	0.54	0.23	0.32	0.57	0.44
Managing the Development of Others (CLAN)	0.22	0.48	-0.14	0.28	0.2	0.07
Managing Interpersonal Relationships (CLAN)	0.11	0.25	**-0.64***	**-0.71***	0	-0.26
Managing Teams (CLAN)	0.39	**0.66***	0.09	0.44	0.49	0.42

5.1.2.3 H3. Manager skills (Practices) have strong effect on Employee Competencies

Table 5.3 shows the results of testing hypothesis H3. The result shows a high positive correlation between manager skills dimension, Managing Innovation and Achievement Orientation (ACH) and Information seeking (INFO) competencies ($r = 0.66$, 0.72 respectively) which is significant at $p < 0.05$ level. Energizing Employees has a high positive correlation with INFO competency ($r = 0.61$) at $p < 0.05$.

A separate analysis for the best and average employees showed that there were significant correlations between factors contributing to manager skills and competencies scores for the best employees. However, for average employees, there were two additional significant correlations:

(i) Managing Competitiveness had a high positive correlation with the Achievement Orientation (ACH) competency ($r = 0.71$) significant at $p < 0.05$).

(ii) Managing Interpersonal Relationships had a high positive correlation with Information Seeking (INFO) competency ($r = 0.82$) significant at $p < 0.05$).

As a result, H3 was partially supported.

Table 5.3 Correlations among employees' competencies and manager skills

	ACH	CO	INFO	INT	INNOV	TW	TL
ADH. Managing Innovation	**0.66***	0.56	**0.72***	0.58	0.28	0.31	0.37
ADH. Managing the Future	0.51	0.47	0.58	0.41	0.26	0.29	0.32
ADH. Managing Continuous Improvement	0.58	0.47	0.59	0.52	0.4	0.32	0.39
MAR. Managing Competitiveness	0.58	0.4	0.45	0.41	0.25	0.01	0.06
MAR. Energising Employees	0.56	0.54	**0.61***	0.5	0.38	0.42	0.44
MAR. Managing Customer Services	0.45	0.35	0.42	0.4	0.29	0.23	0.28
HIER. Managing Coordination	0.24	0.22	0.33	0.23	0.16	0.25	0.3
HIER. Managing the Control System	0.4	0.33	0.4	0.4	0.27	0.34	0.4
HIER. Managing Acculturation	0.3	0.24	0.37	0.29	0.2	0.29	0.36
CLAN. Managing the Development of Others	0.47	0.49	0.55	0.39	0.44	0.32	0.32
CLAN. Managing Interpersonal Relationships	0.42	0.3	0.52	0.25	0.15	0.1	0.15
CLAN. Managing Teams	0.42	0.38	0.47	0.34	0.37	0.19	0.22

Some conclusions can be made on this as shown below:

(i) In general, the higher the scores for Managing Innovation skills of manager, the higher the Achievement Orientation (ACH) and Information Searching (INFO) competencies score that can be found;

(ii) In general, the higher the scores for Energizing Employees the skills of managers, the higher the INFO competency score that can be found;(iii) For average employees, the higher the scores for Managing Competitiveness skills of managers, the higher the ACH competency score that can be found;

(iii) For average employees, the higher the scores for Managing Interpersonal Relationships skills of managers, the higher the INFO competency score that can be found.

5.1.2.4 H4. Employees with higher performance have higher scores for key competencies.

Figure 5.1 shows the average scores of competencies for the "Best" and the "Average" employees. It shows that the average scores for the best employees' competencies were higher than the scores for the average employees. The top two differences were found for the Team Working (TW) and Team Leadership (TL) competencies.

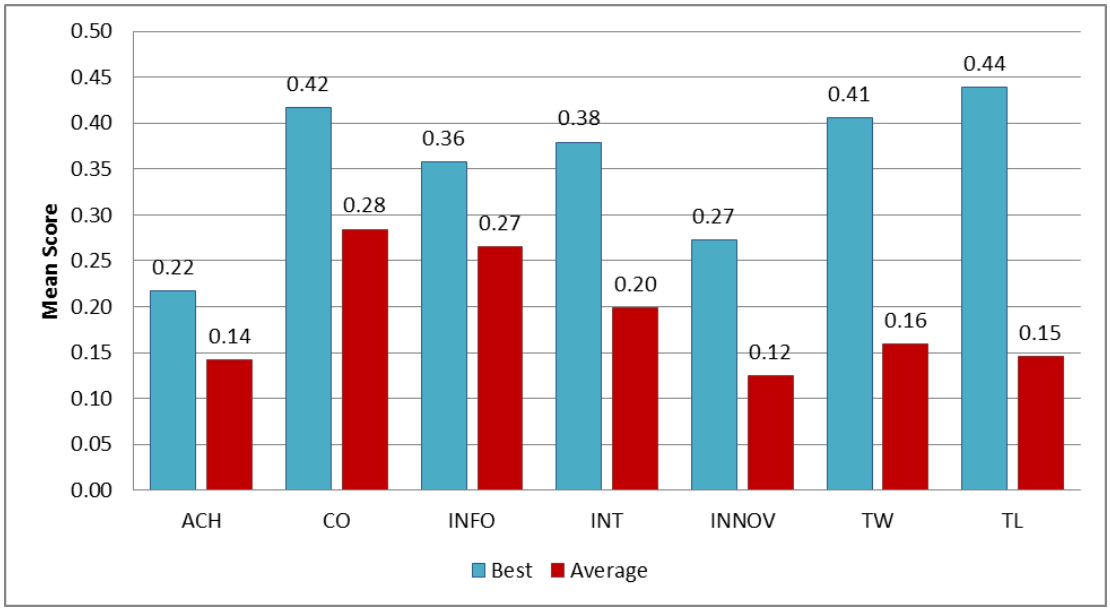

Figure 5.1 Average scores of competencies for the "Best" and "Average" employees

To test the mean differences of the competencies scores between the two groups of employees, Student's t-test was used. Since the two studied samples being compared ("Best" and "Average" groups of employees) were non-overlapping or independent, the Welch corrections for student's t-test were used. Two alternative hypotheses were also considered as follows:

H4.0: true difference in means is equal to 0;

H4.1: true difference in means is greater than 0.

Table 5.4 shows the calculated statistics for H4 hypothesis testing for each competency. The value of the calculated t-test statistics were less than critical t values for each test. As a result, the null hypothesis H4.0 could not be rejected. The hypothesis H4.0 should be tested on a larger sample in future studies.

5.1.3 Findings, contributions and implications of the pilot study

The study intended to investigate the employee competencies of team members and their relationships with other workplace environmental factors. Several findings, implications and contributions could be identified from the results of the pilot study at the reference site, i.e. the manufacturing company.

Table 5.4 Statistics for H4 hypothesis testing

Competency	Student's t-test statistic	Degrees of freedom, df	p-value	Confidence interval, 95 %		Critical t value
				Left	right	
ACH	0.67	3.95	0.27	-0.17	Inf	2.79
CO	0.74	3.61	0.25	-0.26	Inf	2.90
INFO	0.58	4.31	0.29	-0.24	Inf	2.70
INT	1.02	3.13	0.19	-0.23	Inf	3.10
INNOV	1.39	2.92	0.13	-0.11	Inf	3.23
TW	1.19	2.44	0.17	-0.29	Inf	3.64
TL	1.44	2.49	0.13	-0.23	Inf	3.58

First, there were significant correlations between organizational culture dimensions and some competencies. Some conclusions can be drawn as follows:

(iii) For the best employees, the higher the scores for the Responsibility dimension of Organizational climate, the lower the Achievement Orientation score obtained;

(iv) For the best employees, the higher the scores for Commitment dimension of Organizational climate, the higher the Concern for Order and Quality and Information Seeking scores obtained;

(v) For the best employees, the higher the scores for Standards dimension of Organizational climate, the higher Innovation Orientation, Team Work and Team Leadership scores obtained.

Second, the manager skills and practices were highly correlated with organizational climate. Some practically useful implications and conclusions can be drawn as follows:

(i) The higher the Managing Innovation skills of a manager, the higher the Commitment in Team Climate;

(ii) The higher the Energizing Employees, Managing Customer Services and Managing Teams skills of a manager, the higher the Recognition dimension of Team Climate that can be found;

(iii) The higher the Managing Customer Services and Managing the Control System skills of a manager, the higher the Structure and Support dimensions of Team Climate that can be found;

(iv) The higher the Managing Interpersonal Relationships skills of a manager, the higher the Responsibility and Standards dimensions of Team Climate that can be found.

Third, some manager skills and practices are directly associated with high competency scores of achievement orientation (ACH) and information seeking (INFO) competencies. Some conclusions can be drawn as follows:

(i) In general, the higher the scores for Managing Innovation skills of managers, the higher the Achievement Orientation (ACH) and Information Seeking (INFO) competencies score obtained;

(ii) In general, the higher the scores for Energizing Employees skills of managers, the higher the Information Seeking (INFO) competencies score obtained;

(iii) For average employees, the higher the scores for Managing Competitiveness skills of managers, the higher the Achievement Orientation (ACH) competencies score obtained;

(iv) For average employees, the higher the scores for Managing Interpersonal Relationships skills of managers, the higher the Information Seeking (INFO) competencies score obtained.

Fourth, the "best" employees had higher mean scores for all competencies than "average" employees. However, the small sample could not provide the statistical significance of these implications. If this difference is supported by a larger sample, it will give a clearer explanation of "why the best employees are the best" and "how to become a best employee from an average one". Employees with higher performance ("best employees") were identified by managers by the open question "Please indicate the names of three employees in your unit, who are in the top 20% BEST performers in the recent 3-6 months" in the first stage of the survey.

Fifth, the considered competencies had high paired correlations among each other. Some conclusions can be drawn as follows:

(i) The studied competencies were highly inter-dependent;

(ii) The higher the score for one of these competencies, the higher the scores of other competencies observed;

(iii) Developing one competency would likely produce a positive effect on other competencies.

As a result, efforts to improve individual and team performance in companies should follow a holistic approach. By improving manager skills, organizational culture and team climate would likely have significant improvement in scores for the achievement orientation cluster of competencies. This may contribute to companies' staff development programmes, and operational and strategic management practices.

5.1.4 Limitations and suggestions of the pilot study

The studied relationships indicate that only a few of the proposed correlations were statistically significant at $p < 0.05$ level. However, the empirical results were based on a small sample of respondents. Further work will be done to increase the sample size. It is believed that some hypotheses will be proved or rejected based on a larger data set.

5.1.5 Changes in methodology based on the results of the pilot study

The pilot study revealed a few drawbacks of the proposed methodology. First of all, the questionnaires for the survey were too long. As a result, some changes in methodology were made. The variable names "Values" were excluded from the research model. The rationale behind this was based on the assumption that the close link between organizational culture and cultural values, and that the organizational culture dimensions aggregate the effect of a few cultural values and have similar relationships with competencies. Moreover, the original methodology used to assess cultural values in the organization was complicated and time-consuming. The survey procedure was split for the three stages. At each stage, the questionnaire had 50-60 questions.

5.2 Descriptive Analysis

5.2.1 Participants

Electronic questionnaires were distributed among 56 employees and 29 managers of the 17 teams in seven companies. The number of participants from each company is presented in Table 5.5.

Table 5.5 Participants in the study on the context-based competency model for work team

Company code	Number of Teams	Total number of Employees	Total number of Managers
A	4	13	9
B	1	4	1
C	2	6	1
D	5	14	5
E	1	3	1
F	1	4	1
G	3	12	11
Total	17	56	29

Table 5.6 summarizes the demographic characteristics of the respondents. As shown in Table 5.5, there were 31 (54.4%) men and 15 (26.3%) women. Eleven respondents (19.3%) did not indicate their sex. The largest percentage of the respondents were aged between 36 and 55 years old (50.7%), had a bachelor's degree (36.8%), had more than 5 years of total working experience (50.9%) and had worked in the current company for between 3 and 5 years (47.4%). Of the respondents 21.1% did different production-related jobs and 14% of the respondents were responsible for computer and mathematical jobs. A lower percentage of respondents were responsible for different business and financial operations, sales, design and engineering tasks.

Table 5.7 summarizes the demographic characteristics of the managers and information about teams and companies participating in the study. The largest percentage of the respondents were aged between 26 and 45 years old (76.6%), had bachelor's (50%) or master's (23.3%) degrees, and had more than 10 years of total working experience (66.7%) and experience in a management position for more than 5 years (73.3%).

Table 5.6 Respondents' demographic profile (n =57)

	Count	Percent
Sex		
Female	15	26.3
Male	31	54.4
Missing	11	19.3
Age		
36 – 45	12	21.1
26 – 35	28	49.1
56 – 65	1	1.8
25 and under	6	10.5
Missing	10	17.5
Education		
College	9	15.8
Bachelor's degree	22	38.6
Advanced Diploma	1	1.8
Master's degree	2	3.5
High Diploma	2	3.5
Middle School	4	7.0
Missing	17	29.8
Job		
Production	12	21.1
Business and Financial Operations	6	10.5
Architecture and Engineering	4	7.0
Computer and Mathematical	8	14.0
Education. Training, and Library	1	1.8
Sales and related	5	8.8
Arts. Design. Entertainment. Sports, and Media	4	7.0
Office and Administrative Support	2	3.5
Missing	15	26.3
Work Experience		
10 years or more	16	28.1
At least 3 years, but less than 5 years	8	14.0
At least 5 years, but less than 10 years	13	22.8
At least 1 year, but less than 3 years	9	15.8
Less than 1 year	1	1.8
Missing	10	17.5
Work in company		
10 years or more	5	8.8
At least 3 years, but less than 5 years	12	21.1
At least 5 years, but less than 10 years	2	3.5
At least 1 year, but less than 3 years	15	26.3
Less than 1 year	13	22.8
Missing	10	17.5

Table 5.7 Managers' demographic profile (n =30)

	Count	Percent
Age		
26 – 35	13	43.3
36 – 45	10	33.3
46 – 55	6	20.0
25 and under	1	3.3
Missing	0	0.0
Education		
Master's degree	7	23.3
Bachelor's degree	15	50.0
College	5	16.7
Middle School	1	3.3
Ph.D. degree	2	6.7
Missing	0	0.0
Work Experience		
10 years or more	20	66.7
At least 1 year, but less than 3 years	1	3.3
At least 3 years, but less than 5 years	1	3.3
At least 5 years, but less than 10 years	7	23.3
Missing	1	3.3
Work in company		
Less than 1 year	5	16.7
At least 3 years, but less than 5 years	8	26.7
At least 1 year, but less than 3 years	7	23.3
10 years or more	3	10.0
At least 5 years, but less than 10 years	6	20.0
Missing	1	3.3
How much experience do you have on managing position?		
At least 5 years, but less than 10 years	9	30.0
10 years or more	13	43.3
At least 1 year, but less than 3 years	1	3.3
At least 3 years, but less than 5 years	6	20.0
Missing	1	3.3
Number of subordinates reporting directly to you		
1 – 3	6	20.0
4 – 6	7	23.3
7 – 9	2	6.7
16 – 18	2	6.7
19 or more	5	16.7
0	3	10.0
10-12	4	13.3
Missing	1	3.3

	Count	Percent
What size is your organization?		
1001-10000 employees	16	53.3
101 - 500 employees	4	13.3
51 - 100 employees	3	10.0
501-1000 employees	3	10.0
Less 50 employees	3	10.0
More than 10000 employees	1	3.3
Missing	0	0.0
Indicate the (main) industry of your organization		
Consumer Durables & Apparel	10	33.3
Technology Hardware & Equipment	11	36.7
Software & Services	1	3.3
Materials	1	3.3
Professional Services	3	10.0
Semiconductors & Semiconductor Equipment	2	6.7
Capital Goods	1	3.3
Product Testing, Inspection and Certification	1	3.3
Missing	0	0.0
What is type of organizational unit you are managing?		
Team or Work Group	8	26.7
Department	20	66.7
Project	1	3.3
Organization or Branch	1	3.3
Missing	0	0.0
What types of job your unit(team, department) is responsible for?		
Arts. Design. Entertainment. Sports, and Media	4	13.3
Business and Financial Operations	3	10.0
Computer and Mathematical	3	10.0
Installation. Maintenance, and Repair	2	6.7
Office and Administrative Support	3	10.0
Production	9	30.0
Sales and related	6	20.0
Transportation and Material moving	1	3.3
Quality Management	12	40.0

Most of the managers were responsible for managing a department (66.7%) and team or work groups (26.7%). A major portion of them (43%) had one to six direct subordinates. However, three managers did not have direct subordinates because some organizational units participating in the study had two managers and one of them formally didn't have direct subordinates. Also, some "managers" in the study were supervisors or

leaders of a team or work group. They also did not have direct subordinates. The largest portion of the organizational units participating in the study conducted jobs related to quality management (40%), production (30%) and sales (20%). More than 53% of the companies had more than 1,000 employees and operated in technology hardware and equipment (36.7%), consumer durables and apparel (33.3%), and professional services industries (10%).

Table 5.8 summarizes the tests of normality on the demographic information of respondents and managers.

Table 5.8 Test of normality (Employees)

Questions	N	K-S (p)	Lilliefors (p)	W	p
Performance. Level	57	$p < 0.01$	$p < 0.01$	**0.634**	**0.000***
You are	46	$p < 0.01$	$p < 0.01$	**0.591**	**0.000***
Your age	47	$p < 0.01$	$p < 0.01$	**0.740**	**0.000***
The highest level of education you have completed is	40	$p < 0.01$	$p < 0.01$	**0.725**	**0.000***
What type of job you are responsible for?	42	$p < 0.20$	$p < 0.01$	**0.883**	**0.000***
You have worked for this company for	47	$p < 0.01$	$p < 0.01$	**0.845**	**0.000***
Indicate years of your total professional experience	47	$p < 0.05$	$p < 0.01$	**0.860**	**0.000***

Table 5.9 Test of normality (Managers)

Questions	N	K-S (p)	Lilliefors (p)	W	p
What size is your organization?	30	$p < 0.01$	$p < 0.01$	**0.763**	**0.000***
Indicate the (main) industry of your organization	30	$p < 0.01$	$p < 0.01$	**0.782**	**0.000***
What is type of organizational unit you are managing?	30	$p < 0.01$	$p < 0.01$	**0.709**	**0.000***
Your age	30	$p < 0.05$	$p < 0.01$	**0.816**	**0.000***
The highest level of education you have completed is	30	$p < 0.01$	$p < 0.01$	**0.814**	**0.000***
You have worked for this company for	29	$p > 0.20$	$p < 0.01$	**0.885**	**0.004***
Indicate years of your total professional experience	29	$p < 0.01$	$p < 0.01$	**0.603**	**0.000***
How much experience do you have on	29	$p < 0.01$	$p < 0.01$	**0.786**	**0.000***

Questions	N	K-S (p)	Lilliefors (p)	W	p
managing position?					
Number of subordinates reporting directly to you	29	p < 0.15	p < 0.01	**0.881**	**0.003***

5.2.2 Descriptive Statistics and Tests of Normality

This chapter describes the analyzed data based on descriptive statistics and tests of normality. The designations are used in the tables which include: Valid N (number of data instances used to calculate descriptive statistics), Mean, Variance, Std.Dev (standard deviation), K-S p (Kolmogorov-Smirnov test), Lilliefors p (Liliefors test), W (Shapiro-Wilk's W test) and p-level.

5.2.2.1 Descriptive statistics for Competency data

Individual competencies scores ($Comp_{score}$) were calculated by using respondents' assessments of their own and their peers' behaviour. A composite score was obtained by using Eq. (4.1). Descriptive statistics and tests of normality were calculated. The results are shown in Table 5.10.Different tests show that only ACH_B, INNOV_A, INNOV and TL followed a normal distribution. However the results of different tests were not consistent because of the small sample.

Table 5.10 Descriptive statistics and tests of normality (Competencies)

	Descriptive statistics				Tests of Normality, n = 34				
	Valid N	Mean	Variance	Std.Dev.	max D	K-S p	Lilliefors p	W	p-level
ACH	49	0.423	0.012	0.111	0.092	p > 0.20	p > 0.20	0.976	0.645
CO	49	0.528	0.040	0.199	0.116	p > 0.20	p > 0.20	0.966	0.369
INFO	51	0.469	0.030	0.174	0.082	p > 0.20	p > 0.20	0.980	0.786
INT_A	49	0.455	0.031	0.176	0.126	p > 0.20	p > 0.20	0.959	0.234
INT_B	49	0.400	0.026	0.162	0.100	p > 0.20	p > 0.20	0.981	0.790
INT	48	0.434	0.018	0.135	0.081	p > 0.20	p > 0.20	0.983	0.860
INNOV_A	48	0.428	0.041	0.202	0.162	p > 0.20	**p < 0.05***	**0.921***	**0.017***
INNOV_B	45	0.538	0.038	0.194	0.084	p > 0.20	p > 0.20	0.958	0.213
INNOV_C	43	0.523	0.037	0.192	0.127	p > 0.20	p < 0.20	0.954	0.162

INNOV	43	0.492	0.018	0.134	0.152	p > 0.20	**p < 0.05***	0.938	0.053
TW	43	0.427	0.014	0.120	0.084	p > 0.20	p > 0.20	0.983	0.872
TL	54	0.262	0.051	0.227	0.158	p > 0.20	**p < 0.05***	**0.927***	**0.026***

5.2.2.2 Descriptive statistics for team climate data

Table 5.11 presents the descriptive statistics and results of normality tests for the team climate data. The constructs were calculated as averaged scores of the items measured on a four-point Likert scale (i.e. 1 = Definitely Disagree; 2 = Inclined to Disagree; 3 = Inclined to Agree, 4 = Definitely Agree).

Table 5.11 Descriptive statistics and tests of normality (Team Climate)

	Descriptive statistics				Tests of Normality, n = 53				
	Valid N	Mean	Variance	Std. Dev.	max D	K-S p	Lilliefors p	W	p
Commitment	54	3.491	0.260	0.510	0.153	p < 0.20	**p < 0.01***	**0.930***	**0.004***
Recognition	54	2.912	0.382	0.618	0.133	p > 0.20	**p < 0.0*5**	0.973	0.265
Responsibility	54	3.037	0.195	0.441	0.115	p > 0.20	p < 0.10	0.965	0.117
Standards	54	3.191	0.250	0.500	0.113	p > 0.20	p < 0.10	0.958	0.061
Structure	54	3.215	0.234	0.483	0.137	p > 0.20	**p < 0.05***	**0.942***	**0.012***
Support	53	3.377	0.185	0.430	0.168	p < 0.10	**p < 0.01***	**0.944***	**0.015***

5.2.2.3 Descriptive statistics for organizational culture data

Table 5.12 presents the descriptive statistics and results of normality tests for the organizational culture data. The constructs were calculated as averaged scores of the items measured by distributing 100-point scores. Scores were normalized to the values of 0 to 1. The major differences between "now" (labelled by _N) and preferred (labelled by _P) culture types had clan (CLAN) and hierarchy (HIER) types of culture. The current CLAN culture (CLAN_ N) was higher than the preferred CLAN culture (CLAN_P) for 0.048. This shows that the respondents preferred to have a higher level of CLAN type of culture in their work unit. The current Hierarchy culture (HIER_ N) was lower than the preferred hierarchy culture (HIER_P) of 0.024. This means that the respondents preferred to have a lower level of HIER type of culture in their work unit.

5.2.2.4 Descriptive statistics for Manager Skill Assessment Instrument(MSAI) data

Table 5.13 presents the descriptive statistics and results of normality tests for the Manager Skill Assessment Instrument (MASI) data. The constructs were calculated as averaged scores of the items measured on a five-point Likert scale (i.e. 1 = Strongly Disagree; 2 = Disagree; 3 = Undecided, 4 = Agree, 5 = Strongly Agree). Scores from managers' self-assessment and team members were averaged.

Table 5.12 Descriptive statistics and tests of normality for Organizational Culture

	Descriptive statistics				Tests of Normality, n = 43				
	Valid N	Mean	Variance	Std.Dev.	max D	K-S p	Lilliefors p	W	p
CLAN_N	43	0.240	0.004	0.060	0.137	p > 0.20	**p < 0.05***	0.968	0.272
ADH_N	43	0.246	0.002	0.049	0.115	p > 0.20	p < 0.20	**0.942***	**0.032***
MAR_N	43	0.249	0.002	0.049	0.073	p > 0.20	p > 0.20	0.973	0.395
HIER_N	43	0.265	0.002	0.046	0.134	p > 0.20	p < 0.10	**0.917***	**0.004***
CLAN_P	43	0.288	0.002	0.039	0.107	p > 0.20	p > 0.20	**0.935***	**0.017***
ADH_P	43	0.247	0.001	0.037	0.114	p > 0.20	p < 0.20	0.953	0.075
MAR_P	43	0.224	0.001	0.033	0.186	p < 0.10	**p < 0.01***	**0.926***	**0.009***
HIER_P	43	0.241	0.002	0.049	0.140	p > 0.20	**p < 0.05***	**0.825***	**0.000***

Table 5.13 Descriptive statistics and tests of normality (Manager Skills)

	Descriptive statistics				Tests of Normality, n = 49				
	Valid N	Mean	Variance	Std. Dev.	max D	K-S p	Lilliefors p	W	p
ADH_Managing Innovation	53	3.925	0.226	0.476	0.103	p > 0.20	p > 0.20	0.976	0.416
ADH_Managing the Future	54	3.731	0.310	0.557	0.120	p > 0.20	p < 0.10	0.958	0.077
ADH_Managing Continuous Improvement	54	3.957	0.261	0.511	0.127	p > 0.20	p < 0.05	0.980	0.552
MAR_Managing Competitiveness	54	3.575	0.285	0.534	0.087	p > 0.20	p > 0.20	0.983	0.680
MAR_Energizing Employees	54	3.898	0.235	0.485	0.092	p > 0.20	p > 0.20	0.988	0.896
MAR_Managing Customer Services	53	3.934	0.282	0.531	0.099	p > 0.20	p > 0.20	0.980	0.578
HIER_Managing Coordination	54	3.977	0.263	0.513	0.159	p < 0.20	p < 0.01	0.929	0.006
HIER_Managing the Control System	54	3.911	0.276	0.526	0.142	p > 0.20	p < 0.05	0.945	0.024
HIER_Managing Acculturation	54	3.802	0.282	0.531	0.131	p > 0.20	p < 0.05	0.966	0.173

CLAN_Managing the Development of Others	54	3.838	0.297	0.545	0.143	p > 0.20	p < 0.05	0.972	0.293
CLAN_Managing Interpersonal Relationships	51	3.993	0.195	0.442	0.117	p > 0.20	p < 0.10	0.988	0.905
CLAN_Managing Teams	52	3.896	0.289	0.538	0.105	p > 0.20	p > 0.20	0.967	0.178

5.3. Construct Validity and Reliability Analysis

Cronbach's Alpha coefficients were calculated for the Organizational Culture, Team Climate and Manager Skills data sets. The results of the reliability analysis are summarized in Table 5.14.

Table 5.14 Results of Cronbach's alpha based reliability analyses

	Cronbach's Alpha	Cronbach's Alpha Based on Standardized Items	N of Items
Organizational Culture	-	-10.308[a]	48
Team Climate	0.749	0.750	24
Manager Skill Assessment Instrument	0.982	0.983	60

Remark: a. The value is negative due to a negative average covariance among items. This violates reliability model assumptions. You may want to check item coding.

5.4 Correlation Analysis

5.4.1 Correlation Analysis for relationships between Organizational Culture and Employee Competencies

Table 5.15 presents the results of the analysis of correlations between competencies and organizational culture constructs. Achievement orientation (ACH) had a moderate negative correlation (r = -0.469) with clan culture type scores in the company. Concern for order (CO) had a moderate negative correlation with scores for preferred level of adhocracy (ADH_P) (r = -0.412) and market (MAR_P) (r = -0.489) types of culture. It also had a moderate positive correlation (r = 0.409) with scores for preferred level of hierarchy (HIER_P) culture type. Information seeking (INFO) had a moderate negative correlation (r

= -0.407) with clan culture type scores in the company. Ideas assessment (INNOV_B) and average scores for innovation orientation (INNOV) had a moderate negative correlation (r = -0.368 and -0.431 respectively) with scores for preferred level of hierarchy (HIER_P) culture type. Team leadership (TL) had a moderate positive correlation (r = 0.389) with scores for current level of adhocracy (ADH_N) culture type and a moderate negative correlation (r = -0.384) with scores for the current level of market (MAR_N) culture type.

As a result, there was no evidence of strong correlations between culture type and competency constructs at p <0.05 level. The following conclusions and propositions can be drawn:

(i) Organizational culture has no direct strong effect on individual competencies.

(ii) There are probably some intermediate factors between culture and competencies.

(iii) The most affected by organizational culture constructs are achievement orientation (ACH), concern for order and quality (CO), information seeking (INFO), innovation orientation (INNOV) and team leadership (TL) competencies. It is important to consider organizational culture type to support these competencies in practical applications.

The results of correlation analysis was used for concluding with regards to hypothesized relationships. Results of hypotheses testing are presented in Table 5.15. The hypothesis was considered as "supported" if the correlation between variables had direction as proposed by the hypothesis, and it was significant at p < 0.05 level. If significance level p > 0.05, the found relatoinship was considered as "non significant". If a variable had few dimensions and the hypothesis was supported for few of them only, it was reported as "partially supported".

Table 5.15 Correlation coefficients between employee competencies and organizational culture constructs

	ACH	CO	INFO	INT_A	INT_B	INT	INNOV_A	INNOV_B	INNO_C	INNOV	TW	TL
CLAN_N	**-0.469***	-0.017	0.023	-0.114	0.026	-0.075	-0.167	-0.011	-0.006	-0.079	-0.136	-0.166
ADH_N	0.263	-0.004	0.164	0.329	0.114	0.336	0.132	0.233	0.212	0.268	0.246	**0.389***
MAR_N	0.073	-0.092	**-0.407***	-0.061	-0.343	-0.268	-0.234	-0.067	-0.129	-0.192	-0.172	**-0.384***
HIER_N	0.114	0.101	0.194	-0.134	0.178	0.006	0.236	-0.132	-0.065	0.006	0.054	0.141
CLAN_P	0.180	0.212	0.210	0.006	0.022	0.019	-0.027	0.261	-0.017	0.108	0.067	0.178
ADH_P	-0.030	**-0.412***	-0.042	-0.057	-0.150	-0.142	0.223	0.255	0.241	0.330	0.018	-0.064

	ACH	CO	INFO	INT_A	INT_B	INT	INNOV_A	INNOV_B	INNO_C	INNOV	TW	TL
MAR_P	-0.124	**-0.489****	-0.148	-0.311	0.103	-0.183	0.228	0.060	0.276	0.255	0.087	-0.061
HIER_P	-0.026	**0.409***	-0.024	0.217	0.019	0.186	-0.260	**-0.368***	-0.306	**-0.431***	-0.105	-0.040

*. Correlation is significant at the 0.05 level (2-tailed).

**. Correlation is significant at the 0.01 level (2-tailed).

c. Listwise N=29

Based on the correlation coefficients, it is interesting to note that only one hypothesized relationship was supported. Hypothesis H1.CO-1, that hierarchy type of organizational culture (HIER) is positively related to individual scores of the concern for order and quality (CO) competency was supported for preferred culture. The correlation coefficient r = 0.409 shows the moderated positive correlation between variables at $p < 0.05$ level of significance.

Hypothesis H1.TL-2, which proposed that the adhocracy type of organizational culture (ADH) is positively related to individual scores of Team Leadership (TL) competency was supported for the existing culture. The correlation coefficient r = 0.389 shows the moderate positive correlation between variables at $p < 0.05$ level of significance.

Table 5.16 presents significant negative correlations between ACH and CLAN_N, INFO and MAR_N, CO and ADH_P, CO and MAR_P, INNOV and HIER_P, TL and MAR_N variables that may have practical implications and interpretation. As a result, the hypothesis H1, that the organizational culture has a strong effect on employee competencies, can be considered as partially supported for achievement orientation (ACH), concern of order and quality (CO), information seeking (INFO), innovation orientation (INNOV_B and INNOV) and team ledership (TL).

5.4.2 Correlation Analysis for relationships between Team Climate and Employee Competencies

Table 5.17 presents the results of the analysis of correlations between competencies and team climate constructs. Initiative time dimension (INT_A) had moderate negative correlation with commitment (r = -0.334), recognition (r = -0.459) and standards (r = -0.445) dimensions of the team climate at $p < 0.05$ level. Averaged scores of initiative (INT)

competency had a moderate negative correlation (r = -0.369) with the standards dimension of the team climate. Innovation orientation A scale (INNOV_A) had a moderate negative correlation (r = -0.365) with the responsibility dimension and moderate positive correlation (r = 0.339) with structure dimension of the team climate.

As a result, there was no evidence of the strong correlations between team climate and competencies constructs at p <0.05 level. The following conclusions and propositions can be drawn:

(i) Team climate has no direct strong effect on individual competencies.

