

**Identification and exploration of the managerial behaviours  
associated with employee innovation**

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“Nobody said it was easy, no one ever said it would be so hard”

Goldplay, *The Scientist* (2002)



In loving memory of Andrew.....

*"Dream as if you'll live forever and live as if you'll die today."*

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## Abstract

This thesis presents nine studies aiming to identify and explore the managerial behaviours that are associated with employee innovation. The first study adopted an exploratory approach and used Critical Incident Technique (Flanagan, 1954) and Repertory Grid interviews (Kelly, 1955) to identify 15 managerial behaviours that are associated with innovation. The second study then explored the underlying factor structure of these 15 managerial behaviours, using exploratory and confirmatory factor analysis to identify a four-factor model (n=386). The four factors; Interpersonal Style, Feedback, Role Modelling and Empowerment can be plotted on two axes: 1) ideas-focused versus global behaviours, and 2) employee-focused versus task-focused behaviours.

The subsequent three studies aimed to establish construct validation of this four-factor model. Study 3 examined the four-factor model in relation to two prominent models of leadership: 1) Leader-Member Exchange theory (LMX) and 2) the Full Range Leadership Model. Study 4 explored the four-factor model in relation to the organisational characteristics previously shown to influence innovation. Study 5 examined the associations between the four-factor model and manager personality, using the Big Five model of personality and the Innovation Potential Indicator. Overall the result demonstrated evidence of construct validity. Study 6 and 7 then provided preliminary evidence of criterion-related validation of the four-factor model.

The final study then explored how the four managerial behaviour relate to the process of the innovation. The results indicate that managers influence all three phases of the

innovation process; idea generation, idea exploration and development and idea implementation.

In the final chapter the overall findings, are discussed outlining the practical and theoretical implications of the research. The results are discussed in relation to the Cognitive Evaluation Theory of motivation, exploring possible ways in which a manager may influence an employee's motivation to innovate.

## **Chapter 1: The management of employee innovation**

*"Do not go where the path may lead, go instead where there is no path and leave a trail"*

Ralph Waldo Emerson

### **1.1 Rationale for studying the management of innovation**

The need for innovation within an occupational setting has grown over the last decade due to the turbulence of the Western business environment. This has precipitated an interest in how to enhance employee innovation within organisations, as they constantly search for new products, services, processes and management practices. One way to enhance organisational innovation is through harnessing a reservoir of innovation within the workforce, as individual innovation is the building block for organisational innovation (Amabile, 1988).

Key to this, is the question 'can employees' propensity to innovate be enhanced'?

Research suggests the answer to this question is yes, if significant others help to create a setting which fosters innovation. We know that if given the appropriate circumstances, level of stimulation and sufficient security, human beings explore and manipulate their environment in creative and adaptive ways (Hrncir & MacTurk, 1990). However, exactly what can be done to create appropriate circumstances, stimulation and security has yet to be identified.

One salient characteristic of the organisational context, often cited to be an influential determinant of employee innovation, is style of supervision (Amabile & Gryskiewicz, 1987, 1989; Deci & Ryan, 1987; West & Farr, 1989). Indeed research has

slowly begun to focus on contextual variables that enhance innovation, yet there has been little theoretical development in this arena, especially in relation to the managerial behaviours that can enhance innovation. Many researchers have asked the question 'what is the most effective way to construct the work environment to facilitate innovation?' (e.g. Amabile, 1988; Woodman, Sawyer & Griffin, 1993). However, as recently noted by Zhou (1998), at present we know too little to answer this question with confidence. As Bartram (2004) notes there is a need to understand how to shape behaviours to meet organisational needs.

It is likely that managers play a main role in developing the appropriate setting for innovation to ensue. Research has shown employee innovation to be inhibited when individuals feel insecure and unsafe at work (West, 1987; West & Farr, 1990), and significant others can enhance feelings of psychological safety. For example, children who have a close bond with their parents are more likely to explore a strange environment (Ainsworth & Bell, 1970); clients who have a sense of psychological safety with their therapist are more likely to explore more threatening aspects of their own life (Rogers, 1961); and, similarly, employees are more likely to take risks and try new methods of working when they feel 'safe' and free from threat (West & Altnik, 1996). In a similar way to the parent or therapist, the manager may have a significant influence on an employee's perceived work environment, but further research is needed to identify the exact behaviours are responsible for this.

## **1.2 The current research**

This research will examine the managerial behaviours that are associated with innovation in the workplace, with the overall aim of identifying and developing a psychometric model of the managerial behaviours that may be associated



with employee innovation. In order to address this aim this thesis will firstly review the literature, before presenting a number of studies. This chapter, after exploring the definition of innovation, outlines and critiques the previous literature that has identified a range of managerial behaviours to possibly be associated with employee innovation. A short review is also given of a prominent model of the organisational climate that fosters innovation, and the implications this has for the management of employee innovation. Attention is then focussed on individual employee characteristics associated with innovation, and exploration of which of these characteristics managers may be influencing. Finally this chapter concludes with a series of questions which form the basis of this thesis.

### **1.3 The management of innovation: Literature review**

This literature review begins with the presentation of a working model of innovation within an occupational context. This model was developed based on the literature review presented below, and shows employee innovation to be influenced by managerial and organisational factors. This chapter aims to explore each of the boxes in the working model, and after defining innovation, will commence with an exploration of the previous literature on the managerial behaviours thought to be associated with employee innovation. After a review of the criticisms that can be made of research in this area, the organisational factors thought to influence employee innovation are presented. A prominent psychometric model of organisational climate that fosters innovation is reviewed. The chapter then focuses on individual innovation and explores the individual difference factors associated with innovation. This is done to highlight how theoretically managers may influence employee innovation. The literature review is intended to provide the reader with a pathway through what is known about the managerial behaviours associated with innovation and what is not known,

and therefore concludes with a series of research questions that still need to be answered, that are used as the basis for this thesis.

The innovation literature is vast, consisting of a plethora of work conducted by scholars from a range of subject matters. Over half a century ago Guildford (1950) endorsed the importance of innovation in his address to the American Psychological Association. Today a Psych-info search on innovation results in nearly over 3000 articles. The current programme of research aims to add to this area and make an original contribution; firstly, by adding clarity to the understanding of the managerial behaviours associated with innovation. Secondly, by providing integration to a large number of single studies which concentrated on different managerial behaviours. Thirdly, through producing a psychometric model and instrument of the managerial behaviours that can be associated with employee innovation. Fourthly, by exploring the previously identified managerial behaviour within an occupational environment (as some studies have relied upon student samples). Fifthly by identifying original managerial behaviours that are associated with innovation. Finally, by developing an integrative theoretical framework within which to study the managerial behaviours associated with employee innovation.

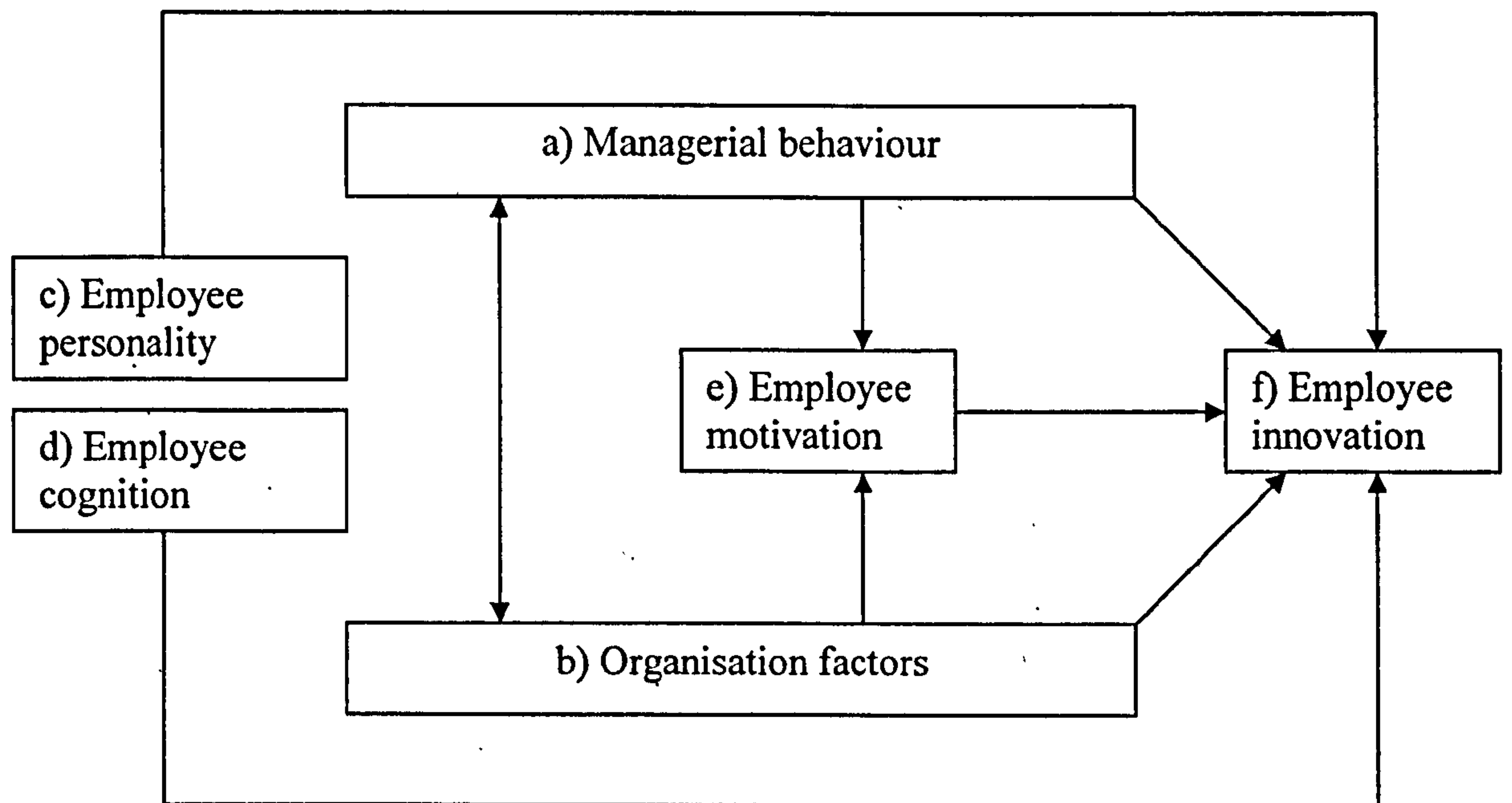
Previously researchers have developed integrative models of innovation within social domains. For example Csikszentmihalyi (1988) presented a systems view of innovation. In this model Csikszentmihalyi (1988) claimed innovation is the product of three main forces; 1) the field, 2) the domain and 3) the individual. The field can be defined as all those persons who affect the structure of the domain, the domain is the culture or system of customary practices, and the individual is the innovator (Csikszentmihalyi, 1988). Although this model provides insight into what may influence of the concept

of innovation. This model is not specific to innovation within organisations. Therefore, it adds little in terms of understanding about how managers may influence innovation .

Another model of innovation which is specific to innovation in organisation Woodman, Sawyer and Griffin's (1993) interactionist theory of innovation, which integrated personality, cognitive and social explanations of innovation. Within this model Woodman et al. (1993) claim that individual characteristics, group characteristics, and organisational characteristics are the input which result in innovation. However this model excludes the role of managerial behaviours, and therefore like Csikszentmihalyi (1988) it provides little insight in to the understanding of the role of the manager in employee innovation.

There has been limited focus on managerial behaviours as an explicit category or factor associated with employee innovation. Therefore, below a working model is presented in Figure 1.1 that shows innovation within the occupational context, developed by the researcher based on the literature review. This shows innovation to be associated to both organisational factors and managerial factors, and shows the association between these factors.

**Figure 1.1: Working model of the influence of the organisational context on employee innovation**



#### **1.4 Defining innovation**

This section aims to review the definition of innovation, and how this differs from creativity, and is thus focusing on box f in Figure 1.1. After examination of the definition of innovation is made, attention is given to process models of innovation.

This section concludes with the presentation of a recently developed componential framework of innovation (Patterson, 2002), which is used within some of the studies presented in this thesis.

Innovation has been defined in a number of ways by a number of researchers. Sternberg (2002) cited the confusion over the terms 'creativity' and 'innovation' to be a key roadblock to study of these concepts. The confusion around the definition of innovation and creativity is well accepted in the literature, and the terms are often used

interchangeably (Sternberg, 2002). Kosslyn (1980) argued *"it is not necessary to begin with a crisp definition of an entity in order to study it...it is hard to define something one knows little about"* (p. 469). However, if advances are to be made in the identification of management behaviours that influence innovation, it is important to have a clear definition of what managers are aiming to enhance.

Recent literature accepts that whilst the concepts of creativity and innovation are similar there are distinct differences between innovation and creativity (see West & Farr, 1990; Patterson, 2002). The main distinction lies in *novelty*, where creativity is concerned with the generation of completely new and original ideas, whereas innovation deals more with both the generation and the *implementation* of ideas (Kanter, 1983; Mumford & Gustafson, 1988; Patterson 2002; Van de Ven, 1986). Supporting this assertion, West and Farr (1990) defined innovation in an organisational setting as:

*"...the intentional introduction and application within a role, group or organisation of ideas, processes, products or procedures, new to the relevant unit of adoption, designed to specifically benefit the individual, the group, the organisation or wider society."* (p. 9)

Innovation in organisational contexts has a number of key characteristics (King & Anderson, 2002). Firstly, an innovation has a tangible output (e.g. a product, process or service); in comparison creativity is merely the generation of a novel idea. Secondly an innovation must be new to the social setting and must be intentionally applied rather than accidental. Creativity on the other hand may involve the accidental discovery of an idea. Thirdly, an innovation must aim to produce a benefit to the organisation; and finally the innovation must be public in its effect.

Recent advancements in this area accept the difference between creativity and innovation, and note that innovation may comprise an idea generation stage followed by an idea application stage. One example of this is Axtell, Holman, Unsworth, Wall, Waterson and Harrington (2000), who claim that innovation is an iterative process and that there are two main stages: Firstly (there is) an awareness or suggestion stage, and secondly an implementation stage.

Historically a number of linear stage theories of innovation have been proposed (e.g. Wallas, 1926). However, other researchers have noted that innovation is not simply a linear process, (Miller, Galanter & Pribram, 1960). Another stage-based model is that of Zaltman, Duncan, and Holbeck (1973), who, like Axtell et al. (2000), proposed two main stages of innovation. However, Zaltman et al. (1973) also outline five sub stages of the innovation process:

### **Initiation**

- 1) *Knowledge awareness* – the organization becomes aware of the existence of an innovation, which it has the opportunity to utilize.
- 2) *Formation of attitudes* – members of the organisation form and exhibit their attitudes to the proposed innovation.
- 3) *Decision* – the potential innovation is evaluated and the decision to proceed with it or abandon the idea is made real.

### **Implementation**

- 4) *Initial implementation* – first attempts to utilize the innovation are made, often on some sort of trial basis.
- 5) *Continued - sustained implementation* – the innovation becomes routinised as part of organisational life.

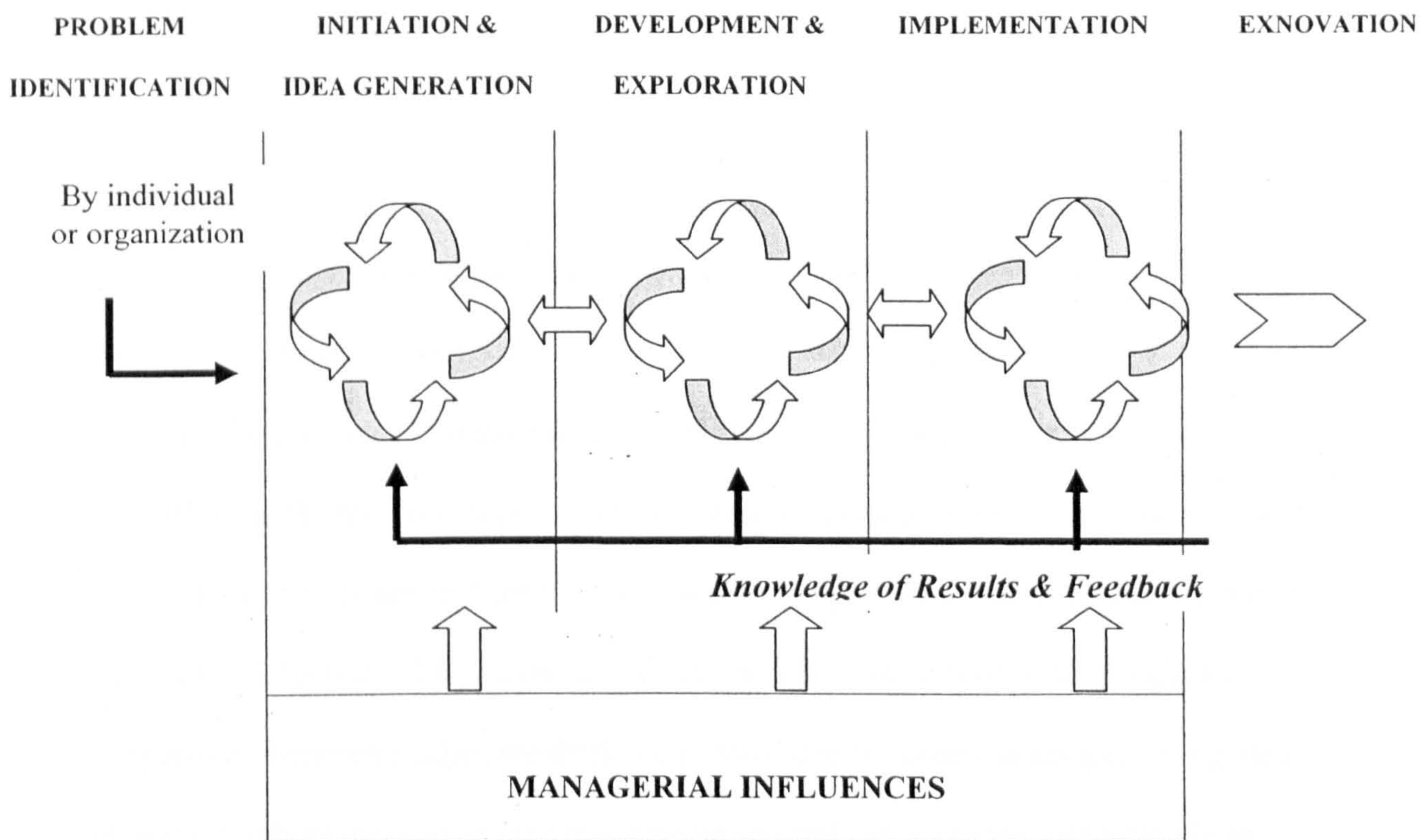
Although Zaltman et al.'s (1973) model is based on innovation in an occupational environment the notion of stages in the innovation process can still be criticised.

Despite recurrent attempts to plot the stages of innovation, there is limited evidence that innovation actually occurs in stages. For example, developing a new product is an iterative process that rarely follows a neat predictable process or follows a set of definable stages. Indeed Schroder, Van de Ven, Scudder and Polley (1989) criticised the linear notion of innovation, and instead suggested that innovations have common features which do not occur in a set pattern.

More recently Patterson (2004) has mirrored this sentiment, by proposing that employee innovative behaviour consists of three *phases*, and is an iterative process between all these phases. Patterson's (2004) model is more applicable here as it focused specifically on the individual level, and highlights the employee characteristics and behaviours that are important. As can be seen from Figure 1.2, in Patterson's (2004) framework employee innovation involves: 1) a creative thinking and idea generation component; 2) a contextual application and assessment component and; 3) an implementation component. This componential framework also demonstrates how the innovation process is not simply one way, but that knowledge of the results leads employees to reappraise and generate further ideas. Supporting this Port and Patterson (2003) found that 69% of case studies of employee innovation followed a non-linear pattern. Further to this Port and Patterson (2003) found that all managers in their sample (n=39) identified three phases in their examples of direct report's innovation. Thus initial empirical support for this framework has been provided, and demonstrated how this framework can be applied to the management of employee innovation. Therefore, as this more recent framework overcomes many of the flaws of previous

innovation frameworks (i.e. it does not suggested linear stages, has some empirical support, and focuses on innovation at the employee level) it will be employed as the innovation framework within the studies presented in this thesis.

**Figure 1.2: Patterson’s (2004) Componential framework of the innovation process**



Adapted from: Patterson, F. (2004) Innovation. In C. Spielberger (Ed.) *Encyclopaedia of Applied Psychology*. New York: Academic Press

The distinction between innovation and creativity, and more importantly between idea generation and implementation, has obvious implications for research that aims to identify managerial behaviours that can influence innovation. Acknowledging this, the current research will explore managerial behaviours, which are associated with both idea generation and idea implementation, thus focusing on innovation as a concept that encompasses but is broader than creativity. However, as discussed later some studies have solely focused on idea generation and therefore further clarification is need to



establish if these behaviours are also associated with idea implementation (innovation).

To this end the current research programme defines *employee innovation* as:

*Intentional employee engagement in the generation and the implementation of any idea in an organisational setting, that intends to benefit the organisation and produce an output<sup>1</sup>.*

### **1.5 Summary**

In summary research has shown that innovation is a multifaceted phenomenon, and contention still exists over its definition. It is important for the reader to note at this stage that the problems that surround the definition and conceptualisation of innovation also influence the measurement of these constructs. Therefore, in reading this review it is important to be aware that the diverse research in this area has defined and measured innovation differently. The innovation literature represents a conceptual jungle as comparisons between studies are difficult to draw, due to some studies measuring idea generation, others measuring idea implementation and some studies measuring both. Further, not all of the studies presented below were conducted in an organisational setting. For example, Zhou (1998) used an experimental paradigm to demonstrate how feedback enhanced students' performance on an idea generation task, however such a task with students offers little insight in to employee behaviour within an occupational context. This is because employee idea generation is unlikely to be set in such a way, and the dynamic between the manager and employee maybe different from that between a student and an experimenter. Consequently, clear theoretical implications for employee innovation at work are lacking from previous work in this area. These points will be discussed later in more detail when a review of the criticisms of previous work in

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<sup>1</sup> An output may be a product, process or service.

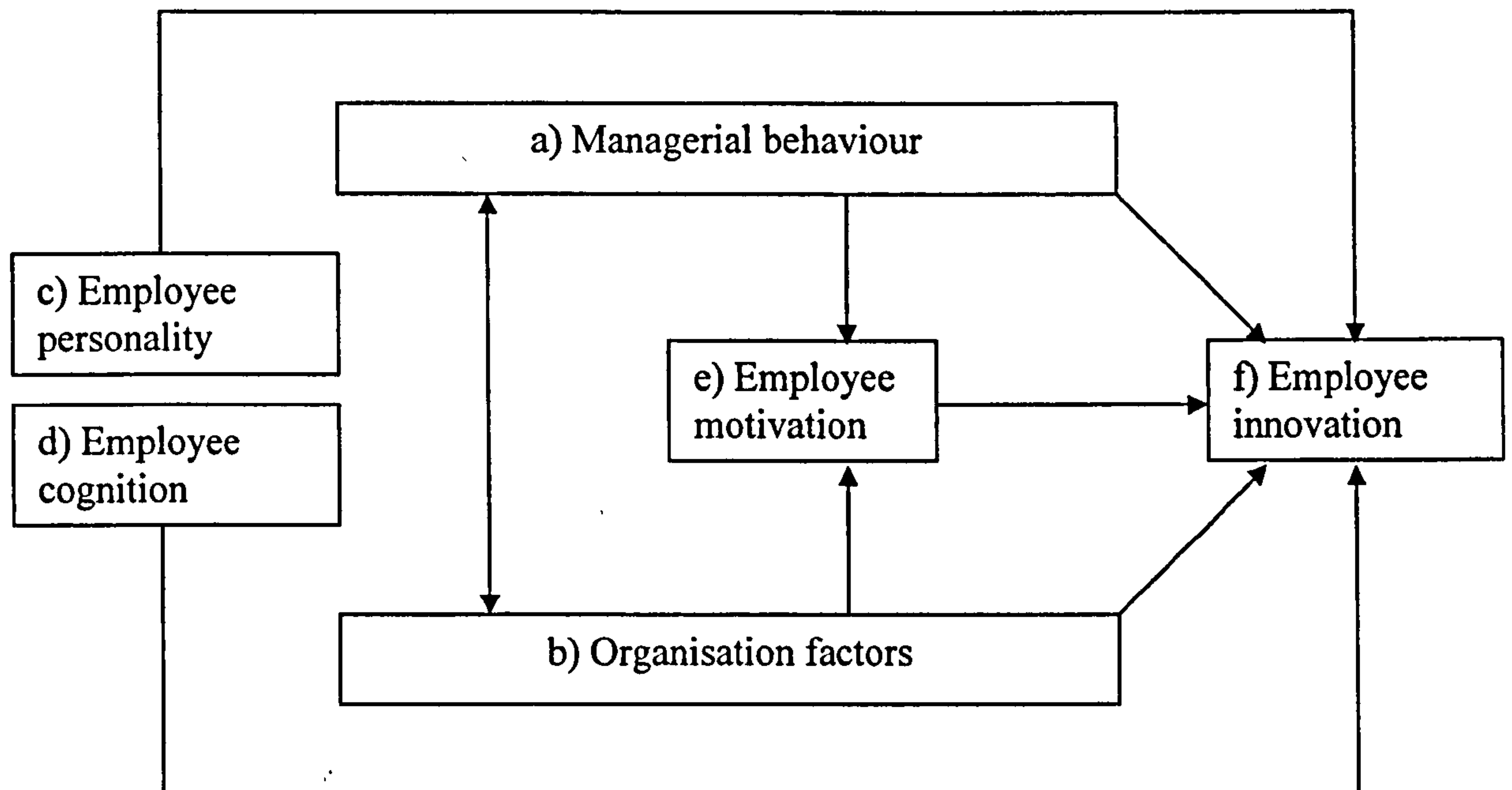
this area is presented, first however an exploration of the research that examines the managerial behaviours associated with employee innovation that is given.

### **1.6 Managerial behaviours associated with employee innovation: Current understanding**

This literature review aims to set the context for the focus of the current thesis thus providing a greater understanding of innovation. This thesis explores the managerial behaviours associated with employee innovation and attention will now turn to literature in this area. Firstly the chapter reviews the managerial behaviours associated with innovation, and discusses the criticisms of this highlighting the gaps in the literature. A review is of a prominent model of the organisational climate which influences innovation is then outlined. This is model discussed because it includes managerial behaviours as a subcomponent of organisational climate (Amabile, 1995). However, the researcher believes that influence of managerial behaviours on employee innovation deserves a more explicit focus. This chapter concludes with this point, and presents a number of questions that need to be addressed in this area, in order to enrich research within this area.

As already noted, by reviewing the existing literature, a model of employee innovation in an organisation context was developed. This model is presented again in Figure 1.3. Box a, the managerial behaviours influencing innovation, will be reviewed and critiqued first, followed by a review of some of the literature relating to box b (organisational factors).

**Figure 1.3: The influence of the organisational context on employee innovation**



Before embarking on a review of box a and b in Figure 1.3 it is important to note that, regrettably, it is impossible to separate the previous literature into that which has examined either idea generation (creativity), or idea implementation, and or both generation and implementation (innovation). Consequently, literature that has examined both idea generation and idea implementation will be reviewed. As discussed in Section 2.4, which outlines the criticisms of the literature, problems of definition create confusion around the identification of the managerial behaviours associated with employee innovation.

This section begins with a review of the factors shown in Table 2.1. Some of these behaviours have empirical evidence to support their association with employee innovation, while others are hypothesised to influence innovation based on theory alone. In an effort to bring clarity to the review of the managerial behaviours themes were

drawn between the behaviours. The themes, managerial behaviours and example sources are shown in Table 1.1.

**Table 1.1: Managerial behaviours associated with innovation**

Theme	Managerial behaviour	Example Source
1) Support	Support for the team's work and ideas	Delbecq & Mills (1985)
	Supportive supervision	Oldham & Cummings (1996)
2) Feedback	Supportive and informative feedback	Amabile & Grysiewicz (1987)
	Positive feedback	Zhou (1998)
3) Encouragement	Encourage employees to voice their concerns	Deci & Ryan (1987)
	Supervisory encouragement	Amabile et al. (1996)
	Encouragement of risk taking	Raudsepp (1963); Amabile et al. (1996)
	Expectations of innovation	Eden (1984); Eden & Shani (1982); Scott & Bruce (1994)
	Job requirements	Unsworth, Wall & Carter (2000)
	Instructions	Amabile et al. (1996)
	Goal setting	Shalley (1995); Redmond et al. (1994)
4) Participative Communication	Informal style	Zhou (1998)
	Social support	West (1989)
	Open channels of communication	Kimberley (1981); Kimberley & Evanisko (1981)
	Free-flowing communication	Gregory (1969)
	Participation	Tierney et al. (1999)
	Leader member exchange	Dansereau et al. (1975); Graen & Scandura (1987); Tierney et al. (1999)
	Autonomy	Bailyn (1985); Shalley et al. (2000)
5) Autonomy / Freedom	Balance between freedom and constraint	Amabile & Conti (1994)
	Control in the form of choice	Andrews (1975)
	Control over decisions	Greenberg (1992)
	Mutual respect	Young (1994)

The behaviours listed in Table 1.1 will be discussed under the following headings: 1) Support, 2) Feedback, 3) Encouragement, 4) Participative Communication, and 5) Freedom, which are the themes that were identified in the literature. These themes were drawn to provide a structure to the previous research in this area.

### 1.7.a Support

One of the main management factors cited as conducive to innovation is the support a manager provides for his or her subordinates, and this theme includes support for the teams work and ideas, and supportive supervision.

However, defining the aspects of management that are supportive of innovation is not an easy task. For example, Rogers (1954) proposed that the provision of psychological safety, helpful advice, empathy and growth enhancing task assignments would foster innovation. Deci and Ryan (1987) claimed that when supervisors are supportive they show concern for their employees' feelings and needs, encourage them to voice their own concerns, provide positive, informational feedback and facilitate employee skill development. Therefore, a range of attributes can be included in support for innovation.

Previous research supports the proposition of a relationship between a supportive management style and employees' propensity to innovate. For example, West (1989) also demonstrated that health care professionals were most innovative when their supervisor provided high levels of social support. Similarly, Oldham and Cummings (1996) found that supportive supervision made a small significant contribution to employee innovation rated by the supervisor ( $r^2 = .10, p < .05$ ). In defining a supportive supervisor Oldham and Cummings (1996) claimed that such a supervisor promoted feelings of self determination as opposed to controlling or limiting innovative performance. Indeed findings showed that supportive supervision and non controlling supervision interacted to predict greater variance in the innovation ratings ( $r^2 = .18, p < .05$ ).

Therefore, in this context supportive supervision is similar to the managerial behaviour of giving autonomy outlined below. This further supports the notion that the definition of 'managerial support for innovation' is unclear, and further research needs to clarify the behaviours which typify it.

Further, it is important to note that Oldham and Cummings (1996) can be criticised, in that the manager's liking or relationship with the employee may have biased the results. For example, a manager may be more supporting of an employee he or she likes, and as a result of this liking have rated the employee's performance higher, regardless of their 'true' innovation. Therefore these results need to be interpreted with caution.

### **1.7.b Feedback**

Related to the concept of supportive supervision is positive feedback, which has been identified as important for the enhancement of innovation, and is the second theme in Table 1.1. For instance, Amabile and Gryskiewicz (1987) found (using critical incident interviews) that feedback, which is supportive and informative, was reported by employees giving examples of idea generation in research and development laboratories.

Zhou (1998) recently found that feedback valence and feedback style had an effect on idea generation. In this setting valence is described as the positive or negative outcome of the comparison between an individual's idea generation performance and a situational criterion (Pretty & Seligman, 1984), and feedback style is the manner in which feedback is given (i.e. informational or controlling; Pittman, Davey, Alafat, Wetherill & Kramer, 1980). In a laboratory experiment 210 undergraduate students were asked to find novel and useful solutions for the problems presented in memos, while feedback valence, style and task autonomy were manipulated. Zhou's (1998) findings

showed that when individuals were given positive feedback they exhibited higher idea generation, than those receiving negative feedback (mean idea generation score of 4.49 in positive feedback group and mean of 3.91 in negative feedback group). Furthermore, those who received feedback in an informational style showed higher idea generation, than those whose feedback was delivered in a controlling way (mean idea generation score of 4.51 in the informational style group and mean of 4.09 in the controlling style group). Using regression analysis Zhou (1998) showed that feedback valence, feedback style and task autonomy predicted variance in idea generation (with  $r^2$  values of .36, .41, .41 respectively with  $p$  values of  $<.01$ ). Zhou (1998) also found an interaction between these feedback factors, such that positive feedback delivered in an informational way resulted in individual's exhibiting even greater idea generation ( $r^2 = .42$ ,  $p <.01$ ).

However, although Zhou (1998) did provide empirical evidence for the proposition that feedback enhanced idea generation, he focused solely on idea generation and used a student population. Therefore, further empirical exploration of how managerial feedback is associated to employee innovation (idea generation *and* implementation) is needed.

### **1.7.c Encouragement**

The third theme of managerial behaviours in Table 1.1 is broad and includes; encouragement of risk taking, encourages employees to voice their own concern, supervisory encouragement, expectations of innovation, job requirements, instructions and goal setting, all of which, previous research has proposed may influence innovation and are reviewed below.

One managerial behaviour that is hypothesised to be associated with innovation is management that not only tolerates but **encourages risk-taking**. Raudsepp (1963) urged managers to encourage constructive non-conformity, individuality and diversity. Amabile et al. (1996) noted that previous research has identified that encouragement of taking risks is important to innovation (e.g. Cummings 1965; Delbecq & Mills, 1985; Kanter, 1985). Young (1994) also claimed that a "loose rein" management style is important for innovation at work. This is defined as a management style which is tolerant and expects a certain degree of risk-taking. However, there is little empirical testing of this proposition.

In relation to giving encouragement is **leader role expectation**. The positive effect of expectation of others on an individual's behaviour is well documented in the self-fulfilling prophecy (SFP: Rosenthal & Jacobson, 1968). A special case of SFP is the Pygmalion effect (Livingston, 1969), which refers to the modification of an individual's behaviour based on the expectations for that behaviour received from another individual (e.g. manager) (Eden, 1984, 1990).

Research has shown how managers can use the Pygmalion effect to influence their subordinate's behaviour. For instance Eden and Shani (1982) found using matched paired groups, that the introduction of expectations explained 73% of the variance in performance, and the subordinates of supervisors who expected more (from their subordinates) also rated their supervisor as a better leader (with the introduction of expectations explaining 28% of the variance in leadership ratings).

