Fostering Work Engagement through State and Trait Trust: Evidence from Irish University Research Centres

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DECLARATION

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ABSTRACT

The central aim of this research was to examine the impact of state and trait trust on employees' levels of work engagement. More specifically, in this study, the three forms of state trust - trust in top management, trust in direct supervisor and trust in team members, as well as trait trust (trust propensity) - were hypothesised as antecedents of work engagement. Furthermore, it was proposed that organizational identification, affective commitment to the supervisor and team psychological safety will mediate the effects of trust in top management, trust in direct supervisor and trust in team members on work engagement respectively. Finally, the relationship of work engagement with a variety of work outcomes such as, in-role job performance, innovative work behaviour, feedback seeking, error communication and organizational commitment, as well as the mediating effects of learning goal orientation on these relationships were investigated. Using survey data from 152 research scientists, drawn from six university science research centres operating in Ireland, the hypotheses were tested through hierarchical multiple regression analyses. The results of this study showed that as hypothesised, organizational identification, affective commitment to the supervisor, and team psychological safety fully mediated the effects of trust in top management, trust in direct supervisor, and trust in team members on work engagement respectively. Moreover, the findings of this study indicated that trust propensity was also positively and significantly related to work engagement. Additionally, it was found that learning goal orientation partially mediated the effects of work engagement on in-role job performance, innovative work behaviour, feedback seeking and error communication, while it did not mediate the relationship between work engagement and organizational commitment. On the basis of these findings, recommendations were made for the management of research centres and for future research directions.

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LIST OF ABBREVIATIONS

BRP	Boundary Role Persons
BTI	Behavioral Trust Inventory
CIPD	Chartered Institute of Personnel Development
COR	Conservation of Resources Theory
DCM	Demand-Control Model
EC	Error Communication
EM	Expectation Maximization Method
ERI	Effort – Reward Imbalance
FBS	Feedback Seeking
INV	Inverse
IP	Intellectual Property
IRP	In-Role Performance
IWB	Innovative Work Behavior
JD-R	Job-Demand-Resources Model
LMX	Leader Member Exchange
Log	Logarithmic
MBI-GS	Maslach Burnout Inventory – General Survey
MCAR	Missing Completely at Random
MI	Multiple Imputation Method
NPD	New Product Development
OB / HRM	Organizational Behavior / Human Resource Management
OC	Organizational Commitment
OCQ	Organizational Commitment Questionnaire
OI	Organizational Identification
OIQ	Organizational Identification Questionnaire
OLBI	Oldenburg Burnout Inventory
OTI	Organizational Trust Inventory
PI	Personal Initiative
PI	Principal Investigator
POB	Positive Organizational Psychology
R&D	Research and Development
SEM	Structural Equation Modeling
SFI	Science Foundation of Ireland
SK	Skewness
SPSS	Statistical Package for Social Sciences
SQT	Square Root
TTO	Technology Transfer Office
UITT	University to Industry Technology Transfer
URC	University Research Centre
UWES	Utrecht Work Engagement Scale
VIF	Variance Inflating Factor

CHAPTER 1

Overview of the Research

1.1 Background

To survive and successfully compete in the rapidly changing and turbulent work environment, organizations need to develop and retain employees who are highly motivated and are willing to go the extra mile for them (Schuafeli and Salanova, 2008). In recognition of this fact, modern organizations are now putting less emphasis on traditional control systems and cost cutting through downsizing and redesigning of their business processes, and instead are focussing more on the effective management of their human capital for enhancing their efficiency and effectiveness. These organizations are, therefore, increasingly investing in conditions, which could enable them to develop employees who are "proactive and show initiative, collaborate smoothly with others, take responsibility for their own professional development and are committed to high quality performance standards" (Bakker and Schaufeli, 2008, p. 147). Thus, organizations require employees who are brimming with energy and self-confidence; are enthusiastic and passionate about their work; and are fully involved in their work activities. In other words, modern organizations need an engaged work force. So what is work engagement?

Work engagement is considered as the "positive antithesis" of workplace burnout – a psychological state that is characterised by feelings of exhaustion, cynicism and reduced professional efficacy (Maslach and Leiter, 1997). While the burned out employees feel tired, view their jobs and the people they work with cynically and generally consider themselves to be ineffectual; engaged employees radiate energy, enthusiasm and passion (Schaufeli and Salanova, 2007). Work engagement is defined as a 'positive, fulfilling work related state of mind that is characterised by vigour, dedication and absorption' (Schaufeli, Salanova, Gonzalez-Roma & Bakker, 2002, p. 74). *Vigour* refers to the inclination to inject effort into one's work, perseverance in the wake of task difficulties, and the demonstration of exceptional levels of energy and steadfastness while working. *Dedication* is

characterised by a strong involvement in one's work and it reflects feelings of enthusiasm, inspiration, pride, significance, and challenge. The final dimension of engagement is *absorption*. This component of work engagement refers to being fully immersed in one's work in a way that time appears to fly by and one finds it excessively difficult to disengage oneself from work. Several studies have found empirical support for the three factor structure of work engagement (e.g. Schaufeli et al., 2002; Storm and Rothman, 2003; Schaufeli and Bakker, 2004; Schaufeli, Taris and Van Rhenen, 2008).

1.2 Importance of Work Engagement

In recent years the importance of work engagement has been enhanced mainly because of two factors. First, the recent trend towards positive psychology with its focus on human strengths, well being and optimal functioning, has evoked a general interest in positive states and as a result has catapulted the construct of work engagement into prominence (Seligman and Csikszentmihalyi, 2000). Second, the concept of work engagement has assumed increased significance because past research has provided empirical evidence, which demonstrates that high levels of work engagement can manifest in several positive outcomes for organizations. For example, research evidence indicates that high levels of work engagement can lead to greater commitment and satisfaction, lower absenteeism and quit rates, improved health and well being, and better in-role and extra-role performance (Schaufeli and Salanova, 2007). In view of these findings, it is reasonable to suggest that an engaged workforce is likely to make a significant contribution to the bottom line of the concerned organization.

1.3 Drivers of Work Engagement

A review of the engagement literature reveals that job resources are the most important precursors of work engagement (Schaufeli and Bakker, 2004; Bakker and Demerouti, 2008; Bakker, Schaufeli, Leiter, Taris, 2008). Job resources refer to those physical, social or organizational aspects of the job that can: (a) ensure successful task completion; (b) diminish the negative consequences of job demands; and (c) fuel personal growth and development (Schaufeli and Bakker, 2004; Bakker and

Demerouti, 2007). Prior research has consistently demonstrated that job resources such as supervisory coaching, social support from supervisor and co-workers, autonomy, positive work climate, and performance feedback can promote work engagement (Schaufeli and Salanova, 2007).

More recently, several studies have highlighted the role of personal resources in advancing employees' engagement with their work. Personal resources are positive evaluations of the self that are "linked to resiliency" and refer to "individual's sense of their ability to successfully control and impact their environment, especially during challenging circumstances" (Hobfoll, Johnson, Ennis and Jackson, 2003, p. 632). For instance, Xanthopoulou, Bakker, Demerouti and Schaufeli (2007) in their recent study showed that the three personal resources, namely, self efficacy, organization based self esteem and optimism were positively related to work engagement.

1.4 The Role of Trust in Work Engagement

As noted above, work engagement has been largely considered a product of job and personal resources. The present study, however, deviates from this established line of inquiry and seeks to broaden the growing engagement literature by investigating the impact of trust on research scientists' levels of work engagement within the context of the Irish university science research centres. Mayer, Davis and Schoorman (1995) draw a distinction between trust as a psychological state and trust as a relatively stable personality trait also known as trust propensity. The present thesis aims to examine the impact of both state and trait trust (trust propensity) on researchers' work engagement.

The current study focuses on three foci of state trust: top management, direct supervisor and team members. Therefore, the present study seeks to examine the effects of trust in the top management, direct supervisor and team members on researchers' engagement with their work. In the present investigation, state trust is conceptualised as a multidimensional construct and following Mishra (1996) is defined as 'one party's willingness to be vulnerable to another party based on the belief that the latter party is (a) competent, (b) reliable, (c) open and (d) concerned', (Mishra, 1996, p. 265). Therefore, in this research, state trust reflects researchers' inclination to depend on the top management, direct supervisor and their team

members based on their belief that these targets are efficacious, dependable, honest and compassionate.

In contrast, trait trust or trust propensity is a relatively stable individual difference, which reflects an individual's general tendency to trust or distrust across a broad range of situations and persons (Rotter, 1980; McKnight and Chervany, 2001). McKnight and Chervany (2001) argue that trust propensity does not necessarily suggest that one considers others to be dependable and reliable but on the contrary implies that irrespective of the reason, one generally is inclined to trust others.

To the best of my knowledge the relationship between work engagement and trust has not been explored before. In sum, this research attempts to prove that in addition to job and personal resources, a climate of trust can also play a key role in promoting work engagement.

1.5 Statement of the Problem

As mentioned in the preceding paragraphs, the current study was undertaken within the context of Irish university research centres. University research centres are organizations, which usually lie "outside the usual academic core" of university departments, and "they bring several fields of science and technology together, sometimes even helping create new fields" (Bozeman and Boardman, 2003, p. 8). These research centres are playing a critical role in accelerating the pace of economic development of the Irish economy by conducting cutting edge research in areas such as, biotechnology, computer sciences and medical technology. Thus, improving the efficiency and effectiveness of these centres is imperative for the economic prosperity of Ireland. The present study argues that the growth and stability of the university research centres can be enhanced by advancing the work engagement of science researchers working in these centres. It is further proposed that state and trait trust can play a vital role in achieving this end.

However, it should be noted that the research centres are a very specific form of organization, whose primary purpose is to increase the research output of universities. Moreover, the researchers working in these centres are high powered knowledge workers who are conducting high-tech scientific research in their respective fields. Thus, the obvious question is that will the findings of this study be specific to the research centres only or whether they can be generalised to other

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contexts as well. Previous research indicates that both work engagement (e.g. Schaufeli, Bakker and Van Rhenen, 2009) and trust (e.g. Collins and Smith, 2006) can influence the attitudes and behaviour of knowledge workers working within the context of high technology organizations such as, the university research centres and that these findings can be generalised to other contexts. This evidence provides confidence that the results and implications of the present study can be applicable to other work environments.

The current study argues that within the environment of research centres positive trust in the top management team, direct supervisor and team members along with researchers' dispositional tendency to trust, can play a crucial role in nurturing work engagement among the research scientists. For instance, trust in team members acquires salience in this context because the research scientists work in interdisciplinary teams and, therefore, are dependent on each other to accomplish team and personal goals. In such a work environment effective task performance and higher work engagement can only occur if the researchers cooperate and work collaboratively to accomplish particular tasks (Schaufeli and Salanova, 2007). Previous research provides mounting evidence that positive trust in team members can be critical in fostering interpersonal cooperation between members (Morgan and Hunt, 1994; Jones and George, 1998) and therefore, has the potential to manifest in stronger engagement and performance.

In a related vein, it is speculated that trust in direct supervisor will also have a positive impact on the engagement levels of the research scientists. High trust in the supervisor might prompt the researchers to give up their personal interests, and to invest their mental and physical energies in accomplishing the performance related goals articulated by the supervisor (Dirks, 2000). Greater motivation to attain the performance specific goals set by the supervisor, in turn, might induce the research scientists to approach their work with greater vigour, dedication and absorption.

Furthermore, it is suggested that trust in the more distal foci, that is the top management team, is also likely to exercise a significant effect on the engagement levels of research scientists. For instance, trust in the ability of the top management team to generate funding is likely to increase researchers' sense of future with the research centre by assuring them that the research centre will survive. This sense of security, by lowering uncertainty and ambiguity, might raise researchers' engagement with their work.

Finally, it is postulated that in addition to state trust, trust propensity is also likely to positively affect researchers' levels of work engagement. Previous research suggests that people who typically trust others are more willing to engage in pro-social behaviours (Colquitt, Scott and LePine, 2007); tend to be less critical of others (McKnight and Chervany, 2001); are more likely to respect the rights of others and are generally liked by others (Rotter, 1980). These positive characteristics might facilitate the high trustors to form an elaborate social network in their workplace through which they may gain access to important information and resources (e.g. social support, constructive feedback etc.), that are necessary for promoting work engagement.

Thus, in the light of this background, the present study seeks to investigate the following research question:

'Will positive trust in top management, direct supervisor and team members, and a high trust propensity foster work engagement among research scientists working in Irish university science research centres?'

1.6 Aims and Objectives of the Study

This research was driven by four objectives. The first and foremost aim of this study was to investigate whether or not trust in top management, trust in direct supervisor, trust in team members and trust propensity can directly and significantly affect researchers' engagement with their research work.

However, the relationship between the three facets of state trust and work engagement might not be direct or unconditional and it may be mediated by other variables. For instance, Dirks and Ferrin (2001) argue that trust is more likely to exercise an indirect effect on organizational outcomes by providing the "conditions under which cooperation, higher performance and / or more positive attitudes and perceptions are likely to occur" (p. 455). This raises the need to identify intervening mechanisms through which researchers' trust in top management, direct supervisor and team members can convert into work engagement.

Dirks and Skarlicki (2004) assert that trust in top management, trust in direct supervisor, and trust in team members are three distinct constructs each having different outcomes and implications. More particularly, they suggest that trust in top

management is likely to be a stronger predictor of organization-relevant outcomes; trust in direct supervisor is likely to be more predictive of supervisor focussed outcomes; and trust in team members is likely to exert a stronger influence on team level outcomes. This is also in line with Ajzen and Fishbein's (1977) principal of compatibility, which states that a given attitude is likely to be a stronger predictor of a particular behaviour if the attitude and the behaviour have the same foci. Thus, it is proposed that each type of trust will affect work engagement through a unique mechanism. Hence, the second objective of this study was to establish whether or not: (1) organizational identification, an organization relevant outcome, will mediate the relationship between trust in top management and work engagement; (2) affective commitment to the supervisor, which is a supervisor specific outcome will mediate the effects of trust in direct supervisor on work engagement; and (3) team psychological safety, a team relevant outcome, will mediate the relationship between trust in team members and work engagement.

The third aim of this study was to explore the effects of work engagement on five organizational outcomes: self-rated in-role job performance; innovative work behaviour; two learning behaviours, namely, seeking feedback for self improvement and error communication; and affective organizational commitment. Although the impact of work engagement on in-role job performance, innovative behaviour and organizational commitment has been examined before, no study to my knowledge has investigated the relationship between work engagement and the two kinds of learning behaviour: seeking feedback for self improvement, and error communication.

Finally, most of the studies have mainly considered the direct effects of work engagement on various outcomes, while little research has been conducted to investigate the mediating mechanisms through which engagement influences workplace attitudes, behaviours, and performance outcomes. Thus, the fourth and final objective of this study was to address this gap by highlighting the role of learning goal orientation in explaining the linkage between work engagement and the five organizational outcomes. However, it is quite possible that work engagement may affect these outcome variables through other intervening processes as well. Therefore, this study proposes that learning goal orientation will at least partially mediate the effects of work engagement on the outcome variables included in this study. The conceptual model depicting these relationships is presented in Figure 1.1:

FIGURE 1.1
Research Model

State Trust

| Trust in Top Management | → | Organizational Identification |

| Trust in Direct Supervisor | → | Affective Commitment to the Supervisor |

| Trust in Team Members | → | Team Psychological Safety |

Work Engagement

Vigour
Dedication
Absorption

Learning Goal Orientation

Outcomes

In-role job performance

Innovative Behaviour

Seeking Feedback for Self Improvement

Error Communication

Affective Organizational Commitment

Trait Trust

Trust Propensity

1.7 Research Hypotheses

On the basis of the research objectives specified above, the following research hypotheses were formulated and tested:

Hypothesis 1a: Researchers' trust in top management is positively associated with their work engagement

Hypothesis 1b: Researchers' trust in direct supervisor will be positively associated with their work engagement

Hypothesis 1c: Researchers' trust in their team members will be positively associated with their work engagement

Hypothesis 1d: Researchers' trust propensity will be positively associated with their work engagement

Hypothesis 2a: Researchers' organizational identification will mediate the effects of trust in top management on work engagement

Hypothesis 2b: Researchers' affective commitment to the supervisor will mediate the effects of trust in direct supervisor on work engagement

Hypothesis 2c: Team psychological safety will mediate the effects of trust in team members on work engagement

Hypothesis 3a: Researchers' work engagement will be positively associated with their in-role job performance

Hypothesis 3b: Researchers' work engagement will be positively associated with their innovative work behaviour

Hypothesis 3c: Researchers' work engagement will be positively associated with seeking feedback for self improvement

Hypothesis 3d: Researchers' work engagement will be positively associated with error communication

Hypothesis 3e: Researchers' work engagement will be positively associated with their organizational commitment

Hypothesis 4a: Researchers' learning goal orientation will at least partially mediate the effects of work engagement on in-role job performance

Hypothesis 4b: Researchers' learning goal orientation will at least partially mediate the effects of work engagement on innovative work behaviour

Hypothesis 4c: Researchers' learning goal orientation will at least partially mediate the effects of work engagement on seeking feedback for self improvement

Hypothesis 4d: Researchers' learning goal orientation will at least partially mediate the effects of work engagement on error communication

Hypothesis 4e: Researchers' learning goal orientation will at least partially mediate the effects of work engagement on organizational commitment

1.8 Definitions of Key Terms and Concepts

The definitions of key terms and concepts used in the present study are summarised in Table 1.1 below:

TABLE 1.1
Definitions of Key Terms & Concepts

Term / Concept	Definition
Work Engagement	A "positive, fulfilling work related state of mind that is characterised by vigour, dedication and absorption" (Schaufeli et al., 2002a, p. 74).
State Trust	"One party's willingness to be vulnerable to another party based on the belief that the latter party is (a) competent, (b) reliable, (c) open and (d) concerned", (Mishra, 1996, p. 265).
Trait Trust or Trust Propensity	A relatively stable individual difference, which reflects an individual's general tendency to trust or distrust across a broad range of situations and persons (Rotter, 1980; McKnight and Chervany, 2001).
Organizational Identification	"Perception of oneness with or belongingness to the organization" (Ashforth and Mael, 1989, p. 22) or "the degree to which a member defines him or herself by the same attributes that he or she believes define the organization" (Dutton et al., 1994, p. 239).
Affective Commitment to the Supervisor	An attachment, which reflects employees' identification with and emotional attachment to their supervisor (Clugston et al., 2000).
Team Psychological Safety	Refers to team members' belief that their "team is safe for interpersonal risk taking" (Edmondson, 1999, p. 354).
Learning Goal Orientation	Reflects an individual's dispositional tendency to improve competence through the acquisition of new skills and knowledge (Dweck, 1986).
In-Role Job Performance	Those activities, which are part of employees' formal job description (Motowidlo and Van Scotter, 1994).
Innovative Work Behaviour	An "intentional creation, introduction and application of new ideas within a work role, group or organization, in order to benefit role performance, the group or the organization" (Janssen, 2000, p. 288).
Feedback Seeking Behaviour	The "conscious devotion of effort toward determining the correctness and adequacy of behaviour for attaining valued end states" (Ashford, 1986, p. 466).
Error Communication	Employees tendency to openly report and discuss errors and mistakes
University Research Centre	A "university based organization whose purpose is to conduct scholarly investigations of an interdisciplinary nature, usually with financial support from government agencies, private companies and other organizations outside of the university" (Steffensen, Rogers and Speakman, 1999, p. 96).

1.9 Thesis Structure

This thesis comprises of twelve chapters and is structured as follows. Chapters 2 and 3 present a review of the relevant literature on work engagement, while chapters 4 and 5 review the literature relating to organizational trust. The literature pertaining to the three intervening variables: organizational identification, affective commitment to the supervisor, and team psychological safety, is reviewed in Chapter 6. In Chapter 7 a brief overview of the outcome variables used in this study is presented. Chapter 8 deals with the context of the study, that is, the university research centres; while Chapter 9 explains the theoretical basis, and logic used for developing the research hypotheses. Chapter 10 discusses the methodology used for this research. More specifically, it explains the philosophical foundations of this research, outlines the data collection procedure and the sample, discusses the measures used in this study, and examines the statistical techniques utilized to test the research hypotheses. The results of this research are presented in Chapter 11. Finally, Chapter 12 wraps up this thesis with a discussion of the results of this study, its theoretical and managerial implications, limitations and future research directions.

1.10 Summary

This chapter presented background information on the dependent variable, work engagement and on the independent variables that are assumed to enhance the engagement levels of research scientists working within the context of university science research centres. More specifically, in this research the three forms of state trust, namely, trust in top management, trust in direct supervisor, and trust in team members, and trait trust or trust propensity were hypothesised as antecedents of work engagement. Furthermore, it was proposed that organizational identification, affective commitment to the supervisor, and team psychological safety will mediate the effects of trust in top management, trust in direct supervisor and trust in team members on work engagement, respectively. It was further speculated that work engagement will positively affect five outcome variables: self-rated in-role job performance, innovative work behaviour, feedback seeking, error communication, and organizational commitment and these effects will be mediated by learning goal orientation. The next chapter reviews the relevant literature relating to work engagement.

CHAPTER 2

Work Engagement: Conceptualisation and Measurement

2.1 Introduction

The literature review on work engagement has been partitioned into two chapters to facilitate the understanding of this emerging concept. The present chapter provides a general introduction to the concept of work engagement; whereas, chapter 3 reviews the recent empirical advances in this area. Specifically, this chapter begins by examining how the recent movement towards positive psychology has propelled the concept of work engagement into prominence. Furthermore, a review of the literature reveals the presence of two distinct strands within the engagement literature. The first strand has its basis in practitioner journals; whereas, the second strand emanates from the academic literature. Thus, the next section critically analyzes the various models and conceptualizations of work engagement. The following section examines the different instruments used to measure this construct and highlights their merits and potential shortcomings. The chapter then advances to review the relationship between engagement and burnout, and concludes that engagement is characterised by high levels of energy and strong identification with one's work; whereas, burnout reflects a low level of energy and a weak identification with one's work.

2.2 Evolution of Work Engagement

Historically, the field of psychological research has been admonished for putting undue emphasis on the negative aspects of human behaviour such as, dysfunction, weakness and pathology (Schaufeli and Salanova, 2007). However, recent times have witnessed the emergence of positive psychology – a new branch of psychology that focuses on the importance of human strengths, optimal functioning and well-being as opposed to exclusively concentrating on human weaknesses and malfunctioning (Seligman and Csikszentmihalyi, 2000). This migration towards

positive psychology has led to a redirection of research interest in positive states such as, happiness (Brulde, 2007), well-being (Luthans, Norman, Avolio and Avey, 2008), hope (Synder, 2002), and most importantly, from the view point of the current study, work engagement (Bakker, Schaufeli, Leiter and Taris, 2008).

2.3 Different Approaches to Work Engagement

A review of the engagement literature reveals that there are two distinct approaches to the concept of work engagement. The first approach comes primarily from the practitioner journals; whereas, the second approach has its roots in the academic literature (Saks, 2006). These approaches are discussed in detail in the following paragraphs.

2.3.1 Practitioners' Approach to Work Engagement

Within the practitioner literature some of the definitions of work engagement that have been advanced include:

- Job engagement is defined 'as a person's enthusiasm and involvement in his or her job. People who are highly involved in their jobs identify personally with the job and are motivated by the work itself' (Roberts and Davenport, 2002 p. 21).

- Employee engagement is 'the individual's involvement and satisfaction with as well as enthusiasm for work' (Gallup Organization: Harter, Schmidt and Hayes, 2002, p. 269). Harter et al. (2002) further contend that employees are emotionally and cognitively engaged "when they know what is expected of them, have what they need to do their work, have opportunities to feel an impact and fulfilment in their work, perceive that they are part of something significant with co-workers whom they trust, and have chances to improve and develop" (p. 269).

- 'Employee engagement is the degree to which individuals are personally committed to helping an organization by doing a better job than what is required to hold the job'(Kowalski, 2003, p.1).

- Work engagement refers to 'bringing discretionary effort to the work in the form of extra time, brain power and energy' (Frank, Finnegan and Taylor, 2004, p.15).

- Engagement is defined as 'a positive attitude held by the employee towards the organization and its values. An engaged employee is aware of business context and works with colleagues to improve performance within the job for the benefit of the organization. The organization must work to develop and nurture engagement, which requires a two way relationship between employer and employee' (Robinson, Perryman and Hayday, 2004, p. 1).

- 'Engagement is about driving employees toward a rational, emotional and intellectual commitment to the company' (Shaw, 2005, p. 6).

- 'Employee engagement or 'passion for work', involves feeling positive about your job, as well as being prepared to go the extra mile to make sure you do your job to the best of your ability. Engagement has three dimensions: emotional engagement – being very involved emotionally with one's work; cognitive engagement – focussing very hard while at work; and physical engagement – being willing to 'go the extra mile for your employer' (Chartered Institute of Personnel Development (CIPD), 2006, p. 3).

- Employee engagement 'can be seen as a combination of commitment to the organization and its values plus a willingness to help out colleagues (organizational citizenship). It goes beyond job satisfaction and is not simply motivation. Engagement is something the employee has to offer: it cannot be required as part of the employment contract' (CIPD, 2007).

The above sample of definitions appears to conceptualise work engagement as a combination of established constructs like organizational commitment, job satisfaction, job involvement, and organizational citizenship behaviour. For example, Shaw (2005) and CIPD (2007) equate engagement with commitment; Frank et al. (2004) depict engagement as a form of extra-role behaviour; and the engagement concept advanced by Harter, Schmidt and Hayes (2002) seems to overlap with job satisfaction and job involvement.

Furthermore, another common theme within the practitioner literature is that employee engagement is characterised by energy, enthusiasm, involvement and focussed effort and therefore, it encompasses both attitudinal and behavioural components (Macey and Schneider, 2008). Wefald and Downey (2008) also echo similar thoughts and contend that concepts of satisfaction, commitment and involvement form an integral part of the definitions used by industrial researchers. In addition, the industrial literature posits that employee engagement can be leveraged by creating favourable employment conditions and is likely to have positive effects on firm's growth and profitability (Macey and Schneider, 2008; Schaufeli and Bakker, 2008). However, with the exception of Harter et al.'s (2002) study, this assertion has not been generally proved through publications in peer-reviewed journals (Schaufeli and Bakker, 2008). Schaufeli and Bakker (2008) further point out that instead of basing their contentions on concrete research evidence, the consultancy and industrial reports "merely state" that positive work engagement can manifest in enhanced organizational performance and effectiveness.

According to Wefald and Downey (2008) there are two main differences between the practitioner and the academic literature. The first difference between the two literatures stems from the fact that industrial view of engagement is more focussed on the outcomes of engagement (e.g. performance, retention and satisfaction). This is understandable because the businesses are more interested in the bottom line effects of work engagement and, therefore, are relatively less focussed on defining and measuring this psychological state. In contrast, the primary focus of academic researchers is on the psychological construct itself and how the construct can be measured. Second, Wefald and Downey (2008) argue that while industry "typically uses macro data analysis where responses for individuals' are averaged over a work group or team" (e.g. Harter et al., 2002), the academics predominantly "use an individual's response as the data point" (e.g. Schaufeli and Bakker, 2004). This can be

problematic because these divergent approaches may lead to contradictory findings. Wefald and Downey (2008) conclude that in order to acquire a clearer understanding of the concept of work engagement, it is imperative that industrial and academic researchers strive to "integrate the measures and methods from the two thought worlds" (p. 144).

However, the practitioner literature suffers from two drawbacks. First, by depicting engagement as synonymous with established constructs such as, commitment, extra-role behaviour, satisfaction and involvement, it appears that this literature is merely "putting old wine in new bottles" (Schaufeli and Bakker, 2008). Second, most of the measures used to assess employee engagement in the practitioner literature ask respondents to report their perceptions of the work conditions prevailing in their organizations. For example, Wefald and Downey (2008) have highlighted ten common themes found in measures of engagement used by practitioners:

- Pride in employer
- Satisfaction with employer
- Job satisfaction
- Opportunity to perform well at challenging work
- Recognition and positive feedback for one's contribution
- Personal support from one's supervisor
- Effort above and beyond the minimum
- Understanding the link between one's job and the organization's mission
- Prospects for future growth with one's employer
- Intention to stay with one's employer

An examination of these themes suggests that industrial measures of engagement primarily represent the conditions under, which higher engagement is likely to take place but they do not in fact measure the construct of engagement itself (Macey and Schneider, 2008). In sum, it is fair to conclude that the concept of engagement developed by the industrial researchers does not present an accurate depiction of this construct.

2.3.2 Academic Approach to Work Engagement

Within the academic literature, the concept of work engagement was first introduced by Kahn (1990). Kahn (1990) defined work engagement as "the harnessing of organizational members' selves to their work roles; in engagement people employ and express themselves physically, cognitively and emotionally during role performances" (p. 694). In contrast, personal disengagement refers to the decoupling of the self from the work role and involves people withdrawing and defending themselves physically, cognitively and emotionally during role performances. Kahn (1990) contends that engagement behaviour refers to the act of simultaneously injecting energies into one's work roles and being able to express one's "preferred self" while performing one's work role. According to Kahn (1990) when people exhibit engagement behaviour they feel physically involved in their work activities, cognitively vigilant, and emotionally connected to others.

In his subsequent study, Kahn (1992) differentiated engagement from psychological presence. More specifically, Kahn (1992) argues that when people are fully present psychologically, while performing their work roles, they are more likely to feel "attentive, connected, integrated and focussed in their role performances" (p. 322). Engagement behaviour, that reflects the act of driving energies into one's work role, is in fact an outcome of such psychological presence.

Kahn (1990) in his ethnographic study found that there were three psychological conditions associated with engagement or disengagement at work: psychological meaningfulness, psychological safety, and psychological availability. Psychological meaningfulness refers to the feeling that one is receiving an adequate return on investment of their physical, cognitive and mental resources into their role performance. Individuals experience psychological meaningfulness when they feel useful and valuable, and believe that they are not being taken for granted. This psychological condition is particularly affected by job characteristics (such as variety, learning opportunities and autonomy), work role fit and rewarding interpersonal interactions with co-workers. Psychological safety refers to the belief that one can express his or her true self "without fear of negative consequences to self-image, status or career" (Kahn, 1990, p. 708). Kahn (1990) argued that supporting and trusting supervisory and co-worker relations were mainly responsible for engendering feelings of psychological safety. Finally, psychological availability refers to the belief

that one has the required physical, emotional and psychological resources to engage the self in a particular work role. Kahn (1990) found that workers were more engaged with their work in situations that provided them more psychological meaningfulness, psychological safety, and psychological availability.

May, Gilson and Harter (2004) provide the only empirical investigation of Kahn's model to-date. Specifically, May et al. (2004) found that although all the three psychological conditions, namely, meaningfulness, safety and availability were significantly related to work engagement, experiencing meaningfulness exerted the most profound impact on this construct. Additionally, they also found that the job enrichment and role fit were significantly associated with meaningfulness; rewarding co-worker and supportive supervisor relations were positively associated with safety; while, adherence to co-workers and self consciousness were negatively related to this psychological condition; and finally resources available had a positive impact on psychological availability; whereas, participation in outside activities had a negative impact on this particular condition.

Perhaps, one shortcoming of Kahn's model is that it has not been empirically tested in different contexts and among different occupational groups. As, noted above, the May et al. study provides the only empirical test of Kahn's model. This study was based in the United States and was conducted within the confines of a large insurance company. Thus, it remains to be seen whether Kahn's model will work in other contexts or countries or different occupational groups.

Other researchers have subsequently also adopted Kahn's (1990) conceptualization of engagement. For instance, Rothbard (2001), like Kahn (1990) defines engagement as psychological presence in or focus on role activities, but goes further to state that it involves two critical components: attention and absorption. Attention refers to "cognitive availability and the amount of time one spends thinking about a role"; while, absorption "means being engrossed in a role and refers to the intensity of one's focus on a role" (p. 656).

In a similar vein, Saks (2006) conceptualizes engagement as the extent to which an individual is psychologically present in a particular organizational role. He suggests that the two most dominant roles for most organizational members are their work role and their role as a member of an organization, and as a consequence he includes both job and organization engagement in his model.

In terms of the development of the concept of engagement, an important contribution comes from the burnout literature, which positions work engagement as a positive antipode of workplace burnout (Maslach, Schaufeli and Leiter, 2001). Burnout is a condition that is characterised by feelings of exhaustion, cynicism and reduced professional efficacy (Maslach and Leiter, 1997). According to Maslach and Leiter (1997) burnout reflects an erosion of engagement with the job. In their view engagement is characterised by three dimensions, that is, energy, involvement and efficacy, which are the direct opposites of the three facets of burnout. In other words, these researchers suggest that when individuals experience the feelings of burnout "energy turns into exhaustion, involvement turns into cynicism and efficacy turns into ineffectiveness" (p. 24). According to this conceptualization, engagement can be measured by the reverse pattern of scores on the Maslach Burnout Inventory-General Survey dimensions (MBI-GS) (Maslach et al., 2001). This implies that engagement is characterised by low scores on exhaustion and cynicism, and high scores on professional efficacy.

Some empirical support for this conceptualization of engagement is provided by case studies of two hospital units (Maslach and Leiter, 1997). The employees in one unit displayed a typical burnout profile (i.e. high scores on exhaustion and cynicism and low scores on efficacy); whereas, employees in the other unit had an opposite profile of engagement (i.e. low scores on exhaustion and cynicism and high scores on professional efficacy).

According to Maslach, Schaufeli and Leiter (2001), six areas of work-life lead to burnout and engagement: workload, control, rewards and recognition, community and social support, perceived fairness, and values. They argue that work engagement is an outcome of sustainable workload, feelings of choice and control, appropriate recognition and rewards, a supportive work community, fairness and justice, and meaningful and valued work. Like burnout, engagement is expected to mediate the effects of these six work-life factors on various work outcomes.

Schaufeli, Salanova, Gonzalez-Roma and Bakker (2002a) however, criticise Maslach and Leiter's conceptualization of work engagement on the grounds that it depicts engagement and burnout as end poles of a single continuum. A major disadvantage of this approach is that it prohibits the examination of the relationship between burnout and engagement because both concepts are considered to be opposite poles of the same continuum and are assessed with one instrument (the MBI-GS).

Schaufeli and colleagues (2002a) also position engagement as the positive antipode of workplace burnout. However, they argue that instead of being two opposite poles, burnout and engagement are independent, yet negatively correlated states of mind. Consequently, they define work engagement in its own right as a "positive, fulfilling work related state of mind that is characterised by vigour, dedication and absorption" (Schaufeli, Salanova, Gonzalez-Roma and Bakker, 2002a, p. 72). *Vigour* reflects a desire to devote effort in one's work, perseverance in the face of job related obstacles, and an expression of high levels of energy and mental toughness while working. *Dedication* refers to a particularly intense work involvement and encompasses feelings of inspiration, pride, enthusiasm, significance and challenge. The final dimension of engagement is *absorption*. *Absorption* is characterised by being totally focussed on one's work activities in a manner that time appears to pass speedily and one finds it increasingly difficult to disengage from his or her work.

Finally, in their recent review Macey and Schneider (2008) argue that although there is a general consensus that employee engagement can yield positive benefits for the organizations, there is some confusion about the meaning of this term. In order to clear this confusion, these researchers propose a conceptual model of work engagement, which depicts engagement as a complex construct comprising of state, behavioural and trait engagement. They argue that engagement as a psychological state has a strong affective tone and is characterised by feelings of energy, enthusiasm, pride, passion and involvement.

Macey and Schneider's (2008) review seeks to differentiate the concept of state engagement from older and more established constructs such as job satisfaction, organizational commitment, and job involvement. More specifically, they contend that the older constructs like job satisfaction, organizational commitment and job involvement do not adequately capture feelings of energy, enthusiasm and involvement, which are central to the concept of engagement. For instance, job satisfaction reflects satiation and contentment; whereas, engagement connotes energy and enthusiasm. In addition, while engagement reflects a high level of activation, job satisfaction "is sufficiently characterised by a sense of well-being and pleasantness connoting at best moderate levels of activation and energy" (p. 24). Furthermore, the measures of job satisfaction, which typically require the respondents to describe their work conditions, may be relevant for ascertaining the conditions, which promote

engagement but do not measure directly the construct of engagement. Macey and Schneider (2008), therefore, conclude that job satisfaction may be at best considered as a facet of engagement when it is assessed as reflecting feelings of energy and enthusiasm. However, when it is measured as satiation or contentment, it cannot be regarded "in the same conceptual space as engagement" (p. 8).

Likewise, organizational commitment reflects employees' psychological attachment with their employing organization; while the focus of engagement is on employees' connection with their work activities. However, like satisfaction, organizational commitment may also be considered as a facet of engagement when it is characterised and measured as a willingness to expend energy on behalf of the organization; feeling a sense of pride as an organizational member; and having personal identification with the organization (Macey and Schneider, 2008).

Finally, although both engagement and job involvement reflect employees' identification with their work, engagement represents a broader construct because it also encompasses feelings of energy, efficacy and enthusiasm.

The second facet of engagement identified by Macey and Schneider (2008) is behavioural engagement. Behavioural engagement includes adaptive behaviours such as, citizenship behaviour, role expansion, proactive behaviour, and demonstration of personal initiative. The common feature of all these behaviours is that they involve "going beyond the usual or typical" (p. 19). More specifically, engagement behaviours are "discretionary in that they go beyond preserving the status quo and instead focus on initiating or fostering change in the sense of doing something more and / or different, whether in response to a temporary condition or a more permanent solution to a perceived existing organizational change" (p. 18). Thus, according to this conceptualization, usual behaviours such as average task performance, reporting for work on time and fulfilling the in-role requirements specified by one's supervisor do not connote engagement.

The third and final facet of engagement identified by Macey and Schneider (2008) is trait engagement. Trait engagement refers to the tendency to experience work in "positive, active and energic ways and to behave adaptively in displaying effort at going beyond what is necessary and initiating change to facilitate organizationally relevant outcomes" (Macey and Schneider, 2008, p. 24). More specifically, trait engagement is an amalgamation of interrelated personality attributes such as positive affectivity, conscientiousness, the proactive personality and autotelic

personality. In the model proposed by Macey and Schneider (2008), trait engagement is a direct antecedent of state engagement, which in turn induces individuals to exhibit engagement behaviours.

However, Macey and Schneider's (2008) approach has come under a fair amount of criticism from several quarters. For instance, Newman and Harrison (2008) contend that Macey and Schneider's (2008) concept of state engagement is "redundant" and as opposed to being an independent construct, it should be considered as one of the components of a higher order job attitude construct. Moreover, although both Newman and Harrison (2008) and Saks (2008) agree that behavioural engagement is a useful concept, they differ with Macey and Schneider's (2008) contention that behavioural engagement involves behaviours, which reflect "going beyond the usual or typical". Newman and Harrison (2008) suggest that engagement can be better understood as "the behavioural provision of time and energy into one's work role, specified as shared variance among job performance, withdrawal and citizenship behaviour" (p. 35).

Furthermore, Dalal, Brummel, Wee and Thomas (2008) argue that Macey and Schneider's (2008) use of the term "state engagement" is misleading. Dalal et al. (2008) suggest that the term state typically captures within-person variations and therefore by implication state engagement should refer to the daily fluctuations in the levels of engagement within a specific person. Thus, what Macey and Schneider (2008) refer to as state engagement, is in fact a relatively stable trait like state, which does not take into account within-person variations. These researchers further argue that engagement is likely to comprise of both state like and trait like components and that it should be considered a cognitive-affective construct and not a dispositional or a behavioural one. Dalal et al. (2008) conclude that the concepts of trait and behavioural engagement specified by Macey and Schneider (2008) should not be termed as engagement but instead should be considered as "putative dispositional antecedents and behavioural consequences of engagement" (p. 55).

Finally, Macey and Schneider (2008) have not specified valid measures for their three components of work engagement. Thus, their model is not open to empirical testing and estimation.

2.4 A Comparison between Different Approaches

The review of the different approaches to work engagement presented in the preceding paragraphs, highlights important differences among these view points. For instance, the practitioner literature equates work engagement with established constructs such as, organizational commitment, job satisfaction, job involvement and extra-role behaviour. Additionally, the main focus of the industrial researchers seems to be on the outcomes of work engagement and less on defining and measuring this psychological construct (Wefald and Downey, 2008). Khan (1990) on the other hand conceptualizes engagement as a behaviour, which reflects the act of injecting energies into one's work role. Schaufeli et al. (2002a) define engagement as a psychological state; while Macey and Schneider (2008) regard engagement as a complex construct comprising of state, trait and behavioural engagement. However, in spite of these differences, all approaches tend to agree that engagement is characterised by feelings of energy, enthusiasm and involvement. The similarities and differences between the various engagement models are summarised in Table 2.1:

TABLE 2.1
Comparison of Engagement Models

Authors	Conceptualization	Dimensions	Common Features
Practitioner Literature	Amalgamation of commitment, satisfaction, involvement and extra-role behaviour	None	Energy Enthusiasm Involvement
Kahn (1990)	A form of behaviour, which involves injecting energy into one's work role	Physical Cognitive Emotional	
Maslach and Leiter (1997)	Psychological State	Energy Involvement Efficacy	
Schaufeli et al. (2002a)	Psychological State	Vigour, Dedication and Absorption	
Macey and Schneider (2008)	A complex construct consisting of three facets	State Engagement Behavioural Engagement Trait Engagement	

The obvious question then is that, which one of these approaches represents the most robust conceptualisation of work engagement. In this connection, Luthans and Youssef (2007) have specified four criteria for a positive psychological capacity to qualify for inclusion in positive organizational behaviour (POB), which refers to the "study and application of positively oriented human resource strengths and psychological capacities that can be measured, developed and effectively managed for performance improvement in today's workplace" (Luthans, 2002, p. 59). Specifically, to be included in POB a positive psychological state: (1) must be grounded in theory and research; (2) have valid measures; (3) should be state like and therefore open to development and manageable for performance improvement; (4) and should be researched, measured, developed and managed at the individual micro level. The industrial approach fails to meet three of these criteria. For example, the industrial

approach to engagement has its basis in practice rather than theory and empirical research (Saks, 2006); it lacks valid measures of engagement (Macey and Schneider, 2008); and finally, this approach primarily focuses on macro issues as opposed to individual micro issues (Wefald and Downey, 2008).

Khan's (1990) model of engagement also falls short on these criteria because only one previous study (May et al., 2004) has empirically tested his model and that too with a measure of engagement, which had unsatisfactory psychometric properties (to be discussed later). Likewise, Macey and Schneider's (2008) approach can also be rejected because they have not specified valid measures for their three components of work engagement and therefore, their model is not open to empirical testing and investigation.

Schaufeli et al.'s (2002a) model of work engagement, on the other hand, satisfies all the four criteria (Luthans, Norman, Avolio and Avey, 2008). Their concept of work engagement has emerged from the research on burnout, which has existed and proliferated over the past three decades and therefore, has solid theoretical foundations. Additionally, it can be measured by a psychometrically valid questionnaire, that is, the Utrecht Work Engagement Scale. This scale has been tested and validated in many different countries and among many different occupational groups. Moreover, the conceptualization of work engagement put forward by Schaufeli and colleagues has state like tendencies, that is, it is malleable and open to development. For instance, previous research suggests that an adequate supply of job resources (e.g. feedback, social support and coaching) can promote work engagement (Bakker and Demerotui, 2008). Finally, the construct of work engagement developed by Schaufeli et al. (2002a) has been mainly researched and measured at the individual micro level (e.g. Schaufeli and Bakker, 2004; Hakanen, Bakker and Schaufeli, 2006).

In addition to fulfilling the criteria for inclusion in POB, the engagement concept developed by Schaufeli and his co-researchers adequately captures the feelings of energy (vigour), enthusiasm (dedication) and involvement (absorption), which are regarded as central features of the construct of work engagement. Furthermore, Schaufeli et al.'s (2002a) definition separates work engagement from the related concept of burnout and as a result establishes it as an independent construct, which is important in its own right. In addition, as noted above, the model of work engagement proposed by Schuafeli and colleagues splits this construct into three dimensions: (1) vigour; (2) dedication; and (3) absorption, which can be

analysed separately. This permits for a more accurate detection of where strengths and deficiencies exist in terms of each facet of work engagement (Freeney and Tiernan, 2006).

In sum, the model proposed by these researchers depict engagement as a "specific, well-defined and properly operationalised psychological state that is open to empirical research and practical application" (Bakker, Schaufeli, Leiter and Taris, 2008). Keeping in view these strengths, the present study also adopts the framework of engagement proposed by Schaufeli et al. (2002a).

2.5 Measurement of Work Engagement

The review of the engagement literature reveals that there are four valid measures of work engagement. The most widely used measure of work engagement is the Utrecht Work Engagement Scale (UWES) developed by Schaufeli and his co-researchers (2002a). Presently, UWES is available in 19 languages and has been used to measure work engagement in almost a hundred studies (see www.schaufeli.com). In addition to the original UWES, which comprises of 17 items, a shortened version of this instrument consisting of nine items is also available (Schaufeli, Baker and Salanova, 2006). Furthermore, a student version of this instrument, which can be used to assess students' engagement with their studies, has also been developed and validated (Schaufeli, Martinez, Marques-Pinto, Salanova and Bakker, 2002b).

UWES has been validated in The Netherlands (Schaufeli and Bakker, 2004), Spain (Schaufeli et al., 2002a), South Africa (Storm and Rothman, 2003) and China (Yi-Wen and Yi-Qun, 2005). In all these studies, the researchers utilized confirmatory factor analysis to test the three factor structure proposed by the UWES. The results from these studies showed that the fit of the hypothesised three factor model was better than the alternate factor models.

However, it is noteworthy that in two studies conducted by Sonnentag (2003) and Shimazu et al. (2008) respectively, the three factor structure of UWES could not be validated and therefore these researchers used the composite score of work engagement. Bakker (2009) attributes this problem to the translation of UWES items into other languages. These studies apart, generally the UWES has produced satisfactory results.

As noted above, UWES includes seventeen items, which are assumed to measure the three underlying dimensions of engagement: vigour, dedication and absorption. Vigour and absorption are measured with six items each; whereas dedication is assessed with five items. All items are scored on a 7-point frequency based scale ranging from 0 ("never") to 6 ("always"). Although the results of confirmatory factor analyses support the three factor structure proposed by UWES, the three dimensions of work engagement appear to be very highly correlated with each other. The average correlations between the three scales usually is around 0.65 (Schaufeli and Salanova, 2007; Schaufeli and Bakker, 2008). Since, from a theoretical point of view the three dimensions refer to the same underlying construct, that is, work engagement and because empirically they are highly correlated with each other, several scholars propose that for practical purposes the composite score of work engagement can also be used for empirical research (Bakker et al., 2008; Bakker and Demerouti, 2008; Schaufeli and Bakker, 2008). Many recent studies have therefore, utilised the composite score to analyze the causes and effects of work engagement (Halbesleben and Wheeler, 2008; Xanthopolou, Huven, Demerouti and Bakker, 2008; Kim, Shin and Swanger, 2009).

Furthermore, the internal consistency of each subscale has proved to be very good. That is, in almost all studies, values of Cronbach's alpha not only met the criteria of 0.70 proposed by Nunnally and Bernstein (1994) but also exceed the more rigorous criteria of 0.80 specified by Henson (2001). Finally, research evidence shows that the three factor structure of the UWES is mostly invariant across various countries and occupational groups (Schaufeli et al., 2002b; Llorens, Bakker, Schaufeli and Salanova, 2006).

However, one potential weakness in the UWES scale is that it exclusively consists of only positively worded items (Bakker, 2009). In this connection, Harrison and McLaughlin (1996) suggest that it is imperative that self-report measures should also contain some negatively worded items in order to control for acquiescence, leniency bias and spurious response consistencies. They further contend that negatively worded items are liable to act as "cognitive speed bumps, to slow a kind of inattentive inertia that might develop from answering a series of overlapping questions" (p. 314). Nonetheless, in spite of this one drawback, UWES appears to be a sound measure of work engagement.

Another promising measure of work engagement is the Oldenburg Burnout Inventory (OLBI) (Demerouti and Bakker, 2008). The OLBI was primarily developed to assess burnout but since it consists of both positively and negatively worded items, it can also be utilised to measure work engagement. The OLBI consists of sixteen items and assesses two dimensions: one ranging from exhaustion to vigour (e.g. "After my work, I regularly feel worn out and weary" and "After my work, I regularly feel totally fit for my leisure activities") and the second ranging from disengagement to dedication (e.g. "I frequently talk about my work in a negative way", and "I get more and more engaged in my work"). Both sub-scales of OLBI consist of eight items each. In each sub-scale, four items are positively worded, while the remaining four are negatively worded. The scores for vigour can be obtained by adding the four positively framed vigour items and the four recoded exhaustion items; while the scores for dedication can be computed by adding the four positively worded dedication items and the four recoded disengagement items. The two factor structure proposed by OLBI has been confirmed in several studies conducted in many different countries and generally this instrument has shown good psychometric properties (Bakker et al., 2008; Demerouti and Bakker, 2008). However, one potential weakness of this instrument is that it does not measure the third dimension of work engagement, that is, absorption.

Moreover, in the only study to empirically test Kahn's (1990) model, May et al. (2004) developed a three dimensional measure of work engagement. More specifically, these researchers identified three components of work engagement: physical (e.g. 'I exert a lot of energy performing my job'), cognitive (e.g. 'I exert a lot of energy performing my job') and emotional (e.g. 'I really put my heart into my job'). Quite interestingly, the three components proposed by May et al. (2004) seem to bear an uncanny resemblance with the three dimensions of the UWES, that is, vigour, dedication and absorption. However, May and colleagues (2004) were unable to establish the three factor structure proposed by their measure and as a result they used the composite score to assess work engagement. Thus, the psychometric properties of this measure need to be rigorously tested and established in diverse samples before it can be considered as a reliable measure of work engagement.

Finally, the Gallup researchers (Harter et al., 2002) have developed a twelve item instrument, labelled as Q 12, to measure work engagement. Harter et al. (2002) argue that their instrument is "a measure of employee perceptions of work

characteristics….the quality of people related management practices, and…antecedents of personal job satisfaction and other affective constructs" (p. 269). Harter and Schmidt (2008) contend that that the Q12 measure consists of "engagement conditions", each of which can promote work engagement and the "composite or sum of which is said to measure engagement through the measurement of its causes" (p. 37).

However, Macey and Schneider (2008) criticize Q 12 on the grounds that its items (e.g. "I have the materials and equipment I need to do my work right" and "My supervisor, or someone at work, seems to care about me as a person") tend to assess the conditions that may enhance employees' engagement with their work but they do not connote energy, enthusiasm and passion, which are central to the concept of work engagement. Put differently, Q 12 measures the "perceived resourcefulness" of the employees' job and not their level of work engagement (Schaufeli and Bakker, 2008). Macey and Schneider (2008) conclude that any measure "that asks how satisfied an employee is with conditions at or of work or asks about the presence of particular conditions of or at work" (p. 26) should not be regarded as a measure of engagement.

Additionally, Harter et al. (2002) reported a correlation of 0.77 between overall job satisfaction and employee engagement measured with Q12. This correlation increased to 0.91 after correcting for measurement error. Furthermore, the observed correlation of overall job satisfaction and employee engagement with a composite measure of business unit performance was found to be identical (0.22). This evidence clearly points to the fact that Harter et al.'s concept of work engagement as measured with Q12 and the construct of overall job satisfaction are virtually indistinguishable.

Finally, although Q12 has exhibited good reliability at the business unit level ($\alpha = 0.91$; Harter et al., 2002) and at the individual level ($\alpha = 0.88$; Avery, McKay and Wilson, 2007), no study to-date has assessed its factor structure and invariance across different countries and occupational groups. In the absence of such psychometric data, Q12 cannot be regarded as a robust measure of work engagement.

Thus, on the basis of the above evidence it is reasonable to suggest that UWES is the most reliable and psychometrically sound measure of work engagement available to-date. Therefore, in the present study, UWES was used to assess work engagement. The various measures of work engagement are presented in Table 2.2.

TABLE 2.2
Various Measures of Work Engagement

Authors	Instrument	Dimensions	No. of items
Schaufeli et al. (2002)	UWES	Vigour Dedication Absorption	17
Demerouti and Bakker (2008)	OLBI	Vigour Dedication	16
May et al. (2004)	-	Physical Cognitive Emotional	13
Harter et al., 2002	Q12	None	12

2.6 The Relationship between Burnout and Work Engagement

The three aspects of burnout namely, exhaustion, cynicism and reduced professional efficacy as measured by MBI-GS (Maslach, et al., 2001) have been found to be negatively related to three dimensions of work engagement, that is, vigour, dedication and absorption as measured by the Utretch Work Engagement Scale in various studies (Schaufeli et al., 2002a; 2002b; Montgomery et al., 2003; Duran et al., 2004; Schaufeli, Taris and Rhenen, 2008).

It is interesting to note that several studies have found that the third dimension of burnout, reduced professional efficacy, loads negatively on to the engagement factor instead of loading positively on to the burnout factor (Schaufeli et al., 2002b; Schaufeli and Bakker, 2004; Schaufeli, Taris and Rhenen, 2008). One reason for this could be that reduced professional efficacy scale is measured with positively worded items which are then subsequently 'reversed' to create a score for this dimension. Schaufeli and Salanova (2007) argue that this problem can be rectified by using an inefficacy scale instead of the traditional MBI-GS efficacy scale. In fact, they empirically demonstrated that compared with efficacy beliefs, inefficacy beliefs related more strongly with the other two burnout dimensions and the alternative three factor burnout model including inefficacy fits better to the data than the traditional model including efficacy. In the light of these findings they conclude that an

inefficacy scale rather than a reversed efficacy scale should be used to assess burnout in future studies.

Furthermore, just as exhaustion and cynicism are considered the core dimensions of burnout, vigour and dedication represent the core components of work engagement (Gonzalez-Roma, Schaufeli, Bakker and Lloret, 2006). Vigour and exhaustion are considered each others direct opposites and they represent the end points of the continuum labelled 'energy'. Likewise, dedication and cynicism are considered direct opposites and the continuum covered by these two dimensions has been described as 'identification'. Hence, work engagement is characterised by high level of energy and strong identification with one's work; whereas, burnout reflects a low level of energy and a weak identification with one's work (Gonzalez-Roma, et al., 2006).

On the contrary, reduced efficacy and absorption are not each others direct opposites. In fact they are two distinct constructs, which do not represent the end points of some underlying continuum (Schaufeli et al., 2002a). It is worth mentioning that reduced efficacy was added as a dimension of burnout on second thoughts after it emerged as a third factor from a factor analysis of a preliminary version of the Maslach Burnout Inventory (Schaufeli et al. 2002a). In recent years, many researchers have raised the question whether or not professionally efficacy represents a true component of burnout. For example, Cordes and Dougherty (1993) and Shirom (2003) contend that professional efficacy appears more like a personality trait rather than a genuine burnout dimension. From an empirical point of view this contention is supported by relatively low correlation of professional efficacy with the other two burnout dimensions (exhaustion and cynicism). Furthermore, research evidence indicates that cynicism appears to develop in response to exhaustion; whereas, professional efficacy seems to develop relatively independently and in parallel (Gonzalez-Roma et al., 2006). Finally, while professional efficacy is particularly related to job resources, the other two dimensions of burnout are also associated with job demands (Breso, Salanova and Schaufeli, 2007).

In a similar vein, absorption was found to be an important aspect of engagement after some thirty in-depth interviews were conducted (Schaufeli, Taris, Le Blanc, Peeters, Bakker and De Jonge, 2001). Absorption is closely aligned to the concept of flow – a state of mind that is characterized by "focussed attention, clear mind, mind and body unison, effortless concentration, complete control, loss of self

consciousness, distortion of time and intrinsic enjoyment" (Csikszentmihalyi, 1990; cited in Schaufeli and Bakker, 2004, p. 295). However, Mauno, Kinnunen and Ruokolainen (2007) highlight two important differences between the two concepts. First, absorption is considered to be a relatively persistent state of mind, while flow reflects a short term peak experience. Second, while absorption is mainly specific to the workplace, flow may occur in any domain of life. Interestingly, recent evidence indicates that absorption plays a slightly different role and appears more likely to be a consequence of engagement, rather than being its core component (Salanova, Llorens, Cifre, Martinez and Schaufeli, 2003).

2.7 Summary

The purpose of this chapter was to present and critically analyze the various theoretical debates surrounding the concept of work engagement. After analyzing the different models of engagement, it was concluded that Schaufeli et al.'s (2002) model presents the most robust conceptualization of this construct. Additionally, this chapter examined the various measures of work engagement and reviewed their merits and shortcomings. On the basis of this analysis, it was suggested that the Utrecht Work Engagement Scale (UWES) developed by Schaufeli and colleagues is the most reliable and psychometrically sound measure of work engagement available to-date. Finally, this chapter explored the relationship between engagement and burnout. Research evidence indicates that burnout and engagement are two distinct yet negatively correlated states of mind. Furthermore, vigour and dedication represent the core of work engagement, while exhaustion and cynicism represent the main components of burnout. In sum, engagement reflects a high level of energy and positive identification with one's work; whereas, burnout is characterised by low levels of energy and poor identification with one's work.

The next chapter reviews the various empirical advancements, which have taken place in the area of work engagement over the last decade.

CHAPTER 3

Work Engagement: Empirical Developments and Advancements

3.1 Introduction

While, chapter 2 looked at the evolution of work engagement and compared its various models and measures, this chapter reviews the applied research on work engagement and examines some of the recent empirical developments, which have taken place in this area. Specifically, this chapter starts by reviewing the job demands-resources model, which can be considered as the cornerstone of the concept of work engagement. Work engagement has been primarily analyzed within the framework of this model. The next section of this chapter examines the antecedents and consequences of work engagement. The review of the relevant literature in this area reveals that job resources and personal resources are the most important antecedents of this construct. This section also suggests that positive engagement with one's work can manifest in important outcomes such as, enhanced satisfaction and commitment, lower turnover and absenteeism rates, improve health and well being and superior levels of performance. The chapter then advances to examine the concept of daily or state engagement and concludes that engagement within individuals can fluctuate over time in response to changes in their work environment. Recent evidence indicates that engagement can crossover among individuals. Furthermore, there is a debate in the literature whether or not engagement can be differentiated from more established constructs like job satisfaction, organizational commitment and job involvement. Moreover, several researchers have recently suggested that excessive engagement might manifest in negative consequences for both the individual and the organizations. All these issues are reviewed in detail in the ensuing sections. The chapter finally concludes by identifying the gaps in the existing literature and by discussing how the present study aims to address these gaps.

3.2 Job Demands-Resources (JD-R) Model

The job demands-resources model was developed in order to overcome the limitations of earlier models of job stress such as the demand-control model (DCM) (Karasek, 1979) and the effort-reward imbalance (ERI) model (Siegrist, 1996). These models had two main shortcomings. First, these models examined the effects of a limited number of demands on strain. For instance, the main rationale of the demands control model is that job strain is an outcome of high job demands (particularly work overload and time pressure) and low job control. Furthermore, this model posits that job control can buffer the impact of job demands on strain. On the other hand, the basic premise of the effort-reward imbalance model is that strain is primarily a result of an imbalance between the amount of effort an individual invests and the corresponding rewards (in terms of salary, promotion, job security, career prospects etc.) he or she receives. In contrast, the job demand-resources model proposes that a wide variety of job conditions can cause strain or well-being.

The second shortcoming of the older models is that they exclusively focus on "negative aspects of work (e.g. excessive workload, insufficient resources) and negative consequences of work (e.g. strain' physical health problems)" (Van Broeck, Vansteenkiste, De Witte and Lens, 2008, p. 278). On the contrary, the JD-R model also takes into account the affirmative aspects of work and examines their positive effects on employees' health and well-being.

The construct of work engagement has been mainly analysed within the framework of the job demands-resources model. The job demands-resources model is pre-dominantly based on four propositions (Bakker and Demerouti, 2007). The first proposition of this model is that employees may work in different work environments, but the characteristics of these environments can be classified into two main categories: job demands and job resources (Demerouti, Bakker, Nachreiner and Schaufeli, 2001; Bakker and Demerouti, 2007). Job demands are those physical, psychological, social or organizational aspects of the job that require constant physical and / or psychological effort or skill and therefore are linked to certain physiological and / or psychological costs. Examples of job demands include: high work pressure, an unfavourable physical environment and emotionally demanding interaction with clients. Job demands may not be always negative, but they have the potential to turn into job stressors, especially when dealing with these demands

involves high effort. Job demands therefore can entail high costs, which may bring forth negative responses such as depression, anxiety or burnout (Schaufeli and Bakker, 2004).

Job resources are those physical, psychological, social or organizational aspects of the job that (a) enable employees to attain their work related goals (b) mitigate job demands and the accompanying physiological and psychological costs and (c) augment personal growth and development (Bakker and Demerouti, 2007). Job resources therefore are not only necessary to effectively cope with job demand but they are also important in their own right because they promote employees' learning, growth and development. Job resources can include social support from supervisor and colleagues, coaching, participation in decision-making, opportunities for growth and advancement and performance based rewards (Bakker and Demerouti, 2007).

The second proposition of this model posits that job demands and job resources evoke two psychological processes which may lead to the development of burnout and engagement. The first is the energetic process that begins with chronic job demands, which may exhaust employees' energy resources and may thus lead to burnout and subsequently to poor health and well being (Hakanen, Bakker and Schaufeli, 2006).

In contrast, the motivational process commences with the presence of job resources and is likely to cultivate work engagement and as a result can lead to positive outcomes such as reduced turnover (Schaufeli and Bakker, 2004), greater organizational commitment (Jackson, Rothman and Vijver, 2006) and improved performance (Schaufeli et al., 2006).

Job resources have the potential to play either an intrinsic or an extrinsic motivational role (Bakker and Demerouti, 2007). As intrinsic motivators, job resources, by satisfying the basic human needs such as the needs for autonomy, competence and relatedness promote individuals' growth and development (Deci and Ryan, 1985). For example, supervisory coaching can improve job competence; whereas, involvement in decision-making and colleague or supervisory support might satisfy the need for autonomy and the need to belong respectively. As extrinsic motivators job resources may prompt employees to put forth greater effort in their work and as a result are likely to facilitate task completion and goal accomplishment (Schaufeli and Bakker, 2004; Bakker and Demerouti, 2007). In sum, it is expected

that an appropriate supply of job resources might supplement employees' work engagement by ensuring effective task completion and by providing opportunities for personal growth and development; whereas, their deficiency can obstruct goal accomplishment and as result may lead employees to develop a negative and cynical attitude towards their work (Bakker and Demerouti, 2007).

In addition to the main effects of job demands and resources, the JD-R model proposes that job resources can interact with job demands to effect work engagement. More specifically, it has been found that that job resources might buffer the impact of job demands on work engagement. In other words the buffering hypothesis suggests that the negative relationship between job demands and work engagement will be weaker for those who have access to more job resources (Bakker, Hakanen, Demerouti and Xanthopoulou, 2007). This hypothesis is in line with the demand – control model (DCM) (Karasek, 1979), which postulates that job control or autonomy may buffer the influence of workload on strain. The job demands-resources model expands this model by "claiming that several different job resources can play the role of buffer for several different job demands" (Bakker and Demerouti, 2007, 314).

There are several reasons why job resources can have a buffering impact on work engagement in the wake of high job demands (Bakker and Demerouti, 2007). For example, social support from one's immediate supervisor and co-workers can facilitate task completion. Thus, it may be reasonable to suggest that instrumental support from colleagues and immediate supervisor might help to get the work done in time and as result may mitigate the impact of work overload on work engagement. Furthermore, job autonomy may have a buffering effect because greater autonomy allows employees to decide for themselves when and how to respond to their demands. Finally, constructive feedback may decrease stress because it can reduce role ambiguity and can enable employees to attain their performance related goals.

The final proposition of the JD-R model is that job resources particularly influence work engagement when job demands are high. This is consistent with the conservation of resources (COR) theory (Hobfoll, 2002), which proposes that resource gain has only a modest effect in itself, but instead attains prominence in the wake of resource loss. This suggests that job resources are likely to acquire their motivational potential particularly when employees have to deal with high job demands. The four propositions of the JD-R model are summarised in Figure 3.1 below:

FIGURE 3.1
The Job Demands-Resources Model
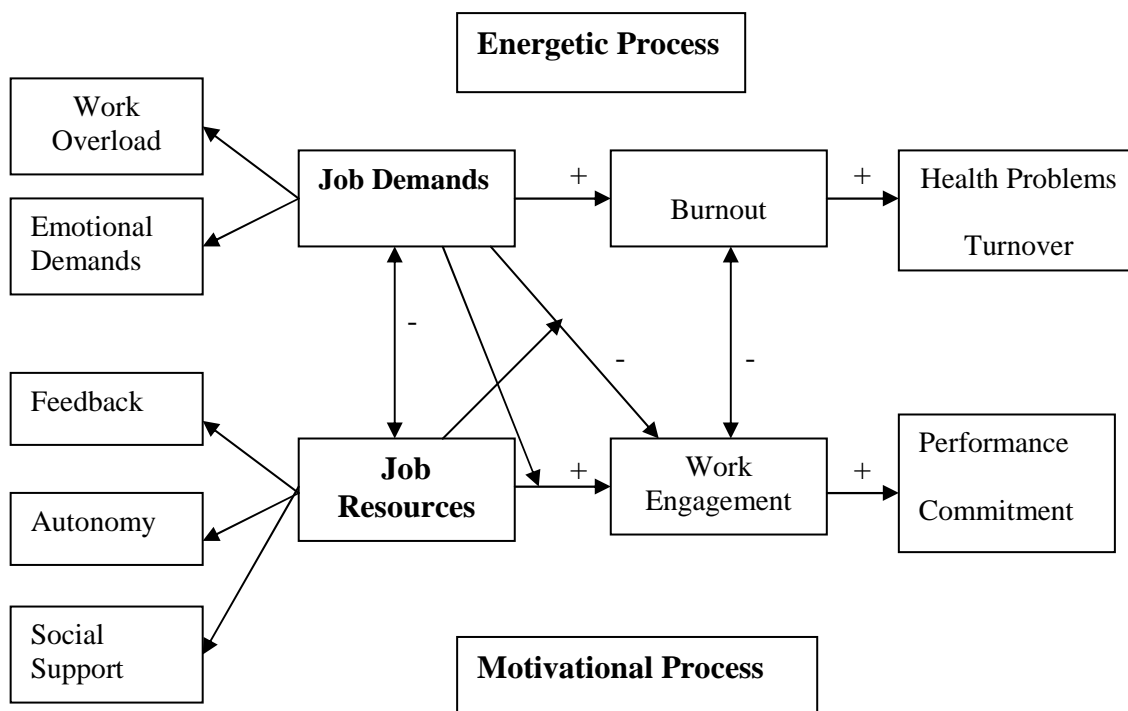
3.3 Evidence for the JD-R model

3.3.1 Evidence for the dual process

Several studies have found empirical support for the hypotheses put forward by the job demands-resources model. For example Demerouti et al. (2001) tested this model on a sample of employees belonging to three occupational groups: human services, industry and transport. A series of Lisrel analyses using self reports as well as observer ratings of working conditions provided strong evidence for the JD-R model. More specifically, it was found that job demands were primarily and positively related to exhaustion; whereas, job resources were primarily and negatively related to disengagement from work.

In another study, Schaufeli and Bakker (2004) applied this model to four independent occupational samples in the Netherlands. The results of their study showed that job demands (workload and emotional demands) mainly predicted burnout, which, in turn, was related to health problems. The results of this study further demonstrated that job resources were also negatively related to burnout. In contrast, job resources (feedback, social support and supervisory coaching) fuelled work engagement, which, in turn, was negatively linked to turnover intentions. However, no relation was found between job demands and work engagement.

Hakanen et al. (2006) tested the JD-R model among a sample of Finnish School teachers. They hypothesised that burnout would mediate the relationship between job demands (pupil misbehaviour, work overload and physical work environment) and ill health; whereas, engagement would mediate the effects of job resources (job control, supervisor support, information, social climate and innovative climate) on organizational commitment. A series of structural equation modelling analyses confirmed both these hypotheses.

All the studies reported above tested the JD-R model with a cross sectional research design, which prevents us from making any firm conclusions about causality. However, Hakanen, Schaufeli and Ahola (2008) overcame this limitation by testing the health impairment and motivational processes proposed by the JD-R model longitudinally. More specifically, using a large sample of Finnish dentists and adopting cross-lagged analyses based on two waves over a 3-year period, these researchers hypothesised that job resources will have a cross lagged effect on work engagement, which, in turn, will increase future organizational commitment; and job demands will have a cross lagged effect on burnout, which subsequently will manifest in higher depression three years later. The results of this study provided support for both the hypotheses. Specifically, it was found that job resources at time 1 had a positive cross-lagged effect on future engagement and work engagement, in turn, had a positive cross-lagged effect on future organizational commitment three years later. Likewise, job demands had a positive cross-lagged impact on future burnout and burnout subsequently had a positive cross-lagged effect on future depression.

Taken together, the above findings lend substantial support to both the processes proposed by the JD-R model. Job demands are related to negative outcomes such as depression and ill-health through burnout; whereas, job resources are related

to positive outcomes such as higher organizational commitment and improved performance through the mediating mechanism of work engagement.

3.3.2 Expansion of the JD-R model

Additionally, several recent studies have attempted to expand the job demands-resources model. For instance, Xanthopoulou, Bakker, Demerouti and Schaufeli (2007) expanded the JD-R model by incorporating personal resources in the model. More specifically, they hypothesised that personal resources (self efficacy, organizational based self-esteem and optimism) will mediate the effects of job resources (autonomy, social support and opportunities for professional development) on work engagement. Testing this hypothesis with a sample of Dutch employees, the results showed that, as predicted, personal resources partially mediated the effects of job resources on work engagement, thereby implying that job resources might boost personal resources, which subsequently may lead to greater work engagement.

In a related vein, Broeck, Vansteenkiste, De Witte and Lens (2008) investigated the role of basic need satisfaction, as defined within the self determination theory in the relationship between job demands (workload, emotional demands, physical demands and work-home interference), job resources (task autonomy, supervisory support, skill utilization and positive feedback), vigour and exhaustion. Using a sample of Dutch employees, these researchers showed that need satisfaction fully mediated the relationship between job resources and exhaustion; whereas, it partially mediated the effects of job resources on vigour and the effects of job demands on exhaustion. On the basis of these findings Broeck et al. (2008) concluded that "employees who are surrounded by resourceful job characteristics are more likely to experience general feelings of psychological freedom (i.e. autonomy), interpersonal connectedness (i.e. belongingness) and effectiveness (i.e. competence), which in turn explains why they feel less exhausted and more vigorous in their jobs" (p. 288). In contrast, employees who are confronted with high job demands are "more likely to have their basic psychological needs thwarted and therefore experience more exhaustion" (p. 288).

3.3.3 Evidence for the buffering effect and salience of job resources in the context of high job demands

Two studies have found empirical support for the buffering hypothesis and the assertion that job resources acquire salience in the context of high job demands. In the first study, Hakanen et al. (2005) tested this interaction hypothesis in a sample of Finnish dentists employed in the public sector. The dentists were split into two random groups in order to cross-validate the results. A set of hierarchal regression analyses disclosed that 17 out of the possible 40 interactions were statistically significant. Furthermore, the results of this study showed that job resources such as variability in professional skills reduced the negative effect of qualitative workload on work engagement. In addition, the findings of this study revealed that job resources like variability in professional skills were instrumental in enhancing work engagement when the qualitative workload was high.

In the second study undertaken among Finnish teachers, Bakker et al. (2007) found that job resources mitigated the negative effects of pupil misbehaviour on work engagement. They also found that job resources particularly influenced work engagement when teachers had to deal with high levels of pupil misconduct. A series of moderated structural equation modelling analyses revealed that fourteen out of eighteen possible two-way interaction effects were statistically significant. More specifically, it was found that job resources such as supervisor support, innovativeness, appreciation and organizational climate played a critical role in helping teachers to cope with high pupil misbehaviour.

3.4 Drivers of Work Engagement

3.4.1 Work Engagement and Job Resources

Previous research shows that job resources are the most important determinants of work engagement (Schaufeli and Bakker, 2004; Bakker, Schaufeli, Leiter, Taris, 2008; Bakker and Demerouti, 2008). As mentioned in the preceding paragraphs, job resources are those features of the job which have the potential to mitigate the deleterious effects of job demands; can pave the way for effective task completion and goal accomplishment; and might provide opportunities for personal

development and growth. The positive association between job resources and work engagement is in agreement with the job characteristic theory (Hackman and Oldham, 1980). This theory postulates that job resources such as, skill variety, task identity, task significance, autonomy and feedback have motivational potential and as a result can enhance intrinsic motivation – a concept, which is closely aligned to the construct of work engagement (Schaufeli and Salanova, 2007).

These findings are also in line with the self determination theory (Ryan and Deci, 2000), which posits that job resources have the potential to fulfil basic human needs, such as needs for competence, autonomy and relatedness. For example job resources such as, job control might fulfil the basic human need for autonomy; whereas, effective supervisory coaching and social support may satisfy the need for competence and relatedness respectively. The satisfaction of the basic human needs, in turn, can increase well being, intrinsic motivation and consequently work engagement (Schaufeli and Salanova, 2007).

Conversely, a lack of resources might expose the individuals to the negative effects of job demands and at the same time may hinder task completion and goal accomplishment. Additionally, an insufficient supply of job resources can impede individuals' learning, growth and development. The confluence of these factors is likely to manifest in disengagement from work.

Empirical research on work engagement has consistently demonstrated that job resources such as supervisory coaching, social support from colleagues and supervisors, autonomy, positive work climate, performance feedback, task variety and training facilities can play a pivotal role in augmenting employees' engagement with their work (Schaufeli and Salanova, 2007). For instance, Schaufeli and Bakker (2004) in their study on Dutch workers belonging to diverse occupational groups showed that three job resources, namely, performance feedback, social support and supervisory coaching were significant predictors of work engagement.

In a related vein, Hakanen et al. (2006) also found evidence of a positive relationship between work engagement and job resources. Their study on Finnish teachers revealed that job control, information, supervisory support, innovative climate and social support were all positively associated with work engagement. In another study of Finnish teachers Bakker et al. (2007) reported similar findings. More particularly, they found that six job resources, namely, job control, supervisor support,

climate, innovativeness, information and appreciation were positively and were significantly linked with teachers' levels of work engagement.

The association between work engagement and job resources has also been established in non-western cultures. For example, Koyuncu, Burke, Fiksenbaum (2006) conducted a study to determine the engagement levels of women mangers and professionals working in a large Turkish bank. The results of this study uncovered that work life experiences, particularly control, rewards and recognition and value-fit significantly predicted all the three dimensions of engagement, that is, vigour, dedication and absorption.

All the studies mentioned above utilized a cross sectional research design, which makes it difficult to draw causal inferences about the relationship between work engagement and job resources. However, recently numerous studies have sought to examine the relationship between engagement and job resources through longitudinal designs. The results from these longitudinal studies have mostly confirmed the positive association between the work engagement and job resources. For example, Mauno, Kinnuen and Ruokolainen (2007) employed a two-year longitudinal design to examine the impact of job control, organizational based self esteem and perceived management quality in a sample of Finnish health care personnel. The findings of this longitudinal study disclosed that job control and organizational based self esteem were the best lagged predictors of vigour, dedication and absorption.

Furthermore, Hakanen, Schaufeli and Ahola (2008) explored the effects of three job resources: craftsmanship, professional contacts and long-term and immediate results on the engagement levels of Finnish dentists by using cross-lagged panel analyses based on two waves over a 3 year period. The results of this study showed that as anticipated, the three job resources had a positive and significant cross-lagged effect on future work engagement.

Additionally, Schaufeli, Bakker and Van Rhenen (2009) in their study of Dutch managers and executives working within the confines of a large Telecom company uncovered that changes in job resources were predictive of work engagement over a period of one year. More particularly, the finding from this study showed that after controlling for baseline work engagement, increases in social support, autonomy, opportunities to learn and to develop and performance feedback at time 1 significantly enhanced work engagement at time 2.

3.4.2 Reciprocal Relationship between Work Engagement and Job Resources

Bulk of the empirical work on work engagement assumes that the relationship between work engagement and job resources is unidirectional, thereby implying that "job resources as measured at one point in time will influence work engagement at a later point in time, but not vice versa" (de Lange, De White and Notelaers, p. 203). However, recent research evidence indicates that work engagement and job resources may reciprocally affect each other. In other words, this school of thought postulates that the relationship between work engagement and job resources is mutually reinforcing and may result in an upward spiral affect. That is, job resources fuel work engagement, which in turn increases job resources and so forth.

There are at least three reasons why work engagement might influence job resources. First, according to the conservation of resources theory, people endeavour to retain, protect and accumulate resources (Hobfoll, 1989). Furthermore, Hobfoll (1989) contends that when people perceive their environment as less threatening, they are more likely to develop resources to offset the possibility of future loss. Since engaged employees generally have the ability to cope well with job demands, it is conceivable that they might perceive less stressors in their work environment and consequently may be more inclined to mobilize or create resources.

Second, the positive effects of work engagement on job resources can be explained in terms of Fredrickson's (2001) broaden-and- built theory of positive emotions. According to this theory, positive emotions such as joy, love and interest can broaden people's momentary thought action repertoires and as a result build their physical, intellectual, social and psychological resources, which are relatively permanent and long lasting. Thus, it is reasonable to suggest that positive affect in the form of work engagement might broaden individuals' thoughts and actions and therefore stimulate them to activate or create job resources.

Finally, it is also plausible that instead of actually building resources, engaged employees might be more aware of the resources in their work environment or they may view the existing job resources more positively than their non-engaged counterparts (Hakanen, Perhoniemi and Toppinen-Tanner, 2008; Schaufeli et al., 2009).

Several studies have found empirical support for the reciprocal relationship between work engagement and job resources. For instance, Llorens, Schaufeli, Bakker

and Salanova (2007) in an experimental study involving 110 Spanish university students showed that task resources (i.e. time control and method control) augmented work engagement and work engagement, in turn, positively influenced task resources, with self efficacy playing a mediating role in this reciprocal relationship.

In their study on Finnish dentists, Hakanen et al. (2008) also sought to examine the reciprocal relationship between resources and engagement by adopting a two-wave 3-year panel design. The findings of their study revealed that job resources at time 1 had a positive cross lagged effect on work engagement at time 2 and in return, work engagement at time 1 had a reversed positive affect on job resources at time 2.

Finally, Xanthopoulou, Bakker, Demerouti and Schaufeli (2009a) replicated these findings in a sample of employees drawn from three divisions of an electrical engineering and electronics company in the Netherlands. The results from this study disclosed that job resources (social support, autonomy, supervisory coaching, performance feedback and opportunities for professional development) at time1 predicted future work engagement at time 2. Additionally, it was shown that engagement at time 1 was positively associated with job resources at time 2.