(ii) There are probably some intermediate factors between climate and competencies.

(iii) The most affected by climate competencies are initiative (INT_A and INT) and innovation orientation (INNOV_A and INNOV_B). It is important to consider climate dimensions to support these competencies in practical applications.

Table 5.16 Results of testing hypotheses for relationships between organizational culture and employee's competencies

Hypotheses	Results
Hypothesis H1. The organizational culture has a strong effect on employee competencies.	Partially supported
H1.ACH-1: Market type of organizational culture is positively related to individual scores of ACH competency	Not supported
H1.CO-1: Hierarchy type of organizational culture is positively related to individual scores of CO competency	Supported for HIER_P
H1.INFO-1: Market type of organizational culture is positively related to individual scores of INFO competency	Not supported.
H1.INFO-2: Adhocracy type of organizational culture is positively related to individual scores of INFO competency	Not supported.
H1.INT-1: Hierarchy type of organizational culture is negatively related to individual scores of INT competency	Partially supported for HIER_P. Non significant
H1.INT-2: Market type of organizational culture is positively related to individual scores of INT competency	Not supported.
H1.INT-3: Adhocracy type of organizational culture is positively related to individual scores of INT competency	Partially supported for ADH_N. Non significant
H1. INNOV-1: Market type of organizational culture is positively related to individual scores of INNOV competency	Not supported
H1. INNOV-2: Adhocracy type of organizational culture is positively related to individual scores of INNOV competency	Supported. Non significant
H1.TW-1 Clan type of organizational culture is positively related to individual scores of TW competency	Not supported
H1.TL-1 Market type of organizational culture is positively related to individual scores of TL competency	Not supported
H1.TL-2 Adhocracy type of organizational culture is positively related to individual scores of TL competency	Partially supported for ADH_N.

The results of correlation analysis was used for concluding with regards to hypothesized relationships. Results of hypotheses testing are presented in Table 5.14. The hypothesis was considered as "supported" if the correlation between variables had direction as proposed by the hypothesis, and it was significant at $p < 0.05$ level. If significance level $p > 0.05$, the found relatoinship was considered as "non significant". If a variable had few dimensions and the hypothesis was supported for few of them only, it was reported as "partially supported".

Table 5.17 Correlation coefficients between employee competencies and team climate constructs

	ACH	CO	INFO	INT_A	INT_B	INT	INNOV_A	INNOV_B	INNOV_C	INNOV	TW	TL
Commitment	0.126	0.172	0.117	**-0.334***	0.023	-0.251	0.041	-0.046	0.067	0.025	0.060	-0.008
Recognition	0.058	-0.035	0.239	**-0.459****	0.090	-0.310	0.069	-0.236	-0.031	-0.094	-0.239	-0.223
Responsibility	0.181	0.040	-0.134	-0.199	-0.116	-0.228	**-0.365***	-0.040	-0.302	-0.309	0.122	0.097
Standards	0.207	0.163	0.207	**-0.445****	-0.025	**-0.369***	-0.097	-0.243	-0.154	-0.222	-0.042	-0.025
Structure	-0.084	-0.073	0.161	-0.225	0.228	-0.039	**0.339***	-0.329	-0.033	-0.022	-0.020	-0.230
Support	0.003	0.099	0.013	-0.330	0.036	-0.240	-0.177	-0.118	-0.026	-0.142	0.039	-0.128

*. Correlation is significant at the 0.05 level (2-tailed).

**. Correlation is significant at the 0.01 level (2-tailed).

c. Listwise N=35

No proposed relationships were supported based on correlations coefficients presented in Table 5.18. However, there are other statistically significant correlations between studying variables. As a result, the hypothesis H2, that the team climate has a strong effect on employee competencies, can be considered as partially supported for initiative (INT_A and INT) competency and innovation orientation (INNOV_A) competencies.

5.5.3 Correlation Analysis for relationships between Manager Skills and Employee Competencies

As shown in Table 5.19, the result shows a moderate positive correlation between concern for order and quality competency (CO) and manager skills dimensions, related to continuous improvement ($r = 0.383$), managing coordination ($r = 0.414$), managing interpersonal relationships ($r = 0.378$) and managing teams ($r = 0.395$) at $p < 0.05$ level.

Achievement orientation (ACH) had a moderate positive correlation with managing coordination (r = 0.370) and managing the control system (r = 0.390) at $p < 0.05$. Innovation idea assessment (INNOV_B) had a moderate positive correlation with managing competitiveness (r = 0.369) at $p < 0.05$.

Table 5.18 Results of testing hypotheses for relationships between team and employee's competencies

Hypotheses	Result
Hypothesis H2. The team climate has a strong effect on employee competencies.	
H2.ACH-1: Structure dimension of team climate is positively related to individual scores of ACH	Supported. Non significant
H2.ACH-2: Standards dimension of team climate is positively related to individual scores of ACH	Supported. Non significant
H2.ACH-3: Responsibility dimension of team climate is positively related to individual scores of ACH	Supported. Non significant
H2.ACH-4: Recognition dimension of team climate is positively related to individual scores of ACH	Not supported
H2.CO-1: Structure dimension of team climate is positively related to individual scores of CO competency	Not supported
H2.CO-2: Recognition dimension of team climate is positively related to individual scores of CO competency	Not supported
H2.CO-3: Commitment dimension of team climate is positively related to individual scores of CO competency	Supported. Non significant
H2.INFO-1: Responsibility dimension of team climate is positively related to individual scores of INFO competency	Not supported
H2.INFO-2: Support dimension of team climate is positively related to individual scores of INFO competency	Not supported
H2.IFNO -3: Commitment dimension of team climate is positively related to individual scores of INFO competency	Supported. Non significant
H2.INT-1: Support dimension of team climate is positively related to individual scores of INT competency	Not supported
H2.INT-2: Commitment dimension of team climate is positively related to individual scores of INT competency	Not supported
H2.INNOV-1: Support dimension of team climate is positively related to individual scores of INNOV competency	Not supported
H2.INNOV-2: Recognition dimension of team climate is positively related to individual scores of INNOV competency	Not supported
H2.INNOV-3: Commitment dimension of team climate is positively related to individual scores of INNOV competency	Not supported
H2.TW-1: Responsibility dimension of team climate is positively related to individual scores of TW competency	Supported. Non significant
H2.TW -2: Support dimension of team climate is positively related to individual scores of TW competency	Not supported
H2.TW-3: Commitment dimension of team climate is positively related to individual scores of TW competency	Not supported
H2.TL-1: Responsibility dimension of team climate is positively related to individual scores of TL competency	Not supported

Hypotheses	Result
H2.TL-2: Recognition dimension of team climate is positively related to individual scores of TL competency	Not supported
H2.TL-3: Commitment dimension of team climate is positively related to individual scores of TL competency	Not supported
H2.TL-4: Standards dimension of team climate is positively related to individual scores of TL competency	Not supported
H2.TL-5: Structure dimension of team climate is positively related to individual scores of TL competency	Not supported

Teamwork competency (TW) had a moderate positive correlation with manager skills dimensions, related to managing innovation (r = 0.410), managing continuous improvements (r = 0.425), energizing employees (r = 0. 454) and managing the development of others (r = 0.397).

As a result, there was no evidence of the strong correlations between culture type and competency constructs at $p < 0.05$ level. The following conclusions and propositions can be drawn:

(i) Manager skills and practices have no direct strong effect on individual competencies.

(ii) There are probably some intermediate factors between manager behaviour and competencies.

(iii) The most affected by manager skills are achievement orientation (ACH), concern for order and quality (CO), information orientation (INFO), innovative ideas assessment (INNOV_) and team work (TW) competencies.

Table 5.19 Correlation coefficients between employee competencies and Manager Skills constructs (Listwise N=33)

	ACH	CO	INFO	INT_A	INT_B	INT	INNOV_A	INNOV_B	INNOV_C	INNOV	TW	TL
ADH_Managing Innovation	0.301	0.309	-0.240	-0.208	-0.077	-0.213	-0.215	0.199	-0.008	-0.003	**0.410***	0.135
ADH_Managing the Future	0.055	0.281	-0.251	-0.281	-0.184	-0.337	-0.097	0.230	-0.095	0.024	0.298	-0.015
ADH_Managing Continuous Improvement	0.312	**0.383***	-0.310	-0.083	0.022	-0.053	-0.128	0.309	0.080	0.127	**0.425***	0.245
MAR_Managing Competitiveness	0.194	0.148	**-0.361***	-0.178	-0.034	-0.164	-0.077	0.330	0.191	0.209	0.230	0.045
MAR_Energizing Employees	0.329	0.200	-0.123	-0.184	0.149	-0.056	-0.007	0.293	0.134	0.196	**0.454****	0.213
MAR_Managing Customer Services	0.314	0.338	-0.071	-0.039	0.096	0.028	-0.097	0.107	-0.031	-0.006	0.259	0.301
HIER_Managing Coordination	**0.370***	**0.414***	-0.167	-0.120	-0.072	-0.140	-0.132	0.259	-0.022	0.055	0.335	0.246

	ACH	CO	INFO	INT_A	INT_B	INT	INNOV_A	INNOV_B	INNOV_C	INNOV	TW	TL
HIER_Managing the Control System	**0.390***	0.316	-0.206	-0.186	0.084	-0.098	-0.150	0.122	-0.047	-0.030	0.301	0.336
HIER_Managing Acculturation	0.272	0.275	-0.156	-0.233	0.064	-0.148	-0.037	0.233	-0.052	0.070	0.288	0.258
CLAN_Managing the Development of Others	0.183	0.319	-0.202	-0.042	-0.021	-0.046	-0.018	**0.369***	0.071	0.200	**0.397***	0.116
CLAN_Managing Interpersonal Relationships	0.107	**0.378***	-0.271	-0.289	-0.160	-0.329	-0.120	0.091	-0.166	-0.084	0.280	0.004
CLAN_Managing Teams	0.185	**0.395***	-0.308	-0.231	-0.094	-0.243	-0.152	0.333	0.014	0.097	0.330	0.118

*. Correlation is significant at the 0.05 level (2-tailed). **. Correlation is significant at the 0.01 level (2-tailed).

The results of correlation analysis was used for concluding with regards to hypothesized relationships. Results of hypotheses testing are presented in Table 5.14. The hypothesis was considered as "supported" if the correlation between variables had a direction as proposed by the hypothesis, and it was significant at $p < 0.05$ level. If significance level $p > 0.05$, the found relatoinship was considered as "non significant". If a variable had few dimensions and the hypothesis was supported for few of them only, it was reported as "partially supported".

The correlation coefficients presented in Table 5.20 show that some hypothesized relationships were supported. Hypothesis H3.CO-1, that Managing Coordination skills are positively related to individual scores of the concern for order and quality competency (CO) competency was supported. The correlation coefficient $r = 0.414$ shows a moderate positive correlation between variables at $p < 0.05$ level of significance. Hypothesis H3.TW-5, that Managing the Develelopment of others(CLAN) skills are positively related to individual scores of Teamwork (TW) competency, wassupported. The correlation coefficient $r = 0.397$ shows a moderate positive correlation between variables at $p < 0.05$ level of significance.

Other hypothesis were supported but not statistically significant. They are important for the furture research. It was proposed that they may be considered significant for larger sample size. As a result, the hypothesis H3, that manager skills have a strong effect on employee competencies, can be considered as partially supported for achievement

orientation (ACH), concern of order and quality (CO), informaiton seeking (INFO), innovation orientation (INNOV_B) and teamwork (TW) competencies.

Table 5.20 Results of testing hypotheses for relationships between manager skills and employee's competencies

Hypotheses	Result
Hypothesis H3. Manager skills have a strong effect on employee competencies	
H3.ACH-1: Managing Competitiveness (MAR) is positively related to individual scores of ACH competency	Supported. Non significant
H3.ACH-2 Energizing Employees (MAR) is positively related to individual scores of ACH competency	Supported. Non significant
H3.ACH-3: Managing Customer Service (MAR) is positively related to individual scores of ACH competency	Supported. Non significant
H3.ACH-4: Managing Continues Improvement (ADH) is positively related to individual scores of ACH competency	Supported. Non significant
H3.CO-1: Managing Coordination (HIER) is positively related to individual scores of CO competency	Supported
H3.CO-2: Managing the Control System (HIER) is positively related to individual scores of CO competency	Supported. Non significant
H3.CO-3: Managing Acculturation (HIER) is positively related to individual scores of CO competency	Supported. Non significant
H3.INFO-1: Managing the Future (ADH) is positively related to individual scores of INFO competency	Not supported
H3.INFO-2: Managing Continues Improvement (ADH) is positively related to individual scores of INFO competency	Not supported
H3.INFO-3: Managing Competitiveness (MAR) is positively related to individual scores of INFO competency	Not supported
H3.INFO-4: Managing Innovation (ADH) is positively related to individual scores of INFO competency	Not supported
H3.INT-1: Managing the Control System (HIER) is negatively related to individual scores of INT competency	Not supported
H3.INT-2: Managing Continues Improvement (ADH) is positively related to individual scores of INT competency	Not supported
H3.INT-3: Managing Innovation (ADH) is positively related to individual scores of INT competency	Not supported
H3.INT-4: Managing the Development of others (CLAN) is positively related to individual scores of INT competency	Not supported
H3.INNOV -1: Managing Innovation (ADH) is positively related to individual scores of INNOV competency	Supported for INNOV_B. Non significant
H3.INNOV -2: Managing the Future (ADH) is positively related to individual scores of INNOV competency	Supported for INNOV_B. Non significant
H3.INNOV -3: Managing Continues Improvement (ADH) is positively related to individual scores of INNOV competency	Supported for INNOV_B and INNOV. Non significant
H3.TW-1 Managing Coordination (HIER) is positively related to individual scores of TW competency	Supported. Non significant
H3.TW-2 Managing Acculturation (HIER) is positively related to individual scores of TW competency	Supported. Non significant

Hypotheses	Result
H3.TW-3 Managing Teams (CLAN) is positively related to individual scores of TW competency	Supported. Non significant
H3.TW-4 Managing Interpersonal Relationships (CLAN) is positively related to individual scores of TW competency	Supported. Non significant
H3.TW-5 Managing the Development of others (CLAN) is positively related to individual scores of TW competency	Supported
H3.TL-1 Managing Innovation (ADH) is positively related to individual scores of TL competency	Supported. Non significant
H3.TL-2 Managing the Future (ADH) is positively related to individual scores of TL competency	Not supported
H3.TL-3 Managing Continues Improvement (ADH) is positively related to individual scores of TL competency	Supported. Non significant
H3.TL-4 Energizing Employees (MAR) is positively related to individual scores of TL competency	Supported. Non significant
H3.TL-5 Managing the Development of others (CLAN) is positively related to individual scores of TL competency	Supported. Non significant

5.4.4 Correlation Analysis for relationships between Managers Skills and Team Climate

Table 5.21 shows the correlations between manager practices and team climate constructs. Commitment, standards and support dimensions of the team climate had significant correlations with most of the manager practices. The recognition dimension had moderate positive correlations with managing the future ($r = 0.327$), managing acculturation construct ($r = 0.278$) and managing interpersonal relationships ($r = 0.315$) at $p < 0.05$ level. The responsibility dimension had a moderate positive correlation with managing teams ($r = 0.279$) at $p < 0.05$ level. The structure dimension had moderate negative correlations with managing coordination ($r = -0.282$) and managing the control system ($r = -0.308$) at $p < 0.05$ level.

5.4.5 Correlation Analysis for relationships between Managers Skills and Organizational Culture

Table 5.22 shows the correlations between manager practices and types of organizational culture. Managing continuous improvement had a moderate positive correlation ($r = 0.322$) with scores for preferred level of hierarchy type of culture (HIER_P) at $p < 0.05$ level. Managing customer services had a moderate negative correlation ($r = -$

0.486) with scores for preferred level of adhocracy type of culture (ADH_P) and moderate positive correlation (r = 0.495) with scores for preferred level of hierarchy type of culture (HIER_P) at p <0.01 level. Managing the control system had a moderate negative correlation (r = -0.333) with scores for preferred level of adhocracy type of culture (ADH_P) and moderate positive correlation (r = 0.350) with scores for preferred level of hierarchy type of culture (HIER_P) at p <0.05 level. Managing the development of others has moderate negative correlation (r = -0.355) with scores for preferred level of adhocracy type of culture (ADH_P) at p <0.05 level. Managing interpersonal relationships and managing teams had a moderate negative correlation (r = -0.336 and 0.309 respectively) with scores for current level of adhocracy type of culture (ADH_N) at p <0.05 level.

Table 5.21 Correlation coefficients between Manager Skills and team climate constructs

	Commit-ment	Recognition	Responsi - bility	Standards	Structure	Support
ADH_Managing Innovation	0.263	0.210	0.148	**0.274***	0.013	**0.366****
ADH_Managing the Future	**0.338***	**0.327***	0.148	**0.301***	0.058	**0.450****
ADH_Managing Continuous Improvement	**0.303***	0.102	0.114	0.213	-0.131	**0.333***
MAR_Managing Competitiveness	0.220	0.237	0.099	0.206	-0.201	**0.306***
MAR_Energizing Employees	**0.395****	0.225	0.120	**0.326***	0.095	**0.389****
MAR_Managing Customer Services	**0.299***	0.126	0.069	**0.293***	-0.263	**0.318***
HIER_Managing Coordination	**0.294***	0.054	0.113	0.236	**-0.282***	0.244
HIER_Managing the Control System	**0.326***	0.171	0.243	**0.319***	**-0.308***	**0.299***
HIER_Managing Acculturation	**0.405****	**0.278***	0.168	**0.369****	-0.114	**0.367****
CLAN_Managing the Development of Others	0.212	0.125	0.106	0.158	0.030	**0.365****
CLAN_Managing Interpersonal Relationships	**0.421****	**0.315***	0.132	**0.335***	-0.018	**0.460****
CLAN_Managing Teams	**0.390****	0.262	**0.279***	**0.339***	-0.221	**0.391****

*. Correlation is significant at the 0.05 level (2-tailed). **. Correlation is significant at the 0.01 level (2-tailed).
c. Listwise N=52

Table 5.22 Correlation coefficients between organizational culture and manager skills

	CLAN _N	ADH_ N	MAR_ N	HIER_ N	CLAN _P	ADH_ P	MAR_ P	HIER _P
ADH_Managing Innovation	0.042	-0.010	-0.040	-0.002	-0.103	-0.237	0.047	0.224
ADH_Managing the Future	0.124	-0.170	0.144	-0.127	-0.177	-0.197	0.123	0.197

	CLAN_N	ADH_N	MAR_N	HIER_N	CLAN_P	ADH_P	MAR_P	HIER_P
ADH_Managing Continuous Improvement	0.032	0.087	-0.009	-0.122	-0.040	-0.294	-0.105	**0.322***
MAR_Managing Competitiveness	-0.089	-0.104	0.211	-0.006	-0.263	-0.063	0.208	0.104
MAR_Energizing Employees	0.077	0.071	-0.183	0.024	0.025	-0.297	0.062	0.161
MAR_Managing Customer Services	0.056	0.140	-0.116	-0.094	-0.053	**-0.486****	-0.135	**0.495***
HIER_Managing Coordination	-0.113	0.150	0.052	-0.073	0.047	-0.286	-0.164	0.289
HIER_Managing the Control System	0.015	-0.018	0.028	-0.029	-0.086	**-0.333***	-0.055	**0.350***
HIER_Managing Acculturation	0.185	-0.119	-0.100	0.004	0.046	-0.290	0.028	0.164
CLAN_Managing the Development of Others	0.173	0.199	-0.177	-0.235	0.204	**-0.355***	-0.252	0.284
CLAN_Managing Interpersonal Relationships	0.127	**-0.336***	0.222	-0.040	-0.303	-0.247	0.178	0.292
CLAN_Managing Teams	0.200	**-0.309***	0.072	0.003	0.004	-0.260	0.057	0.153

*. Correlation is significant at the 0.05 level (2-tailed). **. Correlation is significant at the 0.01 level (2-tailed).

c. Listwise N=41

The correlation coefficients presented in Tables 5.21 and 5.22 show some moderate correlation between manager skills and workplace context (organizational culture and team climate). However, there was no evidence of strong relationships between them. As a result, hypothesis H5, which proposed that manager skills have a strong effect on organizational culture and team climate was not supported.

5.5 T-test of group means differences

To test hypothesis H4 that employees with higher scores for the key competencies have higher performance levels, the t-tests of competencies scores means were performed for groups of Best and Average employees as shown Table 5.23.

The results of the t-tests of Employee Competencies scores for the Best and Average performers showed that there were no significant differences in the competencies scores. However, each company and each team had their own criteria for achieving best performance. Since the measurement of performance was based on expert decisions by managers, the performance level values were biased. To obtain more reliable results, the t-tests were performed for each company. An additional requirement entered was that the

number of cases of the best and average performers should not be less than three for each group. Companies A, C and D met this requirement as shown in Tables 5.24 to 5.26.

Table 5.23 Results of t-tests for competencies scores for Best and Average employees

	Mean Average	Mean Best	t-value	df	p	Valid N Aver.	Valid N Best	Std.Dev. Aver.	Std.Dev. Best
ACH_1	0.417	0.431	-0.501	54	0.619	30	26	0.082	0.125
CO_1	0.534	0.521	0.254	54	0.801	30	26	0.191	0.185
INFO_1	0.455	0.485	-0.671	54	0.505	30	26	0.138	0.195
INT_A_1	0.445	0.466	-0.485	54	0.630	30	26	0.163	0.169
INT_B_1	0.395	0.407	-0.298	54	0.767	30	26	0.152	0.152
INT_1	0.421	0.450	-0.855	54	0.396	30	26	0.131	0.118
INNOV_A_1	0.444	0.410	0.662	54	0.511	30	26	0.140	0.230
INNOV_B_1	0.511	0.569	-1.261	54	0.213	30	26	0.134	0.209
INNOV_C_1	0.535	0.509	0.574	54	0.568	30	26	0.154	0.185
INNOV_1	0.495	0.490	0.162	54	0.872	30	26	0.105	0.132
TW_1	0.448	0.402	1.649	54	0.105	30	26	0.101	0.106
TL_1	0.276	0.246	0.493	54	0.624	30	26	0.195	0.254

The results of t-tests presented in Tables 5.20 to 5.22 support the assumption of biased estimation of performance level in different companies. In company A as shown in Table 5.20, the differences in scores for ACH and TL competencies were statistically significant at $p < .05$ level. The best employees had higher scores for ACH and TL competencies.

Table 5.24 Results of t-tests for competencies scores for Best and Average employees in company A

	Mean Average	Mean Best	t-value	df	p	Valid N Average	Valid N Best	Std.Dev. Average	Std.Dev. Best
ACH_1	**0.433**	**0.582**	**-3.820**	**11**	**0.003***	**10**	**3**	**0.062**	**0.044**
CO_1	0.622	0.578	0.437	11	0.670	10	3	0.168	0.039
INFO_1	0.500	0.560	-1.090	11	0.299	10	3	0.066	0.136
INT_A_1	0.411	0.506	-1.688	11	0.120	10	3	0.082	0.100
INT_B_1	0.409	0.457	-1.073	11	0.306	10	3	0.054	0.109
INT_1	0.413	0.481	-1.592	11	0.140	10	3	0.054	0.100
INNOV_A_1	0.452	0.292	1.527	11	0.155	10	3	0.173	0.072
INNOV_B_1	0.457	0.481	-0.277	11	0.787	10	3	0.116	0.202
INNOV_C_1	0.524	0.417	0.894	11	0.390	10	3	0.190	0.144
INNOV_1	0.475	0.396	0.903	11	0.386	10	3	0.134	0.127
TW_1	0.473	0.444	0.323	11	0.753	10	3	0.136	0.139
TL_1	**0.169**	**0.589**	**-2.652**	**11**	**0.022***	**10**	**3**	**0.173**	**0.429**

Table 5.25 Results of t-tests for competencies scores for Best and Average employees in company C

	Mean Average	Mean Best	t-value	df	p	Valid N Average	Valid N Best	Std.Dev. Average	Std.Dev. Best
ACH_1	**0.373**	**0.521**	**-3.541**	**4**	**0.024***	**3**	**3**	**0.060**	**0.039**
CO_1	**0.733**	**0.383**	**2.855**	**4**	**0.046***	**3**	**3**	**0.034**	**0.210**
INFO_1	0.464	0.368	1.160	4	0.311	3	3	0.102	0.102
INT_A_1	0.422	0.457	-0.327	4	0.760	3	3	0.069	0.168
INT_B_1	0.417	0.296	0.780	4	0.479	3	3	0.028	0.266
INT_1	0.419	0.445	-0.373	4	0.728	3	3	0.021	0.119
INNOV_A_1	0.347	0.229	1.010	4	0.369	3	3	0.024	0.201
INNOV_B_1	0.472	0.346	1.300	4	0.264	3	3	0.024	0.166
INNOV_C_1	0.389	0.362	0.324	4	0.762	3	3	0.024	0.143
INNOV_1	0.403	0.358	0.652	4	0.550	3	3	0.024	0.116
TW_1	0.381	0.389	-0.143	4	0.893	3	3	0.083	0.058
TL_1	0.389	0.233	1.357	4	0.246	3	3	0.183	0.076

In company C as shown in Table 5.21, the differences in scores for ACH and CO competencies were statistically significant at $p < .05$ level. The best employees had higher scores for ACH competency. However, the best employees had lower scores for CO competency.

In company D, as shown in Table 5.22, the differences in scores for ACH and INNOV_A competencies were statistically significant at $p < .05$ level. The best employees had lower scores for ACH and INNOV_A competencies.

Table 5.26 Results of t-tests for competencies scores for Best and Average employees in company D

	Mean Average	Mean Best	t-value	df	p	Valid N Average	Valid N Best	Std.Dev. Average	Std.Dev. Best
ACH_1	**0.457**	**0.330**	**2.267**	**12**	**0.043***	**11**	**3**	**0.077**	**0.123**
CO_1	0.460	0.739	-2.045	12	0.063	11	3	0.205	0.228
INFO_1	0.420	0.468	-0.278	12	0.786	11	3	0.211	0.462
INT_A_1	0.492	0.561	-0.521	12	0.612	11	3	0.222	0.042
INT_B_1	0.366	0.329	0.289	12	0.777	11	3	0.214	0.102
INT_1	0.430	0.445	-0.123	12	0.904	11	3	0.208	0.070
INNOV_A_1	**0.485**	**0.229**	**4.334**	**12**	**0.001***	**11**	**3**	**0.098**	**0.036**
INNOV_B_1	0.584	0.784	-2.084	12	0.059	11	3	0.129	0.215
INNOV_C_1	0.575	0.605	-0.493	12	0.631	11	3	0.087	0.126
INNOV_1	0.545	0.558	-0.424	12	0.679	11	3	0.046	0.058
TW_1	0.485	0.459	0.457	12	0.656	11	3	0.061	0.165
TL_1	0.342	0.222	0.863	12	0.405	11	3	0.229	0.107

As a result, hypothesis H4 was partially supported at company level.

5.6 Predictive Modelling

5.6.1 Decision trees for the prediction of high performance level

Based on the data collected, a decision tree was built for the prediction of high performance level. The decision tree diagram is presented in Fig. 5.2. The model had cross-validation risk at the 0.554 level. The percentage of (total) correct predictions was 87.5%. The percentage of correct predictions of “High” value was 84.6%. Decision rules which met the cutoff requirements discussed in section 4.6.7.2 were extracted and are presented in Table 5.23. The table shows that the high value of performance level of the employees is more probable in nodes 4,5 and 10. The nodes are sorted in accordance with the index value in descending order. There are decision rules which describe levels of the predictors (independent variables) for the target nodes.

Node 10 is described by (1) medium or low level of achievemnt orientation (ACH) competency, not low information seeking (INFO) and innovation ideas assesment (INNOV_B) and high motivation for initiative (INT_B), (2) medium or high level of managing interpersonal relationships skills. High performance level is more likely to appear in teams with similar combinations of competencies and contextual factors.

The rules for nodes 4 and 5 consist of less variables. However, rules for each nodes in Table 5.27 include medium or high level of managing interpersonal relationships skills. Managing interpersonal relationships could be considered as an important predictor of high perfromance of employees.

The second decision tree was built by using competency variables only. The model had cross-validation risk at the 0.554 level. The percentage of (total) correct predictions was 69.6%. The percentage of correct predictions of “High” value was 53.8%. The rules for the competency-based decision tree were extracted into Table 5.28 It shows that the high value of performance level of the employees required a “high” level of innovation ideas assessment (INNOV_B) or “high” level of acievement orientation (ACH)

competencies. As a result, INNOV_B and ACH were the best predictions of the high perfromance level for employees.

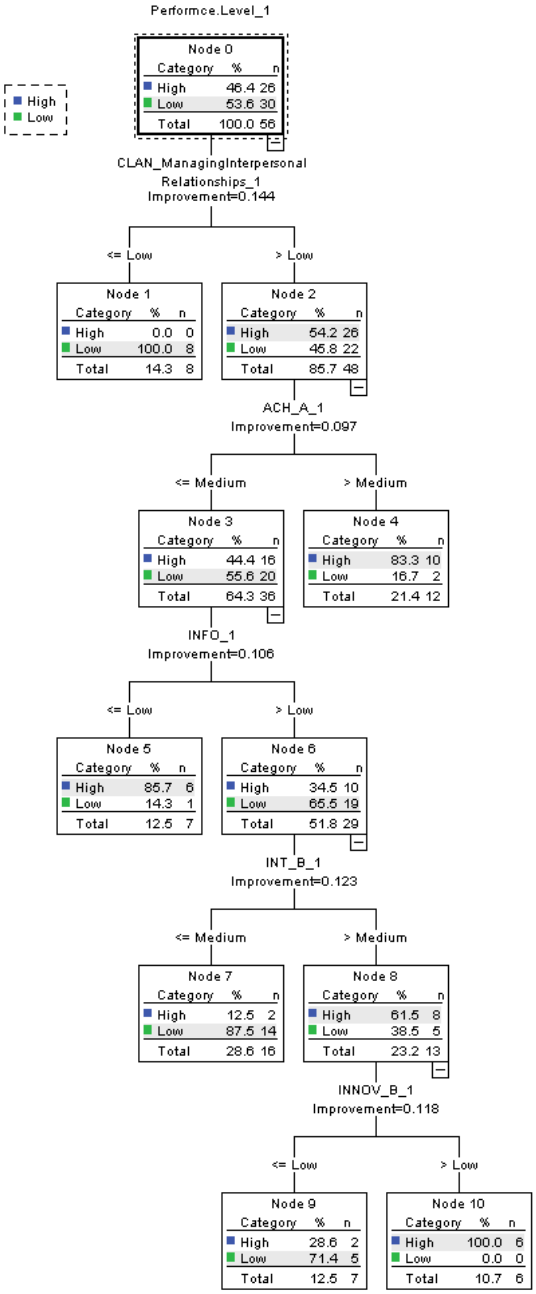

Figure 5.2 Achievement Orientation (ACH) Tree Diagram

Table 5.27 Statistics and decision rules of the decision tree for high Performance Level (All variables)

Node	Gain	Response	Index	Rules	
10	23.1 %	100 %	215.4 %	Competencies:	ACH <= "Medium" , INFO > "Low", INT_B = "High", INNOV_B > "Low"
				Manager skillsI:	Managing Interpersonal Relationships > "Low"
5	23.1 %	85.7 %	184.6 %	Competencies:	ACH <= "Medium", INFO > "Low"
				Manager Skills:	Managing Interpersonal Relationships > "Low"
4	38.5 %	83.3 %	179.5 %	Competencies:	ACH > "Medium"
				Manager Skills:	Managing Interpersonal Relationships > "Low"

Table 5.28 Statistics and decision rules of the decision tree for high Performance Level prediction (Competency)

Node	Gain	Response	Index	Rules	
2	23.1 %	85.7 %	184.6 %	Competency:	INNOV_B = "High"
4	30.8 %	66.7 %	143.6 %	Competency:	INNOV_B <="Medium" ACH = "High"

5.6.2 Decision trees for the prediction of Achievement Orientation (ACH) competency

Decision trees were built for the achievement orientation (ACH) competency. Table 5.29 shows the rules for nodes with probabilities of "High" value for ACH competency. The model had cross-validation risk at the 0.571 level. The percentage of (total) correct predictions was 67.9%. The percentage of correct predictions of "High" value was 57.1%.

A high level of achievement orientation competency more frequently appeared when the responsibility dimension of the team climate and scores for the existing clan type of culture (CLAN_N) had a medium or low level of scores and managing customer services skills was not low.