Leader role expectations in this context are the expectations the manager has of his or her employee (s) to be innovative. Scott and Bruce (1994) assessed the



implication of the Pygmalion Effect on subordinate innovation, by exploring the role of leader role expectations. The role expectations that a manager had for a subordinate to be innovative were found to be positively correlated ( $r = .33, p < .01$ ) to the subordinate's innovative behaviour (as rated by their supervisor). However, role expectations were measured using a single item: *“not all work roles require individuals to be innovative. In fact it could be argued that effective work groups have a blend of innovative individuals and individuals whose role it is to support the innovation of others. In this context, the role is a set of expectations of the position independent of the person holding the position. Indicate the degree to which you would describe the role of each of your subordinates as being either an innovator or being a supporter of innovation”* (Scott & Bruce, 1994, p. 590-591). This item is very long, and although it showed test re-test reliability of .87, there was no presentation of information on its validation.

Eden (1984) theorised that a managers' expectations of their subordinates are communicated through managerial behaviour. Therefore leader role expectations may alter employee self-expectation and subsequent motivations (Eden, 1984) and in turn propensity to innovate.

Leader role expectation is also likely to be related to innovation because, when a manager expects subordinates to be innovative, the subordinates will perceive the manager as more encouraging and facilitating of their innovative efforts (Scott & Bruce, 1994). It is also likely that leader role expectation influences the encouragement that a manager gives his or her employees to take risks and be innovative in their work role.

Another aspect of encouragement the manager gives is the communication of **job requirements for innovation**. A factor that has been identified as important to innovation in the workplace is if the job *requires* innovation from the jobholder.

Innovation requirements are defined as the perceived need to engage in the innovative process (Unsworth, Wall & Carter, 2000). It is likely that innovative requirements arise from job descriptions, the particular role, or the day-to-day necessities of performing the job (Unsworth et al., 2000). Indeed some research has shown that job requirements are likely to influence innovation at work; for instance Oldham and Cummings (1996) noted how some jobs which actually *demand* innovative outcomes, by encouraging employees to focus simultaneously on multiple dimensions of their work, whereas highly routine jobs may inhibit such a focus.

One study has shown that explicit job requirements predicted innovation and job requirements had a greater influence on innovation than autonomy and supportive leaders did (Unsworth et al., 2000). Unsworth et al. (2000) found that when innovation requirements was entered in a regression equation, the effects of autonomy and supportive leadership were surpassed and non significant, while innovation requirement had an  $r$  value of .78. This study claimed that when a job requires innovation and an employee is not innovative, it could 1) violate the psychological contract (Rousseau, 1989) and 2) lead to punishment and not receiving rewards.

However, it also seems likely that there is a self-selection bias in jobs that openly require innovation, in that people who consider themselves innovative search for and accept jobs which explicitly stipulate innovation requirements in job descriptions. As a result, it is probable that such individuals already possess the intrinsic

motivation and self-efficacy to be innovative. Further to this, is important to note that Unsworth et al. (2000) only focused on idea generation as the dependant variable, and the influence of job requirements on innovation still need to be empirically tested.

Despite this, the importance of Unsworth et al.'s (2000) findings for this thesis are that job requirements of innovation are likely to be important. Unsworth et al.'s (2000) study also implies that in jobs which do not openly require innovation or are typically 'innovative jobs', it may be the manager's role to communicate to subordinates that they too are required to be innovative at work. It seems that it is the manager's role to ensure that subordinates are aware that it is part of their job role to be innovative, even if they do not consider it to be part of their job role. As Amabile (1996) found, *"people are more likely to produce unusual, useful ideas if they are given licence to do by the situation or by explicit instructions"* (p. 1159-1160).

Therefore, research implies that in order to influence employee propensity to innovate, managers need to ensure that his or her employees regard innovation as part of their job role. In support of this previous research has shown how managers influence employee perceptions of their job role through their expectations. For example, in developing the Leader Member Exchange theory Graen and colleagues used the concept of a negotiated role as a theoretical base (Dienesch & Liden, 1986). Graen (1976) pointed out that, *"Organisational members accomplish their work through roles"* (p. 1201). In defining job roles, individuals (e.g. managers) with vested interests in the role performance of another individual (e.g. subordinate), will exert pressure upon the individual in the form of role expectations (expectations about the role an employee should adopt; Kahn, Wolfe, Quinn, Snoek & Rosenthal, 1964; Graen, 1976). Through such role negotiation managers may communicate innovation job requirements to employees. This supports the notion that it is likely that both leader role expectations and job

requirements, in this context, are components of giving employees encouragement to innovate.

To conclude, leader role expectations and job requirements have been identified as important influences on employee innovation. Although a clear distinction between these two concepts is not apparent, it is likely that through leader role expectation the manager communicates to the subordinate that innovation is part of his/her job requirements and role, all as part of giving encouragement to innovate.

Another managerial behaviour that can be used to encourage innovation is **goal setting**. The influence of goal setting on behaviour is well documented (Locke & Latham, 1990; Shalley, 1991). Research has supported the positive effects of goals on performance (see Locke & Latham, 1990; Wofford, Goodwin & Premack, 1992, for meta-analytic reviews), implying that specific difficult goals lead to better performance (Locke & Latham, 1991). However, such research also highlights it is imperative that the individual is committed to these goals for performance gains to be made.

However, as Shalley (1995) noted, much less research specifically examines goal setting and its relationship with innovation at work. Shalley (1995) examined the influence of a "do your best" innovation goal on levels of innovation, versus those given no goal. Shalley (1995) argued that an innovation goal motivates individuals to direct their attention and effort towards producing novel and appropriate responses. In an earlier study Shalley (1991) found a significant difference between the mean of a do you best innovation goal (mean = 4.93) and no innovation goal (mean = 3.49) ( $p < .05$ ). However, Shalley (1995) did focus on idea generation and not innovation (which would have also included idea implementation) as outcome variable.

In line with this Redmond et al. (1993) noted that goal setting is a component of problem solving. This relates to the current models of goal setting and motivation (Locke, Fredrick, Lee & Bobko, 1984), which argue that the problem construction process may relate to motivation as a result of self-set goals.

Managers play an important part in the setting of goals at work, and can also influence employee participation in goal setting (Locke, 1996). One component of the skills important in innovation management identified by Amabile (1988) is goal setting that is tight at the overall and outcome levels, but loose in the procedural process towards these goal (see also Amabile & Gryskiewicz, 1987; Bailyn, 1985), implying goal setting may also relate to autonomy.

Therefore, one way in which managers can influence their subordinates' innovation is to set innovation goals for them. Furthermore, for goal setting to have an effect on innovation it is important that the subordinate is committed to those goals (Locke 1996). One way to enhance commitment to goals is through participation in the goal setting.

Over all it seems that previous research suggests that managers giving encouragement to innovate incorporates high expectations of the employees' innovative capability, communication to employees that their job role requires them to innovate and the setting of goals for innovation.

#### **1.7.d Participative Communication**

This theme, like encouragement, is broad and includes open channels of communication,

an informal style of communication, empathy, social support, and participation. These factors are reviewed in turn below.

Previous literature has identified that **open channels of communication** are important for innovation (Kimberley, 1981; Kimberley & Evanisko, 1981). Amabile & Conti (1994) claimed that a management style that is conducive to individual innovation includes an open communication between project teams and their supervisors.

Similarly, Gregory (1969) claims that communication is key to innovation, and that there is a need for free-flowing communication in the workplace for innovation to flourish. However, there has been little research which empirically tests this notion.

In line with communication style, Young (1994) claimed that mutual respect and trust help to build a good supervisor - subordinate relationship which is necessary to nurture innovation. Similarly, Kimberley and Evanisko (1981) argued that innovation is influenced by a democratic or considerate style of manager behaviour - characterised by trust and respect - and an open approach to decision making.

**Participation** in decision-making is a well-known managerial behaviour that can influence employee innovation (Kanter, 1983). For example, a participative management style (Tierny et al., 1999) and a democratic or considerate style (Kanter, 1983; Kimberly & Evanisko, 1981) have been argued to be important for innovation. This further supports the notion that a participative communication style is important for innovation.

### **1.7.e Autonomy**

Many researchers have demonstrated that personal autonomy is a key factor for individuals' innovative work in the scientific, and Research and Development areas (Bailyn, 1985; Shalley et al., 2000), and this is the final theme in Table 1.1. Autonomy can be defined as the perception of self-determination with respect to work procedures, goals and priorities (Koys & Decotiis, 1991).

From a content analysis of 120 interviews with Research and Development engineers, Amabile and Gryskiewicz (1987) identified nine qualities of the occupational environment that serve to enhance idea generation. One quality reported by at least 74% of scientists when interviewed was a sense of freedom over one's work. Along similar lines, Cummings (1965) also found that one factor which hindered the development and expression of ideas was limited span of control. Amabile and Conti (1994) however have pointed out that one key aspect of innovation management is the balance between freedom and constraint.

In addition to this, previous research has shown that in situations which are typically controlling there is a negative effect on innovation (Deci & Ryan, 1989). For instance Amabile (1983a) found that surveillance produced less creative responses from subjects, and children who competed for a reward produced less creative collages than their non-competitive counterparts (Amabile, 1982).

Related to this is the degree of control employees have over decisions they make at work. This relates to how much participation and input employees are given in their work. For instance, control in the form of choice has been shown by Andrews (1975) to have a positive effect on innovation. In another study Plunkett (1990) found

that increasing feelings of participation, by making decision-making and goal setting more interactive, resulted in an increase in innovation. This demonstrates how autonomy relates to the participation factor outlined above.

One type of control over decisions, which Greenberg (1992) argued to be important for innovation, is choice of task to be performed. Greenberg (1992) found that having control over choice of problem had a significant effect on subsequent innovation, yet choice of deadline or supervision had no significant effect. Therefore only weak support was found for the hypothesis that control over decision-making at work will enhance innovation. However Greenberg's (1992) study highlights that not only is control over decisions important for innovation, but the type of decision may also play a roll in the subsequent innovation.

This review will now go on to outline the criticisms that can be made of research which has examined the managerial behaviours associated with innovation.

## **1.8 Criticisms of the research**

There is a series of criticisms which can be made against the previous research in this area, including; 1) definition and measurement of innovation; 2) measurement of management factors; 3) lack of an integrative theory; 4) single variable approach; 5) samples; 6) little advancement towards a contingency theory; and 7) empirical support. Each of these will now be outlined.

### **1.8.a Problems with definition**

As noted earlier, there is great confusion over the definition of innovation. This means that different studies are often focusing on different concepts. This issue is



outlined in greater detail at the beginning of the review. However, in examining the research presented on the managerial behaviours and innovation, it can be seen that under the heading of innovation researchers have examined idea generation, and/or idea implementation.

### **1.8.b Measurement of innovation**

As a result of the confusion surrounding the definition of innovation, research examining this concept has utilised a series of different methodologies to measure innovation. Some methods have focused on innovation outputs and include an array of questionnaires including divergent thinking tests such as Guilford's (1950) Unusual Uses Test. This test asks people to think of as many uses as possible for a common object. Likewise, aiming to measure a similar concept, Torrance (1967) developed the Torrance Test of Creative Thinking (TTCT).

However, generative thinking (idea generation) is only a small component of employee innovation in an occupational context. As a result many such tests only focus on a small subset of innovation outputs and do not really provide a useful insight into the implementation of ideas in an occupational setting.

Further to this, pen and paper tests have been described as inadequate (Sternberg, 1986). Sternberg and Lubart (1999) argue that more significant productions of drawing or writing sample would be appropriate, however again these would offer little insight into innovation in an occupational setting. Other authors have used ratings of experts or supervisors (e.g. Scott & Bruce, 1994). However, often access to managers who are willing or able to rate employees is limited and this can therefore be logistically difficult to administered. Furthermore, innovation within in an occupational

environment occupies a broad behavioural domain, and the rating of employee's innovation outputs can be difficult and inconsistent across employees.

Therefore research in the area of occupational psychology has recently begun to focus on the individual characteristics that are associated with innovation (See Patterson, 1999). Recently Patterson (2000) has developed Innovation Potential Indicator (IPI: Patterson, 1999), a published psychometric tool it has been exposed to a rigorous validation process (see Patterson, 1999) and is specifically designed to assess the personal characteristics associated with innovation at work. This measure therefore allows exploration of the managerial behaviours associated with innovation in relation to the personal characteristics that are associated with employee innovation, and will be used in a later study to demonstrate construct validity of the model of the management of innovation developed in this thesis.

It is important to note however that the IPI measures potential (i.e. individual predictors of innovation) and not innovative outputs (i.e. actual behaviour), as supervisor rating do. However, this test provides a systematic way in which to explore the relationship between the managerial behaviours and behaviours which predict employee innovation.

### **1.8.c Measurement of management behaviours**

The studies outlined above can be criticised for their measurement of the managerial behaviours. Often the questionnaires employed have received very little scientific validation, and thus provide little evidence that such measures are appropriately measuring the domain. One example of this is Scott and Bruce (1994), who as noted earlier used a very long single item to measure leader role expectation (*“Not all work roles require individuals to be innovative. In fact, it could be argued that*

*effective work groups have a blend of innovative individuals and individuals whose role it is to support the innovation of others. In this context, the role is a set of expectations of the position independent of the person holding the position. Indicate the degree to which you would describe the role for each of your subordinates as being either an innovator or being a supporter of innovation”, p.590 - 591).*

This also creates problems in comparisons between studies, as different measures are employed to measure the same management practices, offering little cross study consistency. Furthermore, with little construct and criterion validation around these measurement techniques it is difficult to be certain that studies are measuring the same or different management behaviours. Such studies also tend to simplify these management practices. For example Oldham and Cummings (1996) used a seven item scale to measure supportive supervision. However, as the previous section demonstrates the behaviours which can be themed under the heading of ‘supportive supervision’ are broad. As a result it is unlikely that a seven-item scale is adequate to gain measurement of such a complex construct as many behaviours can be categorised as ‘supportive supervision’.

This has resulted in a confusing literature base, and due to problems with measurement results have to be interpreted with caution. The measurement issues have also contributed to the next criticism; the lack of an integration between findings.

#### **1.8.d Lack of integration of findings**

Although managerial behaviours have been identified as important to innovation (Tierney et al., 1999) a coherent and well-validated theoretical framework does not exist. It seems that in comparison to research which has focused on

individual characteristics of innovative people (e.g. Cattell & Butcher, 1968; Gough, 1979; Patterson, 1999), and research that has focused on ways to nurture innovation (e.g. Baron, 1965; Parnes, 1967), the amount of research looking specifically at management behaviours associated with innovation is considerably smaller. What is more, despite the need to identify the role of management in innovation (Tierney, Farmer & Graen, 1999) little attention has been given to the impact of managerial behaviours on subordinate innovation (Redmond, Mumford & Teach 1993).

Within the literature there is very little integration of the research. Instead, what seems apparent is simply a list of possibly relevant management factors. Due to the flaws in measurement of management behaviours and innovation within the previous research, it is difficult to use such work to form a more integrative framework. Further to this, there has been little theoretical integration of such managerial behaviours with possible mechanisms through which managers may influence innovation. As is noted below it is likely that out of the individual characteristics shown to be associated with innovation (personality, cognitive abilities and motivation) motivation is the aspect most likely to be influenced and changed by managers. Despite this, researchers have failed to integrate the managerial behaviours they have identified as likely to influence innovation with theories of motivation.

#### **1.8.e Single variable approach**

Another reason why there has been little development towards an integrative framework is because researchers often adopt a single variable approach. Few authors have attempted to explore a series of management behaviours and interlinks between them, in an attempt to develop an integrative model. The focus on single variables (e.g. Zhou, 1998; Shalley, 1995) has resulted in a limited progression towards

comprehensive categories of management factors which may either enhance or hinder innovation at work. Indeed, when searching the previous literature, little pattern emerges; instead, an array of variables measured and labelled in a number of different ways are presented (see Amabile & Gryskiewicz, 1989). To overcome this, this literature review has attempted to group such previous research into a more integrative framework.

#### **1.8.f Sampling**

Much of the early work on innovation used samples of eminent people, such as artists or composers (see Simonton, 1994). However, it is difficult to say if or how the innovation of an artist relates to the current workforce in Britain. Therefore, such work may be limited in what it can offer in the way of helping us understand individual propensity to innovate in an occupational setting. Further to this, some studies (e.g. Zhou, 1998) have used student samples. Again, the generalisability of such findings to an organisational context may be limited.

#### **1.8.g Empirical support**

It is clear from the review of the previous literature that many factors have been identified as potentially influencing innovation. However, for many of these factors there is limited empirical support for the proposition researchers have made. Further to this, some of the empirical support presented has been conducted in a laboratory setting. For example, as noted above, Zhou (1998) used a student sample to demonstrate the impact of feedback. Although laboratory settings provide high control, and allow the explicit manipulation of one variable, such settings are not ecologically valid. As the focus here is on managerial behaviours that influence innovation, it is more appropriate to conduct the research in the field setting.

## **1.9 The management of employee innovation: Summary**

In summary, there is a range of managerial behaviours that may be associated with employee innovation. However, research in this area can also be criticised on several grounds, and overall it seems that further work is needed in order to clarify managerial the behaviours associated with on employee innovation. Therefore, this chapter concludes with a series of questions which form the basis of this thesis (see section 1.13). However, before outlining these questions, this chapter will focus on the organisational factors that influence innovation, and will review a model which has included managerial behaviours as part of the organisational climate.

## **1.10 Organisational characteristics that influence employee innovation**

The organisational context has been a principle focus for researchers looking to examine the factors that enhance employee innovation. This section will critically evaluate a prominent model of the organisational climate that influences innovation. It is important to note that the current review is concerned with organisational characteristics that influence *individual* innovation (as defined at the beginning of this chapter), and thus help foster innovative behaviours in employees. Thus this literature review excludes work which has focused on innovations *per se* (e.g. new products), or has developed models of actual innovations rather than employee innovative behaviour (e.g. the work of the Minnesota group; Van de Ven, 1986).

Due to the complexity and wide range of organisational characteristics that can influence employee innovation some confusion exists in this research domain.

Therefore, the instrument reviewed is not only the most recent and well-researched model of the organisational climate that enhances innovation; it also fulfilled

the following criteria (as suggested Mathisen & Einarsen, 2004); a) it aimed to assess the social environment of organisations in relation to innovation, b) it has psychometric properties that are available in the research literature and, c) it has been published in an international journal. This section outlines Amabile's (1995) model and reviews the criticisms of this research area.

### **1.11 Amabile's (1995) model of the work environment that influences individual innovation**

Research has highlighted a series of characteristics within the organisational context that influence the innovation process (see Patterson, Port & Hopley, 2003 for a review). In this section a prominent model, which attempts to qualitatively assess the work climate for innovation, will be introduced. This is critiqued in order to demonstrate that the model is not exhaustive and despite being prominent in the literature in this area, remains open to criticism.

Rather than focus on all of the organisational factors which may influence innovation, Amabile's (1995) model, labelled the KEYS (although Amabile does not define what KEYS stands for), focuses on the work environment. The work environment is the social environment of an organisation, and although Amabile and Gryskiewicz (1989) claim that physical variables may also be included, this is a similar concept to the organisational climate. Ekvall (1983) defines organisational climate as:

*"A conglomerate of attitudes, feelings and behaviours which characterise life in the organisation. The climate has originated, evolved and continues to develop in the ongoing interactions between individuals (personalities) and the organisational setting. Each organisation member perceives the climate, and can describe it in light of his or her perceptions" (p. 2)*

It is crucial to note that Amabile's (1995) model focuses on idea generation, defined by Amabile et al. (1996) as creativity - "*the production of novel and useful ideas in any domain*" (p.1155) - rather than innovation, which entails the implementation of ideas (Axtell et al, 2000; Patterson, 2000) and which is the focus of the current thesis.

Therefore, in discussing this model the term 'idea generation' (as opposed to innovation) will be used. This model is reviewed here as it is a central model that is used in both research and in the applied setting, with norms based on 78 groups from 50 different organisations (n = 12, 525).

The KEYS model was developed from two primary sources: 1) Critical Incident Technique interviews with research and development scientists and technicians in high and low level idea generation situations (Amabile & Gryskiewicz, 1987), and 2) from a review of the previous research.

In the componential theory of idea generation in organisations, Amabile (1988) identified three broad factors: 1) skills in innovation management, 2) motivation to innovate, and 3) resources including materials, personnel and time. The model underlying KEYS is a detailed and specific articulation of this componential theory.

KEYS focuses on the psychological meaning an employee attaches to the environment arguing that it is the psychological meaning of the environment that largely influences events. The factors included in this model are encouragement of idea generation, autonomy, resources, pressures and organisational impediments to idea generation.

These are outlined in greater detail below.



*1) Encouragement of idea generation:* Encouragement of idea generation includes 1) organisational encouragement, 2) supervisory encouragement and 3) work group encouragement. Organisational encouragement of idea generation includes encouragement of risk taking and idea generation, fair, supportive evaluation of ideas, reward and recognition of idea generation, and collaborative idea flow across the organisation. This operates broadly across the organisation. Supervisory encouragement is characterised by goal clarity, open interactions between supervisor and subordinates, and supervisory support of a team's work and ideas. Finally work group encouragement is characterised by diversity in team members' backgrounds, mutual openness, and shared commitment to projects.

*2) Freedom / autonomy:* The second characteristic of the work environment in Amabile's (1995) model is high autonomy in the way work is carried out. Amabile (1995) suggests that employees need to feel a sense of ownership in the way their work is carried out.

*3) Resources:* Resource allocation has been shown to be directly related to the idea generation level of projects (Cohen & Levinthal, 1990; Damanpour, 1991; Farr & Ford, 1990). Amabile et al. (1996) propose that resources are important in order to enhance idea generation, not only due to the practical benefits, but also as resource provision can influence people's belief about the value of the projects they are undertaking to the organisation.

*4) Excessive workload and pressure:* Research has shown that extreme pressures can crush idea generation; however paradoxically some degree of pressure could have a positive effect on idea generation if it arises from an urgent and

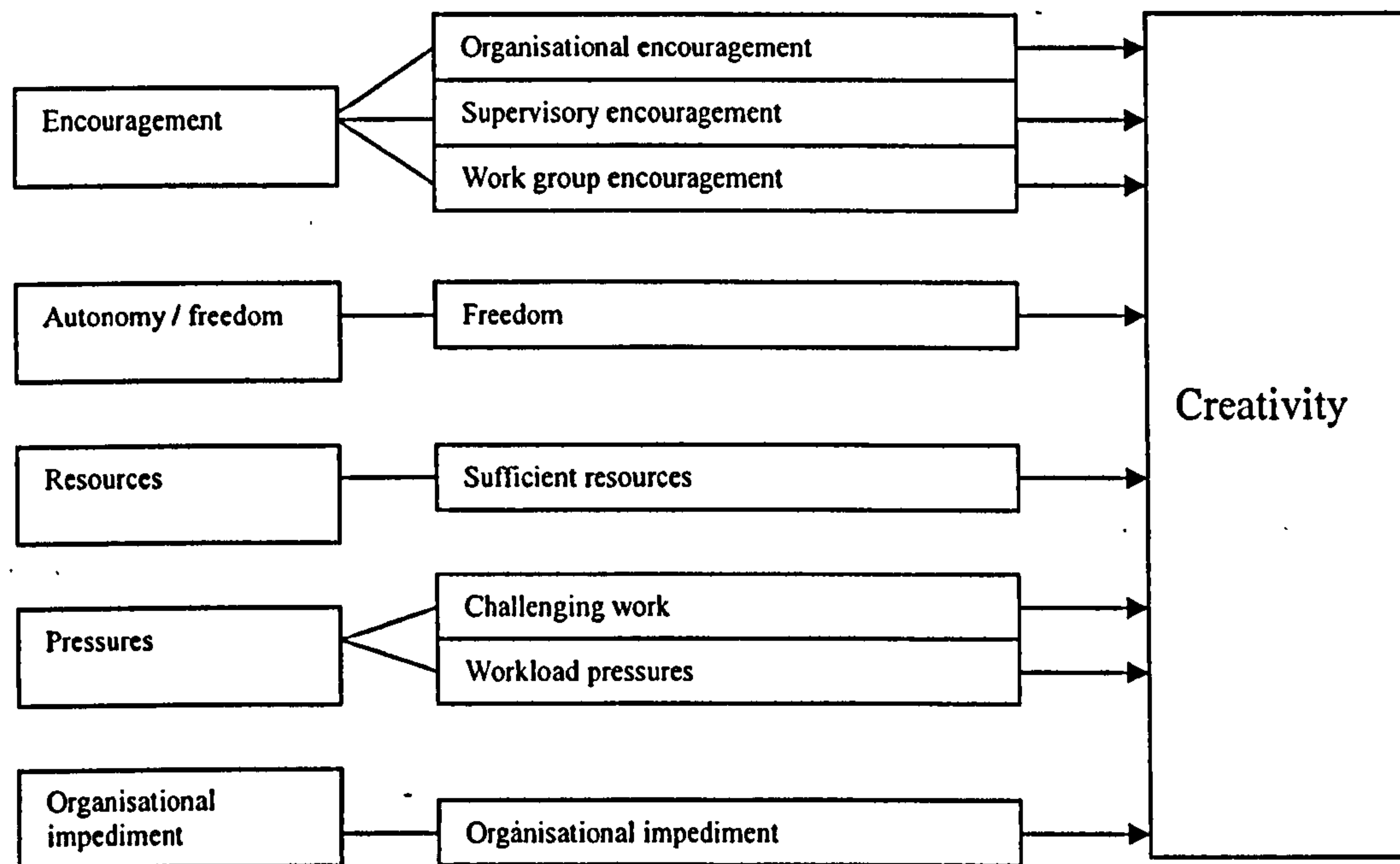
intellectually challenging nature of a problem (Amabile, 1988; Amabile & Gryskiewicz, 1987). Similarly, time for exploration directly correlates with the idea generation of task outcomes in laboratory settings (Conti, Coon & Amabile, 1993; Parnes, 1961; Whitney, Ruscio, & Castle, 1995).

Therefore, Amabile conceptualised two forms of pressure: 1) excessive workload pressure and 2) challenge, the first being negatively related to idea generation and the second positively related to idea generation.

*5) Organisational impediments to idea generation:* Largely research in this area has focused on factors which enhance idea generation rather than hinder it. However within this model internal strife, conservatism, and rigid formal management structures are proposed to hinder idea generation (Amabile, 1988; Amabile & Gryskiewicz, 1987).

Amabile's (1995) model is summarised in Figure 1.4, and the limitations of this model and then presented.

**Figure 1.4: Amabile's (1995) Keys model of idea generation**



### 1.11a Limitations of Amabile's (1995) model

One of the limitations to Amabile's (1995) model is that no data on exploratory factor analysis on the KEYS model have been reported. Confirmatory factor analysis of the model showed moderate fit ( $n = 3,708$ ); goodness of fit index = .85; adjusted goodness of fit index = .84; root mean squared residual = .056 (Amabile et al., 1996). However, many items also loaded onto more than one factor, and with no exploratory factor analysis data it is difficult to evaluate KEYS in relation to the underlying theoretical model (Mathisen & Einarsen, 2004).

Amabile et al. (1996) conducted an extensive three phase validation with over 30,000 employees in an electronic company. In phase one employees chose high and low idea generation projects, and completed the KEYS retrospectively in relation to the organisation at the time of the project. The high – low projects differed significantly in

all scales with p values of less than .001. In phase two experts assessed the idea generation of the projects nominated in phase one. Overall, the experts rated the high idea generation projects as significantly more creative (when compared to low idea generation projects), but there was low inter-rater reliability between the experts' ratings. In phase three a sub-sample was taken of the projects from phase one. In this phase the team members of these projects who had not participated in phase one completed the KEYS. The high and low idea generation projects were significantly different on four of the eight KEYS scales (work group support, challenging work, organisational encouragement and supervisory encouragement).

Overall, these results provide some validation evidence for the KEYS model. However, in phase one the reports were retrospective, and memory biases could influence the accuracy of the employees' perceptions and reports on the KEYS scales. Further to this, the participants were asked to nominate high and low idea generation groups and then asked to rate the extent to which the environment in this project fostered idea generation, which may have resulted in a halo effect. Therefore, due to the biases that are likely to exist in the data and the reliance on retrospective account (which may be inaccurate), these results need to be interpreted with caution. Furthermore, Amabile's (1995) model is not exhaustive and only focuses on the organisational environment, thus excluding other factors within the organisational context which have been shown to influence innovation (for example, the physical work environment). Amabile (1995) also only focused on idea generation - which is solely idea generation and does not incorporate idea implementation - thus excluding other organisational factors that influence innovation .

The relationship between the organisational and managerial factors that influence innovation is explored in Chapter 5. Chapter 5 fully explores the organisational factors that previous literature identifies as influencing innovation. A measure of these factors is then outlined in full.

As a key focus of this thesis is to determine the managerial behaviours that may influence employee innovation, attention will now be given to the characteristics of an innovator. This will allow identification of the possible mechanisms through which a manager may influence employee innovation. Kruz and Bartram (2002) recently noted a small number of broad factors can account for variance in most workplace behaviours. The factors identified by Kruz and Bartram (2002) included cognitive or general reasoning ability, personality factors and motivational factors. Similarly, broadly, there are three different individual level factors which are important for innovation 1) cognitive factors, 2) personality factors and 3) motivational factors (Patterson, 2000). These factors will now be reviewed, in order to introduce a possible theoretical process through which managers influence employee innovation. As personality and cognitive factors are deemed to have reasonable stability (Costa & McCrae, 1994; Guildford, 1950), it is possible that by influencing employee *motivation* to innovate, manager's may influence employee innovation. Therefore greater attention is given to the theories of motivation.

### **1.12 Characteristics of an innovator**

It is beyond the scope of this review to fully explore all of the characteristics of an innovator, and as personality and cognitive factors are argued be reasonably stable, table 1.2 and 1.3 are presented below to demonstrate to the reader the breadth of research in

this area. More extensive attention is then given to motivation as it is argued that managers may influence employee motivation to innovate.

**Table 1.2: Cognitive factors associated with innovation**

<b>Cognitive factor</b>	<b>Example source</b>
Intelligence	Spearman (1927, 1931); Guildford (1950; De Bono, 1971); Sternberg (1984); Barron & Harrington (1981)
Fluency of thinking; Associational Expressional and Ideational fluency	Guildford (1950, 1956, 1959, 1968, 1970)
Flat associative hierarchies	Alissa (1972); Csikszentmihalyi & Beattie (1979); Mednick (1962); Rothenberg (1986)
Lack of cognitive inhibition	Eysenck (1995); Isen, Daubman & Nowicki (1987); Jamison (1993); Mendelsohn (1976)
Defocused attention	Mendelson (1976); Dewing & Battey (1971); Dykes & McGhie (1976)
Domain relevant knowledge	Amabile (1983a); Simon (1986); Nickerson (1999)
Ability to acquire new knowledge	Cohen & Levinthal (1990)
Genius	Eysenck (1979, 1995)
Generative and exploratory cognitive abilities	Finke, Ward & Smith (1992)
Perceived intelligence	Barron & Harrington (1981)

For a full review of the role of cognitive factors in innovation this area the reader is referred to Sternberg and O'Hara (1999).

**Table 1.3: The personality factor associated with innovation**

Personality factor	Example source
Openness to experience, fantasy –orientation, imagination	Bachtold & Werner (1973); Barton & Cattell (1972?); Csikzentmihalyi & Getzels (1973); Feist (1989); Kemp (1981); Rossman & Horn (1972); Walker et al. (1995).
Impulsivity, lack of conscientiousness	Bakker (1991); Barron & Cattell (1972); Dudeck et al. (1991); Hammond & Edelman (1991); Walker et al. (1995)
Anxiety, affective illness, emotional sensitivity	Bakker (1991); Helson (1977); Jamison (1993); Ludwig (1995); Walker et al. (1995); Wilson (1984)
Hostility, aloofness, unfriendliness, lack of warmth	Barron & Cattell (1972); Dudeck et al. (1991); Eysenck (1995); Hammond & Edelman (1991); Wilson (1984)
Drive, ambition, Achievement	Bakker (1991); Busse & Mansfield (1984); Dudeck et al. (1991); Rushton et al. (1987); Wilson (1984)
Dominance, arrogance, self confidence	Bachtold & Werner (1972); Feist (1993); Wispe (1963)
Autonomy, independence	Busse & Mansfield (1984); Rossman & Horn (1972); Smithers & Batcock (1970)
Tendency to challenge authority	Barron (1969); Dellas & Gaier (1970); Mackinnon (1962, 1965); Perkins, Jay & Tishman (1993)
Non-conformity	Barron (1969); Patterson (2000)
Taking of risks	Amabile et al. (1996); Glover (1977)
Broad interests	Barron & Harrington (1981)
Self discipline	Amabile (1983a)
Tolerance of ambiguity	Amabile (1983a); Jackson & Messick (1967); Patterson (2000)
Persistence	Amabile (1983a); Amabile (1988); Helson, Roberts & Agronick (1995)
Self confidence	Barron & Harrington (1981)
Openness to experience	Costa & McCrae (1992); McCrae (1987)
Neuroticism	Andreasen & Glick (1988); Bakker (1991); Hammond & Edelman (1991); Kemp (1981)
Lack of conscientiousness	Getzels & Csikszentmihalyi (1976); Fiest (1999); Walker et al. (1995)
Introversion	Bachtold & Werner (1973); Chambers (1964); Helson (1971; 1977); Rushton et al. (1987)
Lack of agreeableness	Barton & Cattell, 1972; Dudeck et al., 1991; Eysenck, 1995; Feist, 1993; 1994; McDermond, 1965
Extraversion	King, Walker & Broyles (1996); Martindale & Dailey (1996); Patterson (2000)
Psychoticism	Barron (1969); Eysenck (1995); Karlsson (1968; 1970); Heston (1966)

This section does not intend to explore all of the factors in Table 1.3, but the reader is referred to Feist (1999) for a review of the personality factors associated with

innovation.

This section will now focus on the influence of motivation on employee innovation, suggesting possible processes through which managers may influence innovation. This section concludes with a series of research questions.

### **1.12a Motivation**

A final individual characteristic that has been associated with innovation is motivation.

This section will now review the literature in this area.

*“No amount of skill in the domain or in methods of creative thinking can compensate for a lack of appropriate motivation to perform an activity”*

Amabile, 1988 (p. 133).

Motivation is considered a key component of innovative behaviour (Amabile, 1988; Miner, Smith & Bracker, 1994). However, it is not clear what role the different types of motivation play in innovation. This section will review the relationship between intrinsic motivation, extrinsic motivation and self-efficacy, before introducing two key models of motivation and apply them to managerial influence on innovation.

#### **Intrinsic motivation.**

Intrinsic motivation is when a person views engagement in an activity as an end in itself and not as a means to an end. Amabile (1983a) describes intrinsic motivation as a motivational state generated by the individual's reaction to intrinsic properties of the task, which is not generated by extrinsic factors.



Intrinsic motivation has long been identified as a key component of innovation (e.g. Halpin & Halpin, 1973; Torrance, 1966; Amabile and Grysiwicz, 1987). Intrinsic motivation is likely to be a key component of innovation, as intrinsically-motivated individuals tend to be more cognitively flexible (McGraw & Fiala, 1982; McGraw & McCullers, 1979), prefer complexity and novelty (Pitman, Emery & Boggiano, 1982), and seek higher levels of challenge and mastery experience (Boggiano, Ruble & Pitman, 1982; Pittman et al., 1982).