3.4.3 Work Engagement and Personal Resources

Recent research evidence indicates that state like personal resources can play a pivotal role in stimulating work engagement. In contrast to positive traits, which tend to be relatively enduring over time, positive state-like resource capacities are relatively more flexible and thus are more responsive to change and development (Luthans and Youssef, 2007). Personal resources are positive self-evaluations that foster resiliency to set backs and refer to "individual's sense of their ability to successfully control and impact their environment, especially during challenging circumstances" (Hobfoll, Johnson, Ennis and Jackson, 2003: 632). Examples of personal resources include: self-efficacy, optimism and organizational based self-esteem. It has been suggested and empirically proved that such positive self evaluations can play a key role in promoting goal setting, motivation and performance (Bakker, 2009). The reason for this is that individuals who feel efficacious, valued and optimistic tend to develop a positive self-regard and as result are likely to experience goal self concordance (Luthans and Youssef, 2007). People with self goal

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concordance are intrinsically motivated to purse their work goals, which in turn may manifest in higher levels of work engagement and performance.

Several recent studies have established a positive link between personal resources and work engagement. For instance, Xanthopoulou, Bakker, Demerouti and Schaufeli (2007) explored the effects of three personal resources, namely, self efficacy, organizational based self esteem and optimism on the engagement levels of highly skilled Dutch technicians. They found that the three personal resources were significantly predictors of work engagement.

Xanthopoulou, Bakker, Demerouti and Schaufeli (2009a) replicated these results in a subsequent study. In fact, these researchers argued and empirically demonstrated that there is a reciprocal relationship between work engagement and personal resources. Specifically, it was found that time 1 personal resources were predictive of time 2 work engagement; additionally work engagement at time 1 had significant unique effects on time 2 personal resources.

Furthermore, previous research shows that personal resources may have a buffering effect on work engagement. For instance, in a study on cabin attendants, Heuven, Bakker, Schaufeli and Huisman (2006) showed that emotion work-related self-efficacy buffered the impact of emotional dissonance on work engagement. This finding implied that highly efficacious cabin attendants were better equipped to cope with the ill effects of emotional dissonance and therefore were able to maintain their levels of vigour, dedication and absorption.

3.4.4 The Overall Model of Work Engagement

Bakker and Demerouti (2008) have proposed a model, which depicts the interplay between work engagement, job demands, job resources, personal resources (Figure 3.2).

FIGURE 3.2
Overall Model of Work Engagement
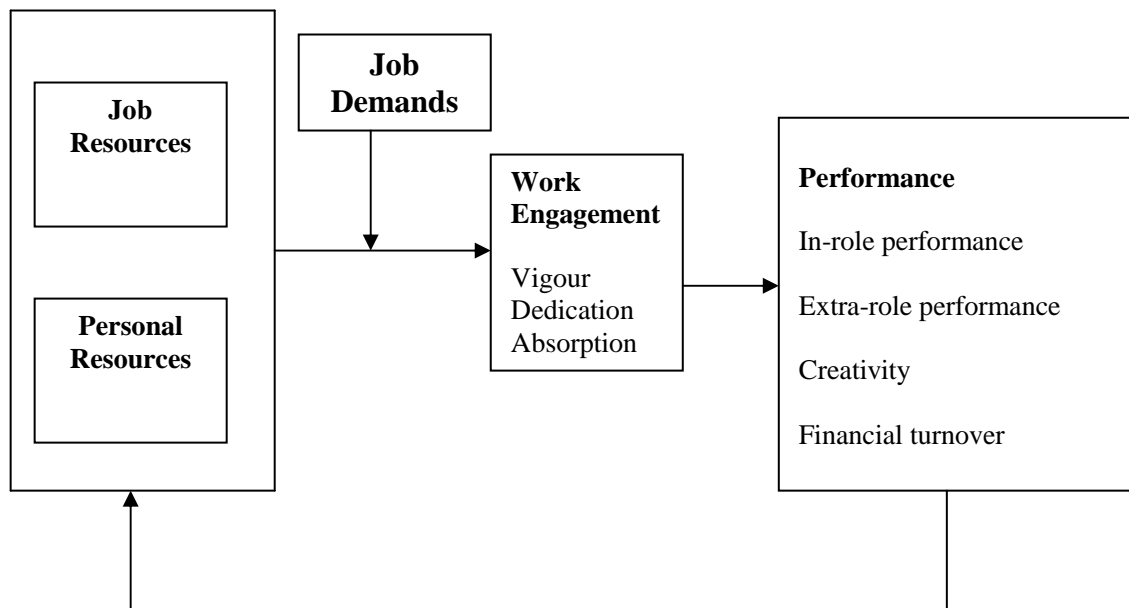
Adapted from Bakker, A.B. and Demerouti, E. (2008), "Towards a model of engagement", Career Development International, Vol. 13, No. 3, pp. 209-223.

This model suggests that job resources and personal resources are instrumental in promoting work engagement. Furthermore, it proposes that the impact of job and personal resources on work engagement is particularly strong when job demands are high. In addition, according to this model, high levels of work engagement can manifest in better performance. Finally, the model argues that a combination of high engagement and improved performance inspires the employees to create their own resources, which subsequently enhances engagement again over time.

3.4.5 Work Engagement and Personality Traits

Prior studies indicate that personality traits can also influence work engagement. For example, Langelaan, Bakker, Van Doornen and Schaufeli (2006) examined whether burnout and work engagement could be differentiated on the basis of personality and temperament. They hypothesised that burnout would be

characterised by high neuroticism and low extraversion and engagement by low neuroticism and high extraversion. The results revealed that burned out employees were high on neuroticism; whereas, engaged workers were characterized by low neuroticism, high extraversion and high levels of mobility. This evidence suggests that generally engaged employees adapt well to changes in their work environment (mobility); are cheerful and out going (extraversion); and are less likely to experience negative emotions such as fear, depression and frustration (neuroticism).

Mosert and Rothman (2006) also reported similar findings in their study on 1794 police officers conducted in South Africa. More specifically, the results of this cross sectional study showed that three personality traits: emotional stability, conscientiousness and extraversion exercised significant unique effects on the two core dimensions of work engagement, that is, vigour and dedication.

The effects of the Big Five personality dimensions: extraversion, agreeableness, conscientiousness, neuroticism and openness were also explored by Kim, Shin and Swanger (2009) in their study on employees working for quick service restaurants. Their findings revealed that engagement was particularly predicted by conscientiousness and neuroticism. Conscientiousness was a positive predictor of work engagement; where as, neuroticism had a negative association with this construct.

Furthermore, two studies have provided evidence that Type A behaviour can affect employees' engagement with their work. First, Richardsen, Burke and Martinussen (2006) sought to explore the impact of this personality trait on the engagement levels of Norwegian police officers. These authors identified two dimensions of Type A behaviour: achievement striving and irritability / impatience. The results of this study disclosed that the achievement striving component of Type A behaviour, which reflects the "non-toxic" portion of this personality trait, was positively associated with work engagement. Hallberg, Johansson and Schaufeli (2007) replicated these findings in a sample of software developers and showed that the achievement striving components of Type A behaviour was a positive predictor of work engagement. These findings signified that employees who are ambitious and have a strong desire to excel in their jobs are likely to exhibit higher levels of work engagement.

3.4.6 Other Predictors of Work Engagement

Although work engagement has been primarily expressed as an outcome of job and personal resources, there is evidence, which suggests that work engagement may be induced by other situational and psychological factors. For instance, Kahn (1990) in his qualitative study interviewed summer camp counsellors and organizational members of an architecture firm about their moments of engagement or disengagement at work. As mentioned earlier, Kahn (1990) found that that there were three psychological conditions associated with engagement or disengagement at work: psychological meaningfulness, psychological safety and psychological availability. In the only study to empirically test Kahn's (1990) model, May et al. (2004) found that all three psychological conditions proposed by Kahn: meaningfulness, safety and availability were significantly related to work engagement.

Additionally, Saks (2006) sought to explore the antecedents of his two dimensions of engagement, namely, job engagement and organization engagement. The results from his study revealed that both job characteristics and organizational support were significant predictors of job engagement; whereas, organizational support and procedural justice were more predictive of organization engagement.

Additionally, Sonnentag (2003) examined the relationship between recovery and work engagement. More specifically, she hypothesised that recovery during leisure time on a specific day would stimulate work engagement and proactive behaviour during the subsequent work day. Results confirmed that day level recovery was positively related to day level work engagement and day level proactive behaviour (personal initiative and pursuit of learning) during the subsequent work day. This finding implies that employees who felt that they had sufficiently recovered during leisure time experienced higher levels of work engagement and showed greater initiative during the subsequent workday.

Finally, recent research indicates that perceptions of organizational justice might have an important bearing on employees' levels of work engagement. Moliner, Martinez-Tur, Ramos, Peiro and Cropanzano (2008) endeavoured to investigate the effects of procedural and interactional justice on work engagement in a sample of 317 contact employees who were working in the Spanish service sector. The results of this study disclosed that both procedural and interactional justice emerged as positive predictors of work engagement. Furthermore, the results showed that work

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engagement fully mediated the effects of the two justice dimensions on extra role customer service. These findings point out that that if the employees are treated fairly and respectfully, they are likely to reciprocate by showing greater energy, enthusiasm and involvement in their work.

3.4.7 Summary

From the above discussion it is clear that job and personal resources are the most important antecedents of work engagement. The results from the studies reviewed above show that the relationship between work engagement and job and personal resources is complex and mutually reinforcing. That is an appropriate supply of job resources such as, performance feedback, job control and coaching and higher levels of personal resources such as, self efficacy can result in stronger work engagement and improved performance. A combination of better performance and greater work engagement is likely to make employees feel more efficacious and may inspire them to create their own resources, which subsequently might enhance their engagement and performance. Moreover, results of previous studies reveal that positive personality traits like extraversion, conscientiousness and the achievement striving component of Type A behaviour can also have a positive impact on employees' engagement with their work. Finally, the findings show that other variables such as, recovery during leisure time and perceptions of organizational justice may also exercise a positive effect on employees' levels of work engagement.

3.5 Consequences of Work Engagement

The importance of work engagement springs from the fact that it can manifest in several positive outcomes for organizations. Previous research indicates that high levels of work engagement can lead to more constructive workplace attitudes and behaviours, improved health and well being and superior performance (Schaufeli and Salanova, 2007). There is substantial evidence that work engagement is positively related to indicators of organizational commitment (Schaufeli and Bakker, 2004; Saks, 2006; Hakanen et al., 2006; Jackson, Rothman, Storm and Vijver, 2006; de Lange et al., 2008; Hakanen, Schaufeli and Ahola, 2008). Halbesleben and Wheeler (2008) argue that engaged employees are generally more committed to their

employing organization and therefore have a lower cognition to turnover because they tend to invest enormous amounts of their time and energy in their jobs and they strongly identify with the work that they do. Furthermore, because the "work has provided so many resources (e.g. flexibility, work-related skills) to the employee, he or she may be reluctant to leave" (Halbesleben and Wheeler, 2008, p. 246).

Additionally, engaged workers have been found to be more satisfied with their jobs than their non-engaged colleagues (Saks, 2006). This finding is not surprising because engaged employees derive meaning and fulfilment from their jobs and therefore are more satisfied than their non engaged counterparts.

Moreover, there is evidence that work engagement might have a positive influence on employees' health and well being. For instance, Hallberg and Schaufeli (2006) in their study on Swedish information communication consultants found that work engagement was negatively and significantly correlated with health complaints such as emotional exhaustion, cynicism, depressive symptoms, somatic complaints and sleep disturbances. In a similar vein, Schaufeli, Taris and Rhenen (2008) uncovered that work engagement was negatively and significantly related to distress and depression. Since engaged employees have the ability to cope well with the demands in their work environment, they are liable to experience less stress and as a result enjoy good health and well-being.

Furthermore, previous research indicates that engaged workers exhibit personal initiative, proactive behaviour and learning motivation (Sonnentag, 2003; Salanova and Schaufeli, 2008, Hakanen et al., 2008). More specifically, Sonnentag (2003) showed that work engagement mediated the effects of recovery on two dimensions of proactive behaviour, that is, personal initiative and pursuit of learning. This finding implied that recovered employees not only feel more engaged the next day, they also exhibit more initiative at work. Salanova and Schaufeli (2008) also revealed that work engagement mediates the relationship between job resources (control, feedback and variety) and proactive behaviour in a Dutch and Spanish sample of employees. Their findings showed that job resources augment work engagement, which in turn spurs the employees to exhibit proactive behaviour at work. Hakanen et al. (2008) uncovered that there was a reciprocal relationship between work engagement and personal initiative. More specifically, they found that work engagement at time 1 had a positive cross lagged effect on personal initiative at time 2 and reciprocally, personal initiative at time 1 had a positive cross lagged

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impact on work engagement at time 2. Hakanen et al. (2008) concluded that "employees with high PI seek and find new challenges in their work and succeed in solving problems efficiently thus achieving good performance, which then fosters feelings of vigour and dedication" (p. 88).

Past empirical research on work engagement has also revealed that engaged employees are likely to go the 'extra mile' for their respective organizations. For instance, Beckers, Van der Linden, Smulders, Kompier, Van Veldhoven and Van Yperen (2004) found that in contrast to non-engaged employees, engaged employees work more overtime. In addition, Bakker, Demerouti and Verbeke, (2004) and Schaufeli, Taris and Bakker, (2006) in their respective studies showed that work engagement was an important predictor of organizational citizenship behaviour, thereby implying that engaged employees are more likely to carry out activities that are not part of their formal role obligations, but nonetheless can play a pivotal role in enhancing the efficiency and effectiveness of the organization (Borman and Motowidlo, 1997).

Finally and perhaps most importantly, previous research provides ample evidence that work engagement can have a positive impact on performance in different contexts. For example, Salanova, Agut and Peiro (2005) conducted a study among employees working in Spanish restaurants to ascertain the impact of organizational resources, work engagement and service climate on employees' performance and customer loyalty. The results showed that organizational resources and work engagement predicted service climate, which subsequently manifested in improved employee performance (as assessed by customers) and stronger customer loyalty.

Harter et al. (2002) showed that employee engagement was related to a range of business outcomes such as higher levels of productivity, profitability, customer satisfaction and loyalty, safety and lower staff turnover across almost 8,000 business units of 36 companies. On the basis of these results the authors concluded that engagement "is related to meaningful business outcomes at a magnitude that is important to many organizations" (p. 276). Furthermore, Schaufeli, Taris and Bakker (2006) in their study among Dutch employees drawn from a wide range of occupations uncovered that work engagement was positively related to all three performance indicators, that is, in-role job performance, extra-role performance and innovative work behaviour. In addition, Xanthopolou et al. (2009b, 2008) showed that

work engagement was a significant predictor of financial returns and in-role job performance respectively.

Bakker (2009) in his recent review posited four possible reasons why engaged employees might perform better than their non-engaged counterparts. First, engaged employees enjoy good health and well being, which allows them to drive greater energies into their work roles and as a result can lead to better performance. Second, engaged employees are most likely to experience positive emotions such as happiness, joy and enthusiasm, which might broaden their momentary thought-action repertoire (Fredrickson, 2001) and build their personal resources through widening the array of thoughts and actions that come to mind. Higher personal resources such as stronger sense of self efficacy may in turn, manifest in superior performance. Third, since engaged employees are intrinsically motivated to achieve their work goals (Schaufeli and Salanova, 2007), they might be more inclined to create or mobilize resources, by for example, asking for instrumental help from their colleagues and supervisor. Access to more resources subsequently can amplify performance. Finally, there is evidence that work engagement may crossover among individuals (Bakker, Demerouti and Schaufeli, 2005; Bakker, Emmerik and Euwema, 2006). Thus, it is plausible that engaged employees' optimism, positive attitudes and proactive behaviours might rub on to their team members and as a result they may perform more effectively as a team (Bakker, 2009; Bakker and Demerouti, 2008; Bakker et al., 2008).

The research evidence reviewed in the preceding paragraphs provides ample testimony to the fact that an engaged workforce can make a significant contribution to a firm's bottom line. Thus, organizational leaders should strive to create conditions, which can enhance employees work engagement. For example, organizational leaders can promote work engagement by reviewing the effectiveness of processes such as performance feedback, social support, autonomy, reward systems and career development opportunities (Bakker et al., 2008). Additionally, employees' levels of work engagement may be increased by strengthening their sense of self-efficacy through appropriate training methods such as guided experiences, coaching and mentoring and role modelling (Llorens et al., 2007).

3.6 Daily Engagement

Empirical studies on work engagement have pre-dominantly adopted a between-person design, which aims to ascertain why some individuals are more engaged and as a result perform better, why other individuals are non-engaged and therefore perform poorly. However, recently researchers have started to study the within-person design, which seeks to determine as to why a particular individual feels highly engaged on certain days but lacks energy, passion and enthusiasm on others. In other words researchers who explore the concept of daily engagement argue that work engagement within individuals might fluctuate over time (Sonnentag, 2003). More specifically, they contend that daily fluctuations in people's work environment can have a bearing on their daily levels of vigour, dedication and absorption (Bakker, 2009).

Three studies to-date have provided evidence that peoples' daily levels of work engagement can vary with daily changes in their work environment. For instance, Sonnentag (2003) sought to examine the impact of recovery during leisure time on work engagement and proactive behaviour during the subsequent work day. A total of 147 employees completed a questionnaire and a daily survey over a period of five consecutive work days. Her results showed that, as hypothesised, day level recovery was positively related to day level work engagement and day level proactive behaviour during the subsequent work day.

In a study among flight attendants, Xanthopolou, Huven, Demerouti and Bakker (2008) aimed to investigate the impact of daily fluctuations in job resources (colleague support) on the daily levels of work engagement through daily levels of self efficacy. Forty-four flight attendants filled in a questionnaire and a dairy booklet before and after consecutive flights to three intercontinental destinations. The results revealed that colleague support had significant unique effects on work engagement and self efficacy. However, as hypothesised self efficacy did not mediate the relationship between colleague support and work engagement. However, work engagement mediated the effects of self efficacy on in-role and extra role performance. Furthermore, colleague support exercised an indirect effect on in-role performance through work engagement.

Finally, Xanthopolou, Bakker, Demerouti and Schaufeli (2009b) explored the effects of daily fluctuations in job resources (autonomy, coaching and team climate)

on employees' daily levels of personal resources (self-efficacy, organizational based self esteem and optimism) work engagement and financial turnover. Forty-two employees working in three branches of a fast food company completed a questionnaire and a dairy booklet over five consecutive days. The results disclosed that day level job resources positively influenced day level work engagement through the mediating mechanism of day level personal resources. Furthermore, it was found that day level coaching had a direct effect on day level engagement, which in turn was positively related to daily financial returns.

3.7 Crossover of Work Engagement

As noted above, there is evidence to suggest that work engagement might be "contagious" and therefore may transfer or crossover among individuals (Bakker, Schaufeli, Demerouti and Euwema, 2006). The process of crossover or transmission is said to occur when psychological well being or strain experienced by one person affects the level of well being or strain of another person (Bakker and Demerouti, 2008; Bakker and Demerouti, 2009; Westman, Etzion and Chen, 2009). It is suggested that the process of crossover can take place through three possible mechanisms (Bakker and Demerouti, 2009; Westman et al., 2009). The first, mechanism is known as empathic crossover, in which stresses and strains are transmitted from one partner to another directly as a result of empathetic reactions. In this process individuals place themselves psychologically in the circumstances of others and try to imagine how they would feel if they were confronted with similar situations and as result they start experiencing the same feelings and emotions.

The second mechanism involves common stressors affecting both partners. According to Westman et al. (2009) the common stressors afflicting both the partners will impact the strain of these partners and the resemblance in strain will appear as crossover. This should, therefore, be deemed as a spurious case of crossover.

Finally, Bakker and Demerouti (2009) and Westman et al. (2009) argue that crossover of strain may be a transmission mediated by interpersonal exchange. Thus, "an increase in the strain of one partner is likely to trigger a provocative behaviour or exacerbate a negative interaction sequence with the other partner, often expressed as social undermining [i.e. expressing negative affect or conveying negative evaluation

or criticism] and perceived as such by the partner at whom this behaviour this directed" (Westman et al., 2009, p. 270).

Four studies to-date have provided empirical evidence that engagement can crossover from one person to another. First, Bakker, Demerouti and Schaufeli (2005) conducted a study among 323 working couples and tested the hypothesis that work engagement may crossover from husbands to wives and vice versa. The results of this study showed that wives' level of vigour and dedication uniquely contributed to husbands' level of vigour and dedication and husbands' level of vigour and dedication uniquely contributed to wives' level of vigour and dedication after controlling for important characteristics of the work and home environment.

In the second study Bakker, Emmerik and Euwema, (2006) in their study among 2,229 officers working in one of 85 teams, examined whether work engagement can crossover from teams to individual team members. The results of the multilevel analyses confirm this crossover phenomenon by showing that team level work engagement is related to individual team members work engagement (vigour, dedication and absorption) after controlling for individual members job demands and resources. This finding implied that "engaged workers who communicated their optimism, positive attitudes and proactive behaviours to their colleagues, created a positive team climate, independent of the demands and resources they were exposed to" (Bakker and Demerouti, 2008, p. 217).

Although, the studies mentioned above, provide compelling evidence that work engagement can crossover from one individual to another, they do not highlight the underlying processes through which this crossover takes place. Bakker and Demerouti (2009) sought to fill this gap by examining the role of empathy in the crossover of women's work engagement to their men's work engagement in a sample of 175 Dutch women and their partners working in different occupational sectors. These researchers identified two dimensions of empathy: perspective taking (i.e. the spontaneous tendency of people to adopt the psychological perspective of their partners) and empathic concern (i.e. an individual's tendency to experience feelings of warmth, compassion and concern for others). More specifically, these researchers hypothesised that both dimensions of empathy will moderate the relationship between women's and men's work engagement, such that the crossover of engagement will be stronger when men are characterised by high levels of perspective taking and empathetic concern. The results revealed that work engagement did indeed cross over

between partners. In addition, the perspective taking dimension of empathy moderated the relationship between women's and men's work engagement; whereas, empathetic concern did not moderate the crossover effect. This finding suggested that work engagement was most likely to crossover when men were characterised by a spontaneous tendency to adopt the psychological perspective of their partners. Furthermore, the results disclosed that women's work engagement indirectly affected men's in-role and extra role performance through its influence on men's work engagement.

Finally, Westman et al. (2009) conducted a study among business travellers and their spouses to ascertain if there was a crossover of vigour from business travellers to their spouses. They rationalised that business trips by providing opportunities for personal growth and by offering temporary respite from the workplace may increase business travellers' levels of vigour, which in turn, may crossover to their spouses. The results of the structural equation modelling showed that, as hypothesised, travellers' vigour crossed over to spouses' vigour.

3.8 Can Work Engagement be differentiated from other Established Concepts?

The concept of work engagement has been criticised by several researchers recently on the grounds that it reflects an amalgamation of more established constructs such as organizational commitment, job satisfaction and job involvement and therefore is "redundant" or what some might call "old wine in a new bottle" (Newman and Harrison, 2008; Saks, 2008). Macey and Schneider (2008) argue that although the construct of work engagement seems to have some conceptual overlap with older constructs of commitment, satisfaction and involvement, these concepts do not adequately capture the feelings of energy, enthusiasm and passion which are central to the concept of work engagement. These authors further contend that "it is the sense of energy and enthusiasm in engagement that makes the construct different, and this is what executives wish to capture" (p. 24).

Furthermore, in an important study, Hallberg and Schaufeli (2006) sought to empirically differentiate engagement from organizational commitment and job involvement. Using confirmatory factor analysis these researchers established that engagement, commitment and involvement were three distinct constructs. Although they were found to be closely related concepts, it was demonstrated that they only

share between 12% and 21% of the variance. This supports the notion that work engagement, organizational commitment and job involvement represent three distinct psychological states.

In addition, it was revealed that these three constructs exhibited different patterns of relationship with other variables such as health complaints, job characteristics, motivation and turnover intentions. More specifically it was found that work engagement demonstrated stronger and more consistent associations with health complaints and that this was the most important conceptual aspect which separated engagement from organizational commitment and job involvement. Organizational commitment was also related to health complaints measures, but its relationship was comparatively weaker whereas job involvement was unrelated to these measures. In addition, the two job factors, autonomy and feedback were found to be more closely related with engagement and organizational commitment as opposed to job involvement. Intrinsic motivation was only related to job involvement; whereas, organizational commitment had the strongest relationship with turnover intentions. On the basis of this evidence it can be concluded that work engagement, organizational commitment and job involvement are three distinct constructs and that it is the health aspect of work engagement which differentiates it from the other two constructs.

Furthermore, work engagement has also been differentiated from workaholism. Workaholism "is the irresistible inner drive to work very hard: that is workaholics work excessively and compulsively" (Schaufeli and Salanova, 2007, p. 147). Schaufeli, Taris and Bakker (2006) illuminate three distinct characteristics of workaholics. First, workaholics tend to spend excessive amount of their time in work activities when given the chance to do so. This implies that workaholics are excessively hard workers. Second, workaholics find it extremely difficult to psychologically disengage from work even when they are not working. In other words, workaholics are obsessed with their work and can be regarded as compulsive workers. Finally, the third unique feature of workaholics is that they work beyond what is expected from them to meet organizational or economic requirements. This suggests that workaholics "work harder than is required out of an inner compulsion, need or drive and not because of external factors such as financial rewards, career perspectives, a poor marriage or organizational culture" (Schaufeli et al., 2006, p. 196).

Like workaholics, engaged employees also work hard and they are also fully engrossed in their work. However, the difference between the two types of workers stems from the fact that engaged employees work hard and are highly involved in their work activities because they enjoy their work; whereas, workaholics work hard because they are driven by a strong inner drive, which they find hard to resist (Schaufeli et al., 2006; Schaufeli, Taris and Rhenen, 2008).

Two empirical studies have provided empirical evidence that suggests that workaholisim and work engagement are two distinct constructs. Schaufeli, Taris and Bakker (2006) demonstrated that the two dimensions of workaholism, working excessively and working compulsively were highly inter-related and were distinguishable from work engagement. Furthermore, it was shown that work engagement was more strongly and positively related to all indicators of health and well-being and job performance, which further lent support to the notion that work engagement and workaholism are two different forms of well being.

In a related vein, Schaufeli, Taris and Rhenen (2008) uncovered, that work engagement can be discriminated from both burnout and workaholism. These authors proved that engagement, burnout and workaholism are three unique constructs. In addition, this study showed that workaholism, burnout and engagement each demonstrated a unique pattern of relationships with variables representing working long hours, job characteristics, work outcomes, social relationships and perceived health. More specifically, it was found that managers high on burnout and workaholism suffered from poor health, they had poor social relationships, and they worked in demanding jobs with poor resources. However, unlike managers who were high on burnout, workaholic managers worked long hours and were more committed to their organization. In contrast, the engaged managers enjoyed good health and well being, developed high quality social relationships, worked in resourceful jobs and experienced higher levels of job satisfaction. Nonetheless, like workaholics, engaged managers also worked long hours and were committed to their organization.

Finally, research evidence indicates that work engagement can be distinguished from job embeddedness (Halbesleben and Wheeler, 2008). Job embeddedness refers to the combined forces that prevent individuals from leaving their job. Using a sample of US employees drawn from a wide variety of industries, Halbesleben and Wheeler (2008) showed that engagement and embeddedness were two distinct constructs. In addition, the results of this study revealed that both these

constructs exhibited a distinct pattern of relationship with measures of in-role job performance and turnover intentions. Work engagement seemed more closely related to measures of in-role job performance and was found to be unrelated to turnover intentions. In contrast, embeddeness had a significant association with turnover intentions, while its effect on in-role job performance was slightly weaker than that of work engagement.

In sum, the above discussion provides substantial evidence that work engagement is an independent construct, which is important in its own right. Furthermore, it appears that its close association with health and well being and the fact that it connotes energy, enthusiasm and involvement are the two most critical aspects, which separate it from other related constructs like commitment, job involvement, burnout and workaholism.

3.9 Dark Side of Work Engagement

Although previous research shows that high levels of work engagement can manifest in several important outcomes for organizations, the question is that is excessive engagement always good? Is there a dark side to work engagement? Bakker (2009) in his comprehensive review argues that "over-engagement" can result in negative consequences for individuals and organizations. More specifically, Bakker (2009) contends that the absorption dimension of work engagement in particular can have detrimental effects on individuals. Employees who are deeply engrossed in their work might forget to rest and recover, which in turn can have deleterious effects on their health and well being. Sonnentag, Mojza, Binnewies and Scholl (2008) also echo the same thoughts. These researchers assert that engagement can be mentally and physically draining and as a result it is imperative that engaged employees psychologically detach themselves from work during off-job time in order to replenish their energies. In fact Sonnentag et al. (2008) empirically demonstrate that "a balance between high engagement at work and high disengagement from work during non-work time is highly relevant for protecting employees' well-being" (p. 270).

Furthermore, Britt (2003) explored the negative consequences of high levels of engagement in situations where individuals face stiff challenges to do their jobs effectively. In a study among army rangers, Britt (2003) found that as expected,

impediments to high performance such as, work overload had adverse effects on the morale and job satisfaction of the rangers. However, these effects were more pronounced for the most highly engaged soldiers. More particularly, Britt reported that the highly engaged rangers, who cared most about their work, were the most demoralized when they were "thwarted" from doing their best. These findings suggest that in certain situations it is plausible that high engagement may lead to negative consequences.

Thus, in view of this evidence, it is speculated that there may be an "optimum" level of work engagement; a departure from this point may result in negative consequences for both the individual and the organization. However, more empirical research is needed to test the downside of work engagement.

3.10 Summary

The purpose of this review was to examine some of the recent empirical advances in the area of work engagement. The chapter commenced by reviewing the job demands-resources model, which posits that job demands and job resources evoke two psychological processes: (1) a health impairment process, in which high job demands lead to burnout and negative outcomes such as, ill health; and (2) a motivational process, in which the availability of job resources manifests in positive outcomes such as, high performance and commitment through work engagement. This model also proposes that job resources can buffer the impact of job demands on work engagement and these resources typically acquire salience when job demands are high.

Furthermore, the review of the relevant literature showed that job resources and personal resources are the most important drivers of work engagement. In addition, this chapter disclosed that work engagement, job resources and personal resources are interlocked in a complex mutually reinforcing relationship and can reciprocally affect each other over time. Research evidence also suggests that work engagement might be positively influenced by personality characteristics such as, extraversion and conscientiousness and perceptions of organizational justice. Moreover, there is mounting empirical evidence, which indicates that high levels of work engagement can translate into positive outcomes such as, better performance,

low absenteeism and turnover rates, improved health and well being and more positive attitudes and behaviours at the work place.

This review also revealed that work engagement is not static and consequently can fluctuate within individuals because of daily changes in their work environment. Furthermore, previous research shows that work engagement is contagious and therefore, is likely to crossover from one individual to another directly as a result of empathetic reactions. Quite importantly, it has also been empirically demonstrated that work engagement can be distinguished from more established constructs such as, organizational commitment, job involvement, burnout, workaholism and job embeddedness. These findings reinforce the notion that work engagement is an independent construct, which is important in its own right.

Finally, the chapter reviewed the dark side of work engagement and concluded that excessive engagement can prove to be harmful and therefore, has the potential of converting into negative consequences for both the individual and the organization. Thus, organizations need to take pertinent steps to curb 'over engagement'.

3.11 Potential Gaps in the Engagement Literature

In spite of the growing number of studies, which have started to examine the concept of work engagement, there are still quite a few gaps within the engagement literature, which demand attention. First, as mentioned above, work engagement has been mainly expressed as a product of job and personal resources. Therefore, there is a growing need to explore the impact of a wider range of predictors on work engagement in order to acquire a deeper insight into this concept.

Second, bulk of the research on work engagement has mainly investigated its impact on outcomes such as, organizational commitment, job satisfaction, turnover intentions and organizational citizenship behaviour. Thus, in order to further reaffirm the importance of work engagement as a critical determinant of organizational effectiveness, it is essential to examine its effects on a broader range of outcome variables.

Third, although an increasing number of studies have provided evidence that work engagement can positively influence important organizational outcomes, much less is known about the mechanisms through which work engagement affects these

outcomes. Consequently, there is a need to identify appropriate mediating variables, which link engagement to organizational outcomes.

The present study seeks to fill these gaps in the literature. First, it attempts to contribute to the developing engagement literature by exploring the relationship between work engagement and trust. More specifically, the first objective of this study is to demonstrate the significant effects of both state (trust in top management, trust in direct supervisor and trust in team members) and trait trust (trust propensity) on work engagement. Although, recently Macey and Schneider (2008) have highlighted the importance of trust in promoting work engagement, no previous study to the best of my knowledge, has empirically investigated the relationship between these two constructs.

In addition, this study also attempts to illuminate the mechanisms through which each type of state trust affects researchers' engagement with their work. Thus, the second aim of this study is to determine whether or not: (1) organizational identification mediates the relationship between trust in top management and work engagement; (2) affective commitment to the supervisor mediates the effects of trust in direct supervisor on work engagement; and (3) team psychological safety mediates the relationship between trust in team members and work engagement.

The third objective of the current study is to examine the effects of work engagement on a variety of organizational outcomes such as, self-rated in-role job performance, innovative work behaviour, two learning behaviours, namely feedback seeking and error communication and organizational commitment. Although, previous studies have explored the impact of work engagement on in-role job performance, innovative work behaviour and organizational commitment, no study to the best of my knowledge has investigated the effects of work engagement on feedback seeking and error communication. Thus, by examining the impact of work engagement on learning behaviour, this study strives to further enhance the importance of work engagement as an important driver of organizational success.

Finally, this research attempts to extend the engagement literature by exploring the role of learning goal orientation in the engagement-organizational outcomes relationship. More particularly, this study postulates that learning goal orientation will at least partially mediate the relationship between work engagement and five organizational outcomes: self-rated in-role job performance, innovative work behaviour, feedback seeking, error communication and organizational commitment.

By examining the mediating role of learning goal orientation in the engagement – outcomes relationship, this research seeks to offer useful insights into the underlying processes thorough which engagement can affect the five outcome variables included in this study.

On the basis of these four objectives, the following hypotheses were formulated and subsequently tested:

Hypothesis 1a: Researchers' trust in top management is positively associated with their work engagement

Hypothesis 1b: Researchers' trust in direct supervisor will be positively associated with their work engagement

Hypothesis 1c: Researchers' trust in their team members will be positively associated with their work engagement

Hypothesis 1d: Researchers' trust propensity will be positively associated with their work engagement

Hypothesis 2a: Researchers' organizational identification will mediate the effects of trust in top management on work engagement

Hypothesis 2b: Researchers' affective commitment to the supervisor will mediate the effects of trust in direct supervisor on work engagement

Hypothesis 2c: Team psychological safety will mediate the effects of trust in team members on work engagement

Hypothesis 3a: Researchers' work engagement will be positively associated with their in-role job performance

Hypothesis 3b: Researchers' work engagement will be positively associated with their innovative work behaviour

Hypothesis 3c: Researchers' work engagement will be positively associated with seeking feedback for self improvement

Hypothesis 3d: Researchers' work engagement will be positively associated with error communication

Hypothesis 3e: Researchers' work engagement will be positively associated with their organizational commitment

Hypothesis 4a: Researchers' learning goal orientation will at least partially mediate the effects of work engagement on in-role job performance

Hypothesis 4b: Researchers' learning goal orientation will at least partially mediate the effects of work engagement on innovative work behaviour

Hypothesis 4c: Researchers' learning goal orientation will at least partially mediate the effects of work engagement on seeking feedback for self improvement

Hypothesis 4d: Researchers' learning goal orientation will at least partially mediate the effects of work engagement on error communication

Hypothesis 4e: Researchers' learning goal orientation will at least partially mediate the effects of work engagement on organizational commitment

The proposed relationships are presented in Figure 3.3 below:

FIGURE 3.3
Research Model
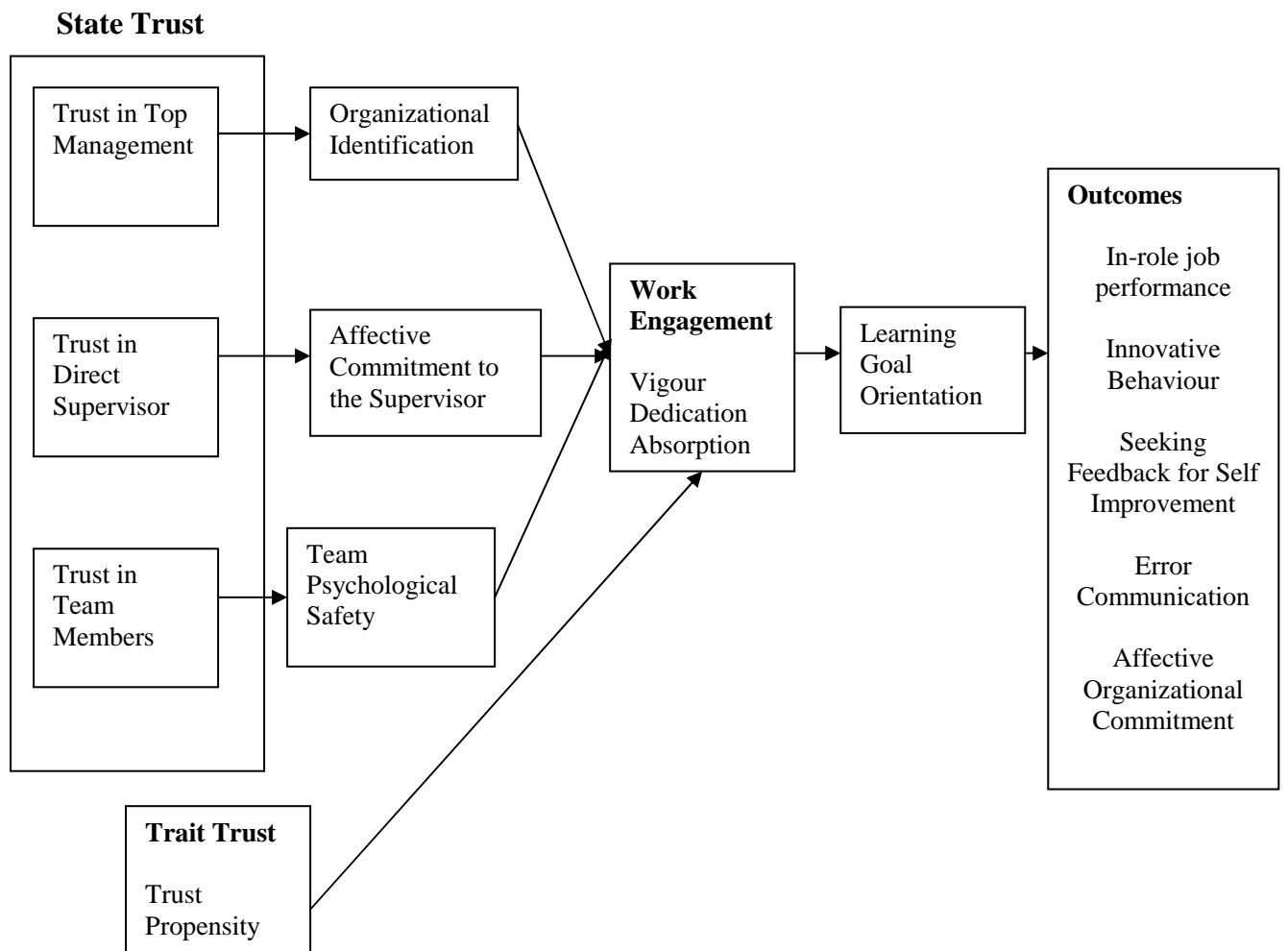
CHAPTER 4

Organizational Trust: Theoretical Developments and Debates

4.1 Introduction

The review of literature pertinent to organizational trust has been divided into two distinct chapters. This chapter reviews the theoretical basis and developments in the area of organizational trust, while the next chapter examines the more applied trust research such as, its measurement, antecedents and consequences.

This chapter commences with an examination and review of the different approaches and definitions of organizational trust. On the basis of this review it is concluded that the psychological approach to organizational trust depicts the most robust conceptualization of this construct. The chapter then proceeds to explore how trust is derived. Specifically, it reviews the various bases of trust, that is, deterrence based trust, knowledge based trust and identification based trust. The review of the relevant literature in this area reveals that trust develops slowly over time and can transform from calculus-based to knowledge-based to identification-based trust. However, several researchers have challenged this assertion and have argued that it is possible for relationships to begin with a relatively high level of initial trust. Thus, the next section reviews the models of high initial trust proposed by McKnight, Cummings and Chervany (1998) and Meyerson, Weick and Kramer (1996). The chapter then advances to review the debate relating to trust and distrust. The research in this area reveals that there are two different view points pertaining to this issue. One school of thought suggests that trust and distrust are two distinct constructs and it is possible for the two to co-exist within the same relationship. In contrast, other researchers argue that trust and distrust are two opposite poles of the same continuum. After reviewing the relevant research in this area it is concluded that more research is needed to establish if trust and distrust are each others direct opposites or two distinct and independent constructs. Finally, the chapter concludes by examining the nature and differences between the three foci of trust, namely, top management, direct supervisor and team members. The literature in this area suggests that trust in top management, trust in direct supervisor and trust in team members are three distinct constructs, each having different antecedents and consequences.

4.2 Approaches to Trust

A review of the extant trust literature reveals that trust has been predominantly conceptualised in three ways: (1) a relatively stable personality characteristic (Rotter, 1967, 1971, 1980); (2) a choice behaviour such as, cooperative choices in a game (Hardin, 1993; Williamson, 1981); and (3) a psychological state, which defines trust in terms of beliefs, intentions and affect (Mayer, Davis and Schoorman, 1995; Rousseau, Sitkin, Burt and Camerer, 1998). These approaches are discussed in the ensuing paragraphs.

4.2.1Trust as a Personality Characteristic

According to personality-based trust researchers, trust refers to "a generalised expectancy held by an individual that the word, promise, oral or written statement of another individual or group can be relied on" (Rotter, 1967, p. 651). Rotter (1980) views trust as a relatively stable personality trait, which reflects a general tendency to trust or distrust a person or a group with whom one has not had a great deal of personal interaction. Mayer et al. (1995) labelled this trait as propensity to trust and refer to it as the "general willingness to trust others" (p. 715). Building on Rotter's work, McKnight, Cummings and Chervany (1998) propose that trust propensity consists of two components: faith in humanity and trusting stance. Faith in humanity means that one assumes that generally people are reliable and have good intentions. Trusting stance on the other hand is more like a personal strategy and means that one assumes that irrespective of the fact whether people are honest and reliable, one will achieve better outcomes by dealing with people as though they were well-intentioned and dependable. Mooradian, Renzl and Matzler, (2006) conclude that trust propensity is "neither focussed on specific others, nor dependent on specific contexts and it is not only related to lifetime experiences but also to temperament, and thereby to genetics and bio-physiological structure", (p. 525).

Rotter (1980) contends that people differ in their propensity to trust others. Life experiences, personality types, cultural background, education and several other socio-economic factors determine one's propensity to trust (Mayer et al., 1995). Mooradian et al. (2006) report that individuals with a high propensity to trust believe that most people are generally sincere, fair and have good intentions; whereas, people

who have a low propensity to trust, see others as self-centred, conniving and potentially harmful.

Trust propensity is expected to be an important driver of trust in novel and ambiguous situations prior to the availability of information about the trustee (Rotter, 1980; Mayer et al., 1995; McKnight et al., 1998; Bigley and Pierce, 1998). However, once people get more familiar with each other and acquire more knowledge about each other, the impact of trust propensity on trust is likely to diminish.

Previous research shows that a high propensity to trust others can yield several benefits for the individuals and the organizations. For instance, Rotter (1980) argues that individuals' tendency to trust others can be beneficial for both the society and as well as the individuals themselves. More particularly, Rotter (1980) in his research found that high trustors are less likely to cheat and lie and more likely to respect the rights of others. Moreover, high trustors are less likely to be unhappy, conflicted or mal-adjusted and are more likely to be liked by others and sought out as a friend by others. Furthermore, McKnight et al. (1998) posit that trust propensity has recently acquired more importance because cross functional teams, structural re-organizations and joint ventures create new working relationships more frequently. In these circumstances an individual's trust propensity is likely to be particularly important because it can prove to be an important driver of trust in new and unfamiliar surroundings. Finally, Colquitt, Scott and LePine (2007) in their meta-analytic study found that trust propensity was positively associated with task performance and citizenship behaviour and was negatively related to counterproductive behaviour.

However, the trait approach to trust suffers from two drawbacks. First, by assuming that trust is a relatively stable personality trait, it suggests that trust is static and once developed, it tends to remain relatively stable. However, recent evidence indicates that trust is dynamic and as relationships evolve overtime, the nature of trust itself can transform (Lewicki and Bunker, 1996). Second, Tan and Lim (2009) have criticized this approach on the ground that it makes a general assessment of the trustworthiness of others and therefore, does not capture the "situation-and person-specific natures of the relation" (p. 48). Tan and Lim (2009) argue that people consciously ascertain the level of their relationship with others on the basis of the task, the situation and the referent. For instance, a manager might trust his subordinate to meet deadlines but may not be willing to share sensitive personal information with him. Tan and Lim (2009) conclude that it is therefore, quite "unlikely that people

would display the same level of innate trust that is independent of the environment and the referent" (p. 48).

4.2.2 Trust as a Choice Behaviour

The behavioural approaches to trust are "grounded in observable choices made by an actor in an interpersonal context" (Lewicki, Tomlinson and Gillespie, 2006, p. 993). The most influential definition of trust within this approach has been advanced by Deutsch (1958) postulating that "an individual may be said to have trust in the occurrence of an event if he expects its occurrence and his expectation leads to behaviour which he perceives to have greater negative motivational consequences if the expectation is not confirmed than positive motivational consequences if it is confirmed" (p. 266). He primarily examined trust using mixed-motive games in laboratory experiments with players who did not have any prior knowledge about each other. Researchers who study trust within the behavioural tradition argue that cooperative behaviour on part of the actors is the main determinant of trust. The trustor needs to decide that to what extent he or she should cooperate with the trustee. In addition, it is expected that the trustor will make the decision to cooperate or not logically and wisely. Axelord's (1984) simulation of cooperation in two-person games presents a good example of how trust develops with cooperation in repeated games. Two players, who do not know each other, choose in each game to cooperate or not. Both players get a high pay off if they both cooperate and get a low pay off if they both decide not to cooperate. The pay off is maximum if one player cooperates and the other decides not to cooperate. In this situation the person who cooperates gets the "sucker pay off"; whereas the person who chooses not to cooperate gets the maximum pay off (Burt and Knez, 1996). This game situation entails risk because the players have to decide whether to cooperate or not before knowing what the other will do. Thus, from this view point the decision on part of the players to cooperate reflects a decision to trust. In other words, the behavioural approach regards trust as "anticipated cooperation" (Burt and Knez, 1996). In game situations, trust is signified by the cooperative moves made by the participants; whereas, distrust is signalled via competitive moves. Thus, in this tradition trust is mainly contingent on the choice to cooperative or not to cooperate.

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The bulk of the work in the behavioural tradition suggests that trust increases incrementally over time in response to other's choice to reciprocate the cooperative action undertaken by the trustor. In contrast, there is a substantial decline in the level of trust if the trustee does not reciprocate the cooperative behaviours exhibited by the trustor. According to Hardin (1993) people use a "commonsense" Bayesian-like decision making process to carefully analyze all the available trust related information in order to make sure that the trusting choices are prudently made; and they promptly withdraw trust if they feel it has been misplaced. The operational level of trust is often ascertained "from either the proportion of cooperative choices or the long term behaviour patterns of those who chose to cooperate" (Lewicki et al., 2006, p. 995). In other words, a high number of cooperative choices are indicative of high levels of trust; while, a relatively low number of cooperative choices are reflective of low levels of trust. Since trust is expressed as an outcome of cooperative behaviour, any shift in individuals' levels of cooperation will bring about changes in their levels of trust. Such shifts in trust can occur not only "from responses to other's defection" but may also take place because of factors not linked to trust in others, such as decision error or boredom (Lewicki et al., 2006).

However, Kramer (1999) has criticized the behavioural models of trust on two grounds. First, he notes that although the behavioural approach provides a useful framework for analyzing how individuals make decisions about trust from a normative or prescriptive point of view, "its adequacy as a descriptive account of how people actually make decisions about trust" (p. 573) is open to question. More specifically, Kramer (1996) contends that many of the assumptions of the rational choice models, on which the behavioural approach to trust is based, are empirically unsound. March (1994, cited in Kramer, 1996) asserts that "rational choice models overstate decision makers' cognitive capacities, the degree to which they engage in conscious calculation, and the extent to which they possess stable values and orderly preferences" (p. 573). Second, Kramer (1996) argues that another drawback of the behavioural approach, which assumes that individuals make rational choices, is that it is overly cognitive in nature and as a result ignores the impact of emotional and social influences on trust decisions. Granovetter (1985, cited in Kramer, 1996) very appropriately concludes that the behavioural models of trust provide at best "an under socialized conception of trust" (p. 573).

In sum, the behavioural approach is too narrow a view of trust because it purely focuses on the cognitive basis of trust and fails to take into account the social and emotional influences on trust assessment. Thus, it is reasonable to conclude that this approach does not capture the complete essence of the concept of trust.

3.2.3 Trust as a Psychological State

Scholars and researchers now widely concur that trust is a psychological state (Kramer, 1999). As a psychological state, trust has been defined and conceptualised both as a unidimensional and a multi-dimensional construct. Some of the most widely cited unidimensional defintions of trust include:

- 'The extent to which one is willing to ascribe good intentions to and have confidence in the words and actions of other people' (Cook and Wall, 1980, p. 39).

- Trust refers to the "undertaking of a risky course of action on the confident expectation that all persons involved in the action will act competently and dutifully" (Lewis and Weigert, 1985, p. 971).

- 'A willingness to rely on an exchange partner in whom one has confidence' (Moorman, Zaltman and Deshpande, 1992, p. 315).

- 'Optimistic expectation about the outcome of an event under conditions of personal vulnerability' (Hosmer, 1995, p. 399).

- 'Trust is the willingness of a party to be vulnerable to the actions of another party based on the expectation that the other will perform a particular action important to the trustor, irrespective of the ability to monitor or control the other party', (Mayer, Davis and Schoorman, 1995, p. 712).

- 'Trust is one's expectations, assumptions, or beliefs about the likelihood that another's future actions will be beneficial, favourable or at least not detrimental to one's interests' (Robinson, 1996, p.576).

- 'Trust is a psychological construct, the experience of which is the outcome of the interaction of people's values, attitudes and moods and emotions', (Jones and George, 1998, p.532).

- Trust refers to 'confident positive expectations regarding another's conduct', (Lewicki, McAllister and Bies, 1998, p. 439).

- 'Trust is a psychological state comprising the intention to accept vulnerability based upon positive expectations of the intentions or behaviour of another', (Rousseau, Sitkin, Burt and Camerer, 1998, p. 395).

In contrast, some scholars endeavour to capture the intricacies of trust with explicitly multi-dimensional definitions which highlight the different aspects of a trusting relationship. These definitions reflect the willingness of the trustor to depend on the trustee after having taken into consideration the personal characteristics of the trustee (McKnight and Chervany, 2001). Examples of multi-dimensional definitions of trust include:

- 'An individual's belief or a common belief among a group of individuals that another individual or group (a) makes good-faith efforts to behave in accordance with any commitments both explicit and implicit, (b) is honest in whatever negotiations preceded such commitments, and (c) does not take excessive advantage of another even when the opportunity is available' (Cummings and Bromily, 1996, p. 303).

- 'Trust is one party's willingness to be vulnerable to another party based on the belief that the latter party is (a) competent, (b) reliable, (c) open and (d) concerned', (Mishra, 1996, p. 265).

- 'Trust is one party's willingness to be vulnerable to another party based on the confidence that the later party is (a) benevolent, (b) reliable, (c) competent, (d) honest and (e) open' (Tschannen-Moran and Hoy, 2000, p. 556).

Although the proponents of the psychological approach have defined trust in many different ways, Rousseau et al. (1998) have noted several similarities amongst these diverse definitions. They argue that these definitions generally reflect three important facets of trust. First, trust in another party reflects an expectation or belief that the other party will act compassionately. Second, one cannot control or force the other party to fulfil this expectation; thus, trust involves a willingness to be vulnerable and entails a risk that the other party may not fulfil that expectation. Third, trust involves some level of dependency on the other party, which implies that the interests of one party cannot be achieved without reliance on the other. These three features, that is, expectations or beliefs, a willingness to be vulnerable and interdependence are the major dimensions of trust within organizations.

Similarly, Lewicki et al. (2006) have identified two critical elements, which appear to be central to most definitions of trust, namely, positive expectations and willingness to accept vulnerability. Positive expectations are confident beliefs held by the trustor that the trustee is efficacious, reliable and compassionate. On the other hand, a willingness to accept vulnerability reflects trustor's intention to take a risk by placing his or her welfare in the hands of the trustee.

Moorman, Zaltman and Deshpande (1992) also echo the same thoughts and argue that "without vulnerability trust is unnecessary because outcomes are inconsequential for the trustor" (p. 315). According to these authors trust is composed of two components. First trust is viewed as a belief, confidence or expectation about an exchange partner's trustworthiness that emanates on the basis of the partner's capability and integrity. Second, trust is viewed as a behavioural intention that reflects a dependence on a partner and therefore, involves vulnerability and uncertainty on part of the trustor. Moorman et al., (1992) conclude that for trust to develop both the belief and behavioural intention components need to be present.

Furthermore, Dietz and Den Hartog (2006) also highlight the belief and behavioural aspects of trust but they go one step further by including trust behaviours as a component of trust. More specifically, they posit that trust can take three forms, namely, belief, decision and action. The belief component reflects the assessment of

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trustworthiness of the trustee. Trustworthiness refers to the evaluation of characteristics and actions of the trustee (Costa et al., 2001). In general the assessment of trustworthiness is based on three primary criteria, that is, benevolence, competence and integrity (Mayer et al., 1995). Other scholars have put forward slightly different criteria for assessing trustworthiness. For instance, Mishra (1996) proposes four dimensions to evaluate the trustworthiness of another party: competence, openness, concern and reliability. Previous research indicates that trustworthiness in the form of beliefs about another party's ability, competence and integrity are major drivers of trust (Mayer et al. 1995). However, it should be noted that although the trustor might consider the trustee to be trustworthy, this does not necessarily mean that the trustor will actually trust the trustee (Dietz and Den Hartog, 2006).

The second component of trust highlighted by Dietz and Den Hartog (2006) is the decision to actually trust the other party. This is the stage at which the trustor will, based on his or her perceptions of trustworthiness of the trustee, make a decision and decide either to place or avoid placing trust in the trustee.

However, this decision to trust reflects only the willingness on part of the trustor to rely on a specific target. To complete the trust process, the trustor must follow through on this decision by engaging in trusting behaviours (Dietz and Den Hartog, 2006). The main distinction between trust and trusting behaviour is that while, trust reflects a generalised behavioural intention to take a risk, trusting behaviours signify actually taking the risk. For instance, an individual may trust his team-mate and thus, may be willing to share sensitive personal information with him or her. However, until the concerned individual actually shares information there is no risk taking. Furthermore, Costa et al. (2001) suggest that trusting behaviours are context specific. For instance, in the contexts of buying and selling relationships, Smith and Barclay (1997), suggest that trust may result in five behaviours: relationship investment, communication openness, acceptance of influence, forbearance from opportunism and control reduction. In contrast, within work teams Costa et al. (2001) propose that cooperation and lack of monitoring are the two behaviours, which are most reflective of trust.

Assessing trust behaviours in a particular context can be useful to learn about another party's motives and intentions and be able to make inferences about trustworthiness of that particular party. This is because, unlike trust, which exists in the mind of the trustor and as a result cannot be readily observed by others, trusting

behaviours (e.g. information sharing) are evident to others and therefore, can prove to be beneficial in evaluation of trustworthiness of the relevant party (Serva, Fuller, Mayer, 2005).

The three approaches of trust discussed in the preceding paragraphs are summarised in Table 4.1.

TABLE 4.1
Theoretical Approaches to Trust

| | | Psychological Approach | |
Trait Approach	Behavioural Approach	Unidimensional	Multidimensional
- Conceptualises trust as a relatively stable individual difference. - Reflects an individual's dispositional tendency to trust others.	- Defines trust as a choice behaviour. - Expresses it as a function of cooperation	- Depicts trust as an amalgamation of beliefs, intentions and emotions. - Highlights two central features of trust: (1) willingness to be vulnerable (2) positive expectations.	- Similar to the unidimensional approach. - However, unlike the unidimensional approach, it explicitly specifies the personal characteristics of the trustee, which engender positive expectations.

In the present study trust is conceptualised as a psychological state, because this is now considered as the dominant approach in this area (Kramer, 1999). Furthermore, previous research shows that trust propensity can also exercise positive effects on organizational behaviour (Colquitt et al., 2007). Thus, in the present study trust propensity is also included as an antecedent of work engagement. In sum, this study seeks to examine the impact of both state and trait trust on researchers' engagement with their research work.

4.3 Definition of Trust for the Present Study

The two most widely cited definitions of trust have been advocated by Mayer et al. (1995) and Rousseau et al. (1998). For instance, Mayer et al. (1995) define trust as "the willingness of a party to be vulnerable to the actions of another party based on the expectation that the other will perform a particular action important to the trustor, irrespective of the ability to monitor or control the other party", (Mayer et al., 1995, p. 712). In a similar vein, Rousseau et al. (1998) suggest that trust is "a psychological state comprising the intention to accept vulnerability based upon positive expectations of the intentions or behaviour of another" (1998, p. 395). Both these definitions highlight the two critical features of trust, namely, positive expectations and a willingness to be vulnerable. However, one major short coming of these definitions is that they remain silent on how the positive expectations are generated. This limitation is overcome by the multi-dimensional definition of trust put forward by Mishra (1996). Mishra (1996) defines trust as "one party's willingness to be vulnerable to another party based on the belief that the latter party is (a) competent, (b) open, (c) concerned and (d) reliable", (p. 265).

Mishra's (1996) definition like Mayer et al.'s (1995) and Rousseau et al.'s (1998) definitions splits trust into trusting beliefs and trusting intentions. However, it goes one step further by explicitly specifying four characteristics of the trustee, that is, competence, reliability, openness and compassion, which engender positive expectations and therefore prompt the trustor to take a risk by putting his or her welfare in the hands of the trustee.

In addition, there is wide spread agreement among scholars and researchers that the four trustworthiness factors specified by Mishra (1996) appear most frequently in the literature and explain a major portion of perceptions of trustworthiness (Clark and Payne, 1997; McKnight et al., 1998; Ellis and Shockley-Zalabak, 2001; Dietz and Den Hartog, 2006). Many scholars regard competence (Cook and Wall, 1980; Butler and Cantrell, 1984; Swan, Trawick, Rinks and Roberts, 1988; Butler, 1991), openness (Butler and Cantrell, 1984; Butler, 1991; Tschannen-Moran and Hoy, 2000), concern (Whitener et al. 1998; Shockley-Zalabak, Ellis and Winograd, 2000) and reliability (Swan et al. 1988; Tschannen-Moran and Hoy, 2000) as pivotal facets of trust.

Competence refers to the expertise and capabilities of the trustee (Mayer et al., 1995); openness reflects trustor's perception that the trustee is honest and straightforward in his or her communications (Mishra, 1996); concern refers to trustor's belief that the trustee will act in his or her best interests (Mayer et al., 1995; Mishra, 1996); and reliability reflects a correspondence between words and actions (Shockley-Zalabak, Ellis and Winograd, 2000; Simons, 2002).

Another, strength of Mishra's (1996) model is that it conceptualises trust as a multidimensional construct consisting of four trusting beliefs, namely, competence, openness, concern and reliability. The major benefit of the multi-dimensional view of trust is that it provides a deeper insight into the complexities of working relationships. For instance, Lewicki et al., (2006) suggest that, "most inter-personal relationships are complex and have a broad bandwidth" (p. 1002) and as a result the answer to the question: "do you trust person A"? is not a simple "yes" or "no", but is more likely to be "to do what"? Thus, it is reasonable to expect that employees might trust the organizational leaders or their team members in certain domains but not in others. For example, employees may have high trust in the skills and abilities of their supervisor and peers but on the other hand may have very little confidence in their integrity. The availability of accurate information on where trust is deficient in a relationship can

help to focus corrective action (Smith and Barclay, 1997). A unidimensional conceptualisation of trust does not offer this important advantage.

Mishra (1996) argues that the four dimensions of trust, namely, competence, concern, reliability and openness, represent components of an overall trust construct. He further contends that these dimensions amalgamate in a "multiplicative" way to create the overall degree of trust that the trustor has with respect to a particular party. This means that "a low level of trust in terms of any of the dimensions off sets high levels of trust in terms of other dimensions" (1996, p. 269).

4.4 Factors of Trustworthiness

The factors of trustworthiness identified by Mishra (1996) are discussed in detail below:

4.4.1 Competence

Competence refers to an individual's capability and expertise to perform a certain task (Butler and Cantrall, 1984; Mayer et al., 1995; Mishra and Mishra, 2008). With regard to organizational leadership, competence can include such skills and abilities as intelligence and clarity of thinking, great communication skills, and a focus on "doing the right things right" (Neff & Critin, 1999, p. 379-387). Perceived ability or competence is central to trust in organizational leader-follower relationships because followers are unlikely to develop trust in their leader unless they believe that the leader is capable of fulfilling the leadership role (Whitener, Korsgaard and Werner, 1998). The followers are likely to believe that the organizational leaders can adequately fulfil their leadership role when they perceive that the organizational leaders have the necessary skills and abilities to make sound decisions (Kirkpatrick and Locke, 1991); achieve the organization's vision (Bartram and Casimir, 2007); successfully deal with crisis situations (Mishra, 1996); and effectively implement change efforts (Albrecht and Travaglione, 2003).

At a peer and group level, competence based trust refers to employees' belief about their co-workers' competency or ability to successfully accomplish tasks and attain group goals (Bennis and Bierderman, 1997). Competence of co-workers

acquires particular salience when employees are working in teams and are reliant on each other to accomplish tasks. According to Dirks (1999) when an individual believes that his group members lack the necessary abilities and skills, he may recognize his effort and hard work as unrelated to group performance. This is because such shortcomings will limit the performance of the group and as a result render his or her efforts futile. In such cases the individual is likely to put forth a low level of effort. Put differently, trust in the competence of group members influences an individual's expectations about the degree to which his or her effort can be transformed into group performance (Dirks, 1999).

4.4.2 Openness

Openness refers to the process by which people put themselves at risk by sharing sensitive information with each other (Tschannen-Moran and Hoy, 2000; Mishra and Mishra, 2008). Mishra and Mishra (2008) contend that open and honest communication can reduce uncertainty and ambiguity because it makes motives, agendas and goals more transparent. In a related vein, Smith and Barclay (1997) posit that by being open in their communication, organizational members can "align perceptions and expectations, clarify roles and avoid misunderstandings" (p. 8). Finally, Costa (2004) argues that by facilitating communication and openness, organizations can encourage the exchange of important knowledge and consequently increase mutual learning.

However, being open entails risks for the concerned party. For instance, Mishra and Mishra (2008) posit that when organizational members share information with their colleagues, there is a danger that they might misuse the shared information or they may fail to reciprocate this openness. Furthermore, Mishra (1996) warns that openness beyond a certain level may serve to damage rather than enhance trust. For example, Mishra (1996) argues that telling someone the complete truth about one's character flaws may actually decrease trust between the two parties. In spite of these potential risks several scholars regard openness as a key aspect of trust (Butler and Cantrall, 1984; Butler, 1991; Tschannen-Moran and Hoy, 2000; Ellis and Shockley-Zalabak, 2001).

4.4.3 Concern

At a minimum demonstration of concern implies that one party believes that the other party will not take unfair advantage even when the opportunity is available (Cummings & Bromiley, 1996; Mishra, 1996; Mishra and Mishra, 2008). However, at higher levels the concern component of trust postulates that the concerned parties will be sensitive to each others needs and will act in each others best interests (Mishra, 1996; Mishra and Mishra, 2008). The concern dimension of trust does not suggest that the parties involved in a relationship lack self interest. "Rather trust in terms of concern means that such self interest is balanced by interest in the welfare of others" (Mishra, 1996; p. 267).

4.4.4 Reliability

Reliability means doing what one says what one is going to do (Simons, 2002; Mishra and Mishra, 2008). In other words, reliability reflects congruence between words and actions. In addition, it also implies keeping one's commitments (Mishra and Mishra, 2008). Compatibility between words and actions and promise fulfilment builds trust; whereas a mismatch between words and deeds and broken promises decrease trust (Mishra, 1996; Simons, 2002; Mishra and Mishra, 2008).

Several scholars consider reliable behaviour to be central to trust. For instance, Lewicki and Bunker (1996) argue that consistency between words and actions is essential for the development of calculus based trust. McAllister (1995) distinguishes between cognitive and affective based trust. Cognitive based trust is based on the perception of reliability and dependability; whereas affective-based trust reflects a special relationship in which the concerned parties express care and concern for each other. McAllister (1995) argues that promise fulfilment, which is a facet of reliable behaviour, is critical for the development of cognition based trust. He further contends that existence of cognition based trust is necessary for the development of affective based trust because individuals must be confident of the other party's reliability and dependability before making an emotional investment in a relationship. Finally, Simons (2002) also echoes the same thoughts and argues that an alignment between

words and deeds, which he refers to as behavioural integrity, is crucial for the development of trust.

Although all of these facets of trust are important, their relative importance will depend on the context under question (Mishra and Mishra, 2008). For example, in the case of a surgeon, competence is likely to be of primary importance; whereas, in the case of an accountant reliability and dependability is just as significant as competence. Tschannen-Moran and Hoy (2000) assert that among teachers and principals all the four trusting beliefs: benevolence, reliability, competence, honesty and openness seem to be critical for developing trusting relations. Furthermore, one particular trustor may place a greater amount of importance on one of the factors across various situations than does another trustor (Mayer & Davis, 1999). Smith and Barclay (1997), therefore, conclude that the relative significance of these facets of trust is likely to be contingent on the specific relationship context.

4.5 Bases / Stages of Trust

Trust is a dynamic phenomenon that takes different characteristics at different stages of a relationship. Shapiro, Sheppard and Cheraskin (1992) and Lewicki and Bunker (1996) propose that there are three main bases for trusting beliefs: calculus / deterrence-based, knowledge-based and identification-based.

4.5.1 Deterrence / Calculus Based Trust

Shapiro et al. (1992) argue that the main condition for sustaining successful business relationships is that there should be compatibility between the words and actions of the concerned parties. The tendency of a party to do what it says it will do mitigates uncertainty and ambiguity and reduces the need for monitoring other's actions. This compatibility between words and actions can be brought about through deterrence, which can be defined as the existence of measures that thwart hostile actions (Shapiro et al., 1992). Thus, deterrence base trust exists "when the potential costs of discontinuing the relationship or the likelihood of retributive action outweigh the short-term advantage of acting in a distrustful way" (Shapiro et al., 1992). In other words deterrence based trust is derived through the presence of costly sanctions for opportunistic behaviour. It can be sustained to the extent "that the deterrent

(punishment) is clear, possible and likely to occur if the trust is violated" (Lewicki and Bunker, 1996, p. 119).

Lewicki and Bunker (1996) argue that trust can be derived not only through the fear of punishment but also by rewarding individuals for preserving it. Thus, they re-named 'deterrence-based trust' as 'calculus-based trust'. They suggest that calculus based trust is strengthened to a large extent by the anticipated rewards for behaving in a trustworthy manner and by the danger of damaging one's reputation as a result of a trust violation. Rousseau et al. (1998) argue that if trust is conceived as a positive expectation about another's intentions, dependence on stringent controls and deterrents may not be trust at all but may instead be thought of as a low level of distrust.

4.5.2 Knowledge Based Trust

While calculus based trust is primarily sustained through the use of deterrents, knowledge based trust on the other hand is derived through the exchange of knowledge. More specifically, knowledge based trust develops over time and is contingent upon how well the trustor can understand and predict the trustee's actions. Shapiro et al. (1992) contend that there are several unique features of knowledge-based trust. First, the availability of information on the trustee enables the trustor to predict the behaviour of the trustee, which in turn engenders trust. Second, predictability boosts trust even if the other person is predictably untrustworthy. This is because the manner in which the concerned person is likely to violate trust can be accurately determined. Finally, accurate prediction requires an understanding between the concerned parties, which can only develop through frequent interaction. Shapiro et al. (1992) suggest that regular communication and courtship are important processes in the development of knowledge based trust. Regular communication puts the concerned parties in constant touch with each other, which, in turn, allows them to gauge each others wants, preferences and approaches to problems. Courtship on the other hand involves conducting thorough research on a potential partner before commencing a formal relationship. By going through this process, the concerned parties can gather enough information about each other, which can enable them to decide whether or not they can productively work together.

4.5.3 Identification Based Trust

Lewicki and Bunker (1996) assert that identification based trust is an outcome of mutual understanding. Each party understands the other and also understands what is required to maintain the relationship of trust. Lewicki and Bunker (1996) note that at this level of trust, "trust exists because the parties effectively understand and appreciate the other's wants; this mutual understanding is developed to the point that each can effectively act for the other" (p.122). Put differently, identification based trust occurs when one party identifies with the other and as a consequence completely internalizes his or her preferences. Identification based trust can be strengthened through the creation of join products, developing a common identity, collocating in the same building and by committing to commonly shared values (Shapiro et al., 1992).

Lewicki and Bunker (1996) argue that relationships can change over time and therefore, trust can transform from calculus-based to knowledge-based to identification-based trust. However, all relationships do not fully mature and as a result it is plausible that trust may not even go past the first stage, that is, calculus based trust. According to Lewicki and Bunker (1996) there are four reasons why relationships sometimes never develop past the first stage. First, the concerned parties may not feel the need to develop more complex relationship; second, the interdependence between the parties is heavily bounded and regulated; third the parties feel that they have accumulated sufficient information about each other and any further information gathering will be futile; and fourth, one or more trust violations have taken place, which makes it unlikely that further trust will develop.

However, if the parties involved in a particular relationship perceive each other to be reliable, they might start gathering information about each others needs, preferences and priorities through repeated and varied interactions. This lays the foundation of knowledge based trust. As people work together, talk to each other and observe each other in different situations, they get to know each other better and consequently they begin to trust each other. This is because increased knowledge about the other makes him or her more predictable. Many working relationships, however, do not advance beyond the knowledge-based trust stage.

Finally, as people get to know each other more deeply, they may start identifying with their "needs, preferences and priorities and come to see them as their

own" (Lewicki and Bunker, 1996, p. 125). However, only a small percentage of relationships progress from the knowledge based trust to identification based trust stage because: "either the parties lack the time or energy to invest beyond the knowledge-based trust level, or the parties may have no desire for a closer relationship" (Lewicki and Bunker, 1996, p. 125).

Lewicki and Bunker (1996) argue that transformation from one stage to another may require a "frame change" in the relationship. For example, these authors contend that the movement from calculus based trust to knowledge based trust involves a change from a stress on differences or contrasts between self and others to a stress on similarities between the self and others. Similarly, the shift from knowledge based trust to identification trust involves a change in frame from simply accumulating knowledge about the other to a "more personal identification with the other" (Lewicki and Bunker, 1996, p. 125).

4.6 High Levels of Initial Trust

The model proposed by Lewicki and Bunker (1996) is based on the premise that trust begins at a zero baseline and develops slowly over time. More specifically, Lewicki and Bunker (1996) contend that over a passage of time trust can transform from calculus-based to knowledge-based to identification-based trust. However, several scholars have challenged this assumption and have argued that it is plausible that even early in a relationship people can experience a relatively high level of trust.

For example, McKnight et al. (1998) assert that people can experience high levels of initial trust because of three reasons. First, individuals may have a high disposition to trust, which may enable them to develop high levels of initial trust. Disposition to trust or trust propensity refers to the tendency of the individuals to depend on others across a broad spectrum of situations and persons. McKnight et al. (1998) distinguish between two types of disposition to trust: (1) faith in humanity, which means that people believe that others are generally well intentioned and reliable; and (2) trusting stance, which is sort of a personal strategy and means that one assumes that irrespective of the fact whether people are honest and reliable, one will achieve better outcomes by dealing with people as though they were well-intentioned and dependable. The second factor, which leads individuals to develop high initial trust, is institution based trust, which implies that people believe that necessary

impersonal structures are in place to protect them against opportunistic behaviours by others. According to McKnight et al. (1998) institution based trust appears to take two forms: (1) situational normality – which, refers to the belief that success is likely because the situation is normal; and (2) structural assurance – which, refers to the belief that success is likely because contextual conditions such as promises, contracts, regulations and guarantees are in place. Finally, high initial trust may develop because of certain cognitive processes that facilitate people to quickly process information and make initial judgments or form initial impressions that the other party is trustworthy. All the three factors, in turn, are likely to have a positive impact on one's trusting beliefs and trusting intentions.

The second approach to high initial trust formation has been advocated by Meyerson, Weick and Kramer (1996). Meyerson et al. (1996) sought to explain how a group of diversely skilled people can come together to work on highly complex projects in temporary groups such as, film crews, presidential commissions, architectural groups and cockpit crews. Members in these teams usually have never worked together and they do not expect to work together again in the future. The stringent deadlines under which these teams work leave little time for relationship building. Thus, in order to trust a temporary group, the members must "wade in" as opposed to waiting until experience shows if a team is trustworthy or not (Meyerson et al., 1996, p. 171). Meyerson et al. (1996) argue that under these circumstances participants build "swift trust" and that this kind of trust can be developed because of several factors, such as:

- Role clarity – which suggests that people deal with one another more as roles than individuals and expect that everyone in the group will carry out their duties professionally.

- Inclination of the members to mitigate inconsistency and unpredictability in their role based behaviour. This is because inconsistent role behaviour and "blurring" of roles erode trust.

- Selection of participants from narrowly defined labour pools such that the reputations of pool members are known, thereby lowering expectations of harmful behaviour.

- The intense pace of work in many temporary groups, which requires focussed attention on task at hand. This helps to prevent the occurrence of dysfunctional and trust destroying behaviours.

- The engagement of participants in tasks, which require moderate levels of interdependence.

In sum, swift trust is more like to develop when "interdependence is kept modest through a combination of distancing, adaptability, resilience [and] interacting with roles rather than personalities" (Meyerson et al., 1996, p. 191).

4.7 Trust and Distrust

An ongoing debate in the trust literature concerns the concept of distrust and its relationship with the construct of trust. The main point of contention is that are trust and distrust opposite ends of the same continuum or whether they represent two distinct concepts. Several scholars argue that trust and distrust are direct opposites of each other (Jones and George, 1998; Schoorman, Mayer and Davis, 2007). For instance, Jones and George (1998) differentiate between three different states of trust: distrust, conditional trust and unconditional trust. According to George and Jones (1998), conditional, unconditional trust and distrust all belong to the same construct – the experience of trust. Distrust is characterised as the lack of trust. Conditional trust is a state in which the attitudes are favourable enough to support future interactions. In contrast, unconditional trust depicts the very essence of trust in which shared values between parties create a common bond. As a relationship develops, trust transforms from conditional trust to unconditional trust. When trust is violated, unconditional trust may turn to conditional trust, or it may turn into distrust, depending upon the magnitude of the violation. In a related vein Schoorman et al. (2007) also argue that 'our definition of trust – willingness to take risk in a relationship – means that at the

lowest level of trust one would not take a risk at all' (p. 350), thereby implying that trust and distrust are opposite ends of the same continuum.

In contrast, Lewicki, McAllister and Bies (1998) argue that trust and distrust are two distinct constructs and therefore, should not be regarded as opposite ends of a single continuum. They contend that the two factor models of satisfaction and dissatisfaction (Herzberg, Mausner and Snyderman, 1967; cited in Lewicki et al., 1998) and the recent evidence from studies of positive and negative affectivity corroborate this line of reasoning. Lewicki et al. (1998) define trust as 'confident positive expectations regarding another's conduct' and refer to distrust as 'confident negative expectations regarding another's conduct' (p. 439). These researchers further assert that trust is a positive valence attitude that is characterized by hope, faith, confidence, assurance and initiative; whereas, distrust is a negative-valence attitude that is characterised by fear, scepticism, cynicism, wariness, watchfulness and vigilance. Moreover, these researchers posit that trust and distrust are likely to have different antecedents and consequences. For example, 'it would be extremely misleading to assume that the positive predictors of trust would necessarily be negative predictors of distrust or that the positive consequences of trust would necessarily be influenced negatively by increased distrust' (p. 448). In other words, within this framework it is likely that trust and distrust will be negatively correlated but in essence they represent two distinct constructs. Additionally, Lewicki et al. (1998) argue that trust and distrust can coexist because 'relationships are multifaceted or multiplex' (p. 442). This implies that trust may exist in some aspects of the relationship, while distrust may reign in others. For example, it is reasonable to assume that a manger might trust his or her subordinate's integrity but may have little faith in his or her competence. Lewicki et al. (1998) conclude that this condition of high trust and high distrust, which implies 'trust but verify', is likely to be most prevalent in working relationships.

However, this approach has received criticism from several quarters. Schoorman et al. (2007) argue that Lewicki et al.'s (1998) assertion that 'trust but verify' is not valid because if you trust a specific person you do not need to verify his or her actions and behaviours. They argue that doing so 'would be the clearest indication that you do not trust' (p. 350).

Furthermore, McKnight and Chervany (2001; cited in Schoorman et al., 2007) developed conceptual models for both trust and distrust on the basis of the existing

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literature. Their findings indicated that the resulting models were identical for both trust and distrust, thereby suggesting that there is no need to treat them as separate constructs.

In a similar vein, Saunders and Thornhill (2004) conducted a case study based on a UK public sector organization to explore the relationship between trust and mistrust. The results of this case study provided only weak support for Lewicki et al.'s (1998) contention that employees may experience both trust and distrust in a given organizational context. More than half of the respondents experienced the feelings of trust at least to some extent, without also experiencing a sense of mistrust. On the other hand three participants felt mistrust at least to some extent but they did not experience any sense of trust. These findings lent support to the notion that trust and distrust are opposite ends of the same continuum rather than being two independent but linked dimensions. However, the findings of this study further revealed that in line with Lewicki et al.'s (1998) model, some participants did experience both trust and mistrust, while six respondents reported that they experienced neither of these emotions. These results offered some support for the assertion that trust and mistrust are independent constructs. On the basis of these findings Saunders and Thornhill (2004) propose a trust-mistrust-absence triangle. These researchers argue that this triangle is superior to Lewicki et al.'s (1998) model because it "incorporates not only separate dimensions for trust and mistrust but also includes the possibility that for some, these are opposite ends of a single continuum as well as incorporating the further possibility that for others one or both constructs may be absent" (p. 511).