Table 5.29 Statistics and decision rules of the decision tree for high ACH scores prediction

Node	Gain	Response	Index	Rules	
7	57.1 %	53.3 %	213.3 %	Team Climate:	Responsibility <= "Medium"
				Organizationa l Culture:	CLAN_N <= "Medium"
				Manager Skills:	Managing cusdtomer services > "Low"

5.6.3 Decision trees for the prediction of concern for order and quality (CO) high scores

Decision trees were built for the concern for order and quality (CO) competency. Table 5.30 shows the rules for nodes with probabilities of "High" value for CO competency. The model had cross-validation risk at the 0.464 level. The percentage of (total) correct predictions was 80.4%. The percentage of correct predictions of "High" value was 84.6%.

High level of CO competency more frequently appeared when the recognition dimension of the team climate and managing development others skills were higher than the low level, and the scores for the preferred clan type of culture (CLAN_P) were high.

5.6.4 Decision trees for the prediction of information seeking (INFO) high scores

The decision trees for the information seeking (INFO) competency had cross-validation risk at the 0.321 level. The percentage of (total) correct predictions was 73.2%. The percentage of correct predictions of "High" value was 0%. The decision tree for INFO did not have nodes that could pass the requirement of the study. Node 4 with the highest response of 9.7% did not meet the required 30% threshold level.

5.6.5 Decision trees for prediction of INT_A high scores

As shown in Table 5.31, the model had cross-validation risk at the 0.571 level. The percentage of (total) correct predictions was 62.5%. The percentage of correct predictions of "High" value was 42.1%.

The decision trees for the initiative competency time dimension (INT_A) had cross-validation risk at the 0.571 level. The percentage of (total) correct predictions was 62.5%. The percentage of correct predictions of "High" value was 42.1%. Table 5.28 shows the rules for nodes with probabilities of "High" value for the initiative competency time dimension (INT_A).

Table 5.30 Statistics and decision rules of the decision tree for high CO scores prediction

Node	Gain	Response	Index	Rules	
8	30.8 %	80 %	344.6 %	Team Climate:	Recognition > "Low"
				Organizational Culture:	CLAN_P = "High"
				Manager Skills:	Managing development others > "Low"
11	53.8 %	63.6 %	274.1 %	Team Climate:	Recognition = "Medium"
				Organizational Culture:	CLAN_P = "Medium", CLAN_N = "High"
				Manager Skills:	Managing development others > "Low"

Table 5.31 shows that the high value of performance level of the employees is more probable in nodes 3 and 5. Node 3 has decision rules for high-level INT_A competency including low scores for the preferred clan type of culture (CLAN_P), and low or medium level of managing coordination skills. Node 5 has decision rules for high-level INT_A competency including medium or high scores for the preferred clan type of culture (CLAN_P), and low or medium level of support dimension of team climate.

Table 5.31 Statistics and decision rules of the decision tree for high INT_A scores prediction

Node	Gain	Response	Index	Rules	
3	42.1 %	72.7 %	214.4 %	Organizational Culture:	CLAN_P = "Low"
				Manager Skills:	Managing Coordination <= "Medium"
5	52.6 %	40 %	117.9 %	Team Climate:	Support <= "Medium"
				Organizational Culture:	CLAN_P > "Low"

5.6.6 Decision trees for the prediction of INT_B high scores

The decision trees for the self-motivation and amount of discretionary dimension of initiative competency (INT_B) had cross-validation risk at the 0.429 level. The percentage of (total) correct predictions was 62.5%. The percentage of correct predictions of "High" value was 42.9%. Table 5.32 shows the rules for teams with probabilities of "High" value for INT_B competency. A high level of INT_B competency more frequently appeared when the existing market type of culture (MAR_N) was low.

Table 5.32 Statistics and decision rules of the decision tree for high INT_B scores prediction

Node	Gain	Response	Index	Rules	
1	42.9 %	60 %	160 %	Organizational Culture:	MAR_N = "Low"

5.6.7 Decision trees for the prediction of initiative (INT) high scores

The decision trees for the initiative (INT) competency had cross-validation risk at the 0.411 level. The percentage of (total) correct predictions was 73.2%. The percentage of correct predictions of "High" value was 83.3%. Table 5.33 shows the rules for nodes with probabilities of "High" value for ACH competency.

Table 5.33 shows that the high value of performance level of the employees is more probable in nodes 2 and 5. Node 2 has decision rules that high-level INT is more likely when scores for the existing adhocracy culture (ADH_N) are high. Node 5 has decision rules for the high-level INT competency that require a combination of the responsibility dimension of r team climate, existing adhocracy and preferred clan types of culture at low or medium levels.

5.6.8 Decision trees for the prediction of INNOV_A high scores

The decision trees for the degree of innovation (INNOV_A) competency had cross-validation risk at the 0.536 level. The percentage of (total) correct predictions was 55.4%. The percentage of correct predictions of "High" value was 0%. In spite of the model having 0% of correct predictions for the current data, it gave valuable information about the most likely situation for high scores of INNOV_A competency.

Table 5.33 Statistics and decision rules of the decision tree for high INT scores prediction

Node	Gain	Response	Index	Rules	
2	27.8 %	83.3 %	259.3 %	Organizational Culture:	ADH_N ="High"
5	55.6 %	47.6 %	148.1 %	Team Climate:	Responsibility <= "Medium"
				Organizational Culture:	ADH_N <= "Medium" CLAN_P <= "Medium"

Table 5.34 shows the rules for nodes with probabilities of "High" value for INNOV_A competency. A high level of INNOV_A is more probable when managing acculturation improvement and preferred clan type of culture are at medium or below level.

Table 5.34 Statistics and decision rules of the decision tree for high INNOV_A scores prediction

Node	Gain	Response	Index	Rules	
3	68.8 %	35.5%	124.2 %	Manager Skills:	Managing Acculturation Improvement <= "Medium"
				Organizational Culture	CLAN_P <= "Medium"

5.6.9 Decision trees for the prediction of INNOV_B high scores

As shown in Table 5.35, the model had cross-validation risk at the 0.518 level. The percentage of (total) correct predictions was 66.1%. The percentage of correct predictions of "High" value was 28.6%. The decision trees for the innovation ideas assessment (INNOV_B) competency had cross-validation risk at the 0.518 level. The percentage of (total) correct predictions was 66.1%. The percentage of correct predictions of "High" value was 28.6%. Table 5.32 shows the rules for nodes with probabilities of "High" value for AINNOV_B competency. It proposes a high level of energizing employees' skills.

Table 5.35 Statistics and decision rules of the decision tree for high INNOV_B scores prediction

Node	Gain	Response	Index	Rules
2	100 %	43.8 %	350 %	Manager Energizing employees = "High" Skills:

5.6.10 Decision trees for prediction of INNOV_C high scores

The decision tree for the support innovations of others (INNOV_C) competency had cross-validation risk at the 0.446 level. The percentage of (total) correct predictions was 58.9%. The percentage of correct predictions of "High" value was 0%. Node 2 with the highest response of 24% did not meet the required 30% threshold level. The total cross-validation risk of the model was 0.276.

5.6.11 Decision trees for prediction of innovation (INNOV) high scores

The model had cross-validation risk at the 0.304 level. The percentage of (total) correct predictions was 69.6%. The decision tree for the innovation orientation (INNOV) competency had cross-validation risk at the 0.276 level. The percentage of (total) correct predictions was 69.6%. The percentage of correct predictions of "High" value was 0%. The percentage of correct predictions of "High" value was 0%. Node 2 with the highest response of 10% did not meet the required 30% threshold level.

5.6.12 Decision trees for prediction of teamwork (TW) high scores

The decision trees for the teamwork (TW) competency had cross-validation risk at the 0.304 level. The percentage of (total) correct predictions was 69.6%. The percentage of correct predictions of "High" value was 0%. The decision tree for TW did not have nodes that could pass the requirement of the study. Node 2 with the highest response of 10% did not meet the required 30% threshold level.

5.6.13 Decision trees for the prediction of team leadership (TL) high scores

The decision trees for the team leadership (TL) competency had cross-validation risk at the 0.518 level. The percentage of (total) correct predictions was 58.9%. The percentage of correct predictions of "High" value was 0%. The decision tree for TL did not have nodes that could pass the requirement of the study. Node 0 with the highest response of 10% did not meet the required 30% threshold level. Node 2 with the highest response of 10.7% didn't meet the required 30% threshold level.

5.7 Summary

This chapter described the results of data analysis performed as part of the study of the context-based competency model for work (project) teams. The descriptive, correlational and reliability analyses were performed. The correlational analyses revealed that only a few of the hypothesized relationships were supported. However, a number of other significant relationships were revealed and studied. The results of t-tests performed to compare the differences of competencies scores for the Best and the Average employees depended on the specific company. However, there were significant differences in the scores when studying the competencies at the company level.

A number of decision trees were built for models for high level of competencies prediction. The decision tree models defined the workplace contextual factors values that were more likely to lead to a high level of studying competencies. The decision tree models can be used to make predictions based on data for workplace contextual factors.

Further discussions of the results of this study, the potential contributions, limitations of the study and suggested directions for future research in this area are presented in Chapter 7.

CHAPTER 6. A STUDY OF THE CONTEXT-BASED COMPETENCY MODEL FOR A STUDENT GROUP

6.1 Background of study

This study was conducted in seven subjects delivered by the Faculty of Engineering of The Hong Kong Polytechnic University. Each subject proposed group work assignments and projects during the semester. Within a class students were assigned into groups (teams) of three to seven students. A total of 101 students participated in the study.

6.2 Descriptive Analysis

6.2.1 Participants

The present study involved 101 students from seven subjects from Faculty of Engineering of The Hong Kong Polytechnic University. The number of students from each subject is shown in Table 6.1.

Table 6.1 Study of the context-based competency model for student groups

Subjects	Number of respondents	Total Number of students	Response rate
EE530	26	45	57.8%
COMP5328	19	26	73.1%
EE550	15	35	42.9%
ISE518	14	26	53.8%
MDP	9	19	47.4%
ISE5604	9	38	23.7%
ME573	9	27	33.3%
Total	101	216	46.8%

The number of respondents that participated in the pilot study was 101. Most of them were male – 66.3% as shown in Figure 6.1.As shown in Figure 6.2, students aged 21-25 years old represented 36.7% of the sample population. The major group of respondents of 44.9% was aged 26-35 years old. Some minor groups of students were age of 36-45

years old represented 17.3% and that aged 46-55 years old represented 1% of the population.

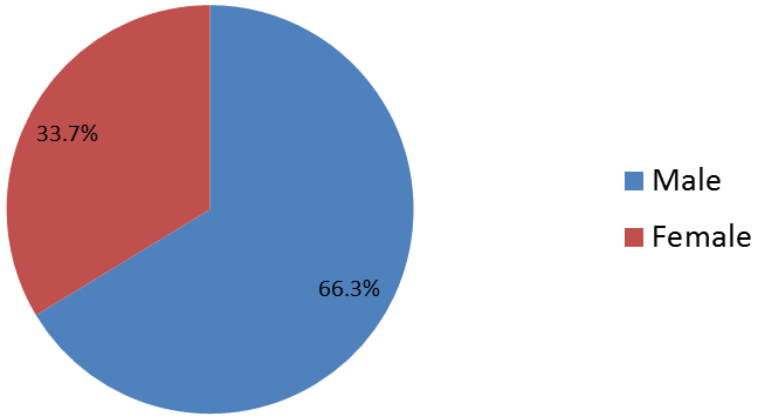

Figure 6.1 Distribution of respondents by sex

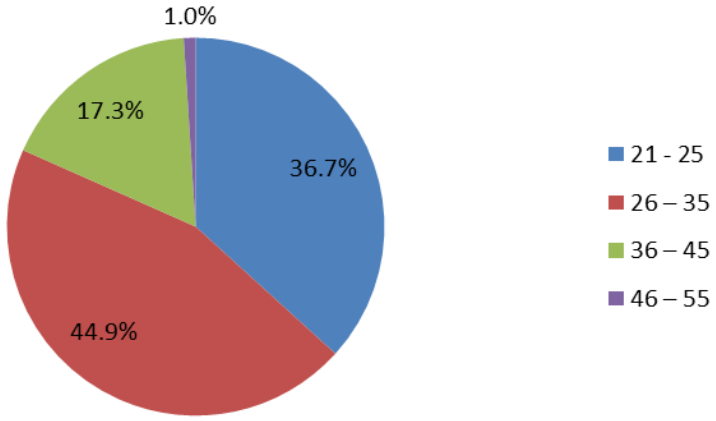

Figure 6.2 Distribution of respondents by age

As shown in Figure 6.3, the respondents came from five countries. Most of them came from Hong Kong (i.e. 65%) and Mainland China (i.e. 31%). Only a few of them came from Korea (2%), Denmark (1%) and Finland (1%). As shown in Figure 6.4, most of the respondents had professional experience (i.e. 23.7%). Of them 14.4% possessed less than 1 year or no professional experience. It is interesting to note that more than 21% of the students had at least 10 years of professional experience.

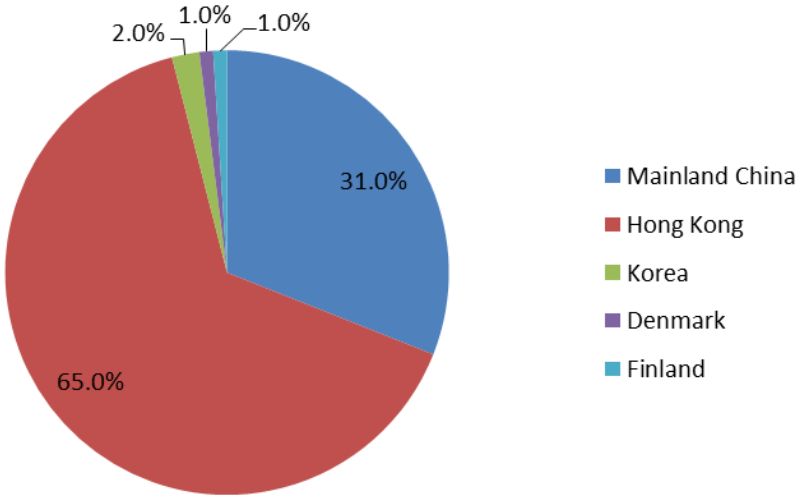

Figure 6.3 County of origin of the respondents

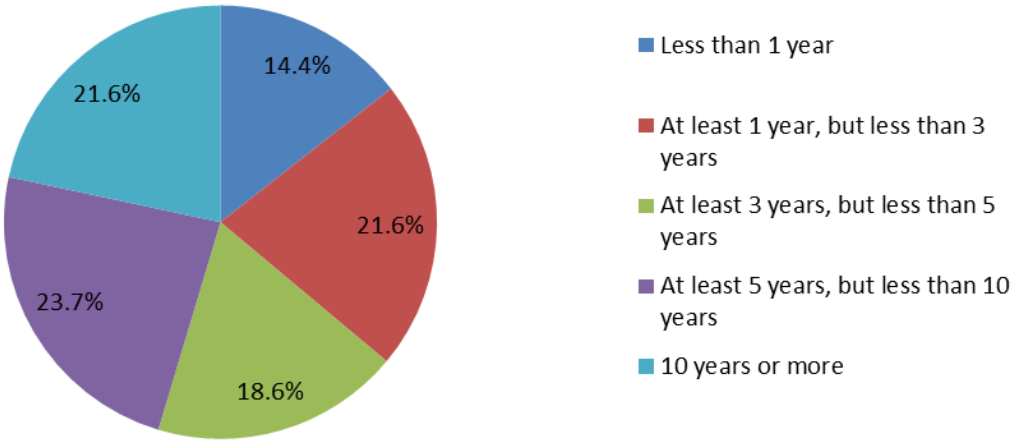

Figure 6.4 Professional experience of the respondents

6.2.2 Descriptive Statistics and Tests of Normality

The descriptive statistics for the study of the context-based competency model for the student group is presented in Table 6.2 while the test of normality competencies data is shown in Table 6.3.

The statistics of the Kolmogorov-Smirnov test for INFO, INT_B, INT, INNOV and TL variables were higher than 0.05. So, the null hypothesis on normality distribution could not be rejected. At the same time, the Shapiro-Wilk test gave some slightly different results.

The hypothesis on normal distribution could not be rejected only for ACH, INFO and INNOV competencies. The Kolmogorov-Smirnov and Shapiro-Wilk tests statistics show that the hypothesis on normality distribution of Team Climate data could be rejected.

Table 6.2 Descriptive statistics for the study of the context-based competency model for a student group

	N	Mean		Std. Deviation	Variance	Skewness		Kurtosis	
	Statistic	Statistic	Std. Error	Statistic	Statistic	Statistic	Std. Error	Statistic	Std. Error
ACH	160	0.239	0.023	0.290	0.084	0.538	0.192	-0.136	0.381
CO	165	0.539	0.020	0.250	0.061	-0.758	0.189	0.321	0.376
INFO	167	0.378	0.017	0.190	0.036	0.037	0.188	-0.553	0.374
INT_A	139	0.592	0.023	0.270	0.075	-0.418	0.206	-0.306	0.408
INT_B	155	0.263	0.015	0.180	0.033	0.849	0.195	2.277	0.387
INT	174	0.265	0.014	0.180	0.032	0.550	0.184	0.073	0.366
INNOV_A	108	0.767	0.034	0.350	0.121	-1.226	0.233	0.166	0.461
INNOV_B	121	0.572	0.022	0.240	0.057	0.672	0.220	-0.510	0.437
INNOV_C	116	0.652	0.018	0.190	0.038	0.083	0.225	-0.334	0.446
INNOV	174	0.307	0.016	0.210	0.045	0.252	0.184	-0.763	0.366
TW	160	0.477	0.017	0.210	0.044	-0.224	0.192	0.672	0.381
TL	174	0.248	0.017	0.230	0.052	1.142	0.184	1.368	0.366
Commitment	155	2.170	0.036	0.444	0.197	0.257	0.195	1.647	0.387
Recognition	162	2.930	0.055	0.705	0.497	-0.565	0.191	0.549	0.379
Standards	159	2.430	0.029	0.369	0.137	-0.127	0.192	-0.565	0.383
Structure	162	2.810	0.035	0.447	0.200	-0.293	0.191	1.446	0.379
Support	159	2.640	0.031	0.391	0.153	-0.637	0.192	0.551	0.383
Fate Control	137	3.350	0.047	0.545	0.297	0.582	0.207	0.349	0.411
Reward for Application	133	3.92	0.043	0.497	0.247	0.064	0.210	-0.097	0.417
Social Complexity	131	3.94	0.044	0.501	0.251	-1.252	0.212	2.532	0.420
Social Cynicism	137	3.35	0.047	0.545	0.297	0.582	0.207	0.349	0.411
GPA	83	3.1	0.053	0.490	0.236	-0.380	0.264	0.050	0.523
Group Performance	116	0.77	0.008	0.084	0.007	0.586	0.225	0.073	0.446
Average GPA score	151	0.77	0.009	0.110	0.012	-0.414	0.197	0.769	0.392

Table 6.3 Test of Normality Competencies data

	Kolmogorov-Smirnov[a]			Shapiro-Wilk		
	Statistic	df	Sig.	Statistic	df	Sig.
ACH	0.115	67	0.029	0.966	67	**0.066**
CO	0.197	67	0.000	0.918	67	0.000
INFO	0.094	67	0.**200***	0.968	67	**0.083**
INT_A	0.164	67	0.000	0.930	67	0.001
INT_B	0.084	67	**0.200***	0.946	67	0.006
INT	0.106	67	**0.058**	0.933	67	0.001
INNOV_A	0.411	67	0.000	0.630	67	0.000
INNOV_B	0.150	67	0.001	0.897	67	0.000
INNOV_C	0.261	67	0.000	0.866	67	0.000
INNOV	0.086	67	**0.200***	0.965	67	**0.058**
TW	0.118	67	0.021	0.952	67	0.011
TL	0.093	67	**0.200***	0.933	67	0.001
Commitment	0.158	155	**0.000**	0.931	155	0.000
Recognition	0.285	162	**0.000**	0.862	162	0.000
Standards	0.157	159	**0.000**	0.945	159	0.000
Structure	0.146	162	**0.000**	0.951	162	0.000
Support	0.167	159	**0.000**	0.927	159	0.000
Fate.Control	0.105	137	**0.001**	0.965	137	0.002
Reward.for.Application	0.117	133	**0.000**	0.983	133	0.094
Social.Complexity	0.146	131	**0.000**	0.906	131	0.000
Social.Cynicism	0.105	137	**0.001**	0.965	137	0.002
GPA	0.154	83	0.000	0.970	83	0.046
Group.Performance	0.110	116	0.001	0.940	116	0.000
Average.GPA.score	0.111	151	0.000	0.964	151	0.001

*. This is a lower bound of the true significance.

a. Lilliefors Significance Correction

The statistics of the Kolmogorov-Smirnov test for Social Axioms data showed that the hypothesis on normality distribution could be rejected. At the same time, the Shapiro-Wilk test gave a significance level of Reward for Application dimension that was higher than .05. As a result, the hypothesis on its normality could not be rejected. Both tests for Performance data showed that the significance level of the normality tests allowed rejection of the null hypothesis on normality distribution.

6.3. Construct Validity and Reliability Analysis

6.3.1 Construct Validity Analysis

A confirmatory factor analysis (CFA) and reliability analysis were used to assess the measured constructs and variables. A confirmatory factor analysis (CFA) was performed using SPSS software to assess the measurement model relating the the measured variables and latent constructs. The CFA was used to confirm a theoretical measurement model for each variable.

6.3.1.1 Construct Validity Analysis for Competency data

The Competency construct was measured by dichotomous items. Scores for the Competency dimension were calculated by Equation (4.1). The measurement assessment and reliability analysis were conducted based on dimensions' scored data. As shown in Table 6.4, the Principal Component Analysis (PCA) for Competency data revealed four components that explained around 65% of the total variance..

Table 6.4 Total Variance Explained

Component	Extraction Sums of Squared Loadings			Rotation Sums of Squared Loadings		
	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %
1	3.688	30.735	30.735	2.828	23.570	23.570
2	1.710	14.249	44.984	2.453	20.439	44.009
3	1.323	11.022	56.006	1.242	10.348	54.357
4	1.040	8.667	64.673	1.238	10.315	64.673

Extraction Method: Principal Component Analysis.

The rotated component matrix shows the correlation coefficients between the principal components and the assessed competencies. Coefficients with a value below 0.4 were suppressed and not displayed in Table 6.5 It shows possible grouping method for data analysis in the further data analysis.

Table 6.5 Rotated Component Matrix[a]

	Component			
	1	2	3	4
ACH		0.670		
CO		0.717		
INFO		0.805		
INT_A	0.464	0.444		
INT_B	0.543			
INT	0.895			
INNOV_A			0.643	
INNOV_B			0.721	
INNOV_C				0.837
INNOV	0.802			
TW		0.674		
TL	0.818			

Extraction Method: Principal Component Analysis.
Rotation Method: Varimax with Kaiser Normalization.
a. Rotation converged in 7 iterations.

6.3.1.2 Construct Validity Analysis for Team Climate data

As shown in Table 6.6, the PCA for Team Climate data revealed three principal components that explained around 63% of the total variance. As shown in Table 6.7, the rotated component matrix shows the correlation coefficients between the principal components and team climate items. Coefficients with a value below 0.4 were suppressed and not displayed in Table 6.7.

Table 16.6 Total Variance Explained

Component	Extraction Sums of Squared Loadings			Rotation Sums of Squared Loadings		
	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %
1	5.070	38.998	38.998	3.686	28.352	28.352
2	1.994	15.337	54.335	3.032	23.327	51.678
3	1.121	8.626	62.961	1.467	11.283	62.961

Extraction Method: Principal Component Analysis.

6.3.1.3 Construct Validity Analysis for Social Axioms data

As shown in Table 6.8, the PCA for Social Axioms data revealed nine principal components that explain around 72% of the total variance. The rotated component matrix shows correlation coefficients between principal components and team climate items (see Table 6.9). Coefficients with a value below 0.4 were suppressed and not displayed in Table 6.9.

Table 6.7 Rotated Component Matrix[a]

	Component		
	1	2	3
Clim02	0.702		
Clim03			-0.660
Clim05	0.856		
Clim06	0.839		
Clim07	0.681		
Clim08		0.751	
Clim11	0.711		
Clim12		0.469	
Clim16	0.701	-0.459	
Clim20			0.728
Clim21		0.812	
Clim23		0.816	
Clim24		0.636	0.443

Extraction Method: Principal Component Analysis.
Rotation Method: Varimax with Kaiser Normalization.
a. Rotation converged in 6 iterations.

Table 26.8 Total Variance Explained

Component	Extraction Sums of Squared Loadings			Rotation Sums of Squared Loadings		
	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %
1	6.706	20.957	20.957	5.154	16.107	16.107
2	4.213	13.167	34.123	2.884	9.011	25.118
3	2.570	8.031	42.154	2.675	8.359	33.477
4	2.373	7.416	49.571	2.346	7.330	40.807
5	1.929	6.027	55.598	2.304	7.199	48.006
6	1.602	5.006	60.604	2.214	6.920	54.926
7	1.320	4.126	64.729	2.075	6.485	61.411
8	1.312	4.099	68.828	1.886	5.894	67.305
9	1.127	3.521	72.349	1.614	5.044	72.349

Extraction Method: Principal Component Analysis.

Table 6.9 Rotated Component Matrix[a]

	Component								
	1	2	3	4	5	6	7	8	9
Sax_01	0.593								
Sax_02	0.797								
Sax_03				0.734					
Sax_04	0.752								
Sax_05				0.811					
Sax_06		0.740							
Sax_07	0.705								
Sax_08		0.661							
Sax_09								0.627	
Sax_10		0.586							
Sax_11	0.752								

	Component								
	1	2	3	4	5	6	7	8	9
Sax_12	0.755								
Sax_13		0.475	-0.433						
Sax_14							0.629		
Sax_15							0.817		
Sax_16	0.745								
Sax_17						0.610			
Sax_18									0.496
Sax_19		0.420						0.657	
Sax_20			0.544						
Sax_21						0.635			
Sax_22		0.780							
Sax_23			0.861						
Sax_24								0.692	
Sax_25				0.436			0.679		
Sax_26						0.814			
Sax_27					0.758				
Sax_28	0.460				0.658				
Sax_29			0.898						
Sax_30									0.850
Sax_31				0.433					
Sax_32					0.642				

Extraction Method: Principal Component Analysis.
Rotation Method: Varimax with Kaiser Normalization.
a. Rotation converged in 9 iterations.

6.3.2 Cronbach's Alpha based Reliability Analysis

As shown in Table 6.10, the reliability analysis was conducted by calculating the Cronbach's Alpha coefficient as a measure for the construct reliability (CR). The results show that Cronbach's Alpha for the Competencies construct dimensions was 0.759. It exceeded 0.60 (Bagozzi & Yi, 1988) and this indicates a good convergence or internal consistency of the theoretical constructs.

Table 6.10 Reliability Statistics

Construct	Cronbach's Alpha	Cronbach's Alpha Based on Standardized Items	N of dimensions	Cases		
				Valid	Excluded[a]	Total
Competency	0.759	0.763	12	67 (38.5%)	107 (61 %)	174 (100%)
Team Climate	0.616	0.608	5	152 (87.4%)	22 (12.6%)	174 (100%)
Social Axioms	0.779	0.773	4	127 (73%)	47 (27 %)	174 (100%)

a. Listwise deletion based on all variables in the procedure.

6.4 Correlation Analysis

The data sets were transformed before the correlation analysis. The missing values in the Competency data were substituted by the column competency mean score. The missing values in Team Climate and Social Axioms data were substituted by the student group mean (based on Group.ID as a grouping variable).

6.4.1 Correlation Analysis for relationships between Student Competencies and Team Climate

As shown in Table 6.11, there was a significant positive correlation between achievement orientation (ACH) and recognition dimension (r = 0.255). Concern for order and quality (CO) had a moderate positive correlation with the recognition (r = 0.337), structure (r = 0.456) and support (r = 0.344) dimensions of the team climate at p <0.01 level. Information seeking (INFO) had a weak positive correlation with the structure (r = 0.252) and support (r = 0.298) dimensions of the team climate at p <0.05 level. The initiative time dimension (INT_A) had a moderate positive correlation with structure (r = 0.347) and weak correlation with the support (r = 0.282) dimensions of the team. Initiative self-motivation and amount of discretionary dimension (INT_B) had a moderate negative correlation with standards (r = -0.302) and positive correlation with structure (r = 0.404). Average score for initiative (INT) competency had a moderate positive correlation with the structure dimension (r = 0.482). Degree of innovation (INNOV_A) had a weak positive correlation with the support dimension (r = 0.279) at p <0.05 level. Average score of innovation (INNOV) competency had a weak positive correlation with the standards dimension (r = 0.260) at p <0.05 level. Teamwork (TW) competency is negatively correlated with the commitment dimension (r = -0.343) at p <0.01 level. Team leadership (TL) competency had a moderate positive correlation with support dimension (r = 0.346) at p <0.01 level.

The results of correlation analysis was used for concluding with regards to hypothesized relationships. Results of hypotheses testing are presented in Table 6.12. The hypothesis was considered as “supported” if the correlation between variables had a direction which proposed by the hypothesis, and it was significant at p < 0.05 level. If

significance level p > 0.05, the found relatoinship was considered as “non significant”. If a variable has few dimensions and the hypothesis was supported for few of them only, it was reported as “partially supported”.

Table 6.11 Correlation coefficients between the Competency and Team Climate dimensions

	ACH	CO	INFO	INT_A	INT_B	INT	INNOV_A	INNOV_B	INNOV_C	INNOV	TW	TL
Commitment	-0.072	-0.013	-0.098	-0.087	-0.174	-0.137	-0.116	0.107	0.015	-0.062	**-0.343****	-0.215
Recognition	**0.255***	**0.337****	0.237	0.237	0.198	0.154	0.188	-0.141	0.077	-0.007	0.245	0.125
Standards	-0.041	0.073	0.224	0.078	**-0.302***	-0.219	-0.100	0.184	0.168	0.090	-0.112	-0.225
Structure	0.230	**0.456****	**0.252***	**0.347****	0.404**	**0.482****	0.216	-0.190	-0.102	**0.260***	0.234	**0.346****
Support	0.245	**0.344****	**0.298***	**0.282***	0.049	0.074	**0.279***	0.004	0.118	-0.015	0.175	0.043

*. Correlation is significant at the 0.05 level (2-tailed).

**. Correlation is significant at the 0.01 level (2-tailed).

Hypothesis H2.ACH-1, that recognition dimension of team climate is positively related to individual scores of achievement orientation (ACH), was supported. The correlation coefficient r = 0.255 showed the moderated positive correlation between variables at p < 0.05 level of significance.

Hypothesis H2.CO-1, that structure dimension of team climate is positively related to individual scores of concern of order and quality (CO) competency, was supported. The correlation coefficient r = 0.456 showed the moderated positive correlation between variables at p < 0.01 level of significance.

Hypothesis H2.CO-2, that recognition dimension of team climate is positively related to individual scores of concern of order and quality (CO) competency, was supported. The correlation coefficient r = 0.337 showed the moderated positive correlation between variables at p < 0.01 level of significance.

Hypothesis H2.INFO-1, that support dimension of team climate is positively related to individual scores of information seeking (INFO) competency, was suported. The correlation coefficient r = 0.298 showed the moderated positive correlation between variables at p < 0.05 level of significance.

Table 6.12 Results of testing hypotheses for relationships between team climate and student's competencies

Hypotheses	Result
Hypothesis H2. The team climate has a strong **effect on student competencies.**	Partially Supported
H2.ACH-1: Structure dimension of team climate is positively related to individual scores of ACH	Supported. Non significant
H2.ACH-2: Standards dimension of team climate is positively related to individual scores of ACH	Not supported
H2.ACH-3: Recognition dimension of team climate is positively related to individual scores of ACH	Supported
H2.CO-1: Structure dimension of team climate is positively related to individual scores of CO competency	Supported
H2.CO-2: Recognition dimension of team climate is positively related to individual scores of CO competency	Supported
H2.CO-3: Commitment dimension of team climate is positively related to individual scores of CO competency	Not supported
H2.INFO-1: Support dimension of team climate is positively related to individual scores of INFO competency	Supported
H2.IFNO -2: Commitment dimension of team climate is positively related to individual scores of INFO competency	Not supported
H2.INT-1: Support dimension of team climate is positively related to individual scores of INT competency	Supported for INT_A
H2.INT-2: Commitment dimension of team climate is positively related to individual scores of INT competency	Not supported
H2.INNOV-1: Support dimension of team climate is positively related to individual scores of INNOV competency	Supported for INNOV_A
H2. INNOV -2: Recognition dimension of team climate is positively related to individual scores of INNOV competency	Supported for INNOV_A. Non significant
H2. INNOV -3: Commitment dimension of team climate is positively related to individual scores of INNOV competency	Supported for INNOV_B. Non significant
H2.TW-1: Support dimension of team climate is positively related to individual scores of TW competency	Supported. Non significant
H2. TW-2: Commitment dimension of team climate is positively related to individual scores of TW competency	Not supported
H2.TL-1: Recognition dimension of team climate is positively related to individual scores of TL competency	Supported. Non significant
H2. TL-2: Commitment dimension of team climate is positively related to individual scores of TL competency	Not supported
H2. TL-3: Standards dimension of team climate is positively related to individual scores of TL competency	Not supported
H2. TL-4: Structure dimension of team climate is positively related to individual scores of TL competency	Supported

Hypothesis H2.INT-1, that support dimension of team climate is positively related to individual scores of initiative (INT) competency, was supported for time dimension of

initiative competency (INT_A). The correlation coefficient r = 0.282 showed the moderated positive correlation between variables at $p < 0.05$ level of significance.