### Extrinsic motivation and innovation

Extrinsic motivators can have a detrimental effect on intrinsic motivation (see: Amabile, DeJong & Lepper, 1976; Condry, 1977; Deci, 1971; Lepper et al., 1973; Amabile, 1979; Amabile, 1990). This relates to what has been called the “over justification hypothesis” (Lepper, Greene & Nisbett, 1973) that states that if someone performs an interesting task under relevant external constraints, he/she will show less intrinsic interest in that activity later when such extrinsic constraints are removed.

External constraints have also been shown to have a negative effect on innovation. For instance, research has demonstrated a negative impact on innovation of evaluation, surveillance, reward, competition, and restricted choice (see Amabile, 1979, 1982; Amabile & Gitomer, 1984; Amabile, Goldfarb & Brackfield, 1982; Koestner, Ryan, Bernieri & Holt, 1984; McGraw & McCullers, 1979). This is thought to result from a decrease in intrinsic motivation, as greater focus is placed on the extrinsic goal or constraint, preventing the individual from being deeply involved with the activity per se. Consequently, the individual will feel less free to engage in risk taking, and will be more likely to rely on well-worn cognitive pathways to achieve the external goal, or avoid external punishment.

However, a number of studies have found extrinsic motivation, in particular rewards, to have a positive effect on originality (Fromme, Mercadal & Mercadal, 1976; Halpin & Halpin, 1973; Krop, 1969; Locurto & Walsh, 1976). Similarly other researchers have contended that rewards enhance divergent thinking (Winston & Baker, 1985), leading Amabile (1997) to acknowledge that rewards may sometimes play a role in innovative performance. This is very important when examining innovation at work, as rewards are frequently found within performance management systems and may be used by managers to help foster innovation.

### Self-efficacy

Another individual difference variable related to motivation that may play a role in innovation is self-efficacy. Self-efficacy is defined as "*people's judgement of their capabilities to organise and execute courses of action required to attain designated types of performance*" (Bandura, 1986, p. 345). Self-efficacy is a well-established predictor of people's behaviour and performance (Choi, Price & Vinkur, 2003), and has been shown to play an important role in innovation (Axtell et al., 2000). For example, Redmond, Mumford & Teach (1993) found that leader behaviour intended to enhance subordinates' self-efficacy, such as support, contributed to the quality and originality of their solutions to marketing tasks.

Bandura (1973) claimed that one of the information cues which assist in the development of self-efficacy is *vicarious experience*: The modelling of others' behaviour. Seeing others perform a threatening activity without adverse consequences can generate expectations in observers to perform such acts. Within this social comparison paradigm, employee motivation may occur through the

modelling of a manager's innovative behaviour. Therefore Bandura's (1969) Social Learning Theory will be briefly reviewed.

In extending the Behaviourist position adopted by operant conditioning theorists, the social cognitive approach uses the addition of cognitive components. The essence of this approach is to emphasise the role of cognitive processes in determining behaviour in a given situation. Social Learning Theory (Bandura, 1969) emphasises the notion of how behaviour is modelled and learnt from observation of others. Role modelling is a key way in which humans learn and are motivated to act in certain ways: People imitate the behaviour of others and build norms of what is appropriate in a given situation.

Social learning has been shown to influence innovation. As Nobel Laureate economist Paul Samuelson stated, "*I can tell you how you get a Nobel prize....have great teachers*" (1972, p. 155). Many studies have demonstrated modelling in creative and innovative performance (Mueller, 1978; Belcher, 1975); however none of these have been in an occupational context and have largely focused on children. As a result it is possible that managers may motivate employees to innovate through the provision of a role model for innovative behaviour; however, this proposition needs further empirical investigation.

This section will now turn to two theories of motivation. These theories are presented in order to give further insight into the possible theoretical mechanisms through which managers may be associated with employee innovation.

### **1.12b Theories of motivation**

In addition to the *types* of motivation that have been associated with innovation,

prominent theories of motivation can be drawn on to explain how *contextual factors* may be associated with innovation. The following section reviews two theories of motivation. Firstly Triandis' (1979) Theory of Interpersonal Behaviour is presented – a theory that has not previously been used to explain innovation. This is followed by an outline of the Cognitive Evaluation Theory (a theory within the Self Determination Theory; Deci & Ryan, 1985), which has previously been associated with innovation (see Zhou, 1998).

### Triandis' (1979) Theory of Interpersonal Behaviour

Many prominent theories of motivation adopt a cognitive perspective and focus on individual-level factors that promote or hinder intrinsic motivation. For example, a number of factors have been identified to direct behaviour, such as intrinsic drives (for example hunger, thirst, sex and avoidance of pain; Hull, 1943). However, such factors fail to acknowledge the role of the interpersonal and social context on motivation (e.g. the manager – employee interaction).

One exception to this is Triandis' (1979) Theory of Interpersonal Behaviour, which was developed to understand the adoption of behaviour. Within his model, Triandis (1979) includes history, ecology, culture, personality, social situation, habit, affect, Facilitating Environmental Resources, genetic biological factors, interpretations and reinforcement as factors affecting motivation, and thus behaviour.

On closer examination of Triandis' (1979) model, it is possible to identify four factors that have a focus that is external to the individual, and therefore may be relevant to the managerial enhancement of employee motivation: 1) culture, 2) social situation, 3) Facilitating Environmental Resources, and 4) reinforcement. In contrast, the

other factors in Triandis' (1979) model tend only to be relevant at the individual level of analysis (e.g. habit, genetics and biological factors). Each of the four factors with an external focus is outlined in greater detail below, and links are drawn between these factors and the managerial enhancement of innovation.

**Culture.** In Triandis' (1979) model, culture is defined as the human-made part of the environment (Herskovits, 1955). Although culture incorporates both objective aspects (bridges, roads, tools) and subjective aspects (laws, myths, roles, values), it is the latter part that is of interest to this thesis. The subjective culture is defined as a way of categorising beliefs, attitudes, ideals, roles, norms and values (Triandis, 1979).

Within culture *norms* are self-instructions to do what is perceived to be correct by appropriate members of a culture (in this case a manager). Similarly *roles*, like norms, are behaviours that are considered correct and appropriate; however roles are behaviours appropriate for a person in a particular position (e.g. innovation behaviours for an employee). Finally *rules* are relationships among abstract categories with strong affective components, implying a preference for a certain kind of behaviour (Triandis, 1979). Triandis (1979) states that values are influenced by childhood socialisation. However, workplace socialisation is a concept familiar to most organisational scholars, where employees *learn* organisational values, rules and norms, and such learning has been shown to be influenced by an employee's supervisor (Wright, 2003).

**Social situation.** The second factor in Triandis' (1979) theoretical framework of behaviour is the social situation. According to Triandis this is concerned with settings, which include more than one person. A key factor influencing this is who the relevant others are. In the current thesis the focus is on the manager, whereby a

manager's social behaviour in relation to the employee may influence employee innovation.

**Facilitating Environmental resources.** A third motivational factor in Triandis' (1979) model which may be influenced by a manager is Facilitating Environmental Resources. Triandis describes such Facilitating Environmental Resources as factors in the environment that make an act easier to do. In terms of managerial behaviours and influence on innovation, this may relate to the provision of empowerment, as freedom to generate and try out new ideas is likely to facilitate innovative behaviour.

**Reinforcement.** The final relevant factor in Triandis' (1979) model is reinforcement. Many factors can reinforce behaviour; however managers may play a role in reinforcing employee innovation through feedback and rewards.

Triandis' (1979) Theory of Interpersonal Behaviour is useful as it incorporates a range of motivational factors. Furthermore, the Theory of Interpersonal Behaviour is wider in scope than other theories of motivation, such as the Theory of Planned Behaviour (Ajzen, 1991), as it includes social and cultural factors. However, such a wide scope may be a limitation in that the model may be over-inclusive, thus failing to differentiate between, and truly identify, key drivers of behaviour.

Up to now, there has been no application of Triandis' (1979) model to employee innovation. However, the model has been applied in an occupational environment to examine information technology adoption (Bergeron, Raymond, Rivard & Gara, 1995; Pare & Elam, 1995). Thompson, Higgins and Howell (1991) used Triandis'(1978) Theory of Interpersonal Behaviour to explain personal computer use, and

found that it explained 40% of the variance in the behaviour. However, Bergeron et al. (1995) found limited support for the model, since it explained less than 30% of the variance in computer use of knowledge workers. Nevertheless, the use of this model in employee innovation still needs to be explored. Therefore, Triandis' (1979) model is used in the current thesis, which aims to assess the influence of managerial behaviour on innovation, since Triandis' model incorporates social factors and their effect on innovation.

In overview, Triandis' (1979) model implies that the management of innovation may be driven by four central factors: Culture, reinforcement, facilitating environmental resources and social situation. The influence of managers on employee motivation to innovate is central to this thesis; therefore in order to provide further support for the mechanisms through which managers may influence innovation, a second theory of motivation is introduced: Deci and Ryan's (1985) Cognitive Evaluation Theory.

#### Deci and Ryan's (1985) Cognitive Evaluation Theory

Self Determination Theory refers to a general framework which encompasses a set of related theories of motivation, which address the effects of internal and external events on human motives for behaving (Deci & Ryan, 1985). A central theory within the self determination framework is the Cognitive Evaluation Theory (Deci & Ryan, 1985), which aims to specify the social and environmental factors that facilitate intrinsic motivation. As the emphasis of this thesis is on the influence of social and environmental factors on innovation (of which intrinsic motivation is a key component), the Cognitive Evaluation Theory will be drawn upon to explain the possible theoretical mechanisms through which managerial behaviours may be associated with employee innovation.

Within the Cognitive Evaluation Theory there are three central aspects or needs that drive motivation: 1) the need for (perceived) control, 2) the need for (perceived) relatedness, and 3) the need for (perceived) competence. The theory asserts that conditions which satisfy these needs lead to intrinsic motivation. Each of these will now be discussed below.

Perceived control: Perceived control refers to a person's belief that he or she can produce a desired outcome and is motivational in nature (Deci & Ryan, 1990; Ryan & Connell, 1989; Ryan, Vallerand & Deci, 1984). Decharms (1968) claimed "*man strives to be the causal agent, to be the primary locus of causation for, or of the origin of, his behaviour*" (p. 269).

Perceived relatedness: Perceived relatedness can be defined as the degree to which someone feels interpersonally connected to others in a particular context. As such intrinsic motivation is more likely to flourish in a context, which has a sense of security and relatedness. In support of this Anderson, Mangoojian and Reznick (1976) found that when children performed a task with an experimenter who ignored them, they had low intrinsic motivation. Similarly, Ryan and Grolnick (1986) reported low motivation in students who found teachers uncaring and cold.

Perceived competence: Perceived competence refers to a person's perceived ability to perform a task in a given situation. White (1959) claimed that competence is a fundamental innate psychological need. White (1959) claimed that the tendency to satisfy the competence need explains the "*persistent tendencies toward activity,*



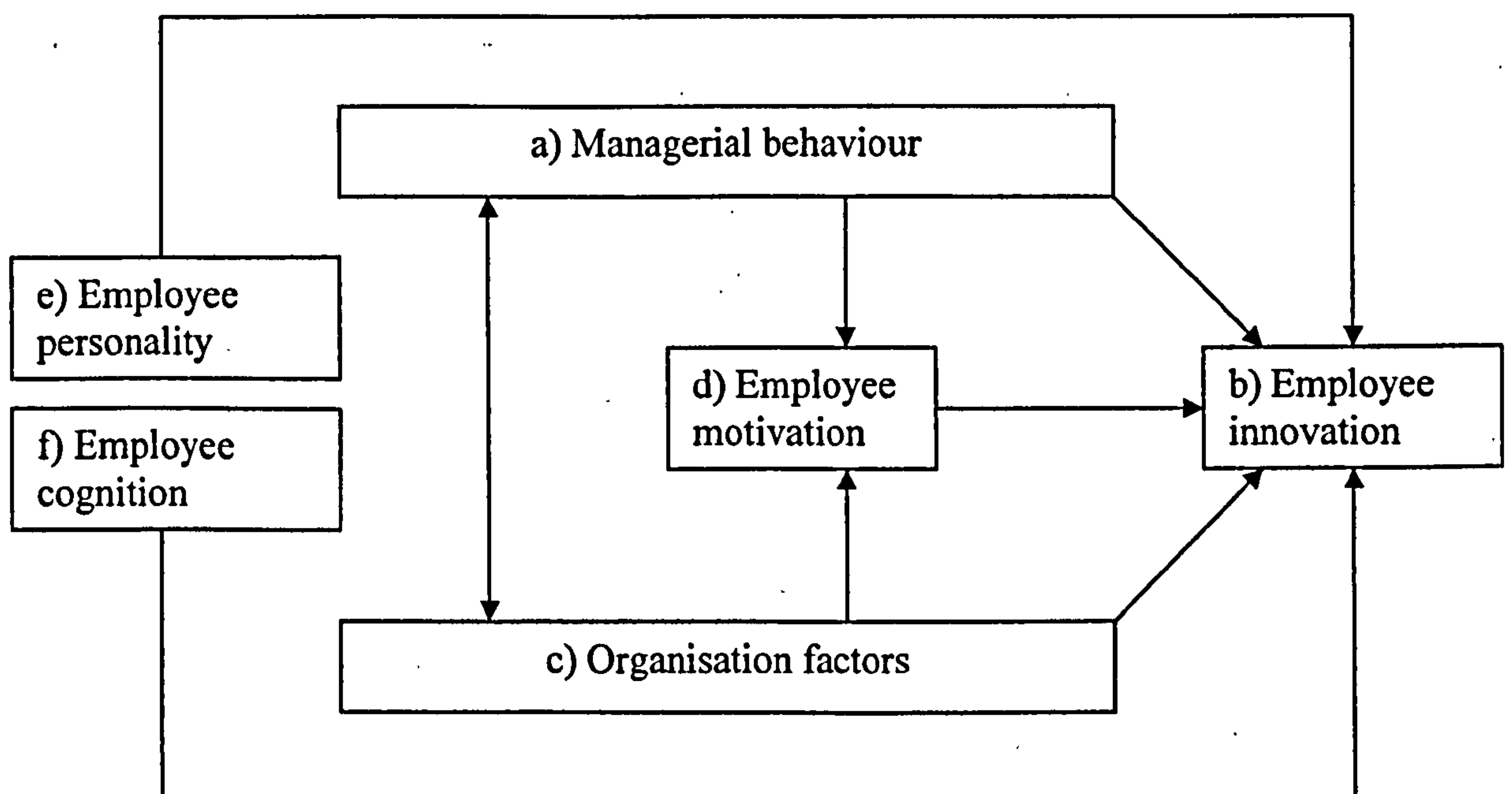
*exploration and manipulation, even when all primary drives have been satisfied” (p. 101).*

This chapter will now conclude with an overview of the literature review, before presenting a series of research questions. The questions have arisen from the literature review and will form the basis of this thesis.

### 1.13 Overview: Questions and hypothesis

This literature review has focused on all the components presented below in the framework of employee innovation (Figure 1.5). In doing this it has introduced what constitutes employee innovation, aiming to provide an insight in to how managerial behaviour may be associated with innovation. On from this the contextual influences and more specifically the managerial behaviours which may influence employee innovation have been reviewed.

**Figure 1.5: The influence of the organisational context on employee innovation**



Subsequently criticisms of the previous work in this area were presented, highlighting a number of flaws in the research. The overall aim of this research is to identify and develop a psychometric model of the managerial behaviours that may be associated with employee innovation. In addressing this aim, this thesis will attempt to tackle some of the gaps highlighted above, and answer a number questions which remain in this area:

- 1) What management behaviours are associated with employee innovation?
- 2) How do such behaviours relate to each other to form an integrative model of managerial behaviours associated with innovation?
- 3) How can such behaviours be measured consistently?
- 4) How do such behaviours relate to the organisational factors that influence innovation?
- 5) How do the managerial behaviour relate to the phases of the innovation process (i.e. idea generation, idea development and exploration, and idea implementation)?
- 6) What theoretical approaches can be used to explain the mechanisms through which managerial behaviour can influence employee innovation?

In answering these questions nine studies will be presented. Firstly an exploratory study is conducted which used a bottom up approach to identify all of the possible managerial behaviours, which are associated with innovation (question one). Secondly a psychometric approach is adopted to identify the underlying structure with the managerial behaviours (question two). In answering questions three and four, six studies are presented, which explore the construct and criterion validation of the model and inventory developed in Study 2. question five is answered with a study, which explores the prominence of the managerial behaviours across the innovation process. Finally the discussion of this thesis explores the theoretical mechanisms

through which the model of managerial behaviours may influence innovation (question five).

Before presenting the studies in this thesis Chapter 2 will introduce the methodological approach taken by this study.

## **Chapter 2: Methodological approach**

*“It is the tension between creativity and scepticism that has produced the stunning and unexpected findings of science.”*

Carl Sagan

### **2.1 Introduction**

This chapter outlines the methodologies adopted throughout this programme of research. Initially the overall methodological approach is outlined, including a description of my epistemological position and justifications for this. Subsequently the context of the research is discussed, and the specific methods adopted and developed in this thesis are presented. Finally the techniques and methods used for coding and analysing the data are described.

### **2.2 Methodological approach**

Both quantitative and qualitative methods were employed within this thesis to ensure richness of understanding. Reasons for choosing specific methods used in this research were largely technical (Bryman, 1988), however philosophical outlook also played a role in this choice. Therefore, my epistemological and ontological positions are outlined below.

#### **2.2.a Epistemological position**

There is a long-standing debate in the social sciences, within which the main dimension is the relative characteristics and merits of quantitative and qualitative methods.

However, as Symon and Cassell (1998) note, this distinction in terms of *technique* is a red herring, and the real debate centres on the wider issue of philosophical

approach. Despite this, quantitative methods are often portrayed as an approach of positivist philosophies, while qualitative methods are typically attributed to phenomenology and symbolic interactionism in terms of philosophical underpinnings. Paradoxically the current research uses both qualitative and quantitative methods within a positivist paradigm. The rationale for this approach is given below.

In exploring the debate surrounding philosophical approach, it is important to acknowledge the central issues of epistemology and ontology. Epistemology relates to assumptions about the ground of knowledge and how one might begin to understand the world, while ontology focuses on the essence of the phenomena under investigation, i.e. whether reality is objective or the product of individual cognition (Burrell & Morgan, 1979).

When conducting research in psychology, the positivist epistemological foundation upon which psychology was formed is inescapable. Such a positivist foundation views the real world as objective, independent and value free, and the aim is to explain and predict this world (Burrell & Morgan, 1979). These positivist ideals form the basis of this research.

Further, the ontological approach which concurs with positivism (and is adopted here) is realism. Realism at an ontological level shares the positivist outlook that objects in the physical, social and psychological world exist independently of our concepts of them (Greenwood, 1991). However, realism also accepts the possible existence of real yet non-empirical entities – for example social structures and relationships which generate observable events (De Cock, 1996).

In adopting both qualitative and quantitative methods, however, it could be argued that this research falls neatly into neither a positivist nor an interpretivist paradigm.

However, the approach of Bryman (1984, 1988) would suggest that one should adopt the most relevant technique for investigating the specific research question, and that methods are not intrinsically linked to paradigms. As long ago as the 1950s researchers were advising that the problem under investigation should dictate the investigation (Trow, 1957). Furthermore, it is important to note that conducting research in organisations poses a number of logistical constraints onto the researcher, and this can make exclusive compliance to one paradigm or set of techniques difficult. As Amabile (1994) notes, in reflecting on the nature of idea generation research (in organisational contexts), "*creativity scholars must attempt to sketch the bounds of our current theoretical conceptions and methodological frameworks*" (Amabile, 1994; p. 245). As a result technical reasons (such as access to participants) also influenced the choice of methods used in this thesis.

Therefore, this thesis initiated the research journey through the use of qualitative interviews, before going on to reflect on the findings from a positivist epistemology and realist ontology and test the theory using psychometric methods. On from this, qualitative methods were used in the validation process of this thesis, as Barunek and Myeong-Gu Seo (2001) suggests qualitative methods can add new meaning to quantitative methods.

Largely this thesis has not been inhibited by choice of methods; something which Kuhn (1962) believed distorts the scientific process. In contrast this thesis has chosen methods which reflect on epistemological, ontological and technical influences. On from this the structure of this thesis reflects the elements in the scientific

process (Wallace, 1971). Wallace (1971) proposed that the scientific process of theory development includes both inductive and deductive approaches, something adopted here in an aim to triangulate findings (see Bryman, 1984).

In order to study innovation a psychometric approach was adopted in this thesis. Below a rationale is given for why this approach was adopted. Within this approach a number of methods were employed in order to gain construct and criterion-related validity for the model that was developed. These methods and sampling, and the analysis used in the studies are also outlined below.

### **2.3 A Psychometric Approach**

Innovation can be studied using a number of approaches. One of the most prominent approaches adopted is the psychometric approach. This approach benefits from being able to quantitatively measure the environment that fosters innovation, a research area that has warranted attention since the 1800s. For example, in 1883 Galton's *Inquiries into Human Faculty* called for innovation to be measured (Taylor & Barron, 1963).

Other approaches to studying innovation are the 1) experimental, 2) biographical, 3) historiometric, and 4) biometric approaches. In order to demonstrate that the psychometric approach is most appropriate to the study of the managerial behaviours associated with innovation, each of the alternative approaches will now be reviewed below.

The *experimental approach* aims to manipulate variables to assess the constructs associated with, or that facilitate, innovation. Like the psychometric approach, the experimental approach uses quantitative measurement: however in the

experimental approach the environments are controlled. The experimental approach has been used to explore the contextual influences on innovation. For example, Zhou (1998) used an experimental approach to explore the effect of feedback on student innovation. However, such experiments lack external validity, and the results may not be generalisable to an occupational context. Indeed, Runco and Sakamoto (1999) noted there is a trade off between control and generalisability.

In the context of the current thesis, it is also important to note that it would be difficult to manipulate each of the managerial behaviours identified to be associated with innovation. One example of a managerial behaviour that may be difficult to manipulate is support for innovation (see Chapter 1 for an outline of this), which has a very broad domain space. Furthermore, an experimental design would limit examination of the relationships between the separate managerial behaviours, as each managerial behaviour would need to be examined by a different experiment to truly identify the influence on innovation (thus adopting a single variable approach and mirroring the flaws of the previous literature). In contrast, if all of the managerial behaviours were manipulated in one experiment, it would be difficult to identify which behaviour was influencing innovation. For example, an experiment could manipulate feedback and autonomy, but exploration of which behaviour is having the greatest influence on innovation would not be possible.

Further to this, the logistical and financial costs associated with the experimental approach make it less suitable to the current thesis than a psychometric approach. Therefore in summary, a psychometric approach seems to be most appropriate to adopt for the current research. In support of this, approaches which are less similar to the



psychometric approach but that can still be used to study innovation are explored below.

The *historiometric approach* draws upon qualitative data from historical data. Largely the focus of such work is on people who have 'gone down in history' as being innovators, such as Newton, Descartes and Beethoven (Simonton, 1999). However, rarely is it possible to draw on data of managers who have 'gone down in history' as having a large influence on innovation, and identify their behaviours. Therefore, this approach is not appropriate to the study of the managerial behaviours associated with innovation.

Another approach that has been used to study innovation is the *biometric approach*, which examines the brain activity of subjects performing cognitive tasks. While this approach has been useful in identifying areas in the brain associated with innovation, its relevance to the managerial enhancement of innovation is limited, and therefore it will not be used in this thesis.

A final approach that has been used to study innovation is the *biographical or case study approach*, which is the most distinct from the psychometric approach (Plucker & Renzulli, 1999). In the biographical approach, researchers construct case studies of eminent innovators using qualitative research methodology (Gedo & Gedo, 1992; Guber & Davis, 1988). Similar to the historiometric approach, the biographical approach examines eminent innovators, and is thus not appropriate for the study of the managerial behaviours associated with innovation.

Thus overall it seems that the psychometric approach is the most appropriate approach to study the managerial behaviours associated with innovation. Although it is not without limitations (for example, a large reliance on self-report data), these

are of a lesser concern than the limitations of the other approaches outlined here. Furthermore, the psychometric approach concurs with the epistemological and ontological approach adopted by the researcher.

This chapter will now outline the methods, sampling and analysis used in the studies within this thesis.

## **2.4 Methods and sampling**

In this section the context, methods and sampling used in this research programme are outlined. This begins with an outline of the organisations involved and the samples used. The methods used are then presented, followed by an outline of the statistical analysis used.

### **2.4.a Context and samples**

Organisational research faces a number of problems when compared to laboratory-based studies. As organisational research is conducted in a field setting, issues surrounding access and data collection influence how the research is conducted. Essentially organisational research is guided by the needs of the research and research question, coupled with the needs of the organisation and its employees. Access to participants and their time is a major constraint that needs to be overcome. In the current research a number of samples are reported. Often within the samples reported, participants were selected from a range of organisations to form a single study sample. This was done in order to attain adequate sample sizes.

Samples reported in this study are largely from Coors Brewers, who sponsored this research. This is a large multinational brewing organisation based in the

north of England. In addition, samples were also gathered from a similar Fast Moving Commercial Goods Organisation (FMCG), Cadbury Schweppes. Furthermore, two functions within the Civil Service also participated in this research. Finally, a number of managers were also selected from a range of occupational samples.

In a similar way to the methods used, the choice of samples reported in this study, was guided by a number of factors: Firstly, the type of sample needed to answer the research question; secondly, the needs of the organisation and the openness of the organisations to giving access to employees (participants); and thirdly, the needs of the employees who participated in the research also had to be taken in to consideration.

The interviews conducted in this study were all conducted within Coors Brewers. Four sites were used for this, two with a central focus on innovation (where innovation training and development was the norm) and two where innovation was not a central focus. Further to this, the organisational reputation held that the first two sites were classed as 'innovative' (based on judgements of the products, processes and services produced here), and the latter two sites were classed as 'not innovative'. This allowed a cross-section of perspectives on the managerial behaviours which influence innovation to be gained.

In developing and validating the inventory designed to measure the managerial behaviours, which may be associated with innovation, a large sample size was required. Therefore samples from Coors Brewers, Cadbury Schweppes, the Civil Service and an advertising company were merged. These samples were also used to establish construct validation. Further to this, a sample was obtained to explore the relationship between a manager's ability to manage innovation and his / her propensity to innovate.

This sample was gained from a large scientific organisation, who were interested to learn more about the profile of the organisation's staff in terms of innovation.

Finally, managers from a range of occupational samples were used to establish criterion related validity (n=39). This sample was used as it was desirable that the range of managers was broad, so that a diverse range of innovation examples and experience could be used.

#### **2.4.b Critical Incident Technique**

The Critical Incident Technique (CIT: Flanagan, 1954) is commonplace within Occupational Psychology. The aim of the technique is to explore a particular incident, which Flanagan defined as "*an observable human activity that is sufficiently complete in itself to permit inferences and predictions to be made about a person performing the act*" (p. 124).

The first study presented in this thesis aimed to identify the range of managerial behaviours which influence employee innovation. Half the sample was asked to describe a time when they had generated an idea at work, and the other half was asked to identify a time when they had implemented an idea at work. Interviewees were then asked to describe the process they went through in each of these instances and to identify the role their manager played in these instances. In both cases the employee was asked to write down the example and then describe it to the interviewer. The interviewee was then probed and asked to identify what role his/her manager played in this situation to facilitate either their generation or implementation of ideas. The interviewee was asked what behaviours the manager specifically showed in order to help him/her generate (and suggest) the ideas, or implement the ideas. This was

then repeated and the interviewer was asked to think of an opposite time when they had not generated or implemented an idea at work. Again interviewees were asked to identify the role of their manager in this example.

Further to this the output from the CIT interviews was also used to generate items for the new questionnaire developed in Study 2.

#### **2.4.c Repertory Grid interviews**

Repertory Grid interviews (Kelly, 1955) were used in addition to CIT interviews, as they provide a powerful way to elicit people's personal constructs of the behaviours of a manager who influences innovation. Like the Critical Incident Technique the Repertory Grid Interview has been established for nearly 40 years. The technique is derived from Personal Construct Theory (PCT; 1955), and aims to identify the personally meaningful distinctions with which a view of the world is constructed.

Within the current research Repertory Grids were used to explore both the managerial behaviours associated with idea generation and those associated with implementation. The elements used, as advised by Easterby-Smith, Thorp and Holman (1996), were homogenous, representative, unambiguous, and as short as possible. In line with this, the following elements were used: 1) a manager who enhances idea generation / idea implementation, 2) a manager who hinders idea generation / idea implementation, 3) an exceptional manager in relation to your organisation's competency model (the competencies were then listed to avoid ambiguity), and 4) a manager who is poor or average in relation to your organisation's competency model (again the competencies were listed to avoid ambiguity).

The elements were examined in triads. The interviewee was presented with three of the elements and asked to consider ways in which two were similar but different or opposite to the third. This was repeated until the person 'dried up' (Easterby-Smith et al., 1996). Laddering was then used to gain more depth into the constructed interviewees generated. This was largely done by asking the interviewee "what did you mean by that?" when they presented a construct, for example 'skilled' versus 'unskilled'. The constructs were also recorded in a short phrase form. However, constructs were not recorded if they were 1) impermeable (where the idea applies only to a small minority of any range of elements), 2) vague, or 3) generated by the role title (e.g. competent).

In order to ensure differences in the constructs relating to managerial behaviours which are associated with innovation and those relating to effective / ineffective managers the subjects were also asked to rank each of the elements on the constructs they had elicited.

#### **2.4.d Questionnaires**

In the second study a trial questionnaire was developed in order to identify the underlying structure to the managerial behaviours identified in Study 1. Items were generated around the themes elicited from the interviews conducted in Study 1 (see above and Chapter 3). This item generation process is described in greater detail in Chapter 4. In addition to administering this trial questionnaire, a number of other measures were also administered. This was done in order to establish construct validity; and to demonstrate that the measure developed in this thesis correlated highly with measures of the same characteristics (convergent validity), and had low associations with measures of different characteristics (discriminate validity). In order to do this, a number of other measures were administered examining 1) leadership styles, 2)

organisation-level variables which influence employee innovation, 3) innovation potential and 4) facets of the Five Factor Model of personality.

To measure leadership, two questionnaires were administered: 1) a measure of the Full Range Leadership Model (transformational and transactional leadership) the MLQ short form (32 items), was administered, and 2) a 6 item measure of leader-member exchange (LMX) based on Liden and Maslyn (1998) multidimensional model of LMX. A measure of the organisation-level inhibitors and facilitators was also developed (see Chapter 6), based on a literature review (for further details see Patterson, Port & Hopley, 2003). Innovation potential was measured using the Innovation Potential Indicator (Patterson 1999), a psychometric test that measure the individual characteristics associated with employee innovation. Finally, facet-level measures of the two factors of the five factor model of personality which have most consistently been associated with innovation (Extroversion and Openness to experience) were measured using Warr's (2002) personality scale. This scale was appropriate in this setting, as it was developed for research purposes and allowed facet-level examination of the two factors consistently associated with innovation. The administration of these measures is outlined in greater detail in Chapter 5, 6, and 7.

#### **2.4.e Map of Innovation**

A key aim of this thesis was not only to identify and explore the managerial behaviours which are associated with innovation, but also to develop new methods. As a result a new technique was developed to explore the innovation process. This technique was labelled the *map of innovation* and is based on the Critical Incident Technique interview method (Flanagan, 1954). This original technique aims to map out the components of the innovation process i.e. 1) idea generation, 2) idea exploration and 3) idea

implementation (see Patterson's, 2002 componential framework outlined in Chapter 1).

In overview, a manager is asked to identify a time when he / she has helped an employee to innovate (a critical incident), and then asked to identify the two most positive and negative features in each of the phases of the innovation process. The interviewer captures these features on cards, and the manager is asked to place them on a self constructed time line depicting when the features actually occurred. Structured probing is then used to identify the specific role the manager played in each of the components, specifically in behavioural terms. Again these are captured on cards by the interviewer and inserted on to the timeline by the manager.

This technique helps managers to map an innovation over a timeline, to produce a detailed diagrammatic representation of the positive and negative features of the innovation, and to specify the role the he/she played in the innovation example. Stiles (1998) notes the usefulness of graphical representations in organisational research, and how they allow identification of the various behaviours, and this is the first such technique developed to explore employee innovation.

The map of innovation was marked using behavioural descriptors of each of the behaviours, which were then assigned an overall score on a 1 – 5 scale (1 = poor, 2 = areas of concern, 3 = satisfactory, 4 = good, 5 = excellent). Each map was analysed firstly by the interviewer, who had completed a one day training course. The map was then marked secondly (and without knowing the interviewers grading) by the author of this thesis. Any discrepancies in grades were discussed and a final mark was agreed.

This was done so that the first marker could allow for any situational constraints



described by the interviewee and the second marker could mark all of the maps to create consistency in the marking.

## **2.5 Analysis**

The data presented in this thesis were analysed in a number of ways. Template analysis was used to analyse the CIT interviews, and Confirmatory Factor Analysis was applied to the questionnaire.

### **2.5.a Template analysis**

The essence of template analysis (Crabtree & Miller, 1992) is to identify *themes* in interview data, which are modified and added to as a researcher reads and interprets the text. Consequently template analysis lies between content analysis (Weber, 1985), where the codes are predetermined and statistical analysis of distribution is carried out, and grounded theory (Glaser & Strauss, 1967), where there is no a priori definition of themes. This technique was chosen because template analysis was developed and utilised largely from a realist perspective, in that it uncovers 'real' beliefs, attitudes, and behaviours (King, 1994).

The procedure adopted here follows recommendations by King (1994; 1998). A codebook was developed and revised by two psychologists. Themes were identified using cluster analysis. Following this the themes were reviewed and developed firstly by the two psychologist and then with an expert panel (for further explanation of this procedure see Chapter 3).

Template analysis has the advantage that it is highly flexible and as such can be used to meet the needs of the researcher. This approach also benefits from the use of

a structured approach to analyse data and data handling. However, the central disadvantage of template analysis is the lack of substantial literature on this technique.

#### **2.4.b Confirmatory Factor Analysis**

A Confirmatory Factor Analysis (CFA) was conducted on a second sample (as recommended by Beckler, 1990), to cross validate the findings of the EFA conducted in Study 2. A key issue in CFA is the indices of fit which are reported. Early work using CFA only reported the likelihood ratio  $\chi^2$  statistic to evaluate fit. However, this statistic does not offer information about the degree of fit, thus further indices are needed. As a result, researchers have identified a range of fit statistics (see Gerbing & Anderson, 1993), in efforts to provide more rigorous indices (Bentler & Bonnet, 1980; Joreskog & Sorbom, 1981). However a range of complex fit indices has resulted and Bollen (1989) recommends to interpret the model using multiple indices of fit. However, seemingly the only consensus in this area is that no one index should be used to the exclusion of all others (Gerbing & Anderson, 1993).