In sum, it is reasonable to conclude that more research is needed to establish whether trust and distrust are each others direct opposites or whether they represent two independent yet negatively correlated states of mind.

4.8 Foci of Trust

Another interesting aspect of trust is that it can have multiple foci. For example, McCauley and Khunert (1992) made the distinction between vertical and lateral trust. According to these authors, "the term lateral refers to trust relations among peers (or equals) who share a similar work situation, whereas the term vertical refers to trust relations between individuals and either their immediate supervisor, top management or organization as a whole"(p. 269). This distinction is important

because within an organization employees may trust their co-workers but not supervisors or they can trust the top management and not the work unit and each type of trust has different outcomes (McCauley and Khunert, 1992; Carnevale and Welchsler, 1992; Tan and Tan, 2000).

Tan and Tan (2000) also emphasise the importance of distinguishing the referents within an organization. They argue that trust in supervisor and trust in organization are two distinct but related constructs, each with its own antecedents and outcomes. Their study showed that trust in supervisor and trust in organization were positively and significantly correlated, which signifies that when employees trust their supervisor there is a "spill-over effect" to the whole organization. Furthermore, the results of their study revealed that trust in supervisor was more strongly predicted by proximal variables, such as ability, benevolence and integrity of the supervisor; whereas, trust in organization was more strongly predicted by global variables such as, organizational support and organizational justice. In addition, both trust in supervisor and trust in organization had different outcomes. Trust in supervisor was more predictive of innovative behaviour and satisfaction with the supervisor; while trust in the organization was more strongly associated with organizational commitment and turnover intentions.

In a related vein, Dirks and Ferrin (2002) also differentiate between trust in supervisor and trust in top management by arguing that the difference between the two types of trusts stems from the fact that the immediate supervisor and top management tend to perform different roles within organizations. The immediate supervisor is responsible for performing activities such as managing performance and day to day activities on the job; whereas, the top managers perform more strategic functions such as setting strategic direction, allocating resources to various projects and departments, communicating to employees the goals of the organization and so on. Dirks and Ferrin (2002) suggest that because of this distinction in the roles performed by the immediate supervisor and top managers, trust in these two referents can result in different outcomes. The results of their study revealed that trust in supervisor was more predictive of job level outcomes such as job performance and job satisfaction; whereas, trust in top management was more strongly aligned with organizational level outcomes, such as organizational commitment.

Although trust in leadership is important, it is not prudent to overlook the implications and consequences of trust in co-workers. Exploring trust in lateral group

relationships has assumed increased importance because of the evolution of team-based structures within organizations (Dirks and Skarlicki, 2004). In contrast to trust in leadership, which might result in contributions directed toward the supervisor or the top management , trust in co-workers is likely to result in contributions directed towards the co-workers such as information sharing with co-workers and helping co-workers in need (Dirks and Skarlicki, 2004). The nature of each type of trust is discussed next.

4.8.1 Trust in Top Management

Top management refers to the group of persons at or near the top of the organizational chart (McCauley and Khunert, 1992). The trust between top management and their employees is not interpersonal in nature and therefore, is less contingent on the evaluation of the personal characteristics and behaviours of the top managers (Costigan, Ilter and Berman, 1998). On the contrary, trust in top management is rather seen as emanating from the perceived efficiency and fairness of larger organizational systems such as, performance appraisal systems, professional development opportunities, job security and the reward system (McCauley and Khunert, 1992). According to McCauley and Khunert (1992), as a means of assessing the extent to which they could trust the management, the employees persistently monitor the organizational environment. Employees will reciprocate trust relations communicated by management only if the organizational structures, roles and climate reflect a trustworthy system. Alternatively, if they represent a lack of trust in employees by top management, employees will react with a similar lack of trust.

4.8.2 Trust in Direct Supervisor and Trust in Team Members / Co-Workers

Historically majority of the studies have concentrated on supervisory trust (Costigan et al., 1998; Elis and Shockley-Zalabak, 2001). Lau and Liden (2008), however, argue that trust in co-workers has assumed a lot of significance in today's work environment because of three reasons. First, the proliferation of self-managed teams within organizations necessitates that employees work collaboratively with each other in order to accomplish team and organizational goals. Research evidence indicates that positive trust in team members can play a pivotal role in fostering

interpersonal cooperation and in developing effective team relationships. Second, in team environments, the rewards and penalty systems are often team oriented. Thus, it is plausible that employees may not be adequately rewarded for their efforts because of their group members' lack of necessary skills to perform their work well. In these circumstances, if employees trust their team members to do their jobs proficiently, they maybe more willing to exert greater effort themselves, because they know that their efforts will be appropriately rewarded. Finally, trust between peers can promote social exchange relationships. If co-workers trust each other, they will be more inclined to engage in helping behaviours, because they feel confident that their colleagues will reciprocate their good deeds in the future.

Furthermore, Lau and Liden (2008) argue that leaders can play a critical role by indirectly influencing the process of trust development between co-workers. For example, when leaders trust their subordinates, they are more likely to provide valued performance related resources such as information and feedback to the trusted employees. Because of these resources, the trusted employees perform well and become more competent in the eyes of their peers. Additionally, the trusted subordinates "may feel a sense of obligation and responsibility to behave in a trustworthy manner" (Lau and Liden, 2008, p. 1131). This sense of obligation might induce them to engage in trustworthy behaviours, which are likely to be "noticed by co-workers, who in turn will be prompted to engage in behaviours that reflect trust in their colleagues" (Lau and Liden, 2008, p. 1132).

In contrast to trust in top management, which is more impersonal (i.e. less dyadic) and is based more on the policies, decisions and procedures enacted by the top managers and less on the evaluation of their personal characteristics, trust in supervisor and trust in team members reflect an interpersonal or dyadic form of trust (Costigan et al., 1998). McAllister, (1995) suggests that interpersonal trust can be classified as affective and cognitive. Cognitive forms of trust deal with issues such as the reliability or competence of another party. Affective trust on the other hand reflects a special relationship, in which individuals express care and concern for each other. Thus, trust in immediate supervisor and co-workers can be formed either through a positive evaluation of their character, such as their competence, integrity and reliability or through their expression of care and concern towards another party.

The present study seeks to examine the impact of trust in all three referents, that is, top management, direct supervisor and team members on researchers' levels of

work engagement. Thus, in line with Mishra's (1996) definition, trust in the current paper reflects an individual's willingness to rely on the top management, his or her direct supervisor and team members based on the belief that these referents are (1) competent; (2) reliable; (3) open; and (4) concerned.

From the preceding discussion it is clear that trust in top management, trust in direct supervisor and trust in team members / co-workers are three distinct constructs, having different antecedents and consequences. Given the fact that trust in each referent can entail significant benefits for organizations, it is imperative that organizational leaders strive to create conditions, which help to develop trust at each level of the organizational hierarchy.

As noted in chapter 1, the first and primary aim of the current study was to examine the effects of trust in top management, trust in direct supervisor, trust in team members and trust propensity on the engagement levels of science researchers working within the context of science research centres. On the basis of this objective the following hypotheses were proposed:

Hypothesis 1a: Researchers' trust in top management is positively associated with their work engagement

Hypothesis 1b: Researchers' trust in direct supervisor will be positively associated with their work engagement

Hypothesis 1c: Researchers' trust in their team members will be positively associated with their work engagement

Hypothesis 1d: Researchers' trust propensity will be positively associated with their work engagement

These relationships are depicted in Figure 4.1 below:

FIGURE 4.1
The Relationship between Trust and Work Engagement

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┌──────────────┐
│ Trust in Top │─────────────┐
│ Management   │              \
└──────────────┘               \          ┌──────────────────┐
                                \         │ **Work**         │
┌──────────────┐                 \        │ **Engagement**   │
│ Trust in     │──────────────────▶       │                  │
│ Direct       │                  ◀───────│ Vigour           │
│ Supervisor   │                 /        │ Dedication       │
└──────────────┘                /         │ Absorption       │
                               /          └──────────────────┘
┌──────────────┐              /
│ Trust in     │─────────────/
│ Team         │            /
│ Members      │           /
└──────────────┘          /
                         /
┌──────────────┐        /
│ Trust        │───────/
│ Propensity   │
└──────────────┘
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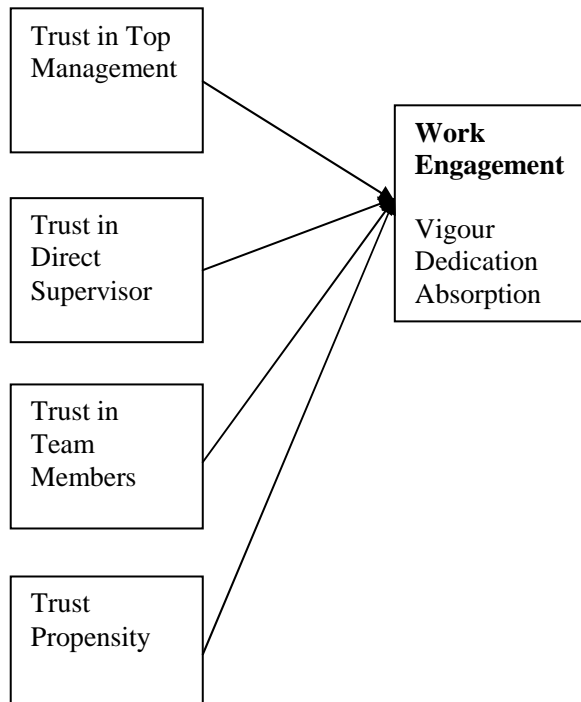
4.9 Summary

The aim of this chapter was to provide an overview of the theoretical developments in the area of organizational trust. It compared the various models of trust and found that the psychological approach to trust is now considered the dominant approach in this area. Moreover, the review of the literature revealed that within the psychological approach, trust has been conceptualised both as a unidimensional and multi-dimensional construct. After analyzing the two view points, it was argued that the multi-dimensional approach to trust reflects a more comprehensive depiction of this construct and thus, in the present study, it was decided to adopt the multidimensional model of trust advanced by Mishra (1996). Moreover, previous research indicates that trust propensity also has the potential to positively influence organizational behaviour and therefore, this construct was also included in the research model developed for this study. Thus, the present study sought to investigate the impact of both state and trait trust on researchers' levels of work engagement.

Additionally, this chapter reviewed the various bases of trust, that is, deterrence based trust, knowledge based trust and identification based trust. The model of trust formation proposed by Lewicki and Bunker (1996) argues that trust develops slowly overtime and can move from deterrence based to knowledge based to identification based trust. However, other researchers have challenged this contention and have suggested that it is possible that individuals can experience high initial trust even in the early stages of the relationship (McKnight et al., 1998; Meyerson et al., 1996).

This review also examined some of the debates surrounding the issue of trust and distrust. Lewicki et al. (1998) argue that trust and distrust are two distinct constructs, each having unique antecedents and consequences. Moreover, they contend that relationships have broad bandwidths and therefore, it is possible for trust and distrust to co-exist within the same relationship. In contrast, scholars like Schoorman et al. (2007) argue that trust and distrust do not represent separate constructs but can be considered as direct opposites of each other. On the basis of this evidence it was concluded that more research is required to ascertain whether trust and distrust are opposite poles of a single continuum or whether they are independent albeit negatively correlated states of mind.

Finally, the present chapter examined the nature of the three foci of trust, namely, trust in top management, trust in direct supervisor and trust in team members. Research evidence indicates that trust in top management, trust in direct supervisor and trust in team members are three distinct constructs, each having different implications and consequences. More particularly, the review revealed that positive trust in top management is likely to manifest in organization focussed outcomes; trust in supervisor is expected to result in supervisor relevant outcomes; and trust in team members is likely to lead to team specific outcomes.

The more applied research on trust, which deals with its measurement, antecedents and consequences, is reviewed in the next chapter.

CHAPTER 5

Organizational Trust: Measurement, Antecedents and Consequences

5.1 Introduction

This second chapter on organizational trust reviews the more applied research relating to this construct. It starts by examining the various challenges associated with the measurement of organizational trust. The literature pertaining to the measurement of trust reveals that there appears to be a dichotomy in the way trust is defined and the way it is measured. Specifically, organizational trust is defined as an intention to engage in trust informed behaviours but most of the available measures only assess the belief component of this construct. This section on the measurement of organizational trust examines the various measures, which assess this construct as a 'willingness to be vulnerable' and concludes that all of these measures seem to be unsuitable for the current study. It then provides a rationale for choosing Mishra and Mishra's (1994) scale to measure trust for the present study. The antecedents and consequences of trust are examined next. The review of the literature in this area discloses that trust is mostly considered as an outcome of: (1) trustor's characteristics; (2) trustee's characteristics; and (3) situational factors. As far as the outcomes of organizational trust are concerned, the chapter reveals that positive trust can manifest in more constructive attitudes and behaviours; higher levels of cooperation; greater flow of knowledge and ideas; and superior levels of performance. Furthermore, there is a debate in the literature whether excessive trust is always good. Thus, this chapter proceeds to review the concept of optimal trust and concludes that excessive trust may result in dysfunctional outcomes and therefore, organizations need to strike a balance between too little and too much trust. The chapter finally ends with a discussion of the costs of distrust.

5.2 Measurement of Organizational Trust

There has been an inconsistency between the way organizational trust has been defined and the way trust has been measured (Gillespie, 2003). The literature relating to organizational trust defines this construct as a behavioural intention to take

risk or as a willingness to be vulnerable by engaging in some trust informed behaviours. However, most of the available scales provide only a measure of the belief component of trust (Dirks and Ferrin, 2002). That is, these instruments seek to measure respondents' perceptions of trustworthiness of a specific referent. This gulf between the definition and measurement of trust has been compounded partly due to the non-availability of scales that measure trust as a willingness to be vulnerable (Gillespie, 2003). In this regard, Mayer et al. (1995) remark that "the most problematic component of the model from the standpoint of measurement is trust itself"(p. 729). A review of the literature reveals that there are four valid scales which measure trust as a willingness to be vulnerable or as an intention to engage in trusting behaviour. These scales have been discussed in studies conducted by Currall and Judge (1995), Cummings and Bromiley (1996), Schoorman, Mayer and Davis (1996) and Gillespie (2003) (also see Dietz and Den Hartog, 2006).

Currall and Judge's (1995) scale was designed to measure trust between boundary role persons (BRP) in different organizations. The scale developed by these researchers measures trust as a willingness to engage in four trusting behaviours: open and honest communication; entering informal agreements; maintaining surveillance; and coordination of tasks. However, this scale is not suitable to measure interpersonal trust such as trust in supervisor or trust in team members.

In a related vein Cummings and Bromiley's (1996) Organizational Trust Inventory (OTI) aims to measure trust between units in a specific organization or between organizations. The OTI consists of 62 items and measures the affective, cognitive and behavioural intention dimensions of trust. Since the original OTI was overly long, these authors also developed a shorter version of this scale, which comprised of 12 items. It is interesting to note that in the shorter version of the scale, Cummings and Bromiley (1996) dropped the Intended Behaviour (IB) items on the grounds that they "singularly and on the average, exhibited lower item-to-factor correlations than did the Affective and Cognitive items" (p. 317).

Schoorman et al. (1996) also developed a four item scale to assess trust as a behavioural intention to take a risk. This scale can be used to measure interpersonal trust such as, trust in supervisor and also more impersonal forms of trust, like trust in top management. However, this four item measure has exhibited poor reliability in many studies. For example, Mayer and Davis (1999) used this scale to measure trust in top management and reported that the value of the Cronbach Alpha was 0.59 and

0.60 in two waves of data, which is significantly lower than the accepted criteria of 0.70 proposed by Nunnally and Bernstein (1994). In another study conducted within the restaurant setting, Davis, Schoorman, Mayer and Tan (2000) used this four item scale to measure employees' trust in their general manager. Davis et al. (2000) found that this scale exhibited a low reliability of 0.62. In a similar vein, Wasti, Tan, Brower and Onder (2007) sought to determine the metric invariance of trust scales developed by Mayer and Davis (1999) across three samples: U.S., Turkey and Singapore. The results of this study revealed that the four item trust scale used by Mayer and Davis (1999) (the same scale developed by Schoorman et al., 1996) exhibited sub optimal psychometric properties. Specifically, the findings from the confirmatory factor analysis showed that the trust scale poorly fitted the data. In addition, this scale exhibited poor reliability, especially in the Turkish ($\alpha = 0.55$) and Singapore samples ($\alpha = 0.68$). On the basis of these findings, Wasti et al. (2007) make two suggestions to improve this scale. First, the item wording of the scale needs to be improved. Second, the number of items in this scale should be increased in order to improve its reliability. Thus, this scale needs to be further developed and tested before it can be considered as a valid and reliable measure of trust.

Finally, Gillespie (2003) has developed a ten item Behavioural Trust Inventory (BTI), which is designed to measure trust as an intention to engage in two types of trusting behaviour: (1) reliance and (2) disclosure. Reliance deals with issues such as, relying on another's skills and knowledge, delegating and giving autonomy; whereas, disclosure involves sharing of sensitive information with one's supervisor or team members. This inventory has been primarily designed to measure trust in the team leader and team members. For instance, Gillespie and Mann (2004) used this scale to measure team members' trust in the project leader within the context of the R&D teams. The results of this study showed that three factors, namely, consultative leadership, idealised influence and congruence between the values of the leader and team members, were most predictive of team members' trust towards leaders. However, this scale cannot be used to measure trust in top management, which depicts an impersonal form of trust.

However, from the point of view of the current study all the four measures discussed above are unsuitable. As mentioned in chapter one of this dissertation, the current study seeks to measure researchers' trust in the top management, direct supervisor and team members. Trust in direct supervisor and team members are

examples of interpersonal trust; whereas trust in top management is more impersonal and less dyadic in nature. Measures by Currall and Judge (1995) and Cummings and Bromiley (1996) are not designed to measure interpersonal trust. Schoorman et al's (1996) scale suffers from poor reliability, while Gillespie's (2003) BTI is designed to measure interpersonal trust and therefore cannot be utilized to measure impersonal forms of trust such as employees' trust in top management. Thus, the obvious question is which measure of trust will prove most suitable for the present investigation?

Lewicki et al. (2006) contend that in part the choice of the measure depends on the definition of trust chosen for the study. The current study adopts the multi-dimensional definition of trust put forward by Mishra (1996), which conceptualizes trust as a willingness to rely on a specific target based on the belief that this particular target is competent, open, reliable and concerned. Thus, the most suitable measure of trust for the current study is that, which reliably assesses the four trusting beliefs specified by Mishra (1996). A review of the literature reveals that the sixteen item scale developed by Mishra and Mishra (1994) provides a reliable and valid measure of the four components of trust identified by Mishra (1996).

In Mishra and Mishra's (1994) scale, each factor of trustworthiness is assessed by four items. Every item in the scale is measured on a seven point Likert-type scale with responses ranging from "Very Strongly Disagree" (weighted 1) and "Very Strongly Agree" (weighted 7). Since these dimensions have been found to be correlated at about 0.80, it has been proposed to aggregate and average the sixteen trustworthiness items to produce a single trust score for each respondent (Spreitzer and Mishra, 2002). The internal consistency of the aggregated trustworthiness scale has been found to be excellent. For example, the value of the Cronbach's alpha for the aggregated scale was found to be 0.93 (Sprietzer and Mishra, 1999), 0.96 (Spreitzer and Mishra, 2002), and 0.97 (Brockner, Spreitzer, Mishra, Hochwarter, Pepper, Weinberg, 2004) in three separate studies. Finally, Mishra and Mishra's (1994) scale can be adapted to measure both interpersonal (e.g. trust in supervisor) and impersonal (e.g. trust in top management) forms of trust. In the light of this evidence it can be concluded that Mishra and Mishra's (1994) trust scale is psychometrically a sound measure of the four trusting beliefs and therefore, is the most suitable measure in the context of the current study.

5.3 Determinants of Trust

There is a good deal of debate in the peer reviewed literature regarding the factors that promote or hinder trust development in organizations (Dietz and Den Hartog, 2006). However, broadly speaking trust can be influenced by: (1) dispositional characteristics of the trustor; (2) characteristics of the trustee; and (3) situational factors. These factors are discussed in detail below:

5.3.1 Dispositional Characteristics of the Trustor

The dispositional tendency of the trustor to trust others or trust propensity can be an important driver of trust. For instance, Mayer et al. (1995), argue that trust propensity, a stable "general willingness to trust others", increases trust "prior to availability of information about the trustee" (1995, p. 716). In a related vein, McKnight et al. (1998) argue that the two components of their disposition to trust, that is, faith in humanity and trusting stance are likely to positively affect trusting beliefs and trusting intentions in novel and ambiguous situations. Several studies have also empirically proved that trust propensity is an important precursor of trust beliefs (Ridings, Gefen and Arinze, 2002; Payne and Clark, 2003; Mooradian et al., 2006; Colquitt et al., 2007).

It is of interest to understand whether trust propensity continues to influence trust once trustworthiness of a specific referent has been determined. Colquitt et al. (2007) in their meta-analytic study argue that trust propensity may be an important determinant of trust even when information on trustworthiness has been ascertained. In fact, they empirically demonstrate that trust propensity remained a significant predictor of trust even after controlling the effects of the three trustworthiness factors, namely, ability, benevolence and integrity. These findings further endorse trust propensity as an important determinant of trust.

5.3.2 Characteristics of the Trustee

Trustor's evaluation of the personal characteristics (e.g. ability, integrity and benevolence) of the trustee can promote or undermine his or her trust in the trustee. For example, Mayer et al. (1995) highlighted three characteristics of the trustee,

namely, ability, benevolence and integrity, which can affect trustor's trust in the trustee. Ability is the perception that the trustee possesses a certain skill set, which enables him or her to have influence within some specific domain. Benevolence refers to the trustor's perception that the trustee cares about his welfare and interests. Finally, integrity refers to trustor's perceptions that the trustee adheres to certain principals, which the trustor finds acceptable. Mayer et al. (1995) argue that the relative importance of these factors will change with the development of the relationship. In the early phase of the relationship, there is limited interaction between the trustor and trustee and as a result the trustor is unable to gauge the benevolence of the trustee. However, at this stage the trustor might be able to acquire information about the integrity of the trustee through third party sources. Thus, in these early stages of the relationship integrity is likely to be a stronger determinant of trust. However, once the relationship develops, trustors interaction with the trustee will increase and he or she will be able to gain a deeper insight about the trustee's benevolence. In this situation benevolence will start to exert a more profound impact on trust.

McKnight and Chervany (1998) also contend that trusting beliefs are important precursors of trusting intentions. Trusting beliefs refers to trustor's perceptions that the trustee is benevolent, competent, honest and predictable; whereas, trusting intentions refer to the willingness on part of the trustor to depend on a trustee in a given situation. Thus, when the trustor believes that a specific target is benevolent, competent, honest and predictable, he or she will be more inclined to rely on him or her.

Several studies have provided empirical evidence that trustee's trustworthiness can be an important predictor of trust. For example, Mayer and Davis (1999) conducted a nine month quasi experiment to examine the impact of the three trustworthiness factors, that is, ability, benevolence and integrity on employees' trust in the top management. The results of this study revealed that all the three trustworthiness factors were significant predictors of trust in top management.

In another study, Davis et al. (2000) explored the impact of ability, benevolence and integrity on trust in general managers within the restaurant industry. The results from the correlation relation analysis revealed that all three trustworthiness factors were positively correlated with employees' trust in their general manager. However, in the regression analysis only benevolence and integrity

emerged as positive predictors of trust. Davis et al. (2000) attributed this finding to the likely effects of multicollinearity.

Mayer and Gavin (2005) also reported similar results. More specifically, these researchers sought to examine the influence of the three trustworthiness factors on employees' trust in their plant manger and the top management team in a sample of 288 employees drawn from a small non-union manufacturing firm. The results from this study indicated that all the three trustworthiness factors, that is, ability, benevolence and integrity were positively associated with trust in the plant manger; whereas only benevolence and ability emerged as significant predictors of trust in the top management team. Finally, Colquitt et al (2007) in their meta-analytic study replicated these findings and showed that ability, benevolence and integrity were significant predictors of trust.

5.3.3 Situational Factors

Previous research indicates that situational or organizational factors can also significantly influence trust. For instance, in their meta-analytic study Dirks and Ferrin (2002) argue that leaders actions and practices such as leadership style (transformational and transactional), perceived organizational support, perceived fairness (procedural, distributive and interactional justice), participation in decision making and unmet expectations are the main antecedents of trust. Dirks and Ferrin (2002) argue that these antecedents affect trust through two different perspectives. One is the relationship based perspective, which is based on the principals of social exchange and deals with the willingness of the employees to reciprocate care and consideration that a leader may express in a relationship (Konovsky and Pugh, 1994; Whitener et al. 1998). The second approach is the character based perspective which focuses on employees' perception of the leader's character (e.g. Mayer et al., 1995).

Transformational leadership, interactional justice and perceived organizational support are likely to effect trust through the relationship based approach; whereas, transactional leadership, distributive justice and unmet expectations signal the fairness and integrity of the leader and hence, are most likely to affect trust through the character based perspective. Procedural justice and participation in decision making, however, signal both respect for the employees and the fairness and integrity of the

leader enacting policies and procedures. Thus, these two variables can engender trust through both the relationship and character based approaches.

The results of this meta-analytic study showed that transformational leadership had the strongest relationship with trust; while, transactional leadership and distributive justice exhibited significantly smaller relationships. Furthermore, it was found that perceived organizational support, procedural and interactional justice, participation in decision making and unmet expectations all were important antecedents to trust.

In addition, Mishra and Morrisey (1990) found four organizational factors on the basis of their survey of West Michigan Managers: (1) open communication, (2) giving workers greater share in the decision making process, (3) sharing of critical information and (4) true sharing of perceptions and feelings, which positively influenced trust. These results lend support to the notion that trust develops in an environment where information is freely shared and the organization shows concern and respect for its employees.

In another study, Payne and Clark (2003) endeavoured to examine the impact of seven organizational factors (role set satisfaction, job satisfaction, confusing job, supportive environment, difficult job, job challenge and controlling boss) on employees trust in the line manager and senior mangers in the industry. The sample for this study consisted of 398 employees drawn two UK service organizations: a hospital and two divisions of a high street bank. The results of this study revealed that both interpersonal-related (role set satisfaction and job satisfaction) and job related variables (difficult job and challenging job) predicted trust in both the line manager and the senior managers in the industry.

Finally, in a case study conducted within a general hospital on a sample of Dutch employees, Bijlsma and Van de Bunt (2003) investigated the impact of five behaviours on trust in managers. More specifically it was hypothesised that monitoring performance, supportive behaviour (help and guidance in improving performance and resolving problems with others), cooperation related problem solving, openness (listening to ideas and suggestions in an atmosphere of security) and feedback on performance (appreciation for good work) would be positively related to trust. The results of this study showed that monitoring performance, support in case of trouble with others and guidance to improve individual performance were the strongest predictors of trust in managers.

The positive relationship between monitoring and trust was quite interesting because traditionally monitoring is considered to reflect a lack of trust and as a consequence has been found to be negatively associated with this construct (Costa et al., 2001; Webber, 2008). However, in the present study monitoring of performance by managers was perceived as show of care and concern by organizational members. In addition, monitoring was also perceived as essential for enabling certain important behaviours of managers, such as feedback on performance, appreciation of good work, assistance for improving individual performance, managerial support and problem solving. On the basis of this evidence, Bijlsma and Van de Bunt (2003) conclude that monitoring and trust are not necessarily negatively related but instead should be seen as complementing each other.

5.4 Positive Consequences of Trust

As mentioned earlier, the importance of trust springs from the fact that it can lead to several positive consequences for the organizations. Specifically, positive trust can manifest in more constructive workplace attitudes and behaviours; higher levels of cooperation; a greater flow of knowledge and ideas; greater innovation; more extra-role behaviours and superior levels of performance. The impact of trust on these positive outcomes is examined in greater detail in the ensuing paragraphs.

5.4.1 Trust and Employees' Attitudes and Behaviours

There is plethora of evidence that positive trust can manifest more constructive workplace attitudes and behaviours, such as greater organizational commitment, enhanced job satisfaction and lower turnover (Dirks and Ferrin, 2001; Dirks and Ferrin, 2002). Dirks and Ferrin (2001) assert that high levels of trust in one's manager can affect job satisfaction and organizational commitment because the manager performs many roles such as evaluating performance, providing guidance with regards to job and career related issues and distribution of rewards, which can have a profound effect on employees' commitment and satisfaction. Thus, if employees believe that they can trust their supervisor to fairly carry out his or her role with regards to these aspects of the job, their levels of job satisfaction and organizational commitment are most likely to go up.

5.4.2 Trust and Cooperation

Jones and George (1998) argue that the presence of high levels of trust in relationships spurs individuals to cooperate and develop synergistic team relationships. Trust performs this role by triggering relevant social processes such as broad and flexible role definition, intensive social relations, high confidence in others, help seeking behaviour, free exchange of information, giving priority to team objectives and needs and high commitment and solidarity. In turn, these synergistic relations lead to superior performance benefits, such as the development of unique organizational capabilities and extra-role behaviours that can give an organization a competitive advantage. Several studies have empirically established a link between trust and cooperation (Morgan and Hunt, 1994; Costa et al., 2001, Costa, 2003).

5.4.3 Trust and Sharing of Knowledge and Ideas

A climate of trust also facilitates knowledge sharing within organizations (Collins and Smith, 2006; Staples and Webster, 2008; Renzl, 2008). This is because in relationships characterised by high trust, the party providing sensitive information feels confident that the recipient of this information will not misuse it (Staples and Webster, 2008; Renzl, 2008). Trust might also facilitate the exchange of information and ideas because trustworthy social conditions enhance an individual's beliefs that a current exchange may lead to later reciprocation (Collins and Smith, 2006). Finally, positive trust encourages employees to seek and offer help, which in turn enhances the likelihood of exchange of knowledge and ideas (Jones and George, 1998).

Several studies have empirically established the link between trust and knowledge sharing. For example, Collins and Smith (2006) conducted a study among a sample of knowledge workers drawn from high technology firms to explore the impact of trust on knowledge exchange and combination. The results of this study showed that trust was positively and significantly related to knowledge exchange and combination among knowledge workers. Staples and Webster (2008) also sought to examine the impact of team members' trust on knowledge sharing within different teams. The results of this uncovered a strong positive association between trust and knowledge sharing for all types of teams, that is, local, hybrid and distributed.

Similarly, Renzl (2008) also reported a positive association between trust in management and knowledge sharing.

5.4.4 Trust and Innovation

In addition, there is evidence that a climate of trust can promote innovation in organizations (Tan and Tan, 2000; Clegg, Unsworth, Epitropaki and Parker, 2002; Madjar and Ortiz-Walters, 2009). Innovation is an effortful and risky endeavour and therefore, employees are more likely to engage in this activity if they believe that the organization will seriously listen to their novel ideas and will provide the necessary resources and support to implement these ideas (Clegg et al., 2002; Madjar and Ortiz-Walters, 2009). For instance, Clegg et al (2002) sought to 'implicate' the role of trust in the innovation process in a sample of design engineers drawn from two large aerospace organizations. More specifically, these researchers proposed two dimensions of trust for innovation: (1) trust that heard – which, refers to an expectancy that the organization takes one's and suggestions seriously; and (2) trust that benefit – which refers to an expectancy that those managing the organization have one's interest at heart and one will share in the benefits of any changes. Clegg et al. (2002) hypothesized that both these aspects of trust will be significantly related to the two dimensions of innovation, namely, idea generation and idea implementation. The result from this study showed that trust that benefit was a significant predictor of suggestion of ideas; whereas, trust that heard was more predictive of idea implementation. These findings implied that when employees believe that their ideas are listened to and taken seriously, they are more likely to strive to have their ideas and suggestions implemented. On the other hand when they believe that they will share the benefits of any change that takes place, they will be more motivated to suggest novel ideas.

Similarly, in a study conducted among a sample of employees drawn from 40 organizational units of three large Finnish multinational companies, Ellonen, Blomqvist and Puumalainen (2008) attempted to examine the impact of interpersonal (vertical and lateral trust) and institutional trust on organizational innovativeness. The results of this study showed that institutional trust was particularly important in enhancing organizational innovativeness.

Finally, Madjar and Ortiz-Walters (2009) endeavoured to examine the effects of trust in supervisor and trust in customers on employees' creativity. Using a sample of hairstylists, Madjar and Ortiz-Walters (2009) showed that both trust in supervisor and trust in customers were positively associated with stylists' creativity. Furthermore, the results of this study revealed that in addition to having main effects, the two types of trust interacted to predict creativity, thereby implying that creativity was highest when trust in both the supervisor and the customers was high.

5.4.5 Trust and Extra-Role Behaviours

Previous research indicates that a climate of trust induces employees to go the extra-mile for the organization. A large of number of studies has empirically demonstrated that trust is a robust predictor of organizational citizenship behaviour (Konovsky and Pugh, 1994; Robinson, 1996; Pillai, Schriesheim and Williams, 1999; Dirks and Ferrin, 2001; Dirks and Ferrin, 2002). Dirks and Skarlicki (2004) argue that trust can affect organizational citizenship behaviour through both the relationship and character based approaches. For instance, according to the relationship based perspective, when employees perceive that the organizational leaders are supportive, value their contribution and care about their best interests, they are likely to reciprocate under the norms of the social exchange (Blau, 1964) by engaging in organizational citizenship behaviour. On the other hand, trust can also positively influence organizational citizenship behaviour through the character based perspective. For instance, trust in a leader's integrity may lead the employees to believe that an exhibition of organizational citizenship behaviours may allow them to reap future benefits because of leader's observance to certain values, such as fair treatment.

5.4.6 Trust and Performance

Perhaps most importantly, trust has also been positively linked with individual, team and business unit performance. There are several possible reasons because of which positive trust may convert into superior performance. For instance, Dirks and Ferrin (2001) argue that a high level of trust in the supervisor or co-workers might prompt the individuals to engage in an exchange relation with these referents. This, in turn, may enable them to receive performance-related resources, such as information,

constructive feedback, guidance and assistance from their supervisor or co-workers and therefore may help them to improve their performance (Dirks and Skarlicki, 2009).

In addition, trust can also positively affect individual performance by increasing work motivation by strengthening the effort-performance and performance-rewards expectancies. For example, when employees trust in their supervisor and co-workers is high, they are likely to believe that they can count on their supervisor and co-workers to come to their help when they are confronted with job related impediments (Costigan et al., 1998). This in turn might enhance their effort-performance expectancy and as result may prompt them to expend more effort in their work. Higher levels of effort and commitment on part of the employees can translate into better performance. Furthermore, when employees put their time, effort and energies into their jobs, they expect the organization to reward them appropriately for their efforts and good performance (Siegall and Worth, 2001). Positive trust in the organizational leadership leads employees to believe that they will be fairly rewarded for their effort and commitment. This perception might increase employees' work motivation by strengthening the performance-rewards linkage and consequently may result in better individual performance.

Finally, Mayer and Gavin (2005) explain the trust-performance linkage in terms of the cognitive resource theory (Kanfer and Ackerman, 1989). These researchers argue that when employees trust in their supervisor is high, they are likely to remain focussed on achieving their performance-related goals as opposed to expending their mental resources on counterproductive activities, such as monitoring the actions of their supervisor. Full concentration on work activities, might eventually result in better performance. Studies by Earley (1986) and Robinson (1996) empirically demonstrate that positive trust can improve individual performance.

Furthermore, previous research indicates that positive trust can manifest in better team performance. For instance, Dirks (1999), in his study demonstrated that high trust among group members indirectly affected group performance and processes by allowing group members to channel their effort and energies towards pursuing group goals instead of individual goals.

Likewise, Dirks (2000) found empirical evidence that trust in team leader had positive and significant main effects on team performance within the context of men's basket ball teams. Dirks (2000) argues that trust in team leader makes team members

suspend their personal motives and spurs them to direct their energy towards 'the role specified by the leader' and 'to work toward the performance related objectives and strategies set by the leader' (p. 1005) which in turn leads to superior team performance.

Dayan, Benedetto and Colak (2008) also sought to examine the effects of managerial trust on three indicators of team performance: product success, team learning and speed-to-market in new product development (NPD) teams. Using data from NPD project teams, Dayan et al. (2008) showed that managerial trust was positively and significantly associated with all the three indicators of team performance.

In a similar vein, Costa, Bijlsma-Frankema and De Jong (2009) rationalised that team trust can positively influence team performance by increasing cooperation among team members. In a longitudinal study, conducted among 79 project research teams, Costa et al. (2009) showed that team trust was a significant predictor of team performance at each stage of the project.

Finally, there is evidence that trust can lead to higher organizational performance. For example, Davis et al. (2000) found that employees' trust in the general manager was positively associated with higher levels of sales and profitability and lower levels of turnover within the context of the restaurant industry. Similarly, Gould-Williams (2003) reported that both interpersonal trust (trust between employees) and systems trust (trust between employees and organization as a whole) were significant predictors of organizational performance. Finally, Collins and Smith (2006) showed that trust was a significant predictor of both the dimensions of organizational performance: revenue from new products and services and sales growth.

The preceding discussion on the antecedents and consequences of trust can be presented in the model presented in Figure 5.1:

FIGURE 5.1

A General Model of Antecedents and Consequences of Trust

```
┌─────────────────────┐                                    ┌──────────────┐
│    Trustor's        │                                    │  Positive    │
│  Characteristics    │                                    │  Attitudes & │
│                     │ ╲                                ╱ │  Behaviours  │
│ Propensity to Trust │  ╲                              ╱  └──────────────┘
└─────────────────────┘   ╲                            ╱
                           ╲    ┌──────────────┐      ╱    ┌──────────────┐
┌─────────────────────┐     ╲   │              │     ╱     │ Cooperation  │
│    Trustee's        │      ╲  │              │    ╱──────└──────────────┘
│  Characteristics    │       ╲ │              │   ╱
│                     │────────→│    Trust     │──────────┌──────────────┐
│  • Ability          │         │              │   ╲      │  Knowledge   │
│  • Benevolence      │        ╱│              │    ╲     │  Sharing     │
│  • Integrity        │       ╱ │              │     ╲    └──────────────┘
└─────────────────────┘      ╱  └──────────────┘      ╲
                            ╱                           ╲  ┌──────────────┐
┌─────────────────────┐    ╱                             ╲│  Innovation  │
│ Situational Factors │   ╱                               └──────────────┘
│                     │  ╱
│ For Example:        │ ╱                                  ┌──────────────┐
│                     │╱                                   │  Extra-Role  │
│ • Transformational  │                                    │  Behaviours  │
│   Leadership        │                                    └──────────────┘
│ • Organizational    │
│   Justice           │                                    ┌──────────────┐
│ • Perceived         │                                    │ Performance  │
│   Organizational    │                                    └──────────────┘
│   Support           │
└─────────────────────┘
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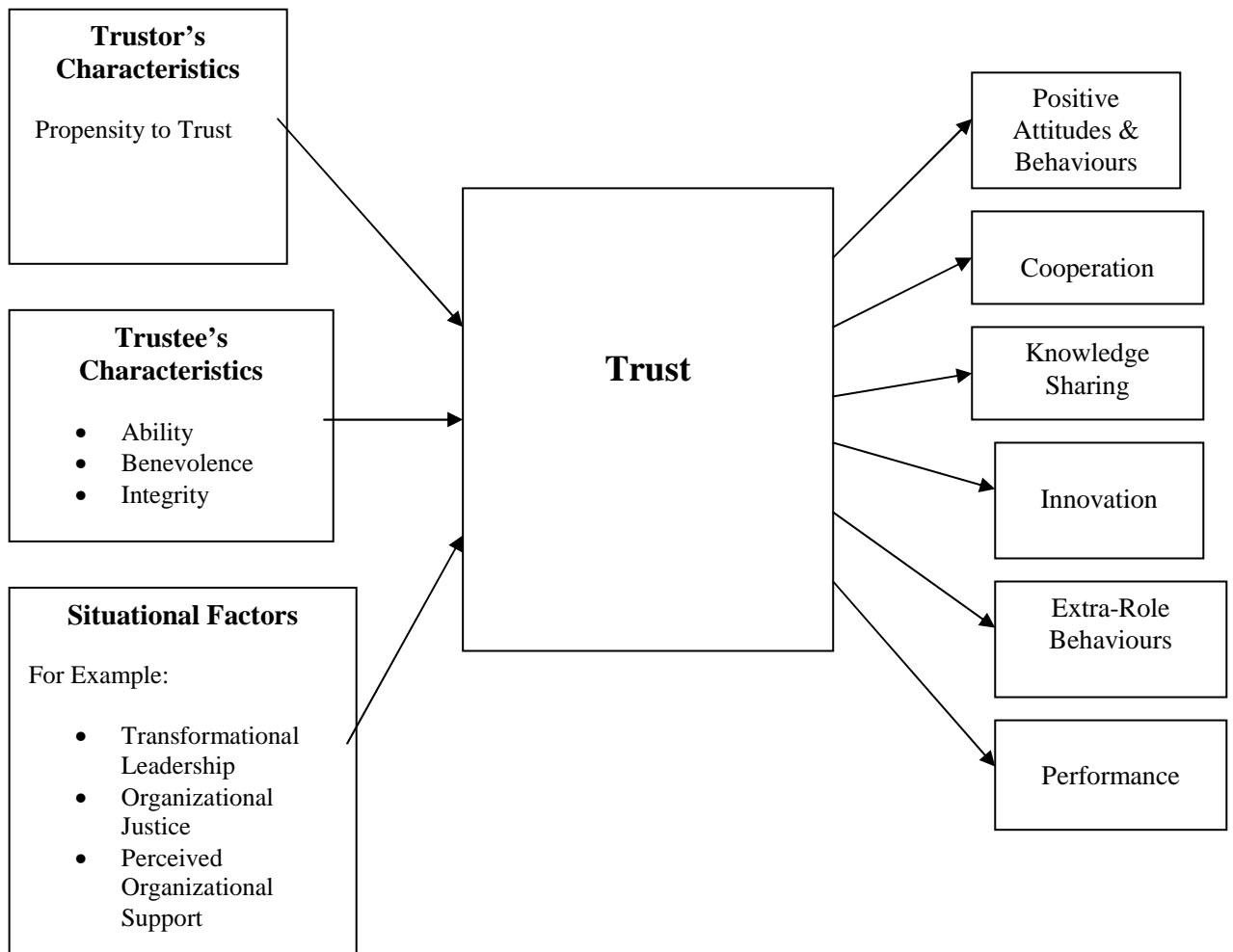
5.5 Downside of Trust – The Concept of Optimal Trust

As noted above, previous research has provided plethora of evidence, which suggests that positive trust can manifest in improved job attitudes, more extra-role behaviours, higher levels of cooperation and improved performance. In light of this evidence it is fair to suggest that a climate of trust can be an important source of competitive advantage for the concerned organization. An important issue, however, is that is excessive trust always better? Or is there a dark side to trust? Recent research suggests that trust beyond a certain point can result in negative consequences both for

the individual and the organization. For instance, several scholars argue that high levels of trust can generate a 'blindness' that can lead to the exploitation and mistreatment of the trustor (Kramer, 1996; Wicks, Berman and Jones, 1999). Furthermore, Erdem (2003) argues that extreme trust can give birth to risks for teams because it can result in groupthink phenomenon. He posits that too much trust in the team leader or in each other can result in a blind acceptance of the status quo, which consequently can lead to a less dynamic team.

In a related vein, a recent study by Langfred (2004) suggests that too much trust in the context of self managing teams can be counter productive and argues that high trust can lead to a reluctance to peer monitor, which when combined with high individual autonomy, can adversely affect team performance.

In addition, Robbison, Dirks and Ozcelik (2004) argue that by increasing and maintaining trust, organizations create a greater risk of facing intense reactions when that trust is breached. These reactions can take the form of emotional distress, aggression and perhaps even violence. According to Robinson et al. (2004) such reactions are likely to occur because employees may feel that there vulnerabilities were taken advantage of or exploited, because the breach was unexpected or it may emanate from a "reality shock or a perceived discrepancy between one's prior expectations and the betraying incident itself" (p. 332).

Finally, Ng and Chua (2006) contend that increasing cognition based trust to a certain point can reduce cooperation because of free riding tendency. This is especially likely to be the case when individuals believe that they possess fewer resources than their fellow group members. The perception of having fewer resources might lead them to believe that they are less critical in contributing towards group welfare. When such people are "also presented with information on the reliability and competence of their richer group members (i.e. high cognition-based trust), their perceived criticality is further diminished, leading to greater free riding tendency (i.e. low cooperation)" (p. 49).

Determining the proper level of trust nevertheless requires astuteness (Tschannen-Moran and Hoy, 2000). Organizational members need to know not only when to trust others and in what respects, but also when to monitor others closely (Lewicki et al., 1998). Thus, organizations should strive to establish optimal trust, which reflects a balance between excess and deficiency (Wicks et al., 1999).

5.6 The Cost of Distrust

Several researchers and scholars ascribe negative individual and organizational consequences to a lack of trust. For instance, Mishra and Morrisey (1990) argue that in a non-trusting environment, people misspend enormous amounts of energy on protecting themselves against opportunistic behaviour. Furthermore, individuals are less forthcoming with ideas and are less creative. Finally, at low levels of trust an organization exhibits decreased commitment and low morale among employees, high absenteeism and turnover and a strong resistance to change (Mishra and Morrisey, 1990).

Engendering distrust can be costly (Tschannen-Moran and Hoy, 1998). In the absence of trust, 'people are increasingly unwilling to take risks, demand greater protections against the possibility of betrayal and increasingly insist on costly sanctioning mechanisms to defend their interests' (Tyler and Kramer 1996, p. 4). Distrust evokes feelings of ambiguity and insecurity leading people to expend their energies on protecting themselves against opportunistic behaviours, instead of focussing on the accomplishment of fundamental work objectives. People may use several means to protect themselves from the possible harm of the distrusted person and to minimize their vulnerability. They may intentionally withhold information, refuse to engage in cooperative behaviour or may use control mechanisms such as rules and contractual agreements to protect their interests (Tschannen-Moran and Hoy, 2000). Such steps are typically dysfunctional and counterproductive and can have deleterious effects on the effectiveness of the organizations. Thus, cultivating a climate of trust within organizations is essential for the growth and survival of organizations.

5.7 Summary

The purpose of this chapter was to highlight some of the practical issues relating to trust. Specifically, the chapter reviewed the difficulties involved in the measurement of trust and concluded that Mishra and Mishra's (1994) trust scale was the most appropriate measure of this construct in the context of the present study. Furthermore, this review examined the various antecedents and consequences of trust. The literature reviewed in this connection revealed that trust is predominantly the

outcome of trustor's dispositional tendency to trust (trust propensity); characteristics of the trustee (e.g. ability, benevolence and integrity); and situational factors such as, transformational leadership behaviours, perceptions of fairness and perceived organizational support. In addition, previous empirical research provides ample evidence that positive trust can play a vital role in enhancing the effectiveness of organizations because it can manifest in important outcomes like more constructive attitudes and behaviours, increased cooperation, greater flow of knowledge and ideas and higher levels of innovation and performance.

Furthermore, it was argued that distrust entails high costs for the organizations. It breeds feelings of suspicion and anxiety and prevents the organizations from enabling certain processes like information sharing and cooperation, which can confer a competitive advantage. Moreover, in a climate of mistrust employees are less focussed on achieving their work goals because they are more concerned about protecting themselves against opportunistic behaviour. Finally, mistrust leads to low commitment and satisfaction and high absenteeism and turnover rates. All these factors can adversely affect individual and organizational performance and effectiveness.

Finally, this review showed that existence of too much trust is also not good for organizations. Excessive trust can have detrimental effects for the organization such as, the creation of groupthink phenomena, which can stifle creativity and initiative (Erdem, 2003). Moreover, trust is costly to create and makes one suspect against opportunistic behaviour. Therefore, it is plausible that the presence of too much trust may actually prove harmful for both the employees and their organizations. Accordingly, it is suggested that the organizations should seek to maintain an optimal level of trust, which refers to the 'golden mean' between excess and deficiency (Wicks et al., 1999).

As mentioned in chapter 1, no study to-date has examined the relationship between trust and work engagement. Nevertheless, this review reveals that positive trust can prove to be an important predictor of other indicators of motivation such as, job satisfaction, organizational citizenship behaviour and turnover intentions. Since, work engagement is also an indicator of motivation, these findings inspire confidence that positive trust in each referent, that is, the top management, direct supervisor and team embers may also play a critical role in enhancing scientists' engagement with their work. Moreover, the findings from this review reveal that in addition to

cultivating work engagement positive trust may also manifest in several other important outcomes for the research centres such as, stronger satisfaction and commitment; greater exchange of knowledge; higher levels of innovation and better individual, team and organizational performance. However, this chapter cautions that excessive trust can manifest in negative outcomes like the group-think phenomena, which can have deleterious effects on scientists' work engagement and performance. Thus, the management of the university research centres need to be aware of these potential pitfalls, while attempting to embed a climate of trust in their respective centres.

CHAPTER 6

Organizational Identification, Affective Commitment to the Supervisor and Team Psychological Safety

6.1 Chapter Overview

This chapter provides a brief literature review of the three mediating variables, namely, organizational identification, affective commitment to the supervisor and team psychological safety. As mentioned in chapter 1, the second objective of the present study was to ascertain whether or not organizational identification will mediate the effects of trust in top management on work engagement; affective commitment to the supervisor will mediate the relationship between trust in supervisor and work engagement; and team psychological safety will mediate the effects of trust in team members on work engagement. In view of this aim, it was predicted that:

Hypothesis 2a: Researchers' organizational identification will mediate the effects of trust in top management on work engagement

Hypothesis 2b: Researchers' affective commitment to the supervisor will mediate the effects of trust in direct supervisor on work engagement

Hypothesis 2c: Team psychological safety will mediate the effects of trust in team members on work engagement

The precise position of the three mediating variables in the research model is depicted in Figure 6.1 below:

FIGURE 6.1
Position of Mediators in the Research Model
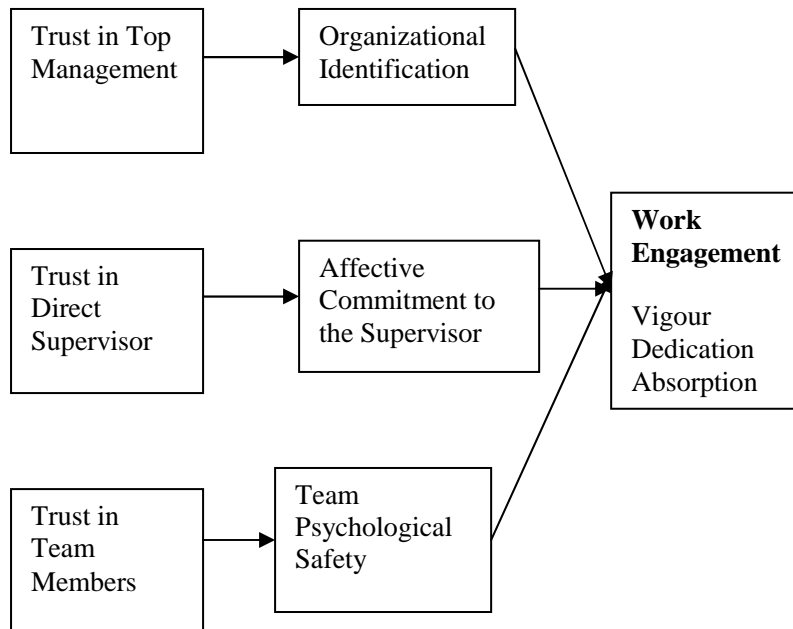
The purpose of this chapter is to examine the evolution of these concepts, review their antecedents and consequences, illuminate their importance for organizations and explain the rationale for using them as mediating variables in the research model.

6.2 Organizational Identification: An introduction

Organizational identification, which refers to a psychological bonding between the employee and his or her organization, has been defined and conceptualized in many different ways. For example, Hall, Schneider and Nygren (1970) equate organizational identification with internalization and consequently define it as the process through which the goals and values of the organization are aligned with the goals and values of the individual. On the other hand O'Reilly and Chatman (1986), conceptualize identification along with compliance and internalization, as one of the basis of commitment. Following Kilman (1961), these authors refer to identification as "involvement based on a desire for affiliation" (p.493). Still others view identification as a component of organizational commitment

(Mowday, Steers and Porter, 1979; Allen and Meyer, 1990). For example, Allen and Meyer (1990) define affective organizational commitment as "employee's emotional attachment to, identification with, and involvement in the organization" (p. 1). In sum, traditionally the concept of identification remained subsumed under the umbrella of more established constructs like internalization and organizational commitment. It was only after, Ashforth and Mael (1989), in their seminal paper re-defined organizational identification in terms of the social identity theory that this construct catapulted into prominence.

6.3 The Social Identity Approach

The main premise of the social identity approach is that group memberships are self definitional (Van Knippenberg and Hogg, 2003). According to this approach individuals not only define themselves in terms of distinctive individual characteristics, which enable them to distinguish themselves from other individuals but also in terms of the unique features and qualities of the groups to which they belong. The former refers to their personal identity; whereas the later reflects their social identity – that is, 'that part of an individual's self concept which derives from his (or her) knowledge of his (or her) membership of a group (or groups) together with the value and the emotional significance attached to the membership' (Tajfel, 1978, p. 63). Put differently, social identification refers to the perception of belongingness to a group (Mael and Ashforth, 1992). Ashforth and Mael (1989) and Mael and Ashforth (1992) argue that through social identification individuals believe that their destiny is linked to the fate of their group. This belief leads the strongly identified individuals to view the successes and failures of the group as their own and consequently stimulates them to expend extra effort to promote the interests of their group (Mael and Ashforth, 1992). In other words, the more people identify with a particular group, the more their attitudes and behaviours become subservient to that group membership (Tajfel and Turner, 1986). Van Knippenberg and Sleebos (2006) contend that social identification 'leads individuals to see the self similar to other members of the collective, to ascribe group defining characteristics to the self, and to take the collective's interest to heart' (p. 572).

Organizational identification depicts a special kind of social identification, in which individuals define themselves in terms of their organizational membership

(Mael and Ashforth, 1992; Dutton, Dukerich and Harquail, 1994). It is defined as the 'perception of oneness with or belongingness to the organization' (Ashforth and Mael, 1989, p. 22) or 'the degree to which a member defines him or herself by the same attributes that he or she believes define the organization' (Dutton et al., 1994, p. 239). Van Knippenberg and Sleebos (2006) argue that 'the more people identify with an organization, the more the organization's values, norms and interests are incorporated in the self-concept' (p. 572). In short, organizational identification can be considered as a 'psychological merging' of the individual and the concerned organization (Tyler and Balder, 2000).

6.4 Organizational Identification and Organizational Commitment

One criticism levied against the concept of organizational identification is that it has a strong conceptual overlap with the related and more established construct of organizational commitment. For example, Riketta (2005) in his meta-analytic study found that the average correlation between organizational identification and affective organizational commitment was 0.78. This finding raises the question whether or not the two concepts can be conceptually and empirically distinguished or whether organizational identification is just a 'new name for an old concept' (Van Knippenberg, 2000, p. 366). Research evidence, however, indicates that the two constructs can be both conceptually and empirically distinguished. According to Ashforth and Mael (1989) the key conceptual difference between the two concepts stems from the fact that organizational commitment is viewed as an attitude, which an individual holds towards his or her employing organization; whereas, organizational identification reflects a sense of 'oneness' with an organization – that is the extent to which the organization is incorporated in the concerned individual's self concept. Put differently, organizational commitment lacks the cognitive self-referential or self-definitional element of identification (Ashforth and Mael, 1989; Van Knippenberg, 2000; Gautam, Van Dick and Wagner, 2004).

Furthermore, another important difference between the two concepts is that identification is extremely flexible and its effect on employees' attitudes and behaviours is contingent on the salience of the group and on the context (Van Dick et al., 2005). On the contrary, commitment is an attitude, which once developed, tends to be relatively permanent and enduring (Van Dick et al., 2005).

Finally, identification and commitment emanate on the basis of different factors. Identification is reliant on the degree of perceived similarity and shared fate, which employees' experience with the organization (Mael and Ashforth, 1992). Commitment, on the other hand, is dependent on extent to which employees are satisfied with their jobs and on the quality of exchange relationship between the employee and the employing organization (Van Knippenberg and Sleebos 2006).

Apart from these important conceptual differences discussed above, several studies have tried to empirically differentiate the two concepts. For example, Gautam et al. (2004) conducted a study with 450 Nepalese employees to differentiate between organizational identification, which was measured by an eight item scale derived from Cheney's (1982) Organizational Identification Questionnaire (OIQ) and four forms of commitment, namely: affective, continuous, normative and attitudinal commitment. The results of the confirmatory factor analyses showed that identification was distinguishable from all the four facets of commitment.

In another empirical study on 200 Dutch faculty members, Van Knippenberg and Sleebos (2006), using confirmatory factor analyses also demonstrated that identification and commitment could be differentiated. Additionally, the results of their study revealed that both constructs exhibited a different pattern of relationship with perceived organizational support, job satisfaction, turnover intentions and self reference. More specifically, the findings of this study disclosed that organizational commitment was more strongly associated with perceived organizational support, job satisfaction and turnover intentions; while, identification was a stronger predictor of self reference. These findings further lend support to the notion that commitment and identification are two different and independent psychological states.

Furthermore, Riketta (2005), in his meta-analytic study found that although organizational identification and organizational commitment were highly correlated (r = 0.78), they shared only 62% of the variance. This finding implied that identification and commitment are related to each other but they represent two distinct constructs. Additionally, Riketta's (2005) study revealed that the two concepts related differentially to various outcome variables. More particularly, the findings showed that organizational commitment was more strongly related to job satisfaction, absenteeism and turnover intentions; whereas, organizational identification demonstrated a stronger association with job involvement and organizational citizenship behaviour.

The preceding discussion provides sufficient evidence that identification and commitment are conceptually and empirically two independent and distinct concepts.

6.5 Antecedents of Organizational Identification

A growing number of studies have investigated the antecedents of organizational identification. Past empirical research indicates that perceived external prestige and the perceived distinctiveness of the organization are the two most important precursors of organizational identification. Perceived external prestige refers to "employees' perception of how the outside world views their organization (Bartels, Pruyn, De Jong and Joustra, 2007). Mael and Ashforth (1992) argue that the employees "identify partly to enhance self-esteem" and as a consequence tend to "invest more of their self concept in valued personas" because this enables them to enhance their feelings of self worth (p. 105). Thus, employees' belief that important outsiders such as customers or suppliers regard their organization highly might give a boost to their self esteem, "since they acquire a more positive evaluation of self" (Reade, 2001b). This increase in self-esteem, in turn, is likely to strengthen their identification with the organization. A large number of studies have found a positive association between perceived external prestige and organizational identification (Mael and Ashforth, 1992; Dutton et al., 1994; Reade, 2001; Smidts, Pruyn, Van Riel, 2001; Dukerich, Golden and Shortell, 2002; Bartels et al., 2007).

All the studies mentioned above consider perceived external prestige to be a uni-dimensional construct. However, Carmeli, Gilat and Waldman (2007), in their study, tried to overcome this limitation by capturing its multi-dimensional nature. More specifically, they specified two components of perceived organizational prestige: perceived social responsibility performance and perceived market and financial performance. The results of this study revealed that perceived social responsibility and development was positively and significantly linked to organizational identification. However, perceived market and financial performance was found to be unrelated to identification.

In a related vein, Ashforth and Mael (1989) argue that the distinctiveness of the organization's values and norms in comparison to those of other organizations is also likely to manifest in greater organizational identification. Distinctiveness makes

the organization more prominent to the members by illuminating its salient features, which differentiate it from other rival firms and as a result can augment organizational identification. Dutton et al. (1994) also echoed the same thoughts. These authors suggest that organizational members who consider their organization to have a distinct culture, novel strategies or some other unique characteristics which sets their organization apart from other organizations are likely to develop stronger organizational identification. Both Mael and Ashforth (1992) and Reade (2001) found strong empirical support for the connection between perceived distinctiveness and organizational identification.

Several authors have highlighted the importance of communication climate for fostering identification. For instance, Smidts et al. (2001) suggest that an open communication climate, in which the top managers and supervisors involve employees in the decision making process can strengthen identification. This is because such a positive and open climate is likely to lead the employees to believe that their opinions are valued by the organizational leadership and this sense of being valued is expected to bolster their feelings of self-worth and eventually increase identification with the organization. Smidts et al. (2001) uncovered a positive and significant relationship between identification and communication climate.

Bartel et al. (2007) also found a positive association between identification and communication climate. However, the results of their study showed that identification to a particular unit within the organization was more strongly predicted by communication climate within that particular unit. More specifically, it was found that communication climate at the work group level was more predictive of work group identification; whereas, communication climate at the department level was more predictive of department identification.

Recent studies have established organizational justice as a strong predictor of organizational identification (Olkkonen and Lipponen, 2006; Cheung and Law, 2008). For example, Olkkonen and Lipponen (2006) found that organization focussed procedural and distributive justice were positively associated with organizational identification whereas the supervisor focussed interactional justice was positively related to work group identification.

Likewise, Cheung and Law (2008) showed that interpersonal and informational justice affected organizational identification indirectly through the mediating mechanism of perceived organizational support. However, distributive

justice was found to be unrelated to perceived organizational support and instead had a direct effect on organizational identification.

Justice perceptions can build identification through two routes. First, when the employees perceive the organization's policies and procedures to be fair, they are likely to derive satisfaction from the organization's environment, which in turn can increase identification. Second, fair policies and procedures are likely to send a signal to the employees that the organization respects and values them. As noted above, the sense of being valued by the organization is likely to raise employees' self-esteem and as a result can fortify organizational identification.

Perhaps most importantly, from the view point of the current study, there is evidence that seems to suggest that trust can be an important precursor of organizational identification. For example, in their survey study of 257 civil servants, Cremer, Van Dijke and Bos (2006) found that affect based trust was significantly related to organizational identification but cognition-based trust was un-related to this construct. More specifically, their findings revealed that affect based trust mediated the effects of procedural justice on organizational identification.

Tseng, Chen and Chen (2005) also reported similar findings in their study of 73 staff nurses conducted in Taiwan. The results of this study showed that both the perceived trustworthiness of the supervisor (benevolence, ability, integrity, communication and consistency) and trusting behaviours exhibited by the employees (compliance, sharing, teamwork and subordination) were related to organizational identification. More specifically, it was uncovered that trusting behaviours mediated the relationship between trustworthiness and organizational identification.

Finally, Dickey, McKnight and George (2007) proposed that franchisee's trust in the franchisor's competence and honesty can increase franchisee's identification with franchisor. The results of this study disclosed that franchisee's trust in the franchisor's competence was positively and significantly related to identification with the franchisor; however trust in franchisor's honesty did not have a significant impact on this construct.

Previous research also illuminates some other antecedents of organizational identification, which are worth noting. These antecedents include: tenure, satisfaction with the organization and sentimentality (Mael and Ashforth, 1992); support and appreciation of supervisors and opportunity for career advancement and fulfilment (Reade, 2001).

6.6 Consequences of Organizational Identification

The importance of organizational identification springs from the fact that it can result in more positive attitudes and behaviours, improved health and well being, more extra-role behaviours and better performance. For example, research evidence indicates that stronger identification with the organization can manifest in greater job satisfaction (Van Knippenberg and Van Schie, 2000; Van Dick et al. 2004; Wegge, Van Dick, Fisher, Wecking and Moltzen, 2006); lower turnover (Van Dick et al. 2004; Olkkonen and Lipponen, 2006) and absenteeism rates (Van Dick and Wagner, 2002); greater support for the organization (Mael and Ashforth, 1992); higher work motivation (Van Knippenberg, 2000; Van Knippenberg and Van Schie, 2000; Van Dick and Wagner, 2002; Wegge, Van Dick, Fisher, Wecking and Moltzen, 2006) and better customer orientation (Wieseke, Ulrich, Christ and Van Dick, 2007).

Additionally, prior research demonstrates that higher organizational identification has positive effects on employees' physical health and well being. For instance, in their study on school teachers, Van Dick and Wagner (2002) found that identification was significantly but negatively correlated with physical symptoms (e.g. headaches, pain in the shoulders). This finding implied that teachers who identified strongly with their schools suffered less physical ailments as opposed to teachers whose levels of identification were low. In another study conducted within the context of call centres, Wegge et al. (2006) found that highly identified individuals encountered fewer health complaints and experienced lower emotional exhaustion and depersonalization.

Finally, there is ample evidence that higher identification can manifest in superior in-role and extra-role performance (Van Knippenberg, 2000). Van Knippenberg (2000), however, argues that the influence of identification on contextual performance or organizational citizenship behaviour is likely to be more pronounced than on in-role job performance. This is because in-role performance is expected to yield greater benefits for the self; whereas, organizational citizenship behaviours are likely to be more beneficial for the group. Since identification engenders a motivation to further the interest of the group, it is conceivable that identification would be more predictive of contextual performance. Previous research provides empirical evidence, which supports the link between both in-role job performance (Riketta, 2005; Carmeli et al., 2007) and organizational citizenship

behaviour (Van Dick, Wagner, Stellmacher and Christ, 2004; Riketta, 2005; Van Dick, Grojean, Christ and Wieseke, 2006).

It should be noted that the organizational identification affects various attitudes and behaviours by prompting individuals to work in the interest of the organization. The sense of "oneness" with the organization induces the employees to internalise the goals and values of the organization and as a result spurs them to work with greater zeal and commitment on behalf of the organization (Mael and Ashforth, 1992; Dutton et al., 1994; Van Knippenberg, 2000). This motivation to further the interest of the organization, in turn, can manifest in more positive attitudes and behaviours and better performance. Moreover, highly identified individuals are able to cope with job demands more effectively because they regard these demands as necessary for achieving the organizational goals and as a consequence they are likely to enjoy better health and physical well being as compared to their less identified counterparts (Wegge et al., 2006).

6.7 Foci of Organizational Identification

Ashforth and Mael (1989) in their ground breaking paper report that organizational identification can have multiple foci. More specifically, they suggest that in addition to identifying with the organization as a whole, the individuals can also identify with their work group, department, union, age cohort etc. Van Knippenberg and Van Schie (2000) also argue on the same lines. These authors contend that organizations offer employees the opportunity to belong to multiple groups such as the organization, departments and teams and each of these group memberships can prove to be potential foci of identification. In their study, Van Knippenberg and Van Schie (2000) distinguish between work group identification and organizational identification and propose that work group identification is stronger than organizational identification and that the former has a more positive impact on workplace attitudes and behaviours than the latter. The results of their study showed that this indeed was the case. More specifically, it was revealed that work group identification was not only stronger than organizational identification but it also had a more profound effect on job satisfaction, turnover intentions, job involvement and job motivation.

Riketta and Van Dick (2005) in their meta-analytic study, however, suggest that work group identification may not necessarily be a stronger predictor of attitudes and behaviour. They argue that work group identification is likely to be a better predictor of work group focussed outcomes; whereas, organizational identification is likely to be a stronger determinant of organization focussed outcomes. In order to test their predictions, Riketta and Van Dick (2005) used data of 40 independent samples and found that work group identification was more closely related with team related variables such as perceptions of team climate, team satisfaction and team directed extra-role behaviour; whereas, organizational identification was more strongly associated with satisfaction with the organization, intention to leave and organization directed citizenship behaviour. These findings led them to conclude that "focus of attachment merits a central role in attempts to explain differences in work related attitudes and behaviours. In general, associations are stronger when the foci of attachment and potential outcome match than when they do not" (p. 505).

Similarly, Van Dick, Wagner, Stellmacher and Christ (2004) revealed that career identification was related to OCB directed towards one's own qualification; team identification was a stronger predictor of team climate; and organizational identification was a better determinant of job satisfaction and turnover intentions.

In their study on German school teachers, Christ, Van Dick, Wagner and Stellmacher (2003) showed that OCB towards one's career was best predicted by career identification; OCB towards the team was best explained by team identification; and finally OCB directed towards the school was best predicted by school identification.

It appears there is strong support for the perception that "identification is the best predictor for those aspects of group relevant behaviour that are most closely related to the identification focus at hand" (Van Dick, Wagner, Stellmacher, Christ and Tissington, 2005, p. 201).

Although, there is substantial evidence that organizational identification and work group identification are differentially related to various attitudes and behaviours, an important question is that can these identifications interact with each other to influence attitudes and behaviours. To answer this question, Van Dick, Van Knippenberg, Kerschreiter, Hertel and Wieseke (2008) sought to examine the interactive effects of organizational identification and work group identification on job satisfaction and organizational citizenship behaviour. Van Dick et al. (2008)

argued that job satisfaction and organization citizenship behaviour are likely to be stronger in cases of high identification with both the organization and the work group. In contrast, the ensuing job satisfaction and organizational citizenship behaviour will tend to be weaker if employees identify strongly with one foci and only weakly with the other or they identify with none of the foci. More specifically, these researchers hypothesised that the positive effect of workgroup identification on job satisfaction and organizational citizenship behaviour will be stronger if organizational identification is high. Van Dick et al. (2008) found support for their interaction hypotheses and concluded that organizations should take pertinent steps to strengthen employees' identification with both the work group and the organization as a whole.

In sum, on the basis of the above discussion it can be concluded that: organizational identification reflects a sense of "oneness" with the organization; it can be distinguished from organizational commitment; it is best predicted by factors, which make the organization attractive and prestigious for the employees; It can have positive impact on important organizational outcomes; and finally organizational identification is likely to have multiple foci and identification with different foci is expected to differentially relate to different outcomes.

6.8 Affective Commitment to the Supervisor: An introduction

The concept of workplace commitment has been a major focus of research since almost the last four decades. Bulk of the research in this area has predominantly focussed on examining the antecedents and consequences of organizational commitment. One of the most widely accepted definitions of organizational commitment is that by Mowday, Steers and Porter (1979) who define this construct as the relative strength of an individual's identification with and involvement in a particular organization. They mention three characteristics of organizational commitment: (1) a strong belief in and acceptance of the organization's goals, (2) a willingness to exert a considerable effort on behalf of the organization and (3) a strong intent or desire to remain with the organization. However, this approach conceptualizes commitment as a unidimensional construct and does not highlight the bases or motives which engender attachment to the organization (Becker, 1992).

Meyer and Allen (1991) overcame this limitation by advocating a three component model of organizational commitment. More specifically, these authors identified three bases of commitment: affective, normative and continuous commitment. Affective commitment refers to the employees' attachment to, identification with and involvement in the organization; continuance commitment refers to the desire to remain with the organization because of the costs associated with leaving that particular organization; finally normative commitment reflects a feeling of obligation to continue employment in an organization. Meyer and Herscovitch (2001) argue that affective, normative and continuous commitment reflect three distinct mind-sets, that is, desire, perceived cost and felt obligation respectively, which bind the employees to their employing organization. Meyer, Stanley, Herscovitch and Topolyntsky (2002) in their meta-analytic study showed that, as predicted, all three forms of commitment were negatively related to turnover. Furthermore, the results of this study showed that affective commitment had the most profound impact on organizational outcomes such as, attendance, performance, organizational citizenship behaviour and on employee relevant outcomes such as, stress and work-family conflict. Normative commitment also had a positive impact on organizational and employee relevant outcomes, but its effect was comparatively weaker than affective commitment. Continuous commitment, however, was either found to be unrelated or negatively related to the outcome variables.

As mentioned earlier, past research has mainly concentrated on commitment to the organization. However, over the past two decades several researchers and scholars have suggested that commitment can have multiple foci and as a result, in addition to the organization, the employees can also become committed to other constituencies located within and outside the organization such as, the top management, supervisors, workgroup and customers (Reichers, 1985; Becker, 1992; Becker and Billings, 1993; Becker, Billings, Eveleth and Gilbert, 1996). Additionally, these authors argue that commitment to foci other than the organization can have important implications and consequences for the organization. For instance, Becker (1992) reported that commitment to the top management, supervisor and workgroup explained unique variance in intention to quit, job satisfaction and pro-social behaviour above and beyond the variance explained by organizational commitment.

The current study, however, exclusively focuses on commitment to the supervisor and positions this construct as a mediating variable, which intervenes between trust in supervisor and employees' work engagement. The next section examines the various conceptualizations of this concept.

6.9 Definition of Commitment to the Supervisor

The review of literature reveals that supervisor commitment has been defined and conceptualized in three different ways. The first approach to this construct was put forward by Becker and his co-researchers (e.g. Becker, 1992; Becker and Billings, 1993). These researchers used O'Reilly and Chatman's (1986) multidimensional framework of organizational commitment and applied it to top management, immediate supervisor and the work group. O'Reilly and Chatman (1986) suggested that commitment reflects an attitude towards the organization and that there are three bases, namely, compliance, identification and internalization, through which employees develop attachment to the organization. Compliance occurs when individuals adopt attitudes and behaviours in order to accomplish particular rewards or to avoid specific punishments. Identification results when an individual adopts attitudes and behaviours in order to develop and maintain a fulfilling relationship. Finally, internalization occurs when an individual adopts attitudes and behaviours because these are compatible with his or her value system.

However, this approach has several shortcomings. First, Becker (1992) found that the compliance measure could not be differentiated across different referents of commitment. Second, in several studies it has been demonstrated that identification and internalization dimensions of commitment are not only highly correlated with each other but they also exhibited the same pattern of relationship with other variables, thus raising the question whether these two dimensions are distinguishable or not (Meyer and Herscovitch, 2001). Finally, previous research indicates that the compliance scale is positively related to turnover intentions (O'Reilly and Chatman, 1986; Becker, 1992). Since commitment is normally associated with lower turnover, this result therefore, suggests that compliance may not be an indicator of commitment.

The second approach to supervisor commitment has been put forward by Chen, Tsui and Farh (2002). These authors used the term 'loyalty to the supervisor' instead of 'commitment to the supervisor'. These authors argued that psychological

attachment to a person is best depicted as 'personal loyalty' rather than as 'an impersonal form of commitment'. Chen et al. (2002) thus defined loyalty to the supervisor as 'the relative strength of a subordinate's identification with, attachment, and dedication to a particular supervisor' (p. 342). Chen (2001) and Chen et al. (2002) specified five dimensions of loyalty to the supervisor. More specifically, they added three new dimensions to the identification and internalization dimensions proposed by Becker (1992). The five dimensions proposed by Chen and his colleagues include:

1. dedication (dedicating oneself to supervisor)
2. effort (exerting extra effort on behalf of the supervisor)
3. attachment to the supervisor (desire to be attached to the supervisor)
4. identification (feeling of pride being associated with the supervisor)
5. internalization (compatibility with supervisor's goals and values)

Chen et al.'s measure of loyalty to the supervisor was primarily developed for collectivist cultures like China 'where there is a high respect for and obedience to those in positions of authority' and where 'supervisors would expect and employees would offer dedication and extra effort' (p. 352). One limitation of this measure is that the three new dimensions proposed by Chen and his co-researchers (dedication, effort and attachment) are likely to be more relevant in collectivist cultures and as a result may not exercise a significant impact on organizational behaviour in the individualistic western societies. This model, therefore, needs to be tested in different cultural settings to establish its external validity.

Finally, Clugston, Howell and Dorfman (2000) extended Meyer and Allen's (1991) three component model of organizational commitment to the supervisor and the workgroup. As noted above, Meyer and Allen (1991) identified three bases of commitment, that is, affective, continuous and normative commitment. Affective commitment to the supervisor reflects an employee's identification with, attachment to and involvement with his or her supervisor. Continuous commitment to the supervisor refers to the costs, which are likely to be incurred because of leaving one's supervisor. Finally, normative commitment reflects an employee's desire to work with his or supervisor because he or she feels obligated to do so.

Several scholars have extended Meyer and Allen's model of organizational commitment to other foci such as the supervisor and workgroup (Becker and Kernan, 2003; Stinglhamber, Bentein, Vandenberghe, 2002; Stinglhamber and Vandenberghe, 2003; Vandenberghe, Bentein and Stinglhamber, 2004). Since Meyer and Allen's (1991) three component model is now widely regarded as the most robust measure of workplace commitment (Meyer, Stanley, Herscovitch and Topolyntsky , 2002), this approach is also being adopted in the current study. Thus, in the present study affective commitment to the supervisor is defined as an attachment, which reflects employees' identification with and emotional attachment to their supervisor (Clugston et al., 2000).

6.10 The Relationship between Organizational Commitment and Supervisor Commitment

Four different lines of reasoning characterise the relationship between organizational and supervisor commitment. The first approach, which depicts the relationship between the two forms of commitment, has been advocated by Hunt and Morgan (1994). Hunt and Morgan (1994) argue that the role of commitment to other constituencies such as top management, supervisor and the work group is primarily to fuel global organizational commitment, which in turn manifests in positive outcomes for the organization. More specifically, they tested two hypotheses. The first hypothesis postulated that organizational commitment and commitment to other foci, namely the top management, supervisor and work group influence the organizational outcomes independently. The second hypothesis proposed that organizational commitment was a key construct, which mediates the effects of constituency specific commitments on organizational outcomes. Utilizing data from Becker's (1992) study, Hunt and Morgan (1994) found support for the second hypothesis. More particularly, their findings showed that organizational commitment was a key intervening variable, which mediates the relationship between constituency specific commitments and organizational outcomes (organizational citizenship behaviour and intention to quit). In other words, the results of this study implied that commitment to top management, supervisor and work group are likely to affect organizational outcomes indirectly by increasing organizational commitment.

Becker and his colleagues advance a separate model, which is based on Lewin's (1943) field theory. This theory postulates that the foci, which are psychologically and physically most proximal to the employees are likely to have the most profound impact on their attitudes and behaviours. Extending this theory to organizational setting, Becker et al. (1996) showed that commitment to the supervisor had a stronger impact on employees' job performance than organizational commitment. This finding implied that local foci such as, the supervisor, because of their psychological proximity to the employees, are in a better position to influence employees' performance related behaviour than the global foci such as the organization or top management. Several studies have found support for this proximal hypothesis (Siders, George and Dharwadkar, 2001; Bentein, Stinglhamber and Vandenberghe, 2002).

The third viewpoint, which underscores the relationship between the commitment to the global and local foci is based on the principal of compatibility (Ajzen and Fishbein, 1977). According to the principal of compatibility, a given attitude is likely to be a stronger predictor of a particular behaviour if the attitude and the behaviour have the same foci. Applying the logic of this principal to the commitment theory, Becker and Billings (1993) suggested that commitment to the local foci such as the supervisor and co-workers is likely to be more strongly related to supervisor or co-worker focussed outcomes; whereas, commitment to the global or distal foci such as the organization is likely to be a stronger predictor of organization focussed outcomes. One potential weakness in the studies of Hunt and Morgan (1994) and Becker et al. (1996) was that these studies did not differentiate between global and local outcomes. For instance, Hunt and Morgan only included global outcomes in their study, that is, overall pro-social behaviour and intention to quit; whereas Becker et al. (1996) only focussed on job performance, which is considered to be a supervisor specific outcome (Becker and Krenan, 2003). This perhaps could be the reason why the two studies reported contradictory findings.

The compatibility principal subsequently has received considerable empirical support. For example, Becker and Krenan (2003) reported that commitment to the supervisor was more strongly aligned with the two supervisor focussed outcomes, namely, in-role job performance and courtesy; whereas, organizational commitment had a stronger association with loyal boosterism – an organization relevant outcome.

Chan, Tong, Redman and Snape (2006) tested the compatibility hypotheses in samples of manufacturing workers in the United Kingdom and China. These researchers, in line with the compatibility hypothesis, postulated that organizational commitment will be more predictive of withdrawal cognitions and conscientiousness; supervisory commitment will more closely aligned with altruism; and co-worker commitment will be directly associated with altruism and individual-oriented union citizenship behaviour. The results of this study showed that, as expected organizational commitment was a stronger predictor of withdrawal cognitions and conscientiousness. Although, supervisory commitment was found to be unrelated to altruism, co-worker commitment emerged as a significant predictor of altruism and individual-oriented union citizenship behaviour in both samples, thereby yielding support for the compatibility hypothesis.

Snape, Chan and Redman (2006) also found support for the compatibility hypothesis in their study of Chinese manufacturing workers. Their study revealed that organizational commitment was more strongly related to two organizational focussed outcomes, namely, withdrawal cognitions, protecting company resources and conscientiousness; while supervisory commitment was more predictive of supervisor related outcomes, that is, altruism and interpersonal harmony.

These findings were replicated in the Turkish context by Wasti and Can (2008). These scholars found that as predicted by the compatibility hypothesis, organizational commitment was more predictive of turnover intentions – an organizational related outcome; while supervisor commitment was more closely connected with organizational citizenship behaviour directed towards the supervisor – a supervisor relevant outcome.

However, several scholars have challenged the compatibility hypothesis and have advocated that in collectivist cultures, supervisory commitment is expected to have a stronger impact on global outcomes than commitment to global foci. Cheng, Jiang and Riley (2003) have termed this the cultural hypothesis. The main rationale for the cultural hypothesis is that in vertical collectivist societies the "emphasis on submission to authority and personalized loyalty render the supervisor a more significant focus of commitment" (Wasti and Can, 2008, p. 409). Cheng et al. (2003) found support for the cultural hypothesis in their Taiwanese study. More particularly, they showed that in addition to local outcomes (organizational citizenship behaviour and job performance), supervisory commitment was also a significant predictor of

global outcomes (turnover intentions and job satisfaction). However, in many subsequent studies the cultural hypothesis could not be validated (Snape et al., 2006; Chan et al., 2006; Wasti and Can, 2008). Wasti and Can (2008) conclude that the influence of culture may be less straightforward and as a result may require "more sophisticated research designs, which incorporate organizational characteristics and the nature of work" (p. 412).

Thus, on the basis of the results discussed above, it is fair to conclude that the compatibility hypothesis provides the most accurate depiction of the relationship between organizational commitment, supervisor commitment and the outcome variables.

6.11 Antecedents of Supervisory Commitment

Surprisingly, not many studies have examined the antecedents of commitment to the supervisor. In one of the few studies, which investigated the antecedents of supervisory commitment, Vandenberghe et al. (2004) demonstrated that a high quality leader-member exchange was positively related with commitment to the supervisor. More specifically, the results of their study showed that supervisory commitment was particularly influenced by the 'affect' and 'professional respect' dimensions of LMX. In a related vein, Stinglhamber and Vandenberghe (2003) showed that perceived supervisor support was positively related with supervisory commitment.

Wong, Wong and Ngo (2002), examined the impact of two antecedents, namely, interactional justice and trust in supervisor, on loyalty to the supervisor in a sample of 295 employees drawn from four contractual joint venture factories. More specifically, they tested two competing models, that is, the direct effect model and the mediation model. The direct effect model proposed that interactional justice and trust in supervisor will have direct effects on loyalty to the supervisor; whereas the mediation model postulated that trust in supervisor will mediate the effects of interactional justice on loyalty to the supervisor. The results from structural equation modelling found support for the mediation model. More particularly, it was found that trust in supervisor fully mediated the relationship between interactional justice and loyalty to the supervisor.

Finally, Wasti and Can (2008) in their Turkish study uncovered that satisfaction with the supervisor and empowerment proved to be the two strongest drivers of commitment to the supervisor.

6.12 Consequences of Commitment to the Supervisor

One important reason why commitment to the supervisor has attracted the attention of scholars and researchers in recent years is that it has been shown to be an important predictor of job performance. Consistent with Lewin's (1943) field theory, Becker and his co-researchers (Becker, 1992; Becker et al., 1996; Becker and Kernan, 2003) argued that psychologically proximal foci such as the supervisor are likely to have a much stronger impact on performance related behaviour than more distal foci such as the top management and the organization. This is because a supervisor regularly interacts with his or her subordinates and as a result is in a better position to monitor, reward and influence their performance related behaviour (Becker et al., 1996). Close interaction with the supervisor also facilitates the employees in seeking feedback on performance. The process of seeking feedback can help the employees to align their goals and values with the goals and values espoused by the supervisor, which subsequently can have positive effects on their performance (Becker et al., 1996). Indeed, Becker et al. (1996) demonstrated that supervisory commitment had a stronger impact on job performance than organizational commitment.

Siders, George and Dharwadkhar (2001) reported that when an employee is committed to his or her supervisor he or she gains access to supervisory resources such as performance feedback and instrumental help, which may not be available to him or her otherwise. Access to important supervisory resources, in turn, manifests in higher performance. Several other studies have also uncovered a positive link between supervisory commitment and job performance (Wong et al., 2002; Chen et al., 2002; Becker and Kernan, 2003; Cheng et al., 2003).

In addition, it has been demonstrated that stronger commitment to the supervisor can lead to higher job satisfaction (Cheng et al., 2003), lower turnover rates (Stinglhamber and Vandenberghe, 2003) and a greater propensity to engage in organizational citizenship behaviours (Wong et al., 2002; Becker and Kernan, 2003; Cheng et al., 2003).

In view of these findings, it is reasonable to suggest that developing commitment to the supervisor can be a useful strategy for increasing the efficiency and effectiveness of the organization.

6.13 Team Psychological Safety: An introduction

Edmondson (1999) argues that learning in teams takes place when employees engage in activities such as asking for help, seeking or giving feedback, experimenting with new work methods and constructively discussing errors and mistakes. Edmondson (1999) further asserts that the importance of these activities stems from the fact that they can help teams to understand customer needs, spot changes in the environment and uncover faulty procedures and processes. However, in spite of these potential benefits, the enactment of these behaviours entails significant risks for the focal individual. For instance, by asking for help or while admitting mistakes, an individual risks being perceived as incompetent, which in turn can have an adverse impact on his or her self-esteem. So under what conditions would the individuals be willing to engage in these interpersonally risk behaviours?

Edmondson (1999, 2004a), contends that a climate of psychological safety can prove to be an important enabler of these risky behaviours. Psychological safety reflects individuals' beliefs that they would not be punished or rejected for taking well intentioned interpersonal risks such as seeking feedback, admitting mistakes or suggesting a novel idea (Edmondson, 1999; Edmondson, Bohmer and Pisano, 2001; Edmondson, 2004). Edmondson (2004a) argues that individuals ascertain the interpersonal risks associated with a given behaviour, by for example, tacitly asking themselves the question that: "If I ask for help, will I be deemed as incompetent?" A negative answer to this tacit question encourages the focal individual to engage in the behaviour under consideration (Edmondson, 2004).

Other researchers have also put forward similar definitions of psychological safety. For instance, Kahn (1990) defines psychological safety as a belief that one can express his or her true self "without fear of negative consequences to self-image, status or career" (p. 708). Kahn in his qualitative study found that psychological safety, along with psychological meaningfulness and psychological availability determined "how people inhabited their roles" (p. 703) in an organization. More specifically, the results of his study showed that when employees felt psychologically

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safe, they injected greater levels of their mental, physical and emotional energies into their work role and at the same time expressed the core aspects of their self-concepts without any fear or inhibitions.

The concept of psychological safety has emerged from Schien and Bennis's (1965; cited in Edmondson, 1999) research on organizational change. These authors argued that if employees are to feel secure and capable of changing, it is imperative that organizations should make a concerted effort to create a climate of psychological safety. In a similar vein, Schien (1985; cited in Edmondson, 2004a, p. 241) suggests that "psychological safety helps people overcome the defensiveness or learning anxiety that occurs when they are presented with data that disconfirms their expectations or hopes, which can thwart productive learning behaviour". Psychological safety does not imply a 'cosy' environment in which employees are close friends or which is devoid of pressures and problems. Psychological safety on the contrary signifies a climate, which promotes constructive problem solving and goal accomplishment by minimizing interpersonal risks and threats for individuals (Edmondson, 2004a).

6.14 Psychological Safety and Trust

The construct of psychological safety seems to have much in common with the concept of trust. Both constructs represent psychological states, which reflect risk and vulnerability for the focal individual. Additionally, both these states involve making choices to mitigate unfavourable consequences in a particular relationship. Finally, heightened perceptions of psychological safety and trust can both result in positive consequences for individuals, teams and organizations. However, Edmondson (2004a) enumerates three facets of psychological safety, which differentiate it from the related concept of trust: the object of focus; time-frame and level of analysis.

6.14.1 Focus on 'Self' Versus 'Others'

Edmondson (2004a) argues that trust involves giving other people the benefit of the doubt. Thus the focus of trust is on *others'* potential actions or credibility. In contrast, the focus of psychological safety is on the *self*. That is, in case of psychological safety the question is that whether or not other people will give you the

benefit of the doubt, when for example you have reported a mistake or have asked for help.

6.14.2 Narrow Temporal Bounds

Second, psychological safety takes into account very short term interpersonal repercussions, which an individual anticipates from engaging in a particular behaviour. For example, an employee pondering over the decision of whether or not to ask his supervisor for feedback on his performance, may be so focussed on the immediate ramifications of seeking feedback, such as being regarded as incompetent, that he ignores the longer term consequence of not seeking feedback – that is, adverse impact on his performance. Edmondson (2004a) contends that the construct of trust on the other hand "pertains to anticipated consequences across a wide temporal range, including the relatively distant future" (p. 244).

6.14.3 Group Level Analysis

Finally, Edmondson (2004a) asserts that the perceptions of psychological safety are most likely to be influenced by an employee's co-workers with whom an employee works most closely. In contrast, concept of trust relates "primarily to a dyadic relationship, whether between individuals or collectives such as firms" (p. 244).

6.15 Antecedents of Psychological Safety

In her comprehensive review, Edmondson (2004a) illuminated four potential antecedents of psychological safety: supportive leadership; trusting relationships; implementation of practice fields; and context support.

Edmondson (2004a) suggests that supportive leadership behaviour can be particularly important in strengthening sense of psychological safety. More specifically, she suggests that a leader can engender feelings of psychological safety among his or her followers by being coaching oriented and accessible; inviting inputs; and by explicitly demonstrating his or her fallibility through admitting mistakes. First, by being accessible, leaders can promote psychological safety by breaking down the

barriers, which prevent effective communication and discussion. Second, leaders' tendency to invite suggestions and inputs from their subordinates is likely to signal to the subordinates that their feedback is valued and respected. This in turn should encourage the employees to voice their opinions, thereby reinforcing their feelings of psychological safety. Finally, leaders' inclination to openly admit mistakes is likely to suggest to the employees that errors and concerns can be discussed without the fear of negative repercussions.

Edmondson (1999) in her study of 51 work teams found evidence that coaching oriented and supportive leadership can have a positive effect on psychological safety. Other studies have also uncovered a positive relationship between supportive leadership behaviour and psychological safety (Kahn, 1990; Brown and Leigh, 1996; Edmondson, 2003; Nembhard and Edmondson, 2006).

Furthermore, Edmondson (2004a) proposes that the existence of trusting relationships between team members can play a pivotal role in engendering feelings of psychological safety. She suggests that if team relationships are characterised by trust and mutual respect for each other, "individuals are more likely to believe that they will be given the benefit of the doubt – a defining characteristic of psychological safety" (p. 252). May et al. (2004) also assert that high levels of affect based trust can play a key role in promoting feelings of psychological safety. Finally, Kahn (1990) in his qualitative study found that "interpersonal relationships promoted psychological safety when they were supportive and trusting" (p. 708).

Firms can also create an environment of psychological safety through the use of practice fields, which refer to "forums deliberately set up to practise important skills rather than take action and reflect upon the results" (Edmondson, 2004, p. 252). Practice fields are useful because they enable teams to participate in simulated experiences and consequently facilitate them to learn from mistakes without having a detrimental effect on their real work (Edmondson, 2004a). Edmondson, Bohmer and Pisano (2001) in their study found that six out of the eight successful cardiac surgery teams that they studied engaged in comprehensive practice sessions in the form of a dry run; whereas, six out of the eight unsuccessful teams refrained from organizing such sessions. In these practise sessions the teams were able to thoroughly practice the surgical procedures, which were to be used in actual surgery. This helped them to detect and eradicate potential technical problems, which could arise during the course of actual surgery. Moreover, these practise sessions also improved coordination and

understanding among the team members. Edmondson et al. (2001) concluded that surgeons who initiated these practice sessions created a psychologically safe environment by signalling to the team members that mistakes were unavoidable and that offering suggestions and better communication were critical factors for success.

Moreover, context support in the form of adequate resources, accurate information and performance based rewards can engender feelings of psychological safety. The availability of resources and support for teams can facilitate task completion and goal accomplishment and as a result is likely to reduce uncertainty and insecurity among team members. Lower uncertainty and insecurity, in turn, can promote feelings of psychological safety. Edmondson (1999) demonstrated that context support was positively and significantly associated with team psychological safety.

Finally, personality traits can shape individuals' perceptions of psychological safety. For instance, Edmondson and Mogelof (2005) contend that individuals who hold a learning goal orientation might have a stronger sense of psychologically safety than individuals who are high on performance goal orientation. Learning oriented people possess a strong desire to develop themselves by acquiring new skills and knowledge and therefore are more likely to engage in interpersonally risky behaviours like experimentation and seeking constructive feedback. In contrast, performance oriented individuals seek validation from others and as a result are more concerned about how others will evaluate them. Such people therefore tend to feel less safe psychologically, which may prohibit them from engaging in learning behaviour. Likewise, individuals with high levels of neuroticism generally are preoccupied with feelings of insecurity, anxiety and inadequacy. This, in turn, may lead such individuals to perceive their work environment as threatening and unsafe. On the contrary, people high on extraversion and openness tend to have a more positive outlook towards life, which might heighten their perceptions of psychological safety and as a consequence may prompt them to engage in risky behaviour (Edmondson and Mogelof, 2005).

6.16 Consequences of Psychological Safety

The foremost benefit of psychological safety is that it can promote learning behaviour in work teams. Learning behaviour is a set of activities, which signifies an

"ongoing process of reflection and action, characterised by asking questions, seeking feedback, experimenting, reflecting on results and discussing errors or unexpected outcomes of actions" (p. 353). According to Edmondson (1999) psychological safety can enable learning behaviour in teams by reinforcing team members' beliefs that they would not be punished for taking well intentioned risks such as seeking feedback, experimenting with new work methods or reporting errors and mistakes. By using both quantitative and qualitative data, Edmondson (1999) showed that a climate of psychological safety facilitated learning behaviour in teams, which in turn manifested in better team performance. Other studies have also established a positive link between psychological safety and learning behaviour (Carmeli, 2007; Carmeli and Gittell, 2008).

Another potential benefit of psychological safety is that it can encourage the adoption of new technology. For instance Edmondson et al. (2001) showed that team members' felt more comfortable speaking up about concerns and offering suggestions and ideas for improvement in teams, which had managed to create an environment of psychological safety. Additionally, members' tendency to speak up also improved coordination among the team members. All these factors, in turn, led to the successful implementation of technology. In another study conducted within the educational settings, Schepers, de Jong, Wetzels and de Ruyter (2008) found that a climate of psychological safety by reducing the risk of flaming (i.e. posting threatening digital messages on the system) or social loafing facilitated the adoption of groupware technology. More specifically, Schepers et al. (2008) demonstrated that existence of psychological safety positively influenced the perceived usefulness and perceived ease of use of the groupware technology.

Furthermore, research studies have uncovered that psychological safety can promote innovation in organizations (Baer and Frese, 2003; Edmondson, 2004a). The process of innovation requires individuals to engage in interpersonally risky behaviours such as suggesting unorthodox ideas, experimentation and challenging the status quo. These activities entail a significant amount of risk for the focal individual. For instance, by suggesting an unorthodox idea or by challenging existing work practises, the individual faces the risk of being regarded as disruptive or negative. The presence of psychological safety may mitigate these interpersonal risks and as a result can stimulate individuals to engage in innovative work behaviours. In a study of 47

mid-sized German companies, Baer and Frese (2003) established that a climate of psychological safety can promote process innovation.

In addition, Nembhard and Edmondson (2006) showed that a safe environment encouraged employees to engage in quality improvement work in the health care sector. Engagement in quality improvement entails, trying out new technologies and procedures, openly receiving and giving feedback and transgressing the professional status limits. Nembhard and Edmondson (2006) argue that it is quite unlikely that the individuals will exhibit these interpersonally risky behaviours in the absence of psychological safety and therefore are likely to avoid engaging in quality improvement efforts.

One potential advantage of psychological safety is that it can eliminate workarounds or quick fixes (Edmondson, 2004b; Halsbesleben and Rathert, 2008). Workarounds refer to "mechanisms where employees address work flow problems to continue to satisfy the requirements of the job" (Halsbesleben and Rathert, 2008; p. 135). Edmondson (2004b) terms workarounds as first order problem solving. The main shortcoming of this approach is that although it might eliminate the immediate problem at hand, it does not address the root cause of the problem. As a consequence, first order problem solving does little to prevent problems from recurring in the future and is more likely to accentuate operational failures by continuing to repeat bad processes and procedures (Tucker and Edmondson, 2003).

Thus, it is imperative that employees should engage in second order problem solving – an approach in which employees not only confront and solve an emergent problem so that the flow of work is not disrupted, but also take concrete steps to detect the underlying causes of that particular problem. This approach can play a critical role in ensuring that a particular problem does not occur again in the future. However, second order problem solving requires risky actions such as close cooperation among team members, an inclination to speak up and the ability to constructively discuss defective work processes. These actions are more likely to occur in an environment which is characterised by high levels of psychological safety. Halsbesleben and Rathert (2008) empirically demonstrated that psychological safety can prevent the use of workarounds.

6.17 Limitations of Psychological Safety

The preceding discussion provides sufficient evidence that a climate of psychological safety can play a vital role in enhancing the growth and profitability of organizations. This raises the obvious question that is more psychological safety always good? Edmondson (2004) argues that although psychological safety is an important enabler of learning behaviour in teams, it has several limitations, which need to be taken into account. First, the effectiveness of psychological safety is contingent on the size of the teams. Edmondson (2004) contends that the effectiveness of psychological safety is likely to be undermined in large teams because of the reduced importance of face-to-face interactions in the planning and implementation of work tasks. Infrequent interaction between team members, in turn, is likely to hinder the development of consistent perceptions of psychological safety.

Second, psychological safety alone is not sufficient to promote learning behaviour in work teams. It is necessary that a climate of psychological safety must be accompanied by a meaningful shared goal to induce employees to engage in the effortful process of learning. Individuals will be more willing to report errors, seek feedback and experiment with new work methods if they believe that their efforts will contribute towards achieving an outcome about which they care.

Third, too much psychological safety could create an environment in which people may feel excessively comfortable in seeking help and feedback or speaking up about concerns and problems. This, in turn, can adversely affect performance and efficiency by leading to large amounts of time being wasted on trivial issues.

Finally, an undue amount of team psychological safety, by creating an exceptionally low barrier to speaking up, may create problems for team members by opening "the door for getting stuck in counterproductive discussions, which they lack the interpersonal skills to resolve" (Edmondson, 2004, p. 265). Thus, psychological safety needs to be accompanied by strong interpersonal capabilities if effective learning is to take place.

In sum, although a psychologically safe environment is most likely to manifest in positive consequences for individuals, teams and organizations, its negative effects cannot be discounted. Thus, as in the case of trust, it is suggested that organizations should strive to cultivate an optimum level of psychological safety, which should reflect a balance between excess and insufficiency.

6.18 Justification for Using Organizational Identification, Affective Commitment to the Supervisor and Team Psychological Safety as Mediating Variables

The rationale for using organizational identification, affective commitment to the supervisor and team psychological safety as mediators between work engagement and the trust variables was briefly discussed in chapter 1. Specifically, it was argued that trust in top management, trust in direct supervisor and trust in team members are three distinct constructs each having different outcomes and implications (Dirks and Skarlicki, 2004). Dirks and Skarlicki (2004) assert that trust in top management is likely to be a stronger predictor of organization-relevant outcomes; trust in direct supervisor is likely to be more predictive of supervisor focussed outcomes; and trust in team members is likely to exercise a stronger impact on team level outcomes. Therefore, on the basis of this logic it was hypothesised that: (1) organizational identification, an organization focussed outcome, will mediate the relationship between trust in top management and work engagement; (2) affective commitment to the supervisor, which is a supervisor specific outcome will mediate the effects of trust in direct supervisor on work engagement; and (3) team psychological safety, a team relevant outcome, will mediate the relationship between trust in team members and work engagement.

Moreover, strengthening organizational identification, enhancing commitment to the direct supervisor and creating a climate of psychological safety can have important implications for science research centres. For instance, research studies have indicated that higher identification with the organization leads to superior performance, lower absenteeism and turnover rates, more extra-role behaviours, greater job satisfaction, increased motivation and improved health and well-being (Van Dick et. al., 2005). In addition, enhanced identification can engender a "psychological oneness" with the organization, which might lead the employees to think and act from the organization's perspective and to view the organization's goals as their own (Van Dick and Wagner, 2002). This may inspire them to expend greater effort towards the attainment of these goals. In view of this evidence it is reasonable to expect that, researchers who strongly identify with their respective centres can play a pivotal role in the success of these centres.

Likewise, it is suggested that fostering higher commitment to the direct supervisor is likely to be critical for research centres. When researchers are committed to their supervisor, they are liable to get access to supervisory resources that may not be available otherwise (Siders et al., 2001). Such supervisory resources can take the form of more social support, constructive feedback, and personalised coaching. These resources have motivational potential and as a result might promote researchers' work engagement and performance (Bakker and Demerouti, 2008; Bakker et al., 2008).

Finally, team psychological safety acquires particular salience within the context of the research centres, where innovation and creativity are considered as critical success factors. To encourage innovation, the research centres need to develop a supportive environment, in which scientists feel safe to experiment with new scientific methodologies and offer new ideas and suggestions. Moreover, innovation is a "complex and challenging" task (Janssen and Van Yperen, 2004) in which mistakes and errors are most likely to occur. If the science researchers feel confident that mistakes will not be held against them, they will be more inclined to engage in activities such as, experimentation, which can promote innovation (Edmondson, 2004). The frequent exhibition of innovative behaviours is expected to result in positive outcomes for the research centres such as, greater publications, larger number of patents and more new products and processes (Santoro and Saparito, 2003).

6.19 Summary

The present chapter reviewed the relevant literature pertaining to the three mediating variables, namely, organizational identification, affective commitment to the supervisor and team psychological safety. The chapter commenced by examining the literature relating to organizational identification. The review of the relevant literature revealed that organizational identification has its roots in the social identity theory and reflects a sense of "oneness" with the organization. The review also indicated that organizational identification can be conceptually and empirically distinguished from organizational commitment. Furthermore, the antecedents and consequences of organizational identification were examined. Research evidence showed that organizational identification is best predicted by factors, which make the organization attractive and prestigious for the employees. In addition, this chapter disclosed that high levels of organizational identification can manifest in several

important outcomes for organizations. Finally, the review suggested that organizational identification is likely to have multiple foci and identification with different foci is expected to differentially relate to different outcomes.

The chapter then advanced to review the literature relating to affective commitment to the supervisor. This review commenced by providing a brief overview of the commitment literature and how the concept of supervisory commitment has evolved within this literature. Furthermore, this review examined the various conceptualizations of supervisory commitment. On the basis of the available evidence it was concluded that concept of supervisory commitment based on Meyer and Allen's (1991) model of workplace commitment presents the most robust conceptualization of this construct. This review also discussed the various view points underlying the relationship between organizational commitment, supervisory commitment and outcome variables and concluded that the compatibility hypothesis provides the most accurate depiction of the relationship between these variables. Furthermore, the review revealed that supervisory commitment is likely to be a stronger predictor of job performance than organizational commitment.

Additionally, this chapter examined the literature relating to team psychological safety. This review examined the various definitions of this construct and concluded that Edmondson's (1999) definition was most suitable for the current study. In addition, it was disclosed that the concept of psychological safety can be conceptually differentiated from trust. The chapter also reviewed the antecedents, consequences and limitations of this construct. Research evidence indicates that although a psychologically safe environment is expected to manifest in positive consequences for individuals, teams and organizations, its negative effects cannot be ignored. Thus, it was suggested that organizations should attempt to cultivate an optimum level of psychological safety, which should reflect a balance between excess and deficiency.

The chapter finally concluded by providing the rationale for using these three variables as mediators between work engagement and trust. The next chapter presents the literature review relating to the five outcome variables included in the research model.

CHAPTER 7

The Outcome Variables

7.1 Introduction

In chapter 1, it was mentioned that an important objective of the current study was to investigate the impact of work engagement on five organizational outcomes: in-role job performance, innovative work behaviour, two learning behaviors, namely, seeking feedback for self improvement and error communication and organizational commitment. This objective led to the formulation of the following research hypotheses:

Hypothesis 3a: Researchers' work engagement will be positively associated with their in-role job performance

Hypothesis 3b: Researchers' work engagement will be positively associated with their innovative work behaviour

Hypothesis 3c: Researchers' work engagement will be positively associated with seeking feedback for self improvement

Hypothesis 3d: Researchers' work engagement will be positively associated with error communication

Hypothesis 3e: Researchers' work engagement will be positively associated with their organizational commitment

These relationships are presented in Figure 7.1 below:

FIGURE 7.1
Relationship between Work Engagement & Outcome Variables
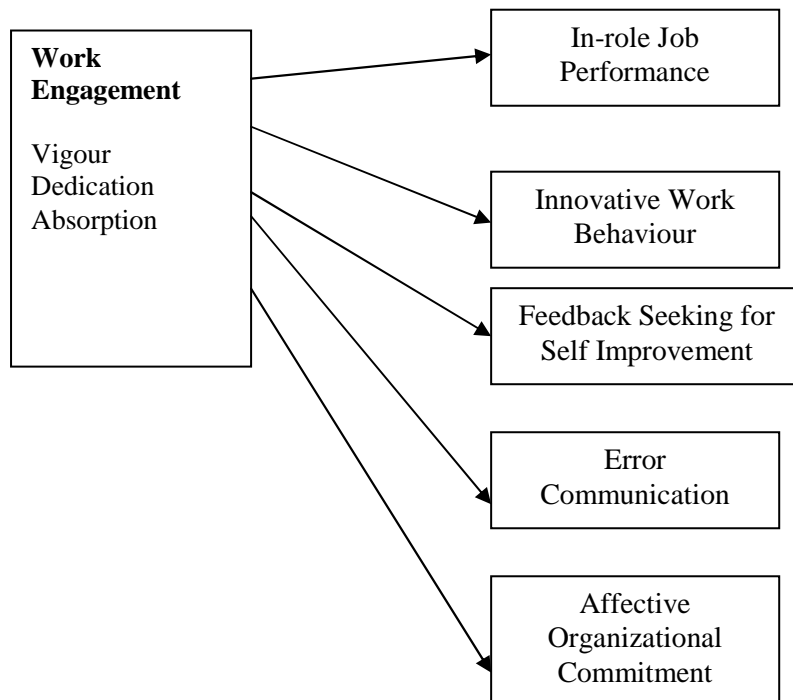
Furthermore, it was argued that work engagement will affect these outcome variables through the mediating mechanism of learning goal orientation. Keeping in view this fourth and final aim of this study, the researcher proposed the following hypotheses:

Hypothesis 4a: Researchers' learning goal orientation will at least partially mediate the effects of work engagement on in-role job performance

Hypothesis 4b: Researchers' learning goal orientation will at least partially mediate the effects of work engagement on innovative work behaviour

Hypothesis 4c: Researchers' learning goal orientation will at least partially mediate the effects of work engagement on seeking feedback for self improvement

Hypothesis 4d: Researchers' learning goal orientation will at least partially mediate the effects of work engagement on error communication

Hypothesis 4e: Researchers' learning goal orientation will at least partially mediate the effects of work engagement on organizational commitment

The part of the research model, which depicts the mediating role of learning goal orientation in the engagement - outcomes relationship is shown in Figure 7.2 below:

FIGURE 7.2
The Mediating Role of Learning Goal Orientation
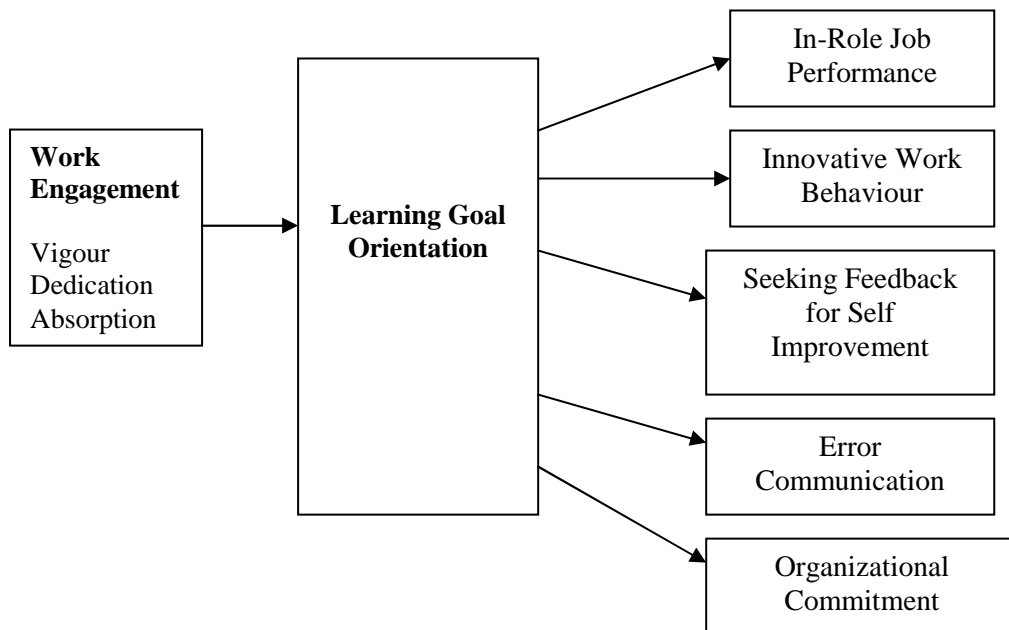
The purpose of this chapter is to present a brief literature review relating to each of the five outcome variables and to explain why they are important in the context of the current study.

7.2 Learning Goal Orientation

As noted above, in the present study, learning goal orientation is positioned as a mediating variable, which intervenes between work engagement and the five organizational outcomes. The construct of goal orientation was initially developed within the educational psychology literature and much of the earlier research in this area was conducted with children in experimental studies (Dweck, 1986; Dweck and Leggett, 1988). However, in the early, 1990s the construct of goal orientation attracted the attention of organizational psychologists and theorists, who reasoned that this construct had the potential to affect employee behaviour within the organizational setting as well (Button, Mathieu and Zajac, 1996; VandeWalle, Cron and Slocum, 2001). Since then, a plethora of studies have sought to examine the impact of employees' goal orientations on organizational behaviour.

Goal orientation is a motivational construct and refers to an individual's inclination toward different types of goals in achievement situations (Dweck, 1986; Dweck and Leggett, 1988). Dweck (1986) identified two major categories of goal orientation: a learning goal orientation, which reflects desire to develop one's competence through the acquisition of new skills and knowledge; and a performance goal orientation, which reflects a desire to demonstrate and authenticate one's competence by seeking positive evaluations and avoiding negative evaluations from others. The present research exclusively focuses on learning goal orientation.

Individuals, who are high on learning goal orientation, attempt to develop themselves by augmenting their skills and know-how (VandeWalle, 1997, 2001, 2003). Such individuals view success or failure to be dependent on the level of effort expended. Additionally, these people hold an incremental theory of ability and as a result believe that their skills and abilities can be enhanced through increased effort and perseverance (VandeWalle, 1997, 2001). Furthermore, learning oriented individuals are more inclined to seek feedback. This is because individuals who hold a strong learning orientation view feedback as an important diagnostic tool, which can help them to remove performance-related deficiencies and as a result allow them to enhance their knowledge, skills and abilities. Finally, when the learning goal oriented people encounter task related obstacles, they tend to exhibit an adaptive response pattern, in that they remain resolute, exert greater effort and rework their strategies (Dweck, 1986; Dweck and Leggett, 1988; VandeWalle, 2003).

Although learning goal orientation is a relatively stable personality characteristic, it can be influenced by situational cues (Button et al., 1996; VandeWalle, 2001; VandeWalle, 2003). For instance, Button et al. (1996) contend that goal orientation is best characterised as a "somewhat stable individual difference that may be influenced by situational characteristics" (p. 28). In a related vein, VandeWalle (2001) reports that, "in a given situation, strong cues that highlight the value of learning or performance goals can override an individual's characteristic goal orientation" (p. 164).

VandeWalle (2001) suggests three possible avenues by which organizations can make the learning goal more salient for the employees. First, through appropriate training programmes organizations can alter the attitudes of employees towards effort expenditure, ability and performance. These programmes can help to cultivate learning orientation by stressing on the point that through greater effort it is possible that individuals can extend their abilities and consequently improve their performance. Second, firms can motivate the employees to adopt a learning goal orientation by introducing a compensation system, which rewards them for developing their abilities through the acquisition of new skills and knowledge. Finally, supportive leadership behaviours, such as providing constructive feedback on performance and encouraging employees to set development objectives and pursue developmental opportunities can also play a key role in raising the learning orientation of employees.

The available empirical evidence also suggests that learning goal orientation may be induced by situational factors. For instance, Sujan, Weitz and Kumar (1994) in their study, conducted among a sample of 190 salespersons, showed that both positive and negative feedback from the supervisor raised the learning orientation of salespersons. Likewise, Kohli, Shervani and Challagalla (1998) found that supervisor's end result and capability orientations were positively associated with salespersons' learning goal orientation. Finally, using a sample of 480 accountants, Coad and Berry (1998) demonstrated that all the four dimensions of transformational leadership, that is, individual consideration, intellectual stimulation, inspirational motivation and idealised influence were positively and significantly related to employees' learning goal orientation. Thus, in the light of this evidence it is fair to conclude that learning goal orientation is both a trait and a state (Sujan et al., 1994; Coad and Berry, 1998).

As mentioned earlier in the chapter, in the present study learning goal orientation is positioned as mediator between work engagement and the five organizational outcomes. More particularly, it is proposed that positive affect in the form of learning goal orientation will induce the scientists' to approach their work with a learning goal orientation and a strong learning orientation in turn will have positive effects on the outcome variables. Learning goal orientation has been used in the capacity of a mediating variable in previous studies. For instance, Janssen and Yperen (2004) used learning goal orientation as a mediator between LMX and three performance outcomes, namely, in-role job performance, innovative work behaviour and job satisfaction. The results of this study revealed that learning goal orientation mediated the effects of LMX on in-role job performance and job satisfaction but not on innovative work behaviour. Likewise, in a more recent study, Chughtai and Buckley (2010) showed that learning goal orientation mediated the effects of organizational identification on in-role job performance and two learning behaviours, that is, feedback seeking and error communication.

A learning orientation acquires particular importance when the task is challenging and complex, when new skills need to be learned and the transfer of learned skills to a new task is required (VandeWalle et al., 2001; VandeWalle, 2003). Keeping in view this fact, it is reasonable to suggest that a learning goal orientation will be of critical importance within the context of university science research centres. The research scientists working in these centres are confronted with novel and complex tasks; they need to learn and master new research related skills; and are required to experiment, which increases the likelihood of encountering failure and set backs. Since, learning oriented individuals are efficacious (Philips and Gully, 1997), tend to remain resolute in the wake of set backs (Dweck and Leggett, 1988) and believe that through sustained effort and hard work they can increase their skills and abilities (VandeWalle, 2003), they are more likely to excel in the challenging environment of the science research centres.