Hypothesis H2.INNOV-1, that support dimension of team climate is positively related to individual scores of innovation orientation (INNOV) competency, was supported for degree of innovation competency (INNOV_A). The correlation coefficient r = 0.279 showed the moderated positive correlation between variables at $p < 0.05$ level of significance.

As a result, the hypothesis H2, that the team climate has a strong effect on student competencies, can be considered as partially supported for achievement orientation (ACH), concern of order and quality (CO), information seeking (INFO), initiative (INT_A, INT_B, INT), innovation orientation (INNOV_A, INNOV), teamwork (TW) and team leaderhip (TL) competencies.

As a result, it is concluded that the team climate dimensions are important factors that should be considered in competency models. The team climate dimensions have significant correlations with most competencies. The correlations between the team climate and innovation ideas assessment (INNOV_B) and average score for innovation (INNOV) have not been found.

6.4.2 Correlation Analysis for relationships between Student Competencies and Social Axioms

Table 6.13 presents the results of the analysis of correlations between student competencies and social axioms. Initiative self-motivation and amount of discretionary dimension (INT_B) had a moderate positive correlation with social cynicism (r = 0.428) at $p < 0.01$ level. Teamwork (TW) competency had a moderate negative correlation (r = -0.381) with social cynicism and a moderate positive correlation (r = 0.330) with social complexity.

The competencies-related data set had many missing values due to the research methodology. As a result only 36 cases were used to calculate the correlations between student competencies and social axioms. Table 6.14 presents the results of the analysis of

correlations between student competencies and social axioms calculated separately for each social axiom..

Table 6.13 Correlation coefficients between Competency and Social Axioms dimensions

	ACH	CO	INFO	INT_A	INT_B	INT	INNOV_A	INNOV_B	INNOV_C	INNOV	TW	TL
Fate Control	0.179	-0.153	0.041	0.207	0.276	-0.024	0.189	-0.205	0.197	-0.121	-0.202	-0.030
Reward for Application	0.036	-0.009	-0.022	0.163	0.050	0.060	0.192	0.181	-0.279	0.062	0.179	0.126
Social Complexity	0.279	0.239	0.074	0.170	0.025	0.043	0.200	0.196	-0.283	0.054	**0.330***	0.074
Social Cynicism	0.188	-0.010	0.087	0.324	**0.428****	0.268	0.246	-0.166	0.111	0.161	**-0.381***	0.171

*. Correlation is significant at the 0.05 level (2-tailed).

**. Correlation is significant at the 0.01 level (2-tailed).

c. Listwise N=36

The correlations between initiative self-motivation and amount of discretionary (INT_B), teamwork (TW) competencies and social cynicism presented in Table 6.14 are consistent with the results presented in Table 6.13. Other significant correlations were also revealed

Table 6.14 Correlation coefficients between Competency and Social Axioms dimensions

	ACH	CO	INFO	INT_A	INT_B	INT	INNOV_A	INNOV_B	INNOV_C	INNOV	TW	TL
Fate Control [a]	0.127	-0.008	-0.119	0.188	**0.305***	0.107	0.101	-0.213	0.133	-0.081	-0.223	-0.025
Reward for Application [b]	0.009	0.165	-0.116	0.215	0.041	0.103	0.109	0.084	-0.162	0.014	0.063	0.141
Social Complexity [c]	**0.277***	**0.386****	0.053	**0.276***	-0.079	-0.001	0.108	**0.305***	-0.027	-0.014	0.164	-0.195
Social Cynicism [d]	0.188	-0.023	0.065	0.322	**0.424****	0.269	0.253	-0.179	0.111	0.138	**-0.381***	0.167

*. Correlation is significant at the 0.05 level (2-tailed).

**. Correlation is significant at the 0.01 level (2-tailed).

a. Listwise N=58. b. Listwise N=57. c.Listwise N=56. d. Listwise N=37.

Achievement orientation (ACH) had a weak positive correlation with social complexity ($r = 0.277$) at $p < 0.05$ level. Concern for order and quality (CO) had a moderate positive correlation with social complexity ($r = 0.386$) at $p < 0.01$ level. Initiative time dimension (NT_A) had a weak positive correlation with social complexity ($r = 0.276$) at $p < 0.05$ level. Initiative self-motivation and amount of discretionary (INT_B) competency

also showed a moderate positive correlation with fate control (r = 0.305). Innovation ideas assessment (INNOV_B) competency had a moderate positive correlation (r = 0.305) with social cynicism social complexity.

As a result, it is concluded that social axioms mostly correlate with achievement orientation (ACH), concern for order and quality (CO), initiative (INT) dimensions and teamwork (TW). Social axioms related to reward for applications had no significant correlation with any one competency. High social cynicism may predict higher scores of self-motivation for initiative (INT_B) and lower scores for teamwork (TW) competencies.

The results of correlation analysis was used for concluding with regards to hypothesized relationships. Results of hypotheses testing are presented in Table 6.15.

Table 6.15 Results of testing hypotheses for relationships between social axioms and student's competencies

Hypotheses	Result
Hypothesis H1. The social axioms have a strong effect on student competencies.	Partially supported
H1.ACH-1: Social Cynicisms axioms are negatively related to individual scores of ACH competency	Not supported
H1.ACH-2: Social Complexity axioms are positively related to individual scores of ACH competency	Supported
H1.ACH-3: Fate Control axioms are negatively related to individual scores of ACH competency	Not supported
H1.CO-1: Rewards for Application axioms are positively related to individual scores of CO competency	Supported. Non significant
H1. INFO-1: Rewards for Application axioms are positively related to individual scores of INFO competency	Not supported
H1. INFO-2: Fate Control axioms are negatively related to individual scores of INFO competency	Supported. Non significant
H1.INT-1: Rewards for Application axioms are positively related to individual scores of INT competency	Supported. Non significant
H1.INT-2: Fate Control axioms are negatively related to individual scores of INT competency	Not supported
H1.TW-1 Social Cynicisms axioms are negatively related to individual scores of TW competency	Supported
H1.TW-1 Fate Control axioms are negatively related to individual scores of TW competency	Supported. Non significant
H1.TW-1 Social Complexity axioms are positively related to individual scores of TW competency	Supported. Non significant
H1.TL-1 Social Cynicisms axioms are negatively related to individual scores of TL competency	Not supported

H1.TL-2 Social Complexity axioms are positively related to individual scores of TL competency	Not supported
H1.TL-2 Fate Control axioms are negatively related to individual scores of TL competency	Not supported

The hypothesis was considered as “supported” if the correlation between variables has direction as proposed by the hypothesis, and it was significant at $p < 0.05$ level. If significance level $p > 0.05$, the found relatoinship was considered as “non significant”. If a variable hadfew dimensions and the hypothesis was supported for few of them only, it was reported as “partially supported”.

Hypothesis H1.ACH-2, that social complexity axioms are positively related to individual scores of achievement orientation (ACH) competency, was supported. The correlation coefficient $r = 0.277$ showed a moderate positive correlation between variables at $p < 0.05$ level of significance.

Hypothesis H1.TW-1 that social cynicisms axioms are negatively related to individual scores of TW competency, was supported. The correlation coefficient $r = -0.381$ showed a moderate negative correlation between variables at $p < 0.05$ level of significance.

As a result, the hypothesis H1 that the social axioms have a strong effect on student competencies, can be considered as partially supported for achievement orientation (ACH), concern of order and quality (CO), initiative (INT_A and INT_B), innovation orientation (INNOV_B) and teamwork (TW) competencies.

6.4.3 Correlation Analysis for relationships between Team Climate and Social Axioms

The correlation coefficients between Team climate and Social axioms are shown in Table 6.16. There were moderate positive correlations between fate control ($r = 0.321$) and social cynicism ($r = 0.328$) social axiomsand commitment dimension of Team Climateteam climate. Correlations between other social axioms and team climate dimensions were very weak, less than 0.2. As a result, team climate and social axioms can be considered independent variables, and considered separately for development treatment and trainings to improve student team performanceThe hypothesis H4, that social axioms have a strong effect on a team climate, can be considered as partially supported.

Table 6.16 Correlation coefficients between Team Climate and Social Axioms

	Fate Control	Reward for Application	Social Complexity	Social Cynicism
Commitment	**0.321***	0.130	0.135	**0.328***
Recognition	0.071	-0.053	0.150	0.006
Standards	0.110	-0.071	0.003	0.063
Structure	0.140	-0.031	0.186	0.109
Support	0.177	-0.134	0.068	0.080

*. Correlation is significant at the 0.05 level (2-tailed).

b. Listwise N=58

6.4.4 Correlation Analysis for relationships between Student Competencies, Team Climate, Social Axioms and Performance indicators

The correlation coefficients between Student Competencies, Team Climate and Social axioms and Performance are shown in Table 6.17. It shows no significant correlations between the competencies and GPA. However, there were weak positive correlations between group performance and ACH, CO, INFO, INNOV_A, a moderate positive correlation with INNOV_C competencies and weak negative correlation with TL. Group average GPA score had a weak positive correlation with ACH competency and moderate positive correlation with INNOV_A competency.

There was a weak positive correlation between GPA and structure dimension of team climate (r = 0.152). Group performance had a weak positive correlation with the recognition (r=0.186) dimension of team climate and weak negative correlation with the reward for application (r = -0.154) social axiom. Group average GPA had a weak positive correlation with Recognition (r = 0.210) and Structure (r = 0.186) and moderate positive correlation with support (r = 0.390 dimensions of team climate).

Due to the procedures for missing data management, many missing values in data used to calcilate Table 6.17 were substituted by means. To remove the distortion effect from the substituted values, correlation analysis was performed again for student competencies and performance variables. Table 6.18 presents the results of the analysis of correlations between student competencies and performance indicators calculated separately for each performance indicator. The correlations between initiative (INT), innovation orientation (INNOV), team leadership (TL) and group performance (r = -0.328,

-0.400 and -0.472 respectively) presented in Table 6.18 are consistent with the results presented in Table 6.17. Other significant correlations were also revealed.

Table 6.17 Correlation coefficients between Student Competencies, Team Climate, Social Axioms and Performance (missing values substituted by means)

	GPA	Group.Performance	Average.GPA.score
ACH	0.143	**0.213****	**0.183***
CO	0.037	**0.153***	-0.039
INFO	0.007	**0.242****	0.061
INT_A	0.034	0.118	0.140
INT_B	0.035	-0.063	0.044
INT	0.088	-0.139	0.034
INNOV_A	0.126	**0.155***	**0.343****
INNOV_B	-0.002	-0.007	0.145
INNOV_C	-0.074	**0.312****	0.132
INNOV	0.064	-0.066	0.142
TW	0.066	0.146	0.146
TL	0.000	**-0.156***	-0.023
Commitment	0.017	0.048	-0.089
Recognition	0.069	**0.186***	**0.210****
Standards	-0.018	0.144	-0.070
Structure	**0.152***	0.058	**0.186***
Support	0.139	0.108	**0.390****
Fate Control	0.069	-0.014	0.010
Reward for Application	0.033	**-0.154***	-0.113
Social Complexity	0.083	0.054	0.030
Social Cynicism	0.149	-0.152	-0.042

*. Correlation is significant at the 0.05 level (2-tailed).

b. Listwise N=174 (missing values substituted by means)

Achievement orientation (ACH) had a moderate positive correlation with group performance (r = 0.409) at p <0.01 level. Initiative time dimension (INT_A) had a moderate negative correlation with group performance (r = -0.328) at p <0.05 level. Degree of innovation (INNOV_A) competency had moderate positive correlations with group performance (r = 0.306) and group average GPA score (r = 0.412). Support innovations of others (INNOV_C) also had moderate positive correlations with group performance (r = 0.372) and weak positive correlations with group average GPA score (r = 0.257). Teamwork (TW) competency had a moderate positive correlation with group average GPA score (r = 0.31) at p <0.05 level.

Table 6.18 Correlation coefficients between Student Competencies and Performance (missing values substituted by means)

	ACH	CO	INFO	INT_A	INT_B	INT	INNOV_A	INNOV_B	INNOV_C	INNOV	TW	TL
Group Performance[a]	**0.409****	0.038	0.244	**0.328***	-0.116	**-0.386****	**0.306***	0.289	**0.372***	**-0.400****	0.282	**-0.472****
Average GPA score[b]	0.228	-0.074	0.120	0.168	-0.087	-0.058	**0.412****	0.208	**0.257***	0.051	**0.31***	-0.196
GPA[c]	0.153	-0.028	-0.040	0.108	-0.066	0.172	0.118	-0.019	-0.113	0.091	0.289	-0.035

*. Correlation is significant at the 0.05 level (2-tailed).

a. Listwise N=44. b. Listwise N = 66. c. Listwise N = 44.

As a result, it is concluded that there are no significant correlations between students competencies and their individual performance (GPA). However, there are significant relationships between student competencies and team performance (Group Performance). The most important competencies which contribute to high group performance are achievement orientation (ACH), Initiative time dimension (INT_A), degree of innovation (INNOV_A) and support innovations of others (INNOV_C) dimensions of innovation competency. Scores for initiative (INT), innovation (INNOV) and team leadership (TL) competencies negatively correlated with group performance. This may be due to the main concern of students about the final grade for the team assignment. Fear of low marks and disfavor from team members may stop students demonstrating initiative and team leadership. As a result, the hypothesis H3, that the higher scores for student's competencies the higher group performance level, was supported for achievement orientation (ACH), initiative time dimension (INT_A), innovation orientation (INNOV_A, INNOV_C, INNOV), teamwork (TW) and team leadership (TL) competencies.

6.4.5 Factor Analysis

Principal Component Analysis (PCA) was conducted to identify the combinations of variables with higher percentage of explained variance.

6.4.5.1 Factor Model 1

As shown in Table 6.19, the factors of group performance were analyzed. Seven components were revealed by PCA and the results show that they explained around 69% of

the total variance. The component matrix was produced for these principal components as shown in Table 6.20.

Table 6.19 Total Variance Explained

Component	Extraction Sums of Squared Loadings			Rotation Sums of Squared Loadings		
	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %
FAC1_1	4.317	20.556	20.556	2.959	14.093	14.093
FAC1_2	2.803	13.348	33.904	2.393	11.395	25.487
FAC1_3	1.809	8.613	42.517	2.331	11.099	36.587
FAC1_4	1.677	7.988	50.505	2.183	10.397	46.984
FAC1_5	1.368	6.516	57.021	1.681	8.006	54.990
FAC1_6	1.332	6.343	63.364	1.559	7.424	62.414
FAC1_7	1.174	5.589	68.954	1.373	6.540	68.954

Table 6.20 Rotated Component Matrix[a]

	Component						
	FAC1_1	FAC1_2	FAC1_3	FAC1_4	FAC1_5	FAC1_6	FAC1_7
Commitment						0.780	
Recognition			0.863				
Standards						0.830	
Structure			0.771				
Support			0.827				
Fate.Control				0.940			
Reward.for.Application					0.767		
Social.Complexity					0.666		
Social.Cynicism				0.940			
ACH		0.620					
CO		0.702					
INFO		0.818					
INT_A	0.546	0.410					
INT_B	0.471						-0.408
INT	0.889						
INNOV_A	0.450						
INNOV_B							0.717
INNOV_C					-0.555		0.551
INNOV	0.845						
TW		0.688					
TL	0.772						

Remarks: Extraction Method: Principal Component Analysis.
Rotation Method: Varimax with Kaiser Normalization.[a]
a. Rotation converged in 6 iterations.

As shown in Table 6.20, the rotated component matrix shows a way of grouping and interpreting variables of the research model. Component 1 combines dimensions of initiative (INT), innovation orientation (INNOV) and team leadership (LT) competencies.

Component 2 combines ACH, CO, INFO, INT_B and TW competencies. Components 3 and 6 combine dimensions of team climate (Clim). Components 4 and 5 combine dimensions of social axioms. Component 7 combines INT_B, INNOV_B and INNOV_C competencies.

6.4.5.2 Factor Model Two

As shown in Table 6.21, the second analysis was conducted for factors consisting of competencies only. Three components were revealed by the PCA and the results show that they explained more than 69% of the total variance.

Table 6.21 Total variance explained by components

	Extraction Sums of Squared Loadings			Rotation Sums of Squared Loadings		
Component	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %
FAC2_1	3.11	34.59	34.59	2.49	27.68	27.68
FAC2_2	1.85	20.51	55.09	2.29	25.43	53.11
FAC2_3	1.28	14.17	69.26	1.45	16.15	69.26

The rotated component matrix as shown in Table 6.22 demonstrates a way of grouping and interpretation variables of the research model. Component FAC2_1 combines all social axioms (Social Axioms) dimensions. Components FAC2_2 and FAC2_3 combine different dimensions of team climate (Clim). The results of the PCA can be used to reduce the dimensions of the research model and provide more stable results for further analysis.

Table 6.22 Rotated Component Matrix

	Component		
	FAC2_1	FAC2_2	FAC2_3
Commitment			0.785
Recognition		0.863	
Standards			0.863
Structure		0.791	
Support		0.842	
Fate.Control	0.849		
Reward.for.Application	0.725		
Social.Complexity	0.639		
Social.Cynicism	0.849		

Remarks: Extraction Method: Principal Component Analysis.
Rotation Method: Varimax with Kaiser Normalization.[a]
a. Rotation converged in 4 iterations.

6.5 t-test of differences in competency level for Best and Average group performance

To test the hypothesis H3, that the higher scores for student's competency the higher group performance level, the t-test for independent samples were chosen.

- Null hypothesis H0: Competency (Best) > Competency(Average)
- Alternative hypothesis H1: Competency (Best) <= Competency(Average)

As shown in Table 6.23, the "Best" groups were groups with the top 10 % scores for group performers. "Average" groups were others. The threshold level k = 0.875. Best = Group.ID (Group.Performance >= 0.875). Average = Group.ID (Group.Performance < 0.875). Significant level: $\alpha = .05$. The results of a one-tailed t-test represented are shown in Table 6.23.

As shown in Table 6.23, the results of the hypothesis test for ACH competency show that the Levene's Test for Equality of Variances had a significance of 0.47. The results of the t-test show that the means of ACH scores of the Best groups were significantly higher than that in the Average groups. As a result, the hypothesis was supported for ACH competency. The hypothesis was also supported for concern for orders and quality (CO), information seeking (INFO), degree of innovation (INNOV_A), support innovations of others (INNOV_C) and teamwork (TW) competencies. Table 6.14 also shows that the Best groups has lower scores for INT, INNOV and TL competencies than the Average groups. The hypothesis was not supported for INT_A, INT_B and INNOV_B competencies.

On the whole, student competencies are important factors of student group performance. The higher scores of achievement orientation (ACH), concern for orders and quality (CO), information seeking (INFO), degree of innovation (INNOV_A), support innovations of others (INNOV_C) and teamwork (TW) competencies, had a higher group performance level. Developing these competencies will likely lead to improvements of students group learning outcomes.

Table 6.23 Independent Samples Test

Assumptions*		Levene's Test for Equality of Variances		t-test for Equality of Means					Group.Performance	
		F	Sig.	t	df	Sig. (1-tailed)	Mean Difference	Std. Error Difference	Group	Mean
ACH	1	0.52	0.47	**2.67**	**172.00**	**0.004**	**0.18**	**0.07**	Best	0.40
	2			2.55	20.65	0.009	0.18	0.07	Average	0.22
CO	1	10.17	0.00	3.23	172.00	0.001	0.19	0.06	Best	0.71
	2			**6.11**	**45.42**	**0.000**	**0.19**	**0.03**	Average	0.52
INFO	1	0.17	0.68	**3.80**	**172.00**	**0.000**	**0.17**	**0.04**	Best	0.53
	2			4.23	22.43	0.000	0.17	0.04	Average	0.36
INT_A	1	0.16	0.69	**1.10**	**172.00**	**0.136**	**0.07**	**0.06**	Best	0.65
	2			1.19	22.09	0.123	0.07	0.06	Average	0.58
INT_B	1	4.07	0.05	-0.67	172.00	0.253	-0.03	0.04	Best	0.24
	2			**-1.12**	**35.48**	**0.135**	**-0.03**	**0.03**	Average	0.27
INT	1	11.18	0.00	-2.70	172.00	0.004	-0.12	0.04	Best	0.16
	2			**-5.09**	**45.19**	**0.000**	**-0.12**	**0.02**	Average	0.28
INNOV_A	1	2.93	0.09	**1.93**	**172.00**	**0.028**	**0.13**	0.07	Best	0.88
	2			3.59	43.81	0.000	0.13	0.04	Average	0.75
INNOV_B	1	3.85	0.05	1.69	172.00	0.047	0.08	0.05	Best	0.65
	2			**1.46**	**19.84**	**0.079**	**0.08**	**0.06**	Average	0.56
INNOV_C	1	0.36	0.55	**2.33**	**172.00**	**0.010**	**0.09**	**0.04**	Best	0.73
	2			2.50	21.91	0.010	0.09	0.04	Average	0.64
INNOV	1	0.60	0.44	**-2.02**	**172.00**	**0.022**	**-0.11**	**0.05**	Best	0.21
	2			-2.41	23.58	0.012	-0.11	0.04	Average	0.32
TW	1	7.26	0.01	5.24	172.00	0.000	0.24	0.05	Best	0.70
	2			**3.68**	**18.62**	**0.001**	**0.24**	**0.07**	Average	0.45
TL	1	2.78	0.10	**-2.41**	**172.00**	**0.008**	**-0.14**	**0.06**	Best	0.13
	2			-3.28	26.54	0.001	-0.14	0.04	Average	0.26

*Assumptions made for each competency: “1” - equal variances assumed; “2” - equal variances assumed

6.6 Predictive Modelling

6.6.1 Development Linear Regression Models

To predict of the research model variables, linear regression models were built. Only models with a significance level of F statistic less than 0.05 are reported as follows.

6.6.1.1 Linear Regression model for Group.Performance 1

First of all a regression model was built based on the PCA components as the factors of the group performance and they were analyzed as shown in Table 6.24.

Table 6.24 Summary of the linear regression model for Group Performance 1

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Change Statistics				
					R Square Change	F Change	df1	df2	Sig. F Change
1	0.461[a]	0.212	0.179	0.062	0.212	6.382	7	166	0.000

a. Dependent Variable: Group.Performance)

Table 6.24 shows the linear regression model built with a good fit for the data as determined by the F-test . The significance level was equal 0.000 (less than 0.05). The percentage of variability of the dependent variable is accounted by all independent variables together was 21.2% (R Square = 0.212).Table 6.25 shows the coefficients of the regression model for group performance. Based on Table 6.25, the equation for the regression line is expressed by Eq. (6.1):

Group.Performance = 0.77 - 0.009(FAC1_1) + 0.021(FAC1_2) +0 .01(FAC1_3) +0.001(FAC1_4) -0.013(FAC1_5) + 0.007(FAC1_6) +0.012 (FAC1_7) (6.1)

Table 6.25 Coefficients of the linear regression model for Group Performance 1

Model	Unstandardized Coefficients		Standardized Coefficients	t	Sig.	95.0% Confidence Interval for B	
	B	Std. Error	Beta			Lower Bound	Upper Bound
(Constant)	0.770	0.005		164.330	0.000	0.760	0.779
FAC1_1	-0.009	0.005	-0.136	-1.971	0.050	-0.019	0.000
FAC1_2	0.021	0.005	0.302	4.381	0.000	0.011	0.030
FAC1_3	0.010	0.005	0.142	2.063	0.041	0.000	0.019
FAC1_4	0.001	0.005	0.013	0.194	0.846	-0.008	0.010
FAC1_5	-0.013	0.005	-0.193	-2.800	0.006	-0.022	-0.004
FAC1_6	0.007	0.005	0.109	1.585	0.115	-0.002	0.017
FAC1_7	0.012	0.005	0.182	2.637	0.009	.0003	0.022

a. Dependent Variable: Group.Performance)

6.6.1.2 Linear Regression model for Group.Performance 2

The second regression model was built based on competencies only. Table 6.26 shows the linear regression model which was built with a good fit for the data as determined by F-test . The significance level was equal to 0.000 (less than 0.05). The

percentage of variability of the dependent variable accounted by all independent variables together was 25 % (R Square). This was higher, than R square of the model built on PCA components.

Table 6.26 Summary of the linear regression model for Group.Performance 2

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Change Statistics				
					R Square Change	F Change	df1	df2	Sig. F Change
1	0.500[a]	0.250	0.194	0.061193	0.250	4.477	12	161	0.000

Remarks: a. Dependent Variable: Group.Performance)

b. Predictors: (Constant), TL), INNOV_B), INFO), INNOV_A), INNOV_C), INT_B), CO), TW), INT_A), ACH), INNOV), INT)

Table 6.27 shows the coefficients of the regression model for group performance. Based on Table 6.27, the equation for the regression line is given by Eq. (6.2):

Group.Performance = 0.641 + 0.019(ACH) +0 .015 (CO) + 0.057 (INFO) + 0.026(INT_A) -0.027(INT_B) - 0.01(INT) +0.042 (INNOV_A) -0.021 (INNOV_B) +0.137 (INNOV_C) -0.025 (INNOV) +0.006 (TW) -0.066 (TL)
(6.2)

Table 6.27 Coefficients of the linear regression model for Group.Performance 2

Model	Unstandardized Coefficients		Standardized Coefficients	t	Sig.	95.0% Confidence Interval for B	
	B	Std. Error	Beta			Lower Bound	Upper Bound
(Constant)	0.641	0.031		20.786	0.000	0.581	0.702
ACH	0.019	0.021	0.076	0.884	0.378	-0.023	0.060
CO	0.015	0.024	0.054	0.645	0.520	-0.032	0.062
INFO	0.057	0.031	0.154	1.795	0.075	-0.006	0.119
INT_A	0.026	0.029	0.092	0.894	0.373	-0.031	0.083
INT_B	-0.027	0.037	-0.068	-0.739	0.461	-0.099	0.045
INT	-0.010	0.057	-0.027	-0.180	0.857	-0.122	0.101
INNOV_A	0.042	0.022	0.170	1.962	0.051	0.000	0.085
INNOV_B	-0.021	0.025	-0.062	-0.851	0.396	-0.071	0.028
INNOV_C	0.137	0.032	0.322	4.230	0.000	0.073	0.201
INNOV	-0.025	0.041	-0.078	-0.612	0.542	-0.106	0.056
TW	0.006	0.028	0.017	0.204	0.838	-0.050	0.061
TL	-0.066	0.030	-0.221	-2.177	0.031	-0.126	-0.006

a. Dependent Variable: Group.Performance)

b. The results have calculated by using data with substituted missing values by means.

6.6.1.4 Linear Regression model for Achievement orientation ACH(Clim, Social Axioms) competency

The third model was built for achievement orientation (ACH) competency. Table 6.28 shows the regression model built with a good fit for the data as determined by the F-test. The significance level was equal to 0.005 (less than 0.05). The percentage of variability of the dependent variable accounted by all independent variables together was 12.3 % (R Square).

Table 6.28 Summary of the linear regression model for Achievement Oriented (ACH) competency

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Change Statistics				
					R Square Change	F Change	df1	df2	Sig. F Change
1	0.351[a]	0.123	0.081	0.26649	0.123	2.902	8	165	0.005

Remark: a. Dependent Variable: ACH)

b. Predictors: (Constant), Social.Cynicism, Standards, Support, Social.Complexity, Commitment, Reward.for.Application, Structure, Recognition

Based on coefficients in Table 6.29, the equation for the regression line is expressed by Eq. (6.3):

ACH = -0.301 - 0.107(Commitment) + 0.041 (Recognition) + 0.083 (Standards) +0.038(Structure) +0.052(Support) -0 .102(Reward.for.Application) +0.069 (Social.Complexity) +0.100 (Social.Cynicism) (6.3)

Table 6.29 Coefficients of the linear regression model for ACH

Model	Unstandardized Coefficients		Standardized Coefficients	t	Sig.	95.0% Confidence Interval for B	
	B	Std. Error	Beta			Lower Bound	Upper Bound
(Constant)	-0.301	0.297		-1.013	0.313	-0.887	0.285
Commitment	-0.107	0.058	-0.162	-1.868	0.064	-0.221	0.006
Recognition	0.041	0.045	0.101	0.915	0.362	-0.048	0.131
Standards	0.083	0.064	0.106	1.297	0.197	-0.044	0.211
Structure	0.038	0.063	0.059	0.603	0.548	-0.086	0.162
Support	0.052	0.071	0.070	0.731	0.466	-0.089	0.193
Reward.for.Application	-0.102	0.059	-0.160	-1.738	0.084	-0.218	0.014
Social.Complexity	0.069	0.063	0.107	1.091	0.277	-0.056	0.193

Model	Unstandardized Coefficients		Standardized Coefficients	t	Sig.	95.0% Confidence Interval for B	
	B	Std. Error	Beta			Lower Bound	Upper Bound
Social.Cynicism	0.100	0.049	0.174	2.063	0.041	0.004	0.196

Remark: a. Dependent Variable: ACH

6.6.1.5 Linear Regression model for INT_A (Clim, Social Axioms)

A linear regression model was built for Time dimension (INT_A) competency. Table 6.30 shows the model which was built with a good fit for the data as determined by the F-test. The significance level was equal to 0.035 (less than 0.05). Coefficients of the linear regression model for INT_A are presented in Table 6.31

Table 6.30 Summary of the linear regression model for INT_A

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Change Statistics				
					R Square Change	F Change	df1	df2	Sig. F Change
1	0.306[a]	0.094	0.050	0.238	0.094	2.137	8	165	0.035

Remarks: a. Dependent Variable: INT_A)

Table 6.31Coefficients of the linear regression model for INT_A

Model	Unstandardized Coefficients		Standardized Coefficients	t	Sig.	95.0% Confidence Interval for B	
	B	Std. Error	Beta			Lower Bound	Upper Bound
(Constant)	-0.171	0.265		-0.644	0.521	-0.694	0.353
Commitment	-0.038	0.051	-0.065	-0.741	0.460	-0.139	0.063
Recognition	0.019	0.040	0.053	0.474	0.636	-0.061	0.099
Standards	0.051	0.057	0.073	0.880	0.380	-0.063	0.164
Structure	0.068	0.056	0.120	1.215	0.226	-0.042	0.178
Support	0.081	0.064	0.125	1.276	0.204	-0.045	0.207
Reward.for.Application	0.011	0.052	0.019	0.207	0.836	-0.093	0.114
Social.Complexity	0.015	0.056	0.027	0.271	0.787	-0.096	0.126
Social.Cynicism	0.047	0.043	0.092	1.075	0.284	-0.039	0.132

Remark: a. Dependent Variable: INT_A)

6.6.1.6 Linear Regression model for Self-motivation and Amount of discretionary (INT_B) competency

A linear regression model was built for Self-motivation and Amount of discretionary (INT_B) competency. Table 6.32 shows the modelwhich was built with a good fit for the data based on the F-test. The significance level was equal to 0.001 (less

than 0.05). The percentage of variability of the dependent variable accounted by all independent variables together was 14.9 % (R Square). Based on the coefficients in Table 6.33, the equation for the regression line is given by Eq. (6.5):

INT_B = 0.388 - 0.058(Commitment) +0.03 (Recognition) - 0.066 (Standards) + 0.08(Structure) - 0.057(Support) - 0 .017(Reward.for.Application) - 0.057 (Social.Complexity) + 0.087 (Social.Cynicism) (6.5)

Table 6.32 Summary of the linear regression model for INT_B

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Change Statistics				
					R Square Change	F Change	df1	df2	Sig. F Change
1	0.386[a]	0.149	0.108	0.162	0.149	3.620	8	165	0.001

Remakrs: a. Dependent Variable: INT_B)

b. Predictors: (Constant), Social.Cynicism), Standards), Support), Social.Complexity), Commitment),Reward.for.Application), Structure), Recognition)

Table 6.33 Coefficients of the linear regression model for INT_B

Model	Unstandardized Coefficients		Standardized Coefficients	t	Sig.	95.0% Confidence Interval for B	
	B	Std. Error	Beta			Lower Bound	Upper Bound
(Constant)	0.388	0.181		2.145	0.033	0.031	0.746
Commitment	-0.058	0.035	-0.141	-1.656	0.100	-0.127	0.011
Recognition	0.030	0.028	0.118	1.085	0.279	-0.025	0.084
Standards	-0.066	0.039	-0.134	-1.669	0.097	-0.143	0.012
Structure0	0.080	0.038	0.199	2.082	0.039	0.004	0.155
Support	-0.057	0.044	-0.125	-1.318	0.189	-0.143	0.029
Reward.for.Application	-0.017	0.036	-0.043	-0.478	0.633	-0.088	0.054
Social.Complexity	-0.057	0.038	-0.145	-1.498	0.136	-0.133	0.018
Social.Cynicism	0.087	0.030	0.245	2.946	0.004	0.029	0.146

Remark: a. Dependent Variable: INT_B

6.6.1.7 Linear regression model for the support innovations of others (INNOV_C) competency

A linear regression model was built for the support innovations of others (INNOV_C) competency. Table 6.34 shows the model which was built with a good fit for the data as determined by the F-test. The significance level was equal to 0.032(less than 0.05). The percentage of variability of the dependent variable accounted by all independent

variables together was 9.6 % (R Square). Based on coefficients in Table 6.35, the equation for the regression line is expressed by Eq. (6.6):

INNOV_C= 0.980 - 0.058(Commitment) + 0.012 (Recognition) +0 .017 (Standards) -0.085(Structure) +0.04(Support) -0.086(Reward.for.Application) + 0.027 (Social.Complexity) +0.025 (Social.Cynicism) (6.6)

Table 6.34 Summary of the linear regression model for INNOV_C

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Change Statistics				
					R Square Change	F Change	df1	df2	Sig. F Change
1	0.309[a]	0.096	0.052	0.15572	0.096	2.179	8	165	0.032

Remarks: a. Dependent Variable: INNOV_C)

b. Predictors: (Constant), Social.Cynicism), Standards), Support), Social.Complexity),Commitment), Reward.for.Application), Structure), Recognition)

Table 6.35 Coefficients of the linear regression model for INNOV_C

Model	Unstandardized Coefficients		Standardized Coefficients	t	Sig.	95.0% Confidence Interval for B	
	B	Std. Error	Beta			Lower Bound	Upper Bound
(Constant)	0.980	0.173		5.649	0.000	0.638	1.323
Commitment	-0.058	0.034	-.152	-1.724	0.087	-0.124	0.008
Recognition	0.012	0.026	0.051	0.457	0.648	-0.040	0.064
Standards	0.017	0.038	0.038	0.459	0.647	-0.057	0.092
Structure	-0.085	0.037	-0.229	-2.318	0.022	-0.157	-0.013
Support	0.040	0.042	0.093	0.952	0.342	-0.043	0.122
Reward.for.Application	-0.086	0.034	-0.232	-2.492	0.014	-0.153	-0.018
Social.Complexity	0.027	0.037	0.073	0.729	0.467	-0.046	0.099
Social.Cynicism	0.025	0.028	0.076	0.889	0.375	-0.031	0.081

6.6.2 Decision Trees

6.6.2.1 Decision trees for the prediction of Group.Perfromance (all variables)

The decision tree for the prediction of group performance based on all variables of the research model is shown in Figure 6.5. The model had cross-validation risk at the 0.305 level. The percentage of (total) correct predictions was 81%. The percentage of correct

predictions of “High” value was 100 %. As a result, the model was highly precise for the prediction of the best group performance.