Therefore in addition to  $\chi^2$ , the current research adopted three indices of fit: 1) an index to explain the overall proportion of variance explained (Comparative Fit Index: CFI), 2) an index that adjusts the proportion of explained variance for model complexity (Tucker-Lewis Index: TLI), and 3) an index on the standardised residuals (Standardised Root Mean Square Residual: SRMR).

#### **2.6 Studies presented in this thesis**

Nine studies are presented in this thesis. Initially in Chapter 3 the research adopted qualitative methodology to add meaning to the current literature, where interviews are conducted with the overall goal of identifying the managerial behaviours

which influence innovation. Following this is a second study (Chapter 4) which uses EFA and CFA to explore the underlying structure of the managerial behaviours identified in Chapter 3, and to develop a psychometric model of the managerial behaviours which influence innovation. Four studies were then conducted to validate the model. Chapter 5 concentrates on construct validation and examines the four-factor managing innovation model in relation to models of leadership (the Full Range Leadership Model, Avolio & Yammarino, 2002, and Leader Member Exchange, Liden & Maslyn, 1998). Chapter 6 then focuses on construct validation in relation to organisational factors that enhance innovation, and Chapter 7 examines the management of innovation in relation to personality. Chapter 8 focuses on a different type of validation: Criterion-related validity. In Chapter 6 two studies are presented: The first explores managerial behaviour using a double blind design, within which the criterion measure is a score on the map of innovation (see above for description); the secondly explores two organisations which are dichotomised by their managerial behaviours. Chapter 9 then explores the prominence of each of the managerial behaviours at each phase in the innovation process. Finally chapter 10 reviews all of these studies and the findings presented in this thesis, and discusses the theoretical implications of this work, the practical applications, limitations and future directions.

Overall the research process is shown in Table 2.1.

**Table 2.1: The research process**

Chapter	Study	Aim	Research question	Method
3	1	To identify managerial behaviours that are associated with innovation	What are the managerial behaviour which associated with innovation?	CIT & Repertory Grid interviews
4	2	To explore the relationships between the behaviours identified in Study 1	Is the proposed four-factor structure an appropriate underlying model to the managerial behaviour identified in Study 1?	Questionnaire analysed using EFA and CFA
5	3	To establish construct validation of the four-factor model with leadership.	How do the behaviours within the influencing innovation model relate to leadership?	Questionnaires
6	4	To establish construct validation of the model with organisational factors that influence innovation	How do the behaviours within the management of innovation model relate the organisational behaviours that influence innovation?	Questionnaires
7	5 & 6	To establish construct validation of the four-factor model with personality and propensity to innovate	How do the four behaviours within the management of innovation model relate to personality, and propensity to innovate?	
8	7 & 8	To establish Criterion-related validity using triangulation of two methods. Organisations and the map of innovation	Can the influencing innovation inventory differentiate between managers in a high and low influencing innovation organisation? Does a manager's scores on the management of innovation model relate to the managers performance in the work place?	Questionnaires in two organisation separated by an inclusion criterion. The Map of Innovation and the four-factor influencing innovation inventory.
9	9	To explore the prominence of each managerial behaviour across the three phases of innovation process.	Are the managerial behaviours associated with innovation seen more or less frequently in the different phases of the innovation process?	The Map of Innovation

## **Chapter 3: Exploration of managerial behaviours associated with employee innovation**

*"You say you want a revolution"*

The Beatles, *Revolution*, (1968)

### **3.1. Introduction**

The previous chapter outlined the methodological approach adopted throughout this thesis. This chapter introduces a qualitative exploratory study, which aimed to identify the managerial behaviours that influence innovation using a multi-method approach. The chapter begins with a brief outline of previous research in this area and an exploration of the problems this study will address (however greater detail of this is presented in the literature review: Chapter 1); subsequently this chapter introduces the two-phase methodology used in this study, before presenting the results. The results section not only shows all of the managerial behaviours recorded in this study, but also presents a framework of how these behaviours can be categorised. The chapter concludes with a discussion of the findings in relation to both the previous work in this area, and the relationship between the managerial behaviours identified here and those of a 'competent' manager. Finally this chapter discusses the framework of managerial behaviours outlined in the Results section, and explores the implications of this work.

The influence managers can have on employee innovation has been recognised by researchers in this field (e.g. Amabile, 1988). Table 3.1 outlines the previous research in this area. Table 3.1 also shows the themes that can be identified in the previous research, all of which are reviewed in greater detail in Chapter 1.

**Table 3.1: Previous research findings illustrating the managerial behaviours associated with employee innovation**

<b>Theme</b>	<b>Managerial behaviour</b>	<b>Source</b>
1) Support	Support for the team's work and ideas	Delbecq & Mills (1985)
	Supportive supervision	Oldham & Cummings (1996)
2) Encouragement	Encouragement of employees to voice their own concerns	Deci & Ryan (1987)
	Supervisory encouragement	Amabile et al. (1996)
	Encouragement of risk taking	Raudsepp (1963); Amabile et al. (1996)
	Expectation of innovation	Eden (1984); Eden & Shani (1982)
	Job requirements for innovation	Unsworth, Wall & Carter (2000)
	Instructions to be innovative	Amabile et al. (1996)
	Goal setting	Redmond et al. (1994); Shalley (1995)
3) Feedback	Feedback which is supportive and informative	Amabile & Gyskiewicz (1987)
	Positive feedback	Zhou (1998)
4) Participative Communication	Informal interaction style	Zhou (1998)
	Social support	West (1989)
	Open channels of communication	Kimberley (1981); Kimberley & Evanisko (1981)
	Free flowing communication	Gregory (1969)
	Participation	Tierney et al., 1999
	Leader member exchange	Graen & Scandura, (1987); Tierney et al. (1999); Scott & Bruce (1994)
	Autonomy	Bailyn (1985); Shalley et al. (2000)
5) Freedom	Balance between freedom and constraint	Amabile & Conti (1994)
	Control in the form of choice	Andrews (1975)
	Control over decisions	Greenberg (1992)
	Mutual respect	Young (1994)

However, as Chapter 1 illustrates, despite great interest within this arena many questions remain unanswered, and there is still a need for further research to produce a more detailed synopsis of the managerial behaviours that are associated with employee innovation. Some suggested key problems in previous research are: 1) there is limited use of exploratory designs, which has led to some managerial behaviours been overlooked; 2) there has been limited integration of all of the previously identified

managerial behaviours to produce a coherent model; 3) there is inconsistency between authors in how innovation at work is defined; and 4) there has been limited attempts to differentiate between the behaviours associated with innovation and those of a competent manager. Each of these problems are outlined below before presenting the aims of this study.

The lack of exploratory approaches in this area may have led to some managerial behaviours being overlooked by previous research. This is especially pertinent since many previous studies have demonstrated a correlation between a single managerial behaviour (such as feedback; Zhou, 1998) and innovation. Therefore, as recommended by Bartunek and Seo (2002), this study adopted a qualitative approach in order to gain an in-depth insight into employee understanding of managerial behaviours associated with innovation, and to gain a detailed comprehension of the managerial dynamics that surround this concept. The adoption of a qualitative approach aimed to clarify existing research and identify original managerial behaviours.

The adoption of an exploratory approach also aimed to generate further understanding of each of the managerial behaviours that influence innovation. As noted above, a second problem of research in this area is the lack of integration between managerial behaviours. However, if knowledge and understanding of these behaviours is increased, it may be possible to initiate attempts to organise the behaviours into a framework that can be explored with further research.

A third problem within this area is that there has been a limited use of a consistent definition of innovation. There has also been limited consistency in how this concept is measured. Growing consensus suggests that innovation consists of two

components: idea generation and idea implementation (see Axtell et al. 2000; Patterson, 2002), yet both of these concepts are not always studied by researchers aiming to explore the managerial behaviours associated with innovation. Lay stereotypes of managers indicates that managers may be resource providers and have a greater role in the implementation of ideas, however Axtell et al. (2000) found that manager may also play a role in the idea generation phase. Therefore, this study is the first to have separately explored both the generation and implementation of ideas within the innovation process, and how managerial are associated with these components.

A fourth problem in the previous research is there has been a limited exploration of the relationship between the managerial behaviours associated with innovation and those of a competent manager. For example, a competent manager may be required to provide employees with freedom and autonomy, but may not be required to show support for innovation. Therefore, in order to demonstrate the overlap and differentiation of the managerial behaviours identified in this study to be associated with innovation, and those of a competent manager, the findings will be discussed in relation to a prominent taxonomy of managerial competence.

Thus in summary the aims of this study are four-fold:

- 1) To identify a complete range of managerial behaviours associated with employee idea generation and idea implementation, by both replicating those identified by previous researchers and through the identification of new behaviours.
- 2) To clarify understanding of the managerial behaviours that associated with innovation.
- 3) To examine the difference between the behaviours identified here and those of a 'competent manager'.



- 4) To identify an organising framework of the key themes in the managerial behaviours that are associated with innovation.

### **3.1.a Research question**

As this study was exploratory a research question was used rather than hypothesis.

- 1) What are the managerial behaviours that are associated with employee innovation?

### **3.2. Method**

This study adopted a two-phase approach. In phase one the managerial behaviours associated with innovation were explored using Critical Incident Technique interviews (CIT: Flanagan, 1954), and in phase two they were explored using Repertory Grid interviews (Kelly, 1955). Both of these phases are presented below and the results are presented synonymously in Table 3.2 (see Results section, section 3.4).

#### **3.2.a. Phase 1: An exploration of the management behaviours that are associated with employee innovation using Critical Incident Technique**

Phase one was designed to examine the managerial behaviours that are associated with employee innovation (both positively and negatively), using CIT (Flanagan, 1954).

#### **3.2.b Participants**

32 employees from a multi-national brewing organisation in the UK. Participants were employed within the Marketing, Technical, Logistics, Sales and Human Resources departments. 50% of the sample was male and 50% was female. The age range was from 18 – 54. Each occupational grade was included in the sample, and the type of job role was wide, ranging from Administrative Support to Director.

### **3.2.c Procedure**

Critical Incident Technique (CIT) interviews were conducted. Half the participants were asked to recall and describe incidents when they had *generated* ideas at work and the other half were asked to recall and describe incidents when they had *implemented* ideas at work, with both groups paying particular reference to the role their manager played in these instances. Subsequently, participants were asked to describe incidents; when they had not generated or implemented a new idea, and the role their manager played in this instance.

### **3.2.d Data analysis**

The data were analysed using Template Analysis (Crabtree & Miller, 1992). Two psychologists independently analysed four interview transcripts. A codebook was then developed by the two psychologists through comparison of codings and discussion of disagreements.

All interviews were analysed using this codebook. As this included an unmanageable number of codes to use in analysis, the statements in the codebook were collapsed in to a smaller number of higher-order codes, as recommended by King (1994). This was done using a clustering exercise (Aldenderfer and Blashfield, 1984) completed independently by two psychologists.

Inter-rater reliability was then analysed on the final themes, following a formal statistical approach using the Kappa coefficient of agreement (Cohen, 1990) to compare ratings by the author with those of an expert panel. The expert panel consisted of 5 PhD in Occupational Psychology who acted as subject matter experts. A mean

pairwise Kappa coefficient was calculated to establish inter-rater reliability. The purpose of this was to ensure that the data had been analysed correctly and that the themes developed from the codebook were accurate.

### **3.3 Phase 2: An exploration of the managerial behaviours associated with employee innovation using Repertory Grid Technique (Kelly, 1955)**

Phase two was designed to examine managerial behaviours that are associated with employee in innovation in the workplace, using Repertory Grid Technique (Kelly, 1955). Repertory Grid was used as it asks interviewees to compare and contrast different managers, and thus helps to identify further managerial behaviour associated with innovation. Previously this technique has not been used in this area.

#### **3.3.a Participants**

20 employees from a multi-national brewing organisation in the UK (although separate from those involved in phase one). The participants were employed in the Marketing, Logistics, Sales, Technical and Human Resources departments. 50% of the sample were male and 50% were female. The age range of the sample was from 23 – 58. All occupational grades were included in the sample.

#### **3.3.b Method**

Repertory Grid Technique interviews were conducted. The sample was split so that half of the participants (n = 10) focused on manager who enhanced / inhibited idea *generation*, and half (n = 10) focused on managers who enhanced / inhibited idea *implementation*. Each interview lasted between an hour and an hour and a half.

### **3.3.c Data analysis**

A similar clustering exercise to that conducted in phase one was carried out on the constructs elicited from the Repertory Grid Technique interviews; this took the form of a card-sort analysis carried out independently by two psychologists.

The two psychologists then discussed the clusters and resolved any disagreement in the themes they had assigned. The themes elicited were then inspected by a panel of three psychologists, leading to revision of some of the themes. As with phase one this resulted in the clarification of some of the definitions and labels. Within this, the panel decided to exclude the statements in the card sort analysis which resulted in the theme 'competent manager'. The rationale for this was 1) this theme is too broad, 2) this theme does not represent a single behavioural domain and 3) this theme did not relate specifically to influencing innovation. As a result 'competent manager' was omitted from further analysis. To further demonstrate the distinction between a manager who enhances innovation and a 'competent manager', the behaviours identified in this study are discussed in relation to a taxonomy of a competent manager (Tett et al., 2000) in the Discussion.

Inter-rater reliability was gained on the card sort using an expert panel of PhD Occupational Psychologists who acted as subject matter experts (n=5), and following the formal statistical procedure of Kappa coefficient, using 20% of the data. A mean Kappa coefficient was then calculated.

### **3.4. Results**

*Phase one:* A total of 91 codes were included in the codebook. The clustering exercise

resulted in 14 themes, which were then discussed with a panel of psychologists (n=3). On examination of the 14 themes by the panel, two themes were excluded: 1) 'manager employee relations' and 2) 'stimulating physical environment', as these two themes were thought not to be managerial behaviours. Conversely these two themes are part of the wider social context in which a manager operates. Therefore, the 14 themes were revised into the 12 themes and the mean Kappa coefficient for these themes was .65. The final 12 themes are shown in Table 3.2.

*Phase 2:* A total of 14 managerial behaviours were identified using the repertory grid interviews, shown in table 3.2. The mean Kappa coefficient for these 14 themes was .72. This established some original behaviours and mirrored some of the behaviours found in phase 1.

*Overall results:* The results show overall that when the behaviours found in phase 1 and phase 2 are added together 15 managerial behaviours were identified; 12 of these behaviours were identified in phase one (CIT interviews), and 14 were found in phase two (Repertory Grid Technique interviews). 11 behaviours were found in both phase one and two.

In relation to previous research four of the behaviours had not been identified and were therefore completely original, and for two behaviours substantial clarity and depth were added over similar behaviours that had been identified in past research. For example, the current research identified optimism as a managerial behaviour and previous research has identified 'clear vision' to enhance innovation; these two concepts are related but not identical. The remaining nine behaviours replicated previous research, but as shown in Table 3.2 this study has clarified understanding of these

behaviours. Table 3.2 shows each of the behaviours, which phase (either one, two or both) the behaviour was identified in, descriptors generated from the interviews, and how this maps on to the previous literature with example sources.

**Table 3.2: The 15 managerial behaviours that influence innovation**

Name and of theme	Description	Behavioural indicators from CIT	Behavioural indicators from Rep Grids	Behaviour identified by previous literature	Reference
1) Open to new ideas and challenge	The manager is open minded and happy for staff to generate and implement new ideas. He / she is willing to listen and build on ideas. He / she does not prefer his or her way of doing things and always ready to discuss the ideas of the staff	<ul style="list-style-type: none"> <li>• Open minded</li> <li>• Lets you have your own ideas</li> <li>• Listens to ideas</li> <li>• Open to new ideas</li> <li>• Manager prefers doing thing his / her own way</li> </ul>	<ul style="list-style-type: none"> <li>• Open to new ideas</li> <li>• Willing to take risks</li> <li>• Open to challenge</li> <li>• Open and receptive to new ideas</li> <li>• Accepts challenge from subordinates</li> </ul>	Open style of communication	Ekvall, 1996
4) Approachable	The manager's style is informal, relaxed and not rigid. There is 2-way communication, which is more open and the manager is a good listener. The manager is approachable, open and honest, he/she is also easy to talk to.	<ul style="list-style-type: none"> <li>• Communicates or gives information to employees about organisational issues</li> <li>• Open style of management</li> <li>• Less formal and rigid style</li> </ul>	<ul style="list-style-type: none"> <li>• Open and honest, not just paying lip service</li> <li>• Likable</li> <li>• Relaxed</li> <li>• Socially approachable</li> <li>• Lots of communication</li> </ul>	Participative and collaborative style	Kanter, 1983
2) Freedom	The manager leaves employees up to their own devices in the way they carry out their jobs. He / she does not impose one correct way to solve problems and lays down few rules. Although there are long-term goals there is freedom at the process level. There are few confined parameters of work. The manager has a participative style	<ul style="list-style-type: none"> <li>• Manager provides a long-term goal but there is freedom at the process level</li> <li>• Not told one correct way to do things</li> <li>• Leaves you up to your own devices</li> <li>• Don't have to ask permission to implement ideas</li> <li>• Managers very tightly</li> </ul>	<ul style="list-style-type: none"> <li>• Tells people only one correct way – his/ her way</li> <li>• Is not restricted</li> </ul>	Autonomy and freedom	Shalley et al 2000; Amabile & Gryskiewicz, 1989.

3) Selfless	The manager is not out for himself or herself, but is team focused. The manager has the best interest of the team in mind. The manager's focus is wide and it is not just on themselves or their own status		<ul style="list-style-type: none"> <li>• Sells subordinates ideas as his/her own</li> <li>• Selfish – not focused on the good of the team</li> <li>• Competitive with ideas</li> <li>• Wide focused versus self focused</li> </ul>	
5) Advisory feedback	Manager gives positive feedback and does not criticise ideas or punish failure. The manager gives guidance on idea	<ul style="list-style-type: none"> <li>• <u>Have regular review meetings to discuss progress of ideas</u></li> <li>• Gives guidance and back up</li> <li>• Positive feedback and critics</li> <li>• Does not blame when things go wrong</li> <li>• No feedback meetings</li> <li>• Checks development of ideas</li> <li>• Always sees the positive even if an idea does not work</li> </ul>	<ul style="list-style-type: none"> <li>• Subordinates want to perform for this manager</li> <li>• Positive feedback</li> </ul>	Feedback
6) Constructively builds ideas	The manager does not criticise or block idea, but tries to help employees build ideas. Refrains from using no as a reflex reaction.	<ul style="list-style-type: none"> <li>• Manager helps build ideas</li> <li>• Does not criticise ideas</li> </ul>	<ul style="list-style-type: none"> <li>• Positive feedback -- does not criticise</li> <li>• Willing to build and explore ideas</li> </ul>	Amabile & Gryskiewicz, 1989; Zhou, 1998
7) Rewards and recognises innovation	The manager provides rewards for innovative efforts	<ul style="list-style-type: none"> <li>• Rewards Creativity</li> <li>• Gives monetary rewards</li> <li>• Manager pushes ideas forward</li> </ul>	<ul style="list-style-type: none"> <li>• Gets buy in for ideas around the organisation</li> <li>• Pushes ideas forward</li> </ul>	



<p><b>8) Expects and encourages others to innovation</b></p>	<p>Manager encourages employees to develop and try out new ideas. The manager expects his or her subordinates to generate and implement ideas. An observable behaviour, which results from this the setting of goals to be innovative at work and communication of these innovation goals to the employees. The manager is enthusiastic about innovation and communicates to the employee that his / her job requires innovation</p>	<ul style="list-style-type: none"> <li>• Encourages you to get stimulation from elsewhere</li> <li>• Encourages you to look for an alternative solution to solve problems</li> <li>• Encourages / facilitates brainstorming</li> <li>• Encouraging manager, expects subordinates to be innovative</li> <li>• Encourages creativity and innovation</li> <li>• Sets goal to be creative</li> <li>• Job requires innovation - manager tells it is part of job</li> <li>• Enthusiastic about ideas</li> <li>• Positive attitude towards innovation</li> </ul>	<ul style="list-style-type: none"> <li>• Encourages creativity</li> <li>• Enthusiastic</li> <li>• Gives encouragement</li> <li>• Positive view / promotes innovation</li> <li>• Views creativity as positive</li> </ul>	<p>Leader role expectation</p> <p>Job requirements</p> <p>Sets creativity goals</p> <p>Supervisory encouragement</p> <p>Support for innovation</p>	<p>Eden, 1990; Scott &amp; Bruce, 1994</p> <p>Oldham &amp; Cummings, 1996</p> <p>Redmond et al 1994;</p> <p>Amabile 1988</p> <p>Amabile, 1996</p> <p>Siegel, S. M. &amp; Kaemmerer, 1978</p>
<p><b>9) Creative</b></p>	<p>The manager is creative him / her self and sets creative examples by implementing and generating ideas of their own. They walk the talk and provide examples of creativity/ innovation. They are curious and open minded</p>	<ul style="list-style-type: none"> <li>• Manager comes up with own ideas</li> <li>• Creative himself</li> </ul>	<ul style="list-style-type: none"> <li>• Manager is creative themselves</li> <li>• Open minded</li> <li>• Curious</li> <li>• Sets creative examples</li> <li>• Curious</li> </ul>		
<p><b>10) Positive affect</b></p>	<p>The manager is outgoing, fun and humorous. He / she enjoys taking to people. They are enthusiastic and likeable.</p>		<ul style="list-style-type: none"> <li>• Outgoing</li> <li>• Fun / humour</li> <li>• Fun and sense of humour / relaxed</li> </ul>		

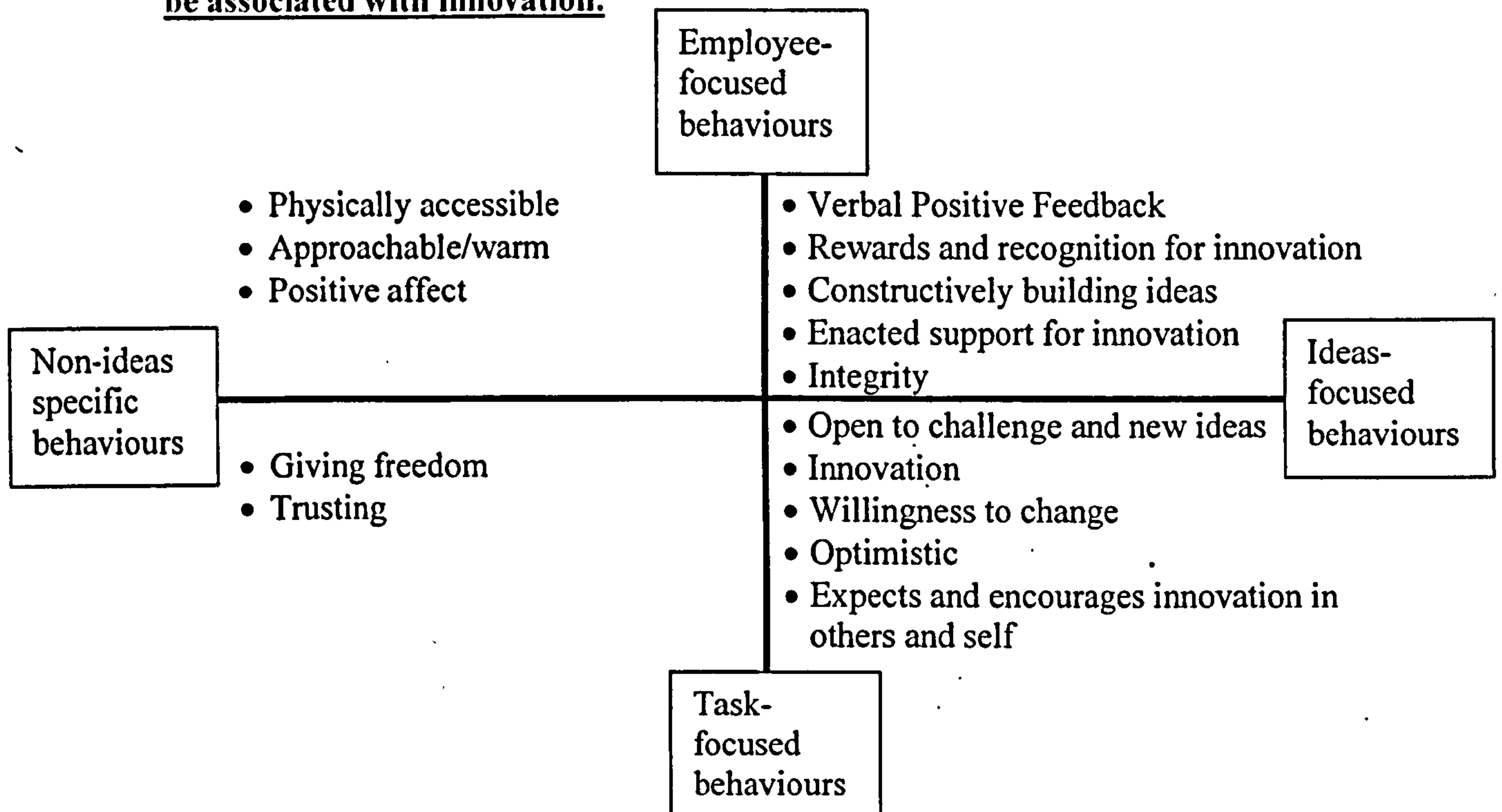
<p><b>11) Trusting</b></p>	<p>The manager trusts and respects the subordinates so gives responsibilities for projects and ideas to the subordinates. The manager also involves subordinates in decision making. The manager has confidence in the staff's abilities and therefore delegates tasks. Where trust is missing subordinates are wary of the manager and the manager is unconfident in the subordinate's ability.</p>	<ul style="list-style-type: none"> <li>• Gives responsibility for ideas and project</li> <li>• Trusts subordinate to do the job</li> <li>• Has confidence in my ability</li> <li>• Includes employees at top level</li> </ul>	<ul style="list-style-type: none"> <li>• Delegates</li> <li>• Trusts subordinates</li> </ul>	<p>Trust and respect</p>	<p>Young, 1994; Kimberley &amp; Evanisko, 1981</p>
<p><b>12) Physically accessible</b></p>	<p>The manager is physically accessible. He / she is willing to make time to discuss ideas. He / she are contactable and easy to get hold of.</p>	<ul style="list-style-type: none"> <li>• Office door is always open</li> <li>• Always there to report back to -- report back when you like</li> <li>• Not contactable</li> <li>• Could not get hold of manager</li> <li>• Too busy</li> <li>• Wasn't around</li> </ul>	<ul style="list-style-type: none"> <li>• Physically approachable</li> <li>• Accessible</li> </ul>		
<p><b>13) Willing to change</b></p>	<p>The manager is willing to change both him / her self and processes at work. He or she is not rooted in tradition or stuck in their ways. He/she is open to change and willing to take risks and learn from mistakes.</p>	<ul style="list-style-type: none"> <li>• Does not do change himself</li> <li>• <u>Manager not open to change</u></li> <li>• Not willing to take small risks</li> <li>• Prefers traditional old fashioned ways</li> <li>• Manager open to change</li> </ul>	<ul style="list-style-type: none"> <li>• Results focused -- not willing to change the process</li> <li>• Willing to learn from mistakes</li> <li>• Willing to take risks</li> <li>• Willing to change</li> </ul>	<ul style="list-style-type: none"> <li>• Tolerates risk taking</li> </ul>	<p>Amabile et al, 1996, Young, 1994</p>
<p><b>14) Optimistic</b></p>	<p>The manager is positive about the future of ideas</p>		<ul style="list-style-type: none"> <li>• Positive about future plans and ideas</li> </ul>	<ul style="list-style-type: none"> <li>• Clear vision</li> </ul>	<p>West 1990; Kanter, 1983</p>
<p><b>15) Enacted support for innovation</b></p>	<p>The manager provides resources so that ideas can be implemented. This includes resources in the form of both time and financial resources.</p>	<ul style="list-style-type: none"> <li>• Allows time to try new ideas</li> <li>• No tight deadlines</li> <li>• Does not give enough time to generate / implement ideas</li> <li>• Manager does not provide resources</li> <li>• Provides resources</li> </ul>		<p>Support for innovation</p>	<p>Oldham &amp; Cummings, 1996; West, 1989</p>

### **3.4.a Interpretation the links between the behaviours**

Further examination of the findings suggests that it is possible to dichotomise the behaviours on two axes: 1) ideas-focused behaviours versus global behaviours, and 2) employee-focused versus task-focused behaviours, in order to produce a framework which can be used to organise and draw links between the separate managerial behaviours that were found to be associated with innovation. This framework is presented below in Figure 3.1, and represents initial efforts to draw clarity and themes between the behaviours reported in this chapter. These themes were identified and discussed by the expert panel (n = 3) involved in the card sort analyses for phases one and two, and who were therefore familiar with all of the managerial behaviours.

Further examination of this framework is carried out in Study 2, Chapter 4, which presents an empirical exploration of the themes relating to the managerial behaviours, and statistically explores the underlying factor structure of the 15 managerial behaviours.

**Figure 3.1: A framework of the managerial behaviours that are reported to be associated with innovation.**



### 3.5 Discussion

The study presented here has found managerial behaviours that not only replicate previous literature, but also add to previous research by highlighting additional management behaviours that may be associated with innovation. Such original behaviours include the manager being creative, optimistic and having integrity. This section explores the theoretical and practical implications of this work, firstly by reviewing the convergence between the findings in phases one and two, and secondly by examining the managerial behaviours identified here and their relation to those identified in previous literature. The discussion will then explore how the behaviours identified here relate to Tett et al.'s (2000) taxonomy of a 'competent manager', in order to demonstrate how a manager who influences innovation can be differentiated from a 'competent' manager. Finally, Chapter 3 will close with

an examination of the four themes of the managerial behaviours identified in the Results section.

### **3.5.a Convergence and consistency between phase one and phase two results**

There was high convergence between the behaviours reported in phase one and phase two. The only behaviours found in phase one and not found in phase two was enacted support for innovation. This is likely to have been reported in phase one as participants were discussing actual incidents of idea generation and implementation where resources may have been key to the example, whereas in phase two participants were comparing actual managers who do and do not promote innovation. This focus on managers themselves may also explain why phase two uncovered some original managerial behaviours. These behaviours were accessibility, positive affect and integrity, all of which have no corresponding previous literature relating them to employee innovation. One reason why previous work in this area may have overlooked such managerial behaviours is that this is the first study in this area to employ Repertory Grid Technique, which compares and contrasts managers on an individual level and therefore focuses on their individual behaviours, further demonstrating the originality of this work.

This discussion will now explore how the managerial behaviours reported in this study relate to and expand on previous literature.

### **3.5.b Behaviours found and their relation to previous literature**

The behaviours found in this study replicate all previous findings from the literature, outlined in Table 3.1. The current findings also enhance understanding

of the previously identified managerial behaviours by adding behavioural specificity and clarity. The literature corresponding to each behaviour identified in this study is discussed below. This illustrates that although some of the behaviours have been identified in the past, they have not been fully understood (e.g. approachability of the manager). The managerial behaviours that directly replicate previous research findings are presented first, followed by those behaviours which have added clarity to the previous findings.

### **3.5.c Enacted support for innovation**

This theme is about a manager providing time and resources for employees to generate and implement an idea. For example, one interviewee said "*He tends (my manager) not to put time restrictions on things*". Similarly one interviewee said "*If you need money to spend he (the manager) will support you*"

Researchers have also noted how resource allocation is directly related to project innovation levels (Cohen & Leventhal, 1990; Damanpour, 1991; Delbecq & Mills, 1985; Farr & Ford, 1990; Tushman & Nelson, 1990). As Amabile et al. (1996) noted, the importance of such resources may not only be due to the obvious practical benefits but also because this may lead the employee to believe that their work is of substantial value to the organisation, which may enhance their motivation to innovate.

### **3.5.d Freedom**

This study identified giving freedom at the task level as an important factor to enhance innovation; however, participants also specified that long-term goals were

needed. For example, one interviewee said about her manager *"He left me too it, but obviously there was a reporting system"*. This finding replicates the work of Amabile and Conti (1994) who claimed that the delicate balance between freedom and constraint was of key importance in the management of innovative employees. Freedom is may be associated to innovation as it can increase motivation (Deci & Ryan, 1989), which is a component of individual innovation (Amabile 1979, 1983; Patterson, 1999).

### **3.5.e Trust**

Previous literature has shown high quality leader-member exchange (LMX) to be related to innovation (Tierney et al., 1999). Although LMX was not included in the managerial themes outlined in this study (as it was not a managerial behaviour, but describes the manager-employee relationship), some of the behaviours that typify high LMX were also found to be associated with innovation e.g. trust. One interviewee said it was important that the manager had *"trust to allow us to try and solve things ourselves"*.

This finding is in line with previous research. For example, Kimberley and Evanisko (1981) argued that innovation is influenced by leader style, which is characterised by trust and respect – a style they labelled a ‘democratic’ or ‘considerate’ style. This is likely to result in the manager providing employees freedom, as he or she can trust the employee to carry out tasks effectively.

The discussion will now explore the managerial behaviours, which have added clarity and structure to the previous research in this area. These behaviours

include feedback constructively building ideas, expects and encourages innovation in self and others, approachability, and openness to ideas and change.

### **3.5.f Feedback**

In the findings presented here, feedback was found to have two distinct aspects 1) giving guidance on ideas, and 2) giving rewards and recognition for innovative efforts. Previously, informative, supportive feedback has also been found to facilitate innovation (Amabile & Gryskiewicz, 1987). Similarly, Zhou (1998) found that positive feedback, given in an informative rather than controlling manner, also fostered idea generation. This shows that the behaviour of giving guidance (found in the current study) directly replicated previous research findings. However, this also demonstrates that the distinct managerial behaviour of giving rewards and recognition (a separate aspect of giving feedback identified in this study) has not been recognised explicitly by previous research. Therefore, this study has added clarity to the previous literature.

### **3.5.g Constructively building on ideas**

Another behaviour identified in this study that is separate yet similar to feedback is a manager who constructively builds on ideas. Amabile, Goldfarb and Brackfield (1990) have shown that fear of negative evaluation is likely to hinder innovation. Therefore, it is possible that a manager who builds on ideas presented by an employee, as opposed to criticising them; may reduce the employee's fear of negative evaluation. For example, one interviewee said that their manager inhibited the generation and implementation of ideas due to a "*fear of being laughed at or put down*". Another interviewee on the other hand, felt "*If you have*



*done something and it's not worked, he (the manager) will say well the positive sides are....*". This finding demonstrates ways in which managers can reduce fear of negative evaluation, and thus helps to clarify previous literature.

### **3.5.h Expects and encourages innovation in self and others**

Supervisory encouragement to be innovative has previously been identified to facilitate innovation and is one of the scales included in the KEYS creative work environment inventory (Amabile et al., 1996)

In addition, the information gathered in this study on this theme (expects and encourages innovation in self and others) helps to organise previous research. This is because many single variables identified by previous research are related to or typical of managerial encouragement of innovative, including; 1) leader role expectation, 2) communication of job requirements, 3) setting goals, and 4) aspects of support for innovation. Each of these behaviours will now be explored in relation to the current theme; 'expects and encourages innovation in self and others'.