In addition, learning oriented scientists can be extremely valuable for the university research centres because previous research reports that individuals who hold a strong learning orientation are likely to engage in self regulation tactics such as feedback seeking, proactive behaviour and emotional control (Porath and Bateman, 2006); use more effective learning strategies (Payne, Youngcourt and Beaubien, 2007); exhibit innovative work behaviour (Janssen and Yperen, 2004); and perhaps

most importantly, display superior job performance (VandeWalle, Brown, Cron and Slocum, 1999; Janssen and Yperen, 2004; Payne et al., 2007). In fact results from Payne et al's (2007) meta-analytic study showed that learning goal orientation explained unique variance in job performance above and beyond the variance explained by cognitive ability and the Big Five personality traits, which further reinforces its importance for high technology organizations, such as the university research centres.

7.3 In-Role Job Performance

An important organizational outcome that might result from work engagement is superior in-role job performance. Motowidlo and Van Scotter (1994) define in-role job performance or task performance as those activities, which are part of employees' formal job description. In other words, task performance refers to "the effectiveness with which job incumbents perform activities that contribute to the organization's technical core either directly by implementing a part of its technological process, or indirectly by providing it with needed material or services" (Motowidlo and Van Scotter, 1997, p. 99). For instance, closing a sales deal can be considered a dimension of task performance for a sales job; whereas, putting out a fire is an example of task dimension for a fire-fighter's job.

Motowidlo and Van Scotter (1994, 1997) argue that job performance can be split into two components: task performance and contextual performance. In contrast to task or in-role job performance, which consists of activities, which are part of employees' formal role requirements, contextual performance consists of activities which are discretionary and not usually prescribed. These researchers specify two facets of contextual performance: interpersonal facilitation, which includes "cooperative, considerate and helpful acts that assist co-worker's performance"; and job dedication, which includes "self-disciplined, motivated acts such as working hard, taking initiative, and following rules to support organizational objectives" (Van Scotter and Motowidlo, 1996; p. 525). Motowidlo and Van Scotter (1994, 1997) contend that the importance of contextual performance springs from the fact that it can play a pivotal role in developing the social and psychological environment of the organization, which facilitates effective task performance.

Nevertheless, both facets of performance are likely to be important for employees because there is ample empirical evidence that supervisors consider both task and contextual performance while making overall performance ratings (Motowidlo and Van Scotter, 1994; Van Scotter and Motowidlo, 1996).

Another important difference between the two types of performance stems from the fact that they have different antecedents. For example, research evidence indicates that experience, job knowledge and ability are main drivers of task performance; whereas, personality variables (e.g. extraversion, conscientiousness and agreeableness) are stronger predictors of contextual performance (Motowidlo and Van Scotter, 1994; Van Scotter and Motowidlo, 1996; Chan and Schmitt, 2002).

Other researchers have also found that the task and contextual performance relate differentially to various antecedents. For instance, Williams and Anderson (1991) explored the impact of organizational commitment and job satisfaction on both task and contextual performance. The results of their study showed that organizational commitment was unrelated to both types of performance; whereas job satisfaction was related to contextual performance but not to task performance. In addition, Dirks and Ferrin (2002) in their meta-analytic study found that trust in leaders was a stronger predictor of contextual performance than in-role job performance. Finally, in a recent study, Jawahar, Meurs, Ferris and Hochwarter (2008) found that self efficacy was a stronger driver of task performance; while political skill was more predictive of contextual performance.

Promoting in-role performance might prove to be critical for the university research centres because researchers' ability to perform their prescribed research related activities proficiently can be instrumental in enhancing their efficiency and effectiveness. The present study proposes that the university research centres can achieve this end by focussing on the cultivation of positive levels of work engagement among their researchers. Although, previous research supports the link between work engagement and in-role job performance (e.g. Schaufeli, Taris and Bakker, 2006), it does not illuminate the mechanism through which work engagement can convert into higher job performance. An innovative feature of the current investigation is that it enumerates the role of learning goal orientation in explaining the link between work engagement and in-role job performance.

7.4 Innovative Work Behaviour

In a rapidly changing and turbulent work environment, a firm's ability to develop and implement innovation is considered vital for its success and survival (Scott and Bruce, 1994; West and Anderson, 1996). West and Farr (1990; cited in West, 2002, p. 357) define innovation as "the intentional introduction and application within a job, work team or organization of ideas, processes, products or procedures which are new to that job, work team or organization and which are designed to benefit the job, the work team or the organization". According to this definition innovation has three unique features. First, innovation is "restricted" to intentional attempts to derive benefits (e.g. economic benefits, personal growth, increased satisfaction, administrative efficiency, staff well being etc.) from new changes. Second, this definition is not restricted to technological changes but also encompasses novel changes in administration or human resource management. Finally, innovation suggests novelty but not "absolute novelty" (West and Anderson, 1996; West, 2002). Thus, according to this definition an organization member bringing in a new idea from another organization will fall within the realm of innovation.

Furthermore, Scot and Bruce (1994) and West (2002) contend that it is also important to differentiate between innovation and creativity. While, creativity refers to the suggestion or development of new idea, innovation entails the application or implementation of these ideas (Scot and Bruce, 1994; West 2002). According to West (2002) "innovation can be defined as encompassing both stages – the development of ideas – creativity; followed by their application – the introduction of new and improved products, services and ways of doing things at work" (p. 357).

Given the fact that innovation is likely to play key role in the long term survival of modern organizations, it is not surprising that firms are increasingly looking for employees who have the capability and motivation to engage in innovative work behaviour (Ramamoorthy, Flood, Slattery and Sardessai, 2005). Janssen (2000) defines innovative work behaviour as an "intentional creation, introduction and application of new ideas within a work role, group or organization, in order to benefit role performance, the group or the organization" (Janssen, 2000, p. 288). Janssen (2000) further contends that innovative work behaviour consists of three interrelated behavioural tasks: idea generation, idea promotion and idea realization. Idea generation refers to the formulation of new ideas, which are in some

way beneficial to the organization or the workgroup. Idea promotion entails galvanizing support for these new ideas. The final step in the innovation process is idea realization, which involves producing an innovation model that can be applied within a work group or to the organization as a whole.

Moreover, innovative work behaviours are discretionary behaviours and are not part of employees' prescribed job description and as a result are not recognized by organization's formal reward systems (Janssen, 2000; Ramamoorthy et al., 2005). Nevertheless, employees' tendency to engage in these extra-role behaviours can lead to enhanced team and organizational effectiveness and performance (Ramamoorthy et al., 2005).

Several studies have attempted to study the facilitators of creativity and innovative work behaviour in organizations. For example, Scott and Bruce (1994) aimed to explore the effects of leadership, individual problem solving style and work group relations on innovative work behaviour. Their sample comprised of all the engineers, scientists and technicians employed in a large R&D centre located in the Unites States. More specifically, Scott and Bruce (1994) postulated that these variables will affect innovative behaviour directly as well as indirectly through their influence on perceptions of climate for innovation (support for innovation and resource supply). The results of their study showed that high quality leader-member exchange, support for innovation and managerial role expectations were positively associated with innovative behaviour; while the systematic problem solving style of employees had a negative impact on this construct.

Similarly, West and Anderson (1996) carried out a study to determine factors, which promoted innovativeness of multidisciplinary top management teams functioning within the context of hospitals. Specifically, they sought to examine the impact of three components of group composition (team size, team tenure and the proportion of team members with a high propensity to innovate), two components of organizational context (resources and organizational size) and four aspects of group processes (clarity of and commitment to objectives, participation, task orientation and support for innovation) on nine outcome variables: six innovative quality measures (magnitude, radicalness, novelty, benefit to administrative efficiency, benefit to patient care and benefit to staff well being), overall innovation, number of innovations and team self reports of innovation. The results of this study showed that the quality

of team innovation (radicalness, novelty, magnitude) was primarily predicted by team composition (team size and the proportion of team members with a high propensity to innovate); whereas, group processes (participation, task orientation and support for innovation) were more predictive of overall innovation.

Amabile (1997) developed the componential theory of individual creativity, which suggests that there are three components to individual creativity: expertise, creative thinking skill and task motivation. *Expertise* implies that the individual needs to possess appropriate knowledge, skills and abilities in the problem area. This dimension may be influenced by the individual's level of education and experience. *Creative-thinking skill* refers to the ability to consider alternate perspectives with intellectual independence. To some extent creative thinking is contingent on personality characteristics, such as independence, propensity for risk taking, self-discipline and persistence in the wake of adversity. However, these skills can also be developed through creativity enhancing skills, such as brainstorming. Although, the two skill dimensions determine what an individual can do in a specific domain, task motivation dimension determines, what he or she will actually do. Motivation can be either intrinsic (i.e. driven by passion for one's work) or extrinsic (i.e. driven by external factors, such as rewards). Amabile (1997) asserts that an individual is more likely to use his or her skills and talents to generate creative and novel ideas if he or she has an intrinsic interest in a task.

According to Amabile (1997) the general perception is that an increase in extrinsic motivation undermines an individual's intrinsic motivation. However, there is evidence that certain types of extrinsic motivators, such as reward and recognition for creative ideas, goal clarity and positive feedback may "synergistically combine" with intrinsic motivation to reinforce intrinsic motivation's positive impact on creativity. There are three factors, which determine whether extrinsic motivation can positively combine with intrinsic motivation to promote creativity: person's initial motivational state, type of extrinsic motivation and the timing of extrinsic motivation. For instance, extrinsic motivation can be additive, when a person has high levels of initial intrinsic motivation and can have negative effects when the intrinsic motivation is weak.

Second, certain types of extrinsic motivators, such as recognition for generating new ideas and constructive feedback, which directly increase a person's involvement in the work itself, can play a key role in bolstering the positive effect of intrinsic motivation on creativity. These motivators are termed as "enabling extrinsic motivators". In contrast, restrictions on how work should be done are examples of "controlling extrinsic motivators". These controlling motivators can have deleterious effects on intrinsic motivation and creativity because they undermine an individual's sense of self-determination.

Finally, the timing of extrinsic motivation can prove critical. More particularly, synergistic extrinsic motivators may be useful at those stages of the creative process where a high level of novelty is not required. However, it may be prudent to reduce all kinds of extrinsic motivators in situations, which require high levels of novelty.

Amabile, Conti, Coon, Lazenby and Herron (1996) developed and validated an instrument called KEYS: *Assessing the Climate for Creativity* to assess the stimulants and impediments to creativity and innovation in organizational work environments. More specifically, the central aim of this study was to use this instrument to ascertain how the work environment of highly creative projects differed from the work environment of less creative projects. The results from this study showed that high creativity projects were significantly higher than the less creative projects on all six factors, which stimulated creativity (organizational encouragement, supervisory encouragement, work group supports, freedom, challenging work and sufficient resources) and lower on factors, which inhibited creativity (excessive workload pressure and organizational impediments). Additionally, the high creativity projects were found to be more creative and productive than the less creative projects. These results provide ample testimony to the fact that the work environments within which people work can exercise a profound impact on their creativity and innovativeness.

In an empirical investigation, Ramamoorthy et al. (2005) proposed an integrated model of innovative work behaviour. More specifically, this model postulated that two organizational processes, namely, meritocracy and justice perceptions (procedural and distributive justice), pay and job autonomy will affect innovative work behaviour through the mediating mechanism of two psychological contract variables, that is, met expectations and obligation to innovate. Using a

sample of 204 employees, drawn from Irish manufacturing organizations, Ramamoorthy et al. (2005) uncovered that obligation to innovate, job autonomy and pay exercised significant direct effects on innovative work behaviour; while, justice perceptions and meritocracy indirectly affected this construct through the intervening process of met expectations and perceived obligation to innovate.

Likewise, in a study among IT professionals, Newton, Blanton and Will (2008) sought to examine the impact of level of fulfilment of the psychological contract on innovative work behaviour. The results of this study revealed that, as hypothesised; the level of fulfilment of the IT professional's psychological contract had a positive impact on innovative work behaviour. Finally, Reuvers, Van Engen, Vinkenburg and Wilson-Evered (2008) conducted a study with a sample of employees drawn from four Australian hospitals to investigate the effects of transformational leadership on innovative work behaviour. The finding from this study showed that transformational leadership was a significant predictor of innovative work behaviour.

The innovativeness and creativity of research scientists can prove to be a critical factor in the research centre's success. This is because researchers' ability to come up with new ideas can result in key performance outcomes for the research centres such as more research publications, greater number of patents and larger creation of new products and capabilities (Santoro and Saparito, 2003). Moreover, the generation of new ideas and creation of new products can also increase the potential of research centres to attract research funding from the government and the industry. In the current study, it is proposed that work engagement might induce innovative behaviours within the university research centres by raising researchers' learning goal orientation.

7.5 Learning Behaviour

Edmondson (1999) defines learning behaviours 'as an ongoing process of reflection and action, characterised by asking questions, seeking feedback, experimenting, reflecting on results and discussing errors or unexpected outcomes of actions' (p. 353). These activities enable teams to uncover errors and mistakes, ascertain the needs and requirements of customers, spot changes in the environment

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and "improve members' collective understanding of the situation" (Edmondson, 1999, p. 351).

Previous research has uncovered that individually, learning behaviours, such as feedback seeking (Ashford and Tsui, 1991; Ancona and Caldwell, 1992), experimentation (Henderson and Clark, 1990) and detection and corrections of errors (Carmeli and Sheaffer, 2008) can result in substantial performance benefits for individuals, teams and the organizations. Moreover, in a study on 51 work teams in a manufacturing company, Edmondson (1999) demonstrated that these learning behaviours collectively enhanced team performance and efficiency. In addition, Edmondson, Bohmer and Pisano (2001) in their study conducted among 16 surgical teams showed that learning behaviours facilitated the implementation of a new technology for cardiac surgery. Furthermore, Chan, Pearson and Entrekin (2003) reported that learning behaviours within and across teams were associated with improved team performance within the context of an Australian hospital. Finally, it has been found that team learning behaviours can promote organizational learning and performance (Chan, Lim and Keasbury, 2003). Research evidence indicates that a climate of trust and psychological safety can play a pivotal role in promoting learning behaviour in work teams (Edmondson, 2004). Keeping in view the performance benefits of learning behaviour, it is imperative that university research centres should strive to create conditions, which facilitate such behaviours in their research teams.

Although the general assumption is that learning can have positive performance benefits for teams, Bunderson and Sutcliffe (2003) caution that too much emphasises on learning can be counterproductive and may therefore result in reduced performance. They argue that since "learning efforts consume resources [without assurance of result] and divert attention from existing initiatives, it may be possible for teams to compromise performance by overemphasizing learning, particularly when they have been performing well" (p. 552). Bunderson and Sutcliffe (2003) contend that excessive experimentation may be more useful for low performing teams because it may help them to find workable solutions to problems. In contrast, high performing teams risk compromising existing performance levels if they abandon workable solutions in order to try out untested initiatives. Bunderson and Sutcliffe (2003) empirically show that there is a curvilinear relationship between team learning and team performance. These findings suggest that although learning is a desirable goal, the university research centres need to manage their learning activities carefully.

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The focus of the present paper is on two learning behaviours, namely feedback seeking and error communication. The concept of feedback seeking refers to the 'conscious devotion of effort toward determining the correctness and adequacy of behaviour for attaining valued end states' (Ashford, 1986, p. 466). In their seminal article, Ashford and Cummings (1983) point out that the importance of feedback seeking behaviour emanates from the fact that it can play a crucial role in augmenting job competence and in reducing role ambiguity for the concerned individual. Furthermore, as noted above, research evidence suggests that indicates that feedback seeking behaviour can also result in superior individual (Ashford and Tsui, 1991) and team (Ancona and Caldwell, 1992) performance.

Ashford and Cummings (1983) suggest that individuals engage in feedback seeking through two strategies: (i) feedback seeking through monitoring and (ii) feedback seeking through inquiry. Monitoring is an indirect method of acquiring feedback information. In this method the concerned individual does not directly ask for feedback but instead may do so by observing the environment, particularly other people, that may provide information as to how well one is doing and how well one compares to others (Ashford, Blatt and VandeWalle, 2003). The second category, feedback seeking through inquiry, occurs when employees directly ask their supervisor or colleagues for information regarding their performance (Williams and Johnson, 2000). Out of the two methods, seeking feedback through inquiry can be more advantageous because information gained from this method is likely to be less vague and more precise (Williams and Johnson, 2000).

In addition, feedback seeking has mostly been conceptualised as a frequency based phenomenon, which reflects how frequently individuals ask for feedback from their supervisors or colleagues. However, VandeWalle (2003) argues that feedback seeking is a multidimensional construct and has therefore highlighted the need for empirical studies that deal with not only feedback frequency but also with other dimensions of this construct such as type, source, method, timing and sign of preference. Thus, another novel feature of the current study is that it aims to explore the impact of work engagement on the type of feedback sought. Park, Schmidt, Scheu and DeShon (2007) contend that one benefit of focussing on the type of feedback sought is that it provides a deeper understanding of the motives behind feedback seeking. More specifically, in the current investigation it is argued that engaged employees will seek feedback to acquire information for self improvement. Ashford

and Tsui (1991) specify two benefits of seeking diagnostic feedback for the focal individual. First, this type of feedback can prove to be more beneficial in identifying weaknesses in performance and therefore, can facilitate the focal individual to adopt appropriate strategies for overcoming these potential weaknesses. Second, when an individual seeks feedback for self improvement from his or her superiors, he or she may be perceived as someone who is genuinely keen on improving his or her performance related behaviours. This, in turn, can lead the superiors to develop a more positive opinion of the seeker's overall effectiveness. In sum, the act of seeking diagnostic feedback can have both informational and impressions management value for the seeker. Hence, in the present study feedback seeking is conceptualised as employees' tendency to seek information for self improvement through the inquiry method.

Edmondson (2004) argues that employees' tendency to openly admit and communicate errors and their ability to devise strategies for preventing these errors from recurring in the future can manifest in enhanced organizational learning and efficiency. Moreover, Tynan (2005) suggests that teams, in which members regularly point out each other's mistakes and pitfalls, discuss and analyse errors constructively and make concerted efforts towards eliminating and correcting mistakes, perform better than teams in which members avoid engaging in these actions.

Carmeli and Sheaffer (2008) argue that the process of detecting and correcting errors can take two forms: single-loop and double-loop learning. Single loop learning occurs when employees identify a gap or an error and try to fix it without trying to ascertain the underlying causes of these errors. Although this approach may eradicate the immediate problem at hand it does little to prevent errors from recurring in the future. In contrast, double loop learning takes place when employees not only detect errors but also try to unearth the root cause of these errors. Double loop learning is more advantageous because it increases learning from failure, ensures that errors do not surface again and improves the quality of the output produced (Carmeli and Sheaffer, 2008).

However, in spite of the potential benefits of these learning behaviours for both individuals and organizations, enacting such behaviours entails significant costs for the focal individual. For example, VandeWalle (2003) specifies three costs linked with feedback seeking behaviour: (i) self presentation costs, which refer to the risk of divulging one's insecurity and need for assistance to others; (ii) ego costs, which refer

to the costs incurred as a result of receiving negative information about the self; and (iii) effort costs, which refer to the costs incurred in acquiring the appropriate information. Likewise, by admitting mistakes or communicating errors, employees risk receiving negative evaluations from their supervisors and peers which in turn can have deleterious effects on their self esteem (Edmondson, 1999).

Thus, it is suggested that employees will only seek feedback or communicate errors if they feel that the perceived benefits of engaging in such behaviours outweigh the associated costs. Nevertheless, the current study postulates that as opposed to focussing on the costs of these learning behaviours, engaged employees may be more willing to concentrate on the benefits, which these behaviours offer. This, in turn, might prompt them to seek feedback and report errors.

7.6 Affective Organizational Commitment

Over the past four decades scholars and researchers have been preoccupied with exploring the causes and effects of organizational commitment. Mowday, Steers and Porter (1979) defined organizational commitment as the relative strength of an individual's identification with and involvement in a particular organization. They highlighted three characteristics of organizational commitment: (1) a strong belief in and acceptance of the organization's goals, (2) a willingness to exert a considerable effort on behalf of the organization and (3) a strong intent or desire to remain with the organization. However, one potential drawback of this approach is that it conceptualizes commitment as a unidimensional construct and does not highlight the bases or motives which engender attachment to the organization (Becker, 1992). Additionally, the instrument developed by Mowday et al. (1979) to measure commitment, that is, the Organizational Commitment Questionnaire (OCQ), has been criticised by Becker (1992) on the grounds that several of its items "inflate concept redundancy between organizational commitment and intent to quit" (p. 236).

In view of these limitations, Meyer and Allen (1991) proposed a three component model of organizational commitment. More specifically, these authors identified three bases of commitment: affective, normative and continuous commitment. Affective commitment refers to the employees' attachment to, identification with and involvement in the organization. Employees with a strong affective commitment continue employment with the organization because they *want*

to do so. Continuance commitment refers to the desire to remain with the organization because of the costs associated with leaving that particular organization. Employees whose major association with the organization is based on continuance commitment remain because they *need* to do so. Finally, normative commitment reflects a feeling of obligation to continue employment in an organization. Employees who hold a strong normative commitment feel that they *ought* to remain with the organization.

Previous research indicates that although all three forms of commitment can reduce turnover, it is affective commitment to the organization, which has the most profound impact on important organizational outcomes (Meyer, Stanley, Herscovitch and Topolyntsky, 2002). For instance, results from Meyer et al.'s (2002) meta-analytic study showed that affective commitment had the strongest impact on organizational outcomes, such as attendance, performance, organizational citizenship behaviour and on employee relevant outcomes, such as stress and work-family conflict. Normative commitment also had a positive effect on organizational and employee relevant outcomes, but its effect was comparatively weaker than affective commitment. In contrast, continuous commitment was found to be mostly unrelated or negatively related to these outcome variables.

Thus, on the basis of the above evidence it is clear that university research centres will benefit most if they take pertinent steps to cultivate affective organizational commitment among their research scientists. As Meyer and Allen (1997, p.89) very aptly remark that:

"Although the impact of an increase in any one of these components of commitment on employees' intention to remain in the organization might be the same, the effect on their willingness to contribute to the attainment of organizational objectives might not…. The most worrisome situation would be in which a particular practice contributed to an elevation in continuance commitment but not in affective or normative commitment."

In the current study it is hypothesised that work engagement will enhance affective organizational commitment. Past research provides supportive empirical evidence that work engagement is a positive predictor of affective organizational commitment (e.g. Saks, 2006). However, it will be interesting to see whether or not work engagement can have the same positive impact on the commitment of research scientists because previous research indicates that scientists are generally more committed to their scientific field or professional peer community than to their organization (Keller, 1997).

7.7 Summary

The central aim of this seventh chapter was to provide a description of the five outcome variables included in the research model. This chapter briefly reviewed the relevant literature relating to these variables and highlighted their importance for the university research centres. Chapter 8 discusses the context of the study, that is, the university research centres.

CHAPTER 8

The Context – University Research Centres

8.1 Introduction

This chapter provides a brief overview of the context of the study, that is, the university research centres. More specifically, the chapter commences by reviewing the factors, which have contributed to the emergence of university research centres as a new organizational form for managing university research. The chapter then advances to review the various types of research centres and highlights their purpose and importance. In addition, the present chapter examines the role of the research director in the management of these research organizations and also discusses some of the administrative problems and issues confronting these organizations. The chapter finally concludes by providing the rationale for conducting the current study within the context of the university research centres.

8.2 The Emergence of University Research Centres

Traditionally, academic departments have been the hub of research activities undertaken within the confines of universities. Research activities within an academic department - an organization devoted chiefly to teaching and administration of curricula, "were generally decentralised, focussed on relatively narrow disciplinary objectives and aimed at the publication of articles in peer-reviewed scientific journals" (Bozeman and Boardman, 2003). This was the path through, which faculty members gained tenure and moved up the academic ladder.

However, during the last twenty years or so the academic research landscape has witnessed a dramatic change with the emergence of university research centres (Youtie, Libaers and Bozeman, 2006). The university research centres are organizations, which usually lie "outside the usual academic core" of university departments and "they bring several fields of science and technology together, sometimes even helping create new fields (Bozeman and Boardman, 2003, p. 8). Unlike departments, which are primarily organized around disciplines, the university

research centres are pre-dominantly organized around research topics (Etzkowitz and Kemelgor, 1998; Youtie et al., 2006). The university research centres have close inter-institutional ties and as a result they often work in close partnership with the government and the industry to find solutions for large scale science and technology problems that require an integrated research approach (Etzkowitz and Kemelgor, 1998; Bozeman and Boardman, 2003; Youtie et al., 2006). Today, university research centres and institutes are conducting cutting edge research in areas of national interest such as defence satellite systems, biotechnology, super computer development, medical technology, earthquake studies, climate change and environmental sustainability (Bozeman and Boardman, 2003).

8.3 The Definition and Types of University Research Centres

Steffensen, Rogers and Speakman (1999) define a university research centre as a "university based organization whose purpose is to conduct scholarly investigations of an interdisciplinary nature, usually with financial support from government agencies, private companies and other organizations outside of the university" (p. 96). In a related vein Rogers et al. (1999) assert that the university research centres are a distinct form of organization and have three main characteristics: (1) they are interdisciplinary, involving faculty members from various academic departments (2) they are boundary spanners, facilitating a flow of information and other resources across the university's boundary, and (3) they are temporary organizations at least compared to university departments, and provide a degree of flexibility in an otherwise stable university structure.

The university research centres tend to vary considerably in terms of their size, mission and the way they are funded and therefore, have no rigid set of common characteristics (Stahler and Tash, 1994; Etzkowitz and Kemelgor, 1998). Stahler and Tash (1994) contend that the "only characteristic that seems fairly consistent across universities is that research centres and institutes have as their primary mission the conduct of research" (p. 541). These authors argue that the research centres can differ a great deal across a number of dimensions, such as:

- Size of external support and research staff
- The proportion of faculty versus professional staff researchers
- Level of separation from academic departments
- Level of integration with the university
- Level of interdisciplinary and multidisciplinary focus
- Relative emphasis on applied research

Hays (1991) and Stahler and Tash (1994) distinguish between three different types of research centres: standard, adaptive and shadow. Shadow centres or institutes predominantly reflect a faculty member's or a department's particular research interests. These types of centres usually do not have a permanent staff and as a result are heavily dependent on graduate assistants for the conduct of research. In most cases, these shadow centres do not have access to external funding and may not have their own physical infrastructure. The key defining factors for these types of centres are "official recognition from the university or from the department; perhaps but not necessarily a separate budget; a sign on the office; and letterhead" (Stahler and Tash, 1994, p. 541). These centres or institutes are seldom known to other faculty and academic administrators and are merely "instruments of faculty fantasy" (Hays, 1991, p. 6).

At a slightly higher level of formality are the adaptive institutes. These institutes and centres may have a small number of permanent staff but like the shadow centres, these entities also lack core infrastructure. These centres frequently redefine their research goals and staffing requirements in accordance with the availability of funding. Both the shadow and adaptive institutes lack the necessary infrastructure to attract the faculty into interdisciplinary setting (Hays, 1991).

The third and most important category of research centres is the standard units. These research centres and institutes typically have independent relatively secure budgets that are separate from academic departmental allocations, are led by a full-time research director, have permanent staff and a well defined mission, and receive a fair amount of funding from external sources, such as government, private industry and foundations (Hays, 1991; Stahler and Tash, 1994).

Similarly, Bozeman and Boardman (2003) propose taxonomy of university research centres, which is presented in Table 8.1

TABLE 8.1

Taxonomy of University Research Centres (taken from Bozeman and Boardman, 2003, p. 17)

Research Unit Type	Horizontal Relations	External Relations	Extra-Research Activities	Research Problem Focus
Academic Department	Minimal, except for those pertaining to curriculum administration	Simple and decentralized	Teaching, university and professional service	Discipline-based, provides consensus for rewards system
Simple URC	Simple, sometimes no significant ones other than to department	Simple, negotiated by researchers interacting with networks of other academic researchers and government funding agencies	Few or none	Based on narrow set of problems, usually established by discipline-based "normal science"
Complex URC	Simple, sometimes no significant ones other than to department	Moderate complexity, including not only academic networks but other knowledge users, especially industry	More extensive, including an expanded educational role, or industrial outreach, or brokering diverse network members	Mix of problem-driven topics and topics set by discipline or field specialization demands
Multipurpose, Multidiscipline URC	Varies, usually very complex, cutting across many units	Complex, often including multiple external industry, government, and university actors	Multiple, often including educational role, industrial interaction, scientific and professional brokering, community outreach	Almost entirely problem driven, not tracking closely to disciplines and established scientific and technical specializations

From Table 8.1 it can be seen that according to this classification, the basic distinction lies between the traditional academic department and the university research centre. Academic departments are organized around disciplines, such as physics, chemistry and mathematics and are primarily guided by three objectives: teaching, research and service (Santoro and Chakrabarti, 1999). Within these departments, individual faculty members aspire to attain the status of "independent research entrepreneurs" by attracting research grants and then by subsequently transforming those grants into research output and graduate student support and mentoring (Bozeman and Boardman, 2003, p. 19). The faculty member who writes the proposal for the grant or contract is known as the principal investigator. It is the principal investigator who is mainly responsible for managing the resources and producing the research output specified in the grant. In departments, the research activity is highly decentralised with the principal investigators "having their own small fiefdoms", and in most cases having "direct contact with research sponsors rather than depending upon line administrators to broker those relations" (Bozeman and Boardman, 2003, p. 19).

However, this decentralised nature of research activity can create problems for departments because faculty entrepreneurs who succeed in attaining grants and contracts, which require them to work collaboratively with other departments, other universities, industry and government "are less likely to be available to teach courses for which students have paid tuition, are less likely to have sufficient time for such organizational maintenance activities as hiring and promotion committees, and in general have the potential to further tighten the tension wires among the diverse activities that academic units string together" (Bozeman and Boardman, 2003, p. 19). Because of these issues, the departments often tend to discourage interdisciplinary and inter-institutional work.

The main difference between the departments and the university research centres springs from the fact that compared to departments, the university research centres have more interaction with external entities, such as industry, government agencies and other universities (Etzkowitz and Kemelgor, 1998; Youtie et al., 2006). In addition, the university research centres also tend to have more intense horizontal relations within the focal university because of their strong focus on interdisciplinary research (Etzkowitz and Kemelgor, 1998; Bozeman and Boardman, 2003).

Moreover, the nature of research conducted within the departments and the research centres also differs. The scientists working in departments tend to focus on basic research and as a result aspire to make substantial contribution to the body of knowledge in their respective disciplines (Geiger, 1990). Put differently, in departments, knowledge production takes place within the Mode 1 framework of research. Mode 1 knowledge production reflects "the traditional, academic norms of scholarship in the disciplines and institutions in which researchers work, such as academic tenure and promotion based on high impact, peer reviewed publication" (Estabrooks, Norton, Birdsell, Newton, Adewale and Thornley, 2008, p. 1068). In contrast, the research centres focus more on Mode 2 research or applied research, which is primarily driven by the needs and requirements of the sponsors (e.g. government and industry) and the practical applicability of knowledge (Kelemen and Bansal, 2002; Estabrooks et al., 2008).

Another unique feature of Mode 2 research is transdisciplinarity, which refers to the "mobilisation of a range of theoretical perspectives and practical methodologies to solve problems" (Hessels and Van Lente, 2008, p. 741). In addition, the research results within the Mode 2 framework are diffused during the process of knowledge production and are aimed not only at other management researchers but also at practitioners and society at large (Kelemen and Bansal, 2002; Hessels and Van Lente, 2008).

Finally, unlike departments and in line with the Mode 2 framework, the research undertaken within the science research centres is characterised by reflexivity (Kelemen and Bansal, 2002; Hessels and Van Lente, 2008). Reflexivity implies that knowledge production is rather a "dialogic process" and provides an opportunity for researchers with different backgrounds and viewpoints to interact and share ideas with each other (Hessels and Van Lente, 2008). Hessels and Van Lente (2008) argue that reflexivity enables researchers to become more aware of the societal consequences of their work. Geiger (1990) very aptly concludes that the research centres "exist to do what departments cannot do: to operate in interdisciplinary, applied or capital intensive areas in response to social demands for new knowledge" (p. 17).

8.4 Purpose and Importance of Research Centres

Research centres have evolved as a flexible organizational structure, which is geared towards meeting the needs and requirements of funding agencies such as, the government and private industry. The main benefits that accrue to these funding bodies are that centres are especially well equipped to commence and maintain collaborative relationships with industry and government because they have full-time staff dedicated to the "mission oriented research agendas of sponsors" (Stahler and Tash, 1994).

Furthermore, the university research centres are considered critical for increasing the research vitality of the universities through the promotion of interdisciplinary research (Etzkowitz and Kemelgor, 1998; Zajkowski, 2003). Etzkowitz and Kemelgor (1998) assert that "in an academic system based on departments and disciplines, centres foster inter-disciplinarity by coordinating researchers within and across intellectual and administrative boundaries" (p. 275). Likewise, Hays (1991) argues that the university research centres provide a "neutral setting in which the research interests of diverse faculty can be fruitfully combined in a common purpose" (p. 3). The ability of the research centres to recruit a multidisciplinary research team stems from the fact that they are able to provide better research-related resources to the researchers. Since the centres have access to substantial amounts of external funding they are often able to provide faculty members with equipment, infrastructure and staff support that their departments cannot (Hays, 1991; Etzkowitz and Kemelgor, 1998).

Another important function of the university research centres is that they facilitate large scale research, which may be beneficial for the society but cannot be undertaken within the confines of the traditional departments because of reasons relating to size, costs or purpose (Geiger, 1990). Thus, "by responding to social demands for relevant knowledge … [the research centres] serve to buffer the academic core of the university from the distortions that those demands would undoubtedly cause if they had to be met within a departmental context" (Geiger, 1990, p. 17).

According to Etzkowitz and Kemelgor (1998) two intellectual reasons provide the impetus for the creation of research centres. First is the enhanced competition in the rapidly moving disciplinary fields. In this competitive and rapidly changing

environment, collaborative research seems a better strategy than individual research because it enables researchers to stay abreast with the latest developments taking place in their respective fields. This situation inspires faculty members to join a "concentrated research focus" at a centre attached to a department. The second intellectual impetus emanates from the fact that a practical or theoretical problem can be best tackled by a group of scientists drawn from several disciplines. The main advantage of this approach is that it provides an opportunity for people with varying viewpoints to interact and share ideas with each other.

One of the most important functions of university research centres is that they enable universities to forge effective alliances with external entities such as, the government and the industry. Etzkowitz and Kemelgor (1998) argue that "centres are one of the organizational forms, along with incubator facilities and research parks, that integrate university, industry and government into a triadic constellation, which is emerging as a driving force for industrial and social innovation" (p. 280). These trilateral linkages between the university, industry and the government have been dubbed as the Triple Helix model of economic and social development (Etzkowitz, Webster, Gebhardt and Terra, 2000; Etzkowitz and Leydesdorff, 2000) (see Figure 8.1).

FIGURE 8.1
The Triple Helix Model of University-Industry-Government Relations
(Etzkowitz and Leydesdorff, 2000)
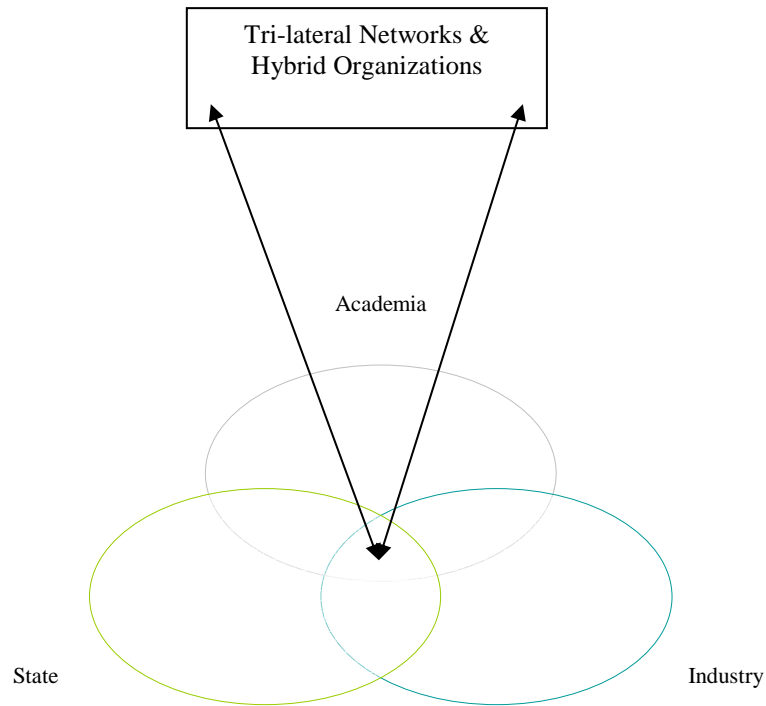
The basic premise of the Triple Helix model is that the university, industry and government no longer operate in isolation but function as a seamless whole to promote innovation and economic development (Etzkowitz et al., 2000; Etzkowitz and Leydesdorff, 2000; Etzkowitz, 2003). The enhanced interaction among university, industry and government as relatively equal partners, and the new advances in innovation strategies and practices that emerge from this cooperation, represent the core of Triple Helix model (Etzkowitz, 2003). The close interaction between these three key players has been instrumental in the emergence of hybrid organizations such as, technology transfer offices in universities, firms and public research labs, and business and financial support institutions such as, business incubators, science parks and angel networks. These new form of organizations are playing a key role in promoting innovation all over the world.

The emergence of the Triple Helix of university, industry and government has resulted in each partner taking on the role of other in addition to performing its core tasks (Etzkowitz, 2003). The rationale of the Triple Helix is not that universities become firms or vice versa. Instead, the basic philosophy of this model is that while each institution assumes some of the capabilities of the other, it continues to maintain its fundamental role and unique identity. For example, traditionally the university has been responsible for creating and disseminating knowledge; industry has been a primary source of productive activities; and the government has mainly acted as the custodian of the societal rules of the game. However, within the context of the Triple Helix model, the university, in addition to its core functions of training students and diffusing knowledge, is also actively involved in creation of new firms through the incubator facilities. In a related vein, the industry continues to produce goods and services but at the same time has also assumed the role of an educator through the formation of company universities. Finally, the government is still responsible for shaping the "rules of the game", but is also acting as a venture capitalist by providing funds to help start new enterprises (Etzkowitz, 2003).

Bozeman and Boardman (2003) argue that there are several factors, which have contributed to the emergence of university research centres, such as: enhanced cost of equipment-intensive science, the need for interdisciplinary research, and the aspiration to transform science and engineering education by making it more "hands on" and, therefore more involved with applied science and technology development. However, the most important factor, which has catapulted the research centres into prominence, has been their ability to facilitate the transfer of technology from the university to industry. The enhanced flow of technology from universities to the private sector, in turn, is likely to generate greater employment, improve productivity and consequently boost regional and national economic growth (Friedman and Silberman, 2003).

Technology transfer refers to the "process whereby invention or intellectual property from academic research is licensed or conveyed through use rights to a for-profit entity and eventually commercialised" (Friedman and Silberman, 2003; p. 18). In other words, technology transfer can be envisaged as the means by, which scientific knowledge is transferred from the university to the industry (Siegal, Waldman, Atwater and Link, 2004).

Siegel et al. (2003, 2004) contend that there are three key stakeholder in the university to industry technology transfer (UITT): (1) university scientists who discover new technologies; (2) university technology managers and administrators, who serve as a link between academic scientists and industry and are re responsible for managing the university's intellectual property; and (3) finally, the firms, who are engaged in the process of commercializing university-based technologies.

The transfer of technology from the university to the industry usually involves a series of steps (Friedman and Silberman, 2003; Siegal et al., 2003). The process begins with a discovery by the university-based scientist. The scientist then files an invention disclosure with their institutions technology transfer office (TTO). Once the invention is disclosed to the TTO, it is responsible for patenting it. After the invention is successfully patented, the university owns the intellectual property rights, and the TTO can market the invention to the interested firms. The next stage involves negotiating a licensing agreement for the patented technology with private firms or entrepreneurs. This kind of agreement can result in financial benefits for the university such as, royalty allowances and an equity stake in the case of start-ups. In the last step of this process, the technology is transformed into a commercialised product. The university may continue it association with the concerned firm beyond this point by, for example, providing resources for the maintenance of licensing agreements.

Markman, Siegal and Wright (2008) specify three modes by which university research and technology can be commercialised: (1) internal approaches; (2) quasi-internal approaches; (3) externalization approaches. The university research centres can use internal activities such as, the creation of technology transfer offices to facilitate the commercialization of their research and technologies. The technology managers working in the TTO play a pivotal role in bridging the gap between "customers" (firms) and "suppliers" (academic scientists), who function in markedly different environments and have divergent norms, standards and values.

Academic institutions and firms also depend on 'quasi-internal' activities to promote commercialisation of technology. The main driver of such activity is the business incubator, which can be defined as "as a property-based organization focussed on accelerating the growth and success of entrepreneurial companies through the provision of business support, resources and services" (Markman et al. 2008, p. 1406). Business incubators have four main goals: (1) economic development; (2)

commercialization of technology; (3) real-estate development; and (4) entrepreneurship. Many universities have created incubators to facilitate the development of start-up companies based on university-owned technologies.

Finally, universities and industries can use the externalization approaches to commercialise technologies. This mode of technology commercialization includes university research parks, regional cluster, academic spin-offs and start ups, licensing, contract research and consultancy, joint venture spin-offs, alliances and collaborations, corporate venture capital and open science and innovation.

8.5 The Role of Research Director

The director of a university based research centre is considered the nucleus of the centre (Rogers et al., 1999; Zajkowski, 2003). Most often, the centres "bear the imprint of the director's philosophy, interests and goals more directly than is the case with academic departments" (Stahler and Tash, 1994, p. 546). Typically, the director of the research centre is a reputed scholar who has a successful track record in acquiring grants and publishing research (Rogers et al., 1999; Bozeman and Boardman 2003). In most cases the research directors are the original principal investigator (PI) who submitted and were eventually successful in acquiring the grant or contract (Bozeman and Boardman 2003).

Compared to a department chair, the role of a director is very challenging and complex. The department chair is primarily responsible for managing the interests of the faculty, staff and students. In contrast, a research director is required to "relate to multiple departments, a web of university administrators, and, often, faculty and administrators from partner or affiliated universities, government sponsors, industry and various accountability overseers" (Bozeman and Boardman 2003, p. 21). However, unlike the department chair, who has some influence over the reward structure, promotion and tenure of faculty members, the research director typically has little control over these matters (Bozeman and Boardman, 2003). Bozeman and Boardman (2003) posit that because of these reasons, compared to a department chair, a research director has relatively less leeway with faculty members.

Furthermore, Rogers et al. (1999) argue that the director must have the ability to motivate his or her research staff in collaborative research activities; to acquire funding; and to successfully conduct funded research. These authors further contend

that the directors must stimulate the other researchers in their research centre to produce research proposals. In addition, Rogers et al. (1999) and Zajkowski (2003) suggest that an effectual and efficient director must have the knack for identifying research funding because unlike departments, the research centres do not have a fixed annual budget and as a result need to locate core funding from sources external to the university.

Perhaps the most challenging task for the research director is to manage the diverse group of researchers. Managing science researchers is especially problematic because previous research has shown that these researchers find it hard to forge working relationships with their fellow scientists, treasure their isolation and are usually not receptive to ideas put forward by others (Roe, 1970). The problem is further compounded by the fact that in most cases research scientists affiliated with research centres have their tenures rooted in academic departments and as a result they may have interests, which conflict with those of the research centre. Hence, the research directors usually need to expend a substantial portion of their time and energies to ensure that diverse faculty members work collaboratively on projects (Bozeman and Boardman, 2003).

8.6 Critique of Research Centres

Although the university research centres have played a pivotal role in the expansion of university research system (Geiger, 1990), they have been criticized on several grounds. For instance, it has been argued that the university research centres do not substantially contribute to the education mission of the universities. Their main contribution to the educational objectives of the universities seems to emanate from the fact that they provide invaluable research training to graduate and post-doctoral researchers and sometimes provide qualified part-time faculty to teach advance courses in speciality areas. In addition, Bozeman and Boardman (2003) contend that researchers based in the university research centres typically have had the experience of working in and with the industry and as a consequence often prove better mentors for graduate and undergraduate students. Furthermore, centre based researchers are more inclined to hire research assistants and are more likely to collaborate with them. However, in spite of these contributions, many critics argue that the existence of research centre is not necessary to bolster research activity in universities because for

"centuries research and scholarship have been successfully conducted within the confines of academic departments, and centres often do not have an intellectual core" (Stahler and Tash, 1994, p. 542).

In addition, Stahler and Tash (1994) argue that there always seems to be tension between departments and centres. This is because the centres directly compete with departments for faculty time, internal funding, research infrastructure and prestige. Furthermore, faculty working with centres generally have less teaching loads, access to better research resources and in some instances, even higher salaries. These privileges can cause resentment among faculty working in departments. Moreover, in many cases the centres and departments pursue different objectives, which further escalate conflict between the two entities. For instance, the centres encourage researchers to work with industry; whereas, few departments encourage ties with the industry and in most cases tend to deemphasise such collaborations (Bozeman and Boardman, 2003).

Another criticism levied against the research centres is that they have failed to promote interdisciplinary research (Hays, 1991; Stahler and Tash, 1994). Hays (1991) suggests two reasons for this. First, many research centres lack visibility (i.e. shadow and adaptive centres) and as a consequence have failed to entice faculty members into interdisciplinary setting. Second, faculty participation, especially the participation of junior and untenured faculty, in the research centres has been hampered by the university incentive and reward system. Faculty efforts on behalf of the university research centres are seldom taken into account by departments in tenure, promotion and salary decisions, which, in turn, make them reluctant to work in centres (Etzkowitz and Kemelgor, 1998).

Furthermore, it has been argued that the research agenda of the university research centres is mainly driven by the needs and interests of the sponsors and less by the requirements of academic research, which, consequently results in a "lack of intellectual core" (Stahler and Tash, 1994). The applied research undertaken in research centres is sometimes perceived by the academic community as "having less significance than more basic research, as being pedestrian in quality and as being less prestigious than research conducted along more traditional disciplinary bounds (Stahler and Tash, 1994, p. 545).

Additionally, previous research reports that university research centres present numerous management challenges for administrators (Hays, 1991; Stahler and Tash,

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1994; Bozeman and Boardman, 2003). For instance, Hays (1991) contends that university research centres are not very well integrated into the university's governance structure. Some research centres are merely an extension of existing departments; while, others are only trivially integrated with a university. Hays (1991) further asserts that in many instances, decisions pertaining to funding, reporting relationships and location tend to be made in a haphazard fashion, which subsequently hinders the progress and performance of the research centres. The centres have also been criticized because they have led to the domination of universities "by their professors rather than by their purposes" (Hays, 1991; p. 5). Put differently, this means that faculty use these centres to further their personal research agendas and appear to disregard the mission and objectives of the university.

Moreover, there is no uniform reporting structure for centres (Stahler and Tash, 1994; Bozeman and Boardman, 2003). A centre director may report to a single department head, or to a vice president of research or to a provost or academic vice president. A centre's importance is ascertained by its location within the university's administrative set up. Usually, a higher reporting authority signifies that the research centre is deemed as a priority by the university administration and therefore, is likely to receive higher internal funding and support.

Finally, the general perception is that the research centres are flexible organizations, which can be easily established and terminated (Steffensen et al., 1999). However, this may not always be the case. It is not difficult to initiate a centre if sufficient funds are available; but once the centre has been established, it might not be very easy to close it down. Centres have the tendency to establish "inertia" of their own and as a consequence may continue to operate even if they are of little use to the university (Stahler and Tash, 1994).

However, in spite of these criticisms, the contribution of the research centres in the expansion of university research system and their role in harnessing of university research to commercial objectives and national and regional economic development can hardly be underestimated. Although, the university research centres are unlikely to replace academic departments in terms of their "teaching function, scholarly activity, generation of new knowledge and their organizational primacy within the university" (Stahler and Tash, 1994; p. 552), they are still expected to play a central role in attracting external funding for the universities, fostering

interdisciplinary collaboration among faculty and sustaining university's sponsored research programmes.

8.7 The Importance of the Context for Current Study

The university research centres appear to be an ideal setting to empirically test the conceptual model developed in the current study. This is because both the central variables used in model, namely work engagement and trust can play a key role in enhancing the effectiveness of these centres. Fostering working engagement among research scientists can be important from the view point of the research centres because previous research indicates that high levels of work engagement can manifest in greater commitment and satisfaction, improved health and well-being, lower turnover and absenteeism rates, exhibition of proactive behaviour and learning motivation and higher levels of innovation and performance (Schaufeli and Salanova, 2007). On the basis of this evidence it is reasonable to suggest that an engaged research team can be instrumental in generating greater number of patents and licences, producing more new products and processes and attracting greater research funding form the government and industry.

Likewise, a climate of trust at each level of the organizational hierarchy can play a key role in augmenting the growth and development of the research centres. For instance, positive trust in the top management team might stimulate the researchers to set aside their personal goals and motives and whole-heartedly support the research agenda specified by them. In such a situation, it is expected that the researchers will be willing to put forth greater effort towards accomplishing the research related goals specified by the top management team, which, in turn, can manifest in higher work engagement. In addition, past research suggests that researchers are often reluctant to engage in the commercialisation of their research because such activities are rarely taken into account in decisions pertaining to tenure and promotion (Ambos, Makela, Birkinshaw and D'Este, 2008). However, if the academic scientists believe that the centre management will adequately reward them for undertaking commercial endeavours, they are likely to be more eager to engage in these activities. This, in turn, will not only generate greater research funding for the universities but will also play a pivotal role in accelerating the pace of economic development of the concerned country (Friedman and Silberman, 2003).

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Furthermore, high trust in the direct supervisor can also have positive effects on researchers' engagement with their work. For example, when researchers dedicate their time and effort to their research work, they expect that their supervisor will recognize their contribution and duly reward them for their efforts. If the researchers think that their supervisor will fairly reward them for their efforts, the chances are that they will approach their work with greater vigour and dedication, which subsequently can lead to several positive outcomes for the centres.

Moreover, according to Stahler and Tash (1994) and Etzkowitz and Kemelgor (1998), university research centres can vary considerably across several dimensions but one characteristic, which appears to be consistent across most centres is that they aim to promote inter-disciplinary research by bringing together scientists from different backgrounds. Thus, one of the biggest challenges faced by research directors is that they have to ensure that the scientists from diverse backgrounds work collaboratively to tackle a particular theoretical or practical problem. In such a context trust in team members acquires particular salience because, previous research indicates that trust in horizontal group relationships can play a key role in fostering "interpersonal cooperation" and in developing "synergistic team relationships" (Jones and George, 1998).

Finally, although a large number of studies have examined the barriers and facilitators of university-industry collaboration and the transfer of technology from university research centres to industries, not many studies have been conducted specifically within the context of university research centres. One notable exception is Dabos and Rousseau (2004), who sought to ascertain the joint perceptions of the employee and employer and to investigate the mutuality and reciprocity in the employment relationship. Paired psychological contract reports were obtained from 80 employee-employer dyads in 16 university-based research centres operating in Latin America. In this study the research directors were identified as the main representatives of the university (employer), who were responsible for specifying the terms of employment of the staff scientists (employees). The results of this study showed that both mutuality and reciprocity were positively associated with indicators of research productivity and career advancement and also with the self-report measures of met expectations and intention to stay. The current study, therefore, seeks to extend both the engagement and trust literature by examining their effects in an under researched context.

8.8 Summary

The main objective of this chapter was to review the literature pertaining to the context of the study, that is, the university science research centres. Specifically, the current chapter presented a general overview of the university research centres. More specifically, it examined the emergence of university research centres as a new organizational form for managing university research; described the various types of research centres; highlighted the purpose and importance of the centres; outlined the role of the university research director in the management of these research organizations; and reviewed some of the potential problems and issues confronting these centres. This chapter also briefly discussed the triple helix model, which is based on the premise that the university, industry and government no longer operate in isolation but function as a seamless whole to promote innovation and economic development. In addition, it reviewed the role of science research centres in the process of technology transfer between the university and its industrial partners. The chapter finally concluded by highlighting the reasons for conducting the current study within the context of the science research centres.

The next chapter presents theory development and hypotheses. More particularly, it discusses the theoretical logic which underlies the relationship between the study variables.

CHAPTER 9

Theory Development and Hypotheses

9.1 Introduction

This chapter presents theory development and hypotheses. More specifically, it starts by proposing that trust in top management, trust in direct supervisor and trust in team members are likely to influence researchers' work engagement and that these effects would be mediated by organizational identification, affective commitment to the supervisor and team psychological safety respectively. Furthermore, it is hypothesised that trust propensity will be significantly and positively associated with researchers' engagement with their work. Finally, this chapter discusses the theoretical logic, which links work engagement to the outcome variables through the mediating mechanism of learning goal orientation. The research models showing these proposed relationships and the research hypotheses are presented in Figures 9.1, 9.2, 9.3 and 9.4 below:

FIGURE 9.1
Hypotheses 1(a to d)
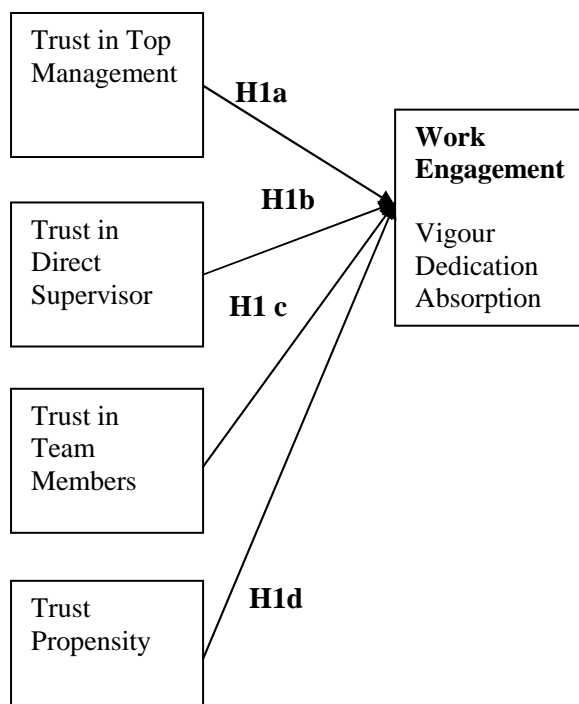
FIGURE 9.2
Hypotheses 2(a to c)

H2a

Trust in Top Management → Organizational Identification

H2b

Trust in Direct Supervisor → Affective Commitment to the Supervisor

H2c

Trust in Team Members → Team Psychological Safety

Work Engagement

Vigour
Dedication
Absorption
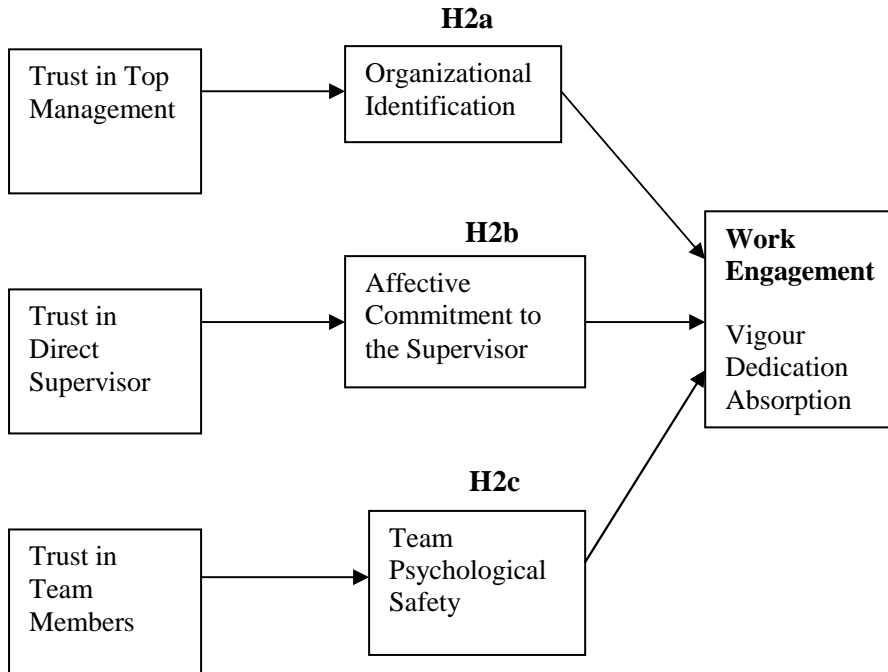
FIGURE 9.3
Hypotheses 3(a to e)

Work Engagement

Vigour
Dedication
Absorption

H3a → In-role Job Performance

H3b → Innovative Work Behaviour

H3c → Feedback Seeking for Self Improvement

H3d → Error Communication

H3e → Affective Organizational Commitment

FIGURE 9.4
Hypotheses 4(a to e)
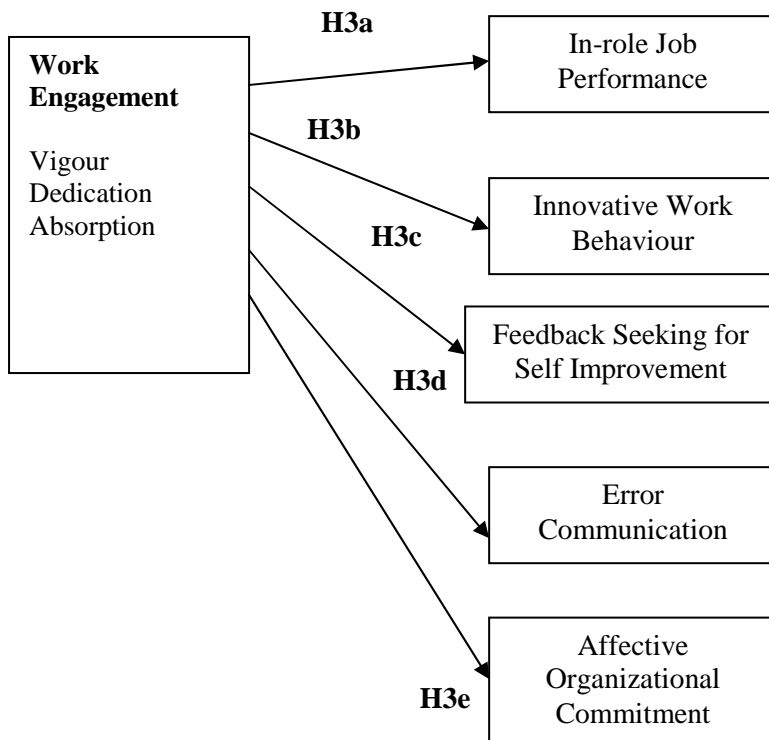
Figure 9.4 Hypotheses 4(a to e)
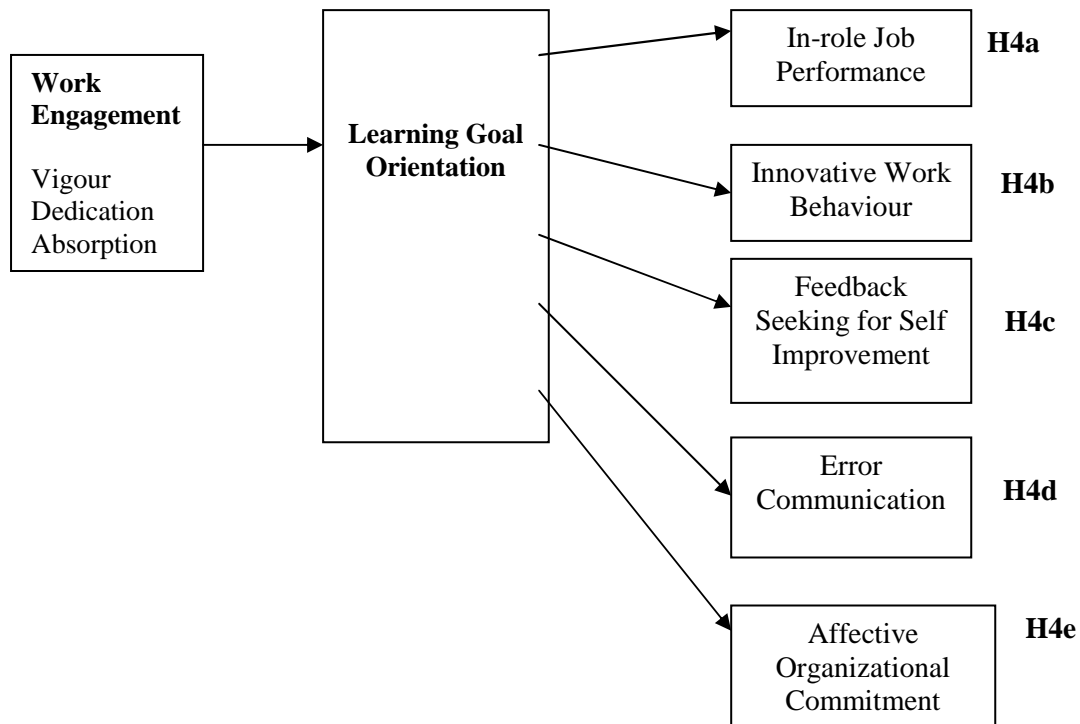
9.2 Work Engagement and Trust in Top Management

There are several reasons why positive trust in the top management is expected to be positively associated with researchers' levels of work engagement. As mentioned in chapter 8, within the context of the university research centre the top management team is responsible for: (1) setting the research agenda; (2) inspiring the research staff to engage in collaborative research; (3) acquiring funding; and (4) carrying out funded research (Rogers et al., 1999). Therefore, if the researchers perceive that the top management team has the capability to carry out these tasks professionally and efficiently, they might feel more comfortable in supporting their research agenda and consequently may be more willing to devote their energy and effort to accomplish the research related goals specified by them. Higher levels of energy and effort exerted by researchers subsequently may culminate in greater work engagement.

In a related vein, researchers' belief that the top management team has the skilful insight and ability to augment the growth and development of the research centre by obtaining funding from external sources might give them increased assurance of a more secure future with the research centre. In such a situation researchers are most likely to concentrate on their research work, rather than feel concerned about such issues as the sustainability of their future employment (Mayer and Gavin, 2005). Complete focus and concentration on research work, in turn, may transform into higher work engagement (Kahn, 1990; May et al., 2004).

In contrast, if the researchers' perceive top management as incompetent and strongly feel that under them the research centre has a bleak future they are likely to become pessimistic about their own future in the centre. Consequently, they may experience a sense of insecurity and anxiety, which subsequently can have an adverse impact on their work engagement.

Furthermore, if the researchers' feel that the top management has been unsuccessful in fulfilling their promised inducements, their level of trust in the top managers might drop and they may perceive it as an infringement of the psychological contract (Robinson, 1996). An infringement of the psychological contract takes place when one party in a relationship recognises another to have failed to discharge promised obligations (Robinson and Rousseau, 1994). When researchers perceive a contract violation, their sense of satisfaction with both the job and the research centre is expected to go down (Robinson and Rousseau, 1994). In these circumstances it may become increasingly difficult for the researchers' to show energy, enthusiasm and involvement in their work and the likely decline in their levels of enthusiasm and involvement might eventually translate into disengagement from work (Schaufeli and Salanova, 2007). Hence, it is reasonable to suggest that in order to promote work engagement, the top managers should strive to deliver on their commitments and seek to create a suitable psychological contract, which should depict an "optimal fit" between the researchers and the research centre in terms of "mutual expectations" (Schaufeli and Salanova, 2007).

Moreover, researchers' perception that the top management is communicating organizational issues candidly and honestly may lower insecurity or uncertainty amongst them (Mishra and Sprietzer, 1998). This is because such vital information gives the research staff a clearer idea about the intentions of the top managers. In such an open environment, it is reasonable to expect that the researchers' will tend to

remain focussed on accomplishing their research related goals rather than being constantly preoccupied by feelings of mistrust and doubt. Full psychological involvement in research related work eventually can enhance researchers' engagement with their work (Kahn, 1992). On the contrary, top management's inclination to cover up key organisational information and keep researchers in the dark is likely to create an insecure environment, in which researchers are liable to withhold their energy and commitment and as a consequence are likely to disengage from their work (Kahn, 1990).

Finally, it is argued that when researchers believe that the policies and procedures adopted by top managers are clearly focused towards promoting and enhancing their well being, they are likely to reciprocate under the norms of social exchange (Blau, 1964) by approaching their work with greater zeal and commitment (Saks, 2006). Saks (2006) suggests that immersing oneself more completely into one's work roles and dedicating greater amounts of cognitive, emotional and physical resources to one's job is a very insightful manner for individuals to respond to the resources and rewards provided by their organization. Thus, the following hypothesis is stated:

Hypothesis 1a: Researchers' trust in top management is positively associated with their work engagement

9.3 Organizational Identification as a Mediating Link between Trust in Top Management and Work Engagement

As mentioned in chapter 5, organizational identification refers to 'perception of oneness with or belongingness to the organization' (Ashforth and Mael, 1989, p. 22) or 'the degree to which a member defines him or herself by the same attributes that he or she believes define the organization' (Dutton, Dukerich and Harquail, 1994, p. 239). In the present study it is argued that positive trust in the top management might strengthen researchers' identification with the research centre. For example, prior research has indicated that individuals identify with a group "partly to enhance self esteem" and as result tend to "invest more of their self concept in valued persona" because this is expected to give a boost to their feelings of self worth (Mael &

Ashforth, 1992, p. 105). Thus, it is speculated that when researchers perceive the top management team to be competent and accomplished, they are more liable to identify with them because by doing so might allow them to acquire a more positive evaluation of the self and as a consequence may increase their feelings of self-esteem and self worth. Since top management is considered the primary purveyor of the research centre's actions, it is reasonable to suggest that researchers' identification with the top management team is likely to spill over to the organization as a whole.

In addition, researchers' belief that the policies and procedures enacted by the top management are fair is likely to signal that the research centre respects them and values their contribution. This sense of being valued by the research centre is likely to raise researchers' self esteem, thereby strengthening their identification with the research centre.

Similarly, researchers' perception that the top management will deliver on their promises might lead them to believe that the research centre is an attractive and a desirable place to belong to. This increase in the perceived attractiveness of the research centre can augment researchers' identification with the centre. Previous research provides sufficient evidence that positive trust can amplify organizational identification (Cremer et al., 2006; Dickey et al., 2007).

A strong organizational identification subsequently is expected to boost researchers' work engagement. As noted above organizational identification is defined as the 'perception of oneness with or belongingness to the organization' (Ashforth and Mael, 1989, p. 22). This psychological oneness with the organization might lead the individuals to view the organization's goals and interests as their own (Mael and Ashforth, 1992; Van Knippenberg, 2000) and as a consequence may stimulate them to dedicate greater amounts of their mental and physical resources towards the attainment of these goals, which by implication can result in greater work engagement.

In addition, prior research has demonstrated that organizational identification leads to increased work motivation (Van Knippenberg, 2000) and greater job involvement (Van Knippenberg and Van Schie, 2000; Riketta, 2005); a construct which is closely aligned with the concept of work engagement (Macey and Schneider, 2008). In a related vein, Wegge et al (2006) in their study on call centres showed that organizational identification was related to three indicators of motivation, namely, job satisfaction, organizational citizenship behaviour and turnover intentions. Given the

fact that work engagement is also an indicator of motivation and has some conceptual overlap with the construct of job involvement, it is safe to assume that high identification may also positively contribute towards increasing work engagement.

Finally, Pratt (1998) argues that social identification with the organization can satisfy the basic human needs for belonging, safety and self enhancement. According to the self determination theory (Ryan and Deci, 2000) the satisfaction of the basic human need to belong is likely to increase intrinsic motivation, well being and subsequently work engagement (Schaufeli and Salanova, 2007). Therefore, it is predicted that:

Hypothesis 2a: Researchers' organizational identification will mediate the effects of trust in top management on work engagement.

9.4 Trust in Supervisor and Work Engagement

The proposed research model suggests that high level of trust in the direct supervisor might also positively affect researchers' engagement with their work. For instance, when researchers dedicate their time, energy and effort to their work, they may expect that their supervisor will recognize and value their contribution by rewarding them either intrinsically (e.g. recognition and appreciation) or extrinsically (e.g. pay raise) (Macey and Schneider, 2008). However, if researchers feel that they cannot count on the supervisor to reward them fairly for their efforts, the chances are that they might become disillusioned and consequently may react by showing lesser amounts of enthusiasm and involvement in their work. This reduction of enthusiasm and involvement on part of the researchers can eventually manifest as disengagement from work.

Conversely, when researchers believe that they can depend on their supervisors to fairly discharge their responsibilities, their motivation and commitment is most likely to improve. In such a situation researchers are likely to contribute greater amounts of their mental and physical resources to role performance, which subsequently can result in higher work engagement (Kahn, 1990; May, Gilson and Harter, 2004).

Furthermore, if the researchers believe that their supervisor is capable and skilled, they are likely to feel more assured that they can count on him or her to

provide assistance and guidance when they run into work related problems (Tan and Tan, 2000). These perceptions are likely to raise researchers' levels of self-efficacy and enhanced self-efficacy beliefs, in turn, may lead to stronger work engagement (Llorens, Schaufeli, Bakker and Salanova, 2007).

Additionally, when researchers believe that the supervisor is concerned about their welfare, has confidence in their abilities and treats them with respect, they are likely to reciprocate under the norms of social exchange (Blau, 1964) by approaching their work with greater energy, devotion and interest (Saks, 2006).

Finally, Lewicki, Tomlinson and Gillespie (2006) contend that "extending trust engenders reciprocity, so that when we trust others, they become more likely to behave in a trustworthy manner and to trust us in return" (p. 998). Applying this logic to the present study, it is argued that when researchers trust their supervisor, the supervisor might reciprocate by trusting them back and supervisor's trust in their research staff may manifest in the staff being encouraged to show "initiative and act autonomously" (Spreitzer and Mishra, 1999, p. 163). According to the job characteristics theory (Hackman and Oldham, 1980), when employees are given greater freedom to carry out their work tasks, their levels of intrinsic motivation and work engagement are expected to go up (Schaufeli and Bakker, 2004). Thus, it is proposed that:

Hypothesis 1b: Researchers' trust in direct supervisor will be positively associated with their work engagement.

9.5 Affective Commitment to Supervisor as a Mediating Link between Trust in Supervisor and Work Engagement

Affective commitment to the supervisor refers to employees' emotional attachment to and identification with their supervisor (Clugston, Howell and Dorfman, 2000). In the current investigation, it is speculated that higher level of trust in the supervisor may have a positive impact on supervisory commitment. Dirks and Ferrin (2002) argue that the supervisor performs many roles such as evaluating performance, providing guidance with regards to job and career related issues and distribution of rewards, which can have a profound effect on employees' commitment and satisfaction. If researchers believe that they can trust their supervisor to impartially

carry out his or her role with regards to these aspects of the job, they are likely to shelve their personal interests and internalise the research related goals and objectives specified by their supervisor (Dirks and Skarlicki, 2004). The aligning of researchers' goals and interests with that of the supervisor, in turn, is expected to engender greater commitment to the supervisor (Becker et al., 1996).

Additionally, it is suggested that higher commitment to the supervisor is likely to increase researchers' work engagement. When the researchers are committed to their supervisor, they are liable to get access to supervisory resources that may not be available otherwise (Siders et al., 2001). Such supervisory resources can take the form of more social support, more frequent feedback and reinforcement, more challenging goals and personalised coaching. These resources have motivational potential and as a result can promote work engagement (Bakker and Demerouti, 2008; Bakker et al., 2008). In view of this discussion the following hypothesis is formulated:

Hypothesis 2b: Researchers' affective commitment to the supervisor will mediate the effects of trust in direct supervisor on work engagement.

9.6 Work Engagement and Trust in Team Members

Traditionally, studies on organizational trust have mainly focused on trust in leadership (Costigan, Ilter and Berman 1998). However, recently, trust in peers or team-members, has assumed increased significance as team processes have received more sophisticated investigation (Jones and George, 1998). Trust in team members acquires particular salience within the context of university science research centers where the research scientists work in multi-disciplinary teams, which require close collaboration to attain their research goals (Boardman and Corley, 2008). Working in teams usually involves some degree of interdependence and as a consequence team members need to rely on each other to attain individual and team goals (Wilson, Straus and McEvily, 2006). In such a situation the only way by which successful task completion and goal accomplishment can take place is through cooperation and research evidence indicates that trust in team members can play a key role in fostering "interpersonal cooperation" and in developing "synergistic team relationships" (Jones and George, 1998).

Positive trust in team members is expected to contribute to higher work engagement in several different ways. For instance, it is argued that high trust in team members might lead the researchers to adopt an "us-rationality" with them, which can induce them to place the team's interest above their own personal interests (Bijlsma-Frankema, De Jong and Van de Bunt, 2008). This "directedness" towards team goals appears to promote employees' willingness to exert extra effort towards the attainment of team goals, which in turn can manifest in enhanced levels of work engagement.

In addition, high levels of trust in team members can increase researchers' inclination to openly share information and ideas because they feel confident that their team members will not behave opportunistically (Collins and Smith, 2006). An open exchange of knowledge, information and ideas is likely to promote researchers' learning and development and as result can foster work engagement (Hakanen, Bakker and Schaufeli, 2006).

In a related vein, in an environment of trust, researchers are more likely to engage in helping behaviours (Dirks and Skarlicki, 2004). Helping behaviours in the form of instrumental help from colleagues increase the likelihood that researchers will be able to complete their research work effectively and therefore, is likely to result in higher work engagement (Schaufeli and Bakker, 2004).

Finally, positive trust can develop high quality relationships between team members, which are characterised by demonstration of concern and mutual respect for each other (Jones and George, 1998; Costa, 2003). In such a supportive environment researchers are more likely to feel accepted within the team and will feel more comfortable in sharing their job specific and personal problems with their team members, which in turn can satisfy their need to belong (Broeck, Vansteenkiste, Witte and Lens, 2008). According to the self-determination theory (Ryan and Deci, 2000), the fulfilment of the basic human need to belong can promote autonomous regulation – a concept that is closely aligned to the construct of work engagement (Meyer and Gagne, 2008).

In contrast, when trust levels are low, researchers are liable to engage in dysfunctional behaviours such as wasting time and energy in monitoring each others' activities, refusing to engage in helping behaviours and expressing unwillingness to share information and ideas with fellow team members (Kiffin-Peterson and Cordery, 2003). Moreover, lack of trust in team members can translate into reduced satisfaction

with the team and the desire to quit the team (Wilson et al., 2006). The confluence of these factors can result in disengagement from work. Hence it is hypothesised that:

Hypothesis 1c: Researchers' trust in their team members will be positively associated with their work engagement

9.7 Team Psychological Safety as a Mediating Link between Trust in Team Members and Work Engagement

Edmondson (1999) defines team psychological safety as team members' belief that their "team is safe for interpersonal risk taking" (p. 354). It is proposed that positive trust in team members might cultivate a climate of psychological safety within teams. For example, Edmondson (2004) proposes that the existence of trusting relationships between team members can play a pivotal role in engendering feelings of psychological safety. More specifically, she suggests that when employees believe that their team members have faith in their skills and capabilities, they are more likely to openly express their thoughts and opinions. On the contrary, if employees perceive that their colleagues have little trust in their abilities, they are likely to feel "judged" or "monitored" and might thus refrain from expressing their opinions because they fear that it may bring harm to their reputation (Edmondson, 2004).

Others scholars have also expressed similar views. For instance, May et al. (2004) assert that high levels of affective trust – a component of trust that reflects a special relationship, in which individuals express care and concern for their partners (McAllister, 1995), can play a key role in promoting feelings of psychological safety. May and his colleagues further argue that employees' tendency to value each others' skills and talents and their willingness to support each other in difficult times can heighten perceptions of psychological safety.

Furthermore, Kahn (1990) in his qualitative study, conducted within the confines of an architecture firm, found that "interpersonal relationships promoted psychological safety when they were supportive and trusting" (p. 708). The results of this study showed that the employees were more willing to share ideas and concepts about designs when they trusted each other.

Finally, using a sample of hair stylists, Madjar and Oritz-Walters (2009) empirically established that a climate of trust can prove to be an important predictor of psychological safety.

A psychologically safe environment, in turn, is likely to promote work engagement. For instance, when researchers feel psychologically safe they are more likely to take risks such as trying out new work methods, proposing unorthodox ideas and generating novel solutions to problems because they do not expect negative consequences for doing so (May et al., 2004). This should increase researchers' initiative and strengthen their sense of self-determination and as a consequence might raise their work engagement. Conversely, when researchers are working under uncertain and unsafe conditions, they will be hesitant to experiment and express their true selves, which in turn may cause their engagement levels to decline (May et al., 2004). Therefore, the following hypothesis is stated:

Hypothesis 2c: Team psychological safety will mediate the effects of trust in team members on work engagement.

9.8 Trust Propensity and Work Engagement