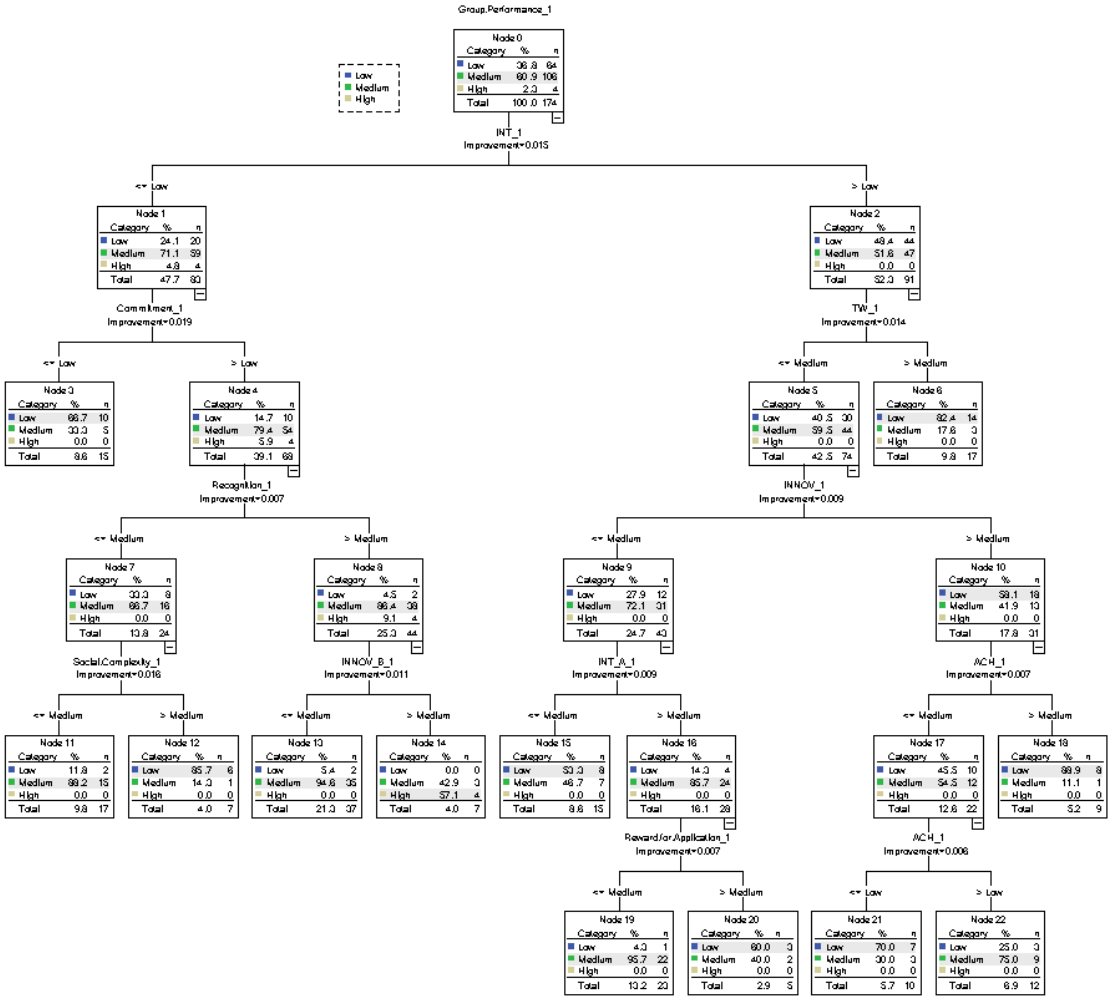

Figure 6.5 Group Performance Tree Diagram

Based on the tree diagram as shown in Figure 6.5, some rules may be concluded that have the highest probability of the High value of Group Performance gained for the rules as described in Table 6.36. A high level of group performance more frequently appeared when the commitment dimension of the team climate was not low, recognition and innovation ideas assessment (INNOV_B) competency were high, and initiative (INT) was low.

Table 6.36 supports the conclusion on the model’s usefullness. The response level was 57.1% and index was 2485.7%. These supported the high quality of the model. However, there were only four cases of “high” value of Group.Performance . All cases

belonged to the same student group. As a result, the model should be tested on a larger size of samples with a larger number of cases with a "high" value of group perfromance. Another possible drawback for the applicatoin of this model relates to the broad definition of "group.performance" variable. It combines different components for different groups (sujects).

Table 6.36 Statistics and decision rules of the decision tree for Group.Performance

Node	Gain	Response	Index	Rules	
14	100 %	57.1 %	2485.7 %	Team Climate:	Commitment > "Low", Recognition = "High"
				Competency:	INT = "Low", INNOV_B = "High"

6.6.2.2 Decision trees fo ther prediction of GPA (Competency, Social Axioms)

Table 6.37 shows that the high value of team leadership competency (TL) was the best predictor of "high" GPA. The model had cross-validation risk at the 0.236 level. The percentage of (total) correct predictions was 78.2 % while the percentage of correct predictions of "High" value was 12.9 %.

Table 6.37 Statistics and decision rules of the decision tree for GPA

Node	Gain	Response	Index	Rules	
2	12.9 %	50 %	280.6 %	Competency:	TL = "High"

6.6.2.3 Decision trees for the prediction of the Achievement orientation (ACH) competency

Decision trees were built for the achievement orientation (ACH) competency. Table 6.33 shows the rules for nodes with probabilities of "High" value of the ACH competency. The model had cross-validation risk at the 0.5 level. The percentage of (total) correct predictions was 61.5% while the percentage of correct predictions of "High" value was 0 %. In spite of the model having 0 % of correct predictions for the ACH, it gives valuable information about the most likely situation for high scores of ACH competency.

Table 6.38 defines two combinations of variables that correspond to higher percentages of value of ACH competency in a node case. Node 8 had decision rules for high level of ACH competency requiring high scores for the support dimension of team climate, low or medium reward for application and low fate control social axioms. Node 10 had decision rules for high level ACH competency requiring low scores for the team climate standards dimension, low or medium level of fate control and high complexity social axioms.

Table 6.38 Statistics and decision rules of the decision tree for the ACH competency

Node	Gain	Response	Index	Rules	
8	15.2 %	38.5 %	202.8 %	Team Climate:	Support = "High"
				Social Axioms:	Fate control = "Low", Reward for Application <= "Medium"
10	12.1 %	36.4 %	191.7 %	Team Climate:	Standards = "Low"
				Social Axioms:	Fate control > "Low", Social Complexity = "High"

6.6.2.4 Decision trees for the prediction of the Concern for Order and Quality (CO) competency

Decision trees were built for the Concern for Order and Quality (CO) competency. The model had cross-validation risk at the 0.575 level. The percentage of (total) correct predictions was 55.2%. The percentage of correct predictions of "High" value was 97.7%. Table 6.339 defines three most valuable variables that correspond to a higher percentage of value of the CO competency in a node case. The highest portion of high value could be found when a group had a high level of support dimension of team climate and medium or high score of social complexity, and high fate control.

Table 6.39 Statistics and decision rules of the decision tree for the Concern for Order and Quality (CO) competency

Node	Gain	Response	Index	Rules	
6	11.4 %	100 %	197.7 %	Team Climate:	Support > "Medium"
				Social Axioms:	Social Complexity > "Low", Fate control > "Medium"
8	25 %	62.9 %	124.3 %	Team	Support > "Medium", Commitment >

Node	Gain	Response	Index	Rules	
				Climate:	"Low
				Social Axioms:	Social Complexity > "Low", Fate control > "Medium

6.6.2.4 Decision trees for the prediction of the Information Seeking (INFO) competency

Decision trees were built for the INFO competency. The model had cross-validation risk at the 0.523 level. The percentage of (total) correct predictions was 56.9% while the percentage of correct predictions of "High" value was 22.6%. Table 6.40 shows four significant rules that correspond to a high level of the INFO competency. The highest portion of the high value of INFO competency was provided by a high standards dimension of team climate, and low or medium scores of fate control and rewards for applications social axioms.

Table 6.40 Statistics and decision rules of the decision tree for the information seeking (INFO) competency

Node	Gain	Response	Index	Rules	
9	22.6 %	80 %	262.6 %	Team Climate:	Standards = "High"
				Social Axioms:	Fate.Control <= "Medium", Rewards.for.Application <= "Medium"
10	3.8 %	40 %	131.3 %	Team Climate:	Standards = "High"
				Social Axioms:	Fate.Control <= "Medium", Rewards.for.Application > "Medium"
8	9.4 %	35.7 %	117.3 %	Team Climate:	Standards <= "Medium", Support = "High"
				Social Axioms:	Social Complexity = "High"
3	52.8 %	31.1 %	102.1 %	Team Climate:	Standards <= "Medium"
				Social Axioms:	Social Complexity <= "Medium"

6.6.2.5 Decision trees for the prediction of the Initiative Time Dimension (INT_A) competency

Decision trees were built for the Time Dimension (INT_A) competency. The model had cross-validation risk at the 0.586 level. The percentage of (total) correct predictions was 60.9% while the percentage of correct predictions of "High" value was 71.1%. Table 6.41 shows significant rules that correspond to a high level of the INT_A competency. The highest portion of the high value of INT_A competency was provided by a high support dimension of team climate, and high rewards for applications social axioms.

Table 6.41 Statistics and decision rules of the decision tree for the Time dimension (INT_A) competency

Node	Gain	Response	Index	Rules	
6	13.2 %	100 %	228.9 %	Team Climate:	Support = "High"
				Social Axioms:	Rewards.for.Application = "High"
17	6.6 %	83.3 %	190.8 %	Team Climate:	Standards > "Low", Structure <= "Medium", Recognition > "Low", Support = "Low"
16	6.6 %	83.3 %	166.5 %	Team Climate:	Support = "High"i, Commitment <= "Medium", Standards = "High"
				Social Axioms:	Rewards.for.Application <= "Medium"
13	10.5 %	72.7 %	166.5 %	Team Climate:	Standards > "Low", Structure <= "Medium
				Social Axioms:	Social.Complexity <= "Medium"
20	11.8 %	60 %	137.4 %	Team Climate:	Standards > "Low", Structure <= "Medium Social.Complexity = "High",Rewards.for.Application > "Medium"
15	22.4 %	51.5 %	117.9 %	Team Climate:	Support = "High", Commitment <= "Medium". Standards <= "Medium"
				Social Axioms:	Rewards.for.Application <= "Medium"

6.6.2.6 Decision trees for the prediction of the Self-motivation and Amount of discretionary (INT_B (Clim, Social Axioms)) competency

Decision trees were built for the Self-motivation and Amount of discretionary (INT_B) competency. The model had cross-validation risk at the 0.460 level. The

percentage of (total) correct predictions was 66.7 %. The percentage of correct predictions of "High" value was 66.7 %. Table 6.42 shows significant rules that correspond to a high level of the INT_B competency including high structure and low commitment dimensions of team climate, low fate control and low or medium level of social complexity.

Table 6.42 Statistics and decision rules of the decision tree for the Self-motivation and Amount of discretionary (INT_B) competency

Node	Gain	Response	Index	Rules	
15	66.7 %	50 %	1450 %	Team Climate:	Structure = "High", Commitment = "Low"
				Social Axioms:	Fate.Control > "Low", Social.Copmlexity <= "Meidum"

6.6.2.7 Decision trees for the prediction of Initiative INT(Clim, Social Axioms) competency

Decision trees were built for the Initiative (INT) competency. The model has cross-validation risk at the 0.448 level. The percentage of (total) correct predictions was 67.2% whilethe percentage of correct predictions of "High" value was 50 %. Table 6.43 shows significant rules that correspond to a high level of the INT competency.

A high level of Initiative (INT) competency more frequently appeared when the standards dimension of the team climate and social complexity were low or medium, support was high, and fate control was medium or high.

Table 6.43 Statistics and decision rules of the decision tree for the Initiative (INT) competency

Node	Gain	Response	Index	Rules	
22	50 %	38.5 %	669.2 %	Team Climate:	Standard <= "Medium", Support = "High"
				Social Axioms:	Social.Copmlexity <= "Meidum", Fate.Control > "Low"

6.6.2.8 Decision trees for the prediction of Degree of Innovation (INNOV_A)(Clim, Social Axioms) competency

Decision trees were built for the Degree of Innovation (INNOV_A) competency. The model had cross-validation risk at the 0.230 level. The percentage of (total) correct

predictions was 81.6% while the percentage of correct predictions of “High” value was 99.3 %. Table 6.44 shows the significant rules that correspond to a high level of the INNO_A competency.The highest portion of the high value of INNOV_A competency was provided by a high standards dimension of team climate, and low fate control social axioms.

Table 6.44 Statistics and decision rules of the decision tree for the Degree of Innovation (INNOV_A) competency

Node	Gain	Response	Index	Rules	
4	7.2 %	100 %	125.2 %	Team Climate:	Standards = “High”
				Social Axioms:	Fate control = “Low”
9	68.3 %	89.6 %	112.2 %	Team Climate:	Standards <= “Medium”, Commitment <= “Medium”
				Social Axioms:	Fate control >“Low”
13	4.3 %	85.7 %	107.3 %	Team Climate:	Standards <= “Medium”, Support <= “Medium”, Commitment = “Low”
				Social Axioms:	Fate control = “Low”
12	4.3 %	85.7 %	107.3 %	Team Climate:	Standards = “High”
				Social Axioms:	Fate control >“Low”, Reward for Application = “High”

6.6.2.9 Decision trees for the prediction of the Ideas Assessment (INNOV_B)competency

Decision trees were built for the Ideas Assessment (INNOV_B) competency. The model had cross-validation risk at the 0.420 level. The percentage of (total) correct predictions was 70.1% while the percentage of correct predictions of “High” value was 34.6%. Table 6.45 shows the significant rules that correspond to a high level of the INNOV_B competency. The highest portion of the high value of INNOV_B competency was provided by a low or medium structure dimension of team climate, and high fate control social axioms. Other important factors were a high standards dimension of team climate.

Decision trees were built for the Support innovations of others (INNOV_C) competency. The model had cross-validation risk at the 0.345 level. The percentage of

(total) correct predictions was 71.8 % while the percentage of correct predictions of "High" value was 29.2%. Table 6.46 shows the significant rules that correspond to a high level of the INNOV_C competency.

Table 6.45 Statistics and decision rules of the decision tree for the Ideas Assessment (INNOV_B) competency

Node	Gain	Response	Index	Rules	
4	19.2 %	55.6 %	371.8 %	Team Climate:	Structure <= "Medium"
				Social Axioms:	Fate control = "High"
8	15.4 %	50 %	334.6 %	Team Climate:	Standards = "High"
				Social Axioms:	Fate control <= "Medium"

6.6.2.10 Decision trees for the prediction of the Support innovations of others (INNOV_C) competency

The highest portion of the high value of INNOV_C competency was provided by a high standards dimension of team climate and social complexity social axioms, and low or medium reward for application.

Table 6.46 Statistics and decision rules of the decision tree for INNOV_C

Node	Gain	Response	Index	Rules	
16	16.7 %	80 %	580 %	Team Climate:	Standards = "High"
				Social Axioms:	Social Complexity= "High", Reward for application <= "Medium"
8	12.5 %	60 %	435 %	Team Climate:	Standards = "Low", Structure <= "Medium"
				Social Axioms:	Reward for application > "Medium"
15	20.8 %	41.7 %	302.1 %	Team Climate:	Standards v
				Social Axioms:	Social Complexity <= "Medium", Reward for application <= "Medium"

6.6.2.11 Decision trees for the prediction of the Innovation Orientation (INNOV) competency

Decision trees were built for the innovation orientation (INNOV) competency. The model had cross-validation risk at the 0.609 level. The percentage of (total) correct predictions was 65.9% while the percentage of correct predictions of "High" value was

42.7%. Table 6.47 shows the significant rules that correspond to a high level of the INNOV competency.The highest portion of the high value of INNOV competency was provided by high support, low or medium structure, medium or high commitment of dimension of team climate, and low or medium fate control.

Table 6.47 Statistics and decision rules of the decision tree for the Innovation Orientation (INNOV) competency

Node	Gain	Response	Index	Rules	
15	19.4 %	77.8 %	375.9 %	Team Climate:	Support = "High"Commitment > "Low", Structure <= "Medium"
				Social Axioms:	Fate control > "Low"
19	27.8 %	55.6 %	268.5 %	Team Climate:	Support = "High", Commitment > "Low", Structure = "High"
				Social Axioms:	Fate control > "Low", Reward for application <= "Medium"

6.6.2.12 Decision trees for the prediction of the Teamwork (TW) competency

The decision tree for the teamwork (TW) competency failed to predict a "High" level of competency. The total cross-validation risk of the model was 0.282. The percentage of correct predictions (total) was 72.4% while the percentage of correct predictions (High) was 0%. Node 0's response was 18.4% and did not meet the required 30% threshold level.

6.6.2.13 Decision trees for prediction of the team leadership (TL(Clim, Social Axioms)) competency

The decision tree for the team leadership (TL) competency did not have nodes that could pass the requirement of the study. Node 10 with the highest response of 16% did not meet the required 30% threshold level. The total cross-validation risk of the model was 0.276. The percentage of correct predictions (total) was 76.4% while the percentage of correct predictions (High) was 0%.

The results of the decision trees analysis show what combinations of team climate and social axioms factors and their values occur at the same time with a "High" value for each competency and performance indicator. These decision tree models may be applied to predict competencies and performance levels for specific student groups. Moreover, it may

be applied for the estimation of goodness of group assigning decisions with respect to specific performance indicators and key professional competencies.

6.7 Summary

This chapter described the results of the data analysis performed as part of the study of the context-based competency model for a student group. The descriptive, correlational and reliability analyses were performed. The results of t-tests performed support the hypothesis that differences in scores of students' competencies have significant effect on differences in student group performance. Hypotheses were supported for ACH, CO, INFO, INNOV_A, INNOV_C and TW competencies. Hypotheses were not supported for INT_A, INT_B and INNOV_B competencies.

Predictive modelling was performed by using factor analysis, regression analysis and decision tree analysis. Factor analysis helped to reduce the dimensions of the research model and provide more stable results for further analysis. Six statistically significant linear regression models were built. These models can be used to predict group performance, achievement orientation (ACH), initiative (INT) and innovation orientation (INNOV) competencies.

A number of decision trees were established and the models for the prediction of the high level of competencies were also built. The built models defined the combination of team climate and social axioms variables that more likely lead to a high level of studied competencies and high performance. Further discussions of the results of this study, the potential contributions, limitations of the study and suggested directions for future research in this area are presented in Chapter 7.

CHAPTER 7 DISCUSSION AND CONCLUSIONS

7.1 Main Findings and Discussion

The preceding chapters presented the results of the analysis of the context-based competency models. These analyses contribute a number of important findings to the literature, and are discussed further in the following subsections. The structure of the discussion is as follows. First, we present the theoretical framework for developing the context-based competency models. Then, we review the context-based competency models for work teams and the factors affecting employee competencies. After, the discussion reviews the effects of competencies on individual performance in different workplace contexts and the ability of the quantitative models to predict competencies and performance in their specific work contexts.

7.1.1 The theoretical framework for developing the context-based competency models

In this study, the theoretical framework for the development of the context-based competency models was based on a thorough literature review. The framework incorporated organizational culture, team climate and manager behaviour as the independent variables affecting employee competencies and performance. This framework was used as the guide for a pilot study in a manufacturing organization, which aimed to study employee competencies. The framework was also used to build two context-based competency models, for industry and for academia. The context-based competency model for industry was built to understand the relationships between employee competencies and context in a corporate environment. The context-based competency model for academia was designed to investigate similar relationships among student groups.

The consequent studies examined whether the hypothesized relationships derived from the context models held in practice. Hypothesis H1 supposed that organizational culture affects employee competencies, and was partially supported for achievement orientation (ACH), concern for order and quality (CO), information seeking (INFO), innovation orientation (INNOV_B and INNOV) and team leadership (TL) competencies. Social axioms, a proxy for team culture, were also related to competencies, and had a

strong effect on the ACH, CO, Initiative (INT_A and INT_B), INNOV_B and Teamwork (TW) competencies.

Hypothesis H2 maintained that team climate has a strong effect on employee competencies, and was also partially supported, for the initiative (INT_A and INT) and innovation orientation (INNOV_A) competencies. The analogous hypothesis (H2) in academia suggested that team climate has a strong effect on student competencies. The data also partially supported this hypothesis, for the competencies of ACH, CO, INFO, initiative (INT_A, INT_B, INT), innovation Orientation (INNOV_A, INNOV), TW and TL. Hypothesis H3, that manager behaviour has a strong effect on employee competencies, can be considered as partially supported for the ACH, CO, INFO, INNOV_B, and TW competencies.

Hypothesis H4 was also partially supported at company level. At the student level, competencies are important factors predicting group performance. Higher ACH, CO, INFO, innovation (INNOV_A, INNOV_C), and TW competency scores were related to higher group performance. Developing these competencies will likely lead to improvements of student group learning.

Hypothesis H5 suggests that manager behaviours have a strong effect on organizational culture and team climate. The correlation coefficients presented in Table 5.21 and 5.22 show some moderate correlations between manager behaviour and workplace context (organizational culture and team climate). However, these results do not provide evidence of a strong relationship between them. As a result, hypothesis H5, which proposed that manager behaviour has a strong effect on organizational culture and team climate was not supported.

7.1.2 Context-based competency models for work and project teams

7.1.2.1 The Effect of Organizational Culture on work teams

Organizational culture is an important factor in the theoretical framework for work (project) teams. Aspects of organizational culture were significantly correlated several competencies (ACH_ACO, INFO, INNOV, TL).

7.1.2.2 The Effect of Team Climate on work teams and student groups

Team climate was moderately correlated with competencies related to initiative, the time dimension of innovation orientation and degree of innovation. The study performed in student groups showed a significant negative correlation between the commitment dimension of team climate and the TW competency in student groups. The recognition dimension was weakly correlated with achievement orientation and concern for order. The standards dimension had a negative correlation with self-motivation and discretionary initiative.

The structure dimension was positively correlated with CO, INFO, INT, INNOV and TL competencies. The support dimension had a weak positive correlation with CO, INFO, the time dimension of initiative (INT_A), and the degree of innovation (INNOV_A) competencies.

7.1.2.3 The Effect of Manager Behaviour on Work Teams

It was interesting to find that manager skills and practices have no strong direct effects on individual competencies. The competencies most affected by organizational culture constructs were ACH, CO, INFO, innovative ideas assessment (INNOV_B) and TW.

The commitment, standards and support dimensions of team climate significantly correlated with most of the manager behaviour dimensions studied. As such, managing customer services and managing the control system were moderately correlated with adhocracy culture (ADH_N), preferred level of adhocracy type of culture (MAR_P) and the preferred level of hierarchy (HIER_P). Moreover, the managing interpersonal relationships factor was moderately correlated with existing level of adhocracy culture (ADH_N).

7.1.2.4 The Effect of Social Axioms on Student Groups

The fate control dimension of social axioms was correlated with self-motivation and amount of discretionary (INT_B) competency. Social complexity had positive

correlations with many competencies, such as ACH, CO, INT_A, and INNOV_B. Social cynicism was positively correlated with self-motivation and amount of discretionary (INT_B) and TW competencies.

7.1.2.5 Employee Competencies and Employee Performance

The best performing employees had higher scores for ACH and TL. There was no evidence that the results of the study generalize to other populations.

7.1.2.6 Group Performance in Student Groups

In the study of student group performance, it was interesting to find that the group performance was correlated to the ACH, CO, INFO, INNOV_A, and to the support innovations of others (INNOV_C) competencies. Group performance had a weak negative correlation with TL. It is also interesting to note that group performance had a weak negative correlation to the reward for application dimension of social axioms.

7.1.3 Effect of workplace context on employee competencies

The constructs of organizational culture, team climate, manager skills and social axioms were explored as factors of the workplace context. The relationships between work context and individual competencies are discussed in the following sections.

7.1.3.1 Achievement orientation for work teams and student groups

In the study of work teams, the ACH competency had a negative correlation to the clan culture type (r = -.426). The results are consistent with the characteristics of the clan type of culture, which enforces cohesion, morale and the development of human resources as effectiveness criteria (Cameron & Quinn, 1999). Clan culture does not support competing against a standard of excellence (Spencer & Spencer, 1993). There was no statistically significant correlation between ACH and team climate. ACH was correlated to managing coordination (r = 0.370) and managing control system (r = 0.390). It is worth noting, that ACH was most highly (but not significantly) correlated with an existing hierarchy culture (r = 0.263) which is characterized by a focus on managing coordination and the control system.

A decision trees was built based on the context-based model for the work teams and showed that ACH competency was more likely to appear the clan type and responsibility variables were less than or equal to the medium level, and managing customer services (MAR) was greater than the low level. This is consistent with the results of the correlation analysis. The responsibility variable may suppress ACH competency because of the strong feelings of responsibility for a job. This provides redundancy, double-checking decisions with others (Stringer, 2002). A high level of Managing customer service (MAR) helps to align employee actions with customer needs and expectations, so as to achieve goals and beat competitors (Cameron & Quinn, 1999).

In the student groups, ACH competency had a positive correlation to the recognition (r=0.255) dimension of team climate. High recognition distinguishes a balance between reward and criticism which arouses achievement motivation (Stringer, 2002).Moreover, ACH had a positive correlation with social complexity (r=0.277). High social complexity axioms suggest multiple ways of achieving a given outcome (Leung & Bond, 2004) that may affect ACH competency.

The decision tree for the student groups shows that a high level of the ACH competency was more likely to appear if (1) the support dimension was high, the fate control dimension was low, and the reward for application dimension was low or medium, and (2) the standards dimension was low, the fate control dimension was medium or high, and the social complexity dimension was high.

7.1.3.2 Concern for order and quality in work teams and student groups

In the study of work teams, CO had a positive correlation with the preferred hierarchy (r = 0.409) type of organizational culture, and negative correlation to the market (r = -0.489) and adhocracy (r = -0.412) culture types. The findings support the hypothesis and are consistent with the literature on hierarchy type cultures (Cameron and Quinn, 1999). The market and adhocracy cultures do not focus on quality and detail, which are important to the CO competency.

The CO competency also had a positive correlation to manager behaviours such as managing continuous improvement (r = 0.483), managing coordination (r = 0.414) and managing teams (r = 0.395). Managing coordination is related to the hierarchy culture type (Cameron and Quinn, 1999). Other correlations between the CO competency and manager behaviours can be interpreted by suggesting that good managing skills reduce uncertainty, better organize work processes, and clarify goals and communication.

There were two cases when a high level of CO competency was more likely to appear. The first case included recognition and managing development others at medium or high levels and high clan (preferred) culture, while the second case is described by recognition and adhocracy (preferred) at medium level, high adhocracy (now) and managing the development of others at medium or high level. Both cases require not low recognition, preferred clan culture and managing the development of others. The decision tree provided 84.6 % of correct predictions of a "high" level of the CO competency.

In the study of student groups, the CO competency had a positive correlation to the recognition (r = 0.337), structure (r=0.456) and support (r = 0.344) dimensions of team climate, and the social complexity (r = 0.386) dimension of social axioms. The decision tree also shows the importance of the high support, not low commitment and social complexity variables. Moreover, it proposed that high fate control more often led to high CO scores. The rules of the decision tree were consistent with the results of the correlation analysis. They revealed that Support and Social Complexity were important factors for the prediction of a high level of CO. The decision tree revealed 97.7% of correct predictions of a high level for the CO competency.

It is interesting to note that the results of analysis of work teams and student groups were different to each other. This may be due to the fact that the nature of group work is significantly different in these two types of work environments. This issue is worthy of further study.

7.1.3.3 Information seeking in work teams and student groups

In the study of work teams in the technology companies, the INFO competency had a negative correlation to the existing market (r = -0.407) culture type. It had a negative

correlation with managing competitiveness (r = -0.361). The literature review revealed that the market culture type is characterized by leaders who are hard-driven by producers and competitors, and who are concerned with achieving goals over the long term (Cameron and Quinn, 1999). As a result, this culture should engage people to seek information about market, technologies, competitors and customers. In the study of student groups, the INFO competency had no significant correlation with social axioms. However, it had weak positive correlations with the structure (r = 0.252) and support (r = 0.298) dimensions of team climate. High scores on the structure dimension means that employees know who does what in the team. High scores for support dimension indicate trust and mutual support within a team or work group (Stringer, 2002). As a result, high support from peers may prompt employees to obtain more information for a team task.

The decision tree also showed that the best predictor of high INFO scores is a high Standards dimension, and low or medium fate control and rewards for application dimensions. The high standards dimension proposes striving for high level performance (Stringer, 2002). fate control had a negative correlation with INFO (r=-0.119). Low fate control scores could contribute to the high INFO scores due to employees holding fewer beliefs regarding predetermined events and outcomes (Leung & Bond, 2004).

7.1.3.4 Initiative in work teams and student groups

In the study of work teams in technology companies, the time dimension (INT_A) competency was negatively correlated with the commitment (r=-0.334), recognition (r=-0.459) and standards (r=-0.445) dimensions of team climate. Low recognition may cause feelings of being unappreciated for a job done (Stringer, 2002) and stimulate the initiation of new actions (i.e., high time dimension; INT_A) to achieve recognition. However, negative correlations between INT_A and recognition and standards were not proposed.

The decision tree analysis demonstrated two cases where a high level of INT_A was more likely to appear. The first case includes the required medium or high clan (preferred) culture and low level of managing coordination. As a result, initiative appears when employees would like to work in teams and the manager does not do much coordination. The second case is when there is a culture characterized by low support and medium or high clan (preferred). In this situation, though an employee should only rely on

themselves, they strive to achieve a shared team goal and is predisposed to collaborate (i.e., prefers clan culture).