Previous literature has shown that leader role expectation is associated with innovation (Scott & Bruce, 1994). Leader role expectation is a special case of self-fulfilling prophecy, the 'Pygmalion effect' (Livingston, 1969), which refers to the modification of an individual's behaviour based on the expectations for that behaviour received from another (e.g. a manager) (Eden, 1984, 1990). Leader role expectation relates to the current theme because in encouraging employee innovation, it is important that a manager *expects* his or her subordinates to be

innovative. For example one interviewee said *"My manger is open to trying new things and actively encourages it, in fact he will make you try new things"*

Another component of 'expects and encourages innovation in self and others' is communication by the manager that the job requires employees to be innovative. For example, one interviewee felt *"my job doesn't require a lot of innovation"* and noted how her manager did not attempt to change this view which prevented her from innovating. Using regression analysis, Unsworth et al. (2000), found that a job requiring an employee to be innovative explains more variance in innovation than autonomy or supportive leaders. Therefore, it seems that a manager who encourages his/her employees to be innovative has to do this by communicating to the employee that their job formally requires them to be innovative.

Another behaviour that typifies, 'expects and encourages innovation in self and others' is the setting of innovation goals. The setting of innovation goals has previously been shown to be important in order to influence innovation by Shalley (1995), who used an experimental and a control group in a goal-setting exercise. The experimental group was given 'do your best innovation' goal in an in-basket exercise, while the control group was given no goal. Shalley (1995) found that the highest idea generation occurred under the innovation goal assigned condition. In this study, one interviewee felt innovation was inhibited by *"no clear goal, there was a beginning and an end but no milestones"*. This implies that innovation goals should be set by the manager in order to encourage innovation.

Furthermore, some of the components which have previously been amalgamated under the heading of 'support for innovation', relate to the theme 'expects and encourages innovation in self and others'. For example, Deci and Ryan (1987) claim that a supportive supervisor encourages employees to voice their views, which is similar to encouraging employees to suggest ideas. This helps to add behavioural clarity to the broad notion of 'support for innovation'.

Overall, this study has shown that the theme 'expects and encourages innovation in self and others' incorporates 1) leader role expectation, 2) supervisor encouragement to be innovative 3) communication of job requirements 4) setting innovation goals and 5) aspects of support for innovation. Therefore, all these previously independent behaviours are behaviourally related, and can be classified under the main heading of 'expects and encourages innovation in self and others'.

### **3.5.i Approachability**

This theme can also be mapped onto more than one managerial behaviour that has been identified in previous literature. Firstly, research suggests that innovation can be enhanced by a manager style that is both participative and collaborative (Kanter, 1983). Concurrently a manager who is approachable and open, takes a participative role in the way he/she relates to employees. For example, one interviewee said that their manager was "*Willing to listen*".

An open style of communication has also been shown to influence innovation (Ekvall, 1996), which is related to approachability. The current study also found

that two-way communication and a manager who is easy to talk to are characteristic of a manager who is approachable.

### **3.5.j Openness to ideas and challenge**

In accordance with the above, openness to challenge and new ideas also maps onto an open style of communication (Gregory, 1969). However, openness to challenge and new ideas is more concerned with a manager wanting employees to specifically challenge his / her view or way of thinking and is therefore specific to ideas. An open style of communication also incorporates a manager who is willing to listen; similarly, openness to ideas and challenge concerns a manager who specifically listens to employees' ideas. For example one interviewee said "*if I've got an idea I know I can talk to him*".

Points 3.5.i and 3.5.j show that an open style of communication is important in two different forms. Firstly in terms of the manager's overall style, and secondly in terms of the manager being open specifically to ideas and challenge. This distinction has not previously been made in the research literature. The dichotomy between managerial behaviours which focus on ideas, and those which are global non ideas-specific behaviours, is discussed below, and builds upon the framework of managerial behaviours that are associated with employee innovation presented in the Results section. This discussion will now go on to explore the managerial behaviours that have added clarity to the previous research.

### **3.5.k Willingness to change**

A manager's willingness to change has been overlooked by previous literature on innovation. Although tolerating risk-taking has previously been identified as important (Young, 1994; Amabile et al., 1996), this is only a small component of the general characteristic of a manager's willingness to change him or herself or processes at work. Thus, this study has added behavioural specificity to this notion and expanded our understanding of the importance of a manager's willingness to change. For example, one interviewee said it was important his manager "*practiced what he preached*".

### **3.5.l Optimism**

As shown in Table 3.2, managerial optimism has not previously been identified as an important behaviour to influence innovation. One interviewee said their manager was "*positive about the future*", which may correspond with clear vision, and it is therefore argued to be a component of optimism.

The other four themes identified in this study have not been covered in previous literature. These behaviours are positive affect, innovation, accessibility, and integrity, an outline of these is given below.

### **3.5.m Positive affect**

This behaviour centres around how outgoing a manager is. Interviewees used words such as "*fun*" and "*humorous*" to describe a manager who facilitates innovation. Although Ekvall (1983) identified playfulness and humour as

components of the organisational climate that promote innovation, such managerial behaviours have been overlook by previous research.

### **3.5.n Innovative**

A manager's own ability to generate and implement ideas was identified in this research to be important to influence innovation. Previously it has been unclear if a manager's own innovation influences the innovative behaviour of their employees. However, in this study interviewees said "*My manager his ideas of his own*"; "*We are quite lucky in that respect because he's very creative himself*". Employees felt that it was important that their managers "*walked the walk*" in relation to the generation and implementation of ideas.

### **3.5.o Accessibility**

The managerial behaviour of accessibility focused on how easy to contact the manager was, in that employees felt that it was important that their managers was physically accessible. Behaviours which typify accessible are replying to phone call and emails, and putting time aside to deal with employees queries. For example, one interviewee felt there innovation was inhibited when "*He (the manager) seemed too busy when I wanted to go and talk to him, there were points when he was too busy with meetings and just wasn't around*".

### **3.5.p Integrity**

A final managerial behaviour identified in this study to be associated with innovation, which has not been identified by previous research is integrity. Integrity focuses on the manager having the interest of the employees in mind

when considering their ideas, and not looking for self-gain out of others ideas.

One interviewee recalled a time when the manager “*sold my ideas as his own*” and felt this inhibited her future innovation.

### **3.6 Relations with managerial competence**

The relationship between the managerial behaviours associated with innovation and those of a competent manager has not previously been explored. Furthermore, as previously discussed (see phase two, Method section), within the Repertory Grid Technique interviews some behaviours were elicited that represented general managerial competence. However, due to the ambiguity surrounding the concept of a ‘competent manager’, it was deemed that such behaviours were not specific to innovation and they were therefore excluded from further analysis. However, the question still remains, *how do the behaviours identified as important for innovation differ from those of a highly effective or competent manager?* In order to demonstrate that influencing innovation and being a competent manager are overlapping yet distinct concepts, the managerial behaviours identified in phases one and two are mapped onto a published taxonomy of managerial competence (Tett Guterman, Bleier and Murphy, 2000). This taxonomy was selected as it is highly comprehensive and contains 53 competencies clustered in to nine themes. It is important to note however that the competencies (such as the ones in Tett et al.’s (2000) taxonomy) are distinct from behaviours (such as the ones identified in the current research). Bartram, Roberstson and Callinan (2002) noted that competencies are sets of behaviours. Despite this, the mapping aims to demonstrate that some of the sets of behaviours that are typical of a competent manager, may be associated with innovation, while others may not. Similarly,

some of the behaviours that are associated with innovation are not typical of, or are outside the remit of, a competent manager.

**Figure 3.2: Taxonomy of managerial behaviours associated with innovation, and those of a competent manager**

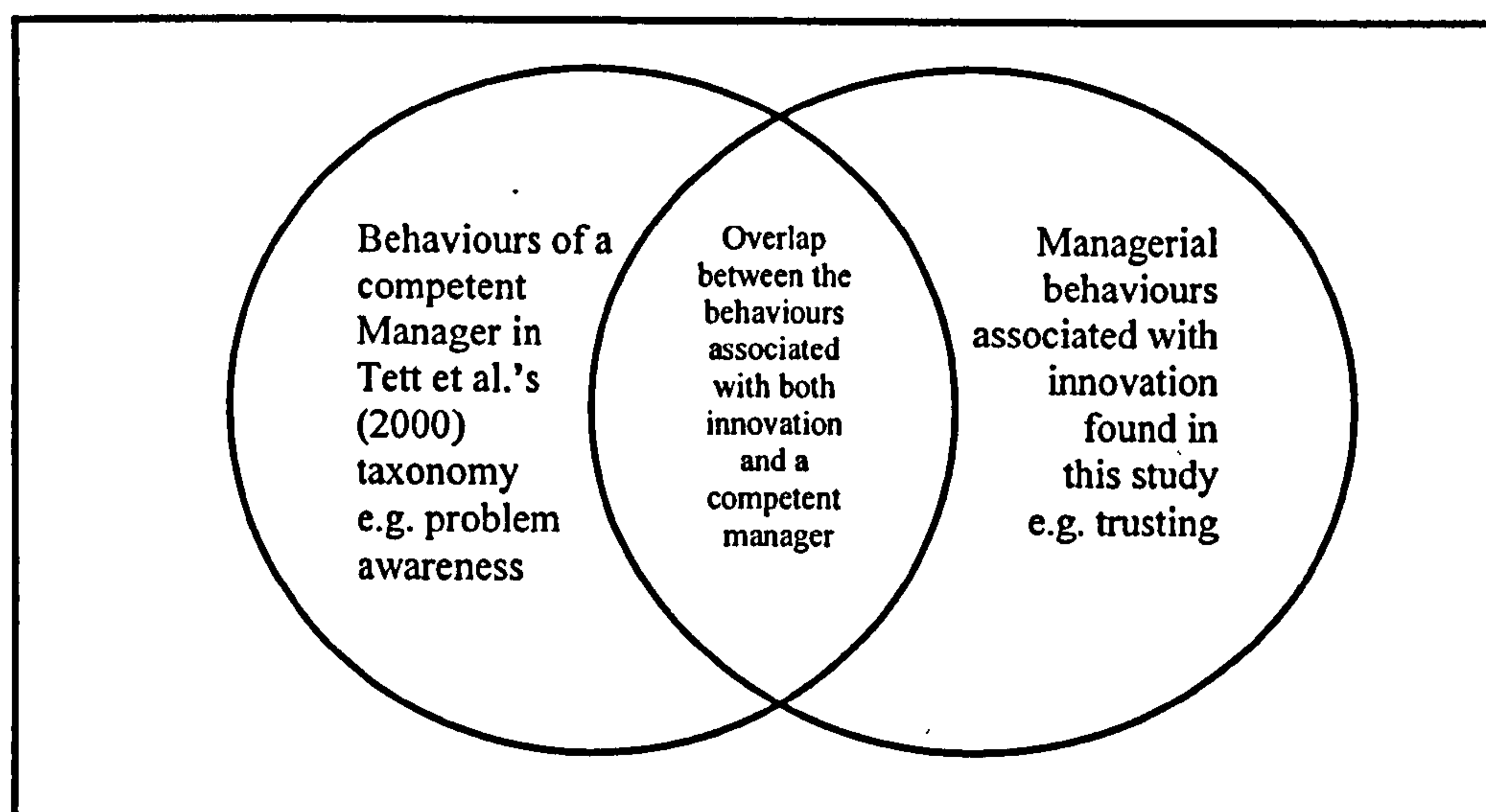
Behaviours in Tett et al.'s (2000) taxonomy not found in phase one or phase two	How the themes in phase one and two overlap with Tett et al.'s (2000) taxonomy		Themes found in phase one and/or phase two not found in Tett et al.'s (2000) taxonomy
<ul style="list-style-type: none"> <li>Problem awareness</li> <li>Decision making</li> <li>Directing</li> <li>Decision delegation</li> <li>Short term planning</li> <li>Strategic planning</li> <li>Monitoring</li> <li>Motivating by persuasion</li> <li>Productivity</li> <li>Task orientation:               <ul style="list-style-type: none"> <li>Initiative</li> <li>Task focus</li> <li>Urgency</li> <li>Decisiveness</li> <li>Politeness</li> <li>Political astuteness</li> <li>Assertiveness</li> <li>Customer focus</li> </ul> </li> <li>Dependability:               <ul style="list-style-type: none"> <li>Orderliness</li> <li>Rule orientation</li> <li>Personal responsibility</li> <li>Trustworthiness</li> <li>Timeliness</li> <li>Loyalty</li> </ul> </li> <li>Open mindedness:               <ul style="list-style-type: none"> <li>Cultural appreciation</li> </ul> </li> <li>Emotional control:               <ul style="list-style-type: none"> <li>Resilience</li> <li>Stress Management</li> </ul> </li> <li>Communication:               <ul style="list-style-type: none"> <li>Public presentation</li> <li>Written communication</li> </ul> </li> <li>Developing others and self:               <ul style="list-style-type: none"> <li>Performance assessment</li> <li>Job enrichment</li> <li>Self-development</li> </ul> </li> <li>Occupational acumen and concerns:               <ul style="list-style-type: none"> <li>Quantity Concern</li> <li>Quality Concern</li> <li>Financial Concern</li> <li>Safety Concern</li> </ul> </li> </ul>	Factor found in this study	Behaviours of a Competent manager in Tett et al.'s (2000) taxonomy	<ul style="list-style-type: none"> <li>Optimistic</li> <li>Trusting</li> <li>Giving freedom</li> <li>Physically accessible</li> <li>Positive affect</li> </ul>
	Enacted support for innovation	Coordinating	
	Encouragement to be innovative	Goal setting Team building Developmental goal steering	
	Selflessness	Compassion Team building	
	Feedback	Motivating by authority Developmental feedback	
	Approachability	Sociability Oral communication	
	Openness to challenge and ideas	Seeking input Cooperation Tolerance Listening skills	
	Innovative	Creative thinking	
	Willingness to change	Adaptability	

As shown in Figure 3.2, there are a number of behaviours within Tett et al.'s (2000) taxonomy of a competent manager that were not found to be associated



with innovation - for example, occupational acumen and concerns, aspects of task focus such as urgency and decisiveness, and aspects of communication such as written communication. Similarly, there are some managerial behaviours that were found to be associated with innovation that Tett et al. (2000) did not include in their taxonomy of a competent manager, - for example, a manager who is optimistic, gives freedom, and shows integrity with ideas. This leads to the conclusion that the behaviours identified as important to be associated with innovation overlap but are distinct from those behaviours which are typical of a competent manager. Figure 3.3 is presented below to illustrate this relationship.

**Figure 3.3: A pictorial representation of the relationship between managerial behaviours associated with innovation and Tett et al.'s (2000) taxonomy**



However, it is important to note that this assertion is also dependent on the context. Thus if influencing employee innovation is part of the competency framework employed by an organisation, all the behaviours identified in this study will represent an aspect of managerial competence.

This discussion will now explore the links between the 15 managerial behaviours identified in this study to be associated to innovation.

### **3.7 The links between the behaviours identified in this study**

The Results section presented a framework of the behaviours identified in this study, that can be used to organise, or draw links between, the managerial behaviours identified to be associated with innovation. This framework highlighted four key themes of managerial behaviour. It was suggested that the behaviours identified in the current thesis can be plotted on two axes: 1) they are either ideas-specific or non-ideas specific, and 2) they are either employee-focused or task-focused. As a result it is possible to identify four key themes: 1) behaviours which represent manager feedback to the *employee* and guidance on *ideas* (Feedback); 2) behaviours which represent a manager's own orientation towards innovation and *ideas* (Role Modelling); 3) behaviour which represents a manager's interpersonal style towards *employees* (Interpersonal Style); and 4) behaviour which represents giving autonomy (Empowerment).

In exploring the behaviours it is possible that each of the themes represents a different aspect of managerial behaviour. For example, it is possible that the Feedback theme represents the manager's responsive style, as it relates to how a manager responds to ideas. It is also possible that the Role Modelling theme represents a manager's own motivation towards innovation, as this theme centres on a manager's own innovation and the expectation of innovation in others. The Empowerment theme may represent the manager's work style, as this theme

relates to how a manager structures tasks for employees. Finally, the Interpersonal Style theme may represent a manager's social or interpersonal style, as the behaviours within this theme focus on how the manager interacts with employees. These themes are presented below in Table 3.3

By organising the managerial behaviours that are associated with innovation into four themes, each representing a different aspect of managerial behaviour (see Table 3.3), it is possible to hypothesise that the underlying factor structure will be represented by a four-factor model, and that these behaviours will be interrelated. Empirical examination of this framework is made in Study 2, Chapter 2.

**Table 3.3: An outline of the four themes identified to underlie the managerial behaviours that are associated with innovation**

Theme	Component	Definition	Facets
Feedback (F)	Responsive style	Represents a manager giving guidance and feedback to employees for their innovation efforts. Is willing to give time and resources to innovation, and ensures that employees receive credit for their ideas.	<ul style="list-style-type: none"> <li>• Verbal positive feedback</li> <li>• Rewards and giving recognition for innovation</li> <li>• Constructively building on ideas</li> <li>• Enacted support for innovation</li> <li>• Integrity with ideas</li> </ul>
Role Modelling (RM)	Motivation towards innovation	Represents the manager's own innovation, and positive orientation towards innovation. A manager sets an example by generating and implementing ideas of his/her own. He / she expects innovation from others and him/herself, and is willing and open to make changes at work. Has a positive view of the future, future plans and ideas.	<ul style="list-style-type: none"> <li>• Expectation of innovation in others and self</li> <li>• Open to challenge and new ideas</li> <li>• Innovative</li> <li>• Willingness to change</li> <li>• Optimistic</li> </ul>
	Social / interpersonal style	Represents how the manager interacts with employees. The manager is approachable and interacts with staff informally. The manager is easy to contact, returning telephone calls and email, and thus is perceived as accessible by employees.	<ul style="list-style-type: none"> <li>• Physically accessible</li> <li>• Approachable/warm</li> <li>• Positive affect</li> </ul>
Interpersonal Style (IS)			

Continued overleaf

Theme	Component	Definition	Facets
Empowerment (E)	Work style	Represents the empowerment of employees and the manager's willingness to trust employees and give them freedom at work.	<ul style="list-style-type: none"> <li>• Gives freedom</li> <li>• Trusting</li> </ul>

### 3.8 Summary

Overall this chapter has conducted exploratory research and has identified 15 managerial behaviours that influence employee innovation. These behaviours have been organised into four themes: Feedback, Role Modelling, Interpersonal Style, and Empowerment.

### 3.9 Conclusions and further work: Towards an extended model of managerial behaviours associated with innovation

This study has aided understanding of the role managers play in influencing innovation, by identifying 15 managerial behaviours that associated with innovation and then organising them into four key factors. A problem with this framework is that there is no empirical evidence to support the themes. As discussed in the previous chapter a psychometric approach seems the most appropriate way to build a model in this area, therefore it is now important to explore how the behaviours outlined here interlink quantitatively using an Exploratory Factor Analysis, and to test the initial themes identified here and those identified in the Exploratory Factor Analysis using a Confirmatory Factor Analysis. Further to this, it is important to test the theoretical mechanisms

proposed in Chapter 1 (e.g. motivation to innovate), through which the managerial behaviours associated with employee innovation. This study has begun to address the theoretical need for an extended model of the managerial behaviours associated with innovation; the further work presented in this thesis aims to expand and explore this model.

## **Chapter 4: The management of innovation - psychometric approach**

*“The importance thing in science is not so much to obtain new facts as to discover new ways of thinking about them.”*

Sir William Bragg

### **4.1. Introduction**

In Chapter 3, 15 managerial behaviours were identified as influencing employee innovation. The previous chapter also proposed that these 15 behaviours could be categorised into four themes. The primary aim of Study 2 is to explore the inter-relationships between these behaviours, and empirically examine the framework that was presented in the previous chapter.

In doing so, this chapter will firstly empirically test the proposed theoretical framework of the four key themes underlying the 15 managerial behaviours, as presented in Chapter 3. This will be undertaken through Exploratory Factor Analysis (EFA) and Confirmatory Factor Analysis (CFA), to test and confirm the hypothesised model using questionnaire data provided by a large sample of employees.

A second aim of this chapter is to begin the development of a psychometric inventory to assess these constructs associated with the managerial influence on innovation, for use in managerial selection and development. Previous authors have noted that confusion in the innovation literature is partially due to a

deficiency in the employment of rigorous research methods (Michael & Wright, 1989). Essentially the management of employee innovation has had weak theoretical development, and new conceptual frameworks need to be developed and tested using multivariate approaches.

The current thesis has so far employed qualitative methodologies to identify managerial behaviours associated with innovation. The finding from this study will also be used generate items for a new psychometric measure of the management of innovation. Exploratory Factor Analysis (EFA) and Confirmatory Factors Analysis (CFA) procedures (presented below), as recommended by Ferguson and Cox (1993), will now be used, to empirically derive a model of the managerial behaviours underlying the behaviours associated with employee innovation, and thus test if the key themes proposed in Study 1 are the most appropriate categories. In doing so, Study 2 consists of three phases: 1) item generation, 2) defining the factor structure, and 3) validating the factor structure.

The current chapter describes the construction and analysis of a new scale for measuring the managerial behaviours associated with innovation. This work builds on the exploratory approach adopted in Chapter 3. An item pool was developed, to cover the 15 behaviours outlined in Table 3.1. The reliability and factor structure of the scales were then evaluated in several organisations. This approach was employed to address not only the practical need but also the theoretical need for a new measurement tool.

Before discussing these three phases of research, the framework developed in the first study (Chapter 3) is presented. The themes shown in Figure 4.1 were developed by plotting the managerial behaviours on two axes: 1) ideas-focused versus global behaviours, and 2) employee-focused versus task-focused behaviours. Figure 4.1 illustrates this framework, and includes the hypothesised four themes that were presented in Chapter 3, the components of managerial behaviour that each theme represents, and the facet behaviours of each theme.

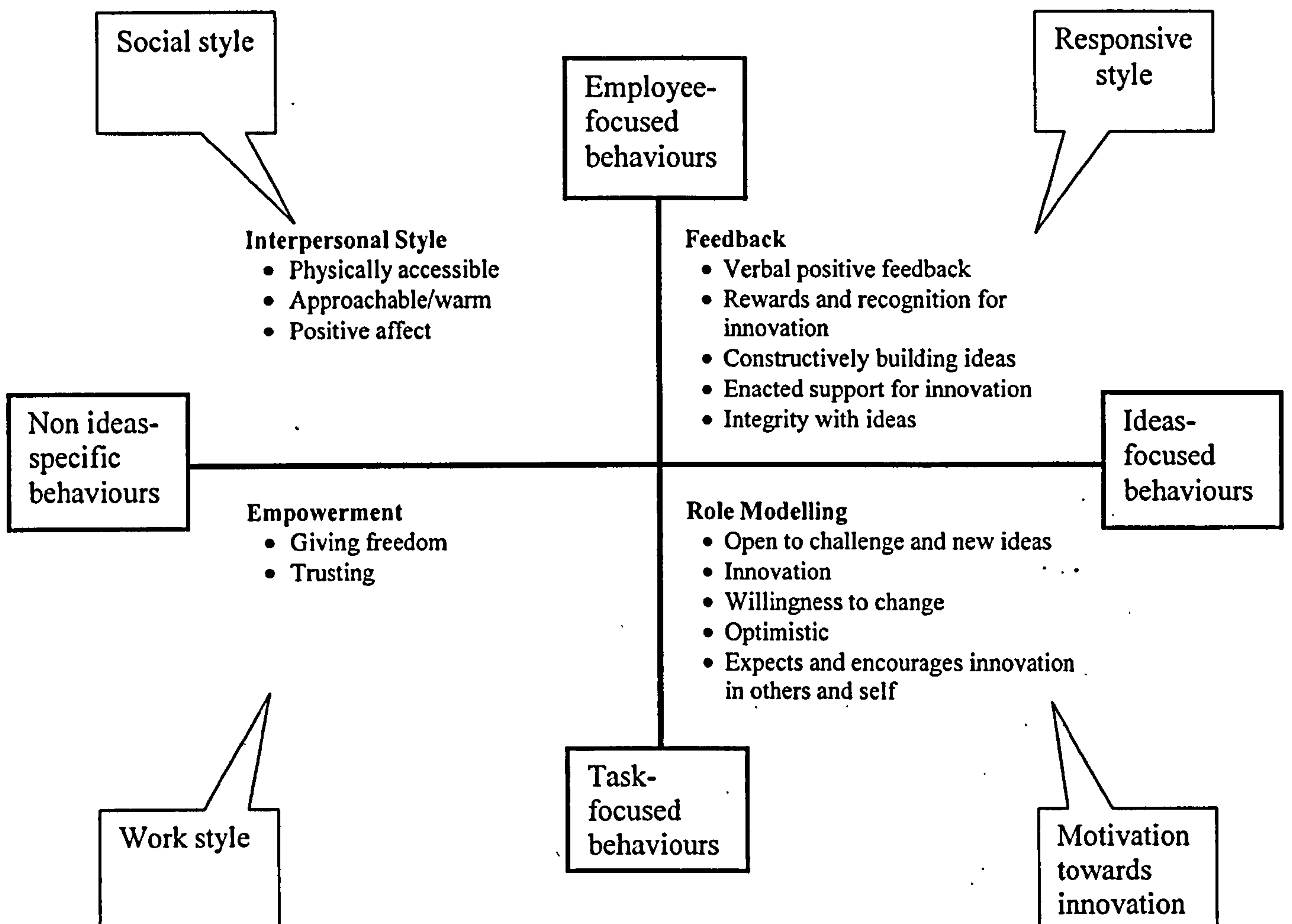
On examination of the four themes it was possible to identify components of managerial behaviours each theme represented. The components of managerial behaviour represented by the four themes, that were developed, in summary are:

- 1) Responsive style: The manager's style of responding to ideas and giving guidance and feedback to employees in relation to their efforts to be innovative.
- 2) Social style: The social support and interpersonal style of the manager.
- 3) Motivation towards innovation: The manager's own innovation and positive orientation towards innovation.
- 4) Work style: The empowerment of employees and the manager's willingness to trust employees with freedom at work.

This is shown in Figure 4.1 overleaf.



**Figure 4.1: The framework of the four hypothesised themes**



Theoretical support is given to this hypothesised four-factor model, by exploring a prominent theory of interpersonal behaviour: Triandis' (1979) Theory of Motivation. As outlined in Chapter 1, Triandis (1979) proposed four factors within the social context that influence motivation: 1) culture, 2) social situation, 3) Facilitating Environmental Resources and 4) reinforcement. As outlined below, these four factors that are external to the individual (and are thus part of the social context) can be mapped onto the four hypothesised factors in the framework of the managerial behaviours associated with employee innovation. The links between

Triandis's (1979) external factors and the hypothesised framework are now explored.

In Triandis' (1979) model, culture represents a way of categorising beliefs, attitudes, ideals, roles, norms and values. Culture helps to build perceptions of what behaviours are considered appropriate, by the setting of rules and norms by significant members of a culture. Culture therefore influences socialisation.

Comparisons can be drawn between the Role Modelling theme of managerial behaviour and the culture factor in Triandis' (1979) model. For example, through setting innovation as an example and expecting others to innovate, the manager builds a norm for innovation.

The second factor in Triandis' (1979) model which is external to the individual is the social situation. The social situation is the setting in which behaviours take place and the interaction with relevant others within this setting. Comparisons can be drawn between social situation and the interpersonal style of a manager, as interpersonal style represents how the manager interacts with employees.

Thirdly Triandis (1979) identified Facilitating Environmental Resources as influencing behaviour. Triandis describes Facilitating Environmental Resources as factors within the environment that make an act easier to do. The empowerment theme, in the management of innovation model, provides employees with freedom to generate and implement ideas, and as such is likely to provide Facilitating Environmental Resources which will in turn influence innovation.

Finally the last factor in Triandis' (1979) model that is external to the individual is reinforcement. Reinforcement can be gained from a variety of means; however, in relation to the themes of managerial behaviour identified here it is likely that the feedback theme is most closely related to the reinforcement factor of Triandis' (1979) model.

Thus, the four hypothesised factors that represent the managerial behaviours associated with innovation can be mapped directly onto the factors external to an individual in Triandis' (1979) Theory of Interpersonal Behaviour. To illustrate this clearly, the relationship between Triandis' (1979) model and the four hypothesised managerial factors that are associated with innovation is shown in Table 4.1. Overall it seems that by exploring the links between the 15 behaviours identified in Chapter 3 and a theory of human motivation, theoretical support can be gained for the proposed four managerial factors that are associated with employee innovation: 1) Feedback, 2) Interpersonal Style, 3) Role Modelling, and 4) Empowerment.

**Table 4.1: The hypothesised themes of managerial behaviours and factors in**

**Triandis' (1979) model of motivation**

<b>Hypothesised themes</b>	<b>Factor in Triandis' (1979) model</b>
<b>Feedback</b> Giving positive feedback and rewards for innovation.	<b>Reinforcement</b> Factors which reinforce desirable behaviour.
<b>Interpersonal style</b> The manager's interaction style he/she exhibits with employees.	<b>Social situation</b> Who relevant others are in the social situation and how they behave towards an individual.
<b>Role modelling</b> Making innovation the norm, by setting an innovation example and expecting innovation in self and others.	<b>Culture</b> A way of categorising beliefs, attitudes, ideals, roles, norms and values.
<b>Empowerment</b> The giving of autonomy and trusting of employees.	<b>Facilitating Environmental Resources</b> Facilitating conditions in the environment that make a behaviour possible.

The method used in this study will now be outlined.

## **4.2. Method**

A three phase method was used this study. The three phases are 1) instrument development; 2) instrument refinement; and 3) instrument validation. Each of these phase is presented below.

### **4.2.a Phase 1: Instrument development: Item generation and review**

The purpose of this phase was to create a large pool of items representing the 15 managerial behaviours that influence innovation. This pool of items was large to ensure the domain was fully sampled.

#### **4.2.b Procedure**

An item bank was generated through an iterative process. Items were developed to represent each of the 15 behaviours shown in figure 4.1; half of these items were reverse coded. The focus of the items was the participant's immediate manager.

The items were generated by three subject matter expert psychologists, all of whom had previous experience of scale development. The full item bank was then reviewed by each of the psychologists separately and then discussed together as group. This process was repeated a number of times, during which a number of items were deemed redundant and minor changes were made to the wording of some items.

A final item bank was established and given a final review by the subject matter expert panel (n=3). The items were reviewed on the basis of several inclusion criteria. Firstly, the expert panel reviewed each item in terms of whether it was consistent with the definition of the behaviour it was intending to measure, using the definitions that are presented the results section - Table 3.1 - in Chapter 3. Secondly, the experts rated each item in terms of clarity; examining how clearly each item was worded and how easy to understand each item was. Thirdly, the judges rated the degree to which each item would be relevant to a wide range of occupational settings and organisations. Items that did not concur with these inclusion criteria were deemed redundant and deleted from the pool.

The resulting final pool consisted of a total of 60 items, 47% of which were reversed coded. Each of the 15 behaviours was represented by between 3 and 6 items, with an average of 4 items covering each behaviour.

#### **4.2.c Phase 2: Instrument Refinement**

The inventory developed in phase 1 was examined for its psychometric properties using a two-stage approach consisting of 1) item analysis, and 2) defining the factor structure using EFA. The aims of this were two-fold: firstly to examine the underlying structure of the constructs generated, and secondly to determine whether the hypothesised four-factor model can be replicated. Therefore, the following hypothesis was developed

*Hypothesis 1: The underlying structure elicited from phase 2 will replicate the four construct groupings presented in the hypothetical, theoretically-driven model.*

#### **4.2.d Participants**

The data for phase two and phase three (see later for an outline of phase three) was collected simultaneously; half of the data was then used to develop the model and half was used to validate it. A total of 386 respondents participated in this study. The sample was from 5 separate organisations as shown in Table 4.2.

**Table 4.2: Sample in Study 2**

<b>Organisation</b>	<b>Functions</b>	<b>N</b>	<b>% of the total sample</b>	<b>Response rate %</b>
<b>Brewing organisation</b>	Marketing, Technical	52	13.5	40.0
<b>Multi-national FMCG (fast moving commercial goods)</b>	Marketing, Human Resources (HR)	72	18.7	69.9
<b>Steel manufacturer</b>	HR, Finance, Steel Plant	105	27.2	28.5
<b>Advertising agency</b>	All	9	2.3	15.0
<b>Civil service function A<sup>2</sup></b>	Custody office, Healthcare, Secretariat	111	28.8	92.5
<b>Civil service function B</b>	Security office	37	9.6	18.9
<b>Total N</b>		<b>386</b>		

The data from all five organisations were combined to form an overall sample.

The age of the sample ranged from age 20–63, with a mean age of the combined sample of 38 years (SD.=9.39). Of the respondents 30% were female, 63% male and 7% did not respond to this question. The mean number of years the respondent had worked for the company was 6.8 (SD.=7.0), and the mean number of years the respondent had worked for the manager was 2.4 (SD.=2.6).

A random 50% split of the sample was calculated using SPSS, resulting in a construction half (n=187) and a validation half (n=199). The construction half was

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<sup>2</sup> Names of the functions within the civil service are withheld due to confidentiality.

used for the Exploratory Factor Analysis (EFA) and the validation half was used for the Confirmatory Factor Analysis (CFA).

#### **4.2.e Phase 2a) Item analysis**

Item selection was conducted in order to produce a set of items that was both normally distributed and consisted of items that formed homogenous scales of the 15 managerial behaviours as recommended by Kline (1986). This is important because one of the assumptions of generalised least square estimation technique is normal distribution (Bollen, 1989).

Therefore all 60 items were examined for skew and kurtosis and any item that was greater than +/- 2.0 was discarded in order to minimise error variance. Further to this, as recommended by Nunnally (1978), the item-total correlation for each of the 15 subscales was calculated to show the contribution made by each item to the total. Any item correlating below .2 with the total score was discarded, as Kline (1996) claims such items do not form a homogenous scale.

As a result two items were removed, leaving a total of 58 items. These were then explored using EFA, outlined below.

#### **4.2.f Phase 2b) Exploratory Factor Analysis**

An exploratory factor analysis was conducted on the remaining items to examine the interrelationship between the items (and thus identify the key themes in the data) and suggest further items for deletion (Ford, MacCallum, & Tait, 1986; Schwab, 1980).



In EFA the generating factors process usually stops when additional factors result only from trivial variance (Rummel, 1970). However, the criterion for retaining factors is uncertain (Humphreys, Ilgenm McGarth & Montanelli, 1969, and various rules of thumb lead to different solutions (Humphreys & Ilgen, 1969). Therefore, in this study the factor structure was guided by an a priori theory, and thus a four-factor structure was imposed (Ford et al., 1986; Kim & Mueller, 1978). However, the existence of this four-factor structure was supported by the scree plot, which is the rule of thumb which has attained most support (Ford et al, 1986). For example, Zwick and Velicer (1982) suggested that the scree test is effective when strong factors are present and Tucker, Koopman, and Linn (1969) found that the scree test performed consistently better than the eigen value-greater-than-one rule.