This thesis also proposes that researchers' dispositional tendency to trust others may also have a positive impact on their work engagement. Previous research suggests that high trustors are more inclined to engage in pro-social behaviour because they feel assured that others will reciprocate their good deeds in some appropriate way (Van Dyne, VandeWalle, Kostova, Latham and Cummings, 2000; Colquitt, Scott and LePine, 2007). In addition, Rotter (1980) reports that people with a high propensity to trust are less likely to lie, cheat or steal and they are more likely to respect the rights of others, are liked by others and are sought out as friends. Moreover, McKnight and Chervany (2001) assert that individuals, who are predisposed to trust others, generally tend to be less critical of others and are usually more likely to give other people the benefit of the doubt. Furthermore, Colquitt et al. (2007) in their meta-analytic study showed that trusting individuals are likely to refrain from engaging in counterproductive behaviours. Finally, high trustors have been found to be less suspicious and therefore, less inclined to monitor the actions of others (Van Dyne et al., 2000).

In view of these positive characteristics, it is reasonable to suggest that the trusting researchers might develop high quality relationships with their supervisors and team members (Van Dyne et al., 2000), which may facilitate them to mobilize resources (e.g. social support from co-workers and supervisors, performance feedback etc.) that are necessary for strengthening their work engagement. Thus, the following hypothesis is formulated:

Hypothesis 1d: Researchers' trust propensity will be positively associated with their work engagement.

9.9 Work Engagement and Organizational Outcomes

In the current study, it is hypothesised that high levels of work engagement will lead to better in-role job performance, higher levels of innovation, a greater tendency to engage in two forms of learning behaviour, namely, feedback seeking and error communication and stronger organizational commitment. These relationships are discussed in the ensuing paragraphs.

9.9.1 Work Engagement and In-Role Job Performance

In-role job performance refers to those activities that are linked to employees' formal role obligations (Borman and Motowidlo, 1997). As mentioned earlier, previous research suggests that engaged workers experience greater job satisfaction, are more committed to their organization and generally have a lower tendency to turnover (Schaufeli and Salanova, 2007). Furthermore, it has been reported that engaged employees are likely to show initiative (Hakanen, Perhoniemi and Toppinen-Tanner, 2008), learning motivation (Sonnentag, 2003) and proactive behaviour (Salanova and Schaufeli, 2008) while working on their jobs. Finally, since engaged employees cope well with the demands in their environment, they are expected to enjoy good health and well-being (Bakker et al, 2008). Improved health and well-being, in turn, might allow the engaged workers to drive greater energy into their work roles and as a result may manifest in superior job performance (Bakker et al., 2008). Therefore, on the basis of this evidence, it is postulated that engaged research scientists will display better in-role job performance than their non-engaged

counterparts. Past empirical research supports the link between in-role job performance and work engagement (Schaufeli, Taris and Bakker, 2006).

Hypothesis 3a: Researchers' work engagement will be positively associated with their in-role job performance.

9.9.2 Work Engagement and Innovative Work Behaviour

Innovative work behaviour involves activities such as experimentation, suggesting new ideas and coming with innovative solutions to problems (Janssen, 2000). The link between work engagement and innovative work behaviour can be explained in terms of the broaden-and-build theory of positive emotions (Fredrickson, 2000). According to this theory certain positive emotions such as joy, interest and love broaden people's momentary thought-action repertoires and build their personal resources, which are permanent and long lasting. Fredrickson (1998) suggests that, "experiences of certain positive emotions prompt individuals to discard time-tested or automatic (everyday) behavioural script and to pursue novel, creative and often unscripted paths of thought and action" (p. 304). Thus it is speculated that when researchers experience positive affect in the form of work engagement they may feel an urge to try out new work methods and come up with innovative ideas and suggestions (Hakanen, Perhoniemi and Tanner, 2008). Prior research provides supporting evidence that work engagement can promote innovative work behaviour (Schaufeli, Taris and Bakker, 2006; Hakanen et al., 2008). Thus we hypothesise:

Hypothesis 3b: Researchers' work engagement will be positively associated with their innovative work behaviour.

9.9.3 Work Engagement and Learning Behaviour

Research evidence indicates that employees' tendency to proactively seek feedback and their inclination to report and constructively analyze mistakes can augment individual, team and organizational learning and performance (Edmondson, 1999, 2004). However, in spite of the potential advantages, the act of seeking feedback and reporting errors entails significant costs for the concerned individual.

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This is because in both cases individuals risk receiving a negative evaluation, which in turn, can have adverse effects on their self image. Thus, it is suggested that individuals will only engage in these interpersonally risky behaviours if the benefits of engaging in these behaviours out strip the costs.

In the current investigation it is argued that engaged researchers might focus more on the value and less on the costs associated with seeking diagnostic feedback and reporting errors, and as a result may be more inclined to engage in these behaviours. Engaged employees are committed to performing at high standards (Schaufeli and Salanova, 2007) and possess a strong desire to learn (Sonnentag, 2003). Thus, it is suggested that the engaged researchers are likely to perceive the process of seeking information for self improvement and discussing mistakes as an opportunity to correct their performance-related deficiencies and satisfy their penchant for learning. This quest for self improvement, in turn, can stimulate the engaged scientists to exhibit learning behaviour.

Moreover, employees who are strongly engaged in their work have been known to exhibit personal initiative and proactive behaviour in the workplace (Sonnentag, 2003; Salanova and Schaufeli, 2008). It is therefore, suggested that these characteristics might provide the necessary impetus to the engaged researchers to proactively seek feedback and communicate errors. To the best of my knowledge these relationships have not been explored before. Thus the following two hypotheses are stated:

Hypothesis 3c: Researchers' work engagement will be positively associated with seeking feedback for self improvement

Hypothesis 3d: Researchers' work engagement will be positively associated with error communication

9.9.4 Work Engagement and Organizational Commitment

Finally, work engagement is likely to lead to greater affective organizational commitment. As mentioned earlier, affective organizational commitment in the present study is conceptualised as employees' attachment to, identification with and involvement in the organization (Meyer, Allen and Smith, 1993). Schaufeli and

Salanova (2007) in their review mention that generally engaged employees' values and norms tend to be compatible with those of their organizations, which might make them more committed to their employing organization. Moreover, Schaufeli and Bakker (2004) report that engaged employees usually have access to plenty of job resources, which gives them less of an incentive to seek employment elsewhere. There is ample evidence, which suggests that work engagement can enhance employees' commitment to their organization (Saks, 2006; Hakanen et al., 2006; Hakanen, Schaufeli and Ahola, 2008).

Hypothesis 3e: Researchers' work engagement will be positively associated with their organizational commitment

9.10 The Mediating Role of Learning Goal Orientation

One important contribution of this thesis is that it highlights the role of learning goal orientation as a conduit through which work engagement affects the five organizational outcomes. Although learning goal orientation is a relatively stable personality trait, it can be affected by situational cues such as leadership style, reward systems and training and development (VandeWalle, 2001). In the present study it is argued that positive affect in the form of work engagement would induce individuals to approach their work with a learning goal orientation.

Schaufeli and Salanova, (2007) report that engaged employees are constantly on look out for new challenges in their jobs and are dedicated to performing at high performance levels. Thus, it is speculated that this pursuit of excellence and new challenges might inspire the engaged scientists to enhance their research potential by learning and mastering new research related skills, which eventually may strengthen their learning orientation.

Moreover, engaged workers because of their high degree of involvement in their work are likely to possess a sound awareness of the requirements of their jobs (Harter, Schmidt and Keyes, 2003). This might facilitate them to identify the necessary skills and knowledge, which are essential for excelling in their work. When the employees are clear about which skills and abilities are important for their work, they will be more inclined to devote their time and energies to look for relevant information and strategies that might help them to acquire those skills. This search for

information and strategies, in turn, can enhance employees' learning orientation (Kohli, Shervani and Challagalla, 1998).

In return it is expected that a strong learning orientation might lead to higher in-role job performance, an increased motivation to engage in innovative work behaviour, a greater exhibition of learning behaviour and enhanced organizational commitment. For instance, prior research has demonstrated that individuals with a learning goal orientation put extra effort into their jobs, set challenging goals for themselves and engage in planning their work (VandeWalle, Brown, Cron and Slocum, 1999). These individuals not only work hard but they also work smart (Sujan, Weitz and Kumar, 1994) and generally tend to have a high sense of self efficacy (VandeWalle, Cron and Slocum, 2001). In addition, learning goal orientation has been found to be positively associated with optimism and hope - two personal resources that might cultivate resiliency in the wake of setbacks (VandeWalle, 2001). In light of this evidence, it is safe to assume that learning oriented researchers will demonstrate superior in-role job performance (Janssen and Van Yperen, 2004).

In addition, it is predicted that individuals high on learning goal orientation are more likely to engage in innovative work behaviour. A learning goal orientation can prove to be an important driver of innovative work behaviour for several reasons. First, "innovation is an especially complex and challenging task encompassing a broad variety of cognitive and social activities, such as generating, promoting, discussing, modifying and ultimately implementing creative ideas" (Janssen and Van Yperen, 2004, p. 371). Since learning orientated individuals have a penchant for complex and novel tasks (VandeWalle, 1997), it is speculated that these individuals may be more inclined to seek out creative activities, which by definition involve uncertain and untested approaches and possess a high likelihood of failure and potential error (Hirst, Van Knippenberg and Zhou, 2009).

Furthermore, Amabile (1997) argues that an individual's intrinsic interest in his or her work can play a pivotal role in sparking innovation and creativity. Previous research suggests that individuals who hold a strong learning orientation have a personal and intrinsic interest in their job tasks (Van Yperen, 2003), which might prompt them to dabble in innovative activities.

Moreover, employees who have a strong learning orientation do not flinch when they encounter demanding situations (VandeWalle, 1997; VandeWalle and Cummings, 1997). Since innovation involves changing the status-quo, it is likely to

arouse resistance from other workers, especially those who may be adversely affected by the innovative change (Janssen, 2003). Due to their resilient nature, learning oriented employees are much better equipped to cope with resistance and opposition from other workers and as a result are expected to persevere and ultimately succeed in implementing their innovative plans. Prior research lends support to the notion that learning goal orientation can induce innovative work behaviour (Janssen and Van Yperen, 2004; Hirst et al., 2009).

Individuals with a high learning goal orientation are also expected to display learning behaviours like feedback seeking and communicating errors. Learning oriented individuals are more liable to seek diagnostic feedback because they consider it as critical to their goal of improving their competence (Janssen and Prins, 2007; Park, Schmidt, Scheu and DeShon, 2007). Furthermore, since people with a learning goal orientation are not unduly bothered by mistakes and consider errors and failures as part of the learning process (Sujan, Weitz and Kumar, 1994), they are also more likely to report and discuss mistakes.

There are at least two reasons why learning goal orientation is likely to be positively related to organizational commitment. First, learning oriented people might perceive greater development and learning opportunities within the organization, which may inspire them to continue employment with their employing organization (D'Amato and Herzfeldt, 2008). Second, learning goal orientation by reinforcing individuals sense of self efficacy, contributes to their feelings of personal competence and self-worth. Enhanced feelings of competence and self-worth, in turn, have been reported to lead to increased organizational commitment (Meyer and Allen, 1997).

Taken together the above discussion implies that work engagement might affect the five organizational outcomes by raising researchers' learning goal orientation. Work engagement however can affect the organizational outcomes in other ways as well. For example, Schaufeli and Bakker (2004) suggest that work engagement can influence organizational outcomes by positively affecting employees' health and well being. In a related vein, Bakker and Demerouti (2008) propose that work engagement can positively affect performance outcomes by facilitating self regulation. Thus, it is predicted that learning goal orientation will at least partially mediate the relationship between work engagement and the five organizational outcomes. Hence, the following hypotheses are specified:

*Hypothesis 4a***:** Researchers' learning goal orientation will at least partially mediate the effects of work engagement on in-role job performance

*Hypothesis 4b***:** Researchers' learning goal orientation will at least partially mediate the effects of work engagement on innovative work behaviour

Hypothesis 4c: Researchers' learning goal orientation will at least partially mediate the effects of work engagement on seeking feedback for self improvement

Hypothesis 4d: Researchers' learning goal orientation will at least partially mediate the effects of work engagement on error communication

Hypothesis 4e: Researchers' learning goal orientation will at least partially mediate the effects of work engagement on organizational commitment

9.11 Summary

The purpose of this chapter was to explain the theory and logic for developing the relevant research hypotheses. More specifically, it was hypothesised that organizational identification, affective commitment to the supervisor and team psychological safety will link trust in top management, trust in direct supervisor and trust in team members to work engagement respectively. It was further predicted that trust propensity will also have a positive impact on researchers' work engagement. Finally, it was speculated that learning goal orientation will act as an intervening mechanism between work engagement and the outcomes variables.

CHAPTER 10

Research Methodology

10.1 Introduction

The present chapter lays down the philosophical foundations of the study and describes its methodological design. More specifically, this chapter comprises of two sections. The first section discusses the epistemological framework of the study and illuminates its ontological foundation. Epistemology is the branch of philosophy that is concerned with the origin of knowledge or how we come to know (Creswell, 2003; Eby, Hurst and Butts, 2009). Epistemology poses the following question: 'What is the relationship between the would-be knower and the object of research?'(Guba and Lincoln, 1994; Creswell, 1994). Ontology on the other hand, is the philosophy of reality, which focuses on what exists in the world around us (Creswell, 2003; Eby et al., 2009). It seeks answer to the following question: 'What is the nature of reality and therefore, what is there that can be known about it?' (Guba and Lincoln, 1994; Creswell, 1994). Furthermore, methodology enables a researcher to find out whatever he or she believes, can be known (Guba and Lincoln, 1994). Epistemology is intimately related to ontology and methodology. While, ontology is the philosophy of reality; epistemology addresses how we can come to know that reality and methodology highlights the particular practices used to attain knowledge of that reality.

The second section of this chapter deals with the research methodology employed for this study. More particularly, it discusses the research design of the study; provides details regarding the research participants; explains the data collection procedures; describes the measurement instruments used to assess the study variables; and finally examines the statistical techniques utilized to test the research hypotheses.

10.2 Philosophical Foundations of this Research

As noted in earlier chapters, work engagement is the main phenomena of interest in the present study. The review of the engagement literature presented in Chapter 2 reveals that this area is embedded in the positivist tradition. Positivism assumes a realist ontology and, therefore, proposes that reality is objective, concrete, 'out there' and independent of the language researchers use to describe it (Creswell, 1994). The basic stance of positivism is argued to be deterministic, which suggests that causes probably determine effects or outcomes (Guba and Lincoln, 1994; Creswell, 2003). The problems, therefore, investigated by the positivists reflect a need to identify the causes that affect particular outcomes (Creswell, 2003). In addition, positivism also reflects a reductionistic philosophy in which the aim is to reduce the ideas into specific propositions or research hypotheses, which subsequently can be empirically tested (Guba and Lincoln, 1994; Creswell, 2003). Positivism has its roots in empiricism, which postulates that observation and measurement represent the core of the scientific method (Benton and Craib, 2001).

Within the positivist framework, the researcher and the researched object are assumed to be independent and distant from each other (Guba and Lincoln, 1994; Creswell, 1994). It is further suggested that the researcher should be capable of researching the object of research without influencing it or being influence by it. Thus, the researchers who adopt a positivist approach take special precautions to control for bias and attempt to remain objective while assessing a particular situation (Creswell, 1994). These aspects of positivism emanate from its realist foundations.

The process of knowledge development within the positivist framework, takes place through the hypothetico-deductive model (Creswell, 1994; Bryman, 2001). In the hypothetico-deductive model, a researcher proposes a theory and on the basis of that theory specifies certain hypotheses, which are then rigorously tested through appropriate analytical techniques (Colquitt and Zapata-Phelan, 2007). Colquitt and Zapata-Phelan (2007) argue that in hypothetico-deductive studies, initial tests of theory are typically focused on establishing the validity of the theory's main propositions. In subsequent tests researchers begin to investigate the possible mediators or moderators of an existing relationship. Finally, the researchers conduct further tests by incorporating new antecedents and outcome variables, which were not part of the original model. These researchers further assert that the potential

contribution of empirical studies using the hypothetico-deductive model can be gauged on two dimensions: theory development and theory testing. In fact the results of Colquitt and Zapata-Phelan's (2007) study showed that over the past five decades both theory building and theory testing have exhibited upward trends and that studies high on these dimensions enjoyed the highest levels of citations.

In the hypothetico-deductive model variables and hypotheses are specified before the study is initiated and they remain fixed throughout the investigation. The purpose of the study is to "develop generalizations that contribute to the theory and that enables one to better predict, explain and understand some phenomena" (Creswell, 1994, p. 7). Since, positivism predominantly focuses on establishing a causal framework, (i.e. theory – model – testing) for developing knowledge, the quantitative method is deemed as the appropriate method for this approach.

The main contribution of this study is not at the philosophical level but at the level of the theory. As mentioned in previous chapters, work engagement has been mainly expressed as an outcome of job and personal resources (Bakker et al., 2008; Bakker and Demerouti, 2008). The present study, however, adopts a new line of inquiry and aims to extend the developing engagement literature by examining the effects of trust on researchers' levels of work engagement. The current study is guided by a mature body of literature because both work engagement and trust are relatively established and well understood constructs, which can be measured by reliable and valid instruments. In this regard, Edmondson and McManus (2007) argue that researchers should strive to obtain an optimum methodological fit, which reflects a consistency between the state of theory development and methods used for the study. More specifically, Edmondson and McManus (2007) contend that "as the area of theory becomes more mature with greater consensus among researchers, most important contributions take the form of carefully specified models and quantitative tests" (p. 1177). Thus, in line with this reasoning, the present study proposes an integrated model, which links the three forms of state trust, that is, trust in top management, trust in direct supervisor and trust in team members and trait trust or trust propensity to work engagement. This model is built from a series of propositions regarding the complex inter-relationship between work engagement and the two forms of trust (i.e. state and trait trust). These propositions were subsequently tested through suitable quantitative techniques, which are discussed in detail in the ensuing paragraphs.

10.3 Research Design: Quantitative Survey

The survey design is considered as the most appropriate research design to measure the perceptions and attitudes of research scientists in this study because it encompasses the positivist framework and the associated quantitative method (Creswell, 1994, 2003). Survey research aims to study "large and small populations to discover the relative incidence, distribution and interrelations of sociological and psychological variables" (Kerlinger, 1986, p. 377). Put differently, survey research is usually a quantitative method, which elicits standardized information in order to define or describe variables or to study relationships between variables (Fowler, 2002). Fowler (2002) highlights three characteristics of surveys:

- The main aim of the survey is to generate statistics, that is, quantitative or numerical descriptions about some aspects of the study population.

- The primary method of gathering information is by asking people questions; their answers constitute the data to be analyzed.

- Usually information is collected from only a small sample of the population rather than from every member of the population.

Surveys are particularly useful in describing the characteristics of a large population (Babbie, 2007; Dillman, 2007). Babbie (2007) and Dilman (2007) argue that a carefully selected probability sample in conjunction with a standardized questionnaire provides a group of respondents whose characteristics can be generalized to the larger population. This advantage gives survey research an edge over other methods such as, focus groups, small group experiments, content analysis and historical analysis (Dillman, 2007). Additionally, since in survey research the required information is collected from a small percentage of the population rather than every member of the population, it provides a relatively quick, inexpensive, efficient and accurate means of collecting information about a specific population (Kerlinger, 1986; Saunders, Lewis and Thornhill, 2009).

However, surveys have certain shortcomings, which need to be noted. For instance, Dilman (2007) identifies four sources of error in survey research, which can adversely affect the results of the concerned study. The first source of error is the sampling error, which occurs as a result of excluding some people from the survey population. This error can bias the sample estimates to the extent that those excluded differ from those included (Fowler, 2002). Secondly, survey research can lead to coverage error. Coverage error takes place when "the list from which the sample is drawn does not include all elements of the population, thus making it impossible to give all elements of the population an equal or known chance of being included in the sample survey" (Dillman, 2007, p. 9). The third source of error, that is, the measurement error, takes place because of the inaccurate and imprecise responses to questions by the respondents. Measurement error occurs because of poor question wording and inappropriate questionnaire design. Finally, the non-response error occurs when a substantial percentage of the people in the survey sample do not respond to the questionnaire and are different from those who respond, in a way relevant to the study. Non-response error is particularly problematic in mail and internet surveys. Dillaman (2007) argues that although effort must be made to reduce all types of error, particular attention needs to be paid to addressing the measurement and non-response errors. These errors can be mitigated through an effective design of questions, questionnaires and implementation methods.

10.3.1 Methods of Data Collection

In survey research the required information can be obtained by using the following methods: (1) personal interviews; (2) telephone interviews; (3) mail questionnaires; and (4) internet or web-based questionnaires. Traditionally, personal interview was considered the most powerful tool of survey research (Kerlinger, 1986; Dillman, 2007). However, the recent advances in computer technology; cultural changes, which require less interaction between people; improvement in the computer-related skills of people; and the advent of new methods of self administering surveys has made self administered questionnaires the dominant method of data collection (Dillman, 2007). The present study also utilized self-administered questionnaires to collect data from the relevant respondents. More specifically, in the present study, both the traditional paper and pencil and web based

questionnaire was used to gather data. Some potential advantages and disadvantages of the self administered questionnaires are discussed next.

10.3.2 Advantages of Self-Administered Questionnaires

Self administered questionnaires, both mail (paper and pencil questionnaire) and internet, offer several advantages to researchers. For instance, they are relatively inexpensive to administer, provide access to geographically dispersed samples and offer respondents the opportunity to think about their answers, to look up records or to consult with others (Fowler, 2002; Zikmund, 2003). In addition surveys conducted on the internet can be interactive and may use colour, sound and animation to elicit higher response rates (Zikmund, 2003). Another, potential advantage of self-administered questionnaires is that they can induce respondents to divulge sensitive and socially undesirable information, which they may be reluctant to reveal in face to face interviews (Fowler, 2002; Zikmund, 2003; Babbie, 2007).

10.3.3 Disadvantages of Self-Administered Questionnaires

The main drawback of the self-administered surveys is the low response rates. For instance, Saunders et al. (2009), report that for mail questionnaires, response rates in the region of 10-20 percent are not uncommon. In a related vein, Cook, Heath and Thompson (2000), in a meta-analysis of 56 on-line surveys found that the average response rate for online surveys was 34.6%. As, noted above, non-response error is particularly problematic if the non-respondents are systematically different from the whole population (Fowler, 2002; Dillman, 2007; Babbie, 2007).

In this regards, Dillman (2007) highlights five elements, which can help to overcome the problem of low response rates in mail surveys. These elements include: (1) a respondent-friendly questionnaire; (2) up to five contacts with the questionnaire recipient; (3) providing respondents with self addressed stamped envelopes; (4) personalized correspondence; and (5) enclosing a token financial incentive with the questionnaire. Out of these five elements, follow up contacts and token financial incentives are the most effective strategies for increasing response rates. According to Dillman (2007) without follow up contact the response rates can be 20-40 percentage points lower than those normally attained. In addition, he suggests that token financial

incentives of one to five dollars enclosed with the questionnaire can significantly boost response rates. Similarly, Roth and BeVier (1998) identified four factors, which can increase response rates for mail and non-mail surveys in HRM / OB research: advance notice, identification numbers, follow-up reminders and salience.

To increase response rates for internet surveys, Schaffer and Dillman (1998) propose several strategies such as, making multiple contacts, personalized correspondence, using more than one mode to contact respondents and offering alternate modes of responding for those who do not respond initially.

Additionally, information obtained from questionnaires is usually based on self-reports, which can lead to the problem of common method variance (Harrison, Mclaughlin and Coalter, 1996; Podsakoff, Mackenzie, Lee and Podsakoff, 2003; Spector, 2006). Common method variance is the "variance that is attributable to the measurement method rather than to the constructs the measures represent" (Podsakoff et al., 2003, p. 879). The main problem with common method variance is that it can artificially inflate or deflate relationships between constructs.

However, Podsakoff et al (2003) argue that the problem of common method bias can be overcome through procedural and statistical remedies. As far as procedural remedies are concerned, Podsakoff et al (2003) recommend that collecting data on the dependent and independent variables from different sources or collecting data on these variables at different points in time is the most effective way of addressing the problem of common method variance. Moreover, assuring respondents that their responses will be kept confidential can stimulate them to answer questions honestly. Furthermore, in order to control response consistencies, the question order may be counterbalanced, such that the dependent measures are placed before the independent measures (Harrison et al., 1996). Finally, the use of validated scales to measure the study variables can play a key role in reducing the problem of common method variance (Spector, 1987, 1994). Additionally, statistical remedies, particularly the Harman's single-factor test, can also be used to address the problem of common method variance (Podsakoff et al., 2003).

10.4 Participants of the Study

The present study was part of a larger project on knowledge creation, innovation and human resource practices, which was undertaken within the context of six science research centres, functioning on the premises of a leading university in Ireland. Data for this cross sectional field study were collected from all the six research centres. These research centres are engaged in cutting edge research in the fields of sensor research, information and communication technology, plasma research, bio-technology, localisation research and digital video processing. The participants included all the research scientists working in various research teams within these centres. Each scientist included in this study was associated with a specific research group, which was led by a principal investigator. The total number of researchers in the research centres surveyed was 460. Table 10.1 highlights the number of respondents in each centre.

TABLE 10.1
Total Population of Researchers in each Research Centre

No.	Research Centre	Total Population of Researchers
1	Research Centre 1	207
2	Research Centre 2	77
3	Research Centre 3	66
4	Research Centre 4	44
5	Research Centre 5	37
6	Research Centre 6	29
Total		**460**

10.5 Data Collection Procedure

In advance of the data collection, discussions were held with the relevant management personnel in each of these research centres to discuss the general purpose of the study and to gain insight on the structure and focus of the research teams within each unit. Prior to commencing the data collection process several important ethical issues were also addressed (Sekaran, 2003; Zikmund, 2003). For instance, before formally beginning the study, the full study proposal was submitted to the Dublin City University Research Ethics Committee for review. The study was formally started only after the study proposal was passed by the Research Ethics Committee. Furthermore, the management personnel of the research centres were assured that the identity of their researchers and their centres would be kept confidential. In addition, the centre managers were guaranteed that the data collected from their researchers would be used only to aggregate the responses and that only the aggregated results would be made public. Moreover, the participation in this study was completely voluntary. In other words, the aim of the researcher was to obtain "informed consent" of the participants (Sekaran, 2003). Finally, to reduce any ambiguities, a concerted effort was made to clearly explain the purpose and process of the research to the concerned managers.

A choice of traditional pencil and paper or web-based survey was offered to each research centre. Three research centres opted for the paper and pencil questionnaire. The total number of respondents in these three centres was 328. The required number of copies along with a cover letter assuring anonymity was handed over to the coordinating managers in these three centres for distribution to all the relevant research staff. As mentioned above, the participation in this study was completely voluntary. The respondents filled up the questionnaire and dropped the completed questionnaire in a box placed at a convenient location for this purpose. The respondents were initially requested to complete the questionnaire within a one week period. After the first week, the relevant coordinating managers sent a reminder to the participants through e-mail, reminding the non-respondents to complete the questionnaire. After this two week period, 150 questionnaires (out of 328) were returned. However, out of these 150 questionnaires, only 136 were complete and

useable. Therefore, the response rate was 41.5 percent. The researcher personally collected the completed forms from these centres.

The remaining three research centres expressed their preference for a web-based survey. For this purpose, a web-based questionnaire was constructed by using the survey monkey software (http://www.surveymonkey.com). The coordinating managers in these centres were of the opinion that maximum response rate might be achieved if they themselves emailed the link of the questionnaire to their researchers. Thus, the link of the questionnaire was provided to the concerned managers in these centres, who subsequently e-mailed it to their researchers. The first page of the web-based questionnaire provided the same cover letter used for the paper and pencil questionnaire. This letter assured respondents that their responses would be kept confidential. The total number of respondents in these three centres was 132. Participants submitted responses, which were automatically stored in the survey monkey database and were subsequently downloaded for later analysis. Again the respondents were initially given one week to fill out the questionnaires and a reminder was sent to them after the first week. Out of the 132 respondents to whom the link of the web-based questionnaire was sent, 68 returned the questionnaire. However, of the 68 questionnaires that were returned, only 56 were deemed useable. Thus, the response rate was 42.4 percent. The fact that the use of paper and pencil and the web based questionnaire yielded similar response rates is consistent with the findings reported by Schaefer and Dillman (1998), who obtained response rates of 57.5 percent and 58 percent for mail and e-mail surveys respectively.

In all, 460 questionnaires were distributed out of which 218 were returned. Of the 218 questionnaires that were returned, 192 were useable. The overall response rate, therefore, was 41.7 percent. In this connection, Baruch and Holtom (2008) examined 463 different studies, published in 17 refereed journals to determine an adequate response rate for management and behavioural science research. On the basis of the results of this study, Baruch and Holtom (2008) recommend a response rate of at least 50% for studies conducted at the individual level. Although, according to this criteria the response rate obtained for the current study is slightly low, but it is quite comparable to some of the studies conducted in the domain of OB / HRM. For instance, Wayne, Shore and Liden (1997) and Clugston, Howell and Dorfman (2000) reported response rates of 40 percent and 37 percent respectively. In a more recent

study, Tucker, Nembhard and Edmondson (2007) achieved a return rate of 46 percent, which compares quite favourably with the response rate of nearly 42 percent accomplished in the present study. In another study, Bartels, Pruyn, De Jong and Joustra (2007) conducted a survey by using an electronic questionnaire among Dutch police officers and attained a response rate of only 29 percent, which was significantly lower than the return rate obtained for the current study.

Furthermore, the response rate attained in the present study compares quite favourably with some of the studies conducted within the context of high technology firms like the university research centres. For instance, Collins and Smith undertook a study among knowledge workers drawn from various high-technology companies and reported a response rate of 34%, which was lower than the response rate accomplished in the current study. Similarly, Santoro and Chakrabarti (2001) conducted a study based within the context of high tech and capital intensive firms and achieved a return rate of 48%, which appeared fairly consistent with the response rate of nearly 42% attained in the current investigation. Finally, Plewa and Quester (2006) attained a participation rate of only 16.06% in their study on university-industry alliances. This, response rate was considerably lower when compared to the return rate accomplished in the present study.

In addition, the return rate accomplished in the current study seems quite positive when compared to other studies undertaken in Ireland. For instance, in a survey conducted among Irish software engineers, Reed and Kelly (2002) attained a return rate of only 8.7 percent. Furthermore, Selvarajan et al. (2007) accomplished a response rate of 18.39 percent in a survey conducted among 246 Irish companies. In addition, Conway and Monks (2008) in their study undertaken in three Irish health service organizations achieved a relatively low response rate of 20 percent. Conway and Monks (2008) concluded that "the response rate [of 20 percent] was disappointing but appears in line with that being achieved in many similar studies, particularly in Ireland where the relatively small number of organizations in existence means that there are particular pressures on survey research" (p. 76). In light of this evidence it is reasonable to suggest that the response rate of 41.7% attained in the present study was adequate.

10.5.1 Characteristics of the Sample

The sample included 119 male and 73 female researchers. The average age and tenure of the respondents was 29 and 2.4 years respectively. About 60 percent of the sample was Irish. All respondents held a Bachelors degree or above with 64 percent holding a Masters or a PhD qualification. Finally, approximately 20 percent of the respondents held a permanent employment contact; whereas, the remaining 80 percent were on a temporary contract. The demographic characteristics of the sample are given in detail in Table 10.2.

TABLE 10.2
Demographic Characteristics of the Sample

Demographics	N	Percent	Demographics	N	Percent
Gender (N = 192)			**Education (N = 192)**		
Male	119	62%	Bachelors	70	36.4%
Female	73	38%	Masters	46	24%
			PhD	76	39.6%
Nationality (N = 192)			**Age* (N = 184)**		
Irish	115	59.9%	20 to 29	111	60.3%
Non-Irish	77	40.1%	30 to 39	65	35.3%
			40 to 49	8	4.3%
			Mean Age = 29 SD = 5.09		
Employment Contract (N = 192)			**Tenure* (N = 183)**		
Temporary	153	79.7%	0.1 to 3.50	139	76%
Permanent	39	20.3%	4 to 7.50	37	20.2%
			8 to 11.50	6	3.3%
			12 to 15.50	1	0.5%
			Mean Tenure = 2.44 SD = 2.13		

*Some of the data for these variables is missing

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10.5.2 Comparison between Respondents and Non-Respondents

As noted above, the response rate in the present study was 41.7%, which means that about 60% of the respondents did not return the questionnaires. Non-response error can bias the results if the non-respondents are systematically different from the respondents (Fowler, 2002; Dillman, 2007; Saunders et al., 2009). Thus, it is imperative to compare the demographics of the respondents and non respondents to determine if they differ significantly. Unfortunately, on the basis of the available information, it was not possible to make a comparison between the respondents and non-respondents. However, it was possible to compare the gender composition and the education profile of the present sample with that of the overall population. The information relating to the gender and education level of the population was taken from the websites of the research centres being surveyed. This comparison is presented in Table 10.3:

TABLE 10.3

Comparison of the Demographic Characteristics of Respondents & Overall Population

Demographic Variables	Respondents (N = 192)	Overall Population (N = 452)*
Gender	Male = 62% Female = 38% **M = 0.62** ***SD = 0.49**	*Male = 63.5% *Female = 36.5% **M = 0.64** **SD = 0.48**
Education	PhD = 39.6% Bachelors and above = 60.4% **M = 0.40** **SD = 0.49**	*PhD = 35% *Bachelors and above = 65% **M = 0.35** **SD = 0.48**

*These figures are based on the information available on the websites of the relevant research centres

**M = Mean
***SD = Standard Deviation

Using independent sample t-test, it was found that there was no difference between the respondents and the overall population with respect to both gender (t = 0.48, p = 0.63 > 0.05) and level of education (t = 1.21, p = 0.23 > 0.05). From these results, it appears as though the demography of the study sample was fairly representative of the entire population. Thus, it can be tentatively concluded that the respondents and non-respondents may not have differed significantly.

10.6 Handling Missing Responses

The data from the useable questionnaires was entered in SPSS 16.0 for the purpose of analyses. However, since all data were collected through self reports, there was no way to ensure that the respondents answered all the items on the questionnaire. Thus, many questionnaires were returned with missing data. According to Newman (2009) missing data or a low response rate can be problematic for two reasons. First, low response rates can manifest in low external validity, which implies that the results obtained from a sub sample of individuals who filled out the questionnaire may not be the same to the results, which may have been obtained if the response rate was 100%. Second, missing data leads to the loss in statistical power because of a reduction in the sample size. Statistical power refers to the ability of a statistical technique to detect a significant effect. Thus, low statistical power hinders the ability of an analytic technique to detect a significant effect in the population even when it exists, because the sample size is too small to detect such an effect.

There are several methods to deal with the problem of missing data but the most important ones highlighted in the literature include: (1) listwise deletion; (2) pairwise deletion; (3) mean substitution; (4) expectation maximization (EM) method; (4) and multiple imputation (MI) (Schaffer and Graham, 2002; Graham, 2009; Newman, 2009). Listwise deletion is the simplest and most direct way of dealing with the problem of missing data. This method is the default method in many statistical software programmes and entails analyzing data from those individuals who provide complete data for all the variables surveyed. In other words, partial respondents' data are deleted from the analyses. One major criticism against this method is that it reduces the sample size and as a result leads to a loss of statistical power (Roth, Switzer and Switzer, 1999; Graham, 2009). However, it should be noted that when

data are missing completely at random (MCAR), listwise deletion yields unbiased parameter estimates (Schaffer and Graham, 2002; Newman, 2009).

Another method of dealing with the problem of missing data is pairwise deletion. The pairwise method is usually used in association with a correlation matrix (Graham, 2009; Newman, 2009). The correlation between the two variables is estimated based on the cases having data for both variables. However, Graham (2009) illuminates two shortcomings of this method. First, since in this method different correlations are based on different subset of cases, there is a probability that the parameter estimates based on this missing data technique will be biased. Second, "because different correlations are based on different subsets of cases, there is no guarantee that the matrix will be positive definite" (Graham, 2009; p. 554). The main disadvantage of non-positive definite matrices is that they cannot be used for most multivariate statistical analysis.

A relatively simple method of dealing with the problem of missing data is mean substitution. Mean substitution inserts the mean value of the variable in place of the missing value. Although this method is relatively simple to apply and enables a researcher to save a lot of data, which may be eliminated if deletion techniques were used, this method has several disadvantages. For instance, Roth et al. (1999) argue that the main problem with mean substitution is that conceptually it does not take into account individual differences when estimating missing data, while empirically it results in some what biased estimates for regression coefficients. Because of these potential shortcomings, there is wide spread unanimity among researchers that this method should be avoided (Roth et al., 1999; Schaffer and Graham, 2002; Graham, 2009).

One recently developed missing data technique is the expectation maximization (EM) method. The EM method is an iterative two-stage method, which uses the maximum likelihood technique to estimate the missing values. However, Graham (2009) cautions that, although the EM method produces excellent parameter estimates (e.g. means and standard deviations) and is an efficient method for computing reliabilities and conducting factor analysis, the data set generated by this method produces unreliable standard errors, which makes hypothesis testing dubious.

Finally, another recent technique, which has received a lot of attention lately, is the multiple imputation method. This method uses the Bayesian approach in which more than one value is imputed for each missing data point (Schaffer and Graham,

2002). Nevertheless, it should be noted that MI method was derived under the assumption of multivariate normality (Schaffer and Graham, 2002; Graham, 2009; Newman, 2009). Since, "real data rarely conform to normality" (Schaffer and Graham, 2002, p. 167); it is plausible that significant departures from normality might adversely affect the estimates obtained from the MI method.

After weighing the pros and cons of all these methods, it was decided to adopt the listwise deletion method because it is the most conservative and widely used technique in OB research (Roth et al. 1999; Newman, 2009). The adoption of this technique reduced the sample size from 192 to 152 (response rate 33.04%). However, as mentioned above, one advantage of the listwise method is that it produces unbiased parameter estimates when the data is MCAR. In order to check whether the data for the current study was MCAR or not, Little's Chi-Square test was utilized (Hair et al., 1998). The null hypothesis for Little's MCAR test is that the data are missing completely at random. If the value of the Chi-Square statistic is statistically insignificant (i.e. $p > 0.05$), it can be concluded that the data are MCAR. The results of this test showed that data were indeed MCAR (Chi-Square = 3976.2; DF = 4053; p = $0.80 > 0.05$).

10.6.1 Power Analysis

Secondly, the main criticism levied against this missing data technique is that it leads to a loss of statistical power, which, in turn, increases the probability of committing Type-II error. In order to test whether this technique reduced the sample size to unacceptable limits, a power analysis was conducted (Cohen, 1992). A power analysis enables the researcher to ascertain the minimum sample size, which is needed to detect a significant effect. In order to conduct a power analysis within the context of multiple regression analysis, four pieces of information are required: (1) level of significance; (2) power; (3) effect size; and (4) number of predictors used in a regression model. The level of significance (α) is the probability of committing a Type I error. Type I error is the probability of rejecting the null hypothesis when it is actually true or in simple terms, it is the chance of the test showing statistical significance when it is actually not present (Hair et al., 1998). By convention the value of the level of significance is set at $\alpha = 0.05$ (Cohen, 1992). This implies that there is a 5% chance of concluding that significance exists when it really does not.

Power is defined as $1 - \beta$, where β is the probability of committing a Type II error. Type II error is the probability of accepting the null hypothesis when it is actually false. Thus, power ($1 - \beta$) is the probability of rejecting the null hypothesis when it should be rejected (Hair et al., 1998). By convention the value of power is set at 0.8 (so $\beta = 0.20$) (Cohen, 1992). A power of 0.80 suggests that there is an 80% chance of rejecting a false null hypothesis or correctly finding a hypothesised relationship when it exists.

Finally, effect size refers to the "estimate of the degree to which phenomena being studied (e.g. correlation or difference in means) exists in the population" (Hair et al., 1998, p. 2). For multiple regression analysis, the effect size f^2 is defined as:

$$\mathbf{f^2 = R^2 \div (1 - R^2)} \qquad \mathbf{(1)}$$

Where, R^2 is the square multiple correlation.

By convention, f^2 effect sizes of 0.02, 0.15, and 0.35 are termed *small*, *medium*, and *large*, respectively (Cohen, 1992).

In the present study the number of independent variables in the regression models (see Chapter 11) varied between 6 and 8. Thus, using a level of significance of 0.05, power of 0.80 and assuming a medium effect size of 0.15, Cohen (1992) has specified the following minimum sample sizes for 6 through 8 independent variables:

TABLE 10.4
Sample Size for Medium Effect Size ($f^2 = 0.15$) at Power = 0.80 and $\alpha = 0.05$

No. of independent variables in the model	Minimum Sample Size
6	97
7	102
8	107

From the results presented in Table 10.4 it is clear that a sample size of 152, after listwise deletion had sufficient power to detect significant effects.

10.6.2 Comparison between Retained and Discarded Cases

Another objection raised against the listwise deletion technique is that it can lead to biased results if the discarded cases are systematically different from the retained cases (Schaffer and Graham, 2002). In order to see if this was a problem in the present study, the demographic characteristics of the retained cases were compared to the demographic characteristics of the discarded cases. This comparison is presented in Table 10.5 below:

TABLE 10.5
Comparison of the Demographic Characteristics of the Retained and Discarded Cases

Demographic Variables	Retained Cases (N =152)	Discarded Cases
Gender	Male = 62.5% Female = 37.5% ***M = 0.63** ****SD = 0.49**	Male = 60% Female = 40% **N = 40** **M = 0.60** **SD = 0.50**
Nationality	Irish = 61.8% Non-Irish = 38.2% **M = 0.62** **SD = 49**	Irish = 52.5% Non-Irish = 47.5% **N = 40** **M = 0.53** **SD = 0.51**
Employment Contract	Permanent = 21.7% Temporary = 78.3% **M = 0.22** **SD = 0.41**	Permanent = 15% Temporary = 85% **N = 40** **M = 0.15** **SD = 0.36**
Education	PhD = 38.2% Bachelors and above = 61.8% **M = 0.38** **SD = 0.49**	PhD = 45% Bachelors and above = 55% **N = 40** **M = 0.45** **SD = 0.50**
Age	**M** = 28.7 years **SD** = 5.03	**N = 32** **M** = 30.3 years **SD = 5.21**
Tenure	**M** = 2.6 years **SD** = 2.23	**N = 31** **M** = 1.73 years **SD** = 1.40

* M = Mean
**SD = Standard Deviation

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Using a t-test of independent samples, it was found that there were no significant differences between the two samples with respect to gender (t = 0.34, p = 0.73 > 0.05), nationality (t = 1.02, p = 0.31 > 0.05), type of employment contract held (t = 0.98, p = 0.33 > 0.05) and level of education (t = 0.80, p = 0.42 > 0.05). Moreover, there was no significant difference in the mean age of the two samples (t = 1.02, p = 0.31 > 0.05). However, there was a significant difference in the tenures of retained and discarded cases (t = 2.09, p = 0.04 <0.05). On the bases of this evidence it is reasonable to suggest that the discarded cases were not unduly influential and that their omission is unlikely to have a significant effect on the results of this study.

In sum, the fact that the data were MCAR; the sample size after listwise deletion had sufficient power to detect significant effects; and that there were no significant differences between the retained and discarded cases, makes listwise deletion an appropriate missing data technique for the current study. This deletion technique has been frequently used in previous research (Tangirala and Ramanujam, 2008; Chen, Tsui and Zhong, 2008; Van Dick et al., 2008; Hom et al., 2009; Mullen and Kelloway, 2009).

10.7 Measurement of Variables

Validated scales were employed to measure the variables in this study. All variables except work engagement and innovative work behaviour were measured on a 7-point Likert-type scale ranging from 1 (*strongly disagree*) to 7 (*strongly agree*). Work engagement was assessed on a 7-point frequency based scale ranging from 0 (*never*) to 6 (*always*); whereas, innovative work behaviour was assessed on a frequency based scale ranging from 1 (*never*) to 7 (*always*). The description of these scales and the justification for using them is discussed in the ensuing paragraphs.

10.7.1 Work Engagement

As mentioned in Chapter 2, work engagement has been assessed through four scales: (1) The Utrecht Work Engagement Scale (UWES) (Schaufeli et al., 2002); Oldenburg Burnout Inventory (OLBI) (Demerotui and Bakker, 2008); Q12 questionnaire (Harter et al., 2002); and the three dimensional work engagement scale developed by May et al (2004). Out of these measures, the UWES developed by

Schaufeli and his colleagues is considered the most valid and reliable measure of work engagement and because of this reason, the present study also utilized the UWES to measure the construct of work engagement. There are several limitations associated with the other three scales, which make them inferior to UWES. These limitations are discussed in detail in Chapter 2. For instance, although OLBI has shown promising psychometric properties, it does not measure the third dimension of work engagement, that is, absorption.

Harter et al.'s (2002) Q12 questionnaire has been criticized by Macey and Schneider (2008) on the ground that the items of this questionnaire do not connote energy, enthusiasm and passion, which are central to the concept of work engagement.

Finally, May et al. (2004) developed a three dimensional scale of work engagement. However, the psychometric properties of this scale need to be rigorously tested with diverse samples before it can be considered a valid measure of work engagement.

In contrast, the validity and reliability of the UWES are now well established. This instrument has been validated in many countries such as, The Netherlands (Schaufeli and Bakker, 2004), Spain (Schaufeli et al., 2002a), South Africa (Storm and Rothman, 2003), Japan (Shimazu et al., 2008) and China (Yi-Wen and Yi-Qun, 2005).

The UWES consists of 17 items and measures the three underlying dimensions of work engagement, namely, vigour, dedication and absorption. *Vigour* was assessed with six items (e.g. 'At my work, I feel bursting with energy'). *Dedication* was measured with five items (e.g. 'I am enthusiastic about my job'). Finally, the third element, that is, *absorption,* was assessed with six items (e.g. 'I am immersed in my work'). The full scale is presented in appendix 1. Schaufeli and Salanova (2007) in their review report that the three sub-scales of UWES have exhibited excellent reliabilities across many different studies and have not only satisfied the criteria of 0.70 proposed by Nunnally and Bernstein (1994) but also have exceeded the more rigorous criteria of 0.80 specified by Henson (2001).

However, research evidence indicates that the three dimensions of work engagement are highly correlated (Schaufeli and Salanova, 2007). Schaufeli and Salanova (2007) report that, the average correlation between the three engagement

dimensions has been found to be around 0.65. Due to the high correlation between the three dimensions of work engagement, several authors have suggested that the composite score of work engagement can also be used for empirical research (Bakker et al., 2008; Bakker and Demerouti, 2008). In the present study the mean correlation between the three dimensions was found to be consistent with previous research (r = 0.64). Thus, because of this high correlation and given the complexity of the research model developed in the current study, the mean value of the 17 items comprising the UWES was computed to form an overall score for work engagement for each respondent. Many researchers recently have used the composite score of work engagement in their respective studies (Halbesleben and Wheeler, 2008; Xanthopolou, Huven, Demerouti and Bakker, 2008; Kim, Shin and Swanger, 2009). In the present study the UWES was used in its original form and is available in full in section 1 (page 374) of appendix B.

10.7.2 Trust in Top Management, Direct Supervisor and Team Members

In Chapter 5 it was argued that there appears to be a dichotomy between the definition and measurement of organizational trust. Trust is defined as a behavioural intention to take a risk or as a willingness to be vulnerable by engaging in trust informed behaviours. However, most of the available scales only measure the belief component of trust, that is, they assess respondents' perceptions of trustworthiness of a specific target. It was further suggested that this inconsistency between the definition and measurement of trust partly emanates from the fact that there is a dearth of reliable instruments, which measure trust as a willingness to be vulnerable (Gillespie, 2003). More specifically, there are four measures, which measure trust as a willingness to be vulnerable or as an intention to engage in trusting behaviour. These measures have been published in Currall and Judge (1995), Cummings and Bromiley (1996), Schoorman, Mayer and Davis (1996) and Gillespie (2003). However, all these scales were deemed unsuitable for the present study because of the reasons outlined in Chapter 5.

In this regard, Lewicki et al. (2006) assert that in part choice of the measure is contingent on the definition of trust chosen for the study. As discussed in Chapter 4, the present study adopts the multi-dimensional definition of trust put forward by

Mishra (1996). Thus, it was decided to use Mishra and Mishra's (1994) trust scale, which has proved to be psychometrically sound measure of the four factors of trustworthiness, namely, competence, openness, reliability and concern, specified by Mishra (1996). A major strength of this measure is that it can be used to measure trust in all the three referents, that is, top management, direct supervisor and team members.

Mishra and Mishra's (1994) scale comprises of sixteen items and measures the four trusting beliefs, namely, openness (e.g. 'I believe that my direct supervisor / team members communicate honestly with me'), reliability (e.g. 'I believe that my direct supervisor / team members can be counted on'), competence (e.g. 'I believe that my direct supervisor / team members are competent and knowledgeable') and concern (e.g. 'I believe that my direct supervisor / team members do not take advantage of me'). Since, the four components of trust have been found to correlate at around 0.80, Spreitzer and Mishra (2002) recommend that the mean value of the 16 items included in this scale should be calculated to determine an overall trust score for each respondent. Therefore, following this recommendation, the mean value of the 16 items was computed to create an overall trust score for each participant.

This scale was used to measure trust in all the three foci, namely, top management, direct supervisor and team members. For the purpose of the current study, the original scale was slightly altered by using the term 'top management team' instead of 'top management', when this scale was used in reference to the top management and by replacing the word 'supervisor' with the word 'direct supervisor', when it was used in reference to the supervisor. Additionally, in order to measure trust in team members the word 'top management team / direct supervisor' was replaced with the word 'team members'. Finally, the term 'organization' in the original scale was substituted with the name of the relevant research centre. This scale can be viewed in full in section 3 (pages 375 and 376) of appendix B. The reliability of the aggregated trustworthiness scale has been found to be excellent in past studies. For example, the value of the Cronbach's alpha for the aggregated scale was found to be 0.93 (Sprietzer and Mishra, 1999), 0.96 (Spreitzer and Mishra, 2002), and 0.97 (Brockner, Spreitzer, Mishra, Hochwarter, Pepper, Weinberg, 2004) in three separate studies.

10.7.3 Trust Propensity

There is a dearth of psychometrically sound measures of trust propensity. In this connection, Schoorman and Mayer and Davis (2007) in their insightful review remark that "work on trust would be greatly facilitated by further development of measures of [trust] propensity" (p. 348). One commonly used measure of trust propensity is the twenty-five item scale developed by Rotter (1967). However, because of its sheer length, this scale is difficult to use as a variable in studies. Another scale to measure trust propensity has been reported in Mayer and Davis (1999). The main drawback of this unidimensional scale is that it has demonstrated low reliabilities in various studies it has been used in (e.g. 0.55 and 0.66 in Mayer and Davis, 1999), which casts a doubt as to whether this scale is a valid measure of trust propensity or not. Schoorman et al. (2007) conclude that the development of a robust measure of trust propensity might enable researchers to "find more relationships between [trust] propensity and other variables of interest, particularly early in the development of a relationship".

In the present study, it was decided to use the three item measure of trust propensity developed and validated by Ridings, Gefen and Arizine (2002) (e.g. 'I generally trust other people unless they give me a reason not to'). The trust propensity scale was used in its original form and is displayed in section 2 (page 374) of appendix B. This scale was chosen because it was short, unidimensional and exhibited excellent reliability in the above mentioned study ($\alpha = 0.92$).

10.7.4 Organizational Identification

A review of the identification literature reveals that the two most commonly used scales to measure organizational identification are the Organizational Identification Questionnaire (OIQ; Cheney, 1983) and the organizational identification scale developed by Mael and Ashforth (1992) (Rikketta, 2005). The OIQ comprises of twenty five items; whereas, Mael and Ashforth's (1992) scale comprises of six items. In present study, Mael and Ashforth's (1992) scale to measure organizational identification was used because of several reasons. First, the length of OIQ makes it difficult use this scale in a study, which is attempting to measure several

variables. On the other hand the short six item identification scale developed by Mael and Ashforth is very convenient to use and easy to understand.

Moreover, Rikketa (2005) in his meta-analytic study argues that eight of the 25 of the OIQ scale are almost identical to items included in the organizational commitment scales developed by Mowday et al (1979) and Allen and Meyer (1990). In fact, Rikketa (2005) found that organizational identification measured with the OIQ scale exhibited a correlation of 0.90 with the organizational commitment scales, thereby suggesting that it is almost interchangeable with the commitment measures. Furthermore, the results from Rikketa's (2005) study showed that organizational identification when measured with the OIQ exhibited the same pattern of relationship with various attitudes and behaviours as affective commitment to the organization. More specifically, the results showed that like organizational commitment the OIQ based organizational identification was more strongly related with age, job satisfaction and intent to leave. In contrast, organizational identification when measured with Mael and Ashforth's (1992) scale showed stronger relationships with job involvement and extra-role performance and demonstrated relatively weaker associations with job satisfaction, absenteeism and intent to leave, thereby suggesting that organizational identification is distinguishable from affective organizational commitment. These findings led Rikketa (2005) to conclude that Mael and Ashforth's (1992) scale seems to be the "most representative OI [organizational identification] measure" (p. 368).

As mentioned above, Mael and Ashforth's (1992) scale consists of six items. These six items were slightly altered by replacing the word 'organization' with name of the research centre being surveyed to bring it in line with the context of the study (e.g. 'When someone criticizes [name of the centre], it feels like a personal insult'). Mael and Ashfroth's (1992) organizational identification scale is presented in section 2 (page 374) of appendix B. This scale has been extensively used in previous research and has demonstrated excellent reliability. For instance, in a recent study by Sluss, Kilmchak and Holmes this scale exhibited a reliability of 0.80. Likewise, in a study conducted by Van Knippenberg and Sleebos (2006) this scale attained a reliability of 0.81.

10.7.5 Affective Commitment to the Supervisor

Past research reveals that supervisory commitment has been assessed through three approaches. Becker and his colleagues (Becker, 1992; Becker and Billings, 1993) were the first researchers who empirically measured this concept. These researchers used O'Reilly and Chatman's (1986) measures of three bases of commitment to the organization, that is, compliance, identification and internalization, and applied these measures to the immediate supervisor, top management and the workgroup. However, this three dimensional measure of commitment to the supervisor is beset with several problems. First, Becker (1992) found that the compliance measure could not be differentiated across different referents. Second, in several studies it was found that that the identification and internalization scales were virtually indistinguishable (Meyer and Herscovitch, 2001). Finally, previous research reveals that the compliance scale is positively associated with turnover intentions (O'Reilly and Chatman, 1986; Becker, 1992), which suggests that compliance may not be an indicator of commitment.

Another measure of supervisory commitment was developed by Chen, Tsui and Farh (2002). Chen et al. (2002) proposed a five dimensional measure of loyalty to the supervisor. More specifically, they added three new dimensions, namely dedication, effort and attachment to the supervisor, to the two internalization and identification dimensions proposed by Becker (1992). Chen et al.'s (2002) scale was mainly developed to measure loyalty to the supervisor in collectivist cultures like China. Thus, one drawback of this scale is that it may not be relevant in the individualistic societies of Europe and USA. This measure needs to be tested outside the collectivist environments before it can be considered a valid measure of supervisory commitment.

Since the three component model developed by Meyer and Allen (1991) is now widely regarded as the most robust approach to workplace commitment (Meyer, Stanley, Herscovitch and Topolyntsky, 2002), several scholars have extended this model to other foci such as the immediate supervisor and one's work group (Clugston, Howell and Dorfman, 2001; Becker and Kernan, 2003; Vandenberghe, Bentein and Stinglhamber, 2004). Thus, in the present study, affective commitment to the supervisor was measured by using the five item scale developed and validated by Clugston et al (2000) (e.g. "I really feel that as if my direct supervisor's problems are

my own"). Clugston et al. (2000) modified the Meyer and Allen's (1991) affective commitment to the organization scale and used it in reference to the supervisor. The original scale developed by Clugston et al. (2000) was slightly modified by using the term 'direct supervisor' instead of supervisor and by replacing the term 'organization' with the term 'centre' to make it suitable for the context of the study. This five item measure attained an excellent reliability of 0.88 in Clugston et al.'s (2000) study and can be viewed in full in section 2 (page 375) of appendix B.

10.7.6 Team Psychological Safety

The concept of psychological safety has been measured both qualitatively and quantitatively. For example, in a qualitative field study in an architecture firm and a summer camp, Kahn (1990) used a series of open ended questions to measure the construct of psychological safety. In the only empirical investigation of Kahn's (1990) model, May, Gilson and Harter (2004) developed a three item measure of psychological safety, which was based on Kahn's (1990) work. However, Edmondson's (1999) team psychological safety scale is the most widely used measure of psychological safety in team environments and therefore, it was chosen to measure the construct of psychological safety in the present study.

This scale consists of seven items out of which four items are positively worded (e.g. it is safe to take a risk on this team); while, three are negatively worded (It is difficult to ask other members of this team for help). The original scale was slightly changed to make it suitable for the present study by replacing the word 'team' with the word 'research team'. It should be noted that Edmondson (1999) used this scale to measure team level psychological safety. However, in the present study this scale was utilized to measure individual level psychological safety. Several previous studies have also used this scale to measure psychological safety at the individual level (Baer and Frese, 2003; Halbesleben and Rathert, 2008; Madjar and Ortiz-Walters, 2009). In Edmondson's (1999) study, the team psychological safety scale attained an internal consistency reliability of 0.82. Likewise, Baer and Frese (2003) also reported a reliability of 0.82 for this scale. Finally, Wikens and London (2006) reported an internal consistency reliability of 0.77 for the team psychological safety scale. This seven item scale is displayed in full in section 2 (page 375) of appendix B.

10.7.7 Learning Goal Orientation

Learning goal orientation was measured by Button, Mathieu and Zajac's (1996) eight item scale (e.g. 'The opportunity to do challenging work is important to me'). This scale has been used in several studies and has exhibited good psychometric properties. For instance, Button et al. found that internal consistency reliabilities were approximately 0.70-0.80 across samples for this scale. Similarly, Ford, Smith, Weissbein, Gully and Salas reported a reliability of 0.79 for the learning goal orientation scale. Furthermore, Kozlowiski, Gully, Brown, Salas, Smith and Nason (2001) found that the reliability for this scale was 0.85. Finally, in Gong and Fan's (2006) study, Button et al.'s (1996) learning goal orientation scale exhibited a good reliability of 0.79. The original items of this scale were not altered in any way for this research. The learning goal orientation scale can be viewed in section 4 (page 377) of appendix B.

10.7.8 In-Role Job Performance

Self-rated in-role job performance was assessed by using Podsakoff and MacKenzie's (1989) five item scale in-role job performance scale (e.g. 'I always complete the duties specified in my job description). The method of self-appraisal has been used in previous research (e.g. Ashforth and Saks, 1996; Yousef, 1998) and has produced satisfactory results. Janssen and Van Yperen (2004) reported a reliability of 0.85 for this in-role job performance scale. The in-role job performance scale was used in its original form in the present study and is displayed in section 4 (page 377) of appendix B.

10.7.9 Innovative Work Behaviour

A review of the literature reveals that four scales have been used to measure innovative work behaviour. These scales have been reported in Scott and Bruce (1994), Janssen (2000), Kleyson and Street (2001) and Krause (2004). Kleyson and Street (2001) proposed five dimensions of innovative work behaviour: opportunity exploration, generativity, formative investigation, championing and application. However, they did not find empirical support for their five dimension structure of

innovative work behaviour, which raises the question whether or not this scale is a psychometrically robust measure of innovative work behaviour. These authors instead suggested that that their fourteen item scale may be used as a composite measure of this construct. However, the fourteen item scale was deemed too lengthy for the present study. Moreover, keeping in view its dubious psychometric properties, it was decided not to use this measure.

Krause (2004) proposed a two dimensional scale (generation and testing of ideas and implementation) to measure innovative behaviours. She found empirical support for her two dimensional scale and both the scales exhibited good reliabilities. However, one potential shortcoming of this scale was that it did not include the dimension of 'idea promotion', which is considered an important part of the innovation process (Scott and Bruce, 1994).

The six item scale developed by Scott and Bruce (1994) measures all the three stages of innovation: idea generation (e.g. 'Creating new ideas for difficult issues), idea promotion (e.g. 'Mobilizing support for innovative ideas') and idea realization (e.g. 'Transforming innovative ideas into useful applications'). However, this scale appears to be more suitable when it is used by employees' supervisors to assess their innovativeness. Scott and Bruce (1994) used this scale to acquire manager-rated scores of innovative work behaviour. Since, in the current study, the data on innovative work behaviour were obtained through self-reports, Scott and Bruce's scale was considered unsuitable.

Thus, for the present study, Janssen's (2000) nine item scale, which also assesses the three stages to innovation: idea generation, idea promotion and idea realization was utilized to measure innovative work behaviour. This scale can be easily adapted for use as a self-report measure and previous research shows that it is a psychometrically sound measure of innovative behaviour. For example, in Janssen's (2000) study this scale demonstrated a high reliability of 0.95 for self-rated and 0.96 for leader-rated scores of innovative work behaviour. In another study conducted by Janssen and Van Yperen (2004), this scale attained a high reliability of 0.98. Finally, Newton, Blanton and Will (2008) reported an internal consistency reliability of 0.92 for this innovative work behaviour scale. No change was made to the original items of this scale for the current study and it can be viewed in section 4 (page 378) of appendix B.

10.7.10 Feedback Seeking for Self Improvement

The five item scale developed and validated by Janssen and Prins (2007) was used to measure seeking of self-improvement feedback information (e.g. 'I ask for feedback to learn how I can master tasks'). This five item scale exhibited a satisfactory reliability of 0.73 in the study conducted by Janssen and Prins (2007) and was therefore, considered a suitable scale for this study. In the present research, this scale was used in its original form and is presented in section 4 (page 377) of appendix B.

10.7.11 Error Communication

Error communication was measured by three items taken from the Error Orientation Questionnaire (e.g. 'When I make a mistake at work, I tell others about it, so that they do not make the same mistake') developed by Rybowiak, Garst, Frese and Batinic (1999). Originally, the error communication scale consists of four items but for this study, one item 'If I cannot manage to correct a mistake, I can rely on others' was dropped because it lacked clarity. Rybowaik et al. (1999) reported an acceptable reliability of 0.71 for the four item error communication scale. In another study, Arenas, Tabernero and Briones (2006) found the internal consistency reliability of this scale to be 0.72. No modification was made to the original three items used to measure error communication in this study. This three item scale is displayed in section 4 (page 378) of appendix B.

10.7.12 Affective Organizational Commitment

The two most widely used measures of organizational commitment are the Organizational Commitment Questionnaire (OCQ) developed by Mowday, Steers and Porter (1979) and the Affective Commitment to the Organization Scale (ACS) validated by Meyer, Allen and Smith (1993). OCQ consists of 15 items; whereas, ACS comprises of six items. However, OCQ has been severely criticized in the literature on the grounds that several of its items "inflate concept redundancy between organizational commitment and intent to quit" (Becker, 1992, p. 236). Moreover, as mentioned earlier, the model of workplace commitment advocated by Meyer and his

colleagues is now considered the dominant approach in this area. Thus, in the present study affective organizational commitment was measured by the six item scale developed by Meyer et al. (1993) (e.g. 'I would be very happy to spend the rest of my career with [name of research centre]'). This scale was altered to suit the context by substituting the word 'organization' with the name of the relevant research centre. This scale is now considered as the most reliable measure of affective organizational commitment and its psychometric properties are well documented in the literature. This measure is presented in section 4 (page 377) of appendix B.

10.7.13 Control Variables

Four control variables: gender, age, tenure and nationality were included in this study. Age was included as a control variable because Schaufeli and Salanova (2007) report that age is positively associated with work engagement, thereby implying that older employees feel more engaged in their work than their younger counterparts. This finding is attributed to the "healthy worker effect", which suggests that "only those who are healthy 'survive' and remain in their jobs, whereas unhealthy (i.e. not engaged) employees drop out" (Schaufeli and Salanova, 2007; p. 148). Moreover, these researchers report that gender may also affect work engagement hence its effects needs to be controlled. The effect of tenure also needs to be controlled because it is plausible that researchers who have higher tenures might have access to more resources because of their seniority, which may affect their levels of work engagement. Finally, since 40% of the present sample was non-Irish, nationality was included as a control variable in the regression models. Previous research shows that nationality can have a bearing on employees' engagement with their work (Xanthopoulou, Bakker, Kantas and Demerouti, in press). In the present study, age and tenure were self-reported in years; whereas gender (1 = male; 0 = female) and nationality (1 = Irish; 0 = Non-Irish) were measured by dummy variables. These control variable are listed in section 5 (page 380) of appendix B.

10.7.14 Self-Reported Outcome Variables

From the preceding discussion it is clear that all the five outcome variables included in the study: (1) in-role job performance; (2) innovative work behaviour; (3)

feedback seeking for self-improvement; (4) error communication; and (5) affective organizational commitment were either attitudes or behaviours and were self-reported. It is acknowledged that the validity of this research could have been further enhanced with the inclusion of performance outcomes, which are specific to the research centres such as, research publications, patents and the number of new products and processes (Santoro and Saparito, 2003). Moreover, the problem of common method variance might have been mitigated if data on in-role job performance, innovative work behaviour and feedback seeking were obtained from researchers' supervisors instead of through self-reports. However, in spite of considerable effort the researcher was unable to get access to this type of data. The main reason for this was that the process of collecting this sort of data could have compromised the anonymity of the respondents, which was unacceptable to the participating research centres. Hence, it was not possible to collect objective performance-related data or data from respondents' supervisors for this study.

10.8 Structure of the Questionnaire

As noted in the preceding sections, both the paper and pencil and the web based questionnaires were used to collect data for this study. Both questionnaires were constructed from the scales described above. More specifically, the questionnaire for this study comprised of five sections. The first section consisted of 17 items drawn from the Utrecht Work Engagement Scale. The second section contained items relating to trust propensity, organizational identification, affective commitment to the supervisor and team psychological safety. In the third section, the respondents were required to report their perceptions of trustworthiness of the top management team, direct supervisor and their team members. The fourth section solicited information about the outcome variables, that is, learning goal orientation, in-role job performance, innovative work behaviour, feedback seeking, error communication and organizational commitment. The fifth and final section required respondents to report their gender, age, tenure, highest degree attained, nationality and the type of employment contract they held. The original questionnaire used for this research is included in appendix A.

While designing this questionnaire, several of the procedural remedies suggested by Podsakoff et al. (2003) to minimize the problem of common method

variance were followed. For instance, the cover letter on the first page of the questionnaire, assured the respondents that their identity and the identity of their research centre will be kept confidential and the data collected from them will be used only to aggregate the responses and only the aggregated results would be made public. It was anticipated that this assurance would prompt the respondents to answer questions honestly and objectively.

Additionally, in order to control response consistencies, the question order was counterbalanced, such that the measure of the dependent variable (i.e. work engagement) was placed before the measures of independent variables (i.e. organizational identification, affective commitment to the supervisor, team psychological safety and the trust variables). Finally, validated and well established scales were utilized to measure all the study variables. This step has been shown to reduce the problem of common method bias.

10.9 Pilot Study

Babbie (2007) suggests that pre-testing the questionnaire before it is actually administered is essential because it enables the researcher to detect and correct mistakes in the questionnaire. Similarly, Saunders et al. (2009) contend that pilot testing a questionnaire can be important because it enables the researcher to ascertain the validity of the questions and helps him or her to attain some idea of the reliability of the data that will be collected.

In line with these suggestions, a pilot study among a sample of Pakistani school teachers was conducted. The sample of Pakistani school teachers was completely different from the sample of Irish research scientists that was used for the main study, which raises doubts about the usefulness and validity of this pilot study. Ideally a pilot study should be conducted with a sample of respondents, which is similar to the one being used in the actual study. However, the research centres included in the present study were unwilling to have their scientists surveyed twice because of time constraints and hence the researcher was unable to collect data from these centres for the pilot test. In addition, despite best of efforts, the researcher could not get access to organizations, which were comparable to research centres. Nevertheless, the researcher managed to get access to the Pakistani schools because of his personal contacts. Although this context is quite different from the research

centres, it was felt that it would provide a good opportunity to pre-test the questionnaire because this questionnaire was deemed fairly relevant for school teachers. In this regards, Babbie (2007) contends that "it's not usually essential that pre-test subjects comprise a representative sample, although you should use people for whom the questionnaire is at least relevant" (p. 257).

Moreover, schools were considered a useful context for the pilot study because previous research indicates that both the main research variables, namely, work engagement (Hakanen et al., 2006) and trust (Tschannen-Moran and Hoy, 1998) have the potential to affect organizational behaviour within this context.

Finally, it was felt that by conducting a pilot study in a different geographic location and among a different occupational group would help to raise the external validity of the main study.

Specifically, data for this pilot study were collected from full-time high school teachers, drawn from six schools, located in a large eastern city of the country. The total number of full time high school teachers in the selected six schools was 238. Thus, 238 questionnaires were delivered to the participating schools for distribution to the respondents. Out of a total of 238 questionnaires which were distributed, 130 were completed and returned thereby yielding a response rate of 54.6 percent. The sample of employees was 77 percent female and 23 percent male. About 86 percent of the participants held a Masters degree; while about 14 percent held an undergraduate qualification. The average age and job tenure for the sample was 40 and 8 years respectively.

For the purpose of this study, the original research model had to be slightly modified so that it could be adapted to the school settings. More specifically, four changes were made to the original model. First, trust in top management was replaced with trust in the school principal. This change was important because the principals play a critical role in shaping the climate of the school and are responsible for providing a safe and stimulating learning environment for teachers and students (Smith and Birney, 2005). Furthermore, previous research has shown that trust in the principal is a key determinant of school effectiveness (Tarter, Sabo and Hoy, 1995). This evidence suggests that the principal is an important trust referent within the context of schools.

Second, co-worker support was used as mediator between trust in co-workers and work engagement instead of team psychological safety. This modification was

made because research evidence indicates that within the school environment, social support is an important driver of teachers' work engagement (Hakanen et al., 2006; Bakker et al., 2007).

Third, trust propensity was not included in the model for the pilot study. This change was necessitated because the two item scale developed by Mooradian et al. (2006), which was used to measure trust propensity, exhibited poor reliability (α = 0.46). For this reason, trust propensity had to be dropped from the model.

The final change pertained to the outcome variables. More particularly, innovative work behaviour was replaced with organizational citizenship behaviour. This alteration was done because it was felt that innovative work behaviour is a more relevant variable for high-technology firms such as, the university research centres. Furthermore, past studies have demonstrated that teachers' tendency to engage in organizational citizenship behaviour is essential for the smooth functioning of schools (Tschannen-Moran and Hoy, 2000). The research model used for this pilot study is depicted in Figure 10.1 below:

FIGURE 10.1
Model for the Pilot Study
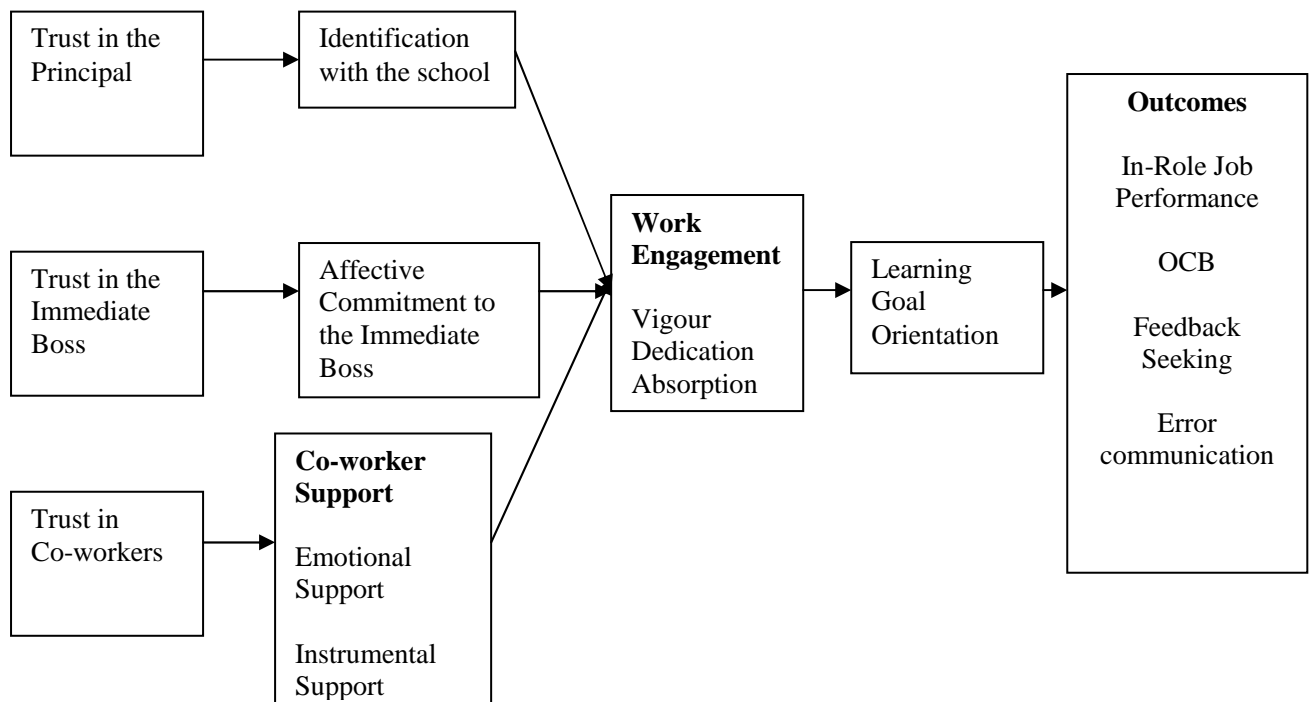
The results of this study are summarised below:

1. Organizational identification fully mediated the relationship between teachers' trust in the principal and work engagement.

2. Trust in immediate supervisor had direct effects on work engagement. In other words affective commitment to the supervisor did not mediate the effects of trust in supervisor on teachers' work engagement.

3. Trust in co-workers did not significantly affect work engagement either directly or indirectly through social support.

4. As hypothesised, learning goal orientation partially mediated the effects of work engagement on in-role job performance and organizational citizenship behaviour. Furthermore, it was found that learning goal orientation fully mediated the relationship between work engagement and error communication. However, work engagement did not have a direct effect on feedback seeking behaviour but affected it indirectly by raising teachers' learning orientation.

The above findings supported most of the research hypotheses but there were three areas of concern. First, affective commitment to supervisor did not mediate the relationship between trust in supervisor and work engagement. This finding may be attributed to the scale used to measure commitment to the supervisor. In this study, I used the six item measure developed by Stinglhamber, Bentein and Vandenberghe (2002) to measure this construct. The results of this study showed that trust in supervisor and affective commitment to supervisor were very highly correlated ($r = 0.61$, $p<0.01$), which may have created the problem of multicollinearity and consequently distorted the results. Moreover, this scale had two negatively worded items which were not properly answered by the respondents. When these items were included in the scale, the alpha coefficient dropped to 0.56 from 0.82. Thus, these items had to be removed from the scale and the score for affective commitment to supervisor for each respondent was determined by averaging the score of the four positively worded items. This could also have had an adverse impact on the results.

To overcome this problem, this scale was replaced with the five item measure developed by Clugston et al (2000) in the present study.

The second unexpected finding was that trust in co-workers was not significantly related to work engagement. This finding may be reflective of the context in which the study was based. Trust in co-workers acquires particular salience when employees need to work collaboratively to accomplish tasks. In such a situation the only pathway to success is co-operation and trust is a key determinant of co-operation. However, in a school setting teachers work more independently and as a result trust in peers may not be that relevant for this context.