In the study of student groups, the time dimension (INT_A) competency had a positive correlation with the structure (r = 0.347) and support (r = 0.282) dimensions of team climate, and with the Social complexity (r = 0.276) dimension of social axioms. The amount of discretionary (INT_B) had a positive correlation with the structure (r = 0.404) and a negative correlation with the standards (r = -0.302) dimensions of team climate. INT_B had also positive correlations with fate control (r=0.305) and social cynicism (r = 0.424).

The decision tree showed six nodes which met the threshold level on gain, response and index. The high scores of INT_A competency were more likely to appear if there was a combination of at least two factors such as high support, high reward for application, medium or high standards, and low structure. A decision tree for the self-motivation and amount of discretionary (INT_B) competency proposed that high structure and commitment, as well as medium or high fate control and medium or low social complexity would more likely lead to high INT_B scores. The decision trees achieved 71.1% correct predictions of high INT_A and 66.7% correct predictions for INT_B competency.

7.1.3.5 Innovation orientation in work teams and student groups

In the study of work teams, the INNOV_A competency had a positive correlation with the structure (r = 0.339) and a negative correlation with the Responsibility (r = -0.365) dimensions. High structure allows for an evaluation of what improvements can be made in a job (i.e., high INNOV_A). However, as high responsibility encourages employees to solve problems on their own (Stringer, 2002) and take personal responsibility for their actions, it may stop them from implementing changes and take risks at a high level.

The INNOV_B competency was negatively correlated with hierarchy culture (preferred) (r = -0.368) and managing the development of others (r = 0.369). The decision tree for the INNOV_B competency shows 100 % correct predictions for high INNOV_B competency with high energizing employees (MAR) as the only predictor.

In the study of student groups, the INNOV_A competency was positively correlated with the support (r = 0.279) dimension of team climate. The decision tree for the INNOV_A competency provided 99.3% correct predictions of a high level of INNOV_A competency. However, the initial distribution showed 79.9 % of students with high INNOV_A competency. The high scores of INNOV_A competency were more likely to appear in two cases. The first case was that described by high standards and low fate control. The second case was that described by medium or high fate control, and medium or high standards and low commitment. The classes defined by the decision tree were not consistent with low index and gain levels.

The innovation ideas assessment (INNOV_B) competency had a positive correlation to the social complexity (r = 0.305) dimension of social axioms. High social complexity axioms help students consider multiple ways of achieving a given goal, and understand inconsistent behaviours (Leung & Bond, 2004) that can be important for doing something new, different or unique (i.e., high INNOV_B). A decision tree for the INNOV_B competency proposed that (1) low or medium structure and high fate control, or (2) high standards and low or medium fate control would more likely lead to high INNOV_B scores. The support innovations of others (INNOV_C) competency was not related to any team climate and social axioms dimensions.

7.1.3.6 Team work and cooperation in work teams

In the study of work teams, the TW competency was related to manager behaviours such as managing innovation (r = 0.410), managing continuous improvement (r =0.425), energizing employees (r=0.454) and managing the development of others (r =0.397). Managing innovations, continuous improvements and energizing employees inspire the team to perform well. Managing the development of others helps successful team building and helps hold a team together. In the study of student groups, the TW was inversely related to the Commitment (r = -0.343) dimension of team climate and to the Social Cynicism (r = -0.381) dimension of social axioms.

7.1.3.7 Team leadership in student groups

In the study of student groups, the team leadership (TL) competency was positively related to adhocracy (existing; r = 0.389) and negatively related to the market (existing; r = -0.384) culture types. The findings support the hypothesis and are consistent with previous literature. The environment of the adhocracy culture is an entrepreneurial and creative workspace that strives to be at the leading edge of new knowledge, products and services (Cameron & Quinn, 1999). As such, it provides opportunities for the demonstration and development of the leadership skills. The TL competency was positively related to the structure dimension (r = 0.346) of team culture.

7.1.4 Quantitative models to predict competencies and performance

Factor analysis, regression analysis and decision trees were used to build quantitative models to predict employees' competencies and performance. Despite limited generalizability, the quantitative models developed provide useful knowledge about the relationships between workplace context factors and employee competencies and performance. Factor analysis was used to reduce the dimensions of the research model and provide more concise factors for future analyses. Linear regression was used to develop a model to predict employee competencies and performance, as well as team performance. A number of decision trees were built. The decision tree models defined the workplace contextual factors that were more likely to lead to competencies. The decision tree models were used to make predictions based on data for workplace contextual factors. The models were validated using the cross-validation method. As a result, further work on the practical applicability and accuracy of the models is needed.

7.2 Contributions

7.2.1 Originality and Theoretical Contributions

The findings of this study provide useful additional knowledge to the body of theory concerned with competencies and team performance in the industry and in student groups in academic institutions. The empirical evidence obtained confirms the importance of contextual factors as influencers of individual competencies and performance levels of team members. Two studies conducted in industry and academia contributed to a deeper understanding of the role of contextual factors in group work and performance.

Specifically, the study conducted in industry integrated the concepts of organizational culture, team climate and manager behaviours into one model that allowed for the prediction competency levels and the team member performance.

The study of student group work went beyond the traditional study of academic performance by considering the behaviour of students in a similar manner to that used to study the behaviour of team members in industry. In addition to the originality of this study in considering contextual factors, the study investigated social axioms as predictors of students' competencies and group performance. The study presented evidence that competencies and social axioms play an important role in group performance.

7.2.2 Practical implications of the findings in work teams

The sustainable development of a company is rooted in the efficiency of its workforce. Effective managing practices and an appropriate workplace environment help build high performing teams and stimulate required competencies. The results of the study presented in this thesis provide companies and universities with important knowledge on how to encourage the right competencies for high performance in the workplace.

The findings suggest that team members' performances are mainly affected by workplace contextual factors including organizational culture, team climate and manager behaviour. As a result, effective team building and design can enhance team performance in industry. The model can be used as a guide for future corporate studies that aim to develop employee competencies.

7.2.3 Practical implications of the findings in student groups

The results of the study of student groups can be used in two ways. First of all, the model can be used to improve the performance of student groups. It can be used to predict the performance of student groups working together over the course of a semester or to build more effective groups based on the individual features of the students. The model can also be used for assessing or developing specific competencies as required by the industry students plan to work in.

Second, the model can be used to enhance corporate performance. It can be used for the purpose of predicting the effectiveness of group-based learning activities during training and development programmes. It can also be used to assess the influence of social axioms on individual competencies. It is assumed that the role of social axioms is similar for students and work team members in companies.

CHAPTER 8 LIMITATIONS OF THE RESEARCH AND SUGGESTIONS FOR FURTHER STUDY

8.1 Limitations in the Theoretical Background and Methodology

The literature review uncovered some limitations in the previous research related to the study of the constructs and their influence on individual and organizational performance. In particular, few authors considered the relationships between competencies and contextual factors. As a result, there was no information regarding the directions and strengths of the relationships under study in the current work.

Furthermore, many different constructs had methodological issues and limitations. First of all, questionnaire-based survey is the only applicable method for data collection. The total number of questions for work team members was around 150. The questions were divided among three questionnaires. It took around 10-15 minutes to complete each questionnaire. As a result, there were not sufficient resources to use triangulation principles to test the strength of the methodology. The studied relationships should be analyzed using other methods to achieve triangulation of the results. The most appropriate methods for data collection would be interviews with experts, interviews with the top and average performers in work teams, long-term experiments and panel studies. The second limitation related to the methodology was the small sample size and the convenience sample. A larger sample using probability sampling should be used in the further research. As a result, the findings have limited generalizability and need to be confirmed by further studies.

8.2 Applicability of Results in Work Groups

The study sample included work groups form organizations in different industries. Though it is assumed that the competencies studied here apply to any industry, the magnitude of the relationships between variables may vary across industries and job types. As such, the industry and job type may mediate the relationships between the competencies and performance. However, the study results are assumed to be accurate and can be used as a guide for future studies. The next limitation is related to the measurement of performance. It was not possible to use a single criterion to measure the performance of employees and

teams and therefore the performance indicator used in this study was based on the subjective opinion of team managers. As such, not only were the performance results susceptible the bias from the managers, it was impossible to find performance indicators to compare the performance results across different industries and jobs types.

Several suggestions for further research arise from this work. For example, studies can use controls to get more robust results in future. Moreover, more specific industry-based and job-based competency models can be built. Finally, it would be a huge contribution to develop hard performance indicators causally related to the company's outcomes that can be used across industries and job types.

8.3 Applicability of Results in Student Groups

The study of student groups was conducted in a sample from the faculty of engineering of one university. The sample could be extended to include student groups from other faculties and institutions in the future research in order to more confidently generalize from the results of the study. Another limitation of the study of the student groups is the kind of group work performed by groups and the intensity of group work. For example, the type of group assignment, time spent on the assignment, average time spent doing group work, and the communication during the group work may have affected the results, and should be controlled for in future studies.

8.4 Integration of the Results of Different Populations

The findings of this study show similarities in relationships between the competencies and the team climate variables in different populations. In future work, the social axioms concept will be incorporated as an independent variable into competency models for work teams in industry. Moreover, the results revealed that the nature of collaboration in work teams and student groups are different. As a result, further research on the compatibility of the results in different populations will be required.

8.5 Confounding Variables

This study focused on observable behavioural indicators, and the opinions and feelings of team members. However, there are other potentially influential factors, including personality, motivation, values, etc., that were not considered. Given that the purpose of this work was to develop a testable theoretical model, we wished to be parsimonious in the variables included in analyses. Nevertheless, these other factors may have significantly influenced the relationships between competencies and contextual factors and should be considered in future research.

APPENDIX A. TOOLS FOR DATA COLLECTION FOR THE STUDY OF THE CONTEXT-BASED COMPETENCY MODEL FOR WORK (PROJECT) TEAMS

Appendix A1. Introduction to study and consent to participate form

You are invited to participate on a study conducted by Mikhail Rozhkov, who is a research student of the Department of Industrial and Systems Engineering in The Hong Kong Polytechnic University. The project has been approved by the Human Subjects Ethics Sub-committee (HSESC) (or its Delegate) of The Hong Kong Polytechnic University (HSESC Reference Number: HSEARS20130509003).The study purpose is to understand what factors enable key competencies that provide higher performance and business results. All information related to you will remain confidential, and will be identifiable by codes only known to the researcher. All responses will be combined in data base, aggregated and analyzed at organization scale level. Neither your manager nor peers nor any third party will access to you response data. All personal identification data will be removed after adding the data to the data base.

You have every right to withdrawn from the study before or during the measurement without penalty of any kind. This research is time consuming for all participants and I highly dependent on the completeness of answered of participated respondents. I very appreciate your volunteering time and efforts. Therefore I respect your right to withdraw you participation in my research at any time.

If you would like to get more information about this study, please contact me Mikhail Rozhkov (on tel. no. XXXXX or email: @gmail.com) or Prof. Benny C.F. Cheung (on tel. no. XXXXX, email: @polyu.edu.hk) or Prof. Eric Tsui (on tel. no. XXXXX, email: @polyu.edu.hk). If you have any complaints about the conduct of this research study, please do not hesitate to contact Dr Virginia Cheng, Secretary of the Human Subjects Ethics Sub-Committee of The Hong Kong Polytechnic University in writing (c/o Research Office of the University) stating clearly the responsible person and department of this study. Thank you for your interest in participating in this study.

Best regards,

Mikhail Rozhkov

PhD Student of the Department of Industrial and Systems Engineering,

The Hong Kong Polytechnic University, E Core, Office DE404, 4/F

CONSENT TO PARTICIPATE IN RESEARCH

Hereby I consent to participate in the captioned research conducted by Mikhail Rozhkov. I understand that information obtained from this research may be used in future research and published. However, my right to privacy will be retained, i.e. my personal details will not be revealed. The procedure as set out in the attached information sheet has been fully explained. I understand the benefit and risks involved. My participation in the project is voluntary. I acknowledge that I have the right to question any part of the procedure and can withdraw at any time without penalty of any kind.

☐ I agree

Appendix A2. Questionnaire 1 for team members

1. Employee General Information

1.1 You are

1. Male
2. Female

1.2 Your age

1. 25 and under
2. 26 – 35
3. 36 – 45
4. 46 – 55
5. 56 – 65
6. 65 and older

1.3 The highest level of education you have completed is

1. Bachelor's degree
2. Master's degree
3. Ph.D. degree
4. Other _____

1.4 What type of job you are responsible for?

1. Architecture and Engineering
2. Arts. Design. Entertainment. Sports, and Media
3. Business and Financial Operations
4. Computer and Mathematical
5. Construction and Extraction
6. Education. Training, and Library
7. Installation. Maintenance, and Repair
8. Life. Physical, and Social Science
9. Office and Administrative Support
10. Production
11. Sales and related
12. Transportation and Material moving
13. Other, please specify _____

1.5 You have worked for this company for

1. Less than 1 year
2. At least 1 year, but less than 3 years
3. At least 3 years, but less than 5 years
4. At least 5 years, but less than 10 years
5. 10 years or more

1.6 Indicate years of your total professional experience

1. Less than 1 year
2. At least 1 year, but less than 3 years
3. At least 3 years, but less than 5 years
4. At least 5 years, but less than 10 years
5. 10 years or more

2. Organizational Culture Survey

Below is a set of statements about different existing (Now) and preferred (Preferred) aspects of an organization. Please distribute the 100 points between statements. Give more points to the statement that more accurate describes your organization. The sum over all distributed points between statements should be equal to 100

2.1 Dominant Characteristics

	Now	Prefer
1. The organization is a very personal place. It is like an extended family. People seem to share a lot of themselves.	❑	❑
2. The organization is a very dynamic and entrepreneurial place. People are willing to stick their necks and take risks.	❑	❑
3. The organization is very results oriented. A major concern is with getting the job done. People are very competitive and achievement oriented.	❑	❑
4. The organization is a very controlled and structured place. Formal procedures generally govern what people do.	❑	❑

2.2 Strategic Emphasis

	Now	Preferred
1. The organization emphasizes human development. High trust, openness, and participation.	❑	❑
2. The organization emphasizes acquiring new resources and creating new challenges. Trying new things and prospecting for opportunities are valued.	❑	❑
3. The organization emphasizes competitive actions and achievement. Hitting stretch targets and winning in the marketplace are dominant.	❑	❑
4. The organization emphasizes permanence and stability. Efficiency, control and smooth operations are important.	❑	❑

2.3 Criteria of Success

	Now	Preferred
1. The organization defines success on the basis of the development of human resources, teamwork, employee commitment, and concern for people.	❑	❑
2. The organization defines success on the basis of the development of having the most unique or newest products. It is a product leader and innovator.	❑	❑
3. The organization defines success on the basis of the development of winning in the marketplace and outpacing the competition. Competitive market leadership is key.	❑	❑
4. The organization defines success on the basis of the development of efficiency. Dependable delivery, smooth scheduling, and low-cost production are critical.	❑	❑

2.4 Organization Glue

	Now	Preferred
1. The glue that holds the organization together is loyalty and mutual trust. Commitment to this organization runs high.	❑	❑
2. The glue that holds the organization together is commitment to innovation and development. There is an emphasis on being on the cutting edge.	❑	❑
3. The glue that holds the organization together is the emphasis on achievement and goal accomplishment. Aggressiveness and winning are common themes.	❑	❑
4. The glue that holds the organization together is formal rules and policies. Maintaining a smooth-running organization is important.	❑	❑

2.5 Management Style

	Now	Preferred
1. The management style in the organization is characterized by teamwork, consensus, and participation.	❑	❑
2. The management style in the organization is characterized by individual risk-taking, innovation, freedom, and uniqueness.	❑	❑
3. The management style in the organization is characterized by hard-driving competitiveness, high demands, and achievement.	❑	❑
4. The management style in the organization is characterized by security employment, conformity, predictability, and stability in relationships.	❑	❑

2.6 Organizational Leadership

	Now	Preferred
1. The leadership in the organization is generally considered to exemplify mentoring, facilitating, or nurturing.	❑	❑
2. The leadership in the organization is generally considered to exemplify entrepreneurship, innovating, or risk-taking.	❑	❑
3. The leadership in the organization is generally considered to exemplify a non-sense, aggressive, results-oriented focus.	❑	❑
4. The leadership in the organization is generally considered to exemplify coordinating, organizing, or smooth-running efficiency.	❑	❑

3. Organizational Climate Survey

This section of the questionnaire is designed to measure how you feel about your work environment. You will be asked to describe the kind of climate or atmosphere that has been created in the organization. By "organization" we mean the smallest work unit that is meaningful to you. When thinking about the organization, you should keep in mind the actual experiences you have had working here.

	Definitely Disagree	Inclined to Disagree	Inclined to Agree	Definitely Agree
01. In this organization, the rewards and encouragements you get usually outweigh the threats and the criticism	❑	❑	❑	❑
02. I feel that I am a member of a well-functioning team.	❑	❑	❑	❑

	Definitely Disagree	Inclined to Disagree	Inclined to Agree	Definitely Agree
03. In some of the projects I've been on, I haven't been sure exactly who my boss was.	❑	❑	❑	❑
04. Around here management resents (dislikes) your checking everything with them. If you think you've got the right approach, you just go ahead	❑	❑	❑	❑
05. In this organization, people are rewarded in proportion to the excellence of their job performance.	❑	❑	❑	❑
06. The jobs in this organization are clearly defined and logically structured.	❑	❑	❑	❑
07. In this organization we set very high standards for performance.	❑	❑	❑	❑
08. People in this organization DO NOT really trust each other enough.	❑	❑	❑	❑
09. In this organization, it is sometimes unclear who has the formal authority to make a decision.	❑	❑	❑	❑
10. Our management believes that no job is so well done that it couldn't be done better.	❑	❑	❑	❑
11. Generally, I am highly committed to the goals of this organization.	❑	❑	❑	❑
12. Around here I feel a pressure to continually improve our personal and group performance.	❑	❑	❑	❑
13. We DO NOT rely too heavily on individual judgment in this organization; almost everything is double-checked.	❑	❑	❑	❑
14. You DO NOT get much sympathy from higher-ups in this organization if you make a mistake.	❑	❑	❑	❑
15. Around here we take pride in belonging to this organization.	❑	❑	❑	❑
16. When I am on a difficult assignment, I can usually count on getting assistance from my boss and co-workers.	❑	❑	❑	❑
17. There is NOT enough reward and recognition given in this organization for doing good work.	❑	❑	❑	❑
18. Our philosophy emphasizes that people should solve their problems by themselves.	❑	❑	❑	❑
19. We have a promotion system here that helps the best person rise to the top.	❑	❑	❑	❑
20. Our productivity sometimes suffers from lack of organization and planning.	❑	❑	❑	❑
21. I DO NOT really care what happens to this organization.	❑	❑	❑	❑
22. You don't get ahead in this organization unless you stick your neck out and try things on your own.	❑	❑	❑	❑
23. As far as I can see, there IS NOT much personal loyalty to the organization.	❑	❑	❑	❑
24. In this organization people DO NOT seem to take much pride in their performance.	❑	❑	❑	❑

4. Contact Information

Please, indicate your given name, family name and contact email

Given Name
Family Name
Email Address

Appendix A3. Questionnaire 1 for a manager

1. Organization, Unit and Manager General Information

In order to provide comparative feedback, please provide the following information about your organization, work unit and yourself. The following demographic and professional questions will only be used for statistical analysis purposes. Once I have entered the demographic information into data base, your individual survey will be destroyed.

1.1 What size is your organization?

1. Less 50 employees
2. 51 - 100 employees
3. 101 - 500 employees
4. 501-1000 employees
5. 1001-10000 employees
6. More than 100000 employees

1.2 Indicate the (main) industry of your organization

1. Automobiles & Components
2. Capital Goods
3. Consumer Durables & Apparel
4. Materials
5. Pharmaceuticals, Biotechnology & Life Sciences
6. Professional Services
7. Semiconductors & Semiconductor Equipment
8. Software & Services
9. Technology Hardware & Equipment
10. Telecommunication Services
11. Other

1.3 What is type of organizational unit you are managing?

1. Team or Work Group
2. Department
3. Project
4. Organization or Branch

1.4 What types of job your unit(team, department) is responsible for?

1. Arts. Design. Entertainment. Sports, and Media
2. Business and Financial Operations
3. Computer and Mathematical
4. Construction and Extraction
5. Education. Training, and Library
6. Installation. Maintenance, and Repair
7. Life. Physical, and Social Science
8. Office and Administrative Support

9. Production
10. Sales and related
11. Transportation and Material moving
12. Other

1.5 Your age
1. 25 and under
2. 26 – 35
3. 36 – 45
4. 46 – 55
5. 56 – 65
6. 65 and older

1.6 The highest level of education you have completed is
1. Bachelor's degree
2. Master's degree
3. Ph.D. degree
4. Other

1.7 You have worked for this company for
1. Less than 1 year
2. At least 1 year, but less than 3 years
3. At least 3 years, but less than 5 years
4. At least 5 years, but less than 10 years
5. 10 years or more

1.8 Indicate years of your total professional experience
1. Less than 1 year
2. At least 1 year, but less than 3 years
3. At least 3 years, but less than 5 years
4. At least 5 years, but less than 10 years
5. 10 years or more

1.9 How much experience do you have on managing position?
1. Less than 1 year
2. At least 1 year, but less than 3 years
3. At least 3 years, but less than 5 years
4. At least 5 years, but less than 10 years
5. 10 years or more

1.10 Number of subordinates reporting directly to you
1. 0
2. 1 – 3
3. 4 – 6
4. 7 – 9
5. 10-12
6. 13 – 15
7. 16 – 18
8. 19+

1.11 Please, indicate performance level of the following employees in recent 3-6 months?

Name of employee	Top 20 %	Average	Bottom 20 %
Name of Employee 1	❑	❑	❑
Name of Employee 2	❑	❑	❑
…	❑	❑	❑
…	❑	❑	❑

2. Organizational Culture Survey

Below is a set of statements about different existing (Now) and preferred (Preferred) aspects of an organization. Please distribute the 100 points between statements. Give more points to the statement that more accurate describes your organization. The sum over all distributed points between statements should be equal to 100

2.1 Dominant Characteristics

	Now	Prefer
1. The organization is a very personal place. It is like an extended family. People seem to share a lot of themselves.	❑	❑
2. The organization is a very dynamic and entrepreneurial place. People are willing to stick their necks and take risks.	❑	❑
3. The organization is very results oriented. A major concern is with getting the job done. People are very competitive and achievement oriented.	❑	❑
4. The organization is a very controlled and structured place. Formal procedures generally govern what people do.	❑	❑

2.2 Strategic Emphasis

	Now	Preferred
1. The organization emphasizes human development. High trust, openness, and participation.	❑	❑
2. The organization emphasizes acquiring new resources and creating new challenges. Trying new things and prospecting for opportunities are valued.	❑	❑
3. The organization emphasizes competitive actions and achievement. Hitting stretch targets and winning in the marketplace are dominant.	❑	❑
4. The organization emphasizes permanence and stability. Efficiency, control and smooth operations are important.	❑	❑

2.3 Criteria of Success

	Now	Preferred
1. The organization defines success on the basis of the development of human resources, teamwork, employee commitment, and concern for people.	❑	❑
2. The organization defines success on the basis of the development of having the most unique or newest products. It is a product leader and innovator.	❑	❑

	Now	Preferred
3. The organization defines success on the basis of the development of winning in the marketplace and outpacing the competition. Competitive market leadership is key.	❑	❑
4. The organization defines success on the basis of the development of efficiency. Dependable delivery, smooth scheduling, and low-cost production are critical.	❑	❑

2.4 Organization Glue

	Now	Preferred
1. The glue that holds the organization together is loyalty and mutual trust. Commitment to this organization runs high.	❑	❑
2. The glue that holds the organization together is commitment to innovation and development. There is an emphasis on being on the cutting edge.	❑	❑
3. The glue that holds the organization together is the emphasis on achievement and goal accomplishment. Aggressiveness and winning are common themes.	❑	❑
4. The glue that holds the organization together is formal rules and policies. Maintaining a smooth-running organization is important.	❑	❑

2.5 Management Style

	Now	Preferred
1. The management style in the organization is characterized by teamwork, consensus, and participation.	❑	❑
2. The management style in the organization is characterized by individual risk-taking, innovation, freedom, and uniqueness.	❑	❑
3. The management style in the organization is characterized by hard-driving competitiveness, high demands, and achievement.	❑	❑
4. The management style in the organization is characterized by security employment, conformity, predictability, and stability in relationships.	❑	❑

2.6 Organizational Leadership

	Now	Preferred
1. The leadership in the organization is generally considered to exemplify mentoring, facilitating, or nurturing.	❑	❑
2. The leadership in the organization is generally considered to exemplify entrepreneurship, innovating, or risk-taking.	❑	❑
3. The leadership in the organization is generally considered to exemplify a non-sense, aggressive, results-oriented focus.	❑	❑
4. The leadership in the organization is generally considered to exemplify coordinating, organizing, or smooth-running efficiency.	❑	❑

Appendix A4. Questionnaire 2 for team members

1. Managers Practices

In this section of the questionnaire you will be asked to assess the practices of your manager—the person to whom you directly report. Describe your manager's actual behavior at most of the time. Please indicate how much you agree or disagree with each of the statements as descriptions of your manager by circling the appropriate number. If you are unsure of an answer, make your best guess.

My manager...

	Strongly Disagree	Disagree	Undecided	Agree	Strongly Agree
1. …communicates in a supportive way when people in my unit share their problems with him.	❑	❑	❑	❑	❑
2. …encourages others in my unit to generate new ideas and methods.	❑	❑	❑	❑	❑
3. …motivates and energizes others to do a better job.	❑	❑	❑	❑	❑
4. …keeps close track of how my unit is performing.	❑	❑	❑	❑	❑
5. …regularly coaches subordinates to improve their management skills so they can achieve higher levels of performance.	❑	❑	❑	❑	❑
6. …insists on intense hard work and high productivity from subordinates.	❑	❑	❑	❑	❑
7. …establishes ambitious goals that challenge subordinates to achieve performance levels above the standard.	❑	❑	❑	❑	❑
8. …generates, or help others obtain, the resources necessary to implement their innovate ideas.	❑	❑	❑	❑	❑
9. …helps or sponsors others when someone comes up with a new idea.	❑	❑	❑	❑	❑
10. …makes certain that all employees are clear about our policies, values, and objectives.	❑	❑	❑	❑	❑
11. ...makes certain that others have a clear picture of how their job fits with others in the organization.	❑	❑	❑	❑	❑
12. …builds cohesive, committed teams of people.	❑	❑	❑	❑	❑
13. ….gives subordinates regular feedback about how they're doing.	❑	❑	❑	❑	❑
14. …articulates a clear vision of what can be accomplished in the future.	❑	❑	❑	❑	❑
15. …fosters a sense of competitiveness that helps members of my work group perform at higher level than members of other units.	❑	❑	❑	❑	❑
16. …assures that regular reports and assessment occur in our unit.	❑	❑	❑	❑	❑
17. …interprets and simplifies complex information so that makes sense to others and can be shared throughout the organization.	❑	❑	❑	❑	❑
18. …facilitates effective information sharing and problem solving in our group.	❑	❑	❑	❑	❑
19. …fosters rational, systematic decision analysis in my unit (e.g., logically analyzing component parts of problems) to reduce the complexity of important	❑	❑	❑	❑	❑

	Strongly Disagree	Disagree	Undecided	Agree	Strongly Agree
issues.					
20. …makes sure that others in our unit are provided with opportunities for personal growth and development.	❑	❑	❑	❑	❑
21. …creates an environment where involvement and participation in decision are encouraged and rewarded.	❑	❑	❑	❑	❑
22. …pays sufficient attention to both task accomplishment and to interpersonal relationships.	❑	❑	❑	❑	❑
23. …when giving negative feedback to others, he fosters their self-improvement rather than defensiveness or anger.	❑	❑	❑	❑	❑
24. …gives others assignments and responsibilities that provide opportunities for their personal growth and development.	❑	❑	❑	❑	❑
25. ... actively helps prepare others to move up in the organization.	❑	❑	❑	❑	❑
26. ... regularly comes up with new, creative ideas regarding processes, products, or procedures for my organization.	❑	❑	❑	❑	❑
27. ... constantly restates and reinforces my vision of the future to members of our unit.	❑	❑	❑	❑	❑
28. ... helps others visualize a new kind of future that includes possibilities as well as probabilities.	❑	❑	❑	❑	❑
29. ... is always working to improve the processes we use to achieve our desired output.	❑	❑	❑	❑	❑
30. ... pushes our unit to achieve world-class competitive performance in service and/or products.	❑	❑	❑	❑	❑
31. ... fosters a motivational climate that energizes everyone involved by empowering others in our unit.	❑	❑	❑	❑	❑
32. ... has consistent and frequent personal contact with our internals and customers.	❑	❑	❑	❑	❑
33. ... makes sure that we assess how well we are meeting our customers' expectations.	❑	❑	❑	❑	❑
34. ... provides experiences for employees that help them become socialized and integrated into the culture of our organization.	❑	❑	❑	❑	❑
35. ... increases the competitiveness of our unit by encouraging others to provide services and/or products that surprise and delight customers by exceeding their expectations.	❑	❑	❑	❑	❑
36. ... has established a control system that assures consistency in quality, service, cost and productivity in our unit.	❑	❑	❑	❑	❑
37. ... coordinates regularly with managers in other units in my organization.	❑	❑	❑	❑	❑
38. ... routinely shares information across functional boundaries in our organization to facilitate coordination.	❑	❑	❑	❑	❑
39. ... uses a measurement system that consistently monitors both work processes and outcomes.	❑	❑	❑	❑	❑
40. ... clarifies for members of our unit exactly what is expected of them.	❑	❑	❑	❑	❑
41. ... assure that everything we do is focused on better serving our customers.	❑	❑	❑	❑	❑
42. ... facilitates a climate of aggressiveness and intensity of our unit.	❑	❑	❑	❑	❑

	Strongly Disagree	Disagree	Undecided	Agree	Strongly Agree
43. ... constantly monitors the strengths and our weaknesses of our best competition and provides our unit with information on how we measure up.	❑	❑	❑	❑	❑
44. ... facilitates a climate of continuous improvement in our unit.	❑	❑	❑	❑	❑
45. ... has developed a clear strategy for helping our unit successfully accomplish our vision in the future.	❑	❑	❑	❑	❑
46. ... captures the imagination and emotional commitment of others when he talks about our vision of the future.	❑	❑	❑	❑	❑
47. ... facilitates a work environment where peers as well as subordinates learn from and help develop one another.	❑	❑	❑	❑	❑
48. ... listens openly and attentively to others who give him their ideas, even when he disagrees.	❑	❑	❑	❑	❑
49. When leading a group, he ensures collaboration and positive conflict resolution among group members.	❑	❑	❑	❑	❑
50. ... fosters trust and openness by showing understanding for the point of view of individuals who come to me with problems or concerns.	❑	❑	❑	❑	❑
51. ... creates an environment where experimentation and creativity are rewarded and recognized.	❑	❑	❑	❑	❑
52. ... encourages everyone in our unit to constantly improve and update everything they do.	❑	❑	❑	❑	❑
53. ... encourages all employees to make small improvements continuously in the way they do their job.	❑	❑	❑	❑	❑
54. ... makes sure that our unit continually gathers information on our customer's needs and preferences.	❑	❑	❑	❑	❑
55. ... involves customers in our unit's planning and evaluation.	❑	❑	❑	❑	❑
56. ... establishes ceremonies and rewards in our unit that reinforces the values and culture of our organization	❑	❑	❑	❑	❑
57. ... maintains a formal system for gathering and responding to information that originates in other units outside our own.	❑	❑	❑	❑	❑
58. ... initiates cross-functional teams or task forces that focus on important organizational issues.	❑	❑	❑	❑	❑
59. ... helps employees strive for improvement in all aspects of their lives, not just in job-related activities.	❑	❑	❑	❑	❑
60. ... creates a climate where individuals in our unit want to achieve higher levels of performance than the competition.	❑	❑	❑	❑	❑

2. Contact Information

Please, indicate your given name, family name and contact email

Given Name
Family Name
Email Address

Appendix A5. Questionnaire 2 for a manager

1. Management Practices

This instrument is designed to obtain description of your management behavior on the job. There are no right or wrong answers. The items on the questionnaire have been derived from research on managerial behavior, and their intent is to provide you with a profile of your own managerial competencies. The items do not assess your style, they assess your behavior. Therefore, you should respond on the basis of what you do, not what you think you should do.

Describe your behavior as a manager. Respond to the items as you actually behave most of the time, not as you would like to behave. If you are unsure of an answer, make your best guess.