Generalised least squares factoring procedure with oblique rotation was used to impose a four-factor solution (Ford et al., 1986; Kim & Muller, 1978). Oblique rotation was used, as this accurately represents the complexity of managerial behaviours in the real world, which are rarely uncorrelated (Harman, 1967). Furthermore as figure 4.1 shows the factors would theoretically be expected to correlate. In order to ensure that each item represented an underlying construct, a minimum loading of .4 was used. Secondly, it was required that each item was clearly defined by only one factor, so it was maintained that the difference between weightings should be greater than .1. However, one item in the Role Modelling factor, '*My manager rarely becomes enthusiastic about future plans*', did not comply with these criteria. However, this was still included as; 1) the item

added meaning to the scale and was judged to represent the domain, and 2) because the difference between the loadings was borderline and almost .1 (.095).

The panel that generated the item pool examined the resulting factors. The factors were examined in relation to the hypothesised four factors, and the framework developed in Study 1, and shown in figure 4.1. Factor labels were then assigned by the panel.

### **4.3 Results**

The final item pool consisted of a total of 60 items, 47% of which were reversed coded. Each of the 15 behaviours was represented by between 3 and 6 items, with an average of 4 items covering each managerial behaviour.

Item selection produced a set of 58 items. Of the original 60 items, one item was removed because it was adversely affected by skew and kurtosis, and one because of a low item-total correlation.

Pre-analysis checks were conducted including the Kaiser-Meyer-Olkin (KMO) test of sampling adequacy (.942) and Barlett's Test of Sphericity (6982.837,  $p > .000$ ) which both indicated that the data set was appropriate for factor analysis. During the EFA process 24 items were removed either because of cross loading or because they did not load on any factor. The final outcome solution from this process indicated a four-factor solution was appropriate and accounted for 61% of the variance. The expert panel (employed in item generation,  $n=3$ ) agreed factor labels to reflect the item content, which were the same as the labels used in the

framework developed in Study 1 (see Figure 4.1). The labels assigned were as follows: factor 1 = Interpersonal style (8 items); factor 2 = Role modelling (11 items); factor 3 = Empowerment (4 items); factor 4 = Feedback (12 items). This supports hypothesis 1, since the four factors identified by the EFA reflect the four behavioural themes generated in Study 1. Overall, the results suggest that the management of innovation, as perceived by the subordinates, can be represented by a four-factor, inter-correlated model. The final factor structure is shown in Table 4.3 below, and the descriptive statistics of each factor is shown in Table 4.4 overleaf.

**Table 4.3: The factor structure**

Factor labels and items	Factor			
	1	2	3	4
<b>Factor 1: Interpersonal Style (Eigen value = 15.14)</b>				
My manager is difficult to talk to (R)	.53	-.10	.24	.25
My manager is easy to approach	.55	-.06	.11	.29
My manager is a friendly person	.56	.09	.16	.20
My manager has a good sense of humor	.71	.12	-.02	.10
My manager is fun to work with	.87	.20	-.03	-.00
My manager does not see work as a place for fun (R)	.48	.05	.05	.26
My manager is easy to contact	.48	-.01	.15	.07
My manager is always available when I want to check something	.46	.02	.20	.07
<b>Factor 2: Role Modelling (Eigen value = 2.44)</b>				
My manager shows no enthusiasm for innovation (R)	.01	.45	.01	.29
My manager has many creative ideas	.27	.74	-.07	.00
My manager readily accepts new ideas	.17	.45	.21	.18
I do not view my manager as a creative person (R)	.29	.73	.04	-.06
My manager sets an example by generating original ideas of his/her own	.25	.73	.01	-.09
My manager seeks to change traditional ways of working	-.19	.57	-.13	.11
My manager prefers to stick to established procedures rather than changing them (R)	-.07	.67	.22	.03
My manager is slow to change the way we do things (R)	-.04	.73	.13	.03
My manager is willing to take risks when implementing a new idea	.04	.67	-.07	.07
My manager rarely becomes enthusiastic about future plans (R)	-.00	.48	-.03	.39
My manager speaks optimistically about the future	-.04	.56	.23	.07

Factor labels and items	Factor			
	1	2	3	4
<b>Factor 3: Empowerment (Eigen value = 1.39)</b>				
My manager has confidence in my ability to do the job well	.08	-.01	.77	.10
My manager does not trust me to do the job well (R)	.08	.05	.72	.08
My manager gives me a lot of freedom in my job	.10	.00	.58	.09
My manager believes that I can be trusted to do a good job	-.00	.08	.92	-.08
<b>Factor 4: Feedback (Eigen value = 1.19)</b>				
My manager gives me time to develop new ways to do things	.08	.14	.22	.50
My manager would not criticize me if a new idea did not succeed	.10	.10	.18	.48
My manager would express disapproval of me if one of my changes went wrong (R)	-.02	.02	.26	.53
My manager would give me recognition if I was creative in my job	.24	.04	.13	.56
My manager would express his or her appreciation if a new idea of mine was successful	.11	.06	.03	.59
My manager would not provide guidance if I was working out new ideas (R)	.03	.22	.10	.63
I would get no reward from my manager for being innovative (R)	.09	.07	-.10	.51
My manager would not indicate any approval if I came up with new procedures (R)	.02	.05	-.00	.77
My manager is more concerned with his/her own success than with my progression (R)	.17	-.01	-.13	.64
My manager would withhold information from me to benefit him/herself (R)	.23	.02	-.03	.67
My manager takes credit for my ideas as if they are his/her own (R)	-.09	.03	.09	.69
My manager would not exploit my ideas as his/her own	-.07	-.02	.06	.72

(R) denotes a reverse coded item

**Table 4.4: Descriptive statistics of each factor**

	Range	Minimum	Maximum	Mean	S.D.	Correlations between factors		
						Role Modelling	Empowerment	Feedback
Interaction Style	4.00	8.00	40.00	29.08	5.82	.58**	.60**	.76**
Role Modelling	3.64	15	55.00	38.06	7.34	-	.43**	.72**
Empowerment	4.00	4.00	20.00	15.61	2.72	-	-	.57**
Feedback	4.00	12.00	60.00	41.48	8.17	-	-	-

\*\* = P < .01

Table 4.4 shows the minimum and the maximum, and the mean scores on each factor. This demonstrates the range of scores on each scale, showing that

respondents used the full 1-5 rating scale. Table 4.4 also illustrates that the factors are inter-correlated.

#### **4.4 Phase 3: Instrument validation:**

Phase two was judged to replicate the theoretical model introduced in Chapter 3. Further empirical assessment is now needed to replicate the four-factor structure using a different approach in order to triangulate the findings. A two-stage process was conducted to do this: a) Confirmatory Factor Analysis (CFA), and b) reliability across different samples.

##### **4.4.a Phase 3: Instrument validation: Confirmatory factor analysis**

A confirmatory factor analysis was used and the goodness of fit indices examined in order to establish the adequacy of the four-factor model. There are numerous fit statistics which can be used to demonstrate the adequacy of the fit the data has to a model. Therefore, in addition to the chi-squared test, three indices are presented: 1) an index to explain the overall proportion of variance explained (Comparative Fit Index: CFI), 2) an index that adjusts the proportion of explained variance for model complexity (Tucker-Lewis Index: TLI), and 3) an index on the standardised residuals (Standardised Root Mean Squared Residual: SRMR).

Given the proposed four-factor model in the EFA, the following hypothesis was developed:

*Hypothesis 2: The four-factor model will be the most parsimonious and represent the best fitting model to the data.*

#### **4.4.b Participants**

The sample used was the validation half of the sample described in phase 2. The total sample size for this half of the data was 199. For the demographics of the sample the reader is referred to Table 4.3 above.

#### **4.4.c Results of the CFA**

The CFA was conducted using M+. The chi-squared statistic, which indicates the degree of correspondence between a proposed model and the empirical data. The chi-squared statistic was significant, and although it is desirable that this is both non-significant and low, it is important to be aware of two potential problems with this statistic. Firstly although the lower boundary is always zero, theoretically it has no upper value and thus not interpretable in a standardised way. Secondly it is highly sensitive to sample size.

Therefore, two other values were used to assess the fit of the data, which are less sensitive to sample size, as recommended by Kline (1993). These are the TFI (Tucker-Lewis Index) and CFI (Comparative Fit Index). It is recommended that both of these values be above .9. Finally the Standardised Root Mean Squared Residual (SRMR) was also used which is the standardised summary of all the covariances, and is favourably less than .1.

The CFA shows a satisfactory goodness of fit of the four-factor model to the data: The chi-squared was 256.12 (D.F. = 67); the CFI was .91; the TFI was .98 and the SRMR was .06.

#### 4.4.d Phase 3b) Factor stability across organisational samples

In order to further confirm the hypothesised factor structure the internal reliability of the factors was investigated, as recommended by Cronbach (1990). This aimed to consistently find acceptable reliabilities across different samples, in order to demonstrate stability of the factor structure. Table 4.5 below shows the internal reliabilities for each factor across the six separate organisations in the sample used for phases two and three.

**Table 4.5: The reliabilities across the organisations**

<b>Organisation</b>	<b>Feedback <math>\alpha</math></b>	<b>Role Modelling <math>\alpha</math></b>	<b>Interpersonal Style <math>\alpha</math></b>	<b>Empowerment <math>\alpha</math></b>
Brewing organisation (n=52)	.89	.87	.88	.82
Multi National FMCG (n=72)	.77	.92	.79	.80
Civil Service: Function A (n=37)	.88	.90	.86	.83
Civil service: Function B (n=111)	.92	.89	.89	.89
Steel manufacturer (n=105)	.93	.90	.91	.81
Advertising Agency (n=9)	.95	.86	.94	.86

FMCG = Fast Moving Commercial Goods Organisation

Over all of the samples there is considerable consistency in the internal reliability of the factors, ranging from .77 to .95. As a result this lends further support to

hypothesis 2, which states that the four-factor model will represent the most parsimonious fit to the model.

#### **4.5. Discussion**

The results presented here replicate and confirm the theoretical four-factor model, hypothesised in Study 1 (outlined in the Introduction). This has been shown using exploratory and confirmatory factor analytic procedures, and by demonstrating the reliability of the four-factor model across a range of organisations. In interpreting this model each factor is discussed in turn, followed by a discussion of the inter-relations between the factors.

Table 4.6 below presents each of the factors. This table provides a summary of the current findings, detailing the managerial behaviours that load onto the four factors. Table 4.6 also shows how the four factors relate to the four factors discussed in the introduction in Triandis' (1979) Theory of Interpersonal Behaviour.



**Table 4.6: Summary of findings**

<b>Factor</b>	<b>Managerial behaviours that load on that factor</b>	<b>Factors in Triandis' model that map on to the four factors</b>
1) Interpersonal Style	<ul style="list-style-type: none"> <li>• Physically accessible</li> <li>• Approachable/warm</li> <li>• Positive affect</li> </ul>	Significant others
2) Role Modelling	<ul style="list-style-type: none"> <li>• Expectation of innovation in others and self</li> <li>• Openness to challenge and new ideas</li> <li>• Innovation</li> <li>• Willingness to change</li> <li>• Optimism</li> </ul>	Culture
3) Empowerment	<ul style="list-style-type: none"> <li>• Giving Freedom</li> <li>• Trusting</li> </ul>	Environmental resources
4) Feedback	<ul style="list-style-type: none"> <li>• Verbal Positive Feedback</li> <li>• Rewards and recognition for innovation</li> <li>• Constructively building on ideas</li> <li>• Enacted support for innovation</li> <li>• Integrity with ideas</li> </ul>	Reinforcement

#### **4.5.a Factor 1: Interpersonal Style**

The first factor consists of eight items, and item content suggests that this factor is associated with a manager's interpersonal style and his/her provision of social support to employees. Items within this scale include: *My manager is a friendly person; My manager is difficult to talk to; My manager is always available when I want to check something.* This factor seems to represent the social element of a manager's behaviour. Therefore, as was postulated in the introduction of this chapter, this factor was judged to represent the social factors Triandis (1979) identified to impact on human behaviour, and to represent the social interaction theme identified in Study 1. As it is possible to draw a link between this factor

and one of the factors in Triandis' (1979) model of interpersonal behaviour, the mechanism through which this factor is thought to influence innovation is motivation. This is outlined in greater detail below.

In addition to Triandis' (1979) model, Chapter 1 also outlined another model of motivation - the Cognitive Evaluation Theory (CET: Deci & Ryan, 1985). One of the aspects hypothesised to motivate people with in the CET is perceived relatedness, defined as the extent to which a person feels meaningfully connected to a significant others (Baumeister & Leary, 1995). As the behaviours typical of a positive Interpersonal Style may enhance an employee's feelings of perceived relatedness, interpersonal style may also lead to increased motivation. However, the perceived relatedness factor is the least researched element of the CET, so there is little empirical evidence to support this proposition.

#### **4.5.b Factor 2: Role Modelling**

The second factor includes 11 items, and item content suggested that it is associated with the manager's own innovation and positive orientation towards innovation. Items in factor one include: *My manager has no enthusiasm for innovation; My manager sets an example by generating original ideas of his/her own; My manager seeks to change traditional ways of working.* This factor is likely to represent the motivational component of the manager's behaviours; specifically it entails a manager's own motivation towards his / her own innovation and that of others. Items relating to this component include *My manager readily accepts new ideas;* and *My manager is willing to take risks when*

*implementing a new idea*. This factor was judged to replicate the theme identified in Study 1 that represented a manager's own innovation.

Theoretical evidence suggests that such managerial behaviours included in this factor are likely to influence innovation via learning and motivation (which is likely to influence innovation, as demonstrated in the literature review). The evidence to support this proposition is reviewed below.

### Social learning

*"I tell you how to get a Nobel Prize... have great teachers"*: Nobel Laureate economist Paul Samuelson (1972, p. 155). Social learning theory stipulates that individuals who do not perform a behaviour, but are capable of doing so, are more likely to perform it after seeing a model do so (Bandura, 1969 ; Bandura & Walters, 1963). Indeed, Bandura (1973) claims seeing others perform a threatening activity without adverse consequences can generate expectations in observers to perform such acts. Within this social comparison paradigm, employee learning may occur through the modelling of a manager's innovative behaviour, and seeing a manager demonstrate creative skills and a willingness to change may encourage employees to model this behaviour (Bandura, 1977).

Evidence from previous research also shows the importance of role models in innovation. Bloom & Sosniak (1981) found that many talented individuals had at least one role model of achievement in that domain.

Therefore, the Role Modelling factor may help to set a norm for innovation and influence employee innovation through role modelling. This is therefore similar to culture factor outlined in Triandis' (1979) theory of interpersonal behaviour. This therefore supports the proposition presented in the introduction, and suggests that in addition to social learning, Role Modelling may also influence employee motivation to innovate. This is reviewed below.

### Motivation

A large behavioural component of the Role Modelling factor is a manager showing an expectation of employees to innovate. Similarly, Scott and Bruce (1994) found that supervisor expectations that an employee will innovate led to increased motivation. In line with this, modern expectancy-value theories of motivation (e.g. Eccles, 1987; Eccles et al., 1983; Wigfield & Eccles, 1992, 2001) relate performance achievement, persistence and choice with individuals expectancy-related and task value beliefs. Within this Eccles and her colleagues acknowledge a range of socio-cognitive variables to impact on expectancies and values, including other people's expectations of them.

Further to this, Feather (1988) presented a similar modern expectancy-value model of behaviour. Drawing on Rokeach's (1979) work, he defined *values* as a set of stable, general beliefs about what is desirable, and postulated that such beliefs emerge from societal norms. In this situation it is likely that the expectations of a manager provide organisational norms for innovation and influence employee motivation through the expectation and valuing of innovation.

Finally it is likely that Role Modelling produces a Pygmalion effect (Livingston, 1969), which is a special case of self-fulfilling prophecy. This mirrors a key component of the theory of planned behaviour; subjective norm: which is a person's belief about whether significant others think he/she should engage in the behaviour (Ajzen, 1991), which predicts a person's intentions to act. Furthermore, the Pygmalion effect has been shown to influence innovation and motivation to innovate (Scott & Bruce, 1994).

#### **4.5.c Factor 3: Empowerment**

The third factor includes four items and item content indicates that this factor relates to a manager's willingness and ability to trust employees and give them control over their job. The impact of freedom and autonomy on innovation has been reported in previous literature (see Chapter 3, Study 1); however the current study has shown that manager's trust and confidence in the employee's ability is also a key component to giving freedom. This factor seems to reflect the Facilitating Environmental Resources identified by Triandis (1979) in his Theory of Interpersonal Behaviour. As giving people the freedom to generate and implement ideas may facilitate innovation. This factor is deemed to influence innovation through the impact of empowerment on employee motivation. This is outlined in greater detail below.

#### **Motivation**

The impact of autonomy on motivation is well documented. Deci et al. (1985) found that when managers were supporting of autonomy employees reported a greater sense of security and had greater trust in their managers. In addition, Deci

et al. (1985) also found that the amount of autonomy orientation a manager had correlated positively and significantly with the employees' *perception* of personal autonomy. Similarly, one of the factors in the Cognitive Evaluation Theory is perceived control, and this is another precursor to motivation (Deci & Ryan, 1985). Furthermore, research has provided also evidence of the impact of autonomy on employee motivation. For example, Zuckerman, Porac, Lathin, Smith, Sheinman and Ryan (1978) found that when employees were given choices about which task to complete and given the opportunity to set the time limit they were significantly more intrinsically motivated.

To this end as motivation is a key component of innovation (Amabile, 1983; Patterson 2002), and empowerment increases motivation, it is suggested here that the managerial behaviour of Empowerment influences innovation through the impact on innovation.

#### **4.5.d Factor 4: Idea guidance**

The fourth factor includes 12 items, and item content suggests that it was associated with a manager guiding ideas, giving resources and rewarding innovation. Items in this factor include *My manager would give me recognition if I was creative in my job; My manager would not provide guidance if I came up with new ideas; My manager gives me time to develop new ways to do things; My manager would not exploit my ideas as his/her own.* This factor represents a manager's 'responsive style', i.e. how he/she responds to ideas. For example, items in this scale include; *My manager would not indicate approval if I came up with new procedures; My manager takes credit for my ideas as if they were his/her*

*own*. Furthermore, this factor was judged to replicate the feedback theme identified in Study 1, and the reinforcement aspect in Triandis' (1979) model of behaviour. This theme incorporates behaviours which involve giving feedback, and guidance on ideas and helping employees build ideas through the use of constructive criticism. In addition, the resource provision (e.g. time and money) for idea generation and implementation are typical of this theme of behaviour. Integrity is also a facet of this theme, as a manager has others' interests at heart and shows concern for other people by developing and guiding their ideas.

Previous literature outlining the impact of the sub-components of feedback on innovation is outlined in Chapter 3. It is postulated that the possible mechanism through which this factor is likely to influence employee innovation is motivation. Theoretical evidence for this is reviewed below.

As previously discussed motivation is a large component of employee innovation (see literature review in Chapter 1). The impact of feedback on motivation is recognised by the Cognitive Evaluation Theory (Deci & Ryan, 1985). Indeed Deci and Ryan (1987) claimed supervisors need to show concern for employees' feelings and needs, and provide positive, informational feedback in order to facilitate employee skill development, thus demonstrating how facets of feedback influence employee motivation.

Zhou (1998) noted how feedback from managers can enhance intrinsic motivation to innovate. Research shows that factors such as expected evaluation, contingent reward and time pressure inhibit innovation by diminishing intrinsic motivation

(Amabile, 1983; Amabile & Gryskiewicz, 1987; Amabile & Gryskiwicz, 1989), all of which are part of the feedback factor.

Furthermore, Deci and Ryan (1985) suggest that one of the psychological antecedents to intrinsic motivation is perceived competence. Perceived competence refers to an individual's belief that he or she is capable of performing a task well (Zhou, 1998). Similarly self-efficacy is defined as belief in one's capabilities to organise and execute courses of action (Bandura, 1997). Therefore, it is suggested here that feedback also impacts on self-efficacy to produce an increase in motivation. This is outlined in greater detail below.

Self-efficacy is a well-established predictor of people's behaviour and performance (Choi, Price & Vinokur, 2003), and has been shown to play an important role in innovation (Axtell et al., 2000). As noted above, self-efficacy is a prerequisite to intrinsic motivation. Evidence to support the notion that feedback will enhance self-efficacy is provided by Deci and Ryan (1985), who cite a number of studies which demonstrate the relationship between competency-based feedback and perceived competence. Furthermore, Vallard and Reid (1984) found that positive feedback increased college students' perceived competence and negative feedback decreased it. Subsequently, Vallard and Reid (1984) performed a path analysis on the data to show that perceived competence mediated feedback and intrinsic motivation.

Mirroring this, an important information cue for self-efficacy judgement is feedback from others (Oldham & Cummings, 1996). Similarly, Bandura (1979)



identified verbal persuasion as one of four factors that can influence efficacy beliefs.

Therefore, overall it seems that feedback may enhance an employees perceived competence about innovation, which will lead to enhanced intrinsic motivation to innovate.

#### **4.6 Conclusions**

In summary, this chapter has empirically observed the four factors hypothesised to be associated with innovation. It has also suggested that managers are associated with employee innovation through a series of mechanisms. Although the largest influence is likely to be on employee motivation to innovate, it seems possible that the Role Modelling factor may also influence innovation through learning.

This thesis will now explore the four-factor management of innovation model in relation to measures of leadership in order to establish construct validity.

Subsequently this thesis will turn to explore the inventory developed in this chapter in relation to innovation potential and personality, and organisational factors that foster innovation.

## **Chapter 5: Construct validation - the management of innovation and models of leadership**

*“Leadership can be thought of as a capacity to define oneself to others in a way that clarifies and expands a vision of the future”*

Edwin H. Friedman

The previous chapter (Study 2) psychometrically explored the 15 managerial behaviours identified in Study 1. Study 2 identified a four-factor model of the managerial behaviours that are associated with innovation, using both exploratory and confirmatory factor analysis. A four-factor structure was presented, which was judged to replicate the framework developed from the interviews conducted in Study 1. Validation of this model is an essential part of theory development, therefore, this chapter will focus on construct validation of the four-factor model.

The aims of this chapter are two-fold: 1) to examine other factors associated with the management of innovation and thus establish construct validity, and 2) to offer theory coherence and add understanding to the four-factor management of innovation model.

Construct validity studies are conducted in order to demonstrate that a construct is consonant with its definition (Cronbach & Meehl, 1955). A construct is similar to a concept, and one way to establish construct validity is to explore a model in relation to other models of related concepts (Kline 1993). This is the approach

adopted in the studies presented below, which examine the four-factor model in relation to two prominent theories of leadership.

### **5.1 Leadership and the management of innovation**

In addition to managerial behaviours, researchers have implied that models of leadership may also relate to innovation (Kanter, 1983). However, theoretical development in this area is limited, as previous literature has tended to explore leadership approaches in relation to productivity rather than innovation (Waldman & Bass, 1991). Despite this, the current research plans to explore the managerial behaviours identified in this research to be associated with innovation and two models of leadership. This is done because on examination of the definitions of the factors within these leadership models, similarities and differences can be identified in relation to the four-factor model, which will allow convergence and discrimination between leadership models and the four-factor management of innovation model.

Two prominent models of leadership are presented below; the Full Range Leadership Model and the Leader Member Exchange model. These models were used because; 1) the Full Range Leadership Model is the most recent and currently the most prominent theory of leadership; 2) Leader Member Exchange relates to how leaders and managers interact and some of the behaviours with the four-factor model focus on how the managers interacts with employees; 3) the Full Range Leadership Model can be measured using a well established psychometric measure.

The Leader Member Exchange model is presented below first, before the Full Range Leadership Model is introduced. The hypothesised relationship between both these models and the four-behaviours in the model of managerial behaviours which associated with innovation, will then be introduced.

### **5.1.a Leader Member Exchange (LMX)**

The Leader Member Exchange theory (LMX) has been extensively researched, and concerns the type of interactions between the leader and a subordinate, suggesting that relationships can range from high to low quality LMX (Dienesch & Liden, 1986). High quality LMX is characterised by trust, mutual liking, and respect (Dienesch & Liden, 1986). In contrast, low quality LMX can be described as interactions which are formal and impersonal.

Research has found positive links between high LMX and innovation (Dansereau, Graen & Haga, 1975; Graen & Scandura, 1987; Tierney et al., 1999). For example, recently Scott and Bruce (1994) identified LMX as a key leadership variable in their model of factors influencing innovation. In testing this model Scott and Bruce (1994) found that LMX was directly related to innovation, in that employees that reported high LMX relationships with their supervisor were more likely to generate ideas. However, the correlation between LMX and idea generation was only .23, and the manager whose perception may have been distorted by the LMX, gave the rating of idea generation. Tierny et al (1999) also found that LMX predicted 33% of the variance in idea generation ratings, yet they concluded that there was a boundary to which LMX influenced idea generation,

and that LMX interacted with leader characteristics to produce the most gain in innovation.

Furthermore, high LMX employees tend to engage in more challenging and relevant tasks (Liden & Graen, 1980) and have a strong sense of advocacy and liking for their supervisors (Duchon, Green & Taber, 1986), which may also lead to increased innovative behaviour at work (Amabile & Gryskiewicz, 1987).

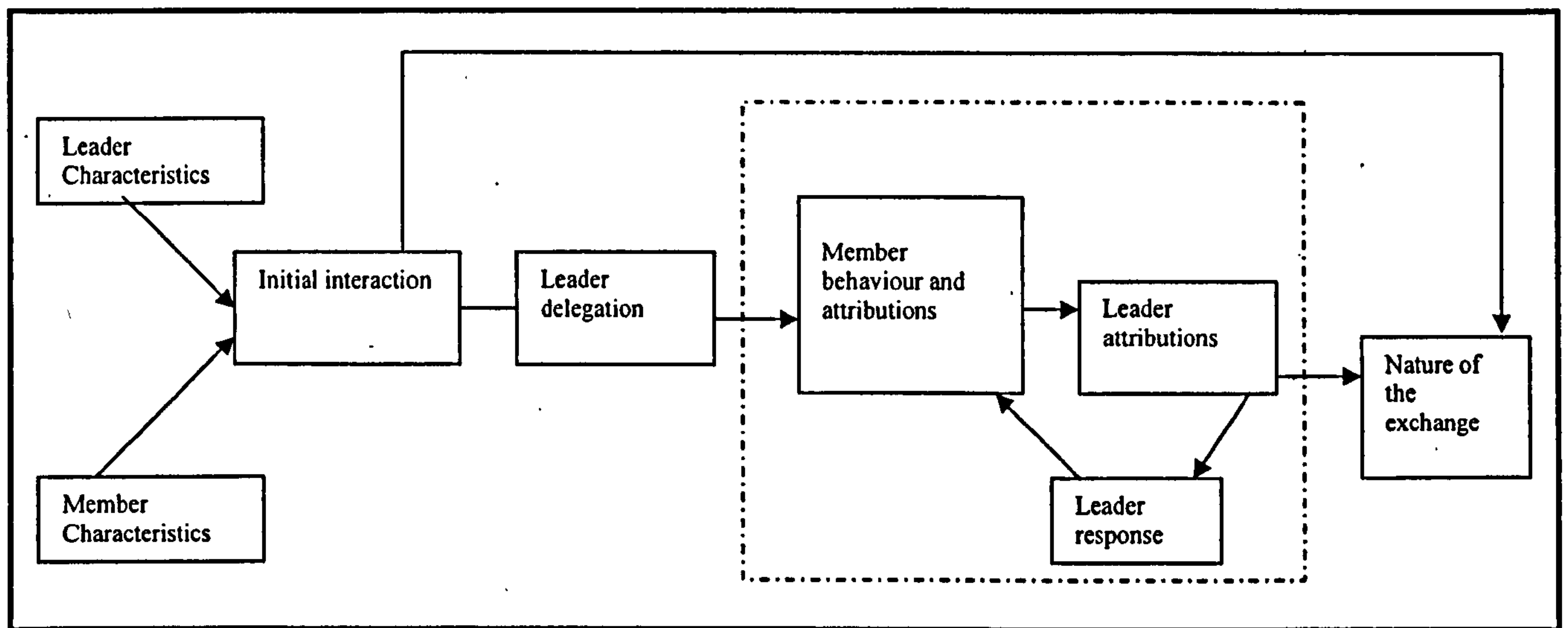
The LMX theory has 25 years of research that demonstrates the importance of interpersonal characteristics of a leader, such as trust, respect and liking of subordinates. However, the theory is not without flaws. Dienesch and Liden (1986) made a number of criticisms of LMX theory and research, noting that the current literature on LMX is limited. Dienesch and Liden (1986) also claimed that research needs to study more extensively how organisational *outcome* variables (e.g. innovation) relate to leader member exchanges. Indeed, of the research available, only a small amount relates to innovation at work.

Dienesch and Liden's (1986) main criticism of the LMX theory is that LMX has been measured differently across empirical studies. For instance, LMX has been measured with two items (e.g. Dansereau et al., 1975) four items (e.g. Graen & Schiemann, 1978; Liden & Graen, 1980), five items (e.g. Graen, Liden, & Hoel, 1982), seven items (Graen, Novak & Sommerkamp, 1982; Seers & Graen, 1984), ten items (Ridolphi & Seers, 1984) and finally twelve items (Wakabayashi & Graen, 1984). It is of concern that few of these scales seem to be based on any

systematic psychometric study or empirical validation. Therefore, research evidence to support the LMX theory may have methodological weaknesses.

In exploring how LMX develops or forms, research suggests that leadership characteristics and behaviour are key antecedents (Dienesch & Liden, 1986; Bauer & Green, 1996), as shown in figure 5.1 below. However, Gerstner and Day (1995) highlighted a need for research investigating the characteristics that may be associated with LMX development.

**Figure 5.1: Model of how Leader Member Exchanges develop**



Adapted from: Dienesch, R. M. & Liden, R. C. (1986) Leader-member Exchange Model of Leadership: A critique and further development. *Academy of Management Review*, 11 (3), 618-634.

As Figure 5.1 illustrates the leader characteristics, initial interaction and leader delegation, influence the development of LMX. To this end three of the four behaviours identified in Chapter 4 are hypothesised to play a role in the formation of a high LMX relationship between a manager and an employee. This is because

two of the behaviours (Interpersonal Style and Feedback) represent managerial interaction with the employee, and a third factor (Empowerment) represents delegation to the employee. The fourth factor in the management of innovation model (Role Modelling) does not relate to the LMX model, as this is specific to setting an example of innovation to the employee. Therefore, the previous literature relating to the hypothesised relationships between three of the managerial behaviours (Feedback, Interpersonal Style, and Empowerment) and the LMX model is presented below.

### **5.1.b Feedback and LMX**

Previous literature suggests that role formation plays a key part in the formation of LMX (Graen & Scandura, 1987). Feedback and guidance from the manager are likely to effect role formation by demonstrating to employees what is required of them and what is regarded as positive behaviour, thus helping the employee gain a greater understanding of his/her role.

Furthermore, actions indicating a positive regard for employees are likely to create feelings of obligation that serve to increase functional behaviour (Shore & Wayne, 1993; Wayne & Green, 1993). More specifically, recipients of positive actions may experience a sense of indebtedness that is highly aversive and can be reduced through reciprocation (Greenberg, 1992). Therefore, when a manager provides positive guiding feedback, employees may feel obligated to reciprocate, and a positive LMX relationship is more likely to develop.

### **5.1.c Interpersonal Style and LMX**

Key aspects of interpersonal style are behaviours which typify positive interactions with employees, and this factor largely centres on how a managers' social style is perceived by employees. In LMX affect, defined as "affection based primarily on interpersonal attraction" (Deinesch & Liden, 1986, p. 625), is expected to relate to LMX development (Liden & Maslyn, 1998; Docherty & Steiner, 1990).

Seemingly affect relates to a manager's interpersonal style, which indicates Interpersonal Style may play a role in the development of LMX (Deinesch & Liden, 1986).

Furthermore, Liden, Wayne and Stilwell (1993) showed that liking was a strong determinant of LMX quality. In relation to the Interpersonal Style factor in the management of innovation model, approachable managers who show concern for staff may be perceived as more likeable, and this may lead to the development of high LMX.

In summary it is possible that the factor Interpersonal Style and the managerial behaviours that typify this factor (e.g. being approachable, having positive effect and being accessible) influence the initial interaction between leaders and members, and thus help to foster a high LMX relationship.

### **5.1.d Empowerment and LMX**

The Empowerment factor in the four-factor influencing innovation model is defined as giving an employee resources in the form of freedom to carry out tasks, and increasing their self-worth by showing trust and confidence in subordinates to



carry out such tasks efficiently and without close supervision. Keller and Dansereau (1995) found that when subordinates were empowered in this way it led to relationships characterised by fewer dyadic problems such as uncertainty about duties, back-biting in the unit and strains in the working relationship.

Similarly Whitner, Brodt, Korsgaard and Werner, (1998) argued managers have considerable impact on developing trust in manager – employee relationships, and that it is the manager’s responsibility to take the first step in initiating trust in relationships. Similarly, in terms of social exchange theory, delegation of control is a social reward in the form of respect and approval from the manager to the subordinate. Such a reward represents the initiation of an exchange between a manager and an employee (Whitner et al, 1998).

On from this Bauer and Green (1996) found that leader delegation was pivotal in LMX development, and state that the increased responsibility and latitude the leader grants to the member through delegation, is strongly associated with higher quality exchanges, regardless of member performance levels.

As a result, it seems that the Empowerment factor in the management of innovation model will play a role in the development of the leader-member exchange, both at the initial interaction and throughout the development process.

Therefore, the current study explores the relationship between the LMX model and three of the four components of the management of innovation model. Through

consideration of the previous literature presented above, the following hypothesis was developed:

*Hypothesis 1: Three of the four behaviours of the management of innovation model (Interpersonal Style, Feedback, and Empowerment) will predict high LMX.*

This section will now discuss the relationship of the management of innovation model and the Full Range Leadership Model - the most current paradigm of leadership (Avolio and Yammarino, 2002).

## **5.2 The Full Range Leadership Model (Transformational/transactional model)**

The Full Range Leadership Theory is one of the most prominent leadership theories in current times, and is an extension of the Transformational / Transactional Leadership Model (Bass & Avolio, 1994, 1997). Transformational and transactional leadership are introduced below before the recent extensions to this model are presented.

Transformational leaders are postulated to be responsible for follower performance that is in excess of ordinary expectations, as transformational leaders transmit a sense of mission, stimulate learning experiences and arouse new ways of thinking (Hater & Bass, 1988). Transactional leaders on the other hand, use contingent rewards and negative feedback, which results in minimum requirement employee performance. Indeed, Transactional Leadership Theory is based on the notion that

leader – follower relations are based on a series of exchanges (Bass, 1995); followers receive valued outcomes (wages, prestige) when they act in accordance to their leader's views (Burns, 1978). Within transactional leadership the leader controls the follower's behaviour and eliminates problems by using corrective means (Bass, 1985, 1998). In comparison to transformational leaders, transactional leaders are more risk avoidant, pay more attention to time constants and structure work to maintain control over employees.