However, it was envisaged that trust in team members was likely to have a more profound impact on work engagement in the current study, which was undertaken within the context of university research centres and where research scientists work in multi-disciplinary teams and are dependent on each other to accomplish work goals.

Finally, as noted above, the two item trust propensity scale used in the pilot study demonstrated an extremely low reliability. Thus, for the main study this scale was replaced with the three item measure of trust propensity developed by Ridings et al. (2002).

In short, this pilot study offered an opportunity to pre-test the questionnaire, provided initial support for the actual research model, raised the external validity of the main study and helped to address some important measurement issues. Some of the results from this pilot study have been peer reviewed and published in Chughtai and Buckley (2009) and Chughtai and Buckley (2010).

10.10 Data Analysis

10.10.1 Factor Structure or Construct Validity and Discriminant Validity of the Study Variables

The construct and the discriminant validity of the study variables were ascertained by conducting an exploratory factor analysis. Before conducting the factor analysis, a researcher needs to make the following four decisions relating to:

- The model to be used for obtaining factor solutions
- The rotational method to be used
- The cut off point for the factor loadings
- Criteria for the number of factors to be extracted

As far as the first decision is concerned, the researcher can use two basic models to obtain factor solution: (1) common factor analysis; and (2) principal component analysis (Hair et al., 1998). Hair et al. (1998) contend that although in most cases both the methods are likely to yield almost identical results, there are two limitations with the common factor analysis, which have contributed to the widespread use of the principal component analysis. First, common factor analysis suffers from factor indeterminancy, which implies "that for any individual respondent, several different factors can be calculated from the factor model results" (Hair et al., 1998, p. 102). Thus, there is no unique solution, as found in the principal component analysis. Second, common factor analysis is prone to Heywood cases (Bandalos and Kaufman, 2009). Bandalos and Kaufman (2009) contend that Heywood cases are negative estimates of the uniqueness in common factor analysis. In view of the shortcomings associated with common factor analysis, it is not surprising that the principal component analysis has been used more extensively in previous research (Riders et al., 2002; Janssen and Van Yperen, 2004; May et al., 2004; Olkkonen and Lipponen, 2006; Janssen and Prins, 2007; Broeck et al., 2008). Thus, in this study also, the principal component analysis was used to generate factor solutions.

The second decision pertains to the rotational method to be used. There is widespread agreement among researchers that factor rotation generally results in solutions that are easier to interpret than un-rotated solutions (Hair et al., 1998; Bandalos and Kaufman, 2009). The rotation can be either orthogonal (e.g. varimax rotation) or oblique (e.g. direct oblimin rotation). The orthogonal rotation yields uncorrelated factors; whereas oblique rotations allow factors to correlate. The aim of both rotational methods, however, is to obtain results, which are easy to interpret In the present study, both the work engagement and the trust scales were multidimensional and in line with previous research, it was expected that the components of these scales will be highly correlated. Thus, the oblique rotation (direct oblimin) was deemed more suitable for the present study. Moreover, Bandalos and

Kaufman, (2009) contend that even if the factors are uncorrelated, an oblique rotation will automatically result in an orthogonal solution and therefore, is likely to be a better choice than an orthogonal rotation.

In addition, the researcher needs to set a cut off point for the factor loadings. In this regard, Hair et al. (1998) suggest that "factor loadings greater than +/- 0.30 are considered to meet the minimal level; loadings of +/- 0.40 are considered more important; and if loadings are +/- 0.50 or greater they are considered practically significant" (p. 111). In light of this evidence it was decided to set the cut off point at +/- 0.40. This cut off point has been used in many previous studies (Wayne, Shore and Liden, 1997; Ridings et al., 2002; May et al., 2004; Dabos and Rousseau, 2004).

Finally, the Kaiser rule was applied to decide on the number of factors to be extracted. According to this criterion, factors having eigen values greater than one are deemed as significant; while, all factors having eigen values less than one are considered insignificant and are therefore disregarded (Hair et al., 1998). This rule has been extensively used in previous studies (Janssen and Van Yperen, 2004; Dabos and Rousseau, 2004; Tucker, Nembhard, Edmondson, 2007; Broeck et al., 2008).

10.10.2 Internal Consistency Reliability

The internal consistency reliabilities for all the multi-item scales were assessed through Cronbach's Alpha. Cronbach's Alpha is a reliability coefficient, which shows how well the items in a set are positively correlated to one another (Sekaran, 2003). According to Nunnally and Brenstein (1994) if the value of the Cronbach's Alpha for a certain scale is 0.70 or above; that scale is deemed reliable.

10.103 Descriptive Statistics

In order to acquire an initial feel for the data, the means, standard deviations, skewness and kurtosis for each study variable were computed. The means and standard deviations provide useful guidelines to researchers about how the respondents have reacted to items in the questionnaire and how good the items and measures are (Sekran, 2003). Skewness and kurtosis, which indicate the degree of symmetry in the data (Saunders et al., 2009) are particularly important because they

enable the researcher to determine whether the study variables are normally distributed or not.

10.10.4 Correlation Analysis

A correlation matrix showing inter-correlations between all the study variables was computed. The correlation coefficient reflects the degree of association between two variables (Zikmund, 2003; Saunders et al., 2009). The correlation coefficient, *r* ranges from +1 to -1 (Saunders et al., 2009). This statistical measure enables a researcher to determine both the magnitude and direction of the relationship. The magnitude of the relationship can be ascertained by the value of the correlation coefficient. Closer is its value to +/- 1, stronger will be the relationship. The direction of the relationship, on the other hand can be gauged from the sign of the correlation coefficient. The correlation analysis serves two purposes. First, it provides initial evidence whether or not the hypothesized relationships are significant and in the expected direction. Second, this analysis can be useful to detect the problem of multicollinearity. According to Ashford and Tsui (1991), correlations above 0.75 indicate that multicollinearity is a serious problem in the data. On the other hand Saunders et al. (2009) specify a slightly more lenient criterion and suggest that a correlation of above 0.90 indicates substantial collinearity.

10.10.5 Common Method Variance

In the present study all the data were acquired through self-reports, which can create problems of common method variance. As note above, the main problem with common method bias is that it may artificially magnify relationships between the study variables (Podsakoff et al., 2003). Thus, to establish if common method variance was an area of concern in the present study, the Harman's single factor test was conducted. The basic assumption of this test is that if a substantial amount of common method variance exists, one general factor that accounts for most of the variance is likely to emerge from a factor analysis of all the measurement items.

10.10.6 Testing the Assumptions of the Regression Analysis

In order to test the direct and mediation hypotheses, the hierarchical multiple regression analysis technique was used. However, before conducting the regression analyses, it was essential to test the assumptions of the multiple regression analysis. Hair et al. (1998) argue that the researcher needs to ensure that the regression model fulfils the following five assumptions relating to:

- Normality of the error term
- Constant variance of the error term or homoscedasticity
- Linearity
- Multicollinearity
- Independence of the error terms or autocorrelation

The first assumption, that is, normality of the error term was checked through two methods. First, this assumption was tested through the visual inspection of the normal probability plots. In this plot, the plotted standardized residuals are compared to a normal distribution, which is represented by a straight diagonal line. If the distribution is normal, the residual line closely follows the diagonal (Hair et al., 1998).

In addition, the normality assumption was tested by obtaining residuals from each regression model and then applying the Shapiro-Wilk test (W) of normality to these residuals. If W is statistically insignificant, it can be assumed that the error term of the regression model is normally distributed.

The assumption of linearity was verified by two methods. First, this diagnosis was made through residual plots by plotting the residuals (studentized) against the standardized predicted dependent variable. If the residuals display a random pattern, it can be assumed that the regression model as a whole is linear. Second, scatter plots were used to determine whether or not the relationship between the dependent variables and each of the independent variables was linear.

In a related vein, the assumption of homoscedasticity was also assessed through a visual examination of the residual plot. The random pattern displayed by residuals suggests that the regression models are homoscedastic.

The assumption of multicollinearity was verified by computing the variance inflating factor (VIF). If the value of VIF is less than 10, it can be inferred that multicollinearity is not a serious problem (Hair et al., 1998; Saunders et al., 2009).

The final assumption deals with the independence of the error terms or the absence of autocorrelation. This assumption was assessed by computing the Durbin Watson test statistic (d) for each regression model. The value of 'd' ranges from 0 to 4. Values close to 0 indicate extreme positive autocorrelation; close to 4 indicates extreme negative autocorrelation; and close to 2 indicates no serial autocorrelation (Gujarati, 2003; Saunders et al., 2009). Generally, a value of 'd' between 1.5 and 2.5 indicates the absence of autocorrelation.

10.10.7 Outliers

In addition to testing the above assumptions, it is also important to check for outliers. In the context of regression analysis, outliers can be defined as an observation, which has a "large residual" (Gujarati, 2003). Since outliers can distort results from statistical tests and can adversely affect the regression coefficients, it is essential to identify them and examine their influence on the regression model (Hair et al., 1998). The two popular approaches to identify outliers or influential cases are the Cook's distance (D) and DFITS (Roth and Switzer, 2002). Cook's distance (D) captures the impact of an observation from two sources: the magnitude of changes in the predicted values when the case is deleted (outlying studentized residuals) as well as the observation's distance from other observations (Hair et al. 1998). On the other hand DFITS measures how much the predicted values changes as a result of deleting a particular observation from the analysis. The DFIT measure is quite similar to Cook's D, although it is scaled differently. In both cases, the techniques generate a statistic for each case that can be compared to some threshold value. In case of Cook's D, if the value of the D- statistic exceeds one for a particular case, that case is deemed as an outlier (Hair et al., 1998). On the other hand, for DFFITS a value of more than one or two indicates a potential outlier or an influential case (Roth and Switzer, 2002).

10.10.8 Test of the Hypothesised Model

As mentioned in earlier chapters, a mediation model was developed for this study in order to get a deeper insight into the underlying processes through which trust can affect work engagement. A review of the literature reveals that the two most widely used statistical techniques to estimate mediation models are: (1) hierarchical regression analysis; and (2) structural equation modelling (Wood, Goodman, Beckman and Cook, 2008). In a hierarchical multiple regression, a set of independent variables are entered cumulatively in a pre-specified sequence by the researcher (Cohen and Cohen, 1983). The order of entry is usually based on some logical or theoretical considerations. F-tests are then used to determine if each added variable or set of variables leads to significant increases in R^2 (Cohen and Cohen, 1983). On the other hand, Hoyle (1995) defines structural equation modelling (SEM) "as a comprehensive statistical approach to testing hypotheses about relations among observed and latent variables" (p. 1).

However, there is a general consensus among researchers that SEM requires large sample sizes and the need for large samples increases as the research model becomes more complex (Kline, 2005; Schumacker and Lomax, 2004; Raykov and Marcoulides, 2006). Schumacker and Lomax (2004) contend that within the SEM framework, a large sample size is required not only to maintain power and obtain stable parameter estimates and standard errors but also because of the multiple observed indicator variables used to define latent variables. Schumacker and Lomax (2004) surveyed the literature and found that sample sizes of 250 - 500 were commonly used in many articles. In a related vein Kline (2005) proposes that sample sizes less than 100 can be considered small; sample sizes between 100 and 200 can be termed as medium; and samples sizes greater than 200 can be deemed as large. Kline (2005) suggests that for complex models, sample sizes that exceed 200 can be considered appropriate. Finally, in a survey of 72 SEM studies, Breckler (1990) found that the median sample size was 198. The research model developed for the purpose of the current study was very complex (18 variables) and the sample size (N = 152) was relatively small. Thus, in view of this fact, it was decided to utilize the hierarchical regression analysis to test the research model.

Moreover, LeBreton, Wu and Bing (2009) state that for simple mediation models, using manifest variables (i.e. X ----- M ------ Y), regression and SEM are likely to give similar results. However, if the aim is to ascertain whether or not the effect of X on Y is mediated by multiple mediators (e.g. M1, M2 and M3), then SEM approach is considered more appropriate (LeBreton et al., 2009). In the present study, the aim was to test simple mediation effects. For instance, it was hypothesised that organizational identification, affective commitment to the supervisor and team psychological safety will mediate the effects of trust in top management, trust in direct supervisor and trust in team members on work engagement respectively. Furthermore, it was postulated that learning goal orientation will mediate the relationship between work engagement and the outcome variables. Hence, it is reasonable to suggest that the hierarchical regression analysis was a suitable technique within the context of the present study. This technique has been extensively used for testing meditation models in previous research (Langfred, 2004; Struges, Conway, Guest and Liefooghe, 2005; Collins and Smith, 2006; Carmeli, 2007; Tucker, Nembhard and Edmondson, 2007; Jones, 2009).

10.10.9 Mediation Analysis

The meditational hypotheses were tested by following the widely adopted four step procedure outlined by Barron and Kenny (1986). According to Barron and Kenny (1986), mediation is established if four conditions are satisfied. First, the independent variable(s) (trust in top management, trust in supervisor and trust in team members) must be significantly associated with the dependent variable (work engagement). Second, the independent variable(s) (trust in top management, trust in supervisor and trust in team members) must be significantly associated with the proposed mediator(s) (organizational identification, affective commitment to the supervisor and team psychological safety). Third, the proposed mediator(s) (organizational identification, affective commitment to the supervisor and team psychological safety) must be significantly associated with the dependent variable (work engagement). Finally, when both the independent variable and the proposed mediator are included in the regression model together, the direct relationship between the independent variable and the dependent variable should weaken considerably, signifying partial mediation; or it should turn insignificant, indicating full mediation.

Interestingly, several scholars (e.g. Kenny, Kashy and Bolger, 1998; Shrout and Bolger, 2002; MacKinnon, Lockwood, Hoffman, West and Sheets, 2002) in the recent past have argued that in order to establish mediation it is not necessary to establish a link between the independent and dependent variables. These researchers suggest that if the independent variable is significantly related to the proposed mediator and the mediator, in turn, is significantly associated with the dependent variable, the indirect effect of the independent variable on the dependent variable can be established through the Sobel test (Sobel, 1982). In other words, according to this line of reasoning, the vital conditions for establishing mediation seem to be the second and third conditions (Kenny et al., 1998). In this connection, Wood et al. (2008) also suggest that in order to conduct a comprehensive test of mediation, it is imperative that the researcher supplements Baron and Kenny's (1986) causal step approach with the Sobel test. Thus, in the present study both these approaches were followed to test the mediation hypotheses.

10.11 Summary

This chapter comprised of two sections. The first section examined the philosophical foundations of this research; while the second section dealt with the research methodology employed for this study. This chapter commenced by examining the philosophical foundations of this research and argued that the positivist framework of theory – model – testing was most appropriate for the current research. Furthermore, the chapter rationalised that the survey design was the most suitable research design to measure the perceptions and attitudes of research scientists in this study because it incorporated the positivist framework and the associated quantitative method. The chapter also provided a description of the study participants; described the data collection procedures; discussed the various research instruments used to measure the study variables; reported the results and implications of the pilot study; and examined the various statistical techniques used for testing the research hypotheses. The next chapter presents the results of this study.

CHAPTER 11

Results and Data Analysis

11.1 Introduction

This chapter presents the results of this study. The chapter begins by analyzing the factor structure of the study variables through exploratory factor analysis. The next section explains the various steps taken and procedures adopted to deal with the problem of non-normality for some of the study variables. The following section examines the descriptive statistics and reliabilities of the scales used in this study. After this the correlation matrix showing correlations among the study variables is discussed. Finally, the hypothesized model is tested through hierarchical multiple regression analyses.

11.2 Factor Structure or the Construct Validity of the Study Variables

Exploratory factor analysis using principal component analysis with oblique rotation was conducted to ascertain the factor structure of all the study variables. A cut-off point of 0.40 was set for the factor loadings in the pattern matrix. Furthermore, in line with the Kaiser rule, all factors having eigen values greater than one were considered significant.

The factor analysis using principal component analysis with oblique rotation for the work engagement scale yielded three factors with eigen values greater than one, which explained 65.12% of the total variance (see Table 11.1). All items relating to vigour and dedication sub-scales loaded on to the appropriate factors. However, for the absorption sub-scale, one item "Time flies when I am working" significantly loaded on to the dedication factor. Since, in the present study the composite score of work engagement was used for the purpose of data analyses, it was decided to retain this item. Therefore, in the current study the mean value of the 17 items included in the Utrecht Work Engagement Scale was calculated to determine an overall score for work engagement for each respondent.

TABLE 11.1

Results of Principal Components Analysis of the Work Engagement Scale

No.	Items	Factors		
		1	2	3
1.	At my work, I feel bursting with energy			-.57
2.	At my job, I feel strong and vigorous			-.57
3.	When I get up in the morning, I feel like going to work			-.63
4.	I can continue working for very long periods at a time			-.83
5.	At my job, I am very resilient mentally			-.84
6.	At my work I always persevere, even when things do not go well			-.65
7.	I find the work that I do full of meaning and purpose	.78		
8.	I am enthusiastic about my job	.82		
9.	My job inspires me	.82		
10.	I am proud of the work that I do	.86		
11.	To me, my job is challenging	.81		
12.	Time flies when I'm working	.43		
13.	When I am working, I forget everything else around me		.78	
14.	I feel happy when I am working intensely		.60	
15.	I am immersed in my work		.46	
16.	I get carried away when I'm working		.78	
17.	It is difficult to detach myself from my job		.80	
	Eigen Value	8.31	1.67	1.09
	Percentage of variance explained	48.89	9.81	6.42

The exploratory factor analysis for the 16 item trust in top management scale resulted in two factors with eigen values greater than one (see Table 11.2). These factors accounted for 77.94% of the total variance. An examination of the pattern matrix revealed that two items, namely, "The top management cares about the best interests of the employees" and "The top management is reliable" significantly loaded on both the factors. These items were therefore removed from the scale. Furthermore, the results from the pattern matrix showed that no clear factor structure emerged for this scale. Thus, the mean value of the remaining 14 items was computed to determine the overall score for trust in top management for each respondent.

TABLE 11.2

Results of Principal Components Analysis of the Trust in Top Management Scale

No.	Items	Factors	
		1	2
1.	The top management is straightforward with employees	.84	
2.	The top management communicates honestly with employees	.73	
3.	The top management does not mislead employees in their communications	.64	
4.	The top management does not withhold important information from employees	.85	
5.	The top management does not try to get out of its commitments	.62	
6.	The top management behaves consistently	.59	
7.	The top management is reliable*	.41	-.61
8.	The top management can be counted on		-.66
9.	The top management is competent and knowledgeable		-.92
10.	The top management can contribute to our organization's success		-.97
11.	The top management can help organization survive during the next decade		-.97
12.	The top management can help solve important problems faced by our organization		-.96
13.	The top management does not take advantage of employees	.92	
14.	The top management does not exploit employees	.84	
15.	The top management cares about the best interests of employees*	.46	-.47
16.	The top management is concerned for employees' welfare	.50	
	Eigen Value	11.09	1.39
	Percentage of variance explained	69.29	8.66

*These items were deleted from the scale

The factor analysis of the 16 item trust in supervisor scale revealed two factors with eigen values greater than one (see Table 11.3). These factors explained 74.1% of the total variance. Furthermore, the results of these analyses showed that one item "My direct supervisor is competent and knowledgeable" had significant cross loadings on both factors. Hence, this item was deleted from the scale. Moreover, the results indicated an absence of a clear factor structure. Thus, the mean value of the 15 items was calculated to produce an overall score for trust in supervisor for each participant.

TABLE 11.3

Results of Principal Components Analysis of the Trust in Supervisor Scale

No.	Items	Factors	
		1	**2**
1.	My direct supervisor is straightforward with me	.76	
2.	My direct supervisor communicates honestly with me	.82	
3.	My direct supervisor does not mislead me in his or her communications	.88	
4.	My direct supervisor does not withhold important information from me	.93	
5.	My direct supervisor does not try to get out of his or her commitments	.93	
6.	My direct supervisor behaves consistently	.77	
7.	My direct supervisor is reliable	.78	
8.	My direct supervisor can be counted on	.75	
9.	My direct supervisor is competent and knowledgeable*	.46	.54
10.	My direct supervisor can contribute to our organization's success		.94
11.	My direct supervisor can help our organization survive during the next decade		.94
12.	My direct supervisor can help solve important problems faced by our organization		.92
13.	My direct supervisor does not take advantage of me	.81	
14.	My direct supervisor does not exploit me	.85	
15.	My direct supervisor cares about my best interests	.77	
16.	My direct supervisor is concerned for my welfare	.71	
	Eigen Value	10.17	1.69
	Percentage of variance explained	63.57	10.53

*This item was deleted from the scale

Next, the 16 items in the trust in team members' scale were put through the principal component analysis with oblique rotation (see Table 11.4). The findings showed that there were three factors with eigen values greater than one, which together explained 77.74% of the total variance. A further examination of the pattern matrix revealed that one item "My team members communicate honestly with me" significantly loaded on factor 1 and factor 3. On the other hand another item "My team members can be counted on" had similar loadings on the three factors and these loadings were below the cut-off point of 0.40. Thus, both these items were removed from the scale and the mean value of the remaining 14 items was computed to determine the score of trust in team members for each respondent.

TABLE 11.4

Results of Principal Components Analysis of the Trust in Team Members Scale

No.	Items	Factors		
		1	**2**	**3**
1.	My team members are straightforward with me			.50
2.	My team members communicate honestly with me*	.40		.43
3.	My team members do not mislead me in their communications	.69		
4.	My team members do not withhold important information from me	.71		
5.	My team members do not try to get out of their commitments	.81		
6.	My team members behave consistently	.40		
7.	My team members are reliable			.46
8.	My team members can be counted on*	.33	.33	.39
9.	My team members are competent and knowledgeable		.48	
10.	My team members can contribute to our organization's success		.91	
11.	My team members can help our organization survive during the next decade		1.0	
12.	My team members can help solve important problems faced by our organization		.96	
13.	My team members do not take advantage of me	.93		
14.	My team members do not exploit me	.94		
15.	My team members care about my best interests			.87
16.	My team members are concerned for my welfare			1.0
	Eigen Value	10.02	1.35	1.07
	Percentage of variance explained	62.62	8.43	6.70

*These items were deleted from the scale

Factor analysis for the trust propensity scale yielded a single factor with eigen value greater than one. All the three items measuring this construct loaded on its original factor, which explained 77.04% of the total variance (see Table 11.5). The mean value of the three items constituting the trust propensity scale was computed to produce a trust propensity score for each respondent.

TABLE 11.5

Results of Principal Components Analysis of the Trust Propensity Scale

No.	Items	Factor
1.	I generally have faith in humanity	.88
2.	I feel that people are generally reliable	.89
3.	I generally trust other people unless they give me a reason not to	.86
	Eigen Value	2.31
	Percentage of variance explained	77.04

The exploratory factor analysis using principal component analysis with oblique rotation for the organizational identification scale resulted in only one factor with eigen value greater than one (see Table 11.6). This factor explained 64.63% of the total variance. The mean value of the six items measuring this construct therefore, was computed to form a score for organizational identification for each respondent.

TABLE 11.6

Results of Principal Components Analysis of the Organizational Identification Scale

No.	Items	Factor
1.	When someone criticizes my organization, it feels like a personal insult	.82
2.	When I talk about my organization, I usually say 'we' rather than 'they'	.73
3.	I am very interested in what others think about my organization	.80
4.	I view my organization's successes as my successes	.83
5.	When someone praises my organization, it feels like a personal compliment	.90
6.	If a story in the media criticized my organization, I would feel embarrassed	.73
	Eigen Value	3.88
	Percentage of variance explained	64.63

The exploratory factor analysis for the affective commitment to the supervisor scale manifested in a one-factor structure. All the five items loaded on its original factor, which explained 56.33% of the total variance (see Table 11.7). The mean value of these five items was calculated to produce an overall score for affective commitment to the supervisor for each participant.

TABLE 11.7

Results of Principal Components Analysis of the Affective Commitment to the Supervisor Scale

No.	Items	Factor
1.	I would be very happy to spend the rest of my career working with my current direct supervisor	.72
2.	I enjoy discussing my direct supervisor with people outside my organization	.55
3.	I really feel as if my direct supervisor's problems are my own	.77
4.	Working with my direct supervisor has a great deal of personal meaning for me	.87
5.	I feel emotionally attached to my direct supervisor	.80
	Eigen Value	2.82
	Percentage of variance explained	56.33

The exploratory factor analysis for team psychological safety scale yielded two factors with eigen values greater than one. Together, these two factors explained 53.88% of the total variance (see Table 11.8). This finding was surprising because previous research reveals a one factor structure for this scale (Edmondson, 1999; Baer and Frese, 2003). An examination of the pattern matrix revealed that the four positively worded items in the scale significantly loaded on the first factor; whereas, the three negatively worded items loaded on the second factor. Babbie (2007) argues that the negatively worded items can prove to be problematic because generally they are harder to interpret Furthermore, previous research indicates that negatively worded items that are reverse scored can manifest in inconsistent dimensionality and reverse coding factors (i.e. factors defined exclusively by negatively worded items) (Cordery and Sevastos, 1993; Magazine, Williams and Williams, 1996). Magazine et al. (1996) contend that reverse coding factors are "a result of careless responses, insufficient cognitive ability, impaired response accuracy as a result of negatively worded items and the actual measurement of a different construct" (p. 245). Thus, it was decided to remove the three negatively worded items from the scale and measure team psychological safety with the four positively worded items. An abridged version of the team psychological safety scale has been used in previous research and has shown satisfactory results (Nembhard and Edmondson, 2006; Tucker, Nembhard and Edmondson, 2007).

TABLE 11.8

Results of Principal Components Analysis of the Team Psychological Safety Scale

No.	Items	Factors	
		1	2
1.	If someone in our research team makes a mistake, it is often held against him or her*		.65
2.	Members of our research team are able to bring up problems and tough issues	.77	
3.	People in our research team sometimes reject others for being different*		.81
4.	It is safe to take a risk in our research team	.78	
5.	It is difficult to ask other members of our research team for help*		.68
6.	No one in our research team would deliberately act in a way that undermines others' efforts	.56	
7.	People in our research team value each other's unique skills and talents	.71	
	Eigen Value	2.42	1.35
	Percentage of variance explained	34.63	19.25

*These negatively worded items were deleted from the scale

As expected, factor analysis using principal component analysis with oblique rotation for the learning goal orientation scale yielded a single factor with eigen value greater than one (see Table 11.9). This factor explained 68.4% of the total variance. The mean value of the eight items comprising this scale was therefore, calculated to ascertain the score for learning goal orientation for each study participant.

TABLE 11.9

Results of Principal Components Analysis of the Learning Goal Orientation Scale

No.	Items	Factor
1.	The opportunity to do challenging work is important to me	.76
2.	When I fail to complete a difficult task, I plan to try harder the next time I work on it	.76
3.	I prefer to work on tasks that force me to learn new things	.87
4.	The opportunity to learn new things is important to me	.88
5.	I do my best when I am working on a fairly difficult task	.85
6.	I try hard to improve on my past performance	.80
7.	The opportunity to extend the range of my abilities is important to me	.85
8.	When I have difficulty solving a problem, I enjoy trying different approaches to see which one will work	.83
	Eigen Value	5.47
	Percentage of variance explained	68.4

Exploratory factor analysis for the five item in-role job performance scale also yielded a single factor, which explained 68.61% of the total variance (see Table 11.10). The mean value of these five items was calculated to form a score for in-role job performance for each respondent.

TABLE 11.10

Results of Principal Components Analysis of the In-Role Job Performance Scale

No.	Items	Factor
1.	I always complete the duties specified in my job description	.85
2.	I meet all the formal performance requirements of the job	.92
3.	I fulfil all responsibilities required by my job	.90
4.	I never neglect aspects of the job that I am obligated to perform	.85
5.	I often fail to perform essential duties	.58
	Eigen Value	3.43
	Percentage of variance explained	68.61

Similarly, exploratory factor analysis resulted in a one factor structure for the innovative work behaviour scale. All the nine items loaded on a single factor, which explained 67.03% of the variance (see Table 11.11). Hence, the mean value of the

nine items comprising this scale was computed to determine an overall score for innovative work behaviour for each respondent.

TABLE 11.11

Results of Principal Components Analysis of the Innovative Work Behaviour Scale

No.	Items	Factor
1.	Creating new ideas for difficult issues	.75
2.	Mobilizing support for innovative ideas	.84
3.	Searching out new work methods, techniques or instruments	.73
4.	Acquiring approval for innovative ideas	.84
5.	Transforming innovative ideas into useful applications	.84
6.	Generating original solutions for problems	.82
7.	Introducing innovative ideas into the work environment in a systematic way	.88
8.	Making important organizational members enthusiastic for innovative ideas	.85
9.	Evaluating the utility of innovative ideas	.82
	Eigen Value	6.03
	Percentage of variance explained	67.03

The items of the two learning behaviours, that is, type of feedback sought (five items) and error communication (three items), were submitted to a principal component analysis with oblique rotation. The results of this analyses revealed that two factors emerged with eigen values greater than 1, accounting for 80.86% of the variance (see Table 11.12). Each item loaded on its appropriate factor, which established discriminant validity between the measures of feedback seeking and error communication. Hence, the mean value of the five items, measuring type of feedback sought, was calculated to form a score for this construct for each respondent. Similarly, the mean value of the three items belonging to error communication was computed to determine the score for this variable for each participant.

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TABLE 11.12

Results of Principal Components Analysis of the Learning Behaviour Scales

No.	Items	Component	
		Factor 1	**Factor 2**
	Feedback Seeking		
	I ask for feedback:		
1.	To learn how I can master tasks	.93	
2.	To learn how I can improve performing my work	.96	
3.	To get information about how I can solve problems	.97	
4.	To improve my knowledge and capabilities	.96	
5.	To set more appropriate goals for myself	.84	
	Error Communication		
1.	When I make a mistake at work, I tell others about it, so that they do not make the same mistake		.70
2.	If I cannot rectify an error by myself, I turn to my team members for help		.89
3.	When I have done something wrong, I ask others how I should do it better		.89
	Eigen Value	4.83	1.64
	Percentage of variance explained	60.34	20.52

Finally, the six items measuring organizational commitment were submitted to a principal component analysis with oblique rotation. The results showed that, as expected, a single factor emerged, which explained 61.73% of the total variance (see Table 11.13). The mean value of the six items measuring organizational commitment was, therefore, calculated to produce an overall score for organizational commitment for each participant.

TABLE 11.13

Results of Principal Components Analysis of the Organizational Commitment Scale

No.	Items	Factor
1.	I would be very happy to spend the rest of my career with this organization	.65
2.	I really feel as if this organization's problems are my own	.77
3.	I do not feel a strong sense of 'belonging' to this organization	.80
4.	I do not feel 'emotionally attached' to this organization	.85
5.	I do not feel like 'part of the family' at this organization	.85
6.	This organization has a great deal of personal meaning for me	.79
	Eigen Value	3.70
	Percentage of variance explained	61.73

11.3 Discriminant Validity among Study Variables

An exploratory factor analysis using principal component analysis with oblique rotation was also performed to get some evidence for measures discriminant validity. First, the items of the three trust scales were submitted to a principal component analysis to make sure that the respondents differentiated between the three trust referents, that is, the top management, direct supervisor and team members. The results presented in Tables 11.1, 11.2 and 11.3 show that the factor structure for the three trust scales was not clear. Therefore, in order to see whether or not the items included in the three trust scales load cleanly on to three separate factors, the number of factors to be extracted under the principal components analysis was set at 3. The results of this analysis showed that the items relating to the three trust scales cleanly loaded onto their respective factors, thereby providing evidence that the respondents differentiated among the three foci of trust. The three factors together explained 65.02% of the total variance. The results of this analysis are presented in Table A1 in appendix C.

Next, items relating to trust propensity, organizational identification, affective commitment to the supervisor, team psychological safety, learning goal orientation, in-role job performance, innovative work behaviour, feedback seeking, error communication and organizational commitment were submitted to a principal component analysis with oblique rotation. The results of this analysis showed that as

expected, ten factors emerged, with eigen values greater than 1, accounting for 70.9% of the total variance. All items cleanly loaded onto their respective factors. However, there was one exception. One item ('I really feel as if [name of the research centre] problems are my own) in the affective commitment to the organization scale loaded on the organizational identification factor. Moreover, the factor loading of this item (0.38) was below the cut off point of 0.40. Thus, this item was removed from the organizational commitment scale. This meant that the earlier decision to average the six items of this scale, which was based on the results presented in Table 11.13, had to be revised and therefore, the overall score for organizational commitment was determined by computing the mean value of the remaining five items. The results of this factor analysis are presented in Table A2 in appendix D.

Finally, there is a debate in the engagement literature whether or not work engagement can be differentiated from affective organizational commitment (Macy and Schneider, 2008). In view of this debate, the items relating to the three engagement dimensions (i.e. vigour, dedication and absorption) and affective organizational commitment were submitted to a principal component analysis with oblique rotation. The results of this analysis revealed the emergence of four factors with eigen values greater than 1. These four factors explained 65.9% of the total variance. All items relating to vigour, dedication, absorption and affective organizational commitment loaded cleanly on to their respective factors, thereby suggesting that work engagement and organizational commitment are two distinct constructs. These results are depicted in Table A3 in appendix E.

11.4 Descriptive Statistics

The means, standard deviations, skewness and kurtosis for all the quantitative variables are presented in Table 11.14.

TABLE 11.14

Descriptive Statistics of Study Variables

Variables	N	Minimum	Maximum	Mean	SD	Skewness	Std. Error	Kurtosis	Std. Error
Work Engagement	179	1.65	5.94	4.31	.84	-.29	.182	-.22	.361
Trust in top management	188	1.27	7.00	5.18	1.15	-.31	.177	-.14	.353
Trust in supervisor	189	1.40	7.00	6.13	1.00	-1.91	.177	5.37	.352
Trust in team members	189	2.00	7.00	5.90	.93	-.98	.177	1.29	.352
Trust Propensity	192	1.67	7.00	5.47	1.13	-.78	.175	.25	.349
Organizational identification	191	1.00	7.00	4.29	1.39	-.43	.176	-.11	.350
Affective commitment to supervisor	190	1.00	7.00	4.34	1.30	-.30	.176	-.20	.351
Psychological Safety	186	2.25	7.00	5.37	1.05	-.48	.178	-.38	.355
Learning goal orientation	192	2.50	7.00	6.33	.77	-1.67	.175	3.66	.349
In-role job performance	190	2.00	7.00	6.02	.96	-1.19	.176	1.76	.351
Innovative work behaviour	190	1.89	7.00	4.73	1.08	.13	.176	-.47	.351
Type of feedback sought	191	1.00	7.00	5.90	1.07	-1.36	.176	2.81	.350
Error Communication	189	2.33	7.00	5.93	.89	-.83	.177	.99	.352
Affective organizational commitment	189	1.00	7.00	3.96	1.35	-.06	.177	-.28	.352
Age	184	21.00	48.00	29	5.09	1.07	.179	1.11	.356
Tenure	183	.10	13.00	2.44	2.13	1.75	.180	4.04	.357
Valid N (listwise)	**152**								

The results show that means for all the study multi-item variables were above the mid-point of the used Likert-scales (see Table 11.14). However, these means compared favorably to the means for these variables reported in previous studies. For example, the work engagement scores attained in the present sample were compared to the norm scores for various Dutch occupational groups reported in Schaufeli and Bakker, (2003) (see Table 11.15).

TABLE 11.15
A Comparison of the Levels of Work Engagement between the Current Sample and the Dutch Samples

Occupational Group	N	Mean	Standard Deviation
Irish Research Scientists (present sample)	179	4.31	0.84
Managers	632	4.29	1.03
Farmers	875	4.22	1.06
White Collar Workers	1,826	4.15	1.11
Home Care Staff	84	3.71	1.03
Blue Collar Workers	376	3.67	1.23
Physicians	655	3.04	0.92

The results show that the engagement scores attained in the current study were in line with the norm scores reported for the Dutch managers, farmers and white collar workers (see Table 11.15).

In a similar vein, the trust scores obtained in the current study were compared against two studies conducted in the United States using the same trust measure as the current study (see Table 11.16).

TABLE 11.16
A Comparison of Trust Scores between Current and the US Samples

Study	Trust Foci	N	Mean	Standard Deviation
Current Study	Top Management	188	5.18	1.15
Spreitzer and Mishra (2002)	Top Management	331	3.87	1.46
Brockner et al. (2004)	Top Management	103	4.97	1.36

The findings (see Table 11.16) again reveal that the mean trust score for top management from the present sample is fairly consistent with the scores obtained from Brockner et al's (2004) study, whereas it was considerably higher than mean score reported by Spreitzer and Mishra (2002). Unfortunately, it was not possible to

locate a study which employed the Mishra and Mishra's (1994) scales to measure trust in supervisor and trust in team members thus not allowing a comparison of trust scores for these referents.

Furthermore, the findings from Table 11.14 show that most of the multi-item variables were negatively skewed. Age and tenure were, however, positively skewed. The problem of skewness was particularly acute for trust in supervisor (SK = -1.91), learning goal orientation (SK = -1.67), in-role job performance (SK = -1.19), Type of feedback (SK = -1.36), age (SK = 1.07) and tenure (SK = 1.75). High skewness is problematic because it violates the assumption of normality. The importance of the normality assumption stems from the fact that many statistical tests such as the t and F tests are based on the assumption that the variables are normally distributed (Hair, Anderson, Tatham and Black, 1998). A serious violation of this assumption prohibits the use of t and F statistics. A variable is said to be normally distributed if the values of the skewness and kurtosis equals zero (Kline, 2005).

However, there is widespread agreement among researchers that true normality is a rare occurrence in education and psychology research (Micceri, 1989; Dunlap, Burke and Greer, 1995; Schafer and Graham, 2002). Researchers can aim to improve normality through the use of transformations (Dunlap et al., 1995). Hair et al. (1998) and Tabachnick and Fidell (2001) recommend the following three transformations to correct the problem of non-normality:

1. Logarithmic Transformation (Log 10)
2. Square Root Transformation
3. Reciprocal Transformation

Kline (2005) suggests that "it may be necessary to try several different transformations before finding one that works for a particular distribution" (p. 51). For instance, in their study on health care professionals, Nembhard and Edmondson (2006) found that one of their study variables, that is, psychological safety was negatively skewed. These researchers applied a logarithmic transformation to this variable to correct the negative skew. In contrast, Gillespie and Mann (2004) found that two of their variables, namely, global trust and consultative leadership were moderately negatively skewed. These researchers applied a square root transformation to achieve normality.

Tabachnick and Fidell (2001) argue that the three transformations mentioned above are meant to correct positively skewed variables and cannot be directly applied to negatively skewed variables. In order to apply these transformations to negatively skewed variables, we first need to reflect these variables to convert negative skewness into positive skewness. This means that we have to reverse code the variable by finding the highest value in the distribution and adding one to this value to form a constant. A new variable is then formed by subtracting this constant from each person's score. The new variable now becomes positively skewed and hence the transformation can then be applied to this variable. For instance, suppose that the highest value for a particular variable is 7. This variable can be reflected as follows:

$$Y = (7+1) - X = 8 - X \qquad\qquad (1)$$

where, Y is the new variable and X is the original variable. The transformation to this new variable can be applied as follows:

$$\text{Log } (Y) = \text{Log } (8 - X) \qquad\qquad (2)$$
$$\text{SQT } (Y) = \text{SQT } (8 - X) \qquad\qquad (3)$$
$$\text{Inv } (Y) = \text{Inv } (8 - X) \qquad\qquad (4)$$

Once the variable is transformed it has to be reflected again to bring it back to its original meaning. This can be done by finding the highest value for the transformed variable; adding one to it to form a constant and then subtracting this constant from each person's scores.

Using this procedure, it was found that logarithmic transformation worked the best for the current data set. It should be noted that since age and tenure were both positively skewed, the logarithmic transformation was applied directly to these variables. The comparison between the transformed and non-transformed variables is provided in Table 11.17.

TABLE 11.17
Skewness and Kurtosis for Transformed and Non-Transformed Variables

Variables	N	Skewness		Kurtosis	
		Transformed Variables	Non-Transformed Variables	Transformed Variables	Non-Transformed Variables
Work Engagement*	179	-0.29	-0.29	-0.22	-0.22
Trust in top management*	188	-0.31	-0.31	-0.14	-0.14
Trust in supervisor	189	-0.59	-1.91	-0.40	5.37
Trust in team members	189	0.01	-0.98	-0.80	1.29
Trust propensity	192	0.17	-0.78	-0.61	0.25
Organizational Identification*	191	-0.43	-0.43	-0.11	-0.11
Affective commitment to supervisor*	190	-0.30	-0.30	-0.20	-0.20
Psychological Safety	186	0.27	-0.48	-0.72	-0.38
Learning goal orientation	192	-0.69	-1.67	-0.30	3.66
Innovative work behaviour	190	0.13	0.13	-0.47	-0.47
In-role job performance	190	-0.27	-1.19	-0.92	1.76
Feedback Seeking	191	-0.19	-1.36	-0.81	2.81
Error Communication	189	0.10	-0.83	-0.91	0.99
Affective organizational commitment*	189	-0.06	-0.06	-0.28	-0.28
Age	184	0.64	1.07	0.04	1.11
Tenure	183	-0.74	1.75	0.92	4.04

*skewness levels of these variables could not be improved with transformation

The results show that skewness levels improved appreciably through the application of logarithmic transformation (see Table 11.17). However, it should be noted that the skewness levels for work engagement, trust in top management, affective commitment to the supervisor, organizational identification and organizational commitment could not be improved further through the transformation. Fan and Wang (1998) contend that when two-thirds of the observed variables exceed skewness or kurtosis values of +/- 1.0, it can be inferred that the distribution is mildly non-normal; whereas, if the observed variables have skewness values at about +/- 1.5

and kurtosis values around +/- 3 to 4, the distribution can be said to be moderately non-normal. In a related vein Enders and Bandalos (1999) suggest that if skewness = 1.25 and kurtosis = 3.5, the distribution can be said to be moderately skewed. On the other hand, if skewness = 2.25 and kurtosis = 7.0, the distribution can be termed as highly skewed. An examination of Table 9.15 reveals that after the transformation, skewness values ranged from -0.74 to +0.64 and the kurtosis values ranged from -0.92 to +0.92 for the present sample. These skewness and kurtosis values indicate an approximately normal distribution.

11.5 Reliability of Study Variables

The internal consistency / reliability for all the multi-item constructs were ascertained through Cronbach's Alpha. Cronbach's Alpha is a reliability coefficient, which shows how well the items in a set are positively correlated to one another (Sekaran, 2003). The values of the Cronbach's Alpha for the multi-item variables used in the current study are presented in Table 11.18.

TABLE 11.18

Cronbach's Alpha for the Study Variables

Variables	No. of items	Cronbach's Alpha
Work Engagement	17	0.93
Trust in top management	14	0.96
Trust in supervisor	15	0.96
Trust in team members	14	0.95
Trust Propensity	3	0.85
Organizational identification	6	0.89
Affective commitment to the supervisor	5	0.80
Team psychological safety	4	0.67
Learning goal orientation	8	0.93
In-role job performance	5	0.87
Innovative work behaviour	9	0.94
Type of feedback sought	5	0.96
Error Communication	3	0.78
Affective organizational commitment	5	0.85

The reliabilities for all the multi-item scales were generally acceptable as all alpha values met minimum the criterion of 0.70 proposed by Nunnally and Bernstein (1994). The only exception was the shortened team psychological safety scale, which exhibited a slightly lower reliability of 0.67. The alpha values ranged from 0.67 to 0.96 for the present sample.

The reliabilities exhibited by the variables in this study were found to be quite consistent with the reliabilities for these constructs reported in previous studies. For example, Halbesleben and Wheeler (2008) and Mauno, Kinnunen , Makikangas and Natti (2005) reported reliabilities of 0.93 and 0.92 for the composite work engagement scale respectively. Furthermore, for Mishra and Mishra's (1994) trust scale, the value of the Cronbach's alpha was found to be 0.93 (Sprietzer and Mishra, 1999), 0.96 (Spreitzer and Mishra, 2002), and 0.97 (Brockner, Spreitzer, Mishra, Hochwarter, Pepper, Weinberg, 2004) in three separate studies. In a similar vein, Janssen and Yperen (2004) reported reliabilities of 0.85 and 0.94 for the in-role job performance and innovative work behavior scales, which compares very favorably with the reliabilities of 0.87 and 0.94 attained in the present study for the two constructs. The value of the Cronbach's alpha for the abridged team psychological safety scale ($\alpha = 0.67$), however, fell slightly short of the criteria of 0.70 proposed by Nunnally and Bernstein (1994). Nevertheless, it was still comparable to the reliabilities of the shortened psychological safety scales used by Nembhard and Edmondson ($\alpha = 0.73$) (2006) and Tucker, Nembhard and Edmondson ($\alpha = 0.74$) (2007).

In order to determine whether this four item scale was a valid measure of team psychological safety, some additional analyses were conducted. First, the inter-item correlations were computed and it was found that the average inter-item correlation for the four items was 0.36, which exceeded the criteria of 0.30 proposed by Robinson, Shaver and Wrightsman (1991). Secondly, for each item, the corrected item to total correlation was computed by calculating the correlation between it and a composite of the other three items. The results showed that these correlations ranged from 0.40 to 0.54 with an average of 0.46. These item to total correlations were well within the recommended range of 0.20-0.80 specified by Cox and Ferguson (1994). In addition, the correlation between work engagement and psychological safety attained in the

current study (r = 0.39, p<0.01) compared very favourably with the correlation between the two variables (r = 0.35, p<0.01) reported by May et al. (2004).

Finally, several published studies in leading peer reviewed journals have used scales, which exhibited alphas lower than 0.70. For instance, the four item trust measure used by Mayer and Davis attained a reliability of 0.59 and 0.60 in two waves of data, while the four item feedback scale used by Salanova and Schaufeli (2008) exhibited a reliability of 0.65. Thus, in light of this evidence it was decided to retain this scale for the purpose of data analysis.

11.6 Common Method Variance

In the present study all the data were acquired through self-reports, which can create problems of common method variance. The main problem with common method bias is that it may artificially magnify the relationship between the study variables (Podsakoff, Mackenzie, Lee and Podsakoff, 2003). To establish if common method variance was an area of concern in the present study, the Harman's single factor test was conducted (Podsakoff et al., 2003). If a substantial amount of common method variance exists, one general factor that accounts for most of the variance is likely to emerge from a factor analysis of all the measurement items. The results from the factor analysis revealed 24 factors with eigen-values greater than 1.0 that accounted for 80.1% of the total variance. The first factor accounted for only 30.7% of the variance. These findings indicate that common method variance was not a major problem in this study.

11.7 Correlations Analysis

Table 11.19 shows the correlations between the study variables. The results show that all the proposed relationships were significant and in the expected direction (see Table 11.19). For example the correlation matrix (see Table 11.19) shows that work engagement was significantly correlated with trust in top management (r = 0.30, p<0.01), trust in supervisor (r = 0.44, p<0.01), trust in team members (r = 0.34, p<0.01) and trust propensity (r = 0.31, p< 0.01). Additionally, the findings from the correlation matrix show that work engagement was significantly correlated with all the outcome variables. More specifically, it was found that work engagement was

significantly associated with learning goal orientation (r = 0.54, p<0.01), self-report measures of in-role job performance (r = 0.41, p<0.01) and innovative work behaviour (r = 0.47, p<0.01), the two learning behaviours, that is, type of feedback sought (r = 0.47, p<0.01) and error communication (r = 0.42, p<0.01) and organizational commitment (r = 0.39, p<0.01).

Furthermore, the results also showed that work engagement was significantly correlated with the three mediating variables, namely, organizational identification (r = 0.42, p<0.01), affective commitment to the supervisor (r = 0.42, p<0.01) and team psychological safety (r = 0.39, p<0.01). Out of the four control variables, only nationality (r = -0.17, p<0.01) was found to be significantly related to work engagement. The negative sign of the correlation coefficient for nationality implied that the non-Irish nationals were more engaged to their work than their Irish counterparts.

Finally, the findings from the correlation analysis revealed that trust in top management was significantly correlated with organizational identification (r = 0.54, p<0.01); trust in supervisor was significantly associated with affective commitment to the supervisor (r = 0.52, p<0.01); and trust in team members had a significant association with team psychological safety (r = 0.65, p<0.01). These findings offered preliminary support for all the direct hypotheses. Additionally, the results from the correlation matrix showed that no correlation exceeded 0.75, which indicates that multicollinearity was not a major issue in the present study (Ashford and Tsui, 1991).

TABLE 11.19

Correlation among Study Variables

Variable	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17
1. Work engagement																	
2. Trust in top management	0.30**																
3. Trust in supervisor[b]	0.44**	0.44**															
4. Trust in team members[b]	0.34**	0.26**	0.48**														
5. Trust propensity[b]	0.31**	0.22**	0.14	0.25**													
6. Organizational identification	0.42**	0.54**	0.28**	0.20*	0.16												
7. Affective commitment to supervisor	0.42**	0.31**	0.52**	0.11	0.29**	0.37**											
8. Team psychological safety[b]	0.39**	0.23**	0.51**	0.65**	0.21**	0.18*	0.31**										
9. Learning goal orientation[b]	0.54**	0.20*	0.28**	0.40**	0.21**	0.37**	0.12	0.22**									
10. In-role job performance[b]	0.41**	0.13	0.18*	0.28**	0.32**	0.20*	0.05	0.20*	0.56**								
11. Innovative work behaviour	0.47**	0.27**	0.25**	0.23**	0.16*	0.37**	0.28**	0.25**	0.41**	0.30**							
12. Feedback seeking[b]	0.47**	0.19*	0.37**	0.40**	0.40**	0.25**	0.26**	0.29**	0.55**	0.54**	0.34**						
13. Error communication[b]	0.42**	0.07	0.31**	0.45**	0.25**	0.18*	0.12	0.40**	0.51**	0.37**	0.27**	0.50**					
14. Organizational commitment	0.38**	0.58**	0.40**	0.22**	0.13	0.66**	0.41**	0.26**	0.22**	0.14	0.39**	0.22**	0.19*				
15. Gender	0.05	0.14	0.06	-0.05	-0.03	0.14	0.07	-0.04	-0.01	-0.03	0.07	-0.09	-0.15	0.02			
16. Nationality	-0.17*	-0.18*	-0.04	0.07	-0.23**	-0.14	-0.15	0.17*	-0.14	-0.07	-0.25**	-0.22**	-0.05	-0.15	0.09		
17. Age[b]	0.13	0.10	-0.1	-0.08	0.15	0.19*	-0.02	-0.1	0.22**	0.24**	0.20*	0.09	0.13	0.05	0.15	-0.2*	
18. Tenure[b]	-0.01	-0.01	-0.09	-0.1	0.02	0.03	-0.12	-0.05	-0.09	0.07	-0.08	-0.08	-0.03	0.01	-0.05	0.3**	0.17*

*p<0.05

**p<0.01

[b]based on scores after Log (10) transformation to correct skew

11.8 Testing the Assumptions of the Regression Analysis

In order to test the direct and mediation hypotheses, the hierarchical multiple regression analysis technique was used. The four control variables, that is, gender, age, nationality and tenure were entered in the first step and the independent variables were entered in the subsequent steps. However, as mentioned in Chapter 8, before conducting the regression analysis it is essential that the researcher ensures that the regression model fulfils the following five assumptions pertaining to:

- Normality of the error term
- Constant variance of the error term or homoscedasticity
- Linearity
- Multicollinearity
- Independence of the error terms or autocorrelation

The first assumption, that is, normality of the error term was checked through two methods. First, this assumption was tested through the visual inspection of the normal probability plots. In the present study, a visual examination of the normal probability plots of the residuals obtained from all the regression models revealed no significant deviation from normality.

In addition, the normality assumption was tested by obtaining residuals from each regression model and then applying the Shapiro-Wilk test (W) of normality to these residuals. If W is statistically insignificant, it can be assumed that the error term of the regression model is normally distributed. The results of this test revealed that in a few of the regression models the value of W came out to be significant, thereby implying that the error term was not normally distributed. However, Gujarati (2003) contends that the normality assumption assumes a key role when the sample size is small – that is, it is less than 100. Furthermore, the central limit theorem assumes that in large sample sizes even if the error term is not normally distributed, the sampling distribution of the regression coefficients will tend to be normally distributed and therefore, the usual test procedures, that is, the t and F tests will be valid (Gujarati, 2003). Since, in the present study the sample size is greater than 100; it is reasonable

to assume that minor violations of this assumption are unlikely to have an adverse impact on the regression results.

The assumption of linearity was verified by two methods. First, this diagnosis was made through residual plots by plotting the residuals (studentized) against the standardized predicted dependent variable. In the current study the studentized residuals obtained from all regression models exhibited a random pattern, thereby implying that regression models were linear. Second, scatter plots were used to determine whether or not the relationship between the dependent variables and each of the independent variables was linear. A visual inspection of these plots showed that the relationship between the dependent variables and each of the independent variables used in the current study was indeed linear.

The assumption of homoscedasticity was also assessed through a visual examination of the residual plot. The random pattern displayed by residuals suggested that the regression models were homoscedastic and thus hetroscadesticity was not a issue in the present analysis.

The assumption of multicollinearity was verified by computing the variance inflating factor (VIF). If the value of VIF is less than 10, it can be inferred that multicollinearity is not a serious problem (Hair et al., 1998; Gujarati, 2003). In the current study, the values of VIF obtained form all the regression models were below two (2.0), which indicated the absence of multicollinearity.

The final assumption deals with the independence of the error terms or the absence of autocorrelation. This assumption was assessed by computing the Durbin Watson test statistic (d) for each regression model. For the present study the value of 'd' ranged from 1.58 to 2.38 in the regression models. On the basis of this finding it can be concluded that autocorrelation was not a serious concern in the present sample.

11.8.1 Outliers

As mentioned in Chapter 8, two approaches were used to identify outliers or influential cases: Cook's distance (D) and DFITS. In case of Cook's D, if the value of the D- statistic exceeds one for a particular case, that case is deemed as an outlier (Hair et al., 1998). For DFFITS a value of more than one or two indicates a potential outlier or an influential case (Roth and Switzer, 2002). In the present study both these methods were used to detect influential observations. The results showed that the

values of Cook's D and DFFITS for all the regression models were below one. Thus, in the present sample there was no major outlier problem.

Thus, all assumptions regarding the multiple regression analysis were met, which made it possible to proceed to the next stage, that is, the testing of the research hypotheses.

11.9 Test of Research Hypotheses

As mentioned in chapter one, the current study aims to test the following research hypotheses:

Hypotheses 1 (a to d)

- Researchers' trust in top management is positively associated with their work engagement
- Researchers' trust in direct supervisor will be positively associated with their work engagement
- Researchers' trust in their team members will be positively associated with their work engagement
- Researchers' trust propensity will be positively associated with their work engagement

Hypotheses 2 (a to c)

- Researchers' organizational identification will mediate the effects of trust in top management on work engagement
- Researchers' affective commitment to the supervisor will mediate the effects of trust in direct supervisor on work engagement
- Team psychological safety will mediate the effects of trust in team members on work engagement

Hypotheses 3 (a to e)

- Researchers' work engagement will be positively associated with their in-role job performance
- Researchers' work engagement will be positively associated with their innovative work behaviour
- Researchers' work engagement will be positively associated with seeking feedback for self improvement
- Researchers' work engagement will be positively associated with error communication
- Researchers' work engagement will be positively associated with their organizational commitment

Hypotheses 4 (a to e)

- Researchers' learning goal orientation will at least partially mediate the effects of work engagement on in-role job performance
- Researchers' learning goal orientation will at least partially mediate the effects of work engagement on innovative work behaviour
- Researchers' learning goal orientation will at least partially mediate the effects of work engagement on seeking feedback for self improvement
- Researchers' learning goal orientation will at least partially mediate the effects of work engagement on error communication
- Researchers' learning goal orientation will at least partially mediate the effects of work engagement on organizational commitment

All the above stated hypotheses were tested through hierarchical multiple regression analyses.

11.10 The Impact of State and Trait Trust on Work Engagement

Hypotheses 1a – 1d state that trust in top management, trust in supervisor, trust in team members and trust propensity are significantly related to researchers'

levels of work engagement respectively. In order to test these hypotheses a three step hierarchical multiple regression analyses were conducted. In the first step the four control variables, that is, gender, nationality, age and tenure were entered. In the second step the three types of state trust, namely, trust in top management, trust in supervisor and trust in team members were introduced in the regression model. In the third and final step, trait trust or trust propensity was entered into the model. Models 1, 2 and 3 of Table 11.20 show the results. The results from model 1 (see Table 11.20) show that out of the four control variables, only nationality (b = -0.19, p<0.05) was significantly associated with work engagement. The negative sign of its coefficient implied that the non-Irish researchers were more engaged to their research work than their Irish counterparts. Overall, the four control variables explained 5% of the variance in work engagement.

In the second step the three forms of state trust were inducted into the regression model. The results from model 2 (see Table 11.20) showed that trust in supervisor (b = 0.31, p<0.01) and trust in team members (b = 0.21, p<0.05) were significant predictors of work engagement; whereas trust in top management (b = 0.08, *ns*) was unrelated to this construct. Together, the three forms of state trust explained an additional 23% of the variance in work engagement.

Finally, in step three trust propensity was entered into the model. The results from model 3 (see Table 11.20) revealed, that trust propensity (b = 0.17, p<0.05) was significantly and positively associated with work engagement. More specifically, these findings showed that trait trust explained unique variance in work engagement (change in R^2 = 0.02) above and beyond the variance explained by the three situational forms of trust. Moreover, the results from model 3 showed that trust in supervisor (b = 0.31, p<0.01) and trust in team members (b = 0.16, p<0.05) also continued to exercise a significant impact on work engagement. Thus, hypotheses 1a, 1b and 1d were accepted; while hypothesis 1c was rejected.

TABLE 11.20

Results of Regression Examining the Effects of Trust on Work Engagement[a]

Step	Variables	Work Engagement	Work Engagement	Work Engagement
		Model 1	Model 2	Model 3
1.	Gender	0.05	0.03	0.03
	Nationality	-0.19*	-0.17*	-0.13
	Age[b]	0.08	0.11	0.1
	Tenure[b]	0.03	0.08	0.07
2.	Trust in top management		0.08	0.06
	Trust in supervisor[b]		0.31**	0.31**
	Trust in team members[b]		0.21*	0.16*
3.	Trust propensity[b]			0.17*
	R^2	0.05	0.28	0.30
	ΔR^2	NA	0.23	0.02
	ΔF	1.99	15.81**	5.50*

[a]standardized coefficients are shown

[b]based on scores after Log(10) transformation to correct skew

*$p<0.05$

**$p<0.01$

11.11 The Mediating Effects of Organizational Identification, Affective Commitment to the Supervisor and Team Psychological Safety

Hypotheses 2a-2c state that organizational identification will mediate the effects of trust in top management on work engagement; affective commitment to the supervisor will mediate the relationship between trust in supervisor and work engagement; and team psychological safety will mediate the effects of trust in team members on work engagement. In order to test these meditational hypotheses, Barron and Kenny's (1986) traditional causal step approach was supplemented with the more recent work in this area by Kenny, Kashy and Bolger (1998) and Shrout and Bolger (2002). These scholars argue that in order to establish mediation it is not necessary to

establish a link between the independent and dependent variables. They contend that if the independent variable is significantly related to the proposed mediator and the mediator, in turn, is significantly associated with the dependent variable, the indirect effect of the independent variable on the dependent variable can be established through the Sobel test (Sobel, 1982).

The results show that trust in supervisor and trust in team members were significant predictors of work engagement; while, trust in top management did not exercise a significant impact on this construct (see Table 11.20). Thus, the first condition specified by Baron and Kenny (1986) was met with regards to trust in supervisor and trust in team members but it was not fulfilled with respect to trust in top management.

The second condition of mediation postulates that the independent variable must be significantly associated with the proposed mediator. This condition was analysed by independently regressing organizational identification, affective commitment to the supervisor and team psychological safety on trust in top management, trust in supervisor and trust in team members respectively. Gender, nationality, age, and tenure were used as control variables in the regression model. Table 11.21 shows the results of these analyses.

Results from model 2a (see Table 11.21) show that trust in top management (b = 0.48, p<0.01) was significantly related to organizational identification. Furthermore, results from model 2b (see Table 11.21) show that trust in supervisor (b = 0.53, p<0.01) was a significant predictor of affective commitment to the supervisor. Finally, findings from model 2c (see Table 11.21) revealed that trust in team members (b = 0.61, p<0.01) was also positively and significantly related to team psychological safety. Therefore, the second condition specified by Baron and Kenny (1986) was satisfied.

TABLE 11.21

Results of Regression Predicting Organizational Identification, Affective Commitment to the Supervisor & Team Psychological Safety[a]

Step	Variables	OID Model 1a	OID Model 2a	ACS Model 1b	ACS Model 2b	TPS[b] Model 1c	TPS[b] Model 2c
1.	Gender	0.12	0.06	0.08	0.04	-0.07	-0.04
	Nationality	-0.15	-0.07	-0.16	-0.14	0.20	0.13
	Age[b]	0.14	0.10	-0.04	0.007	-0.04	-0.03
	Tenure[b]	0.05	0.05	-0.08	-0.03	-0.11	0.001
2.	Trust in top management		0.48**				
3.	Trust in supervisor[b]				0.53**		
4.	Trust in team members[b]						0.61**
	R^2	**0.07**	**0.28**	**0.04**	**0.31**	**0.05**	**0.41**
	ΔR^2	**NA**	**0.21**	**NA**	**0.27**	**NA**	**0.36**
	ΔF	**3.03***	**50.56****	**1.78**	**66.11****	**2.05**	**99.79****

[a]standardized coefficients are shown

[b]based on scores after Log(10) transformation to correct skew

*$p < 0.05$

**$p < 0.01$

Note: OID = organizational identification; ACS = affective commitment to supervisor; TPS = team psychological safety

The third condition of mediation states that the proposed mediators must be significantly related to the dependent variables. The results shown in model 2 (see Table 11.22) reveal that all the proposed mediators, namely, organizational identification (b = 0.24, p<0.01), affective commitment to the supervisor (b = 0.20, p<0.01) and team psychological safety (b = 0.35, p<0.01) had a significant impact on work engagement after controlling the effects of gender, nationality, age and tenure. Thus, the third condition of mediation was also met.

TABLE 11.22

Results of Regression Examining the Effects of Mediators on Work Engagement[a]

Step	Variables	Work Engagement Model 1	Work Engagement Model 2
1.	Gender	0.05	0.03
	Nationality	-0.17	-0.16*
	Age[b]	0.11	0.08
	Tenure[b]	0.007	0.05
2.	Organizational identification		0.24**
	Affective commitment to supervisor		0.20**
	Team psychological safety[b]		0.35**
	R^2	**0.05**	**0.39**
	ΔR^2	**NA**	**0.34**
	ΔF	**2.03**	**28.23****

[a]standardized coefficients are shown

[b]based on scores after Log(10) transformation to correct skew

*$p<0.05$

**$p<0.01$

The findings reported in Table 11.20 revealed that trust in top management was unrelated to work engagement. Thus, according to the criterion specified by Barron and Kenny (1986), it is not possible to establish the mediating role of organizational identification in the relationship between trust in top management and work engagement. However, as noted earlier, the second and third conditions of mediation, which according to the latest research are considered to be most important for establishing mediation were fulfilled. More specifically, it was found that trust in top management was significantly related to organizational identification (see Table 11.19) and organizational identification, in turn, was significantly associated with work engagement (see Table 11.20). Thus, it is possible to test whether or not trust in top management exercises an indirect effect on work engagement through organizational identification by conducting the Sobel test (Sobel, 1982). The findings from the Sobel test confirmed that trust in top management exerted an indirect effect on work engagement through organizational identification ($z = 3.75$, $p< 0.01$).

Nevertheless, results presented in Table 11.20 show that both trust in supervisor and trust in team members were significantly related to work engagement. Thus, the first condition of mediation specified by Barron and Kenny (1986) was met with regards to these variables. Therefore, it was possible to test whether or not affective commitment to the supervisor and team psychological safety mediate the effects of trust in supervisor and trust in team members on work engagement respectively according to the procedure outlined by Barron and Kenny (1986). For this purpose two separate three-step hierarchical multiple regression analyses were performed. In the first analyses, the four control variables were entered in the first step. In the second step the three types of state trust and trust propensity were entered in the model; while in the third step, affective commitment to the supervisor was inserted in the regression equation. In the second analyses, affective commitment to the supervisor was removed from the model in the third step and it was replaced with team psychological safety. These findings are shown in model 3 of Tables 11.23 and 11.24.

From model 3 (see Table 11.23) it can be seen that when affective commitment to supervisor was added in the third step, it was found to be significantly related to work engagement (b = 0.27, p<0.01) but the direct effect of trust in supervisor became insignificant (b = 0.16, *ns*). Furthermore, the effect of trust propensity also became insignificant (b = 0.10, *ns*) but the effect of trust in team members remained significant (b = 0.23, p<0.01). These findings implied that affective commitment to the supervisor fully mediated the relationship between trust in supervisor and work engagement. The results from the Sobel test confirmed this mediation finding (z = 3.16, p<0.01).

TABLE 11.23

Results of Regression Examining the Mediating Effects of Affective Commitment to the Supervisor[a]

Step	Variables	Work Engagement	Work Engagement	Work Engagement
		Model 1	Model 2	Model 3
1.	Gender	0.05	0.03	0.02
	Nationality	-0.19*	-0.13	-0.12
	Age[b]	0.08	0.1	0.11
	Tenure[b]	0.03	0.07	0.09
2.	Trust in top management		0.06	0.04
	Trust in supervisor[b]		0.31**	0.16
	Trust in team members[b]		0.16*	0.23**
	Trust propensity[b]		0.17*	0.10
3.	Affective commitment to the supervisor			0.27**
	R^2	0.05	0.30	0.35
	ΔR^2	NA	0.25	0.05
	ΔF	1.92	13.48**	10.46**

[a]standardized coefficients are shown

[b]based on scores after Log(10) transformation to correct skew

*$p<0.05$

**$p<0.01$

Next, affective commitment to the supervisor was taken out of the model and team psychological safety was inserted in its place. These results are shown in Table 11.24. The findings from model 3 (see Table 11.24) uncover that when team psychological safety was added in the third step, it was found to be a significant predictor of work engagement (b = 0.25, p<0.05) but trust in team members was no longer significant (b = 0.05, *ns*). Trust in supervisor (b = 0.25, p<0.01) and trust propensity (b = 0.15, p<0.05), nonetheless continued to remain significant. These findings point out that team psychological safety fully mediated the effects of trust in team members on work engagement. The Sobel test provided further support for this mediation effect (z = 3.26, p<0.01). In sum, the results of these analyses lent support to hypotheses 2a, 2b and 2c.

TABLE 11.24

Results of Regression Examining the Mediating Effects of Team Psychological Safety[a]

Step	Variables	Work Engagement	Work Engagement	Work Engagement
		Model 1	Model 2	Model 3
1.	Gender	0.06	0.03	0.05
	Nationality	-0.19*	-0.14	-0.18*
	Age[b]	0.09	0.1	0.11
	Tenure[b]	0.04	0.07	0.07
2.	Trust in top management		0.06	0.05
	Trust in supervisor[b]		0.31**	0.25**
	Trust in team members[b]		0.17*	0.05
	Trust propensity[b]		0.17*	0.15*
3.	Team psychological safety[b]			0.25**
	R^2	**0.05**	**0.31**	**0.34**
	ΔR^2	**NA**	**0.26**	**0.03**
	ΔF	**2.00**	**13.46****	**7.23****

[a]standardized coefficients are shown

[b]based on scores after Log(10) transformation to correct skew

*p<0.05

**p<0.01

11.12 The Effects of Work Engagement on Organizational Outcomes

Hypotheses 3a-3e postulate that work engagement will be positively and significantly related to: in-role job performance, innovative work behaviour, type of feedback sought, error communication and organizational commitment. In order to test these hypotheses, separate two-step hierarchical multiple regression analyses for each outcome variable were conducted. The four control variables, namely, gender, nationality, age and tenure were entered in the first step; whereas, work engagement was entered in the second step. These finding are depicted in models 2a, 2b, 2c, 2d and 2e of Table 11.25. These findings show that that work engagement is positively and significantly associated with: (1) in-role job performance (b = 0.42, p<0.01); (2)

innovative work behaviour (b = 0.42, p<0.01); (3) feedback seeking (b = 0.46, p<0.01); (4) error communication (b = 0.41, p<0.01); and (5) organizational commitment (b = 0.37, p<0.01). Additionally, the results from these analyses showed that nationality was a significant predictor of innovative work behaviour (b = -0.20, p<0.05), feedback seeking (b = -0.19, p<0.05) and organizational commitment (b = -0.22, p<0.05). These findings suggest that compared to Irish nationals, non-Irish nationals are more likely to engage in innovative work behaviour, seek feedback for self-improvement and are expected to be more committed to the their respective research centres. Furthermore, the results showed that age positively related to in-role job performance (b = 0.23, p<0.01), thereby suggesting that older researchers perform better than their younger counterparts. In short, the results presented in Table 11.25, provide firm support for hypotheses 3a-3e.

TABLE 11.25

Results of Regression Examining the effects of Work Engagement on Organizational Outcomes[a]

Step	Variables	IRP[b]	IRP[b]	IWB	IWB	FBS[b]	FBS[b]	EC[b]	EC[b]	OC[b]	OC[b]
		Model 1a	Model 2a	Model 1b	Model 2b	Model 1c	Model 2c	Model 1d	Model 2d	Model 1e	Model 2e
1.	Gender	-0.05	-0.07	0.09	0.07	-0.09	-0.11	-0.20*	-0.22**	0.01	-0.005
	Nationality	0.02	0.09	-0.20*	-0.13	-0.19*	-0.12	0.05	0.12	-0.21*	-0.14
	Age[b]	0.23**	0.19*	0.16	0.11	0.1	0.05	0.14	0.1	0.02	-0.02
	Tenure[b]	-0.05	-0.05	-0.07	-0.062	-0.09	-0.09	-0.1	-0.10	0.06	0.06
2.	Work engagement		0.42**		0.42**		0.46**		0.41**		0.37**
	R^2	**0.05**	**0.22**	**0.09**	**0.26**	**0.08**	**0.28**	**0.05**	**0.21**	**0.04**	**0.17**
	ΔR^2	**NA**	**0.17**	**NA**	**0.17**	**NA**	**0.20**	**NA**	**0.16**	**NA**	**0.13**
	ΔF	**2.08**	**33.96****	**4.12****	**35.34****	**3.31***	**43.88****	**2.07**	**31.46****	**1.68**	**24.89****

[a]standardized coefficients are shown

[b]based on scores after Log(10) transformation to correct skew

*p<0.05

**p<0.01

Note: IRP = in-role job performance; IWB = innovative work behaviour; FBS = type of feedback sought; EC = error communication; OC = organizational commitment

11.13 The Mediating Role of Learning Goal Orientation in the Work Engagement-Organizational Outcome Relationship

Hypotheses 4a-4e propose that learning goal orientation will at least partially mediate the effects of work engagement on: in-role job performance, innovative work behaviour, type of feedback sought, error communication and organizational commitment. In order to test these mediation hypotheses, the four-step procedure outline by Baron and Kenny (1986) was followed. The first condition of mediation, which requires that the independent variable must be significantly associated with the dependent variable, was satisfied by the results presented in Table 11.25.

The second condition necessitates that the independent variable, that is work engagement, must be significantly related to the proposed mediator that is, learning goal orientation. This condition was analysed by regressing learning goal orientation on the four control variables, namely, gender, nationality, age and tenure and work engagement. As the results depicted in model 2 of Table 11.26 demonstrate, work engagement was significantly related to learning goal orientation ($b = 0.52$, $p<0.01$). Additionally, the findings from these analyses showed that age was positively and significantly associated with learning goal orientation ($b = 0.19$, $p<0.01$), thereby implying that older employees hold a stronger learning orientation than their younger colleagues. Hence, the second condition for mediation was also satisfied.

TABLE 11.26

Results of Regression Examining Effects of Work Engagement on Learning Goal Orientation[a]

Step	Variables	Learning Goal Orinetation[b]	Learning Goal Orinetation[b]
		Model 1	Model 2
1.	Gender	-0.06	-0.08
	Nationality	-0.03	0.06
	Age[b]	0.25**	0.19**
	Tenure[b]	-0.15	-0.16*
2.	Work engagement		0.52**
	R^2	**0.08**	**0.33**
	$\triangle R^2$	**NA**	**0.27**
	$\triangle F$	**3.32***	**61.59****

[a]standardized coefficients are shown

[b]based on scores after Log(10) transformation to correct skew

*$p < 0.05$

**$p < 0.01$

The third condition proposes that learning goal orientation must be a significant predictor of the five outcome variables: in-role job performance, innovative work behaviour, type of feedback sought, error communication and organizational commitment. To test this condition, separate two-step hierarchical multiple regression analyses were conducted for each outcome variable. These results are shown in models 2a, 2b, 2c, 2d and 2e of Table 11.27. The findings revealed (see Table 11.27) that learning goal orientation was positively and significantly associated with: in-role job performance (b = 0.53, p<0.01), innovative work behaviour (b = 0.36, p<0.01), feedback seeking (b = 0.54, p<0.01), error communication (b = 0.47, p<0.01) and organizational commitment (b = 0.20, p<0.05). Thus, the third condition for mediation was also met.

TABLE 11.27

Results of Regression Examining the Effects of Learning Goal Orientation on Organizational Outcomes[a]

Step	Variables	IRP[b]	IRP[b]	IWB	IWB	FBS[b]	FBS[b]	EC[b]	EC[b]	OC[b]	OC[b]
		Model 1a	Model 2a	Model 1b	Model 2b	Model 1c	Model 2c	Model 1d	Model 2d	Model 1e	Model 2e
1.	Gender	-0.05	-0.02	0.06	0.08	-0.04	-0.01	-0.20*	-0.17*	0.02	0.03
	Nationality	0.07	0.08	-0.18*	-0.17*	-0.15	-0.14	0.08	0.09	-0.20*	-0.20*
	Age[b]	0.26**	0.13	0.17*	0.08	0.1	-0.03	0.15	0.03	-0.004	-0.05
	Tenure[b]	-0.05	0.03	-0.07	-0.03	-0.06	0.02	-0.1	-0.03	0.07	0.1
2.	Learning goal orientation[b]		0.53**		0.36**		0.54**		0.47**		0.20*
	R^2	0.06	0.31	0.09	0.21	0.05	0.32	0.05	0.25	0.04	0.07
	$\triangle R^2$	NA	0.25	NA	0.12	NA	0.27	NA	0.20	NA	0.03
	$\triangle F$	2.59*	63.2**	4.15**	25.73**	2.17*	67.82**	2.10	45.22**	1.62	6.79*

[a]standardized coefficients are shown

[b]based on scores after Log(10) transformation to correct skew

*p<0.05

**p<0.01

Note: IRP = in-role job performance; IWB = innovative work behaviour; FBS = type of feedback sought; EC = error communication; OC = organizational commitment

To test, the final condition of mediation, which requires that the direct effect of the independent variable on the dependent variable should reduce significantly in magnitude (partial mediation) or it should become non-significant (full mediation), when the mediator is included in the regression model, the analyses performed in Table 11.25 were repeated by adding learning goal orientation in the third step of the regression model. The results for in-role job performance, innovative work behaviour and feedback seeking are presented in Table 11.28; while, the results for error communication and organizational commitment are depicted in Table 11.29. The results (see Table 11.28) show that when learning goal orientation was added in the third step, the direct effect of work engagement on in-role job performance, innovative work behaviour and feedback seeking remained significant but declined from $b = 0.42$ ($p<0.01$) to $b = 0.19$ ($p<0.05$) for in-role job performance; was reduced from $b = 0.42$ ($p<0.01$) to $b = 0.31$ ($p<0.01$) for innovative work behaviour; and decreased from $b = 0.46$ ($p<0.01$) to $b = 0.24$ ($p<0.01$) for feedback seeking. Moreover, although the effect of work engagement decreased, learning goal orientation as a mediator had significant unique effects on in-role job performance ($b = 0.44$, $p<0.01$), innovative work behaviour ($b = 0.21$, $p<0.05$) and feedback seeking ($b = 0.43$, $p<0.01$).

TABLE 11.28

Results of Regression Examining the Mediating Effects of Learning Goal Orientation[a]

Step	Variables	IRP[b]	IRP[b]	IRP[b]	IWB	IWB	IWB	FBS[b]	FBS[b]	FBS[b]
		Model 1a	Model 2a	Model 3a	Model 1b	Model 2b	Model 3b	Model 1c	Model 2c	Model 3c
1.	Gender	-0.05	-0.07	-0.04	0.09	0.07	0.09	-0.09	-0.11	-0.08
	Nationality	0.02	0.09	0.06	-0.20*	-0.13	-0.14	-0.19*	-0.12	-0.14*
	Age[b]	0.23**	0.19*	0.11	0.16	0.11	0.07	0.1	0.05	-0.03
	Tenure[b]	-0.05	-0.05	0.02	-0.07	-0.06	-0.04	-0.09	-0.09	-0.02
2.	Work engagement		0.42**	0.19*		0.42**	0.31**		0.46**	0.24**
3.	Learning goal orientation[b]			0.44**			0.21*			0.43**
	R^2	**0.05**	**0.22**	**0.35**	**0.09**	**0.26**	**0.29**	**0.08**	**0.28**	**0.40**
	$\triangle R^2$	**NA**	**0.17**	**0.13**	**NA**	**0.17**	**0.03**	**NA**	**0.20**	**0.12**
	$\triangle F$	**2.08**	**33.96****	**31.23****	**4.12****	**35.34****	**6.12***	**3.31***	**43.88****	**31.62****

[a]standardized coefficients are shown

[b]based on scores after Log(10) transformation to correct skew

*$p < 0.05$

**$p < 0.01$

Note: IRP = in-role job performance; IWB = innovative work behaviour; FBS = type of feedback sought

Likewise, the results (see Table 11.29) revealed that when learning goal orientation was entered in the third step, it was found to be significantly associated with error communication (b = 0.43, p<0.01). Nonetheless, the direct effect of work engagement on error communication was reduced from b = 0.41 (p<0.01) in the second step to b = 0.23 (p<0.01) in the third step. Furthermore, the findings presented in Table 11.29 showed that in case of organizational commitment, learning goal orientation was not significant in the third step (b = 0.009, *ns*), while work engagement continued to be a significant predictor of this construct (b = 0.37, p<0.01).

TABLE 11.29

Results of Regression Examining the Mediating Effects of Learning Goal Orientation[a]

Step	Variables	EC[b]	EC[b]	EC[b]	OC	OC	OC
		Model 1a	Model 2a	Model 3a	Model 1b	Model 2b	Model 3b
1.	Gender	-0.20*	-0.22**	-0.19**	0.01	-0.005	-0.004
	Nationality	0.05	0.12	0.1	-0.21*	-0.14	-0.14
	Age[b]	0.14	0.1	0.03	0.02	-0.02	-0.03
	Tenure[b]	-0.1	-0.10	-0.05	0.06	0.06	0.06
2.	Work engagement		0.41**	0.23**		0.37**	0.37**
3.	Learning goal orientation[b]			0.35**			0.009
	R^2	0.05	0.21	0.29	0.04	0.17	0.17
	ΔR^2	NA	0.16	0.08	NA	0.13	0
	ΔF	2.07	31.46**	17.85**	1.68	24.92**	0.01

[a]standardized coefficients are shown

[b]based on scores after Log(10) transformation to correct skew

*$p<0.05$

**$p<0.01$

Note: EC = error communication; OC = organizational commitment

Taken together, these findings suggest that, as predicted, learning goal orientation partially mediated the effects of work engagement on in-role job performance, innovative work behaviour, feedback seeking and error communication. However, contrary to expectations, learning goal orientation did not mediate the relationship between work engagement and organizational commitment.

In order to establish whether the effect of work engagement on in-role job performance, innovative work behaviour, feedback seeking and error communication significantly decreased upon the addition of learning goal orientation, the Sobel test (1982) was performed. The findings from the Sobel test confirmed that learning goal orientation mediated the effects of work engagement on in-role job performance ($z = 5.21$, $p<0.01$), innovative work behaviour ($z = 2.41$, $p<0.05$), feedback seeking ($z = 5.16$, $p<0.01$) and error communication ($z = 4.29$, $p<0.05$). In sum, these findings corroborate hypotheses 4a, 4b, 4c and 4d respectively. However, hypothesis 4e, which proposed that learning goal orientation will mediate the effects of work engagement on organizational commitment was rejected.

11.14 Summary

The results of this study offered support for all but two hypotheses. More specifically, the findings of this study revealed that trust in supervisor, trust in team members and trust propensity exercised significant unique effects on researchers' levels of work engagement. However, contrary to expectations, trust in top management did not have a direct effect on work engagement. Furthermore, the results from this chapter showed that affective commitment to the supervisor and team psychological safety fully mediated the effects of trust in supervisor and trust in team members on work engagement respectively. In addition, the results showed that although trust in top management did not exert a direct effect on work engagement, it affected this construct indirectly through organizational identification. Moreover, it was found that work engagement was a significant predictor of all the five outcome variables. Finally, the findings revealed that, as predicted, learning goal orientation partially mediated the effects of work engagement on: in-role job performance, innovative work behaviour, feedback seeking and error communication. However,

learning goal orientation failed to mediate the effects of work engagement on organizational commitment. These results are summarised in Figures 11.1, 11.2, 11.3 and 11.4 below:

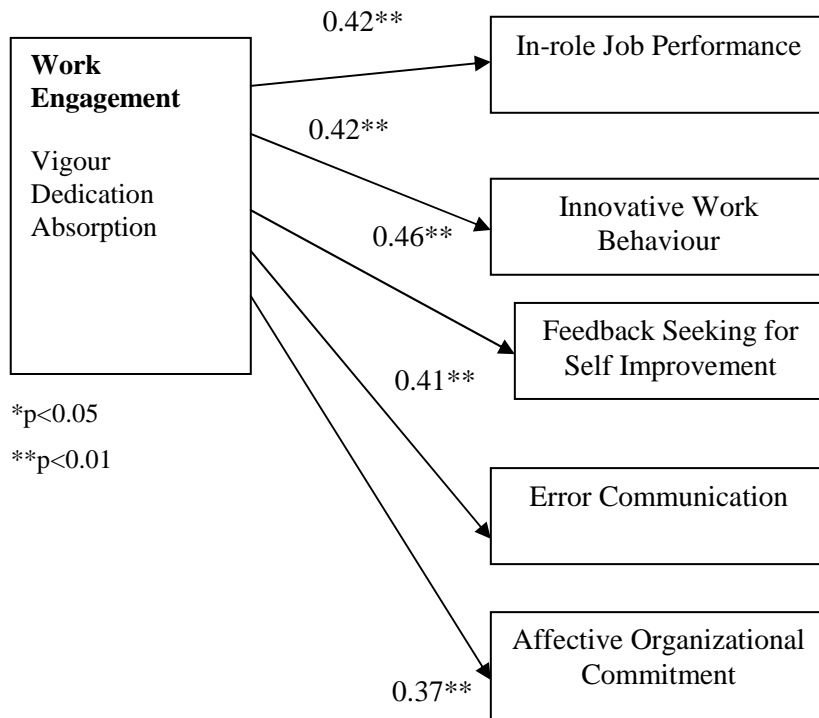**FIGURE 11.1**
Hypotheses 1(a to d)
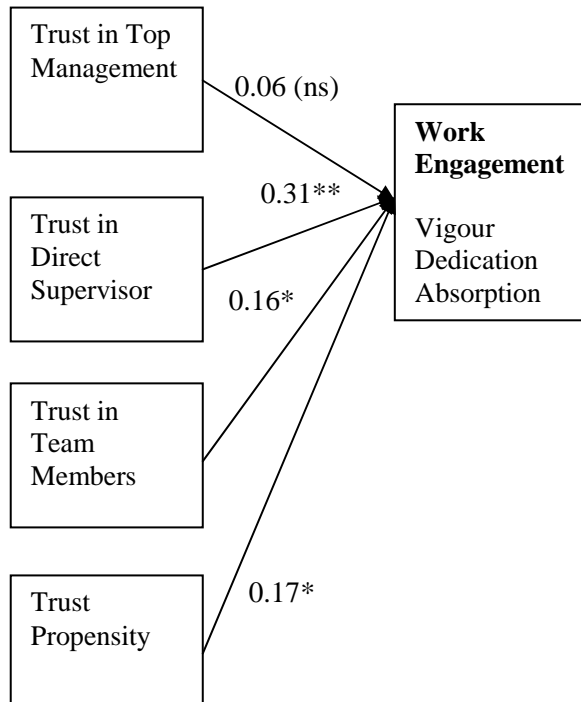

*p<0.05
**p<0.01

FIGURE 11.2
Hypotheses 2(a to c)