	Strongly Disagree	Disagree	Undecided	Agree	Strongly Agree
1. I communicate in a supportive way when people in my unit share their problems with me.	❑	❑	❑	❑	❑
2. I encourage others in my unit to generate new ideas and methods.	❑	❑	❑	❑	❑
3. I motivate and energize others to do a better job.	❑	❑	❑	❑	❑
4. I keep close track of how my unit is performing.	❑	❑	❑	❑	❑
5. I regularly coach subordinates to improve their management skills so they can achieve higher levels of performance.	❑	❑	❑	❑	❑
6. I insist on intense hard work and high productivity from my subordinates.	❑	❑	❑	❑	❑
7. I establish ambitious goals that challenge subordinates to achieve performance levels above the standard.	❑	❑	❑	❑	❑
8. I generate, or help others obtain, the resources necessary to implement their innovate ideas.	❑	❑	❑	❑	❑
9. When someone comes up with a new idea, I help sponsor them to follow through on it.	❑	❑	❑	❑	❑
10. I make certain that all employees are clear about our policies, values, and objectives.	❑	❑	❑	❑	❑
11. I make certain that others have a clear picture of how their job fits with others in the organization.	❑	❑	❑	❑	❑
12. I build cohesive, committed teams of people.	❑	❑	❑	❑	❑
13. I give my subordinates regular feedback about how I think they're doing.	❑	❑	❑	❑	❑
14. I articulate a clear vision of what can be accomplished in the future.	❑	❑	❑	❑	❑
15. I foster a sense of competitiveness that helps members of my work group perform at higher level than members of other units.	❑	❑	❑	❑	❑
16. I assure that regular reports and assessment occur in my unit.	❑	❑	❑	❑	❑
17. I interpret and simplify complex information so that makes sense to others and can be shared throughout the organization.	❑	❑	❑	❑	❑

	Strongly Disagree	Disagree	Undecided	Agree	Strongly Agree
18. I facilitate effective information sharing and problem solving in my group.	❑	❑	❑	❑	❑
19. I foster rational, systematic decision analysis in my unit (e.g., logically analysing component parts of problems) to reduce the complexity of important issues.	❑	❑	❑	❑	❑
20. I make sure that others in my unit are provided with opportunities for personal growth and development.	❑	❑	❑	❑	❑
21. I create an environment where involvement and participation in decision are encouraged and rewarded.	❑	❑	❑	❑	❑
22. In groups I lead, I make sure that sufficient attention is given to both task accomplishment and to interpersonal relationships.	❑	❑	❑	❑	❑
23. When giving negative feedback to others, I foster their self-improvement rather than defensiveness or anger.	❑	❑	❑	❑	❑
24. I give others assignments and responsibilities that provide opportunities for their personal growth and development.	❑	❑	❑	❑	❑
25. I actively help prepare others to move up in the organization.	❑	❑	❑	❑	❑
26. I regularly come up with new, creative ideas regarding processes, products, or procedures for my organization.	❑	❑	❑	❑	❑
27. I constantly restate and reinforce my vision of the future to members of my unit.	❑	❑	❑	❑	❑
28. I help others visualize a new kind of future that includes possibilities as well as probabilities.	❑	❑	❑	❑	❑
29. I am always working to improve the processes we use to achieve our desired output.	❑	❑	❑	❑	❑
30. I push my unit to achieve world-class competitive performance in service and/or products.	❑	❑	❑	❑	❑
31. By empowering others in my unit, I foster a motivational climate that energizes everyone involved.	❑	❑	❑	❑	❑
32. I have consistent and frequent personal contact with my internal and my customers.	❑	❑	❑	❑	❑
33. I make sure that we assess how well we are meeting our customers' expectations.	❑	❑	❑	❑	❑
34. I provide experiences for employees that help them become socialized and integrated into the culture of our organization.	❑	❑	❑	❑	❑
35. I increase the competitiveness of my unit by encouraging others to provide services and/or products that surprise and delight customers by exceeding their expectations.	❑	❑	❑	❑	❑
36. I have established a control system that assures consistency in quality, service, cost and productivity in my unit.	❑	❑	❑	❑	❑
37. I coordinate regularly with managers in other units in my organization.	❑	❑	❑	❑	❑
38. I routinely share information across functional boun¬daries in my organization to facilitate coordination.	❑	❑	❑	❑	❑
39. I use a measurement system that consistently monitors both work processes and outcomes.	❑	❑	❑	❑	❑

	Strongly Disagree	Disagree	Undecided	Agree	Strongly Agree
40. I clarify for members of my unit exactly what is expected of them.	❑	❑	❑	❑	❑
41. I assure that everything we do is focused on better serving our customers.	❑	❑	❑	❑	❑
42. I facilitate a climate of aggressiveness and intensity of my unit.	❑	❑	❑	❑	❑
43. I constantly monitor the strengths and my weaknesses of our best competition and provide my unit with information on how we measure up.	❑	❑	❑	❑	❑
44. I facilitate a climate of continuous improvement in my unit.	❑	❑	❑	❑	❑
45. I have developed a clear strategy for helping my unit successfully accomplish my vision in the future.	❑	❑	❑	❑	❑
46. I capture the imagination and emotional commitment of others when I talk about my vision of the future.	❑	❑	❑	❑	❑
47. I facilitate a work environment where peers as well as subordinates learn from and help develop one another.	❑	❑	❑	❑	❑
48. I listen openly and attentively to others who give me their ideas, even when I disagree.	❑	❑	❑	❑	❑
49. When leading a group, I ensure collaboration and positive conflict resolution among group members.	❑	❑	❑	❑	❑
50. I foster trust and openness by showing understanding for the point of view of individuals who come to me with problems or concerns.	❑	❑	❑	❑	❑
51. I create an environment where experimentation and creativity are rewarded and recognized.	❑	❑	❑	❑	❑
52. I encourage everyone in my unit to constantly improve and update everything they do.	❑	❑	❑	❑	❑
53. I encourage all employees to make small improvements continuously in the way they do their job.	❑	❑	❑	❑	❑
54. I make sure that my unit continually gathers information on our customer's needs and preferences.	❑	❑	❑	❑	❑
55. I involve customers in my unit's planning and evaluation.	❑	❑	❑	❑	❑
56. I establish ceremonies and rewards in my unit that reinforce the values and culture of our organization	❑	❑	❑	❑	❑
57. I maintain a formal system for gathering and responding to information that originates in other units outside my own.	❑	❑	❑	❑	❑
58. I initiate cross-functional teams or task forces that focus on important organizational issues.	❑	❑	❑	❑	❑
59. I help my employees strive for improvement in all aspects of their lives, not just in job-related activities.	❑	❑	❑	❑	❑
60. I create a climate where individuals in my unit want to achieve higher levels of performance than the competition.	❑	❑	❑	❑	❑

Appendix A6. Questionnaire 3 for team members

1. Achievement Orientation

Think about your colleagues in day-to-day experience in your organization during the last 3-6 months or more. Put into the box a mark that indicates the extent to which your colleagues behave in specific way at workplace. If some items don't fit an employees behavior or you can not assess them, leave them unchecked.

A: Intensity and completeness of achievement-motivated action

	Assess Yourself	Name 1	Name 2	Name 3
ACH1. Shows no special concern with work, does only what is required	❑	❑	❑	❑
ACH2. Works hard, but gives no evidence of a standard of excellence for work outputs.	❑	❑	❑	❑
ACH3. Works toward implicit standards of excellence. Tries to do job well or right.	❑	❑	❑	❑
ACH4. Works to meet a standard set by management (e.g. manages to a budget, meet sales quotas, quality requirements).	❑	❑	❑	❑
ACH5. Uses his or her own specific methods of measuring outcomes against a standard of excellence (not imposed by management); e.g. $ spent, grades, outperforming others, time spent, scrap rates, beating the competition, etc.	❑	❑	❑	❑
ACH6. Makes specific changes in the system or in own work methods to improve performance. (e.g., does something better, faster, at lower cost, more efficiently; improves quality, customer satisfaction, morale revenues), without setting any specific goal.	❑	❑	❑	❑
ACH7. Sets and acts to reach challenging goals for self or others (e.g. "to improve sales/quality/productivity by 15% in 6 month").	❑	❑	❑	❑
ACH8. Makes decisions, sets priorities, or chooses goals on the basis of explicit consideration of potential profit, return on investment, or cost benefits analysis.	❑	❑	❑	❑
ACH9. Commits significant resources and/or time to improve performance, try something new, reach a challenging goal (e.g., starts new product or services), while also taking action minimize the risks involved (e.g., does market research, lines up customers in advance, etc.).	❑	❑	❑	❑
ACH10. Takes numerous, sustained over time entrepreneurial efforts, overcome obstacles	❑	❑	❑	❑

B: Achievement Impact

	Assess Yourself	Name 1	Name 2	Name 3
ACH11. Works to improve his or her own efficiency through time-management techniques, good personal work methods, etc.	❑	❑	❑	❑
ACH12. May make a small financial commitment.	❑	❑	❑	❑
ACH13. May achieve a moderate-sized sale or financial commitment. Works to make more efficient system, improve group performance	❑	❑	❑	❑
ACH14. May achieve a major sale comparable financial commitment.	❑	❑	❑	❑

2. Concern for Order, Quality, and Accuracy

Think about your colleagues in day-to-day experience in your organization during the last 3-6 months or more. Put into the box a mark that indicates the extent to which your colleagues behave in specific way at workplace. If some items don't fit an employees behavior or you can not assess them, leave them unchecked.

A. Intensity and complexity of actions

	Assess Yourself	Name 1	Name 2	Name 3
CO1. Lack of concern with order, despite problems caused by disorder.	❑	❑	❑	❑
CO2. Active order keeping is not needed, or it is done by someone else, or a lack of concern for order is noticed but does not cause problems.	❑	❑	❑	❑
CO3. Maintains an orderly workspace with desk, files, tools and so on in good order.	❑	❑	❑	❑
CO4. Works for clarity – wants roles, expectations, tasks, data crystal-clear and preferably in writing.	❑	❑	❑	❑
CO5. Double-checks the accuracy of information or own work	❑	❑	❑	❑
CO6. Monitors quality of other's work. checks to ensure procedures are followed. Or keeps clear, detailed records of own or other's activities.	❑	❑	❑	❑
CO7. Monitors progress of a project against milestones or deadlines. Monitors data, discovers weaknesses or missing data, and seeks out information to keep order; general concern for increasing order in existing systems.	❑	❑	❑	❑

3. Information Seeking

Think about your colleagues in day-to-day experience in your organization during the last 3-6 months or more. Put into the box a mark that indicates the extent to which your colleagues behave in specific way at workplace. If some items don't fit an employees behavior or you can not assess them, leave them unchecked.

A. Intensity and complexity of actions

	Assess Yourself	Name 1	Name 2	Name 3
INFO1. Does not seek additional information about a situation, other than what has been given	❑	❑	❑	❑
INFO2. Asks direct questions of immediately available people (or people who are directly involved in the situation even if not physically present), consults available resource	❑	❑	❑	❑
INFO3. Gets out personally investigation of a problem. Questions those closest to the problem.	❑	❑	❑	❑
INFO4. Asks a series of probing questions to get at the root of a situation or a problem, below the surface presentation.	❑	❑	❑	❑
INFO5. Calls on others, who are not personally involved, to get their perspective, background information, experience	❑	❑	❑	❑
INFO6. Makes a systematic effort over a limited period of time to obtain needed data or feedback; or does formal research through newspaper, magazines, or other resources.	❑	❑	❑	❑
INFO7. Has personally established ongoing systems or habits for various kinds of information gathering (may include "management by walking around," regular informal meetings)	❑	❑	❑	❑

	Assess Yourself	Name 1	Name 2	Name 3
INFO8. Involves others who would not normally be involved and gets them to seek out information	❑	❑	❑	❑

4. Initiative

Think about your colleagues in day-to-day experience in your organization during the last 3-6 months or more. Put into the box a mark that indicates the extent to which your colleagues behave in specific way at workplace.If some items dont fit an employees behavior or you can not assess them, leave them unchecked.

A. Time dimension

	Assess Yourself	Name 1	Name 2	Name 3
INT1. Thinks Only of the Past. Misses or fails to act on clear opportunities.	❑	❑	❑	❑
INT2. Not Applicable or Does Not Take Initiative	❑	❑	❑	❑
INT3. Persists – takes two or more steps to overcome obstacles or rejection	❑	❑	❑	❑
INT4. Recognizes and acts on present opportunities or addresses present problems (usually completed within 1 or 2 days).	❑	❑	❑	❑
INT5. Acts quickly and decisively in a crisis	❑	❑	❑	❑
INT6. Creates opportunities or minimizes potential problems by a unique extra effort (new program, special travel, etc.) occurring within a time frame of 1 to 2 months.	❑	❑	❑	❑
INT7. Anticipates and prepares for a specific opportunity or problem that is not obvious to others' Takes action to create an opportunity or avoid future crisis, looking ahead 3-12 months.	❑	❑	❑	❑

B. Self-motivation, Amount of discretionary

	Assess Yourself	Name 1	Name 2	Name 3
INT12. Avoids Required Work	❑	❑	❑	❑
INT13. Requires constant supervision	❑	❑	❑	❑
INT14. Completes assigned without constant supervision	❑	❑	❑	❑
INT15. Works extra hours, nights, weekends, etc. as needed to complete work when not required to do so.	❑	❑	❑	❑
INT16. Exceeds job description, e.g., takes on extra tasks.	❑	❑	❑	❑
INT17. Starts and carries through new projects	❑	❑	❑	❑
INT18. Acts without formal authority, takes personal risks, bends the rules to get the job done (emphasis must be on meeting the needs of the job, not on defiant norm breaking)	❑	❑	❑	❑
INT19. Gets others involved in unusual extra efforts (e.g., enlists family, co-workers, community members, usually on a volunteer basis).	❑	❑	❑	❑

5. Innovation Orientation

Think about your colleagues in day-to-day experience in your organization during the last 3-6 months or more. Put into the box a mark that indicates the extent to which your colleagues behave in specific way at workplace. If some items don't fit an employees behavior or you can not assess them, leave them unchecked.

A. Degree of Innovation

	Assess Yourself	Name 1	Name 2	Name 3
INOV01. Does Not Do New Things	❑	❑	❑	❑
INOV02. Does things (to improve performance) that have not been done in the job before, but that may have been done elsewhere in the organization.	❑	❑	❑	❑
INOV03. Improves performance by doing something new and different (that has not been done in the company, not necessarily new to the industry)	❑	❑	❑	❑
INOV04. Improves performance by doing things that are unique, cutting-edge, new to the industry	❑	❑	❑	❑
INOV05. Does things that are so new and effective the transform an industry (e.g., Apple's transformation of the personal computer industry, Schockley's development of transistors, leading to the electronic industry, Henry Ford's transformation of the auto manufacturing industry).	❑	❑	❑	❑

B. Ideas Assessment

	Assess Yourself	Name 1	Name 2	Name 3
INOV06. Assesses which creative ideas and suggestions may work; can plan and operationalize the innovative ideas	❑	❑	❑	❑
INOV07. Accurately assesses the value of creative ideas and suggestions; can plan and operationalize innovative ideas	❑	❑	❑	❑
INOV08. Anticipates future trends accurately	❑	❑	❑	❑
INOV09. Regarded as a proven and respected consultant to groups and organizations in the midst of complex and challenging change	❑	❑	❑	❑

C. Support innovations of others

	Assess Yourself	Name 1	Name 2	Name 3
INOV10. Helps others in the creative thinking and brainstorming processes. Builds on other peoples ideas.	❑	❑	❑	❑
INOV11. Manages the creative process of others, bringing their ideas to bear, and projects how potential ideas may play out.	❑	❑	❑	❑
INOV12. Recognizes viable creative ideas of others and brings them to the table and to those in a position to implement them	❑	❑	❑	❑
INOV13. Creates competitive and breakthrough strategies and plans; generates an attitude of enthusiastic expectancy in others regarding change and challenge	❑	❑	❑	❑

6. Teamwork

	Assess Yourself	Name 1	Name 2	Name 3
TW01. Uncooperative. Disruptive, causes trouble.	❑	❑	❑	❑
TW02. Neutral, passive, does not participate, or is not a member of any team.	❑	❑	❑	❑
TW03. Participates willingly, supports team decisions, is a "good team player", does his or her share of the work.	❑	❑	❑	❑
TW04. Keeps people informed and up to date about the group process, shares all relevant or useful information.	❑	❑	❑	❑
TW05. Express positive expectations of others. Speaks of team members in positive terms. Shows respect for other's intelligence by appealing to reason.	❑	❑	❑	❑
TW06. Genuinely values other's input and expertise, is willing to learn from others (especially subordinates). Solicit ideas and opinions to help from specific decisions or plans. Invites all members of a group contribute to a process.	❑	❑	❑	❑
TW07. Publicly credits others who have performed well. Encourages and empowers others, makes them feel strong or important.	❑	❑	❑	❑
TW08. Acts to promote a friendly climate, good morale, and cooperation (holds parties and get-togethers, creates symbols of group identity). Protects and promotes group reputation with outsiders.	❑	❑	❑	❑
TW09. Brings conflict within the team into the open and encourages or facilitates a beneficial resolution of conflicts.	❑	❑	❑	❑

7. Team Leadership

	Assess Yourself	Name 1	Name 2	Name 3
TL01. Manages meetings – states agendas and objectives, controls time, make assignments, etc.	❑	❑	❑	❑
TL10. Successfully mediates conflict between individuals and groups	❑	❑	❑	❑
TL15. Moves quickly to resolve issues to prevent bitterness	❑	❑	❑	❑
TL17. Can organize people into teams	❑	❑	❑	❑
TL21. Builds trust and leads teams, encouraging others to step out of their comfort zones to form new interpersonal relationships	❑	❑	❑	❑
TL22. Encourages collaboration and easily gains trust and support of others	❑	❑	❑	❑
TL23. Actively recruits people from diverse backgrounds to work together in groups	❑	❑	❑	❑
TL25. Creates a climate that treats interface between diverse people and groups as the norm	❑	❑	❑	❑
TL26. Actively seeks and integrates diverse thoughts and perspectives in order to develop more robust plans and solutions	❑	❑	❑	❑
TL27. Fosters a climate of inclusion, where diverse thoughts are freely shared and integrated to develop plans and solutions that are best suited to circumstances	❑	❑	❑	❑

8. CONTACT INFORMATION

Please, indicate your given name, family name and contact email

Given Name
Family Name
Email Address

Appendix A7. Questionnaire 3 for a manager

1. Achievement Orientation

Think about your subordinates day-to-day experience in your organization during the last 3-6 months or more. Put into the box a mark that indicates the extent to which your subordinates behave in specific way at workplace. If some items don't fit an employee's behavior, leave them unchecked.

A: Intensity and completeness of achievement-motivated action

	Name 1	Name 2	Name 3
ACH1. Shows no special concern with work, does only what is required	❑	❑	❑
ACH2. Works hard, but gives no evidence of a standard of excellence for work outputs.	❑	❑	❑
ACH3. Works toward implicit standards of excellence. Tries to do job well or right.	❑	❑	❑
ACH4. Works to meet a standard set by management (e.g. manages to a budget, meet sales quotas, quality requirements).	❑	❑	❑
ACH5. Uses his or her own specific methods of measuring outcomes against a standard of excellence (not imposed by management); e.g. $ spent, grades, outperforming others, time spent, scrap rates, beating the competition, etc.	❑	❑	❑
ACH6. Makes specific changes in the system or in own work methods to improve performance. (e.g., does something better, faster, at lower cost, more efficiently; improves quality, customer satisfaction, morale revenues), without setting any specific goal.	❑	❑	❑
ACH7. Sets and acts to reach challenging goals for self or others (e.g. "to improve sales/quality/productivity by 15% in 6 month").	❑	❑	❑
ACH8. Makes decisions, sets priorities, or chooses goals on the basis of explicit consideration of potential profit, return on investment, or cost benefits analysis.	❑	❑	❑
ACH9. Commits significant resources and/or time to improve performance, try something new, reach a challenging goal (e.g., starts new product or services), while also taking action minimize the risks involved (e.g., does market research, lines up customers in advance, etc.).	❑	❑	❑
ACH10. Takes numerous, sustained over time entrepreneurial efforts, overcome obstacles	❑	❑	❑

B: Achievement Impact

	Name 1	Name 2	Name 3
ACH11. Works to improve his or her own efficiency through time-management techniques, good personal work methods, etc.	❑	❑	❑
ACH12. May make a small financial commitment.	❑	❑	❑
ACH13. May achieve a moderate-sized sale or financial commitment. Works to make more efficient system, improve group performance	❑	❑	❑
ACH14. May achieve a major sale comparable financial commitment.	❑	❑	❑

2. Concern for Order, Quality, and Accuracy

Think about your subordinates day-to-day experience in your organization during the last 3-6 months or more. Put into the box a mark that indicates the extent to which your subordinates behave in specific way at workplace. If some items don't fit an employee's behavior, leave them unchecked.

A. Intensity and complexity of actions

	Name 1	Name 2	Name 3
CO1. Lack of concern with order, despite problems caused by disorder.	❑	❑	❑
CO2. Active order keeping is not needed, or it is done by someone else, or a lack of concern for order is noticed but does not cause problems.	❑	❑	❑
CO3. Maintains an orderly workspace with desk, files, tools and so on in good order.	❑	❑	❑
CO4. Works for clarity – wants roles, expectations, tasks, data crystal-clear and preferably in writing.	❑	❑	❑
CO5. Double-checks the accuracy of information or own work	❑	❑	❑
CO6. Monitors quality of other's work. checks to ensure procedures are followed. Or keeps clear, detailed records of own or other's activities.	❑	❑	❑
CO7. Monitors progress of a project against milestones or deadlines. Monitors data, discovers weaknesses or missing data, and seeks out information to keep order; general concern for increasing order in existing systems.	❑	❑	❑

3. Information Seeking

Think about your subordinates day-to-day experience in your organization during the last 3-6 months or more. Put into the box a mark that indicates the extent to which your subordinates behave in specific way at workplace. If some items don't fit an employee's behavior, leave them unchecked.

A. Intensity and complexity of actions

	Name 1	Name 2	Name 3
INFO1. Does not seek additional information about a situation, other than what has been given	❑	❑	❑
INFO2. Asks direct questions of immediately available people (or people who are directly involved in the situation even if not physically present), consults available resource	❑	❑	❑
INFO3. Gets out personally investigation of a problem. Questions those closest to the problem.	❑	❑	❑
INFO4. Asks a series of probing questions to get at the root of a situation or a problem, below the surface presentation.	❑	❑	❑
INFO5. Calls on others, who are not personally involved, to get their perspective, background information, experience	❑	❑	❑
INFO6. Makes a systematic effort over a limited period of time to obtain needed data or feedback; or does formal research through newspaper, magazines, or other resources.	❑	❑	❑
INFO7. Has personally established ongoing systems or habits for various kinds of information gathering (may include "management by walking around," regular informal meetings)	❑	❑	❑

INFO8. Involves others who would not normally be involved and gets them to seek out information	❑	❑	❑

4. Initiative

Think about your subordinates day-to-day experience in your organization during the last 3-6 months or more. Put into the box a mark that indicates the extent to which your subordinates behave in specific way at workplace. If some items don't fit an employee's behavior, leave them unchecked.

A. Time dimension

	Name 1	Name 2	Name 3
INT1. Thinks Only of the Past. Misses or fails to act on clear opportunities.	❑	❑	❑
INT2. Not Applicable or Does Not Take Initiative	❑	❑	❑
INT3. Persists – takes two or more steps to overcome obstacles or rejection	❑	❑	❑
INT4. Recognizes and acts on present opportunities or addresses present problems (usually completed within 1 or 2 days).	❑	❑	❑
INT5. Acts quickly and decisively in a crisis	❑	❑	❑
INT6. Creates opportunities or minimizes potential problems by a unique extra effort (new program, special travel, etc.) occurring within a time frame of 1 to 2 months.	❑	❑	❑
INT7. Anticipates and prepares for a specific opportunity or problem that is not obvious to others' Takes action to create an opportunity or avoid future crisis, looking ahead 3-12 months.	❑	❑	❑

B. Self-motivation, Amount of discretionary

	Name 1	Name 2	Name 3
INT12. Avoids Required Work	❑	❑	❑
INT13. Requires constant supervision	❑	❑	❑
INT14. Completes assigned without constant supervision	❑	❑	❑
INT15. Works extra hours, nights, weekends, etc. as needed to complete work when not required to do so.	❑	❑	❑
INT16. Exceeds job description, e.g., takes on extra tasks.	❑	❑	❑
INT17. Starts and carries through new projects	❑	❑	❑
INT18. Acts without formal authority, takes personal risks, bends the rules to get the job done (emphasis must be on meeting the needs of the job, not on defiant norm breaking)	❑	❑	❑
INT19. Gets others involved in unusual extra efforts (e.g., enlists family, co-workers, community members, usually on a volunteer basis).	❑	❑	❑

5. Innovation Orientation

A. Degree of Innovation

	Name 1	Name 2	Name 3
INOV01. Does Not Do New Things	❑	❑	❑
INOV02. Does things (to improve performance) that have not been done in the job before, but that may have been done elsewhere in the organization.	❑	❑	❑
INOV03. Improves performance by doing something new and different (that has not been done in the company, not necessarily new to the industry)	❑	❑	❑
INOV04. Improves performance by doing things that are unique, cutting-edge, new to the industry	❑	❑	❑
INOV05. Does things that are so new and effective the transform an industry (e.g., Apple's transformation of the personal computer industry, Schockley's development of transistors, leading to the electronic industry, Henry Ford's transformation of the auto manufacturing industry).	❑	❑	❑

B. Ideas Assessment

	Name 1	Name 2	Name 3
INOV06. Assesses which creative ideas and suggestions may work; can plan and operationalize the innovative ideas	❑	❑	❑
INOV07. Accurately assesses the value of creative ideas and suggestions; can plan and operationalize innovative ideas	❑	❑	❑
INOV08. Anticipates future trends accurately	❑	❑	❑
INOV09. Regarded as a proven and respected consultant to groups and organizations in the midst of complex and challenging change	❑	❑	❑

C. Support innovations of others

	Name 1	Name 2	Name 3
INOV10. Helps others in the creative thinking and brainstorming processes. Builds on other peoples ideas.	❑	❑	❑
INOV11. Manages the creative process of others, bringing their ideas to bear, and projects how potential ideas may play out.	❑	❑	❑
INOV12. Recognizes viable creative ideas of others and brings them to the table and to those in a position to implement them	❑	❑	❑
INOV13. Creates competitive and breakthrough strategies and plans; generates an attitude of enthusiastic expectancy in others regarding change and challenge	❑	❑	❑

6. Teamwork

	Name 1	Name 2	Name 3
TW01. Uncooperative. Disruptive, causes trouble.	❑	❑	❑
TW02. Neutral, passive, does not participate, or is not a member of any team.	❑	❑	❑
TW03. Participates willingly, supports team decisions, is a "good team player", does his or her share of the work.	❑	❑	❑
TW04. Keeps people informed and up to date about the group process, shares all relevant or useful information.	❑	❑	❑
TW05. Express positive expectations of others. Speaks of team members in positive terms. Shows respect for other's intelligence	❑	❑	❑

	Name 1	Name 2	Name 3
by appealing to reason.			
TW06. Genuinely values other's input and expertise, is willing to learn from others (especially subordinates). Solicit ideas and opinions to help from specific decisions or plans. Invites all members of a group contribute to a process.	❑	❑	❑
TW07. Publicly credits others who have performed well. Encourages and empowers others, makes them feel strong or important.	❑	❑	❑
TW08. Acts to promote a friendly climate, good morale, and cooperation (holds parties and get-togethers, creates symbols of group identity). Protects and promotes group reputation with outsiders.	❑	❑	❑
TW09. Brings conflict within the team into the open and encourages or facilitates a beneficial resolution of conflicts.	❑	❑	❑

7. Team Leadership

	Name 1	Name 2	Name 3
TL01. Manages meetings – states agendas and objectives, controls time, make assignments, etc.	❑	❑	❑
TL10. Successfully mediates conflict between individuals and groups	❑	❑	❑
TL15. Moves quickly to resolve issues to prevent bitterness	❑	❑	❑
TL17. Can organize people into teams	❑	❑	❑
TL21. Builds trust and leads teams, encouraging others to step out of their comfort zones to form new interpersonal relationships	❑	❑	❑
TL22. Encourages collaboration and easily gains trust and support of others	❑	❑	❑
TL23. Actively recruits people from diverse backgrounds to work together in groups	❑	❑	❑
TL25. Creates a climate that treats interface between diverse people and groups as the norm	❑	❑	❑
TL26. Actively seeks and integrates diverse thoughts and perspectives in order to develop more robust plans and solutions	❑	❑	❑
TL27. Fosters a climate of inclusion, where diverse thoughts are freely shared and integrated to develop plans and solutions that are best suited to circumstances	❑	❑	❑

APPENDIX B. TOOLS FOR DATA COLLECTION FOR THE STUDY OF THE CONTEXT-BASED COMPETENCY MODEL FOR STUDENT TEAMS

Appendix B1. Introduction to study and consent to participate form

You are invited to participate on a study conducted by Mikhail Rozhkov, who is a research student of the Department of Industrial and Systems Engineering in The Hong Kong Polytechnic University. The project has been approved by the Human Subjects Ethics Sub-committee (HSESC) (or its Delegate) of The Hong Kong Polytechnic University (HSESC Reference Number: HSEARS20130509003).The aim of this study is to investigate the potential benefits of considering the relationships between workplace environment and employees preferences to achieve improvements in personal professional performance, work climate and satisfaction. This part of the study is interesting in similar relationships in student groups. It proposes that student groups are similar to real work groups in some extent.

The study will involve completing a questionnaire, which will take you about 20 minutes. All information related to you will remain confidential, and will be identifiable by codes only known to the researcher. All responses will be combined in data base, aggregated and analyzed at group scale level. Neither your professor nor other students nor any third party will access to you response data. All personal identification data will be removed after adding the data to the data base. You have every right to withdrawn from the study before or during the measurement without penalty of any kind. I very appreciate your volunteering time and efforts. Therefore I respect your right to withdraw you participation in my research at any time.

If you would like to get more information about this study, please contact me Mikhail Rozhkov (on tel. no. XXXXX or email: @gmail.com) or Prof. Benny C.F. Cheung (on tel. no. XXXXX, email: @polyu.edu.hk) or Prof. Eric Tsui (on tel. no. XXXXX, email: @polyu.edu.hk). If you have any complaints about the conduct of this research study, please do not hesitate to contact Dr Virginia Cheng, Secretary of the Human Subjects Ethics Sub-Committee of The Hong Kong Polytechnic University in writing (c/o Research Office of the University) stating clearly the responsible person and department of this study. Thank you for your interest in participating in this study.

Best regards, Mikhail Rozhkov PhD Student of the Department of Industrial and Systems Engineering,The Hong Kong Polytechnic University, E Core, Office DE404, 4/F

CONSENT TO PARTICIPATE IN RESEARCH

Hereby I consent to participate in the captioned research conducted by Mikhail Rozhkov. I understand that information obtained from this research may be used in future research and published. However, my right to privacy will be retained, i.e. my personal details will not be revealed. The procedure as set out in the attached information sheet has been fully explained. I understand the benefit and risks involved. My participation in the project is voluntary. I acknowledge that I have the right to question any part of the procedure and can withdraw at any time without penalty of any kind.

☐ I agree

Appendix B2. Questionnaire for students

1. General Information

1.1 You are
1. Male
2. Female

1.2 Your age
1. 20 and under
2. 21 - 25
3. 26 – 35
4. 36 – 45
5. 46 – 55
6. 56 – 65
7. 65 and older

1.3 What country are you from?
1. Mainland China
2. Hong Kong
3. Korea
4. Japan
5. Canada
6. Other

1.4 Do you have full-time work experience?
1. Yes
2. No

1.5 Indicate years of your total professional experience
1. Less than 1 year
2. At least 1 year, but less than 3 years
3. At least 3 years, but less than 5 years
4. At least 5 years, but less than 10 years
5. 10 years or more

1.6 What is your Grade Point Average (GPA) ?

1.7 What is your priority for working in this group?
1. Get knowledge
2. Submit/finish the assignment (or project)
3. Get high marks
4. Have fun
5. Other

1.8 Who was a real leader in your group?
1. name 1
2. name 2
3. name 3
4. name 4
5. Other

2. Group members behavior

Think about your group members during your group assignment for ISE518. Put into the box a mark that indicates who from your team members behaved in specific way. If some items don't fit an team members behavior or you cannot assess them, leave them unchecked.