Recently Bass's (1985) Transformational/Transactional Model has been extended by Bass and Avolio (1994, 1997) to be the Full Range Leadership Theory. The current model comprises of nine factors which build on the original six factors. The nine factors reflect three broad classes of behaviour; 1) transformational, 2) transactional and 3) laissez-faire leadership. These nine factors are outlined below.

Transformational leadership consists of the following five factors (Avolio & Yammarino, 2002):

- 1) *Idealised influence (attributed)*, or attributed charisma, refers to follower attributions about the leaders as a result of how they perceive the leader's power, confidence, and transcendent ideals. This is the emotional component of leadership, which theoretically shifts follower self interest toward the interest of the greater good.
- 2) *Idealised influence (behaviours)*, or behavioural charisma, refers to specific leader behaviours that reflect the leaders' values and beliefs, their sense of mission and purpose, and their ethical and moral position.

- 3) *Inspirational Motivation* refers to leaders who inspire and motivate followers to reach ambitious goals that may have previously seemed unreachable, by raising followers' expectation and communicating confidence that followers can achieve ambitious goals, thus creating a self fulfilling prophecy (i.e. Pygmalion effect).
- 4) *Intellectual stimulation* refers to how leaders question the status quo and appeal to followers' intellect to make them question their assumptions, and invite innovative and creative solutions to problems.
- 5) *Individualised consideration* refers to leaders who provide customised socio-economic support to followers, while developing and empowering them. This outcome is achieved by coaching and counselling followers, maintaining frequent contact with them, and helping them to self-actualise.

Transactional leadership consists of three factors:

- 1) *Contingent reward leadership* is based on economic and emotional exchanges by clarifying role requirements, and rewarding and appraising desired outcomes. Contingent reward leadership is a constructive transaction and is reasonably effective in motivating followers, but to a lesser degree than transformational leadership is.
- 2) *Management-by-exception active* is a negative transaction, because the leader monitors deviations from the norm and provides corrective action. It is similar to contingent reward in terms of focusing on outcomes; however in this case the leader actively watches for, and acts on mistakes or errors.

3) *Management-by-exception passive* is similar to management by exception active; however, passive leaders wait until deviations occur before intervening.

In order to account for the full range of leadership styles, the Full Range Leadership Model incorporates a ninth factor representing non-leadership, a scale called *laissez-faire*.

Although a range of studies have produced a number of different factor structures (Avolio, Bass & Jung, 1999; Carless, 1998; Hater & Bass, 1988), substantial research has found empirical support for the transformational and transactional dimensions in organisations, and the above structure reflects current thinking (Avolio, 1999; Bass, 1998).

Despite the prominence of this model it is still open to criticism. The factor structure reported in the literature is varied and not always consistent with Bass and Avolio's (1994; 1997) proposed nine factors (e.g. Avolio, Bass & Jung, 1999; Carless, 1998; Hater & Bass, 1988). Similarly, it is not clear how some of the factors relate to each other. For example, Bass (1995) showed that management by exception passive and *laissez-faire* formed a higher order factor, and Yammarino and Bass (1990) found that these two factors to correlate positively with each other and negatively with all the other leadership factors. The study presented here will therefore use confirmatory factor analysis to test if the nine factors are the most appropriate factor structure.

Further criticisms can be made of the understanding of the relationship between transformational and transaction leadership. Hater and Bass (1988), point out that despite being contrasting types of leadership, transformational and transactional leadership are not unrelated. Burns (1978) viewed the two types of leadership at opposite ends of a continuum, while Bass (1985) on the other hand viewed them as separate dimensions, implying a leader can be to some extent both transactional and transformational (Bryman, 1992). Bass (1985) argues that transformational leadership builds on transactional but not the other way around. Both types of leadership are linked to goal achievement, yet the models differ in the process by which the leaders motivate the follower and the type of goals they set (Hater & Bass, 1988).

### **5.2.a The Full Range Leadership Model and innovation**

Previous research has primarily focused on the relationship between the Full Range Leadership Model and individual performance, satisfaction and effectiveness (Bass & Avolio, 1990). Less attention has explored the relationship between the Full Range Leadership Model and employee innovation. Howell and Avolio (1993) found that the relationship between transformational leadership and consolidated unit performance was moderated by support for innovation. Howell and Avolio (1993) also suggest that transformational leaders perform better in environments that employees describe as innovative. This may imply that if a manager demonstrates behaviour that enhances innovation, and employee innovation is increased, the manager may consequently demonstrate more transformational behaviour. However, it is important to note that this study did not explore the influence of transformational leadership on individual innovation, but

rather concentrated on whether the climate was supportive of innovation, and its links with organisational outputs. As previously noted, the notion of 'support for innovation' is very broad and thus difficult to measure.

Another study, which has explored the influence of transformational leaders on innovation, is that of Sosik, Kahai, and Avolio (1998). This study used a laboratory environment to create a high and a low transformational leader group. The idea generation of the group was then tested using electronic brainstorming, and it was found that elaboration and originality of ideas improved significantly, but that fluency and flexibility of ideas did not. However, the sample for this study was small (n=36) and it only focused on idea generation, and not implementation.

Further to this, other authors have also suggested that a strongly transformational leadership style can inhibit innovative behaviours (Basu & Green, 1997), possibly due to employees feeling intimidated by such a powerful leader. To date, no study has explored how the managerial behaviours are associated with innovation relates to the Full Range Leadership Model. However there are some theoretical similarities and differences between the factors in both of these models. Therefore as Transformational Leadership has been proposed to relate to innovation (Bass, 1985) and as there are some similarities in the conceptualisation of factors within the Full Range Leadership Model and the four-factor influencing innovation model, empirical exploration of the associations between the factors/behaviour in the two models is conducted below, in order to provide construct validation of the four-factor model. The proposed theoretical relationship between the two models,

based on the conceptualisation of the factors/behaviours within the two models is presented below.

### **5.2.b The Full Range Leadership Model and the management of innovation model**

There has been no previous research exploring the relationship between the behaviours identified to influence innovation in Chapters 3 and 4, and the Full Range Leadership Model. However, there are a number of similarities and differences in the conceptualisation of the factors that make up these models, which are discussed below, followed by the presentation of a series of hypotheses. The hypothesised relationships with each of the four influencing innovation behaviours will be outlined respectively.

The Role Modelling factor in the influencing innovation model is expected to most closely relate to the Transformational Leadership facets. Specifically, as *Inspirational Motivation* consists of communicating expectations to subordinates, this is expected to be strongly and positively correlated with Role Modelling. Furthermore, it is hypothesised that Role Modelling will be strongly and positively associated with *Intellectual Stimulation*, as Bass (1995) argues this involves a leader inviting innovation - an aspect which mirrors the willingness to change and openness to ideas components of Role Modelling. Similarly *Individualised Consideration* is characterised by recognising group member ideas (Sosik et al, 1998), and as Role Modelling incorporates openness to ideas, a positive association is expected between *Individualised Consideration* and Role Modelling. *Idealised Influence Attributed and Idealised Influence Behaviours* are expected to



be positively correlated with Role Modelling, because these behaviours refer to the leader's values, their sense of mission, and purpose, and Role Modelling incorporates communicating values for innovation to employees. In relation to the transactional factors, *Contingent Reward* is expected to be positively associated with Role Modelling, as Role Modelling clarifies that roles require innovation, and role clarification is a component of contingent reward. Therefore hypothesis 3 was developed:

*Hypothesis 3: Role Modelling is expected be positively associated with all of the facets of the Transformational Leadership scale and the Contingent Reward facet of the Transactional scale.*

Negative correlations are expected between Role Modelling and *Management by Exception (Passive)*, as this involves a manager watching for deviations from the norm, whereas Role Modelling involves a manager being motivated towards change and thus not *expecting* staff to follow the norm, however as Role Modelling is not related to actively monitoring employee behaviour no relationship is expected with *Management by Exception (Active)*. Finally negative correlations are expected between a *Laissez-Faire* leadership style and Role Modelling, as *Laissez-Faire* represents non-leadership. Therefore hypothesis 4 was developed:

*Hypothesis 4: There will be a negative association between Role Modelling and Management by Exception Passive, and the Laissez-faire facets of the Full Range Leadership Model.*

Feedback is expected to correlate moderately and positively with the facets of Transformational Leadership, as they involve giving employees guidance and feedback. Furthermore, *Contingent Reward* is expected to be positively related to Feedback as this is about rewarding behaviour. In contrast *Management by Exception Passive* is expected to be negatively related to Feedback as this involves punishment and criticism, and are not guiding aspects of leadership behaviour, while *Management by Exception Active* is not expected to be associated with feedback, as feedback does not relate to a managing actively monitoring employee behaviour. Thus the following hypotheses were formed.

*Hypothesis 5: Feedback (F) will show moderate positive associations with all of the facets of the Transformational Leadership scale, and with Contingent Reward.*

*Hypothesis 6: Feedback will show negative associations with Management by Exception Passive.*

Interpersonal Style is expected to have low yet positive associations with the facets of Transformational Leadership. Interpersonal Style is concerned with how approachable and accessible the manager is, and may therefore relate to the coaching and teaching of employees, which is part of *Individualised Consideration* (Hater & Bass, 1988). Furthermore, by being approachable, managers may demonstrate how they are focused on the 'greater good' and are not simply interested in themselves, and thus be associated with *Idealised Influence*

*(Attributed)*. However, as Interpersonal Style is not connected to a manager's sense of mission it is expected to be less associated with *Idealised Influence (Behaviours)*.

Interpersonal Style is also characterised by positive affect and the use of humour, which helps to create an informal environment where people are free to suggest ideas and question assumptions. Thus it is predicted that Interpersonal Style will be related to *Intellectual Stimulation* and *Inspirational Motivation*. A negative association will be expected between Interpersonal Style and *Management by Exception Active* as this is diametrically opposed to some of the components of Interpersonal Style such as being approachable. Thus the following hypotheses represent the proposed relationships:

*Hypothesis 7: Interpersonal Style will have a positive association with the scales of Transformational Leadership.*

*Hypothesis 8: There will be a negative association between Interpersonal Style and Management by Exception Active.*

Empowerment is expected to show no association with the Full Range Leadership Model, as Empowerment does not relate to a leader's values, mission or charisma.

These hypothesised relationships are summarised in Table 5.1 below to provide clarity.

**Table 5.1: The hypothesised relationships between the four-factor management of innovation model and the Full Range Leadership Model**

	Idealised Influence Attributed	Idealised Influence Behaviours	Intellectual Stimulation	Inspirational Motivation	Individual Consideration	Contingent Reward	Management by Exception Active	Management by Exception Passive	Laissez Faire
Feedback	+	+	+	+	+	+		-	-
Interpersonal Style	+	+	+	+	+	+		-	-
Role Modelling	+	+	+	+	+	+		-	-
Empowerment <sup>3</sup>									

- = Negative relationship; + = Positive relationship; = No relationship

### 5.2.c Controlling for LMX

The theoretical integration of the two leadership theories outlined above (LMX and the Full Range Leadership Model) has been explored by Graen and Uhl-Bein (1995). Deluga (1992) demonstrated that Transformational Leadership was associated with quality exchanges, and Howell and Hall-Merenda (1999) found LMX and Transformational Leadership to correlate ( $r = .53, p < .05$ ). Howell and Hall-Merenda (1999) noted that LMX relationships may attenuate relationships between Transformational Leadership and other variables. For example, if an employee has a high LMX relationship with his/her manager, he/she may be more likely to rate the manager's behaviour more positively, on both the Full Range Leadership Model and the four-factor influencing innovation model.

<sup>3</sup> As noted above empowerment is expected to show no association with the Full Range Leadership Model

Thus in line with previous literature, LMX will be controlled for when examining the relationship between the four-factor influencing innovation model and the Full Range Leadership Model.

### 5.3 Method

#### 5.3.a Participants

The sample used here was the same as the sample used in Study 2. A total of 386 respondents participated in this study. The sample was from 5 separate organisations and is shown in Table 5.2 overleaf.

**Table 5.2: Breakdown of the sample**

Organisation	N	% of the total sample	Response rate %
Brewing organisation	52	13.47	40
Multi National FMCG	72	18.65	69
Steel manufacturer	105	27.20	28
Advertising agency	9	2.33	42
Civil service	148	38.34	92
Total	386		

The data from all of the above organisations were combined to form an overall sample. The age of the sample ranged from age 20 to 63, and the mean age of the combined sample was 38.3 years (SD 9.39). Of the respondents 30% were female, 63% male and 7% did not respond to this question. The mean number of years the respondent had worked for the company was 6.8 (SD 7.0), and the mean number of years the respondent had worked for the manager was 2.4 (SD 2.6).

### **5.3.b Procedure**

Participants were administered three questionnaires: 1) the questionnaire developed in Chapter 4 to measure the four-factor management of innovation model, 2) the Multifactor Leadership Questionnaire (MLQ) short form - a measure of the Full Range Leadership Model, and 3) an adapted six item version of the LMX. The LMX measure was based on Liden and Maslyn's (1998) measure of LMX. Employees were asked to rate their direct line manager/supervisor on each of these three scales. No time limit was set.

### **5.3.c Data analysis**

Exploratory factor analysis was conducted on the LMX scale to ensure it covered one factor, using principle components analysis. Confirmatory factor analysis was conducted on the MLQ in order to establish the most satisfactory factor structure, because as noted earlier, this has caused debate in the literature (Turner, Barling, Epitropaki, Butcher & Milner, 2002).

Subsequently, both correlational and regression analyses were performed to establish the degree of association between the four-factor model and other leadership measures, with the intention of examining construct validity.

Correlations were also performed between the number of years employees had worked for their current manager and 1) the four behaviours in the influencing innovation model; 2) the nine factors in the Full Range Leadership Model; and 3) the LMX scale. This was done in order to demonstrate that the number of years an

employee had worked for his/her manager did not influence the rating the employees gave on the scales used in this study.

In order to explore the relationship between LMX and the four-factor management of innovation model a series of stepwise multiple regressions were conducted on the four-factor influencing innovation scales and the LMX scale<sup>4</sup>. Regression analysis was chosen as it allows the researcher to investigate the relationship between one dependent variable (DV) and several independent variables (IVs).

In order to explore the relationship between the four-factor management of innovation model and the nine factors in the Full Range Leadership Model partial correlations were then performed; these correlations were calculated controlling for LMX, because as noted above LMX is believed to inflate employee ratings of managers. As a large number of correlations were carried out Bonferroni adjustment was then calculated in order to establish the most appropriate significance level. This was done by dividing the .05 significance level by the number of correlations.

The Results section reports the initial correlational analysis between the variables, followed by multiple regressions where appropriate.

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<sup>4</sup> All the regression analyses reported in this chapter followed pre-analysis checks for skew, kurtosis, linearity and normality of residuals, and checks for multi-collinearity and outliers.

## 5.4 Results

Table 5.3 shows the means, SDs, alpha coefficients, and correlations with the number of years worked for the manager, for all of the scales in this study.

**Table 5.3: Means, SDs,  $\alpha$  coefficients, and correlations with the number of years worked for current manager of the nine MLQ scales, LMX and the four management of innovation factors**

N=386		$\alpha$	Mean	SD	No. of years worked for manager
The Management of Innovation Model	Role Modelling	.91	3.46	.67	-.126(*)
	Interpersonal Style	.90	3.65	.73	-.052
	Feedback	.92	3.46	.67	-.074
	Empowerment	.85	3.91	.68	.033
LMX	Leader Member Exchange	.88	3.60	.75	-.045
The Full Range Leadership Model	Intellectual Stimulation	.81	2.22	.88	-.054
	Inspirational Motivation	.87	2.36	.97	-.121(*)
	Individual Consideration	.81	2.08	1.03	-.084
	Idealised Influence Behaviours	.67	2.10	.84	-.003
	Idealised Influenced Attributed	.83	2.21	.99	-.066
	Contingent Reward	.87	2.06	1.0	-.097
	Management by Exception Passive	.73	3.60	.75	.177(**)
	Management By Exception Active	.61	1.51	.80	.010
	Liaise Faire	.77	.92	.34	.132(*)

(\*)  $p < .05$  ; (\*\*)  $p < .01$  ;  $\alpha$  = Internal reliability alpha coefficient



Overall, the results presented in Table 5.3 show that all scales in the four-factor influencing innovation model have acceptable reliability. However, two of the scales in the MLQ: idealised influence Behaviours and Management by exception Active, have low alphas of .67 and .61 respectively. However this is greater than the .5 acceptability level recommended by Kline (1993), such that these scales were still used in further analysis. Table 5.3 also shows that out of the four scales in the managing innovation model only Role Modelling had a significant association with the number of years an employee has worked for a manager ( $r = -.13; p < 0.5$ ). Similarly, only three of the scales in the MLQ had small correlations with the number of years an employee has worked for a manager. LMX showed no relationship with the number for years an employee has worked for a manager.

#### 5.4.a The management of innovation model and LMX

The scree plot and eigen values predicted one factor in the LMX scale, which was supported by the Exploratory Factor Analysis (N=386). This factor accounted for 62% of the variance. The factors loadings on the LMX scale are shown in table 5.4.

**Table 5.4: The factor loading matrix of the LMX scale.**

Item	Factor loadings
Eigen value = 3.75	
My working relationship with my manager is an effective one	.83
My manager would support me if I got in to difficulties	.79
I have considerable trust in my manager's decisions	.82
My manager is the kind of person one would like to have as a friend	.77
I know where I stand with my manager	.69
My manager appreciates my strengths and potential	.84

Correlations and regression analysis were conducted to analyse the association between LMX and the four behaviours in the management of innovation model. As previously discussed, it was hypothesised that the management of innovation model would predict and explain substantial variance in the development and thus the rating of the LMX.

The results showed that all four behaviours correlated with LMX; Feedback  $r = .84, p < .01$ ; Interpersonal Style  $r = .83, p < .01$ ; Role Modelling  $r = .67, p < .01$ ; Empowerment  $r = .73, p < .01$ . Therefore, regression analysis was performed in order to establish the extent to which the four behaviours in the management of innovation model predict LMX, and all four behaviours were entered in to the regression equation. The results of this are shown in Table 5.5 and 5.6 overleaf, demonstrating that three of the four behaviours are significant in the regression model. On examination of Table 5.6, it is possible to see that the Role Modelling factor is not significant in the model and this predicts no variance in LMX. The results also show that Interpersonal Style, Feedback, and Empowerment predict nearly 82% of the variance in LMX.

**Table 5.5: The multiple regression model showing the relationship between LMX and the four-factor management of innovation model**

<i>N=386</i>		R	R Square	Adjusted R Square	Std. Error of the Estimate	Change Statistics				
Independent variables	R Square Change					F Change	df1	df2	Sig. F Change	
Empowerment Feedback Interpersonal Style Role Modelling		.905	.819	.817	.31948	.819	427.328	4	378	.000

**Table 5.6: Regression coefficients for the four behaviours in the management of innovation model and LMX**

	Unstandardized Coefficients		Standardized Coefficients	t	Sig.
	B	Std. Error	Beta		
Feedback	.440	.047	.397	9.442	.000
Interpersonal Style	.374	.037	.365	10.126	.000
Role Modelling	.031	.037	.027	.827	.409
Empowerment	.247	.033	.224	7.493	.000

The results of the relationship between the Full Range Leadership Model and the four-factor management of innovation model will now be presented.

#### **5.4.b The management of innovation model and the Full Range Leadership Model**

The results presented below firstly show the confirmatory factor analysis of the MLQ, followed by the presentation of the correlations between the Full Range Leadership Model and the four-factor management of innovation model.

#### **5.4.c Confirmatory Factor Analysis of the Multifactor Leadership Questionnaire**

As noted above there has been some contention over the most appropriate factor structure in the Multifactor Leadership Questionnaire designed to measure the Full Range Leadership Model. Therefore, in order to establish that the hypothesised

nine factors were the most adequate fit to the data (see Bass, 1995) a CFA was performed. In evaluating the fit of the data to a nine factor model the  $\chi^2$  statistic was calculated, which indicates the degree of correspondence between the proposed model and the empirical data. The chi-squared statistic was significant, and although it is desirable that this is both non-significant and low, it is important to be aware of two potential problems with this statistic. Firstly although the lower boundary is always zero, theoretically it has no upper value and thus is not interpretable in a standardised way. Secondly the chi-squared is very sensitive to sample size (Kline, 1993).

Three other values were used to assess the fit of the data, which are less sensitive to sample size. These are the Tucker-Lewis index (TLI) and Comparative Fit Index (CFI). It is recommended that both of these values are above .9. Finally the Standardised Root Mean Squared Residual (SRMR) was also used which is the standardised summary of all the covariances, and is favourably less than .1.

The nine factor model in the Full Range Leadership Model showed the most parsimonious fit to the data;  $\chi^2 = 440.94$  (D.F. = 110); CFI = .91; TLI = .98; SRMR = .057.

Therefore the nine factors were used in further correlation analyses. Correlations were conducted to explore the relationship between the MLQ and the management of innovation model. However, during this analysis LMX was controlled for, as LMX may influence the employee ratings of their manager's behaviours and leadership qualities. The associations between the four management of innovation

behaviours and the nine facets of the Full Range Leadership Model are shown in Table 5.7.

**Table 5.7: Partial correlations between Multifactor Leadership Questionnaire and the four managerial behaviours associated with employee innovation**

N= 386

	Intellectual Stimulation	Idealised Influence Attributed	Idealised Influence Behaviours	Individual Consideration	Inspirational Motivation	Management By Exception Active	Management By Exception Passive	Contingent Reward	Laissez Faire
Role Modelling	.50**	.40**	.45**	.29**	.62**	-.15	-.31**	.36**	-.22**
Feedback	.40**	.31**	.24**	.35**	.38**	-.12	-.24**	.43**	-.19**
Interpersonal Style	.22**	.26**	.15**	.23**	.21**	-.15	-.31**	.36	-.22
Empowerment	.07	-.03	-.06	-.02	.16	-.15	-.03	.033	-.02

\*\* = bonferroni adjusted  $p < .01$

The results show considerable convergence and divergence with factors within the full range leadership model. In summary, when controlling for LMX, as predicted Role Modelling is most closely related to the Full Range Leadership Model showing a positive relationship with Intellectual Stimulation ( $r = .50, p < .01$ ), Idealised Influence Attributed ( $r = .40, p < .01$ ), Idealised Influence Behaviours ( $r = .45, p < .01$ ), Individual Consideration ( $r = .29, p < .01$ ), Contingent Reward ( $r = .36, p < .01$ ), and a negative relationship with Management By Exception Passive ( $r = -.31, p < .01$ ) and Laissez-faire ( $r = -.22, p < .01$ ). This pattern of results is mirrored by the Feedback factor of the influencing innovation model, but there was no relationship with Management by Exception Passive or Active.

Interpersonal Style shows a positive relationship with Intellectual Stimulation ( $r = .22, p < .01$ ), Idealised Influence Attributed ( $r = .26, p < .01$ ), Idealised Influence Behaviours ( $r = .15, p < .01$ ), Individual Consideration ( $r = .23, p < .01$ ), Inspirational Motivation ( $r = .21, p < .01$ ) and a negative association with Management By Exception Passive ( $r = -.31, p < .01$ ), and no significant relationship with Contingent Reward, Laissez Faire, and Management By Exception Active. Empowerment shows the most conceptual distance from the Full Range Leadership Model showing no significant correlations with any of the facets of the Full range Leadership Model.

## **5.5 Discussion**

Initially the relationship between LMX and the four-factor management of innovation model is discussed, before attention is given to the relationship between the four-factor management of innovation model and the Full Range Leadership Model.

### **5.5.a LMX and the management of innovation model**

The results show that three of the managerial behaviours associated with innovation also predict variance in the rating of LMX. This therefore supports hypotheses 1 and 2; that Interpersonal Style, Feedback and Empowerment predict LMX, with Interpersonal Style and Feedback predicting most of the variance (79%).

These findings imply that the managerial behaviours associated with innovation also help employees form high LMX relationships with their manager. This

supports the LMX development model (Dienesch & Liden, 1986) presented in Figure 5.1 (page 138), which shows that Interpersonal Style, Feedback and Empowerment are possible antecedents of LMX.

These findings also provide partial support for the framework of managerial behaviours associated with innovation, developed in the previous studies. The framework, which was initially presented in Study 1, proposes that two of the managerial behaviours – Feedback and Interpersonal Style - are employee-focused, as they centre on interaction with the employee. As Interpersonal Style and Feedback explained most of the variance in LMX (79%), which is a construct that focuses on leader-member interaction, it supports the notion that these behaviours are employee-focused.

#### **5.5.b The Full Range Leadership Model and the Management of Innovation Model**

The results show that the two components of the four-factor management of innovation model that are ideas-focused (Role Modelling and Feedback), have the strongest association with the facets of transformational leadership. In contrast, the non ideas-focused behaviours, Interpersonal Style and Empowerment, show lower or non-significant associations with (and are thus less related to) the constructs of the Full Range Leadership Model (incorporating both transformational and transactional leadership). Each of the four behaviours (1. Role Modelling; 2. Feedback; 3. Interaction Style; and 4. Empowerment) will be reviewed respectively in terms of the associations with the Full Range Leadership Model.

1) Role Modelling. It was hypothesised that Role Modelling would be positively associated with all of the facets of the transformational leadership scale and the Contingent Reward facet of the transactional scale (hypothesis 3), and would be negatively associated with Management by Exception Passive, and Laissez-faire (hypothesis 4). The results provide support for hypotheses 3 and 4, and demonstrate that Role Modelling is most closely related to Inspirational Motivation. As noted in the Chapter 1, research has shown motivation to be key to innovation (Amabile, 1983; Patterson 2002). Furthermore, as Inspirational Motivation refers to leaders who motivate and inspire followers to reach ambitious goals, this supports the notion proposed in Chapter 4, that one possible mechanism through which Role Modelling may influence innovation is by influencing employee motivation to innovate.

Furthermore, Individual Consideration showed a weaker correlation with Role Modelling ( $r = .29$ ), when compared to the other transformational facets. This is likely to be because although Role Modelling is concerned with encouraging employees to innovate, it does not include recognising and rewarding innovation (a component of Individualised Consideration). A .50 correlation between Role Modelling and Intellectual Stimulation was found, which was to be expected as Intellectual Stimulation centres on inviting innovation from employees, and Role Modelling focuses on encouraging innovation.

Idealised Influence Attributed and Idealised Influence Behaviours were both also positively associated with Role Modelling. As these behaviours refer to a leaders



values and sense of mission and purpose, this indicates that as hypothesised Role Modelling involves a manager communicating his/her values to the employees, however in Role Modelling the values are specific to innovation.

2) Feedback. It was hypothesised that Feedback would have a positive association with all of the facets of the transformational leadership scale, and with the Contingent Rewards facet of the Full Range Leadership Model (hypothesis 5). Furthermore, it was also hypothesised that Feedback would be negatively associated with Management by Exception Passive (hypothesis 6). Hypothesis 5 and 6 were fully supported.

There was a positive association between Intellectual Stimulation and Feedback ( $r = .40, p < .01$ ), as Intellectual Stimulation promotes consideration of different viewpoints (Bass, 1985) - supporting the notion that the feedback factor relates to building on and discussing employee ideas.

Like Role Modelling, Feedback was shown to be positively related to Contingent Reward ( $r = .43, p < .01$ ), which implies that through giving feedback managers may clarify roles in relation to ideas and innovation, as role clarification is a main component of Contingent Reward.

Further to this, Avolio and Yammarino (2002) claim that Contingent Rewards help to motivate employees, which supports the proposition that feedback may influence innovation through enhancing motivation, which was presented earlier in this thesis.

In a similar way to Role Modelling Feedback was positively associated with both Idealised Influence Attributed and Idealised Influence Behaviour, which implies that the through giving feedback that is specific to ideas, the manager communicates his/her values and sense of mission to the employee. Furthermore, as this behaviour is ideas-focused, the values that this behaviour will communicate will be specific to ideas and innovation.

The results also suggest that through giving feedback, the manager may inspire and motivate employees, as Feedback was positively associated with Inspirational Motivation. Feedback is also likely to entail coaching and counselling employee in relating to their ideas, as it was positively associated to Individual Consideration. Finally as negative relations were observed between Feedback and Management by Exception Passive, it is likely that a manager who gives feedback on ideas does not wait until problems occur before intervening.

3) Interpersonal Style. It was hypothesised that Interpersonal Style would have low positive associations with the scales of transformational leadership (hypothesis 7) and a negative association with Management by Exception Active (hypothesis 8). Indeed, Interpersonal Style showed no relationship with the transactional components of the Full Range Leadership Model, except a negative relationship with Management by Exception Passive ( $r = -.31, p < .01$ ). This implies that that a manager low on Interpersonal Style will tend to wait until things go wrong before he or she intervenes, which may mean employees perceive him or her as unavailable or inaccessible – behaviours which typify low Interpersonal Style.

As expected, Interpersonal Style showed small positive associations with all of the transformational leadership facets. As all of the correlations observed in relation to Interpersonal Style are low (under .35) this indicates that this factor is not closely associated with the Full Range Leadership Model. One explanation for this is that the Full Range Leadership Model tends to focus on values of the leader, and while values may be moderately related to whether a manager is approachable, accessible and has positive affect (the behaviours which typify Interpersonal Style), this factor is more focused on employee – manager interaction.

4) Empowerment. Finally, empowerment showed no significant associations with the Full Range leadership Model, which suggests that Empowerment shows the most conceptual distance from the Full range Leadership Model. One reason for this conceptual distance is that Empowerment centres on the managers work-style, while the Full Range Leadership Model focuses on the leader characteristics such as the leader's ethical and moral position (Avolio & Yammarino, 2002).

Overall there are several implications of these results over the increased understanding they have given to the four-factor management of innovation model. Firstly the two ideas-focused behaviours (Feedback and Role Modelling) relate most strongly to the Full Range Leadership Model. This may be because transformational leaders motivate employees to go beyond what is normally expected, to achieve exceptional results (Hater & Bass, 1988), by raising awareness of the importance of designated outcomes (Bass, 1985). This implies that, as the two ideas-focused behaviours have the strongest relationship with the

transformational leadership facets, they may motivate innovation by increasing awareness of the importance of innovation (through Role Modelling and giving Feedback).

A second implication of this study is that the findings support the most recent factor structure proposed by the Full Range Leadership researchers. This is the nine-factor structure proposed by Avolio and Yammarino (2002). Furthermore, the results presented here show that some behaviours within the four-factor managing innovation model have a positive relationship with factors from both the transformational and transactional scales. This supports Bass and Avolio (1993) who claim that leaders can display both transactional and transformational behaviours. However, this contradicts Burns (1978) who claimed that transformational and transactional leadership lie on a continuum. The results presented here suggest that in order to influence employee innovation a manager needs to demonstrate a combination of both transformational and transactional behaviours.

### **5.5.c Summary**

Overall, the results presented here have shown that three of the behaviours in the four-factor management of innovation model influence the development of LMX. Furthermore, the management of innovation model has two components which are similar to the Full Range Leadership Model; Feedback and Role Modelling, and two which are relatively distinct from it; Empowerment and Interaction Style. Furthermore, the results suggest that managerial behaviours associated with

innovation are positively associated with elements of both transformational and transactional leadership.

The results presented here firstly provide evidence of construct validation, as the four-factor management of innovation model relates to two theories of leadership in a predicted way. Secondly, the results have also enhanced understanding of the four behaviours that are associated with the management of innovation.

The next chapter will explore the managing innovation model in relation to organisational factors that influence innovation, with aim of providing further construct validation for the model.

## **Chapter 6: Exploring Construct Validity – the management of innovation and the organisational context**

*“Creativity is a gift. It doesn’t come through if the air is cluttered”*

John Lennon

The previous chapter aimed to explore construct validation of the four-factor management of innovation model. This chapter builds on the previous chapter, and this study aims to explore how the four-factor influencing innovation model relates to the key themes of organisational factors that have been postulated to influence innovation, and in doing so develop understanding of the construct validity of the four-factor influencing innovation model.

It is important to examine the relationship between organisational and managerial behaviours that are associated with innovation for two main reasons: 1) managerial behaviours are sometimes viewed as a subset of the organisational factors, and 2) managerial behaviours may influence employee perceptions of the organisational factors. However, there has been little integration within the literature of managerial and organisational factors that are associated with innovation. When integration has occurred, general managerial behaviours have been amalgamated under the broad term of organisational climate that enhances innovation. For example, Amabile (1995) included the factor of ‘supervisory encouragement’ in her model of the organisational climate that enhances innovation. As a result, the influence of a manager’s behaviour on employee perceptions of the organisational

factors which influence innovation has largely been a neglected issue (Kozlowski & Doherty, 1989).

A number of models have identified a wealth of organisational factors thought to influence innovation (for example Amabile's (1995) KEYS model; Ekvall's (1983) Creative Climate Questionnaire). In addition, a number of researchers have identified a range of single organisational factors that may enhance innovation (see Patterson, Port & Hobley (2003) for a review) . However, within this, three central themes can be identified amongst the most consistently identified factors (Patterson, Port & Hobley, 2003). As a background to this, the factors that research has identified to influence innovation are briefly critiqued below.

As noted in Chapter 1 the current most prominent model of organisational climate that fosters innovation, the KEYS model (Amabile, 1995), can be criticised for reasons such as: 1) no data on exploratory factor analysis have been reported; 2) confirmatory factor analysis of the model showed moderate fit (goodness of fit index = .85; adjusted goodness of fit index = .84; root mean squared residual = .056); 3) the retrospective analysis used in the validation process could have led to memory biases and halo effects, influencing the accuracy of the employees' perceptions and reports on the KEYS scales; 4) the KEYS focuses on creativity, which is solely idea generation and does not incorporate idea implementation; and 5) Amabile's (1995) model is not exhaustive and only focuses on the organisational 'environment', and excludes other factors within the organisational context which have been shown to be associated with innovation (for example, the physical work environment).

Therefore, Table 6.1 provides a review of all of the factors that may influence innovation, which have been identified in previous literature (including those in Amabile's (1995) model presented in Chapter 1). This information is presented in order to establish the best way to assess the organisational factors that influence innovation.

Some of the factors presented in Table 6.1 may have been excluded from Amabile's (1995) KEYS model as they are not only characteristics of organisational environment, but include factors external to the organisation and formal policies. Furthermore, the factors listed below not only help to foster or hinder idea generation, but also foster or hinder employee innovation (idea generation *and* implementation).

In examining the organisational factors listed below it is possible to identify three themes: 1) factors that create a climate that promotes innovation, 2) factors which influence the organisational structure and work process, and 3) factors which are external to the organisation (see Patterson, Port & Hopley, 2003 for a review). As outlined below, on some occasions there is empirical support for the notion that these characteristics influence employee innovation, and in other instances the relationships are theoretically hypothesised. In addition, there is no psychometric evidence of this hypothesised three-factor structure, and this issue will be addressed in this study.



This section is structured into three hypothesised themes of organisational factors that influence innovation: 1) climate, 2) structure and work processes, and 3) external environment. As can be seen from Table 6.1 below, each of these themes has a number of subcomponents, which are reviewed in turn below.