```
Trust in Top          0.48**    Organizational      0.24**
Management     ────────────>    Identification    ────────────>
                                                                  Work
Trust in              0.53**    Affective           0.20**        Engagement
Direct         ────────────>    Commitment to     ────────────>
Supervisor                      the Supervisor                    Vigour
                                                                  Dedication
                                                                  Absorption
Trust in              0.61**    Team                0.35**
Team           ────────────>    Psychological     ────────────>
Members                         Safety
```

*p<0.05

**p<0.01

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FIGURE 11.3
Hypotheses 3(a to e)


```
                    0.42**
Work Engagement  ──────────────→  In-role Job Performance

Vigour              0.42**
Dedication       ──────────────→  Innovative Work Behaviour
Absorption
                    0.46**
                 ──────────────→  Feedback Seeking for Self Improvement

                    0.41**
                 ──────────────→  Error Communication

                    0.37**
                 ──────────────→  Affective Organizational Commitment
```

*p<0.05

**p<0.01

FIGURE 11.4
Hypotheses 4(a to e)
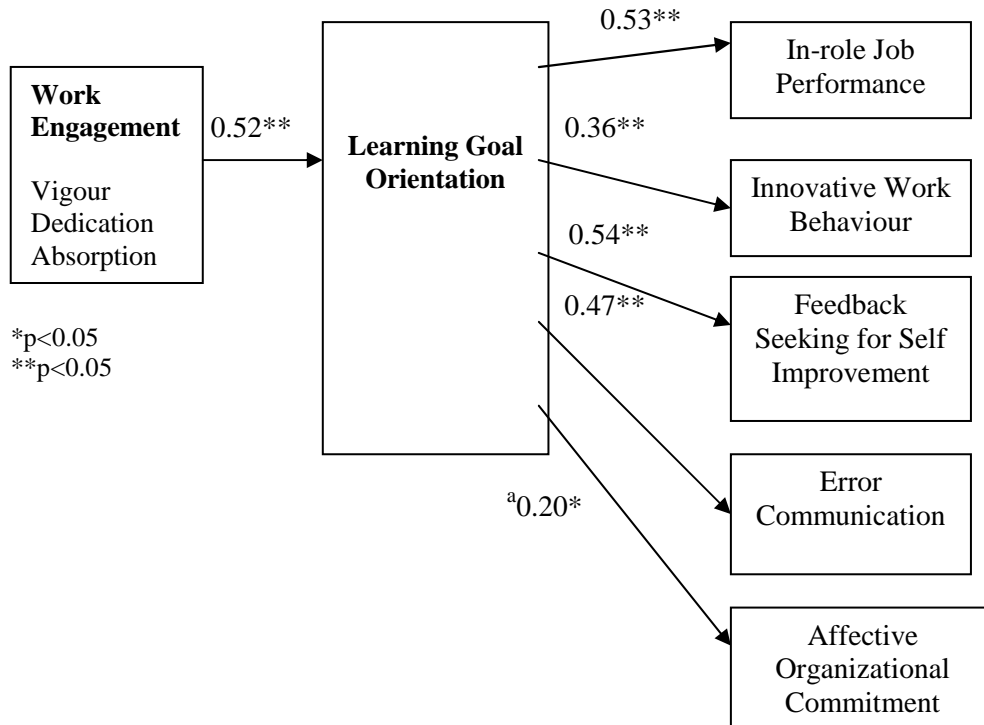
*a**Note:** Although the direct effect of learning goal orientation on organizational commitment was significant, it's mediating effect on the engagement – commitment relationship was insignificant (b = 0.009, ns).*

CHAPTER 12

Discussion, Implications and Conclusions

12.1 Introduction

As discussed in chapter 1, this research had the following four aims and objectives:

- To determine whether or not trust in top management, trust in direct supervisor, trust in team members and trust propensity can directly and significantly affect researchers' work engagement.

- To establish whether for not: (1) organizational identification, an organization relevant outcome, will mediate the relationship between trust in top management and work engagement; (2) affective commitment to the supervisor, which is a supervisor specific outcome will mediate the effects of trust in direct supervisor on work engagement; and (3) team psychological safety, a team relevant outcome, will mediate the relationship between trust in team members and work engagement.

- To examine the impact of work engagement on five outcome variables: (1) self-rated in-role job performance; (2) innovative work behaviour; (3) feedback seeking for self-improvement; (4) error communication; and (5) affective organizational commitment.

- To ascertain if learning goal orientation mediates the effects of work engagement on these five organizational outcomes.

On the basis of these objectives the following hypotheses were formulated and tested:

Hypothesis 1a: Researchers' trust in top management is positively associated with their work engagement

Hypothesis 1b: Researchers' trust in direct supervisor will be positively associated with their work engagement

Hypothesis 1c: Researchers' trust in their team members will be positively associated with their work engagement

Hypothesis 1d: Researchers' trust propensity will be positively associated with their work engagement

Hypothesis 2a: Researchers' organizational identification will mediate the effects of trust in top management on work engagement

Hypothesis 2b: Researchers' affective commitment to the supervisor will mediate the effects of trust in direct supervisor on work engagement

Hypothesis 2c: Team psychological safety will mediate the effects of trust in team members on work engagement

Hypothesis 3a: Researchers' work engagement will be positively associated with their in-role job performance

Hypothesis 3b: Researchers' work engagement will be positively associated with their innovative work behaviour

Hypothesis 3c: Researchers' work engagement will be positively associated with seeking feedback for self improvement

Hypothesis 3d: Researchers' work engagement will be positively associated with error communication

Hypothesis 3e: Researchers' work engagement will be positively associated with their organizational commitment

Hypothesis 4a: Researchers' learning goal orientation will at least partially mediate the effects of work engagement on in-role job performance

Hypothesis 4b: Researchers' learning goal orientation will at least partially mediate the effects of work engagement on innovative work behaviour

Hypothesis 4c: Researchers' learning goal orientation will at least partially mediate the effects of work engagement on seeking feedback for self improvement

Hypothesis 4d: Researchers' learning goal orientation will at least partially mediate the effects of work engagement on error communication

Hypothesis 4e: Researchers' learning goal orientation will at least partially mediate the effects of work engagement on organizational commitment

Using survey data from 152 research scientists, drawn from six university science research centres operating in Ireland, these research hypotheses were tested through hierarchical multiple regression analyses. The research model, showing the hypothesised relationships is depicted in Figure 12.1 below:

Figure 12.1
Research Model
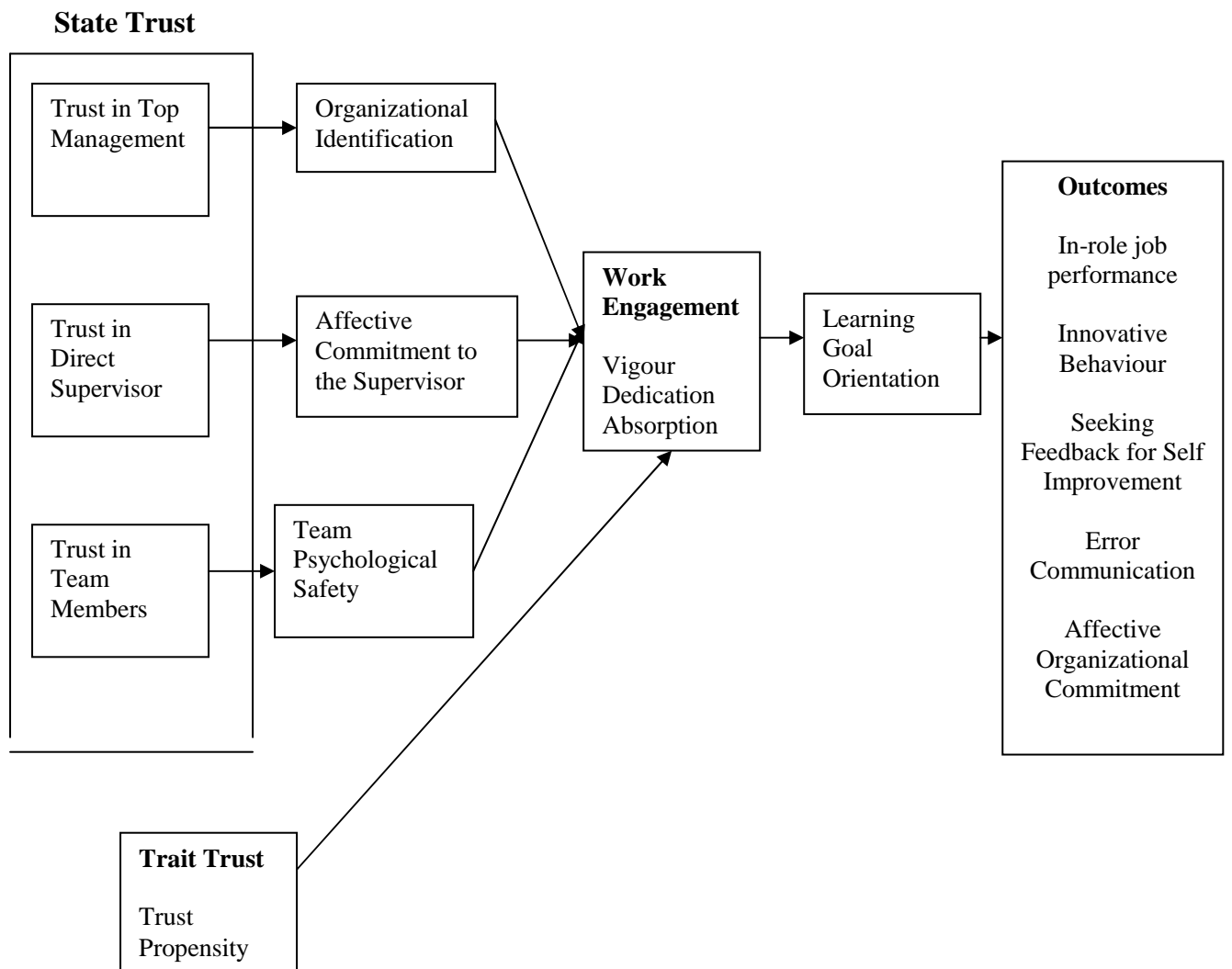
The present study makes an important contribution to both the engagement and trust literature. As discussed in chapter 3, previous research has predominantly expressed work engagement as a function of job and personal resources. However, this research empirically demonstrates that cultivating a climate of trust might be an important avenue through which organizations may be able to build an engaged workforce. Moreover, in chapter 5 it was noted that positive trust is an important predictor of other indicators of motivation such as, job satisfaction, organizational citizenship behaviour and turnover intentions. This study extends the extant trust literature by empirically establishing a link between trust and work engagement.

This chapter begins by presenting a summary of the main findings of this research and then proceeds to discuss these results in detail. This is followed by a discussion of managerial implications, limitations and potential contributions of the study. The chapter finally concludes with a presentation of some future research directions.

12.2 Summary of the Research Findings

Before discussing the findings of this study in detail, the main results of this research are summarised below:

12.2.1 The Direct Relationship between Work Engagement and Trust

The results of this study showed that:

• Trust in top management was unrelated to work engagement (H1a)

• Trust in supervisor was positively and significantly related to work engagement (H1b)

• Trust in team members was positively and significantly related to work engagement (H1c)

• Trust propensity was positively and significantly related to work engagement (H1d)

12.2.2 The Mediating Role of Organizational Identification, Affective Commitment to the Supervisor and Team Psychological Safety

Furthermore, it was disclosed that:

- Organizational identification fully mediated the effects of trust in top management on work engagement (H2a)

- Affective commitment to the supervisor fully mediated the relationship between trust in direct supervisor and work engagement (H2b)

- Team psychological safety fully mediated the effects of trust in team members on work engagement (H2c)

12.2.3 Consequences of Work Engagement

The consequences of work engagement indicated that it was positively and significantly associated with:

- In-Role Job Performance (H3a)
- Innovative Work Behaviour (H3b)
- Feedback Seeking (H3c)
- Error Communication (H3d)
- Organizational Commitment (H3e)

12.2.4 Mediating Role of Learning Goal Orientation

Finally, the results revealed that as hypothesised, learning goal orientation partially mediated the effects of work engagement on:

- In-Role Job Performance (H4a)
- Innovative Work Behaviour (H4b)
- Feedback Seeking (H4c)

- Error Communication (H4d)

However, contrary to expectations learning goal orientation did not mediate the relationship between work engagement and organizational commitment (H4e).

12.3 Discussion of the Research Findings

12.3.1 The Direct Effects of State and Trait Trust on Work Engagement

The bulk of the research on work engagement has predominantly illuminated the role of job resources in fostering work engagement (Schaufeli and Bakker, 2004; Bakker and Demerouti, 2008). The results of the present study, however, show that psychological states such as trust can also play a critical part in cultivating work engagement. Hypotheses 1a proposed that trust in top management will be positively associated with work engagement. However, contrary to expectations, the results of this study showed that trust in top management did not exercise a significant impact on researchers' levels of work engagement. Interestingly, the correlation analysis (see Table 11.19, page 267) showed that trust in top management was positively and significantly related to work engagement (r = 0.30, p<0.01). However, when trust in top management was entered into the regression model along with trust in direct supervisor, trust in team members and trust propensity, its effect became insignificant. This finding suggests that within the context of university research centres, researchers' trust in their supervisor and team members and researchers' dispositional tendency to trust others is more important in bolstering their work engagement than their trust in top management.

One possible explanation for this finding might be that the top management team, including the research director, performs more strategic functions such as setting the research agenda of the centre, acquiring funding, allocating resources among various research teams and inspiring scientists with diverse backgrounds to work collaboratively on specific research projects. In reality, top management may have limited involvement in every day job related activities such as, evaluating performance, providing feedback and assistance with research-related tasks or offering advice regarding proximal job and career related issues (Dirks and Skarlicki, 2004). As a consequence top management may only influence researchers' work

activities and consequently work engagement in an indirect manner through the policies and procedures enacted by them.

In addition, this finding also appears to be consistent with the notion that entities, which are psychologically and physically more proximal to employees' such as, the direct supervisor are likely to exercise a stronger impact on their attitudes and behaviours than more distal entities like, the top management or the organization (Becker et al.,1996). In support of this argument, Becker et al. empirically demonstrated that commitment to supervisor was a stronger predictor of employees' job performance than organizational commitment. Antonakis and Atwater (2002) also echo the same thoughts and contend that psychological and physical distance between the leader and followers' tends to diminish leaders' influence because of reduced social interaction. Thus, in view of this evidence it may not be surprising that trust in top management did not exercise a direct impact on researchers' work engagement.

Hypothesis 1b postulated that trust in the direct supervisor will be significantly and positively associated with work engagement. The results of this study found support for this hypothesis. It is suggested that trust in supervisor can enhance work engagement by leading the researchers to believe that their supervisor will fairly reward them for their energy, enthusiasm and involvement. This might increase researchers' work motivation by strengthening their performance – reward expectancy and as a result may lead to higher work engagement.

Furthermore, employees' confidence in their supervisor's skills and capabilities is likely to assure them that they can count on him or her to help them in the wake of job related obstacles. This might make them feel more efficacious and as a result spur them to show greater vigour, dedication and absorption in their work (Llorens et al., 2007).

Finally, Lewicki et al. (2006) contend that trust is reciprocal – that is, when we trust others, they are likely to reciprocate by trusting us in return. Applying this logic to the current study, it is speculated that when researchers trust their supervisor, the supervisor might reciprocate by trusting them back and supervisor's trust in his or her research staff might manifest in the staff being allowed to work more autonomously on research projects. Greater autonomy in research work might enhance researchers' sense of self determination and as a result may prompt them to show greater energy and involvement in their work. In a similar vein, Salamon and Robinson (2008) advance the concept of collective felt trust, which refers to employees' shared belief

about the extent to which they are trusted by their management. These researchers argue that when employees believe that the management trusts them, they are likely to behave responsibly by exhibiting behaviour that is likely to augment the performance of the organization. This motivation to enhance organizational performance may, in turn, spur the employees to approach their work with greater vigour and dedication.

Hypothesis 1c, which predicted that trust in team members will have a significant positive impact on researchers' levels of work engagement was also substantiated. Trust in fellow research team members by enabling important processes such as knowledge sharing and cooperation can positively influence researchers' engagement with their work. For example, access to important information and instrumental help from colleagues (a form of cooperative behaviour) can ensure successful task completion and as a consequence may manifest in greater work engagement (Hakanen et al., 2006). Moreover, an environment of trust within teams leads to the formation of high quality relationships, in which team members express care and concern for each other (Jones and George, 1998; Costa, 2003). In such a situation researchers are more likely to feel part of the team, which in turn can fulfil their need to belong and consequently increase their work engagement (Schuafeli and Bakker, 2004; Schaufeli and Salanova, 2007).

In line with hypothesis 1d, trust propensity also emerged as a significant predictor of researchers' work engagement. People with a dispositional tendency to trust others are more likely to engage in cooperative and pro-social behaviours (Colquitt et al., 2007; Van Dyne et al., 2000). In addition, they are less likely to lie, cheat or steal and they are more likely to respect the rights of others (Rotter, 1980). Because of these positive attributes, it is expected that high trustors are likely to develop more positive and meaningful relationships with their peers and supervisors, which may enable them to receive valued performance-related resources such as, information, constructive feedback and instrumental support that are necessary for bolstering their engagement levels. This finding is consistent with previous research, which indicates that positive personality traits such as, extraversion, emotional stability and conscientiousness can increase employees' engagement with their work (Langelaan et al., 2006; Mosert and Rothman, 2006; Kim et al., 2009).

12.3.2 The Mediating Role of Organizational Identification, Affective Commitment to the Supervisor and Team Psychological Safety

An important contribution of the present study is that it highlights three unique mechanisms by which positive trust in top management, direct supervisor and team members can affect work engagement. In the current study it was argued that trust in top management, trust in direct supervisor and trust in team members are three distinct constructs each having different outcomes and implications (Dirks and Skarlicki, 2004). Dirks and Skarlicki (2004) suggest that trust in top management is likely to be a stronger predictor of organization-relevant outcomes; trust in direct supervisor is likely to be more predictive of supervisor focussed outcomes; and trust in team members is likely to exert a stronger influence on team level outcomes. This is also in line with Ajzen and Fishbein's (1977) principal of compatibility, which states that a given attitude is likely to be a stronger predictor of a particular behaviour if the attitude and the behaviour have the same foci.

Thus, it was anticipated that each type of trust will affect work engagement through a distinct mechanism. More specifically, it was hypothesised that: (1) organizational identification, an organization relevant outcome, will mediate the relationship between trust in top management and work engagement; (2) affective commitment to the supervisor, which is a supervisor specific outcome will mediate the effects of trust in direct supervisor on work engagement; and (3) team psychological safety, a team relevant outcome, will mediate the relationship between trust in team members and work engagement.

The findings of this study indicate that although trust in top management did not exercise a direct impact on work engagement, it indirectly affected this construct through organizational identification. This result suggests that positive trust in the top management strengthens researchers' psychological attachment with the organization. For instance, researchers' belief that the policies and procedures enacted by the top management are fair and directed towards their well-being is likely to signal that the research centre respects them and values their contribution. This sense of being valued by the research centre might bolster researchers' feelings of self-worth and self-esteem and as a consequence may stimulate organizational identification (Sluss, Klimchak and Holmes, 2008). Previous research supports the link between trust and

organizational identification (Cremer et al., 2006). A strong identification, in turn, is expected to augment researchers' engagement with their work. Increased identification can engender a "psychological oneness" with the research centre, which might lead the researchers' to view the centre's research related goals as their own. This may inspire the researchers to dedicate greater amounts of their mental and physical energies towards the attainment of these goals, which subsequently can lead to greater work engagement. Moreover, Pratt (1998) contends that social identification with the organization can satisfy the basic human need to belong. According to the self determination theory (Ryan and Deci, 2000) the fulfilment of the basic human need to belong can increase intrinsic motivation – a concept that is closely aligned to the construct of work engagement (Schaufeli and Salanova, 2007). To the best of my knowledge, no previous study has empirically established a link between organizational identification and work engagement.

Furthermore, the results of this investigation revealed that affective commitment to the supervisor fully mediated the relationship between trust in supervisor and work engagement. This suggests that trust in supervisor affects work engagement indirectly by strengthening researchers' psychological bonding with their supervisor. It is argued that positive trust in the supervisor is likely to lead the researchers to suspend their personal interests and motives and internalise the research related goals specified by the supervisor (Dirks and Skarlicki, 2004). The internalisation of the supervisor's goals and objectives by the researchers, in turn, is expected to enhance their commitment to the supervisor (Becker et al., 1996). When researchers experience elevated levels of commitment to their supervisor, they may get access to important resources such as more constructive feedback, social support and personal coaching, which subsequently can influence their level of engagement with their work (Siders et al., 2001). This contention is in line with the LMX literature, which contends that when employees become committed to their supervisors and consequently develop high quality relationships with them, they are likely to reap substantial benefits in the form of formal and informal rewards, favour doing, ample access to supervisors and increased communication (Harris, Kacmar and Witt, 2005). Again I am unaware of any previous study, which has examined the relationship between affective commitment to the supervisor and work engagement.

Additionally, the results disclosed that team psychological safety fully mediated the effects of trust in team members on work engagement. This finding implies that trust in team members also influenced work engagement indirectly by cultivating a climate of psychological safety in teams. When researchers trust their fellow team members and perceive them as considerate, reliable and honest they are more likely to experience a sense of psychological safety (Edmondson, 2004; May et al., 2004). In a psychologically safe environment, researchers are more liable to innovate, try new ways of doing things and express their true selves without fear because they feel confident that they will not be ridiculed or penalised for doing so. In such a situation it is realistic to assume that the researchers will be more engaged in their work (May et al., 2004).

12.3.3 The Direct Effects of Work Engagement on Organizational Outcomes

The results of this study further revealed that work engagement was positively and significantly associated with all the five organizational outcomes: (1) in-role job performance (hypothesis 3a); (2) innovative work behaviour (hypothesis 3b); (3) feedback seeking (hypothesis 3c); (4) error communication (hypothesis 3d); and (5) organizational commitment (hypothesis 3e).

In line with the previous research, the results of this study showed that work engagement was positively associated with in-role job performance (Schaufeli et al., 2006; Xanthopolou et al., 2008). Past empirical research suggests that engaged employees are likely to show initiative (Hakanen, Perhoniemi and Toppinen-Tanner, 2008), learning motivation (Sonnentag, 2003) and proactive behaviour (Salanova and Schaufeli, 2008) while working on their jobs. Additionally, engaged employees have been reported to enjoy good health and well being, which allows them to put greater energy and effort into their work (Bakker et al., 2008). Finally, prior research indicates that engaged workers are more committed to their organization and generally have a lower tendency to turnover (Schaufeli and Salanova, 2007). The confluence of these factors can manifest in better in-role job performance.

Furthermore, the findings of the present study showed that work engagement can promote innovative work behaviours. The evidence of an association between work engagement and innovative behaviours is an important finding because researchers' inclination to engage in these behaviours can manifest in important

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outcomes for the science research centres such as greater research publications, more patents, creation of new products and enhanced research funding (Santoro and Saparito, 2003). In the current paper it is suggested that positive affect in the form of work engagement, might broaden researchers' momentary thought-action repertoires (Fredrickson, 2000) and as a result may induce them to dabble in creative activities. Previous studies have also established a link between work engagement and innovative work behaviour (Schaufeli et al., 2006; Hakanen et al., 2008).

Additionally, the findings of this study revealed that work engagement can facilitate learning behaviour within the context of the university research centres. More specifically, the results of this research revealed that work engagement was positively and significantly related to both feedback seeking and error communication. This finding is important from the perspective of the university research centres because past research demonstrates that employees' tendency to engage in learning behaviour can manifest in enhanced individual, team and organizational learning and performance (Edmondson, 1999). However, in spite of the potential advantages, employees are often reluctant to seek feedback or report errors because of the high risks associated with these behaviours.

The findings from the present study suggest that engaged researchers might focus more on the value and less on the costs associated with seeking diagnostic feedback and reporting errors, which may prompt them to engage in these behaviours. Prior research indicates that engaged employees are dedicated to performing at high standards (Schaufeli and Salanova, 2007) and possess a strong desire to learn (Sonnentag, 2003). Thus, it may be reasonable to suggest that the engaged researchers are likely to perceive the process of seeking information for self improvement and discussing mistakes as an opportunity to correct their performance-related deficiencies and satisfy their penchant for learning. This desire for self improvement and learning, in turn, might encourage the engaged scientists to proactively seek feedback and report errors. This relationship between work engagement and learning behaviour has not been examined before.

Finally, the findings from this study showed that work engagement was a significant predictor of organizational commitment, which corroborates the findings from previous studies (Saks, 2006; Hakanen et al., 2006; Hakanen, Schaufeli and Ahola, 2008). However, the existence of a positive association between work engagement and organizational commitment within the context of university research

centres is interesting because past research suggests that scientists are generally more committed to their scientific field or professional peer community than to their organization (Keller, 1997). Furthermore, Goswami, Mathew and Chadha (2007) contend that it is plausible that the scientist' professional values may conflict with organizational expectations, which, in turn, might reduce their loyalty to the organization. In this connection, Halbesleben and Wheeler (2008) report that highly engaged employees may find it difficult to leave their job because of the enormous amounts of energies they have invested in that job and because they strongly identify with the work they do. Moreover, since work has provided so many resources to the employee such as, autonomy and work-related skills, it becomes difficult for him or her to quit the job and seek employment elsewhere. By switching jobs "the employee may need to start again, which may be a risky investment of resources that he or she is not willing to make" (Halbesleben and Wheeler, 2008, p. 246). These reasons might explain why the engaged scientists in the present study demonstrated high commitment to their respective research centres.

12.3.4 The Mediating Role of Learning Goal Orientation on the Work Engagement-Organizational Outcome Relationship

While, past empirical research has provided ample evidence that high levels of work engagement can manifest in several positive outcomes for the organizations, it has remained silent on the underlying processes through which engagement can affect these outcomes. One novel feature of this study is that it illuminated the role of learning goal orientation in explaining the linkage between engagement and the five organizational outcomes. The results of this study showed that learning goal orientation partially mediated the effects of work engagement on in-role job performance, innovative work behaviour, feedback seeking and error communication. This finding implies that work engagement can affect these outcomes directly and as well as indirectly by strengthening researchers' learning orientation. However, contrary to expectations, learning goal orientation did not mediate the relationship between engagement and organizational commitment.

Although, learning goal orientation is a relatively stable individual difference variable it is not insensitive to situational cues (VandeWalle, 2001, 2003). The results from the present study showed that positive affect in the form of work

engagement induced researchers' to approach their work with a learning goal orientation. This is because, in line with prior research, engaged researchers are expected to possess a strong desire to excel in their research work (Schaufeli and Salanova, 2007), which subsequently can stimulate them to develop their competence through the acquisition of new skills and knowledge. In addition, engaged researchers because of their high degree of involvement in their research work are likely to possess a strong understanding of the requirements of their research related work (Harter, Schmidt and Keyes, 2003). This, in turn, might facilitate them to identify the precise research specific skills and knowledge, which can enable them to perform their research work more effectively. When researchers are clear about which skills and abilities are important for them, they may be more liable to devote their time and energies to devise strategies to acquire those skills, which subsequently might raise their learning orientation (Kohli et al., 1998). Previous research provides supportive empirical evidence that engaged workers exhibit greater learning motivation (Sonnentag, 2003).

A strong learning orientation, in turn, might encourage the researchers' to engage in self-regulation tactics (e.g. goal setting, planning and effort), boost their sense of self efficacy, increase their willingness to try out new work methods and make them more resilient in the wake of tough situations (Porath and Bateman, 2006; Hirst, Van Knippenberg and Zhou, 2009). The convergence of these factors can eventually manifest in greater innovativeness and superior in-role job performance (Janssen and Yperen, 2004). Furthermore, learning oriented researchers are more likely to seek diagnostic feedback because they consider it as critical to their goal of improving their competence (Janssen and Prins, 2007; Park, Schmidt, Scheu and DeShon, 2007). In addition, since individuals who hold a strong learning goal orientation are not overly concerned about making mistakes and consider errors and failures as part of the learning process (Sujan, Weitz and Kumar, 1994), they are also more likely to communicate errors and mistakes.

Consistent with past research, work engagement had a significant direct effect on organizational commitment; however, this relationship was not mediated by learning goal orientation. Quite interestingly, the correlation analysis showed that learning goal orientation was positively associated with organizational commitment ($r = 0.22$, $p<0.01$) but when it was included in the regression model together with work engagement, its effect became insignificant. Initially, it was rationalized that learning

oriented researchers might perceive more learning and developmental opportunities within their centre, which in turn, may increase their organizational commitment (D'Amato and Herzfeldt, 2008). However, the findings from this study suggest that researchers' commitment to their research centre is not based on their perception of learning opportunities available in the centre, but rather is a direct response to strong work engagement.

12.3.5 Work Engagement and Demographic Variables

Finally, the results of this study showed that age, gender and tenure were unrelated to work engagement. These findings are in line with past empirical research, which shows that demographic variables are generally weakly correlated with work engagement (Schaufeli and Bakker, 2003; Schaufeli and Salanova, 2007). For instance, some studies have found a weak positive relationship between age and work engagement, thereby suggesting that older employees feel slightly more engaged than younger employees (e.g. Schaufeli and Bakker, 2003). Schaufeli and Salanova (2007) attribute this finding to the 'healthy worker effect', which implies that "only those who are healthy survive and remain in their jobs, whereas, unhealthy (i.e. not engaged) employees drop out" (p. 148). In a related vein, there is some evidence that men exhibit somewhat higher levels of work engagement than their female counterparts (Schaufeli and Bakker, 2003). However, these effects are so small that they "hardly bear any practical significance" (Schaufeli and Salanova, 2007; p. 148).

Nevertheless, one important finding which came to light in this study was the significant impact of nationality on researchers' levels of work engagement. The results showed that non-Irish scientists were more engaged to their work than their Irish counterparts. Previous research also provides evidence that nationality can influence work engagement. For instance, Xanthopoulou, Bakker, Kantas and Demerouti (in press) conducted a study with a sample of 206 Greek and 162 Dutch employees and found that Greek employees reported higher levels of work engagement than the Dutch employees.

Nationality and cultural differences have also been found to effect organizational behaviour in other contexts. For example, Al-Enezi, Chowdhury, Shah and Al-Otabi (2009) conducted a study among a multicultural sample of nurses in Kuwait and found that Indian nurses were relatively more satisfied than their Filipino

counterparts. Al-Enezi et al. (2009) attributed this difference in the levels of satisfaction to the fact that Indian nurses came from more conservative cultural backgrounds and therefore, found it easier to adapt to the local environment.

Similarly, Huff and Kelley (2003) undertook a study in seven countries to ascertain the impact of cultural differences on individuals' propensity to trust the in-group and out-group. The results from this study showed that individuals from collectivist cultures had a stronger in-group bias, which manifested in lower individual propensities to trust and organizational trust for external partners.

Furthermore, Bonache (2005) sought to compare the levels of job satisfaction among expatriates, repatriates and domestic employees working in a Spanish multinational corporation. The results of this study showed that expatriates reported higher levels of satisfaction with various job characteristics (task variety, autonomy, opportunities for learning) and their careers than the repatriates and domestic employees. Bonache (2005) argues that expatriates regarded foreign assignments as an opportunity for personal and professional development and believed that international experience will be instrumental in advancing their careers. The confluence of these factors might have contributed towards their higher job satisfaction.

Finally, Casimir and Waldman (2007) contend that cultural background can affect the perceived significance of various traits with regard to effective leadership. They found empirical support for this contention in their study conducted among Australian and Chinese white collar employees. Specifically, Casimir and Waldman (2007) found that since the Australian culture lays importance on egalitarianism, the Australian employees regarded leader traits (e.g. communicative, friendly, humours, participative and respectful) which mitigated power distance as more important. In contrast, the Chinese culture is characterised by respect for authority and collectivism and as a result the Chinese employees expressed greater preference for leadership traits such as, integrating and modesty.

The preceding discussion provides some evidence that differences in nationality and culture can have a profound impact on employees' behaviours and attitudes, thus explaining the results for the current sample.

In the absence of qualitative data, one can only speculate upon the exact reasons as to why nationality affected scientists' work engagement in the present study. One possible explanation for this finding could be that in the current study a

high proportion of foreign scientists working in the research centres surveyed came from less developed countries, which do not possess the necessary infrastructure and facilities for scientific research. Thus, when these foreign scientists get the opportunity to work with world class academics and get access to state of the art facilities, they are stimulated to approach their work with greater energy, enthusiasm and involvement. On the contrary, the Irish scientists are used to working in such a positive work environment and therefore, these facilities may not have a very profound impact on their levels of work engagement.

Another reason for this finding could be that foreign nationals may regard the experience of working abroad as an opportunity for personal and professional development and expect it to play a pivotal role in furthering their careers (Daily, Trevis and Dalton, 2000; Stahl, Miller and Tung, 2002; Bonache, 2005). This, in turn, might increase their career satisfaction (Bonache, 2005) and subsequently work engagement.

Finally, it is suggested that the cultural values of individualism and collectivism may have accounted for the differences in the engagement levels of Irish and non-Irish scientists. Of Hofstede's (1980) four dimensions, individualism and collectivism are without doubt the most researched cultural values (Wasti, 2003). The main difference between individualism and collectivism stems from the fact that in collectivist societies, personal and in-group goals are closely aligned; whereas in individualistic societies personal goals take precedence over in-group goals. Furthermore, while people from collectivist cultures tend to be people oriented in organizational settings, individualists tend to be more task oriented (Hofstede, 1980). In a related vein, Boyacigiller and Adler (1991; cited in Wasti, 2003) contend that employees from collectivist cultures commit to their organization because of their ties with colleagues; whereas individualists may be more attracted to the job content or promotion policies.

A high percentage of non-Irish researchers in the current study came from collectivist cultures, which may have enabled them to form closer ties with their supervisors and colleagues. This, in turn, could have facilitated them to acquire important resources such as, information, support and personalised coaching, which consequently might have boosted their engagement levels. In contrast, the Irish scientists belong to an individualistic society and as a result it is possible that for them, extrinsic rewards such as, pay raises and promotion opportunities might prove

more important for raising their work engagement. However, within the context of research centres such extrinsic rewards might be hard to come by, which consequently may have had a downward effect on Irish researchers' levels of work engagement.

12.4 Organizational and Managerial Implications

This study provides evidence that high trust in the top management, direct supervisor and team members can raise researchers' engagement with their work. Furthermore, the results from the present study showed that positive trust in the top management can enhance organizational identification. In addition, findings from this study revealed that high trust in supervisor can manifest in increased commitment to the supervisor; whereas, trust in team members can create an environment, in which researchers' feel psychologically safe to express their true selves without the fear of being punished or ridiculed.

So, the obvious question is that how might the research centre managers cultivate a climate of trust at each level of the organizational hierarchy? For instance, previous empirical research on trust indicates that organizational leaders (top managers and supervisors) can develop trust in their followers through the exhibition of transformational leadership behaviours (Dirks and Ferrin, 2002; Gillespie and Mann, 2004; Bartam and Casimir, 2007; Burke, Sims, Lazzara and Salas, 2007). Under this leadership style, the leaders help subordinates to solve complex problems and at the same time strive to develop their skills and competencies so that they can effectively deal with future problems (Burke et al., 2007). Transformational leaders show concern for their followers and provide them opportunities for growth, coaching and mentoring (individualised consideration); they encourage followers to come up with creative and novel solutions to problems (intellectual stimulation); set challenging but attainable goals and inspire their followers to accomplish these goals (inspirational motivation); and articulate a compelling vision for the followers (idealised influence) (Bass and Steidlmeier, 1999). All these behaviours are likely to be viewed by the followers as signs of leader's benevolence and are therefore, expected to engender trust (Burke et al., 2007). Similarly, Gillespie and Mann (2004) showed that consultative leadership (i.e. consulting team members on important decisions and valuing their inputs) was an important factor, which promoted team members' trust in the team leader.

Furthermore, the perceptions of organizational justice have also been shown to influence employees' trust in their leaders (Dirks and Ferrin, 2002; Saunders and Thornhill, 2003; Burke et al., 2007). Organizational justice has been further sub-divided into three areas: procedural, distributive and interaction justice (Saunders and Thornhill, 2003; Burke et al., 2007). Procedural justice refers to fairness of the policies and procedures enacted by leaders; distributive justice focuses on the fair allocation of outcomes such as, rewards and promotions; and interactional justice refers to employees' perceptions about the fairness of the interpersonal treatment they receive from their leaders (Saunders and Thornhill, 2003). Thus, employees' trust in their leaders is likely to be enhanced when they believe that the policies and procedures implemented by their leaders are in their best interests, they are fairly rewarded for their efforts and are treated with and communicated with respect (Dirks and Ferrin, 2002; Saunders and Thornhill, 2003; Burke et al., 2007).

In addition, Thomas, Zolin and Hartman (2009) demonstrated that open communication by reducing uncertainty and ambiguity for employees is likely to play a critical role in promoting trust in organizations. Specifically, the results from their study revealed that quality of information (timely, accurate and relevant) was more predictive of trust in supervisor; whereas adequacy of information was more strongly aligned with trust in top management. On the basis of these findings Thomas et al. (2009) conclude that "while employees count on top management to set the strategy and determine criteria for organizational success, then, supervisors must be trusted to show workers the connections between employees' jobs and organization's goals and to provide the more specific, high quality information needed to perform their jobs well" (p. 303).

In view of these prescriptions, it is suggested that the university research centres should strive to make the centre leaders aware of the importance of treating their subordinates in a respectful, fair, and benevolent manner. Additionally, the centres may also focus on further improving the communication skills of leaders so that they can communicate both the organizational and research related goals effectively to their researchers. Moreover, through counselling the leaders can be encouraged to engage in trust building behaviours such as, allowing subordinates to voice their concerns, delegating responsibility and providing them opportunities for personal and professional development (Whitener et al., 1998; May et al., 2004).

Put differently, the relevant centre personnel can use the results of this study and also evidence from previous research to make the top managers and supervisors realise that an environment of trust can yield substantial benefits for both the science researchers and the research centres. For individual scientists, positive trust in leadership might manifest in greater motivation, higher satisfaction and improved well-being; while for research centres, greater trust in multiple levels of management may lead to more extra-role behaviours, lower turnover and absenteeism rates and higher levels of innovation and performance. The centres can also make their leaders conscious about the fact that trust destroying behaviours on the contrary, can have adverse consequences for centres because they are likely to result in dysfunctional outcomes such as, deliberate withholding of information, reluctance to engage in citizenship behaviours and lower morale and commitment. This may inspire the top managers and supervisors to develop a supportive work environment through the implementation of fair policies and procedures, exhibition of transformational leadership behaviours and by embedding a climate of open communication. Such positive measures on part of the centre leadership may subsequently enable them to garner greater trust from their subordinates.

However, it is noteworthy that while some of the actions and policies discussed in the preceding paragraphs might help to promote trust, it is quite plausible that they may also manifest in negative consequences. For instance, the literature on social support contends that instrumental support at work can sometimes translate into undesirable consequences especially, when receiving that support impinges on the freedom of choice of the recipient (Deelstra, Peeters, Schaufeli, Stroebe, Doornen and Zijlstra, 2003). Deelstra et al. (2003) argue that this situation is particularly likely to occur in the workplace when instrumental support is imposed on the employee by his or her superior.

Additionally, Eisenberg and Witten (1987) contend that open communication may sometimes manifest in dysfunctional outcomes. For instance, they suggest that open communication "may be harmful to organizations during a crisis" because it might have an adverse impact on employees' morale and commitment. Furthermore, they assert that open communication may also have adverse consequences for employees. Specifically, Eisenberg and Witten (1987) argue that "although the interests of the organization often are best served when employees reveal all they

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know about problems and opportunities, revealing such information can be damaging to the individual's job security and career aspirations" (p. 422).

Finally, research evidence indicates that transformational leadership can also have a dark side. Bass and Steidlmeier (1999) assert that transformational leaders might use their charisma and influence to further their own self-interests and seek power and position even at the expense of their followers' welfare. Bass and Steidlmeier (1999) term such leaders as "pseudo-transformational". They further contend that such leaders "profess strong attachment to their organization and its people but privately are ready to sacrifice them" (p. 187). Thus, the managers of research centres need to be aware of these potential dangers while implementing these polices to promote trust.

Likewise, the centre managers can take a series of steps to enhance trust at the horizontal level of the organizational hierarchy. For instance, previous research suggests that co-workers' tendency to support each other in the wake of adversity at work, their willingness to show mutual respect for one another and their inclination to openly acknowledge the value of each others' contribution can reinforce trust between them (May et al., 2004; Greenberg, Greenberg and Antonucci, 2007). In addition, Gillespie (2003) and Costa et al. (2009) posit that team members' willingness to engage in trust enhancing behaviours like sharing personal and work related information can heighten trust amongst them. Thus, the managers of research centres may consider employing team building exercises to encourage scientists to openly share information and ideas with fellow team members, value each other's contributions and work collaboratively to solve problems (Greenberg et al., 2007). Such actions might facilitate researchers to build trusting relationships with their peers, which subsequently can strengthen their work engagement.

In a similar vein, Prichard and Ashleigh (2007) empirically demonstrated that teams that received team-skills training (planning, time management, task monitoring, role allocation and work group effectiveness) showed higher levels of trust than those that did not. They argued that team-skills training enabled team members to develop better interpersonal relationships with each other and improved coordination and communication, which consequently increased trust amongst them. In light of this finding, the managers of university research centres can consider implementing such team-skills training programmes to promote trust between team members.

Furthermore, recent work by Lau and Liden (2008) demonstrates that leaders' "trust nominations" can play a vital role in engendering trust between co-workers. Using the framework of balance theory (Heider, 1958; cited in Lau and Liden, 2008), they argue that employees might find it imperative to trust co-workers, who are trusted by the leader. Lau and Liden (2008) assert that "not trusting a co-worker with whom the leader has formed a trusting relationship would create imbalance in the focal individual's relationship with the leader" (p. 1135). Thus, to avoid this imbalance, employees may start to trust co-workers who are trusted by the leader. In view of this evidence, the centre personnel can use leadership training and development programmes to create awareness among the top management team and supervisors about the deep effect that their perceptions of group members is likely to have on members' perceptions of each others' trustworthiness (Lau and Liden, 2008). This might encourage the organizational leaders to forge trust based relationships with their subordinates, which subsequently may increase trust among these subordinates.

In a recent study, Webber (2008) demonstrated that familiarity with team members can play an important role in promoting trust between team members. Thus, through team building activities and by arranging regular social gatherings, the centre managers can increase interaction between team members. This might facilitate the development of close relationships between members and consequently may enhance trust between them (Webber, 2008). Moreover, Shapiro, Sheppard and Cheraskin (1992) contend that when team members are closely located within an office building, they are more likely to form friendships with each other. They further argue that this may also result in improved communication between members. The confluence of these factors can subsequently enable team members to forge trust based relations with each other. Shapiro et al. (1992) conclude that "something as simple as the strategic location of the coffee machine can vastly improve trust between otherwise separate groups" (p. 373). In light of this evidence, the centre managers can consider re-designing their labs and workspace so as to allow their researchers to work more closely with each other.

Furthermore, previous research shows that cooperative or helping behaviours such as, willingly helping each other with work related problems, can promote trust among peers (Ferrin, Dirks and Shah, 2006; Lau and Liden, 2008; Webber, 2008). Again through team building exercises and counselling the centre managers can make their researchers aware of the importance and benefits of engaging in these

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behaviours. In order to encourage helping behaviours and emphasise their importance, the centre personnel can also consider including the enactment of these behaviours as one of the evaluation criterion in researchers' performance reviews.

Finally, Ferrin and Dirks (2003) and Greenberg et al. (2007) contend that competitive versus cooperative reward structures can have an important bearing on trust in team members. Competitive rewards base remuneration on individual performance; whereas, cooperative rewards base remuneration on overall team performance (Greenberg et al., 2007). Ferrin and Dirks (2003) found that generally competitive rewards tend to undermine trust by promoting dysfunctional behaviours such as, reluctance to share information and holding negative views regarding team performance; while, cooperative rewards enhanced trust by facilitating information sharing and other positive behaviours. Thus, to build trust and encourage cooperative behaviour, the centre managers might consider implementing a reward structure, which is based on team outcomes as opposed to individual outcomes (Collins and Smith, 2006).

Furthermore, the results of this study showed that trust propensity was a significant predictor of work engagement. This result suggests that when selecting researchers, the centre managers might try to identify individuals who are liable to trust others (Mooradian et al., 2006). Such individuals can not only play a key role in creating a climate of trust at each level of the organizational hierarchy but as the results of this study suggest, may also play a critical role in the process of building work engagement.

An important issue, however is that is excessive trust always good? Are there situations in which too much trust can prove to be detrimental for the individuals and organizations? In this regard, several authors have cautioned that high levels of trust can generate a 'blindness' that can lead to the exploitation and mistreatment of the trustor (Kramer, 1996; Wicks, Berman and Jones, 1999). Furthermore, Erdem (2003) argues that extreme trust can entail significant risks for teams because it can result in groupthink phenomenon. He argues that too much trust in the team leader or in each other can result in a blind acceptance of the status quo, which consequently can lead to a less dynamic team. Likewise, Langfred (2004) suggests that too much trust in the context of self managing teams can have deleterious consequences because high trust can lead to a reluctance to peer monitor, which when combined with high individual autonomy, can have a negative impact on team performance.

Therefore, it is plausible that existence of too much trust may smother creativity and initiative, through for example, the creation of groupthink phenomena (Erdem, 2003), which subsequently can reduce employees' levels of vigour, dedication and absorption. Thus, it is suggested that the research centres should aim to maintain an optimal level of trust, which reflects a balance between excess and deficiency (Wicks et al., 1999).

In this regard, it is interesting to note that several studies have highlighted the performance benefits of monitoring. For instance, Langfred (2004) and Costa, Bijlsma-Frankema and De Jong (2009) argue that monitoring can manifest in better team performance by improving coordination and mitigating process losses. Similarly, it is suggested that that monitoring can result in superior team performance by restraining free riding and social loafing and thus directing team members to channel their effort and energies towards accomplishing group goals instead of individual goals (Bijlsma-Frankema et al., 2008; Costa et al., 2009).

It is interesting to note that traditionally monitoring has been considered to reflect a lack of trust and as a consequence is expected to be negatively associated with this construct (Costa et al., 2001, Costa, 2003). However, the relationship between monitoring and trust is not straightforward and there are contradicting view points regarding how these two constructs interrelate (Costa and Bijlsma-Frankema, 2007; Costa et al., 2009). More specifically, there are two competing approaches, which underscore the relationship between trust and monitoring: (1) the substitution perspective; and (2) the complementary perspective. The substitution perspective contends that trust and monitoring are inversely related because trust manifests in higher levels of cooperation, greater flow of information and ideas and reduction in uncertainty, which reduces the need for monitoring or other control mechanisms (Costa et al., 2009). In fact, Costa et al. (2001) and Webber (2008) in their respective studies showed that trust was inversely related with monitoring; thereby indicating that trust can act as a substitute for control.

Other researchers have found support for the complementary approach and therefore, argue that trust and monitoring are not negatively related but can prove to be mutually reinforcing (Bijlsma and Van de Bunt, 2003; Bijlsma-Frankema et al., 2008). For instance, Bijlsma-Frankema et al. (2008) assert that monitoring is considered as an essential part of supervisors' "task of gathering information, taking action to redirect team processes and securing fairness" (p. 27). Since, monitoring is

considered as an essential vehicle for securing fairness; it is likely to have a positive impact on trust. Thus, Bijlsma and Van de Bunt (2003) conclude that monitoring and trust are not necessarily negatively related but instead should be seen as complementing each other. Several studies have found empirical support for the complementary perspective (Bijlsma and Van de Bunt, 2003; Bijlsma-Frankema et al., 2008; Costa et al., 2009). In light of this discussion, it is reasonable to suggest that trust alone may not be sufficient to achieve better performance and efficiency; it needs to be complemented with an adequate level of monitoring to attain optimal results.

Additionally, the results of this study showed that high levels of work engagement can promote learning, innovation, performance and commitment within the unique environment of the university research centres. Thus, any method that might foster work engagement among employees can be a useful strategy for increasing the innovativeness and productivity of the research centres. The present study highlights the role of trust in furthering researchers' engagement with their research work. However, the management team of research centres can also advance work engagement of researchers by providing them an adequate supply of resources at the level of the task (e.g. skill variety, job control and feedback), interpersonal and social relations (e.g. social support), organization of work (e.g. participation in decision making) and at the level of the organization at large (e.g. pay raises, promotion opportunities) (Schaufeli and Bakker, 2004; Bakker and Demerouti, 2007).

Moreover, researchers' levels of work engagement may be enhanced by strengthening their sense of self-efficacy through appropriate training methods such as guided experiences, coaching and mentoring and role modelling (Llorens et al., 2007).

Although, there is ample evidence that high levels of work engagement can be beneficial for both the individual and the organization, but like trust, the question is that is excessive engagement always good. For instance, in his recent review Bakker (2009) argues that "over engagement" can deplete an individual's mental and physical resources and as a consequence may eventually lead to burnout. Thus, there may be an "optimal level" of engagement; a departure from this level may have harmful effects for the concerned employee. These arguments suggest that the research centres need to manage the engagement levels of their researchers by ensuring that they get adequate time to recover from their rigorous and energy sapping scientific work. As Sonnentag et al. (2008) very aptly remark that "a balance between high engagement at

work and high disengagement from work during non-work time is highly relevant for protecting employees' well-being" (p. 270).

Finally, one important finding from the view point of the research centres was that non-Irish researchers showed higher levels of work engagement than their Irish colleagues. Additionally, the results showed that non-Irish researchers were more innovative, exhibited stronger organizational commitment and had a greater inclination to seek feedback for self-improvement. These findings suggest that the Irish research centres can benefit by recruiting talented scientists from abroad. Thus, it is recommended that the centre managers should seek to strengthen their recruitment and selection procedures so that they can identify and recruit talented researchers from abroad.

12.5 Public Policy Implications

The present research also has important implications for the Irish Government's policy to improve economic performance through the creation of a "Smart Economy". A central feature of the Smart Economy is to build the innovation or 'ideas' component of the economy through the effective utilization of peoples' knowledge, skills and abilities. Furthermore, another important objective of this economy is to convert innovative ideas into valuable processes, products and services. More particularly, a Smart Economy strives to harness the skills and creativity of people to stimulate research, innovation and commercialisation. It has, at its core, the creation of "an exemplary research, innovation and commercialisation ecosystem" and "to make Ireland an innovation and commercialisation hub in Europe" (Government of Ireland, 2008, p. 8).

The university research centres are one such organizational form that can help the Irish Government to develop a Smart Economy. These centres bring researchers from several fields of science and technology together to tackle a specific research problem and have been instrumental in promoting innovation and national economic growth by facilitating the flow of technology from universities to the private sector. University research centres are now playing a key role in enhancing the economic performance of the Irish economy by conducting world class research in areas such as, biotechnology, computer sciences and medical technology. The results from the present study showed that the growth and development of the university research

centres might be enhanced by building an engaged research team. The findings of this research further showed that the research centres may be able to achieve this objective by embedding a climate of trust at both the vertical and lateral level of the organization. Thus, it is hoped that the findings of this study would inspire the Irish policy makers to provide more funding and incentives to the research centres so that they can become more efficient and productive and consequently enable the government to create "The Innovation Island" (Government of Ireland, 2008).

Furthermore, as noted in chapter 8, the university research centres have strong links with the government, industry and international bodies. Thus, the researchers who are entrusted with the responsibility of managing these research organizations are confronted with numerous management challenges because they not only have to lead the scientists from multiple disciplines but also have to manage multiple stakeholders, all with different requirements and expectations (Adler, Elmquist, Norrgren, 2009). The leaders therefore, need effective management and leadership capabilities to successfully manage boundary-spanning research organizations such as, the university research centres. Unfortunately, many scientists who assume the leadership of these new organizational forms lack the necessary skills and abilities to manage such complex organizations (Adler et al., 2009). This is because the universities usually promote their best professors to management positions based on their professional competence rather than their leadership skills. Thus, in order to enhance the research productivity of university research centres and increase the competitiveness of the Irish economy, it is imperative that the leadership skills of centre managers should be improved through appropriate management development programmes. Alternatively, the university research centres can also consider introducing separate career paths for researchers engaged in leadership and managerial roles and researchers involved in the more conventional academic activities of teaching and research (Adler et al., 2009). Adler et al. (2009) conclude that "such a system could contribute to raising both the external funding for universities, develop skills in interacting with the external environment, provide an increased selection base for recruiting deans and presidents and contribute to more balanced university matrix with more constructive conflicts and less internal politics" (p. 1148).

12.6 Contributions of the Study

This section highlights some of the ways in which this study extends the growing engagement literature. As mentioned earlier, work engagement has been mainly expressed as an outcome of job and personal resources (Bakker et al., 2008; Bakker and Demerouti, 2008). The present study, however, diverged from this established line of enquiry and analysed work engagement within the framework of state and trait trust. The finding that the three forms of state trust, namely, trust in top management, trust in direct supervisor and trust in team members can fuel work engagement, provides ample testimony to the fact that psychological variables such as trust can play a key role in building work engagement. Additionally, this study also illuminates the processes through which the three forms of state trust can affect work engagement. More specifically, the results showed that trust in top management can affect work engagement by augmenting organizational identification; trust in direct supervisor may influence work engagement by increasing affective commitment to the supervisor; and trust in team members can promote work engagement by cultivating a climate of psychological safety. On the other hand, the finding that trust propensity can positively affect employees' engagement with their work reaffirms the importance of positive personality traits as important determinants of work engagement.

Furthermore, the results of this study showed that the three mediating variables, that is, organizational identification, affective commitment to the supervisor and team psychological safety exercised significant unique effects on work engagement. To the best of my knowledge the impact of organizational identification and affective commitment to the supervisor on work engagement has not been analysed before, while only one study to-date has empirically established a link between work engagement and psychological safety (May et al., 2004). Thus, in addition to trust, this investigation also illuminates three other potential antecedents of work engagement.

The investigation of the relationship between work engagement and a variety of important work outcomes provides further insight into the effects of work engagement. Consistent with previous research, work engagement was found to contribute to stronger organizational commitment, higher innovation and superior levels of performance. However, one important contribution of this study was that it

empirically established a link between engagement and two learning behaviours, that is, feedback seeking and error communication. This relationship has not been examined in any published study before. The fact that work engagement can facilitate learning behaviour in research centres further reinforces the notion that an engaged workforce can prove to be a vital source of competitive advantage for the concerned organization.

One important contribution of this study is that it established the role of learning goal orientation as an intervening variable in the engagement-organizational outcome relationship. However, learning goal orientation only partially accounted for the impact of engagement on in-role job performance, innovative work behaviour, feedback seeking and error communication, while it failed to account for the effects of work engagement on organizational commitment. This result implies that the engagement-outcome relationship may not be as straight forward as it seems and therefore, raises the need for additional research to better understand this mechanism.

Finally, using a sample of research scientists drawn from six university science research centres provides some critical insights into the management of knowledge workers. There is now widespread agreement among scholars and researchers that knowledge is the key driver of national and regional innovation (Etzkowitz and Leydesdroff, 2000; Plewa and Quester, 2006). The growing importance of knowledge in stimulating innovation and economic development has increased the importance of knowledge workers all over the globe. These workers are now considered a critical source of competitive advantage for many firms. Thus, enhancing the motivation and productivity of these workers can be crucial for accelerating the pace of economic development of the knowledge-based economies. The present study, therefore, makes a contribution to the literature by highlighting the role of trust in enhancing scientists engagement with their research work in an under researched context.

12.7 Limitations of the Study

Although this study makes an important contribution to the engagement literature, it is not without limitations. First, data for this study were collected from six university research centres in a single geographic location. Thus, it is possible that the findings and implications of this study may not generalise well to research centres

located in other countries or to other occupational groups, which may reduce the external validity of the study. However, results from the pilot study conducted among Pakistani school teachers showed that trust positively and significantly influenced work engagement in an environment, which is culturally, politically and economically quite different from Ireland or for that matter any other western country. These findings tend to enhance the external validity of the present study.

This study had a cross sectional research design. The fact that all data were collected at one point in time in each research centre prohibits us from making any definite conclusions about causality. Thus, the causal links specified in the present study need to be viewed cautiously. Longitudinal studies, by temporally separating the measurements of the dependent, mediating and independent variables, can provide a more robust test of causality (Bijlsma-Frankema et al., 2008). However, the longitudinal research design also has its weaknesses. First, "although longitudinal design allows time interval among hypothesised predictors and outcomes, strictly speaking, it does not allow conclusions about causality" (Xanthopoulou, Bakker, Demerouti and Schaufeli, 2009). Second, Podsakoff et al. (2003) argue that a longitudinal research design by measuring the independent and dependent variables at different points in time allows contaminating factors to intervene between the measurements of these variables. Finally, this method places high demands on respondents' time and energies and its use might comprise the confidentiality of respondents (Podsakoff et al., 2003). Nonetheless, on balance, this method permits a researcher to make more confident inferences about causal links than the cross sectional research design (Kiffin-Petersen and Cordery, 2003).

A third limitation of this study was that all data were acquired through self-report questionnaires, which may create problems of common method variance. The main problem with common method bias is that it may artificially magnify the relationship between the study variables (Podsakoff et al., 2003). Moreover, Spector (1994) argues that collecting data exclusively from a single source can be problematic because it "leaves many alternative explanations for observed correlations other than that the intended traits are related" (p. 390). However, several authors contend that the common method variance problem is over stated or exaggerated (Spector, 1987, 2006). In fact, Spector (2006) labels this problem as an "urban legend" in the sense "that it reflects something that is based on truth but has been distorted and exaggerated as it is passed from person to person over time" (p. 222). After

reviewing a series of studies Spector (2006) concluded that it is plausible that in some combinations of variables common method variance may prove problematic but it is in no way a universal inflator of correlations between variables.

Podsakoff et al. (2003) suggest that the problem of common method variance can be overcome through: (1) the design of the study's procedures; and (2) statistical controls. The most effective procedural remedy is to collect data on the dependent and independent variables from different sources or to collect data on these variables at two different points in time. However, the main shortcoming of these remedies is that since data come from different sources or is collected at different points in time, it must be linked together. This necessitates the use of an identifying variable such as, respondents' names, which could compromise the anonymity of the respondents and as a result may make them hesitant to participate in the survey or may induce them to distort their responses. Additionally, this remedy is cumbersome and time consuming both for the researcher and the participants. The research centres participating in this survey were completely unwilling to comprise the confidentiality of their researchers and hence, it was not possible to collect data from different sources.

However, some other procedural remedies advocated by Podsakoff et al. (2003) were followed in this study. For instance, the respondents were specially instructed not to write their names or the names of their organizations on the questionnaire. This procedure can diminish "people's evaluation apprehension and make them less likely to edit their responses to be more socially desirable, lenient, acquiescent and consistent with how they think the researcher wants them to respond" (Podsakoff et al., 2003, p. 888). Additionally, in order to mitigate response consistencies, the measure of the dependent variable (i.e. work engagement) was placed before the measures of the independent variables (i.e. organizational identification, affective commitment to the supervisor, team psychological safety and the trust variables) in the questionnaire (Harrison et al., 1996). Moreover, as recommended by (Podsakoff et al., 2003), all the study variables were measured by established scales, which have demonstrated high reliabilities and validity in previous studies. The use of validated scales can also play a critical role in alleviating the problem of common method variance (Spector, 1987, 1994).

Furthermore, the Harman's single-factor test was used to ascertain whether or not common method variance was a problem in the present study (Podsakoff et al., 2003). According to this test, if a substantial amount of common method variance

exists; one general factor that accounts for most of the variance is likely to emerge from a factor analysis of all the measurement items. The results from the factor analysis revealed 24 factors with eigen-values greater than 1.0 that accounted for 80.1% of the total variance. The first factor accounted for only 30.7% of the variance. These results suggested that common method variance was not a serious issue in this study.

This study was also limited by the fact that some of the study variables were negatively skewed. This problem was particularly pronounced for some of the trust variables (trust in supervisor, trust in team members and trust propensity), psychological safety, in-role job performance, feedback seeking and error communication. Since, the trust and the team psychological safety scales asked respondents to report sensitive information about their supervisors and team members, it is plausible that responses to these questions may have been influenced by social desirability, which refers to the "tendency on part of the individuals to present themselves in a favourable light, regardless of their true feelings about an issue or topic" (Podsakoff et al., 2003; p. 881). This tendency might have contributed to the problem of negative skew in these variables. Other studies have also found the trust (Gillespie and Mann, 2004) and psychological safety (Nembhard and Edmondson, 2006) variables to be negatively skewed. Moreover, Dunning, Johnson, Ehrlinger and Kruger (2003) argue that people base their perceptions of performance, in part, on their preconceived notions about their skills, which may lead them to "hold overinflated views of their skills that cannot be justified by their objective performance" (p. 86). Thus, these preconceived notions of skill may have led the respondents to over-rate their in-role job performance and as result might have contributed towards the negative skew in this variable.

In order to correct the problem of negative skew, the logarithmic transformation was applied to the skewed variables. In this regard, Vandenberg (2009, personal communication) recommends that one should run the regression models twice – once without transformations and the second time with it to see if there are any differences in the proposed relationships. Following this recommendation, all the regression models were run both with and without transformations and it were found that the results were identical with one exception. Trust propensity did not emerge as a significant predictor of work engagement when the regression model was run with original variables. Dunlap, Burke and Greer (1995) and Norris and Aoian (2004)

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contend that transformations can have the effect of inflating the correlations between the concerned variables. For instance, using a financial data set Dunlap et al. (1995) found that transformation increased correlations when the original correlations were low to moderate (range of r = 0.10 to 0.32) and the skew ranged from 0.32 to 21.77. In the present study it was found that after transforming the trust propensity variable, its correlation with work engagement increased from 0.28 to 0.31. This appears to be the possible reason why the relationship between these two variables came out as significant when the regression model was run with transformed variables. Thus, in view of this fact, the significant relationship between work engagement and trust propensity needs to be viewed with caution.

Additionally, although in the present study trust in team members was measured, the researcher was unable to collect information relating to individual teams such as their size, work content, and longevity. Because of these limitations, the data could not be aggregated to the team level.

Another shortcoming of this study pertained to the team psychological safety scale. The results of the exploratory factor analysis revealed the existence of a reverse coding method factor defined by the three negatively worded items in the team psychological safety scale (Magazine et al., 1996). Negatively worded items have been found to result in inconsistent dimensionality and reverse coding factors in several previous studies (Cordery and Sevastos, 1993; Magazine et al., 1996). Moreover, these negatively worded items attained a low reliability of 0.54. Thus, in the current study, the three negatively worded items included in Edmondson's (1999) team psychological safety scale had to be dropped and as a result team psychological safety was measured with the four positively worded items included this scale. This shortened scale attained a reliability of 0.67, which was marginally lower than Nunnally and Bernstein's (1994) criteria of 0.70. Although, the value of the Cronbach alpha for this shortened scale fell slightly short of the criteria of 0.70 specified by Nunnally and Bernstein's (1994), it was still quite close to the reliabilities of the shortened psychological safety scales used by Nembhard and Edmondson ($\alpha = 0.73$) (2006) and Tucker, Nembhard and Edmondson ($\alpha = 0.74$) (2007).

In addition, the average inter-item correlation for this four item scale was 0.36, which exceeded the criteria of 0.30 proposed by Robinson, Shaver and Wrightsman (1991). Furthermore, results showed that the corrected item to total correlations for this scale ranged from 0.40 to 0.54 with an average of 0.46. These item to total

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correlations were well within the recommended range of 0.20-0.80 specified by Cox and Ferguson (1994). Moreover, the correlation between work engagement and psychological safety attained in the current study (r = 0.39, p<0.01) was fairly consistent with the correlation between the two variables (r = 0.35, p<0.01) reported by May et al. (2004). Finally, numerous published studies have used scales, which exhibited alphas lower than 0.70. For instance, the four item trust measure used by Mayer and Davis demonstrated a reliability of 0.59 and 0.60 in two waves of data, while the four item feedback scale used by Salanova and Schaufeli (2008) attained a reliability of 0.65. Thus, in light of this evidence it can be concluded that the four item measure of psychological safety used in the present study was a reasonably valid measure of this construct.

Finally, the mediation analysis revealed some issues with regards to the mediating effects of organizational identification on the trust in top management-work engagement relationship. More specifically, no association was found between trust in top management and work engagement and as a consequence the first condition of mediation (i.e. significant association between the independent and dependent variable) specified by Baron and Kenny (1986) was not satisfied. However, the second and third conditions of mediation, which are now considered more important for establishing mediation (Kenny et al., 1998), were fulfilled. Furthermore, the result of the Sobel test was significant, which further lent support to the fact that trust in top management had an indirect effect on work engagement via organizational identification. Nevertheless, this finding needs to be confirmed in future studies before any firm conclusions can be drawn.

12.8 Future Research Directions

This research also enumerates some future research directions that can provide further insights into the concept of work engagement and overcome the limitations of current research. First, this study provides evidence on how a climate of trust can affect the engagement levels of scientists working within the context of the Irish university research centres. However, the research centres are a very specific form of organization, which have been designed to increase the research vitality of universities. Moreover, the researchers working in these centres are high powered

knowledge workers who are conducting cutting edge research in the areas of biotechnology, sensor research and information technology.

This raises the question whether the findings of this study are specific only to this context and therefore, whether they can be generalised to other contexts or to other occupational groups. In order to establish the robustness of the results reported here and increase the external validity of the study, future studies should empirically test the research model developed in this research in diverse geographical and occupational settings. For instance, the pilot study conducted before this research was undertaken, examined the relationship between trust and work engagement within the context of the Pakistani school system. The results from this study broadly supported the relationship between trust and work engagement, thereby raising the external validity of the current study. Future research should aim to test the present model outside the academic sector, such as the construction industry, banking and financial sector and the software and telecom industry. The work environments of these contexts are quite different from the environment prevalent in research centres and therefore, it would be interesting to see if the results attained in this study can be replicated in these unique contexts.

Owing to the limitations associated with the cross sectional nature of this study, it is recommended that future studies should test the conceptual model developed in this study through a longitudinal research design. Longitudinal studies "allows for more confident conclusions about causal relations, which are difficult with cross sectional designs, regardless of measurement method" (Spector, 1994, p. 387). Moreover, a longitudinal research design can also mitigate the problem of common method variance (Podsakoff et al., 2003).

An additional advantage of a longitudinal research design is that it can enable researchers to ascertain how changes in the levels of trust over time can influence work engagement. Previous research indicates that trust is dynamic and can change over time (Wilson Straus and McEvily, 2006; Webber, 2008; Costa et al., 2009). For instance, Costa et al. (2009) in their study on project research teams found that for both the low and high prior social capital teams trust levels exhibited a sharp decline from Time 1 to Time 2 and then slightly increased from Time 2 to Time 3. They attributed this dynamic pattern to the stage of team development (forming, storming and performing stage). Likewise, Wilson et al. (2006) showed that initially trust started at relatively low levels in computer mediated teams but over time increased to

a level comparable with face-to-face teams. Moreover, in a longitudinal study undertaken among student project teams, Webber (2008) demonstrated that at Time 2 only one dimension of trust emerged. However, the results further revealed that at Time 3 affective and cognitive trust emerged as independent albeit related dimensions. These findings implied that teams in the early stages of team formation may never have the time to differentiate between the two trust dimensions. Thus, future studies can extend the present research model by exploring how changes in trust over time can affect work engagement by employing a longitudinal research design.

Additionally, previous research indicates that work engagement has reciprocal relationships with job resources (Hakanen et al., 2008) and personal resources (Llorens et al., 2007; Xanthopoulou et al., 2009a). In this respect, an interesting area, which future research might consider exploring is, to test if there is a similar reciprocal relationship between trust and work engagement. For instance, previous research reports that engaged employees may perceive more resources in their work environment or may view the existing resources more positively (Hakanen et al., 2008). Thus, it is possible that engaged employees might perceive their work environment more favourably and as result may exhibit higher levels of trust in the organizational leadership and their colleagues than the non- engaged workers.

Past research suggests that experience of positive moods and emotions is likely to develop more favourable attitudes towards other individuals which in turn may positively affect their willingness to trust other people (Jones and George, 1998; Williams, 2001). Thus, it is speculated that when employees experience a positive state of mind in form of work engagement, 'they may develop more positive perceptions of others and see the world through 'rose coloured glasses', resulting in a heightened experience of trust in another person' (Jones and George, 1998, p. 534). In fact, Dunn and Shcweitzer (2005) in their study empirically demonstrate that emotions with positive valence such as happiness and gratitude can increase trust. Hence, it is possible that relationship between trust and engagement is mutually reinforcing and might lead to an upward spiral effect. That is, high trust promotes work engagement, which in turn boosts trust and so on. By investigating the reciprocal relationship between trust and work engagement, future research studies can reinforce the notion that work engagement is interlocked in a complex and mutually reinforcing relationship with its antecedents. In addition, this would also

extend the current research model by providing a new perspective on the trust-engagement relationship.

Furthermore, all data in this study data were acquired through self reports. In this connection, researchers suggest that self-reports provide the most appropriate way to investigate relationships among perceptual variables like trust and work engagement (Spector, 1994; Jones, 2009). However, it is possible to obtain data on in-role job performance, innovative work behaviour and feedback seeking from different sources. Future studies can therefore, analyze the present research model by collecting data pertaining to these constructs from other sources such as, employees' supervisors or team members.

In this study it was hypothesized and empirically supported that positive trust can lead to high work engagement. However, as mentioned earlier, excessive trust can have negative consequences such as, the creation of group think phenomena, which can stifle creativity and initiative. Thus, it is possible that there may be a curvilinear relationship between trust and work engagement. That is, beyond a certain point increases in trust might start having negative effects on employees' engagement with their work. Future studies can investigate these possibilities by estimating the following model:

$$\text{Work Engagement} = b_0 + b_1 \,(\text{Trust in Supervisor}) + b_2 \,(\text{Trust in Supervisor})^2 \qquad (1)$$

If the coefficient of the square term is negative and significant, it can be concluded that the relationship between trust in supervisor and work engagement is curvilinear. This analysis can also be performed for trust in top management and trust in team members.

Another interesting area, which researchers might consider exploring is the impact of social networks on trust and work engagement. Although, previous research has examined the effects of network ties on trust (Levin and Cross, 2004; Chua, Ingram and Morris, 2008), no previous study to-date has explored the relationship between network ties and work engagement. Given the fact that employees rely on networks of relations for information, resources and support to achieve career success, this can be a fruitful area for future research. For example, Chua et al. (2008) examined the impact of four types of network ties by which managers tend to be connected in their professional networks on cognition and affect-based trust: (1)

friendship ties; (2) task advice ties; (3) economic resource ties and (4) career guidance ties. The results showed that these ties were differentially related to the two types of trust. Specifically, friendship ties were more predictive of affect based trust; whereas task advice ties and economic assistance ties were more strongly associated with cognition-based trust. However, career guidance ties were positively related to both cognition and affect-based trust. Likewise, Levin and Cross (2004) demonstrated that strong ties were important predictors of knowledge sharing and trust.

Future studies can examine the impact of these ties on employees' engagement with their work. For instance, it is plausible that employees who have strong friendship ties might enjoy greater mutual care and social comfort, which may fulfil their need to belong and consequently enhance their levels of work engagement. Although an important area, social networks could not be incorporated in the model developed for the current study because of its sheer complexity. Nevertheless, as mentioned above, this remains an attractive avenue for future research.

Additionally, the findings of this study showed that learning goal orientation partially mediated the effects of work engagement on in-role job performance, innovative work behaviour, feedback seeking and error communication, while it did not mediate the relationship between engagement and commitment. This finding suggests that work engagement can affect these performance outcomes through other mechanisms as well. For instance, Bakker and Demerouti (2008) in their recent paper suggest that work engagement might positively influence performance outcomes by facilitating self-regulation. Thus, future research can identify other potential intervening variables, which might explain the linkage between engagement and organizational outcomes.

Another interesting finding from the current study relates to the impact of nationality on work engagement. The results of this study showed that non-Irish researchers were more engaged to their research work than their Irish counterparts. This finding implies that differences in geographic contexts can impact work engagement. Although several researchers have conducted cross-national studies in the area of work engagement (Schaufeli et al., 2002b; Salanova and Schaufeli, 2008), no previous study to-date has examined how employees levels of vigour, dedication and absorption can be affected when they work as expatriates in foreign countries.

Research evidence indicates that working abroad as expatriates can have both positive and negative effects for the concerned individual. For instance, in a study conducted among German expatriates, Stahl et al. (2002) found that majority of the expatriates considered their international assignments as a great opportunity for enhancing their personal and professional development. Likewise, Daily et al. (2000) report that international experience acquired through foreign assignments "provides firms' executives with a competitive advantage; one crucial for their advancement to the chief executive suite" (p. 515). These factors can positively impact on employees' satisfaction and engagement.

On the contrary, Bonache (2005) argues that compared to domestic employees, expatriates "experience greater job over load, greater external pressure and greater pressure from the visibility of their job. Moreover, their functions are not always completely specified; so they may experience a higher degree of uncertainty and role ambiguity" (p. 112). Similarly, Shaffer, Harrison and Gilley (1998) contend that non-work factors such as, higher levels of perceived cultural novelty (i.e. distance between the host and home cultures) and problems associated with spouse / family adjustment (i.e. psychological comfort experienced by children) can have a negative bearing on expatriate adjustment. The convergence these factors can have deleterious effects on expatriates' levels of energy, enthusiasm and involvement.

Thus, future research studies can aim to fill this gap and seek to investigate how employees' levels of work engagement can be affected when they relocate to another country. These studies can also compare the work engagement of expatriates and domestic employees and identify the factors, which account for any differences in their levels of work engagement.

Finally, as mentioned in the preceding paragraphs, research on work engagement has thus far only investigated the positive effects of this construct. There is evidence which suggests that work engagement might also have a dark side. For instance, Bakker (2009) contends that "over engagement" can manifest in burnout and as a result can have adverse effects on employees' health and well-being. Moreover, in a study on army rangers, Britt (2003) found that impediments to high performance, such as work load had negative effects on the morale and satisfaction of rangers. However, these effects were more pronounced for the most highly engaged soldiers. In a related vein, Xanthopoulou, Bakker, Kantas and Demerouti (in press) contend that when "highly passionate, idealistic and dedicated professionals" are unable to do

their work because of job-related obstacles, they are likely to burn out. These findings suggest that in some situations high levels of work engagement can lead to negative consequences. Future research studies in this area can investigate these important issues.

12.9 Conclusion

This research presents one of the first attempts to develop and test an integrated model, which links work engagement to trust. The results of this study provide substantial evidence that the existence of a climate of trust within the university research centers can play a pivotal role in enhancing researchers' levels of engagement with their work. Moreover, this study further enhances the importance and utility of the concept of work engagement by empirically linking it to a variety of important outcomes such as, in-role job performance, innovative work behaviour, feedback seeking, error communication and organizational commitment. In addition, this study highlights one possible mechanism in the form of learning goal orientation through which work engagement may influence the outcome variables.

Furthermore, the results of this study have important policy implications for directors of the research centres and Science Foundation of Ireland (SFI). Specifically, the findings from this study indicate that in order to build an engaged research team, the centre directors need to formulate policies and strategies, which could embed a climate of trust in their respective research centers. By using appropriate management development programmes, the top mangers and supervisors can be motivated to develop a supportive work environment through the implementation of fair policies and procedures, exhibition of transformational leadership behaviours and by creating a climate of open communication. Such trust building measures on part of the centre leadership may subsequently enable them to elicit greater trust from their subordinates. Moreover, trust between team members can be increased through redesigning the work place and jobs in a way that facilitates interaction between members. This might lead to the development of closer relationships between researchers and consequently may augment trust between them (Webber, 2008). Additionally, the centre directors can consider implementing a reward structure, which is based on team outcomes as opposed to individual outcomes. Such a strategy may promote cooperative behaviour

between researchers and as a result might lead to the development of trust based relationships at the lateral level of the organization.

This research also has implications for the leaders and mangers of SFI. As mentioned in chapter 8, the university research centres are expected to play a key role in promoting innovativeness and economic growth of the Irish economy by facilitating the transfer of technology from higher education institutes into the market place. Moreover, these science research centres are actively engaged in generating new knowledge, leading edge technologies and competitive enterprises in the fields of science and engineering within Ireland. Thus, it is imperative that the SFI leaders provide more funding and incentives to the research centres in order to strengthen their IP / commercialisation functions and to enhance their research productivity. Such measures can enable the SFI to achieve its vision, which envisages that by the year 2013, Ireland will become "internationally renowned for the excellence of its research, and will be to the forefront in generating and using new knowledge for economic and social progress, within an innovation driven culture" (Strategy for Science, Technology and Innovation, 2006 to 2013, p. 8).

Although findings from this study as well as from past empirical research provide compelling evidence that work engagement can be a critical driver of organizational success, its negative effects should not be ignored. Recent studies have started to suggest that "over engagement" can have detrimental effects both for the individual and the concerned organization. However, in spite of the possible negative outcomes, it can be safely concluded that organizations in general and research centres in particular are likely to reap substantial benefits if they have an engaged workforce.

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APPENDIX A

Original Questionnaire

Dublin City University Business School

Dublin 9, Ireland

Dear Sir / Madam,

You are being requested to participate in a study on work engagement. The purpose of this study is to examine the role of trust in fostering work engagement among research scientists working in the university research centres in Ireland.

You are part of a selected sample of employees who are requested to complete the enclosed questionnaire. I know how valuable your time is and I appreciate your efforts in filling out this questionnaire. The completion of the questionnaire should, however, take you no longer than 15 minutes. Your input will provide valuable insights into the understanding of work engagement within the context of the Irish university research centres.

I assure you that your identity and your organisation's identity would remain undisclosed; data collected from you will be used only to aggregate the responses and only the aggregate results will be made public.

Please do not put your name on this questionnaire.

Thank you for your help and participation.

Yours sincerely,

Aamir Ali Chughtai
Research Scholar
Dublin City University Business School
Glasnevin
Dublin 9

Instructions: The following 17 statements are about how you feel at work. Please read each statement carefully and decide if you ever feel this way about your job. If you have never had this feeling **circle** the number '0' (zero). If you have had this feeling, indicate how often you feel it by **circling** the number (from 1 to 6) that best describes how frequently you feel that way.

	Almost never	Rarely	Sometimes	Often	Very often	Always
0	1	2	3	4	5	6
Never	A few times a year or less	Once a month or less	A few times a month	Once a week	A few times a week	Every day

1.	At my work, I feel bursting with energy	0 1 2 3 4 5 6
2.	At my job, I feel strong and vigorous	0 1 2 3 4 5 6
3.	When I get up in the morning, I feel like going to work	0 1 2 3 4 5 6
4.	I can continue working for very long periods at a time	0 1 2 3 4 5 6
5.	At my job, I am very resilient mentally	0 1 2 3 4 5 6
6.	At my work I always persevere, even when things do not go well	0 1 2 3 4 5 6
7.	I find the work that I do full of meaning and purpose	0 1 2 3 4 5 6
8.	I am enthusiastic about my job	0 1 2 3 4 5 6
9.	My job inspires me	0 1 2 3 4 5 6
10.	I am proud of the work that I do	0 1 2 3 4 5 6
11.	To me, my job is challenging	0 1 2 3 4 5 6
12.	Time flies when I'm working	0 1 2 3 4 5 6
13.	When I am working, I forget everything else around me	0 1 2 3 4 5 6
14.	I feel happy when I am working intensely	0 1 2 3 4 5 6
15.	I am immersed in my work	0 1 2 3 4 5 6
16.	I get carried away when I'm working	0 1 2 3 4 5 6
17.	It is difficult to detach myself from my job	0 1 2 3 4 5 6

Section 2

Instructions: Please indicate the extent to which you agree or disagree with each of the following statements by **circling** a number from 1 to 7.

Strongly Disagree	Moderately Disagree	Slightly Disagree	Neither agree nor disagree	Slightly Agree	Moderately Agree	Strongly Agree
1	2	3	4	5	6	7

1.	When someone criticizes the centre, it feels like a personal insult	1 2 3 4 5 6 7
2.	When I talk about the centre, I usually say 'we' rather than 'they'	1 2 3 4 5 6 7
3.	I am very interested in what others think about the centre	1 2 3 4 5 6 7
4.	I view the centre's successes as my successes	1 2 3 4 5 6 7
5.	When someone praises the centre, it feels like a personal compliment	1 2 3 4 5 6 7
6.	If a story in the media criticized the centre, I would feel embarrassed	1 2 3 4 5 6 7
7.	I generally have faith in humanity	1 2 3 4 5 6 7
8.	I feel that people are generally reliable	1 2 3 4 5 6 7
9.	I generally trust other people unless they give me a reason not to	1 2 3 4 5 6 7

Instructions: Please indicate the extent to which you agree or disagree with each of the following statements by **circling** a number from 1 to 7.

Strongly Disagree 1	Moderately Disagree 2	Slightly Disagree 3	Neither agree nor disagree 4	Slightly Agree 5	Moderately Agree 6	Strongly Agree 7

1. I would be very happy to spend the rest of my career working with my current direct supervisor   1 2 3 4 5 6 7
2. I enjoy discussing my direct supervisor with people outside the centre   1 2 3 4 5 6 7
3. I really feel as if my direct supervisor's problems are my own   1 2 3 4 5 6 7
4. Working with my direct supervisor has a great deal of personal meaning for me   1 2 3 4 5 6 7
5. I feel emotionally attached to my direct supervisor   1 2 3 4 5 6 7
6. If someone in our research team makes a mistake, it is often held against him or her   1 2 3 4 5 6 7
7. Members of our research team are able to bring up problems and tough issues   1 2 3 4 5 6 7
8. People in our research team sometimes reject others for being different   1 2 3 4 5 6 7
9. It is safe to take a risk in our research team   1 2 3 4 5 6 7
10. It is difficult to ask other members of our research team for help   1 2 3 4 5 6 7
11. No one in our research team would deliberately act in a way that undermines others' efforts   1 2 3 4 5 6 7
12. People in our research team value each other's unique skills and talents   1 2 3 4 5 6 7

Section 3

Instructions: Please indicate the extent to which you agree or disagree with each of the following statements by **circling** a number from 1 to 7.

Strongly Disagree 1	Moderately Disagree 2	Slightly Disagree 3	Neither agree nor disagree 4	Slightly Agree 5	Moderately Agree 6	Strongly Agree 7

I believe that:
1. The top management team is straightforward with employees   1 2 3 4 5 6 7
2. The top management team communicates honestly with employees   1 2 3 4 5 6 7
3. The top management team does not mislead employees in their communications   1 2 3 4 5 6 7
4. The top management team does not withhold important information from employees   1 2 3 4 5 6 7
5. The top management team does not try to get out of its commitments   1 2 3 4 5 6 7
6. The top management team behaves consistently   1 2 3 4 5 6 7
7. The top management team is reliable   1 2 3 4 5 6 7
8. The top management team can be counted on   1 2 3 4 5 6 7
9. The top management team is competent and knowledgeable   1 2 3 4 5 6 7
10. The top management team can contribute to the centre's success   1 2 3 4 5 6 7
11. The top management team can help the centre survive during the next decade   1 2 3 4 5 6 7
12. The top management team can help solve important problems faced by the centre   1 2 3 4 5 6 7
13. The top management team does not take advantage of employees   1 2 3 4 5 6 7
14. The top management team does not exploit employees   1 2 3 4 5 6 7
15. The top management team cares about the best interests of employees   1 2 3 4 5 6 7
16. The top management team is concerned for employees' welfare   1 2 3 4 5 6 7

Instructions: Please indicate the extent to which you agree or disagree with each of the following statements by **circling** a number from 1 to 7.

Strongly Disagree	Moderately Disagree	Slightly Disagree	Neither agree nor disagree	Slightly Agree	Moderately Agree	Strongly Agree
1	2	3	4	5	6	7

I believe that:

1. My direct supervisor is straightforward with me   1 2 3 4 5 6 7
2. My direct supervisor communicates honestly with me   1 2 3 4 5 6 7
3. My direct supervisor does not mislead me in his or her communications   1 2 3 4 5 6 7
4. My direct supervisor does not withhold important information from me   1 2 3 4 5 6 7
5. My direct supervisor does not try to get out of his or her commitments   1 2 3 4 5 6 7
6. My direct supervisor behaves consistently   1 2 3 4 5 6 7
7. My direct supervisor is reliable   1 2 3 4 5 6 7
8. My direct supervisor can be counted on   1 2 3 4 5 6 7
9. My direct supervisor is competent and knowledgeable   1 2 3 4 5 6 7
10. My direct supervisor can contribute to the centre's success   1 2 3 4 5 6 7
11. My direct supervisor can help the centre survive during the next decade   1 2 3 4 5 6 7
12. My direct supervisor can help solve important problems faced by the centre   1 2 3 4 5 6 7
13. My direct supervisor does not take advantage of me   1 2 3 4 5 6 7
14. My direct supervisor does not exploit me   1 2 3 4 5 6 7
15. My direct supervisor cares about my best interests   1 2 3 4 5 6 7
16. My direct supervisor is concerned for my welfare   1 2 3 4 5 6 7

Instructions: Please indicate the extent to which you agree or disagree with each of the following statements by **circling** a number from 1 to 7.

Strongly Disagree	Moderately Disagree	Slightly Disagree	Neither agree nor disagree	Slightly Agree	Moderately Agree	Strongly Agree
1	2	3	4	5	6	7

I believe that:

1. My team members are straightforward with me   1 2 3 4 5 6 7
2. My team members communicate honestly with me   1 2 3 4 5 6 7
3. My team members do not mislead me in their communications   1 2 3 4 5 6 7
4. My team members do not withhold important information from me   1 2 3 4 5 6 7
5. My team members do not try to get out of their commitments   1 2 3 4 5 6 7
6. My team members behave consistently   1 2 3 4 5 6 7
7. My team members are reliable   1 2 3 4 5 6 7
8. My team members can be counted on   1 2 3 4 5 6 7
9. My team members are competent and knowledgeable   1 2 3 4 5 6 7
10. My team members can contribute to the centre's success   1 2 3 4 5 6 7
11. My team members can help the centre survive during the next decade   1 2 3 4 5 6 7
12. My team members can help solve important problems faced by the centre   1 2 3 4 5 6 7
13. My team members do not take advantage of me   1 2 3 4 5 6 7
14. My team members do not exploit me   1 2 3 4 5 6 7
15. My team members care about my best interests   1 2 3 4 5 6 7
16. My team members are concerned for my welfare   1 2 3 4 5 6 7

Instructions: Individuals have different views about how they approach work. Please read each statement below and select the response that reflects how much you agree or disagree with the statement by **circling** a number from 1 to 7.

Strongly Disagree	Moderately Disagree	Slightly Disagree	Neither agree nor disagree	Slightly Agree	Moderately Agree	Strongly Agree
1	2	3	4	5	6	7

1. The opportunity to do challenging work is important to me   1 2 3 4 5 6 7
2. When I fail to complete a difficult task, I plan to try harder the next time I work on it   1 2 3 4 5 6 7
3. I prefer to work on tasks that force me to learn new things   1 2 3 4 5 6 7
4. The opportunity to learn new things is important to me   1 2 3 4 5 6 7
5. I do my best when I am working on a fairly difficult task   1 2 3 4 5 6 7
6. I try hard to improve on my past performance   1 2 3 4 5 6 7
7. The opportunity to extend the range of my abilities is important to me   1 2 3 4 5 6 7
8. When I have difficulty solving a problem, I enjoy trying different approaches to see which one will work   1 2 3 4 5 6 7

Instructions: Please indicate the extent to which you agree or disagree with each of the following statements by **circling** a number from 1 to 7.

Strongly Disagree	Moderately Disagree	Slightly Disagree	Neither agree nor disagree	Slightly Agree	Moderately Agree	Strongly Agree
1	2	3	4	5	6	7

1. I would be very happy to spend the rest of my career with the centre   1 2 3 4 5 6 7
2. I really feel as if the centre's problems are my own   1 2 3 4 5 6 7
3. I do not feel a strong sense of 'belonging' to the centre   1 2 3 4 5 6 7
4. I do not feel 'emotionally attached' to the centre   1 2 3 4 5 6 7
5. I do not feel like 'part of the family' at the centre   1 2 3 4 5 6 7
6. The centre has a great deal of personal meaning for me   1 2 3 4 5 6 7
7. I always complete the duties specified in my job description   1 2 3 4 5 6 7
8. I meet all the formal performance requirements of the job   1 2 3 4 5 6 7
9. I fulfill all responsibilities required by my job   1 2 3 4 5 6 7
10. I never neglect aspects of the job that I am obligated to perform   1 2 3 4 5 6 7
11. I often fail to perform essential duties   1 2 3 4 5 6 7

I ask for feedback:

12. To learn how I can master tasks   1 2 3 4 5 6 7
13. To learn how I can improve performing my work   1 2 3 4 5 6 7
14. To get information about how I can solve problems   1 2 3 4 5 6 7
15. To improve my knowledge and capabilities   1 2 3 4 5 6 7
16. To set more appropriate goals for myself   1 2 3 4 5 6 7

Instructions: With what frequency do you engage in the behaviours listed below? Please indicate this by **circling** a number from 1 to 7.

	Never	Almost never	Rarely	Sometimes	Often	Very often	Always
	1	2	3	4	5	6	7

1. Creating new ideas for difficult issues — 1 2 3 4 5 6 7
2. Mobilizing support for innovative ideas — 1 2 3 4 5 6 7
3. Searching out new work methods, techniques or instruments — 1 2 3 4 5 6 7
4. Acquiring approval for innovative ideas — 1 2 3 4 5 6 7
5. Transforming innovative ideas into useful applications — 1 2 3 4 5 6 7
6. Generating original solutions for problems — 1 2 3 4 5 6 7
7. Introducing innovative ideas into the work environment in a systematic way — 1 2 3 4 5 6 7
8. Making important organizational members enthusiastic for innovative ideas — 1 2 3 4 5 6 7
9. Evaluating the utility of innovative ideas — 1 2 3 4 5 6 7

Instructions: Please indicate the extent to which you agree or disagree with each of the following statements by **circling** a number from 1 to 7.

Strongly Disagree	Moderately Disagree	Slightly Disagree	Neither agree nor disagree	Slightly Agree	Moderately Agree	Strongly Agree
1	2	3	4	5	6	7

1. When I make a mistake at work, I tell others about it, so that they do not make the same mistake — 1 2 3 4 5 6 7
2. If I cannot rectify an error by myself, I turn to my team members for help — 1 2 3 4 5 6 7
3. When I have done something wrong, I ask others how I should do it better — 1 2 3 4 5 6 7
4. I am not likely to obtain a much higher job title in the centre — 1 2 3 4 5 6 7
5. I expect to advance to a higher level in the centre in the near future — 1 2 3 4 5 6 7
6. My opportunities for upward movement are limited in the centre — 1 2 3 4 5 6 7
7. I have made plans to leave the centre once I have the skills and experience to move on — 1 2 3 4 5 6 7
8. I have made plans to leave the centre if it cannot offer me a rewarding career — 1 2 3 4 5 6 7
9. I have made sure that I get credit for the work I do — 1 2 3 4 5 6 7
10. I have made my direct supervisor aware of my accomplishments — 1 2 3 4 5 6 7
11. My research team frequently comes up with ideas for improvement in the scientific methodology — 1 2 3 4 5 6 7
12. In my research team we have generated many improvements on the traditional way of doing things — 1 2 3 4 5 6 7

Instructions: With what frequency do you engage in the behaviours listed below? Please indicate this by **circling** a number from 1 to 7.

	Never	Almost never	Rarely	Sometimes	Often	Very often	Always
	1	2	3	4	5	6	7

1. Directly ask your direct supervisor for information concerning your performance — 1 2 3 4 5 6 7
2. Directly ask your direct supervisor for informal appraisals of your work — 1 2 3 4 5 6 7
3. Directly ask your direct supervisor how well you are performing on the job — 1 2 3 4 5 6 7

Instructions: Please indicate how certain or uncertain are you about your future in the research centre by **circling** a number from 1 to 5.

Very Certain	Certain	Neutral	Uncertain	Very Uncertain
1	2	3	4	5

1.	How certain are you about what your future career picture looks like in the centre?	1 2 3 4 5
2.	How certain are you of the opportunities for promotion and advancement which will exist in the next few years?	1 2 3 4 5
3.	How certain are you about your job security?	1 2 3 4 5
4.	How certain are you about what your responsibilities will be six months from now?	1 2 3 4 5

Instructions: Please indicate the extent to which you agree or disagree with each of the following statements by **circling** a number from 1 to 7.

Strongly Disagree	Moderately Disagree	Slightly Disagree	Neither agree nor disagree	Slightly Agree	Moderately Agree	Strongly Agree
1	2	3	4	5	6	7

1.	People in our research team share their special knowledge and expertise with one another	1 2 3 4 5 6 7
2.	If someone in our research team has some special knowledge about how to perform the team task, he or she is not likely to tell the other team members about it	1 2 3 4 5 6 7
3.	There is virtually no exchange of information, knowledge or sharing of skills among team members	1 2 3 4 5 6 7
4.	More knowledgeable team members freely provide other members with hard to find knowledge or specialized skills	1 2 3 4 5 6 7
5.	People in our research team help one another in developing relevant strategies	1 2 3 4 5 6 7
6.	People in our research team share a lot of information with one another	1 2 3 4 5 6 7
7.	People in our research team offer lots of suggestions to each other	1 2 3 4 5 6 7

Instructions: Please answer the following questions by **circling** a number from 1 to 7.

Low			Average			High
1	2	3	4	5	6	7

1.	How would you characterise your own performance in recent months?	1 2 3 4 5 6 7
2.	How would you characterise the performance of your research team in recent months?	1 2 3 4 5 6 7

Instructions: The following questions seek information about you. Please answer these questions by **circling** the appropriate word or by **filling** in the blank spaces.

1. Your Gender:

    (1) Male   (2) Female

2. What is your age as of your last birthday? _____ Years

3. What is the total number of years that you have been working with THE CENTRE? _____ Years

4. What is your current job title _____

5. Highest degree attained:

    (1) Bachelors   (2) Masters   (3) PhD

6. What is your nationality?

    (1) Irish   (2) EU (excluding Ireland)   (3) Other _____

7. What type of Employment Contract do you hold?

    (1) Permanent   (2) Temporary

8. Have you had a performance review?

    (1) Yes   (2) No

Thank you for your cooperation

APPENDIX B

Annotated Questionnaire

DCU

Dublin City University Business School
Dublin 9, Ireland

Dear Sir / Madam,

You are being requested to participate in a study on work engagement. The purpose of this study is to examine the role of trust in fostering work engagement among research scientists working in the university research centres in Ireland.

You are part of a selected sample of employees who are requested to complete the enclosed questionnaire. I know how valuable your time is and I appreciate your efforts in filling out this questionnaire. The completion of the questionnaire should, however, take you no longer than 15 minutes. Your input will provide valuable insights into the understanding of work engagement within the context of the Irish university research centres.

I assure you that your identity and your organisation's identity would remain undisclosed; data collected from you will be used only to aggregate the responses and only the aggregate results will be made public.

Please do not put your name on this questionnaire.

Thank you for your help and participation.

Yours sincerely,

Aamir Ali Chughtai
Research Scholar
Dublin City University Business School
Glasnevin
Dublin 9

ISSP — Irish Social Sciences Platform   ISSP Sponsors: HEA Higher Education Authority An tÚdarás um Ard-Oideachas   NDP NATIONAL DEVELOPMENT PLAN

The Utrecht Work Engagement Scale

Instructions: The following 17 statements are about how you feel at work. Please read each statement carefully and decide if you ever feel this way about your job. If you have never had this feeling **circle** the number '0' (zero). If you have had this feeling, indicate how often you feel it by **circling** the number (from 1 to 6) that best describes how frequently you feel that way.

	Almost never	**Rarely**	**Sometimes**	**Often**	**Very often**	**Always**
0	1	2	3	4	5	6
Never	A few times a year or less	Once a month or less	A few times a month	Once a week	A few times a week	Every day

1. At my work, I feel bursting with energy ... 0 1 2 3 4 5 6
2. At my job, I feel strong and vigorous ... 0 1 2 3 4 5 6
3. When I get up in the morning, I feel like going to work ... 0 1 2 3 4 5 6
4. I can continue working for very long periods at a time ... 0 1 2 3 4 5 6
5. At my job, I am very resilient mentally ... 0 1 2 3 4 5 6
6. At my work I always persevere, even when things do not go well ... 0 1 2 3 4 5 6
7. I find the work that I do full of meaning and purpose ... 0 1 2 3 4 5 6
8. I am enthusiastic about my job ... 0 1 2 3 4 5 6
9. My job inspires me ... 0 1 2 3 4 5 6
10. I am proud of the work that I do ... 0 1 2 3 4 5 6
11. To me, my job is challenging ... 0 1 2 3 4 5 6
12. Time flies when I'm working ... 0 1 2 3 4 5 6
13. When I am working, I forget everything else around me ... 0 1 2 3 4 5 6
14. I feel happy when I am working intensely ... 0 1 2 3 4 5 6
15. I am immersed in my work ... 0 1 2 3 4 5 6
16. I get carried away when I'm working ... 0 1 2 3 4 5 6
17. It is difficult to detach myself from my job ... 0 1 2 3 4 5 6

Instructions: Please indicate the extent to which you agree or disagree with each of the following statements by **circling** a number from 1 to 7. **Note: Questions 1 to 6 = Organizational Identification; Questions 7 to 9 = Trust Propensity**

Strongly Disagree	**Moderately Disagree**	**Slightly Disagree**	**Neither agree nor disagree**	**Slightly Agree**	**Moderately Agree**	**Strongly Agree**
1	2	3	4	5	6	7

1. When someone criticizes the centre, it feels like a personal insult ... 1 2 3 4 5 6 7
2. When I talk about the centre, I usually say 'we' rather than 'they' ... 1 2 3 4 5 6 7
3. I am very interested in what others think about the centre ... 1 2 3 4 5 6 7
4. I view the centre's successes as my successes ... 1 2 3 4 5 6 7
5. When someone praises the centre, it feels like a personal compliment ... 1 2 3 4 5 6 7
6. If a story in the media criticized the centre, I would feel embarrassed ... 1 2 3 4 5 6 7
7. I generally have faith in humanity ... 1 2 3 4 5 6 7
8. I feel that people are generally reliable ... 1 2 3 4 5 6 7
9. I generally trust other people unless they give me a reason not to ... 1 2 3 4 5 6 7

Instructions: Please indicate the extent to which you agree or disagree with each of the following statements by **circling** a number from 1 to 7. **Note: Questions 1 to 5 = Affective Commitment to the Supervisor; Questions 6-12 = Team Psychological Safety**

Strongly Disagree 1	Moderately Disagree 2	Slightly Disagree 3	Neither agree nor disagree 4	Slightly Agree 5	Moderately Agree 6	Strongly Agree 7

1. I would be very happy to spend the rest of my career working with my current direct supervisor   1 2 3 4 5 6 7
2. I enjoy discussing my direct supervisor with people outside the centre   1 2 3 4 5 6 7
3. I really feel as if my direct supervisor's problems are my own   1 2 3 4 5 6 7
4. Working with my direct supervisor has a great deal of personal meaning for me   1 2 3 4 5 6 7
5. I feel emotionally attached to my direct supervisor   1 2 3 4 5 6 7
6. If someone in our research team makes a mistake, it is often held against him or her   1 2 3 4 5 6 7
7. Members of our research team are able to bring up problems and tough issues   1 2 3 4 5 6 7
8. People in our research team sometimes reject others for being different   1 2 3 4 5 6 7
9. It is safe to take a risk in our research team   1 2 3 4 5 6 7
10. It is difficult to ask other members of our research team for help   1 2 3 4 5 6 7
11. No one in our research team would deliberately act in a way that undermines others' efforts   1 2 3 4 5 6 7
12. People in our research team value each other's unique skills and talents   1 2 3 4 5 6 7

Section 3

Instructions: Please indicate the extent to which you agree or disagree with each of the following statements by **circling** a number from 1 to 7. (**Trust in Top Management Team**)

Strongly Disagree 1	Moderately Disagree 2	Slightly Disagree 3	Neither agree nor disagree 4	Slightly Agree 5	Moderately Agree 6	Strongly Agree 7

I believe that:
1. The top management team is straightforward with employees   1 2 3 4 5 6 7
2. The top management team communicates honestly with employees   1 2 3 4 5 6 7
3. The top management team does not mislead employees in their communications   1 2 3 4 5 6 7
4. The top management team does not withhold important information from employees   1 2 3 4 5 6 7
5. The top management team does not try to get out of its commitments   1 2 3 4 5 6 7
6. The top management team behaves consistently   1 2 3 4 5 6 7
7. The top management team is reliable   1 2 3 4 5 6 7
8. The top management team can be counted on   1 2 3 4 5 6 7
9. The top management team is competent and knowledgeable   1 2 3 4 5 6 7
10. The top management team can contribute to the centre's success   1 2 3 4 5 6 7
11. The top management team can help the centre survive during the next decade   1 2 3 4 5 6 7
12. The top management team can help solve important problems faced by the centre   1 2 3 4 5 6 7
13. The top management team does not take advantage of employees   1 2 3 4 5 6 7
14. The top management team does not exploit employees   1 2 3 4 5 6 7
15. The top management team cares about the best interests of employees   1 2 3 4 5 6 7
16. The top management team is concerned for employees' welfare   1 2 3 4 5 6 7

Instructions: Please indicate the extent to which you agree or disagree with each of the following statements by **circling** a number from 1 to 7. (**Trust in direct supervisor**)

Strongly Disagree	Moderately Disagree	Slightly Disagree	Neither agree nor disagree	Slightly Agree	Moderately Agree	Strongly Agree
1	2	3	4	5	6	7

I believe that:

1. My direct supervisor is straightforward with me   1 2 3 4 5 6 7
2. My direct supervisor communicates honestly with me   1 2 3 4 5 6 7
3. My direct supervisor does not mislead me in his or her communications   1 2 3 4 5 6 7
4. My direct supervisor does not withhold important information from me   1 2 3 4 5 6 7
5. My direct supervisor does not try to get out of his or her commitments   1 2 3 4 5 6 7
6. My direct supervisor behaves consistently   1 2 3 4 5 6 7
7. My direct supervisor is reliable   1 2 3 4 5 6 7
8. My direct supervisor can be counted on   1 2 3 4 5 6 7
9. My direct supervisor is competent and knowledgeable   1 2 3 4 5 6 7
10. My direct supervisor can contribute to the centre's success   1 2 3 4 5 6 7
11. My direct supervisor can help the centre survive during the next decade   1 2 3 4 5 6 7
12. My direct supervisor can help solve important problems faced by the centre   1 2 3 4 5 6 7
13. My direct supervisor does not take advantage of me   1 2 3 4 5 6 7
14. My direct supervisor does not exploit me   1 2 3 4 5 6 7
15. My direct supervisor cares about my best interests   1 2 3 4 5 6 7
16. My direct supervisor is concerned for my welfare   1 2 3 4 5 6 7

Instructions: Please indicate the extent to which you agree or disagree with each of the following statements by **circling** a number from 1 to 7. (**Trust in Team Members**)

Strongly Disagree	Moderately Disagree	Slightly Disagree	Neither agree nor disagree	Slightly Agree	Moderately Agree	Strongly Agree
1	2	3	4	5	6	7

I believe that:

1. My team members are straightforward with me   1 2 3 4 5 6 7
2. My team members communicate honestly with me   1 2 3 4 5 6 7
3. My team members do not mislead me in their communications   1 2 3 4 5 6 7
4. My team members do not withhold important information from me   1 2 3 4 5 6 7
5. My team members do not try to get out of their commitments   1 2 3 4 5 6 7
6. My team members behave consistently   1 2 3 4 5 6 7
7. My team members are reliable   1 2 3 4 5 6 7
8. My team members can be counted on   1 2 3 4 5 6 7
9. My team members are competent and knowledgeable   1 2 3 4 5 6 7
10. My team members can contribute to the centre's success   1 2 3 4 5 6 7
11. My team members can help the centre survive during the next decade   1 2 3 4 5 6 7
12. My team members can help solve important problems faced by the centre   1 2 3 4 5 6 7
13. My team members do not take advantage of me   1 2 3 4 5 6 7
14. My team members do not exploit me   1 2 3 4 5 6 7
15. My team members care about my best interests   1 2 3 4 5 6 7
16. My team members are concerned for my welfare   1 2 3 4 5 6 7

Instructions: Individuals have different views about how they approach work. Please read each statement below and select the response that reflects how much you agree or disagree with the statement by **circling** a number from 1 to 7. (**Learning Goal Orientation**)

Strongly Disagree 1	Moderately Disagree 2	Slightly Disagree 3	Neither agree nor disagree 4	Slightly Agree 5	Moderately Agree 6	Strongly Agree 7

1. The opportunity to do challenging work is important to me   1 2 3 4 5 6 7
2. When I fail to complete a difficult task, I plan to try harder the next time I work on it   1 2 3 4 5 6 7
3. I prefer to work on tasks that force me to learn new things   1 2 3 4 5 6 7
4. The opportunity to learn new things is important to me   1 2 3 4 5 6 7
5. I do my best when I am working on a fairly difficult task   1 2 3 4 5 6 7
6. I try hard to improve on my past performance   1 2 3 4 5 6 7
7. The opportunity to extend the range of my abilities is important to me   1 2 3 4 5 6 7
8. When I have difficulty solving a problem, I enjoy trying different approaches to see which one will work   1 2 3 4 5 6 7

Instructions: Please indicate the extent to which you agree or disagree with each of the following statements by **circling** a number from 1 to 7. **Note: Questions 1 to 6 = Affective Organizational Commitment; Questions 7-11 = In-role Job Performance; Questions 12-16 = Feedback Seeking for Self Improvement**

Strongly Disagree 1	Moderately Disagree 2	Slightly Disagree 3	Neither agree nor disagree 4	Slightly Agree 5	Moderately Agree 6	Strongly Agree 7

1. I would be very happy to spend the rest of my career with the centre   1 2 3 4 5 6 7
2. I really feel as if the centre's problems are my own   1 2 3 4 5 6 7
3. I do not feel a strong sense of 'belonging' to the centre   1 2 3 4 5 6 7
4. I do not feel 'emotionally attached' to the centre   1 2 3 4 5 6 7
5   I do not feel like 'part of the family' at the centre   1 2 3 4 5 6 7
6   The centre has a great deal of personal meaning for me   1 2 3 4 5 6 7
7. I always complete the duties specified in my job description   1 2 3 4 5 6 7
8. I meet all the formal performance requirements of the job   1 2 3 4 5 6 7
9. I fulfill all responsibilities required by my job   1 2 3 4 5 6 7
10. I never neglect aspects of the job that I am obligated to perform   1 2 3 4 5 6 7
11. I often fail to perform essential duties   1 2 3 4 5 6 7
    I ask for feedback:
12. To learn how I can master tasks   1 2 3 4 5 6 7
13. To learn how I can improve performing my work   1 2 3 4 5 6 7
14. To get information about how I can solve problems   1 2 3 4 5 6 7
15. To improve my knowledge and capabilities   1 2 3 4 5 6 7
16. To set more appropriate goals for myself   1 2 3 4 5 6 7

Instructions: With what frequency do you engage in the behaviours listed below? Please indicate this by **circling** a number from 1 to 7. **(Innovative Work Behaviour)**

Never	Almost never	Rarely	Sometimes	Often	Very often	Always
1	2	3	4	5	6	7

1. Creating new ideas for difficult issues — 1 2 3 4 5 6 7
2. Mobilizing support for innovative ideas — 1 2 3 4 5 6 7
3. Searching out new work methods, techniques or instruments — 1 2 3 4 5 6 7
4. Acquiring approval for innovative ideas — 1 2 3 4 5 6 7
5. Transforming innovative ideas into useful applications — 1 2 3 4 5 6 7
6. Generating original solutions for problems — 1 2 3 4 5 6 7
7. Introducing innovative ideas into the work environment in a systematic way — 1 2 3 4 5 6 7
8. Making important organizational members enthusiastic for innovative ideas — 1 2 3 4 5 6 7
9. Evaluating the utility of innovative ideas — 1 2 3 4 5 6 7

Instructions: Please indicate the extent to which you agree or disagree with each of the following statements by **circling** a number from 1 to 7. **Note: Questions 1 to 3 = Error Communication**

Strongly Disagree	Moderately Disagree	Slightly Disagree	Neither agree nor disagree	Slightly Agree	Moderately Agree	Strongly Agree
1	2	3	4	5	6	7

1. When I make a mistake at work, I tell others about it, so that they do not make the same mistake — 1 2 3 4 5 6 7
2. If I cannot rectify an error by myself, I turn to my team members for help — 1 2 3 4 5 6 7
3. When I have done something wrong, I ask others how I should do it better — 1 2 3 4 5 6 7
4. I am not likely to obtain a much higher job title in the centre — 1 2 3 4 5 6 7
5. I expect to advance to a higher level in the centre in the near future — 1 2 3 4 5 6 7
6. My opportunities for upward movement are limited in the centre — 1 2 3 4 5 6 7
7. I have made plans to leave the centre once I have the skills and experience to move on — 1 2 3 4 5 6 7
8. I have made plans to leave the centre if it cannot offer me a rewarding career — 1 2 3 4 5 6 7
9. I have made sure that I get credit for the work I do — 1 2 3 4 5 6 7
10. I have made my direct supervisor aware of my accomplishments — 1 2 3 4 5 6 7
11. My research team frequently comes up with ideas for improvement in the scientific methodology — 1 2 3 4 5 6 7
12. In my research team we have generated many improvements on the traditional way of doing things — 1 2 3 4 5 6 7

Instructions: With what frequency do you engage in the behaviours listed below? Please indicate this by **circling** a number from 1 to 7.

Never	Almost never	Rarely	Sometimes	Often	Very often	Always
1	2	3	4	5	6	7

1. Directly ask your direct supervisor for information concerning your performance — 1 2 3 4 5 6 7
2. Directly ask your direct supervisor for informal appraisals of your work — 1 2 3 4 5 6 7
3. Directly ask your direct supervisor how well you are performing on the job — 1 2 3 4 5 6 7

Instructions: Please indicate how certain or uncertain are you about your future in the research centre by **<u>circling</u>** a number from 1 to 5.

Very Certain	Certain	Neutral	Uncertain	Very Uncertain
1	2	3	4	5

1. How certain are you about what your future career picture looks like in the centre? 1 2 3 4 5
2. How certain are you of the opportunities for promotion and advancement which will exist in the next few years? 1 2 3 4 5
3. How certain are you about your job security? 1 2 3 4 5
4. How certain are you about what your responsibilities will be six months from now? 1 2 3 4 5

Instructions: Please indicate the extent to which you agree or disagree with each of the following statements by **<u>circling</u>** a number from 1 to 7.

Strongly Disagree	Moderately Disagree	Slightly Disagree	Neither agree nor disagree	Slightly Agree	Moderately Agree	Strongly Agree
1	2	3	4	5	6	7

1. People in our research team share their special knowledge and expertise with one another 1 2 3 4 5 6 7
2. If someone in our research team has some special knowledge about how to perform the team task, he or she is not likely to tell the other team members about it 1 2 3 4 5 6 7
3. There is virtually no exchange of information, knowledge or sharing of skills among team members 1 2 3 4 5 6 7
4. More knowledgeable team members freely provide other members with hard to find knowledge or specialized skills 1 2 3 4 5 6 7
5. People in our research team help one another in developing relevant strategies 1 2 3 4 5 6 7
6. People in our research team share a lot of information with one another 1 2 3 4 5 6 7
7. People in our research team offer lots of suggestions to each other 1 2 3 4 5 6 7

Instructions: Please answer the following questions by **<u>circling</u>** a number from 1 to 7.

Low			Average			High
1	2	3	4	5	6	7

1. How would you characterise your own performance in recent months? 1 2 3 4 5 6 7
2. How would you characterise the performance of your research team in recent months? 1 2 3 4 5 6 7

Instructions: The following questions seek information about you. Please answer these questions by **circling** the appropriate word or by **filling** in the blank spaces.

1. Your Gender: **(Control Variable)**

    (1) Male   (2) Female

2. What is your age as of your last birthday? _____ Years **(Control Variable)**

3. What is the total number of years that you have been working with THE CENTRE?
    _____ Years **(Control Variable)**

4. What is your current job title _____

5. Highest degree attained:

    (1) Bachelors   (2) Masters   (3) PhD

6. What is your nationality? **(Control Variable)**

    (1) Irish   (2) EU (excluding Ireland)   (3) Other _____

7. What type of Employment Contract do you hold?

    (1) Permanent   (2) Temporary

8. Have you had a performance review?

    (1) Yes   (2) No

Thank you for your cooperation

TABLE A1
Results of the Principal Components Analysis of the Trust Scales

	Factors		
	1	**2**	**3**
Trust in Top Management			
The top management is straightforward with employees	**.769**		
The top management communicates honestly with employees	**.831**		
The top management does not mislead employees in their communications	**.849**		
The top management does not withhold important information from employees	**.705**		
The top management does not try to get out of its commitments	**.825**		
The top management behaves consistently	**.840**		
The top management is straightforward with employees	**.865**		
The top management communicates honestly with employees	**.924**		
The top management does not mislead employees in their communications	**.901**		
The top management does not withhold important information from employees	**.895**		
The top management does not try to get out of its commitments	**.871**		
The top management behaves consistently	**.551**		
The top management is straightforward with employees	**.624**		
The top management communicates honestly with employees	**.719**		
Trust in Direct Supervisor			
My direct supervisor is straightforward with me			**.849**
My direct supervisor communicates honestly with me			**.870**
My direct supervisor does not mislead me in his or her communications			**.837**
My direct supervisor does not withhold important information from me			**.865**
My direct supervisor does not try to get out of his or her commitments			**.823**
My direct supervisor behaves consistently			**.680**
My direct supervisor is reliable			**.868**
My direct supervisor can be counted on			**.897**
My direct supervisor can contribute to our organization's success			**.618**
My direct supervisor can help our organization survive during the next decade			**.616**
My direct supervisor can help solve important problems faced by our organization			**.540**
My direct supervisor does not take advantage of me			**.736**
My direct supervisor does not exploit me			**.784**
My direct supervisor cares about my best interests			**.883**
My direct supervisor is concerned for my welfare			**.730**
Trust in Team Members			
My team members are straightforward with me		**.876**	
My team members do not mislead me in their communications		**.829**	
My team members do not withhold important information from me		**.803**	
My team members do not try to get out of their commitments		**.784**	
My team members behave consistently		**.734**	

	Factors		
	1	**2**	**3**
My team members are reliable		**.857**	
My team members are competent and knowledgeable		**.756**	
My team members can contribute to our organization's success		**.765**	
My team members can help our organization survive during the next decade		**.726**	
My team members can help solve important problems faced by our organization		**.646**	
My team members do not take advantage of me		**.755**	
My team members do not exploit me		**.727**	
My team members care about my best interests		**.780**	
My team members are concerned for my welfare		**.672**	
Eigen Values	15.89	6.63	5.43
Percent of Variance Explained	36.96	15.43	12.63

APPENDIX D

TABLE A2
Results of the Principal Components Analysis of the Study Variables

	Factors									
	1	2	3	4	5	6	7	8	9	10
Trust Propensity										
I generally have faith in humanity								.877		
I feel that people are generally reliable								.809		
I generally trust other people unless they give me a reason not to								.864		
Organizational Identification										
When someone criticizes my organization, it feels like a personal insult									.702	
When I talk about my organization, I usually say 'we' rather than 'they'									.597	
I am very interested in what others think about my organization									.741	
I view my organization's successes as my successes									.651	
When someone praises my organization, it feels like a personal compliment									.695	
If a story in the media criticized my organization, I would feel embarrassed									.717	
Affective Commitment to the Supervisor										
I would be very happy to spend the rest of my career working with my current direct supervisor										.650
I enjoy discussing my direct supervisor with people outside my organization										.526
I really feel as if my direct supervisor's problems are my own										.636
Working with my direct supervisor has a great deal of personal meaning for me										.741
I feel emotionally attached to my direct supervisor										.765
Team Psychological Safety										
Members of our research team are able to bring up problems and tough issues					.616					
It is safe to take a risk in our research team					.597					
No one in our research team would deliberately act in a way that undermines others' efforts					.737					
People in our research team value each other's unique skills and talents					.612					
Learning Goal Orientation										
The opportunity to do challenging work is important to me	.629									
When I fail to complete a difficult task, I plan to try harder the next time I work on it	.618									
I prefer to work on tasks that force me to learn new things	.792									
The opportunity to learn new things is important to me	.805									
I do my best when I am working on a fairly difficult task	.758									
I try hard to improve on my past performance	.721									
The opportunity to extend the range of my abilities is important to me	.834									
When I have difficulty solving a problem, I enjoy trying different approaches to see which one will work	.767									

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	Factors									
	1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**
Organizational Commitment										
I would be very happy to spend the rest of my career with this organization		.451								
I really feel as if this organization's problems are my own									0.38	
I do not feel a strong sense of 'belonging' to this organization		.685								
I do not feel 'emotionally attached' to this organization		.771								
I do not feel like 'part of the family' at this organization		.739								
This organization has a great deal of personal meaning for me		.545								
In-Role Job Performance										
I always complete the duties specified in my job description						.705				
I meet all the formal performance requirements of the job						.777				
I fulfil all responsibilities required by my job						.757				
I never neglect aspects of the job that I am obligated to perform						.705				
I often fail to perform essential duties						.453				
Feedback Seeking										
I ask for feedback:										
To learn how I can master tasks				.898						
To learn how I can improve performing my work				.955						
To get information about how I can solve problems				.942						
To improve my knowledge and capabilities				.931						
To set more appropriate goals for myself				.803						
Innovative Work Behaviour										
Creating new ideas for difficult issues			.623							
Mobilizing support for innovative ideas			.775							
Searching out new work methods, techniques or instruments			.638							
Acquiring approval for innovative ideas			.847							
Transforming innovative ideas into useful applications			.876							
Generating original solutions for problems			.726							
Introducing innovative ideas into the work environment in a systematic way			.899							
Making important organizational members enthusiastic for innovative ideas			.891							
Evaluating the utility of innovative ideas			.852							
Error Communication										
When I make a mistake at work, I tell others about it, so that they do not make the same mistake							.583			
If I cannot rectify an error by myself, I turn to my team members for help							.842			
When I have done something wrong, I ask others how I should do it better							.789			
Eigen Value	14.96	5.82	4.14	3.12	2.28	1.95	1.85	1.58	1.32	1.26
Percentage of Variance Explained	27.7	10.78	7.67	5.77	4.23	3.61	3.42	2.93	2.45	2.33

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TABLE A3
Results of the Principal Components Analysis for the Engagement and Organizational Commitment Scales

Variables	Factor 1	Factor 2	Factor 3	Factor 4
Work Engagement				
At my work, I feel bursting with energy **(V1)**	.642			.144
At my job, I feel strong and vigorous **(V2)**	.637			.148
When I get up in the morning, I feel like going to work **(V3)**	.611			.185
I can continue working for very long periods at a time **(V4)**	.727			-.057
At my job, I am very resilient mentally **(V5)**	.665			.146
At my work I always persevere, even when things do not go well **(V6)**	.598			.107
I find the work that I do full of meaning and purpose **(D1)**				.729
I am enthusiastic about my job **(D2)**				.788
My job inspires me **(D3)**				.803
I am proud of the work that I do **(D4)**				.832
To me, my job is challenging **(D5)**				.758
Time flies when I'm working **(AB1)**				.407
When I am working, I forget everything else around me **(AB2)**			.803	
I feel happy when I am working intensely **(AB3)**			.553	
I am immersed in my work **(AB4)**			.467	
I get carried away when I'm working **(AB5)**			.778	
It is difficult to detach myself from my job **(AB6)**			.742	
Affective Organizational Commitment				
I would be very happy to spend the rest of my career with this organization		.465		
I do not feel a strong sense of 'belonging' to this organization		.860		
I do not feel 'emotionally attached' to this organization		.900		
I do not feel like 'part of the family' at this organization		.875		
This organization has a great deal of personal meaning for me		.691		
Eigen Value	8.95	2.77	1.62	1.16
Percentage of variance explained	40.69	12.57	7.37	5.25