2.1 Achievement Orientation

	Assess yourself	Name 1	Name 2	Name 3
ACH1. Shows no special concern with work, does only what is required	❑	❑	❑	❑
ACH2. Works hard, but gives no evidence of a standard of excellence for work outputs (i.e. wants to be best, but dont care or make a good results, but dont care about assignment requirements and mark).	❑	❑	❑	❑
ACH3. Works hard, toward implicit standards of excellence. Tries to do job well or right.	❑	❑	❑	❑
ACH7. Sets and acts to reach challenging goals for your group (to get A mark)	❑	❑	❑	❑

2.2 Concern for Order, Quality, and Accuracy

	Assess yourself			
CO1. Lack of concern with order, despite problems caused by disorder.	❑	❑	❑	❑
CO2. Active order keeping is not needed, or it is done by someone else, or a lack of concern for order is noticed but does not cause problems.	❑	❑	❑	❑
CO4. Works for clarity – wants roles, expectations, tasks, data crystal-clear and preferably in writing.	❑	❑	❑	❑
CO5. Double-checks the accuracy of information or own work	❑	❑	❑	❑
CO6. Monitors quality of other's work. checks to ensure procedures are followed. Or keeps clear, detailed records of own or other's activities.	❑	❑	❑	❑
CO7. Monitors progress of a project(assignment) against milestones or deadlines.	❑	❑	❑	❑

2.3 Information Seeking

	Assess yourself	Name 1	Name 2	Name 3
INFO1. Does not seek additional information for task(assignment), other than what has been given	❑	❑	❑	❑
INFO2. Asks direct questions of immediately available people (or people who are directly involved in the task even if not physically present), consults available resource	❑	❑	❑	❑
INFO3. Gets out personally investigation of a problem. Questions those closest to the problem.	❑	❑	❑	❑
INFO5. Calls on others, who are not personally involved, to get their perspective, background information, experience	❑	❑	❑	❑
INFO6. Makes a systematic effort over a limited period of time to obtain needed data or feedback; or does formal research through newspaper, magazines, or other resources.	❑	❑	❑	❑

2.4 Initiative

	Assess yourself	Name 1	Name 2	Name 3
INT2. Not Applicable or Does Not Take Initiative	❑	❑	❑	❑
INT3. Persists – takes two or more steps to overcome obstacles or rejection	❑	❑	❑	❑
INT4. Recognizes and acts on present opportunities or addresses present problems	❑	❑	❑	❑
INT5. Acts quickly and decisively in a crisis	❑	❑	❑	❑
INT12. Avoids Required Work	❑	❑	❑	❑
INT13. Requires constant supervision	❑	❑	❑	❑
INT14. Completes assigned without constant supervision	❑	❑	❑	❑
INT15. Works extra hours, nights, weekends, etc. as needed to complete work when not required to do so.	❑	❑	❑	❑
INT16. Exceeds assignment description, e.g., takes on extra tasks.	❑	❑	❑	❑
INT19. Gets others involved in unusual extra efforts (e.g., enlists family, co-workers, community members, usually on a volunteer basis).	❑	❑	❑	❑

2.5 Innovation Orientation

	Assess yourself	Name 1	Name 2	Name 3
INOV01. Does Not Do New Things	❑	❑	❑	❑
INOV02. Proposes and Does ideas, methods and solutions to get higher mark	❑	❑	❑	❑
INOV06. Assesses which creative ideas and suggestions may work; can plan and operationalize the innovative ideas	❑	❑	❑	❑
INOV07. Accurately assesses the value of creative ideas and suggestions; can plan and operationalize innovative ideas	❑	❑	❑	❑
INOV09. Regarded as a proven and respected consultant in our group in the midst of complex and challenging change	❑	❑	❑	❑
INOV10. Helps others in the creative thinking and brainstorming processes. Builds on other peoples ideas.	❑	❑	❑	❑
INOV11. Manages the creative process of others, bringing their ideas to bear, and projects how potential ideas may play out.	❑	❑	❑	❑
INOV12. Recognizes viable creative ideas of others and brings them to the table and to those in a position to implement them	❑	❑	❑	❑

2.6 Teamwork and cooperation

	Assess yourself	Name 1	Name 2	Name 3
TW1. Uncooperative	❑	❑	❑	❑

TW2. Neutral, passive, does not participate, or is not a member of any team.	❑	❑	❑	❑
TW3. Participates willingly, supports team decisions, is a "good team player", does his or her share of the work.	❑	❑	❑	❑
TW4. Keeps people informed and up to date about the group process, shares all relevant or useful information.	❑	❑	❑	❑
TW5. Express positive expectations of others. Speaks of team members in positive terms. Shows respect for other's intelligence by appealing to reason.	❑	❑	❑	❑
TW6. Genuinely values other's input and expertise, is willing to learn from others. Solicit ideas and opinions to help from specific decisions or plans. Invites all members of a group contribute to a process.	❑	❑	❑	❑
TW7. Publicly credits others who have performed well. Encourages and empowers others, makes them feel strong or important.	❑	❑	❑	❑
TW8. Acts to promote a friendly climate, good morale, and cooperation (holds parties and get-together, creates symbols of group identity).	❑	❑	❑	❑

2.7 Team Leadership

	Assess Yourself	Name 1	Name 2	Name 3
TL01. Manages meetings – states agendas and objectives, controls time, make assignments, etc.	❑	❑	❑	❑
TL10. Successfully mediates conflict between individuals and groups	❑	❑	❑	❑
TL15. Moves quickly to resolve issues to prevent bitterness	❑	❑	❑	❑
TL17. Can organize people into teams	❑	❑	❑	❑
TL21. Builds trust and leads teams, encouraging others to step out of their comfort zones to form new interpersonal relationships	❑	❑	❑	❑
TL22. Encourages collaboration and easily gains trust and support of others	❑	❑	❑	❑
TL23. Actively recruits people from diverse backgrounds to work together in groups	❑	❑	❑	❑
TL25. Creates a climate that treats interface between diverse people and groups as the norm	❑	❑	❑	❑
TL26. Actively seeks and integrates diverse thoughts and perspectives in order to develop more robust plans and solutions	❑	❑	❑	❑
TL27. Fosters a climate of inclusion, where diverse thoughts are freely shared and integrated to develop plans and solutions that are best suited to circumstances	❑	❑	❑	❑

3. Group Climate Survey

This section of the questionnaire is designed to measure how you feel about your group work environment. You will be asked to describe the kind of climate or atmosphere that has been created in the group.

	Definitely Disagree	Inclined to Disagree	Inclined to Agree	Definitely Agree

02. I feel that I am a member of a well-functioning team.	❑	❑	❑	❑
03. In our group, I have been sure exactly who was a team leader.	❑	❑	❑	❑
05. In our group, students are rewarded in proportion to the excellence of their job performance.	❑	❑	❑	❑
06. The jobs in our group were clearly defined and logically structured.	❑	❑	❑	❑
07. In our group we set very high standards for performance.	❑	❑	❑	❑
08. People in our group DO NOT really trust each other enough.	❑	❑	❑	❑
11. Generally, I am highly committed to the goals of this group.	❑	❑	❑	❑
12. Around here I feel a pressure to continually improve our personal and group performance.	❑	❑	❑	❑
16. When I am on a difficult assignment, I can usually count on getting assistance from my team members.	❑	❑	❑	❑
20. Our productivity sometimes suffers from lack of organization and planning.	❑	❑	❑	❑
21. I DID NOT really care what happens to this group.	❑	❑	❑	❑
23. As far as I could see, there WAS NOT much personal loyalty to the group.	❑	❑	❑	❑
24. In this group people DO NOT seem to take much pride in their performance.	❑	❑	❑	❑

4. Social Axioms

There are no right or wrong answers. Please answer the questions according to your individual opinion. The results of the survey will only be used for the purpose of research, and we will keep the results strictly confidential.

	Strongly disbelieve	Disbelieve	No opinion	Believe	Strongly believe
1_One will succeed if he/she really tries.	❑	❑	❑	❑	❑
2_There are certain ways for people to improve their destiny.	❑	❑	❑	❑	❑
3_Fate determines a persons success in life.	❑	❑	❑	❑	❑
4_Success requires strong willpower.	❑	❑	❑	❑	❑
5_Matters of life and death are determined by fate.	❑	❑	❑	❑	❑
6_People create hurdles to prevent others from succeeding.	❑	❑	❑	❑	❑
7_Building the way step by step leads to success.	❑	❑	❑	❑	❑
8_People dislike others who succeed in life.	❑	❑	❑	❑	❑
9_There are ways for people to find out about their fate.	❑	❑	❑	❑	❑
10_Powerful people tend to exploit others.	❑	❑	❑	❑	❑

11_There is usually more than one good way to handle a situation.	❑	❑	❑	❑	❑
12_A persons behavior is influenced by many factors.	❑	❑	❑	❑	❑
13_People can suddenly lose everything they have.	❑	❑	❑	❑	❑
14_The people whom a person will love in his or her life is determined by fate.	❑	❑	❑	❑	❑
15_Individual characteristics, such as appearance and birthday, can reveal ones fate.	❑	❑	❑	❑	❑
16_Adversity can be overcome by effort.	❑	❑	❑	❑	❑
17_Luck can be enhanced by certain tactics.	❑	❑	❑	❑	❑
18_Many issues appear far more complicated than they really are.	❑	❑	❑	❑	❑
19_People who become rich and successful forget the people who helped them along the way.	❑	❑	❑	❑	❑
20_Difficult problems can be overcome by hard work and persistence.	❑	❑	❑	❑	❑
21_Kind-hearted people usually suffer losses.	❑	❑	❑	❑	❑
22_Opportunities for people to get wealthy promote dishonesty.	❑	❑	❑	❑	❑
23_Hard working people will achieve more in the end.	❑	❑	❑	❑	❑
24_People with different opinions can all be correct.	❑	❑	❑	❑	❑
25_Fate determines one's successes and failures.	❑	❑	❑	❑	❑
26_Kind-hearted people are easily bullied.	❑	❑	❑	❑	❑
27_People may have opposite behaviors on different occasions.	❑	❑	❑	❑	❑
28_Endurance and determination are key to achieving goals.	❑	❑	❑	❑	❑
29_Hard-working people are well rewarded.	❑	❑	❑	❑	❑
30_A bad situation can suddenly change for the better.	❑	❑	❑	❑	❑
31_The only way to get ahead is to take advantage of others.	❑	❑	❑	❑	❑
32_One has to deal with matters according to the specific circumstances.	❑	❑	❑	❑	❑

5. Contact Information

Please, indicate your given name, family name and contact email

Given Name
Family Name
Email Address

APPENDIX C. R LANGUAGE SCRIPTS USED FOR CALCULATING VARIABLES' SCORES

Table C1. Script for calculating organizational culture (OrgCult) scores

```
###1. Folder to save results
        #1.1 OrgCult_n_types scales
        nCLAN <- c("nW11", "nW21","nW31", "nW41", "nW51", "nW61")
        nADH<- c("nW12", "nW22","nW32", "nW42", "nW52", "nW62")
        nMAR <- c("nW13", "nW23","nW33", "nW43", "nW53", "nW63")
        nHIER <- c("nW14", "nW24","nW34", "nW44", "nW54", "nW64")
        OrgCult_EN_types <- c("EN_CLAN", "EN_ADH", "EN_MAR", "EN_HIER")
        OrgCult_MN_types <- c("MN_CLAN", "MN_ADH", "MN_MAR", "MN_HIER")

        #1.2 OrgCult_p_types scales
        pCLAN <- c("pW11", "pW21","pW31", "pW41", "pW51", "pW61")
        pADH<- c("pW12", "pW22","pW32", "pW42", "pW52", "pW62")
        pMAR <- c("pW13", "pW23","pW33", "pW43", "pW53", "pW63")
        pHIER <- c("pW14", "pW24","pW34", "pW44", "pW54", "pW64")
       OrgCult_EP_types <- c("EP_CLAN", "EP_ADH", "EP_MAR", "EP_HIER")
       OrgCult_MP_types <- c("MP_CLAN", "MP_ADH", "MP_MAR", "MP_HIER")

###2 Preprocessing data
#2.1 Calculate culture types scores
 #for Employees
        Employee_Cult$EN_CLAN <- round(rowSums(Employee_Cult[ , nCLAN])/6/100, digits = 3)
        Employee_Cult$EN_ADH <- round(rowSums(Employee_Cult[ , nADH])/6/100, digits = 3)
        Employee_Cult$EN_MAR <- round(rowSums(Employee_Cult[ , nMAR])/6/100, digits = 3)
        Employee_Cult$EN_HIER <- round(rowSums(Employee_Cult[ , nHIER])/6/100, digits = 3)
        Employee_Cult$EP_CLAN <- round(rowSums(Employee_Cult[ , pCLAN])/6/100, digits = 3)
        Employee_Cult$EP_ADH <- round(rowSums(Employee_Cult[ , pADH])/6/100, digits = 3)
        Employee_Cult$EP_MAR <- round(rowSums(Employee_Cult[ , pMAR])/6/100, digits = 3)
        Employee_Cult$EP_HIER <- round(rowSums(Employee_Cult[ , pHIER])/6/100, digits = 3)

 #for Managers
        Manager_Cult$MN_CLAN <- round(rowSums(Manager_Cult[ , nCLAN])/6/100, digits = 3)
        Manager_Cult$MN_ADH <- round(rowSums(Manager_Cult[ , nADH])/6/100, digits = 3)
        Manager_Cult$MN_MAR <- round(rowSums(Manager_Cult[ , nMAR])/6/100, digits = 3)
        Manager_Cult$MN_HIER <- round(rowSums(Manager_Cult[ , nHIER])/6/100, digits = 3)
        Manager_Cult$MP_CLAN <- round(rowSums(Manager_Cult[ , pCLAN])/6/100, digits = 3)
        Manager_Cult$MP_ADH <- round(rowSums(Manager_Cult[ , pADH])/6/100, digits = 3)
        Manager_Cult$MP_MAR <- round(rowSums(Manager_Cult[ , pMAR])/6/100, digits = 3)
        Manager_Cult$MP_HIER <- round(rowSums(Manager_Cult[ , pHIER])/6/100, digits = 3)

#2.2 Calculate mean OrgCult_types scores
 #for Employees
        Respondent.Data <- Employee_Cult
        teams <- levels(as.factor(Respondent.Data$Team.ID))
        Employee_Cult_type_scores_Team <-  as.data.frame(Respondent.Data[0, c("Team.ID",
       OrgCult_EN_types, OrgCult_EP_types)])
        for (j in 1 : length(teams)) {
            team_num <- teams[j]
            data <- Respondent.Data[which(Respondent.Data$Team.ID == team_num), ]
                data_team_score <- round(colMeans(data[, c(OrgCult_EN_types,
                OrgCult_EP_types)], na.rm = TRUE), digits = 3)
                data_team_score$Team.ID <- team_num
                data_team_score <- as.data.frame(data_team_score)
```

```
                    Employee_Cult_type_scores_Team <- rbind(Employee_Cult_type_scores_Team,
            data_team_score)
        }
        writeResult.csv(Employee_Cult_type_scores_Team, "Employee_Cult_type_scores_Team",
                        older.OrgCult)

 #for Managers
        Manager.Data <- Manager_Cult
        teams <- levels(as.factor(Manager.Data$Team.ID))
        Manager_Cult_type_scores_Team <-  as.data.frame(Manager.Data[0, c("Team.ID",
       OrgCult_MN_types, OrgCult_MP_types)])
        for (j in 1 : length(teams)) {
            team_num <- teams[j]
            data <- Manager.Data[which(Manager.Data$Team.ID == team_num), ]
            data_team_score <- round(colMeans(data[, c(OrgCult_MN_types, OrgCult_MP_types)],
                                na.rm = TRUE), digits = 3)
             data_team_score$Team.ID <- team_num
             data_team_score <- as.data.frame(data_team_score)
             Manager_Cult_type_scores_Team <- rbind(Manager_Cult_type_scores_Team,
             data_team_score)
        }
        writeResult.csv(Manager_Cult_type_scores_Team, "Manager_Cult_type_scores_Team",
                        folder.OrgCult)
```

Table C2. Script for calculating organizational climate (OrgClim) scores

```
# Script for analysis of OrgClim data

### 1. folder to save results
   folder <- paste("./results/1.Data description/", "2. OrgClim", "/", sep = "")
   dir.create(folder, showWarnings = TRUE, recursive = FALSE, mode = "0777")
   Clim_dimensions <- c("Commitment", "Recognition", "Responsibility", "Standards", "Structure",
"Support")

### 2. Calculate aggregate data
   scales <- read.csv(paste(dir.sc, "OrgClimate_scales.csv", sep = ""), header = TRUE, sep = ",")
   Employee_Clim$Commitment <- rowSums(Employee_Clim[ , as.vector(scales[,1])])/4
   Employee_Clim$Recognition <- rowSums(Employee_Clim[ , as.vector(scales[,2])])/4
   Employee_Clim$Responsibility <- rowSums(Employee_Clim[ , as.vector(scales[,3])])/4
   Employee_Clim$Standards <- rowSums(Employee_Clim[ , as.vector(scales[,4])])/4
   Employee_Clim$Structure <- rowSums(Employee_Clim[ , as.vector(scales[,5])])/4
   Employee_Clim$Support <- rowSums(Employee_Clim[ , as.vector(scales[,6])])/4

   OrgClim_scores <-Employee_Clim[ ,c("QP.ID", "Respondent.ID", "Team.ID", "Commitment",
                          "Recognition", "Responsibility", "Standards", "Structure", "Support")]
   writeResult.csv(OrgClim_scores, "OrgClim_score", folder)

### 3. Calculate mean Clim_scores for each Team
     Respondent.Data <- Employee_Clim
     teams <- levels(as.factor(Respondent.Data$Team.ID))
     Clim_scores_Team <-  as.data.frame(Respondent.Data[0, c("Team.ID", Clim_dimensions)])

     for (j in 1 : length(teams)) {
       team_num <- teams[j]
         data <- Respondent.Data[which(Respondent.Data$Team.ID == team_num), ]
         data_team_score <- round(colMeans(data[, Clim_dimensions], na.rm = TRUE), digits = 3)
         data_team_score$Team.ID <- team_num
```

```
        data_team_score <- as.data.frame(data_team_score)
        Clim_scores_Team <- rbind(Clim_scores_Team, data_team_score)
    }
    writeResult.csv(Clim_scores_Team, "Clim_scores_Team", folder.OrgClim)
```

Table C3. Script for calculating manager skills (MSAI) scores

```
###1. OrgCult_n_types scales
        ADH_Managing.Innovation <- c("MSAI02", "MSAI08", "MSAI27", "MSAI45", "MSAI51")
        ADH_Managing.the.Future <- c("MSAI09", "MSAI14", "MSAI28", "MSAI46", "MSAI59")
        ADH_Managing.Continuous.Improvement   <- c("MSAI26", "MSAI29", "MSAI44", "MSAI52",
            "MSAI53")
        MAR_Managing.Competitiveness <- c("MSAI15", "MSAI30", "MSAI35", "MSAI42", "MSAI43")
        MAR_Energising.Employees <- c("MSAI03", "MSAI06", "MSAI07", "MSAI31", "MSAI60")
        MAR_Managing.Customer.Services  <- c("MSAI32", "MSAI33", "MSAI41", "MSAI54",
"MSAI55")
        HIER_Managing.Coordination<- c("MSAI11", "MSAI17", "MSAI37", "MSAI38", "MSAI57")
        HIER_Managing.the.Control.System <- c("MSAI04", "MSAI16", "MSAI19", "MSAI36",
"MSAI39")
        HIER_Managing.Acculturation       <- c("MSAI10", "MSAI34", "MSAI40", "MSAI56", "MSAI58")
        CLAN_Managing.the.Development.of.Others<- c("MSAI05", "MSAI20", "MSAI24", "MSAI25",
            "MSAI47")
        CLAN_Managing.Interpersonal.Relationships  <- c("MSAI01", "MSAI13", "MSAI23",  "MSAI48",
            "MSAI50")
        CLAN_Managing.Teams  <- c("MSAI12", "MSAI18", "MSAI21", "MSAI22", "MSAI49")
        MSAI_dimensions <- c("ADH_Managing.Innovation", "ADH_Managing.the.Future",
            "ADH_Managing.Continuous.Improvement",   "MAR_Managing.Competitiveness",
            "MAR_Energising.Employees", "MAR_Managing.Customer.Services",
            "HIER_Managing.Coordination",  "HIER_Managing.the.Control.System",
            "HIER_Managing.Acculturation", "CLAN_Managing.the.Development.of.Others",
            "CLAN_Managing.Interpersonal.Relationships", "CLAN_Managing.Teams")

### 2. Calculate aggregate data
        #for Employee_MSAI
        Employee_MSAI$ADH_Managing.Innovation <- rowSums(Employee_MSAI[ ,
        ADH_Managing.Innovation])/5
            Employee_MSAI$ADH_Managing.the.Future <- rowSums(Employee_MSAI[ ,
        ADH_Managing.the.Future])/5
            Employee_MSAI$ADH_Managing.Continuous.Improvement <- rowSums(Employee_MSAI[ ,
        ADH_Managing.Continuous.Improvement])/5
        Employee_MSAI$MAR_Managing.Competitiveness <- rowSums(Employee_MSAI[ ,
            MAR_Managing.Competitiveness])/5
        Employee_MSAI$MAR_Energising.Employees <- rowSums(Employee_MSAI[ ,
            MAR_Energising.Employees])/5
        Employee_MSAI$MAR_Managing.Customer.Services <- rowSums(Employee_MSAI[ ,
            MAR_Managing.Customer.Services])/5
        Employee_MSAI$HIER_Managing.Coordination <- rowSums(Employee_MSAI[ ,
            HIER_Managing.Coordination])/5
        Employee_MSAI$HIER_Managing.the.Control.System <- rowSums(Employee_MSAI[ ,
            HIER_Managing.the.Control.System])/5
        Employee_MSAI$HIER_Managing.Acculturation <- rowSums(Employee_MSAI[ ,
            HIER_Managing.Acculturation])/5

        Employee_MSAI$CLAN_Managing.the.Development.of.Others <- rowSums(Employee_MSAI[ ,
            CLAN_Managing.the.Development.of.Others])/5
            Employee_MSAI$CLAN_Managing.Interpersonal.Relationships <-
            rowSums(Employee_MSAI[ , CLAN_Managing.Interpersonal.Relationships])/5
            Employee_MSAI$CLAN_Managing.Teams <- rowSums(Employee_MSAI[ ,
            CLAN_Managing.Teams])/5
```

```
Employee_MSAI_score <- Employee_MSAI[, c("Respondent.ID", "Team.ID",
MSAI_dimensions)]
writeResult.csv(Employee_MSAI_score, "Employee_MSAI_score", folder.MSAI)


#for Manager_MSAI
Manager_MSAI$ADH_Managing.Innovation <- rowSums(Manager_MSAI[ ,
    ADH_Managing.Innovation])/5
Manager_MSAI$ADH_Managing.the.Future <- rowSums(Manager_MSAI[ ,
    ADH_Managing.the.Future])/5
Manager_MSAI$ADH_Managing.Continuous.Improvement <- rowSums(Manager_MSAI[ ,
    ADH_Managing.Continuous.Improvement])/5
Manager_MSAI$MAR_Managing.Competitiveness <- rowSums(Manager_MSAI[ ,
    MAR_Managing.Competitiveness])/5
Manager_MSAI$MAR_Energising.Employees <- rowSums(Manager_MSAI[ ,
    MAR_Energising.Employees])/5
Manager_MSAI$MAR_Managing.Customer.Services <- rowSums(Manager_MSAI[ ,
    MAR_Managing.Customer.Services])/5
Manager_MSAI$HIER_Managing.Coordination <- rowSums(Manager_MSAI[ ,
    HIER_Managing.Coordination])/5
Manager_MSAI$HIER_Managing.the.Control.System <- rowSums(Manager_MSAI[ ,
    HIER_Managing.the.Control.System])/5
Manager_MSAI$HIER_Managing.Acculturation <- rowSums(Manager_MSAI[ ,
    HIER_Managing.Acculturation])/5
Manager_MSAI$CLAN_Managing.the.Development.of.Others <- rowSums(Manager_MSAI[ ,
    CLAN_Managing.the.Development.of.Others])/5
Manager_MSAI$CLAN_Managing.Interpersonal.Relationships <- rowSums(Manager_MSAI[ ,
    CLAN_Managing.Interpersonal.Relationships])/5
Manager_MSAI$CLAN_Managing.Teams <- rowSums(Manager_MSAI[ ,
    CLAN_Managing.Teams])/5
Manager_MSAI_score <- Manager_MSAI[, c("Manager.ID", "Team.ID", MSAI_dimensions)]
writeResult.csv(Manager_MSAI_score, "Manager_MSAI_score", folder.MSAI)

## 2) Calculate mean scores
#for Employees
Respondent.Data <-  Employee_MSAI_score
teams <- levels(as.factor(Respondent.Data$Team.ID))  # list of teams
Employee_MSAI_scores_Team <-  as.data.frame(Respondent.Data[0, c("Respondent.ID",
        "Team.ID", MSAI_dimensions)])
for (j in 1 : length(teams)) {
    team_num <- teams[j]
    data <- Respondent.Data[which(Respondent.Data$Team.ID == team_num), ]
    data_team_score <- round(colMeans(data[, MSAI_dimensions], na.rm = TRUE),
                digits = 3)
    data_team_score$Team.ID <- team_num
    data_team_score <- as.data.frame(data_team_score)
    Employee_MSAI_scores_Team <- rbind(Employee_MSAI_scores_Team, data_team_score)
}
writeResult.csv(Employee_MSAI_scores_Team, "Employee_MSAI_scores_Team", folder.MSAI)


#for Managers
Manager.Data <- Manager_MSAI_score
teams <- levels(as.factor(Manager.Data$Team.ID))  # list of teams
Manager_MSAI_scores_Team <-  as.data.frame(Manager.Data[0, c("Manager.ID", "Team.ID",
        MSAI_dimensions)])
for (j in 1 : length(teams)) {
    team_num <- teams[j]
    data <- Manager.Data[which(Manager.Data$Team.ID == team_num), ]
    data_team_score <- round(colMeans(data[, MSAI_dimensions], na.rm = TRUE),
```

```
                digits = 3)
            data_team_score$Team.ID <- team_num
            data_team_score <- as.data.frame(data_team_score)
            Manager_MSAI_scores_Team <- rbind(Manager_MSAI_scores_Team, data_team_score)
        }
        writeResult.csv(Manager_MSAI_scores_Team, "Manager_MSAI_scores_Team", folder.MSAI)
```

Table C4. Script for calculating employees competencies (EComp) scores

```
### 1.  Functions for Scores calculation for Competencies
    ecomp_score_calc <- function (ecomp_data, ecomp_ind, ecomp_level) {
        remove(ecomp_output_frame)
        ecomp_output_frame <- as.data.frame(matrix(0, nrow=dim(ecomp_data)[1],ncol=2))
        for (i in 1:dim(ecomp_data)[1])  {
            ecomp_i <- ecomp_data[i, ecomp_ind] * ecomp_level
            ecomp_i <- rowSums(ecomp_i, na.rm = TRUE)  # sum all scores for Comp indicators (levels)
            responses <- ecomp_data[i, ecomp_ind]
            lev_ind <- rowSums(responses, na.rm = TRUE)
            comp_max_level <- ecomp_level[length(ecomp_level)]
            scores_i <- ecomp_i/lev_ind/comp_max_level # calc average score
            ecomp_output_frame[i,1]  <- ecomp_data$Respondent.Assessed[i]   # input Response.ID
            ecomp_output_frame[i,2]  <- round(scores_i, digits = 3)
          }
          return(ecomp_output_frame)
    }

### 2.  Functions for Scores calculation for TL
    ecomp_score_calc_TL <- function (ecomp_data, ecomp_ind, ecomp_level) {
     remove(ecomp_output_frame)
       ecomp_output_frame <- as.data.frame(matrix(0, nrow=dim(ecomp_data),ncol=2))
       for (i in 1:dim(ecomp_data)[1])  {
            ecomp_i <- ecomp_data[i, ecomp_ind] * ecomp_level
            ecomp_i <- rowSums(ecomp_i, na.rm = TRUE
            max_level <- length(ecomp_level)
            scores_i <- ecomp_i/max_level
            ecomp_output_frame[i,1]  <- ecomp_data$Respondent.Assessed[i]   # input Response.ID
            ecomp_output_frame[i,2]  <- round(scores_i, digits = 3)
       }
       return(ecomp_output_frame)
    }
{…}
```

APPENDIX D. INTERVALS FOR ASSIGNING THE DATA FROM WORK TEAMS INTO "LOW", "MEDIUM" AND "HIGH" CLASSES.

Variables	Min	Max	Low bound (33.3 %)	Medium bound (66 %)	High bound (100 %)
ACH_1	0.19	0.63	0.33	0.48	0.63
CO_1	0.25	1.00	0.50	0.75	1.00
INFO_1	0.22	0.70	0.38	0.54	0.70
INT_A_1	-0.10	1.00	0.27	0.63	1.00
INT_B_1	0.00	1.00	0.33	0.67	1.00
INT_1	0.00	0.80	0.27	0.53	0.80
INNOV_A_1	-0.08	0.71	0.18	0.44	0.71
INNOV_B_1	-0.04	0.73	0.22	0.47	0.73
INNOV_C_1	0.00	0.77	0.26	0.51	0.77
INNOV_1	0.25	1.00	0.50	0.75	1.00
TW_1	0.25	1.00	0.50	0.75	1.00
TL_1	0.25	0.81	0.44	0.62	0.81
Commitment_1	2.25	4.25	2.92	3.58	4.25
Recognition_1	1.50	4.25	2.42	3.33	4.25
Responsibility_1	1.75	4.00	2.50	3.25	4.00
Standards_1	2.25	4.25	2.92	3.58	4.25
Structure_1	1.50	4.00	2.33	3.17	4.00
Support_1	2.25	4.25	2.92	3.58	4.25
CLAN_N_1	0.10	0.33	0.18	0.26	0.33
ADH_N_1	0.14	0.35	0.21	0.28	0.35
MAR_N_1	0.17	0.37	0.23	0.30	0.37
HIER_N_1	0.16	0.41	0.24	0.33	0.41
CLAN_P_1	0.23	0.35	0.27	0.31	0.35
ADH_P_1	0.19	0.32	0.23	0.27	0.32
MAR_P_1	0.16	0.29	0.20	0.25	0.29
HIER_P_1	0.10	0.30	0.17	0.23	0.30
ADH_Managing Innovation_1	2.60	5.00	3.40	4.20	5.00
ADH_Managing the Future_1	2.40	5.00	3.27	4.13	5.00
ADH_Managing Continuous Improvement_1	2.60	5.00	3.40	4.20	5.00
MAR_Managing Competitiveness_1	2.40	5.00	3.27	4.13	5.00
MAR_Energizing Employees_1	2.60	5.00	3.40	4.20	5.00
MAR_Managing Custome rServices_1	2.60	5.00	3.40	4.20	5.00
HIER_Managing Coordination_1	2.20	5.00	3.13	4.06	5.00
HIER_Managing the Control System_1	2.20	5.00	3.13	4.06	5.00
HIER_Managing Acculturation_1	2.20	5.00	3.13	4.06	5.00
CLAN_Managing the Development of Others_1	2.60	5.00	3.40	4.20	5.00
CLAN_Managing Interpersonal Relationships_1	2.90	5.00	3.60	4.30	5.00
CLAN_ManagingTeams_1	2.60	5.00	3.40	4.20	5.00

APPENDIX E. INTERVALS FOR ASSIGNING THE DATA FROM STUDENT TEAMS INTO "LOW", "MEDIUM" AND "HIGH" CLASSES.

Variables	Min value	Max value	Low bound (33.3 %)	Medium bound (66 %)	High bound (100 %)
ACH	-0.20	1.00	0.20	0.60	1.00
CO	-0.20	1.00	0.20	0.60	1.00
INFO	0.00	0.71	0.24	0.47	0.71
INT_A	0.00	1.00	0.33	0.67	1.00
INT_B	-0.17	1.00	0.22	0.61	1.00
INT	-0.04	0.83	0.25	0.54	0.83
INNOV_A	0.00	1.00	0.33	0.67	1.00
INNOV_B	0.25	1.00	0.50	0.75	1.00
INNOV_C	0.33	1.00	0.55	0.78	1.00
INNOV	0.00	0.76	0.25	0.51	0.76
TW	-0.13	1.00	0.25	0.62	1.00
TL	0.00	1.00	0.33	0.67	1.00
Commitment	1.00	3.67	1.89	2.78	3.67
Recognition	1.00	4.00	2.00	3.00	4.00
Standards	1.67	3.33	2.22	2.78	3.33
Structure	1.00	4.00	2.00	3.00	4.00
Support	1.33	3.67	2.11	2.89	3.67
Fate Control	2.25	4.88	3.12	4.00	4.88
Reward for Application	2.50	5.00	3.33	4.17	5.00
Social Complexity	2.25	4.88	3.12	4.00	4.88
Social Cynicism	2.25	4.88	3.12	4.00	4.88
GPA	1.75	4.00	2.50	3.25	4.00
Group Performance	0.65	1.00	0.77	0.88	1.00

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