**Table 6.1: The themes of the organisational factors that influence innovation**

**(Patterson, Port & Hobley, 2003)**

<b>Organisational factor</b>	<b>Subcomponents</b>	<b>Example source</b>
<b>Climate</b>	Climate & strategy that support innovation	Kanter (1983); Meyer (1982); Anderson (2004)
	Corporate expectations and values	Abbey & Dickson (1983); Amabile et al. (1996); Patterson (2004)
<b>Structure and work processes</b>	Performance management / HR systems	Chandler, Keller & Lyon (2000); West (2000); Storey et al. (2002)
	Physical environment	Katz (2003)
	Organisational formality and structure	Bennett (2003); Zaltman et al. (1973)
	Flow of ideas	West & Wallace (1991); Kimberley (1981)
<b>External environment</b>	Competition and perceived need for innovation	King & Anderson (2002)
	Environmental turbulence	Pierce & Delbecq (1977); Duchesneau, Cohn & Dutton (1979)

## **6.1 Climate**

Climate can be defined as commonly shared, consciously performed, social interaction behaviour: “what we do” (Burnside, 1990). This literature review identified two components of the climate for innovation: 1) Organisational climate and strategy that support innovation, and 2) Corporate expectations and values. Each of these is reviewed below.

### Organisational climate and strategy that support innovation

Support for innovation is often highlighted by researchers in this field; however, a precise description of what constitutes support for innovation is rarely presented. Organisational support for innovation is characterised by an orientation towards innovation, support of members pursuing new ideas (Kanter, 1983), and encouragement of innovation through both words and deeds (Mohamed & Riskards, 1996). Scott and Bruce (1993) found support for innovation to significantly relate to innovative behaviour ( $r = .30$ ,  $p < .05$ , measured with Seigel and Kaemmerer's (1978) support for innovation scale).

An organisation can build a climate for, and show its support of, innovation by including innovation in the organisational strategy. In a study of American hospitals, Meyer (1982) found that hospitals' responses to the crisis of a doctors' strike - including whether or not it was perceived as an opportunity for innovation - were determined more by strategy and ideology than by resources and structure. Although research has stressed there is no one ideal strategy for innovation, Cooper (1984) found that the most innovative firms had a strategy that unified 'technical prowess' and aggressiveness with a strong market orientation.

### Corporate expectations and values

Research suggests that people are more likely to innovate if they are given a licence to do so (Amabile et al., 1996). Employee expectations of the organisation and its values in relation to innovation are likely to have a significant influence on what is perceived to be 'normal' or 'acceptable' behaviour, and are likely to

provide the 'backbone' to the climate of the organisation. Key values include openness to change (Duncan, 1972), and an organisation's willingness to experiment with ideas (Abbey and Dickson, 1983).

In encouraging innovation Amabile et al. (1996) highlighted several aspects of such encouragement, including: 1) encouragement of risk-taking and a valuing of innovation from the highest level; 2) fair, supportive evaluation of ideas; 3) reward and recognition for innovation; and 4) collaborative idea-flow across the organisation, and participative management and decision-making.

Section 6.2 outlines the second theme of organisational factors that influence innovation: structure and work processes.

## **6.2 Structure and work processes**

Organisational structure and work processes centre on how work is organised, and the structure of the organisation. This theme includes: 1) performance management / HR systems, 2) the physical work environment, 3) organisational formality, and 4) flow of ideas – each of which are discussed below.

### Performance management / HR systems

Human Resource practices play a pivotal role in attracting, building and nurturing innovative employees, and help to show that the organisation is supportive of innovation. For example, Chandler, Keller and Lyon (2000) found that reward systems led to increased innovation, whilst workload pressures and cultures that sought to 'control' employees inhibited perceptions of an innovative culture.

Other Human Resource practices which may impact on innovation include job security (West, 2000), flexible employment contracts (Storey, Quintas, Taylor & Fowle, 2002), appraisal and reward systems for innovation and knowledge management systems (Filius, DeJong & Roelofs, 2000).

### Physical environment

Although little research has found a direct link between the physical environment and innovation, it is likely that a stimulating physical environment will influence innovation. Research suggests that a relaxing (West & Farr, 1990), stimulating (Katz, 2003) working environment is likely to increase innovation in employees.

One example of this may be a coffee lounge where employees can talk informally, relax and develop ideas with other employees from around the organisation.

Research from environmental psychology also demonstrates that the physical work environment helps to enhance employee morale (Robinson, Roth & Brown, 1993) and motivation (Tiglao-Torres, 1990).

In support of the influence of the physical environment on innovation, Kindler (1984) claimed that organisational support for innovation may include the creation of physical changes in the work environment. The physical environment helps to build the social environment, thus setting people's expectations of appropriate behaviour (Graham, La Rocque, Yetman, Ross & Giustra, 1980). In line with this, aspects of the physical environment which may set the norm for innovation include the provision of resources to facilitate brainstorming (e.g. white boards, external stimuli and technology), notice boards displaying innovation missions and

values, and work spaces that facilitate communication with co-workers and collaboration across employees or teams (Horgen, Schon, Porter & Joroff, 1998).

### Organisational formality and structure

In examining the impact of organisational formality and structure on innovation, it is important to consider three main aspects that may influence innovation. These aspects are: 1) **Centralisation** - the extent to which authority and decision-making lies at the top of a hierarchy (Barker, 1998); 2) **Formalisation** - the degree of emphasis placed on rules (Bennett, 2003); and 3) **Complexity** - the degree of occupational specialisation within the organisation (Zaltman, Duncan & Holbeck 1973). It is beyond the scope of this review to explore each of these and the reader is referred to Patterson, Port and Hoblely (2003), or King (1990) for a more detailed review.

Overall however it seems important for organisations to achieve the balance between a too flat and too rigid structure. Further research is needed to clarify the impact of these factors on innovation, and to identify the contingencies under which organisational structure can enhance innovation.

### Flow of ideas

A factor within the work structure theme is the flow of ideas around the organisation. This factor relates to how ideas are communicated to, from, or around employees. West and Wallace (1991) suggest that the more people interact and information share, the more likely people are to offer ideas, and invest in the outcomes of such ideas. Part of this may include how readily employees search

for ideas or 'scan' for innovations (Kimberley, 1981). Some organisations have formalised the flow of ideas around their organisation with the notion of an 'idea champion'. An idea champion's role is to communicate and take forward a particular idea, and gather support for it from around the organisation; this is thought to assist in ensuring idea implementation (West, 1990).

The final themes of organisational factors will now be reviewed – the external environment.

### **6.3 External environment**

Factors external to the organisation have been recognised as possible facilitators or inhibitors of innovation (Baldrige & Burnham, 1975), this is labelled the external environment. However development of this area has been limited. Such factors include 1) environmental turbulence, and 2) perceived need and competition.

#### **Environmental turbulence**

It has been argued that a high degree of turbulence in the environment will stimulate innovation and increase awareness of cues to innovate (Pierce & Delbecq, 1977). Duchesneau, Cohn, & Dutton (1979) found that environmental uncertainty in a shoe firm resulted in a greater consideration of innovation, and prompted the firm to become more future orientated. However, according to the threat rigidity theory (Staw, Sunderlands & Dutton, 1981), under threatening conditions organisations undergo a mechanistic shift, centralising control, conserving resources, restricting information flow, relying on tried and tested

routines, and showing a tendency to take incremental step changes, and such action is believed to hinder innovation.

### Competition and perceived need for innovation

Another possible external factor is the perceived need for innovation often generated by competition (Copper, 1984). Necessity has been said to be the mother of invention. Research suggests that employees will innovate if there is a perceived need to do so (Amabile & Conti, 1996; Bunce & West, 1984). Research has also shown that in situations of high time pressure, innovation was exhibited by employees when a meaningful sense of urgency (defined as the feeling that one is on a mission and realising the importance of solving a problem) was present (Andrews & Farris, 1972). Therefore, perceived need may also enhance employees understanding of how important innovation is and help inform employees that they are required to innovate.

## **6.4 Conclusions**

A large number of organisational factors have been identified which may influence innovation. These broadly represent three central themes: 1) climate, 2) work processes and structure, and 3) external environment.

This review will now examine how the factors above are likely to relate to the managerial behaviours associated with employee innovation.

## **6.5 How organisational factors relate to the management of innovation**

Early theorists regarded managers as having an important effect on organisational climate (Likert, 1967; McGregor, 1960). To this end, Amabile (1995) noted that managers will influence many of the factors in her model of the organisational environment that fosters innovation, postulating that managers “create” the work environment. Kozlowski and Doherty (1989) also claimed that managers play a key role in determining the climate of an organisation, and argued managers transmit the climate of the organisation to their employees. Indeed, Kozlowski and Doherty (1989) found subordinates with a high quality relationship with their supervisor had a more positive perception of climate, exhibited greater consensus on climate and had perceptions similar to their supervisor.

In line with the current programme of research, Amabile et al. (1996) noted that

*“the future challenge for future research will be to determine the specific managerial behaviours within their organisation that lead people to perceive such encouragement.” (p.1180)*

It is therefore proposed that the managerial behaviours in the influencing innovation model that are ideas focused (i.e. Feedback and Role Modelling) will be related to the climate factor. Thus hypothesis 1 is:

*Hypothesis 1: Role Modelling and Feedback will show a positive association with the climate factor in the organisational factors scale.*



The managerial behaviours associated with innovation are also expected to influence employee ratings of the structure and work processes factor, as managers are often responsible for organising work. Furthermore, as the structure and work processes scale is focused on innovation, the managerial behaviours may influence variance in this scale. Again, the strongest associations will be expected between structure and work processes and the idea-focused behaviours (Feedback and Role Modelling). Therefore hypothesis 2 is:

*Hypothesis 2: There will be positive associations between the four managerial behaviours associated with innovation and the structure and work processes factor.*

Finally it is unlikely that the manager will have a large influence on the external environment; however he or she may play a role in communication of the external environment to employees.

## **6.6 Method**

### **6.6.a Participants**

The sample was the same as that used in Study 3, Chapter 5. A total of 386 respondents participated in this study. The sample was from 5 separate organisations and is shown in Table 6.2.

**Table 6.2: Breakdown of the sample**

Organisation	N	% of the total sample	Response rate %
Brewing organisation	52	13.47	40
Multi National FMCG	72	18.65	69
Steel manufacturer	105	27.20	28
Advertising agency	9	2.33	42
Civil service	148	38.34	92
Total	386		

FMCG = Fast Moving Commercial Goods Organisation

The data from all of the above organisations were combined to form an overall sample. The age of the sample ranged from age 20 to 63, and the mean age of the combined sample was 38.3 years (SD 9.39). Of the respondents 30% were female, 63% male and 7% did not respond to this question. The mean number of years the respondent had worked for the company was 6.8 (SD 7.0), and the mean number of years the respondent had worked for the manager was 2.4 (SD 2.6).

### **6.6.b Procedure**

A questionnaire was developed to measure the organisational factors that may enhance innovation. This consisted of three phases: 1) item generation 2) item analysis and 3) item confirmation, which are discussed in greater detail below.

### **6.6.c Phase 1: Item generation**

An item bank was generated through an iterative process. Items were developed to represent each of the facets of the three themes, shown in Table 5.9. Half of the generated items were reverse coded. The items were generated by three subject matter expert psychologists, all of whom had previous experience of scale development. The full item bank was then reviewed by each of the psychologists

separately and then discussed together as a group for approximately one hour. This process was repeated several times, resulting in a number of items being deemed redundant and minor changes to the wording of some items.

A final item bank was established and reviewed by the subject matter expert panel (n=3). The items were reviewed on the basis of several criteria: Firstly the expert panel reviewed each item in terms of whether it was consistent with the definition of the facet it aimed to measure. Secondly, each item was rated in terms of the clarity of the wording. Finally, the judges rated the degree to which each item would be relevant to a wide range of occupational settings and organisations. Items, which did not concur with these criteria, were deemed redundant.

The final pool consisted of a total of 25 items, 12 of which were reversed coded. Each of the factors was represented by between 2 and 6 items, with an average of 4 items covering most of the organisational facets of the three organisational factors.

#### **6.6.d Phase 2: Item analysis**

Item selection was conducted in order to produce a set of items that were both normally distributed and formed homogenous scales of the organisational factors, as recommended by Kline (1986). All 25 items were also examined for skew and kurtosis and any item that showed variance greater or less than 2.0 was removed, in order to minimise error variance. However no items were required to be removed.

An exploratory factor analysis was conducted on responses to the 25 items to examine the relationships between the items (and thus identify the key themes in the data), and to suggest further items for deletion (Ford, MacCallum, & Tait, 1986). The guiding theory suggested a presence of three factors, and this was supported by the scree plot (Ferguson & Cox, 1993). Hence generalised least squares factoring procedure with oblique rotation was used to impose a three-factor solution (Ford et al., 1986; Kim & Muller, 1978). In order to ensure that each item represented an underlying construct, a minimum loading of .4 was used. Secondly it was required that each item was clearly defined by only one factor, so it was maintained that the difference between loadings was greater than .1.

#### **6.6.e Phase 3: Instrument validation; Confirmatory factor analysis**

Phase two was judged to replicate the three factor theoretical model of organisational factors that foster innovation introduced in the introduction. Further empirical assessment was then needed to replicate the three-factor structure using a different approach in order to triangulate the findings. Therefore a Confirmatory Factor Analysis (CFA) was performed.

Goodness of fit indices were also examined, in order to establish the adequacy of the three-factor model. There are numerous fit statistics which can be used to demonstrate the adequacy of fit the data has to a model. Therefore, in addition to the  $\chi^2$ , three indices are presented: 1) an index to indicate the overall proportion of variance explained (CFI), 2) an index that adjusts the proportion of explained variance for model complexity (TFI), and 3) an index on the standardised residuals (SRMR).

## **6.6.f Relationship between the managerial behaviours and the organisational factors**

Raw scores were then calculated for employees' perceptions of the final organisational factors scales and the management of innovation measure, and Pearson's *r* correlations were calculated between the organisational factors and the four behaviours in the management of innovation inventory. Subsequently a series of regression analyses were conducted for each of the three organisational factors<sup>4</sup>. The four managing innovation behaviours were entered as the IVs and the organisational factors were entered as the DVs, so that the employees perception of the manager could be used to predict the employees perception of the organisational factors that influence innovation. Standard multiple regression is most often used for testing theories (where all IVs are entered together); therefore in line with this stepwise regression was used (where IVs are entered on statistical grounds), as recommended for model-building purposes (see Tabachnik & Fidell, 1996).

## **6.7 Results**

### **6.7.a EFA and CFA**

Pre-analysis checks were conducted including Kaiser-Meyer-Olkin (KMO) tests of sampling adequacy (.876) and Bartlett's test of sphericity (1207.05  $p < .0001$ ), which indicated the data was appropriate for factor analysis. The factor analysis

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<sup>4</sup> All of the regression analyses presented in this chapter followed pre analysis checks for skew, kurtosis, linearity and normality of residuals, and checks for multi-collinearity and outliers.

indicated the presence of three factors, accounting for 53.7% of the variance (shown in table 6.3). The three factors were confirmed by the CFA.

Table 6.3 shows the results of the exploratory factor analysis on the organisational factors that influence innovation.

**Table 6.3: The EFA results for the organisational factors which foster innovation**

Factor labels and items	Factor		
	1	2	3
<b>Factor 1: Work Processes and Structure (Eigenvalue = 6.56)</b>			
The development of new ideas is difficult because my team has little contact with other parts of the organisation (R)	.61	.14	-.01
There is rarely communication of ideas to and from colleagues outside my team (R)	.75	.07	-.16
There is considerable red tape in this organisation when trying to get things done (R)	.72	.07	-.04
People are not restricted by excessive bureaucracy in this organisation	.64	.04	.14
The physical work environment in this organisation tends to stifle innovation (R)	.72	-.05	.09
The physical work environment in this organisation encourages new ideas	.70	-.11	.11
The physical layout in this organisation helps to create a stimulating work environment	.82	-.10	.03
The physical layout of the organisation makes it difficult to innovate (R)	.71	-.04	.02
The reward systems in this organisation benefit mainly those who don't rock the boat (R)	.44	.04	.06
<b>Factor 2: External Environment (Eigenvalue = 1.77)</b>			
Our market is very stable and prefers our traditional products (R)	-.12	.58	.14
There is a market demand for innovation in our business	.13	.75	.03
In this type of business innovation is needed in order to survive	.07	.78	.08
Traditional ways are essential for success in this line of business (R)	.04	.74	-.18
<b>Factor 3: Climate (Eigenvalue = 1.33)</b>			
This organisation is more concerned with the past than with change (R)	.06	-.10	.72
This organisation is willing to take risks with new ideas	.22	.08	.64
Change is encouraged in this organisation	-.13	.08	.90
We are encouraged to be creative in this organisation	.34	.09	.50
People in this organisation are expected to deal with problems in a traditional way (R)	.24	.13	.51

(R) denotes reverse coding

The table above shows the three factors resulting from the EFA; the first factor represents structure and work processes, the second factor represents the external

business environment, and the third factor relates to organisational climate for innovation. The CFA provides support for the three-factor structure with the CFI and TFI both above .9 and the SRMR below .1. The  $\chi^2$  statistic was significant (451.909; Df. 132), however as previously noted there are problems with this statistic as it is adversely influenced by sample size. Therefore, other indices were used; CFI = .96; TFI = .95; SRMR = .07, showing an appropriate fit of the data to a three factor model.

The means, SDs and alpha coefficients of the three organisational factors and the four scales in the management of innovation inventory are presented in Table 6.4.

**Table 6.4: The means, SD, alpha coefficients and correlations of the organisational factors and the four management of innovation scales**

N= 386	$\alpha$	Mean	SD	Min	Max	Feedback	Interpersonal Style	Role Modelling	Empowerment
	Climate	.79	16.08	3.6	5	25	.51(**)	.39(**)	.59(**)
External environment	.86	24.21	6.5	6	20	.25(**)	.12(*)	.26(**)	.13(*)
Structure & work processes	.68	14.91	2.8	9	45	.52(**)	.44(**)	.48(**)	.37(**)
Feedback	.92	41.48	8.2	12	60				
Interpersonal Style	.90	29.08	5.8	8	40				
Role Modelling	.91	38.10	7.3	15	55				
Empowerment	.85	15.61	2.7	4	20				

\* = p<.05; \*\* = p<.01;  $\alpha$  = internal reliability coefficient

Table 6.5 shows the regression analysis of the organisational climate factor and the management of innovation model.

**Table 6.5: Regression analysis of the organisational climate factor with the four managerial behaviours associated with innovation**

Independent Variables	R	R Square	Adjusted R Square	Std. Error of the Estimate	Change statistics		
					R Square Change	F Change	Sig. F Change
Feedback Interpersonal style Role Modelling Empowerment	.60	.36	.35	2.93610	.36	51.52	.000

**Table 6.6: Regression coefficients for the organisational climate factor and the four managerial behaviours associated with innovation**

	Unstandardized Coefficients		Standardized Coefficients	t	Sig.
	B	Std. Error	Beta		
Feedback	.888	.430	.165	2.066	.039
Interaction Style	-.362	.340	-.073	-1.066	.287
Role Modelling	2.600	.344	.475	7.553	.000
Empowerment	.316	.303	.059	1.042	.298

*N = 386*

The results show that in relation to hypothesis 1, the climate factor showed good reliability and was positively associated to all the scales in the influencing



innovation inventory (Feedback  $r = .51$ ,  $p < .01$ ; Role Modelling  $r = .59$ ,  $p < .01$ ; Interpersonal Style  $r = .39$ ,  $p < .01$ ; Empowerment  $r = .38$ ,  $p < .01$ ). Subsequent regression analysis provided further support for hypothesis 1 as Interpersonal Style and Empowerment were not significant in the regression equation, as shown in table 6.6. Table 6.5 shows that overall Role Modelling and Feedback to account for 35% of the variance in climate.

Below table 6.7 shows the regression analysis of the four-factor influencing innovation model and the structure and work processes factor.

**Table 6.7: Regression analysis of behaviours from the four-factor management of innovation model and the structure and work processes factor**

Independent Variables	R	R Square	Adjusted R Square	Std. Error of the Estimate	Change Statistics		
					R Square Change	F Change	Sig. F Change
Feedback Interpersonal style Role Modelling Empowerment	.537	.289	.281	5.49364	.289	36.835	.000

**Table 6.8: The regression coefficients for the structure and work processes factor and the management of innovation model**

<i>N</i> = 386	Unstandardized Coefficients		Standardized Coefficients	t	Sig.
	B	Std. Error	Beta		
<b>Feedback</b>	2.637	.813	.278	3.244	.001
<b>Interpersonal Style</b>	.807	.651	.091	1.239	.216
<b>Role Modelling</b>	1.980	.651	.206	3.041	.003
<b>Empowerment</b>	.145	.578	.015	.250	.803

In relation to hypothesis 2, initially the correlation matrix indicated positive relationships between the four managerial behaviours associated with innovation and the structure and work processes factor from the scale of organisational factors which may enhance innovation. Subsequent regression analysis indicated that regression model was significant as shown in Table 6.7. On examination of the coefficients in Table 6.8 Interpersonal Style and Empowerment were not significant in the regression model, but Feedback and Role Modelling account for 28% of the variance in structure and work processes. This indicates that the two ideas-focused managerial behaviours influence employee perceptions of structure and work processes.

Below Table 6.9 shows the regression model for the management of innovation and the external environment factor. These results are also discussed below.

**Table 6.9: The regression model for the management of innovation model and the external environment factor**

Independent Variables	R	R Square	Adjusted R Square	Std. Error of the Estimate	Change Statistics		
					R Square Change	F Change	Sig. F Change
Feedback Interpersonal style Role Modelling Empowerment	.30	.09	.08	2.64	.088	8.65	.000

**Table 6.10: The regression coefficients for the management of innovation model and the external environment factor**

	Unstandardized Coefficients		Standardized Coefficients	t	Sig.
	B	Std. Error	Beta		
Feedback	.987	.393	.245	2.515	.012
Interpersonal Style	-.637	.312	-.171	-2.041	.042
Role Modelling	.799	.318	.196	2.510	.013
Empowerment	-.076	.274	-.019	-.278	.781

All of the four managerial behaviours showed weak positive correlations to external environment. Furthermore, Empowerment was not significant in the regression model, yet Feedback, Role Modelling, and Interpersonal Style were found to account for approximately 8% of the variance in external environment ( $R^2 = .08$ ;  $p < 0.01$ ), showing that the managerial behaviours play a moderate role in the employees understanding of the external organisational environment that may influence innovation.

## 6.8 Discussion

This study identified three central factors that cover the organisational factors that previous research has identified to influence innovation: 1) Climate, 2) structure and work processes, and 3) external environment. The results of this study in relation to these organisational factors will be discussed in turn. As the aim of the study was to establish construct validity, attention will be given to the relationships found between the four behaviours in the management of innovation model and the three organisational factors. Specifically, this will examine whether the relationships found are similar to those expected based on conceptualisations of the factors and behaviours used in this study. The discussion presented below starts with a discussion of the climate factor, before focusing on the structure and work processes factor, and finally the external environment factor.

Examination of the relationships between the four managerial behaviours and the climate factor, indicates that all four managerial behaviours have a positive association with climate (Feedback  $r = .51$ ,  $p < .01$ ; Interpersonal Style  $r = .39$ ,  $p < .01$ ; Role Modelling  $r = .59$ ,  $p < .01$ ; Empowerment  $r = .38$ ,  $p < .01$ ). Furthermore, the regression analysis shows that the two ideas-focused behaviours (Feedback and Role Modelling) together explain approximately 35% of the variance in this factor (supporting Hypothesis 1). This supports Amabile et al.'s (1996) claim that managers are responsible for building a climate that is supportive of innovation.

This finding also supports the proposition that the Role Modelling factor incorporates a manager's expectations of innovation in self and others, as Climate includes corporate expectations. It seems that through the Role Modelling factor

managers help to create expectations of innovation, which employees perceive to also be the expectations of the organisation as a whole. As Amabile et al. (1996) noted, people will innovate if given the licence to do so, and these findings imply that a manager plays a significant role in building an organisational climate where innovation is perceived to be 'normal' or acceptable.

This may also support the notion that social learning occurs when managers provide a role model for innovation, as people imitate the behaviour of others and build norms of what is appropriate in a given situation (Bandura, 1969). In the current context, employees may observe a managerial role model, which then leads to innovation becoming the norm, and as a result innovation is perceived to be expected and valued by the organisation. This further supports the proposition presented in Study 2 that Role Modelling may influence employee innovation through social learning, in that employees learn a positive value of innovation from their manager.

Furthermore, in Triandis' (1979) Theory of Interpersonal Behaviour the culture factor is a way of categorising beliefs, attitudes, ideals, roles, norms and values, and is similar in conceptualisation to the climate factor presented in this study. Similarly, the culture factor in Triandis' (1979) model was likened to the Role Modelling factor earlier in this thesis. The significant relationship between Role Modelling and climate may also provide support for the parallels which were drawn between Triandis' (1979) model of Interpersonal Behaviour and the Role Modelling factor (see Chapter 3). These parallels were drawn to demonstrate that the Role Modelling factor may be influencing employee innovation through social

learning and motivation. Therefore, as a significant relationship was found between a factor which is similar to Triandis' (1979) concept of Culture and Role Modelling, further support for this proposition was gained.

Although the climate factor showed positive correlations with Interpersonal Style and Empowerment, these behaviours were not significant in the regression equation. This implies that the non ideas-focused behaviours in the management of innovation model do not influence innovation by setting norms for innovation. This discussion will now explore the second organisational factor; structure and work processes.

The structure and work processes factor also showed significant correlations with all four of the managerial behaviours (Feedback  $r = .52$ ,  $p < .01$ ; Interpersonal Style  $r = .44$ ,  $p < .01$ ; Role Modelling  $r = .48$ ,  $p < .01$ ; Empowerment  $r = .37$ ,  $p < .01$ ), thus fully supporting hypothesis 2. In a similar way to climate, the two ideas-focused behaviours (Feedback and Role Modelling) were found to explain 28% of the variance in this factor. This finding suggests that the feedback provided by a manager influences how formally structured the work environment is perceived to be. For example, centralisation was one of the facets of this scale, which focuses on the extent to which decision-making lies at the top. When a manager gives feedback he/she provides time and resources for employees to explore ideas, and builds on these ideas rather than telling employees how to solve a problem, thus sharing the decision-making.

Furthermore, Feedback involves rewarding and recognising ideas, and this may alter employee perceptions that the HR systems reward innovation. West and Wallace (1988) suggest that the more people interact and share information, the more likely they are to offer ideas to others. Therefore, by interacting and giving feedback, managers may help employees generate, offer, and share ideas, thus promoting the flow of ideas around the organisation. Further to this managers are also likely to influence the flow of ideas by sharing these ideas with other managers further up the hierarchy. This supports the notion that managers are 'gate-keepers' in the communication of ideas to the rest of the organisation. This section will now discuss the third and final factor in the organisation factors scale; the external environment.

The results show that that managerial behaviours have a limited association with employees' perception of the external environment (Feedback  $r = .25$ ,  $p < .01$ ; Interpersonal Style  $r = .12$ ,  $p < .05$ ; Role Modelling  $r = .26$ ,  $p < .01$ ; Empowerment  $r = .13$ ,  $p < .05$ ). In the regression Feedback, Role Modelling, and Interpersonal Style were found to account for approximately 8% of the variance in external environment ( $R^2 = .09$ ;  $p < 0.001$ ). Although it is unlikely that managers actually influence the factors that are external to the organisation, the results presented here suggest that managers play a relatively minor role in communication of the external competition and turbulence to employees. Managers may do this when they are communicating expectations of innovation to others, and when explaining reasons why innovation is needed, and interacting with employees.

Overall this study has provided some construct validation for the four-factor managing innovation model. Construct validation has been shown as the four managerial behaviours associated with innovation relate to the three organisational factors that influence innovation in the predicted fashion.

Further to this the two ideas-focused managerial behaviours (Feedback and Role Modelling) predict variance in perceptions of the organisational climate that fosters innovation. This implies that such managerial behaviours communicate innovation-specific information to employees, supporting the framework which suggests that these two behaviours are innovation (or ideas) specific. Furthermore, although associated with the three organisational factors, the two non ideas-focused behaviours did not predict any of the variance in these factors. This again supports the notion that Interaction Style and Empowerment are not ideas-focused and not setting the norm for innovation, and may be influencing innovation through other mechanisms.

Thus, this study has also demonstrated that the organisational factors identified in previous research to influence innovation can be arranged into three central themes: 1) climate, 2) structure and work processes, and 3) external environment. Previously, models of the organisational factors have tended to focus explicitly on organisational climate (e.g. Amabile, 1995; Ekvall, 1996) and rarely have models sampled the range of factors previously identified in the research literature. This is therefore a unique contribution to this area of research. This study has also contributed a measurement tool based on exploratory and confirmatory factor analysis evidence, which can be used to conduct further research in this area.



However, future research needs to establish further construct and criterion-related evidence for the measurement tool. Although this is a limitation of the study, other scales (e.g. Amabile, 1995) are also open to such criticism, and are not inclusive of all of the factors used here (see Chapter 1).

Having explored the four-factor management of innovation model in relation to the organisational climate, the next chapter will explore this model in relation to the personal characteristics of a manager. In establishing construct validity it is important to identify how the behaviours in this model concur with and differentiate from personality variables, as this will further develop understanding of the behaviours in the model. Two further studies are presented, one which focuses on a manager's own propensity to innovate, and one which focuses on some of the factors within the Five Factor Model of personality.

## **Chapter 7: Exploring construct validity – the management of innovation and a manager's personality**

This chapter builds on the two previous chapters and present further exploration of construct validity. So far, the four-factor management of innovation model has been examined in relation to leadership models and the organisational factors that influence innovation. Attention will now turn to exploring the four-factor managing innovation model and personality. Two models of personality will be used in this chapter; 1) the Innovation Potential Indicator (a model of propensity to innovate see below), and 2) the Five Factor Model of personality (FFM). Firstly Study 5 is presented which explores the management of innovation model in relation to a manager's own propensity to innovate, followed by Study 6 which explores the management of innovation in relation to the FFM.

### **7.1 Study 5: Management of innovation and a manager's propensity to innovate**

A manager's own ability to generate and implement ideas was identified in Study 1 as important for influencing innovation in others. Further to this, one of the behaviours identified in Study 2 represents a manager role modelling innovation by setting an example of generating and implementing ideas, expecting others and themselves to innovate, and having a positive view of innovation. Therefore, in order to provide further construct validity for the four-factor management of innovation model, the relationship between the four-factor management of innovation model and a model of individual propensity to innovate was explored. The process of construct validation demonstrates the relationship between a

manager's propensity to innovate and his/her ability to show the managerial behaviours that are associated with innovation. This section will now explore a prominent model of propensity to innovate: the Innovation Potential Indicator.

## 7.2 The Innovation Potential Indicator (IPI)

The Innovation Potential Indicator is a four-factor model of individual potential to innovate (Patterson, 1999). This scale has four factors, as shown in Table 7.1.

**Table 7.1: The four-factor Innovation Potential Indicator (Patterson, 2000)**

Scale	Description
Motivation to Change (MTC)	This is the motivational component of innovation. This relates to whether an individual welcomes frequent change at work, tolerates ambiguity and is intrinsically motivated. <i>Positively related to innovation.</i>
Challenging Behaviour (CB)	This represents the social component of innovation potential. This relates to actively engaging and challenging other people's points of view. <i>Positively related to innovation.</i>
Adaptation (AD)	This represents the problem-solving component of innovation potential, and is related to an individual's preference to use tried and tested methods. <i>Negatively related to innovation.</i>
Consistency of Work Styles (CWS)	This represents an action component of innovation potential, and centres on an individual's preferred work style, and whether an individual prefers a strict, methodical and consistent approach to work. <i>Negatively related to innovation.</i>

This model was chosen as it has extensive construct and criterion-related validity (see Patterson, 1999). The model includes social, cognitive, motivational and work-style components of innovative behaviour. This model incorporates findings from all of the previous literature on individual innovation. Further to this, the IPI model has a measurement tool which is specifically related to innovation in an

occupational context, and is therefore applicable to this study. The theoretical relationship between a manager's own innovation and the four behaviours in the management of innovation model will now be explored, before this is empirically tested.

### **7.3 Manager innovation and the management of innovation model**

This section will review each of the four factors in the Innovation Potential Indicator (IPI) model and their theoretical relationships with the four behaviours in the management of innovation model.

Of the four factors in the Innovation Potential Indicator model, Motivation to Change (MTC) has consistently been reported to explain most of the variance in innovative behaviour (Patterson, 2003). As motivation to change measures a person's motivation towards making changes at work, it is expected that motivation to change will show a positive relationship with all four behaviours within the management of innovation model. This relationship is hypothesised because all four managing innovation behaviours influence change and innovation, and it is therefore important that a manager who displays these behaviours is motivated towards change.

The other three factors of the Innovation Potential Indicator (Challenging Behaviour, Adaptation and Consistency of Work Styles) are expected to only be associated with Role Modelling, as one aspect of this management behaviour is a manager's own innovation and willingness to change. As Empowerment, Interpersonal Style and Feedback are not associated with a manager's own

innovation, no association is expected with the other three factors in the Innovation Potential Indicator.

Therefore the following hypotheses were formed:

*Hypothesis 1: Motivation To Change will be positively associated with all four management of innovation behaviours.*

*Hypothesis 2: Role Modelling will be positively associated with Motivation To Change and Challenging Behaviour, and negatively associated with Adaptation and Consistency Work Styles.*

## **7.4 Method**

### **7.4.a Participants**

The sample was a convenience sample of 140 managers from various occupational settings. The age of the sample ranged from 19 to 55 years with a mean age of 33. 53% of the sample was male and 47% was female.

### **7.4.b Procedure**

Self-report versions of the Innovation Potential Indicator and the four-factor influencing innovation inventory were completed by the participants. No time limit was set. Raw scores were calculated and the data were then examined through correlation analysis.

## 7.5 Results

Table 7.2 shows the means, SDs and alphas for each scale, and the correlations between the IPI and the four-factor management of innovation inventory. The positive correlations are shown in bold.

**Table 7.2: Mean SDs,  $\alpha$  and correlations of the Innovation Potential Indicator and the four-factor management of innovation model**

<i>N</i> = 140	Mean	SD	$\alpha$	Motivation to Change	Challenge Behaviour	Adaptation	Consistency of Work Styles
Feedback	48.72	4.93	.77	<b>.29(**)</b>	.06	<b>-.18(*)</b>	.04
Interpersonal style	32.59	3.37	.70	<b>.23(**)</b>	-.05	-.13	.07
Empowerment	15.60	2.31	.81	<b>.20(*)</b>	-.07	-.08	.12
Role modelling	40.14	4.89	.74	<b>.62(**)</b>	<b>.46(**)</b>	<b>-.66(**)</b>	<b>-.30(**)</b>
Motivation to change	30.80	4.09	.67				
Challenging behaviour	23.39	4.55	.70				
Adaptation	20.65	3.38	.60				
Consistency of Work styles	20.26	3.49	.74				

\* =  $p < .05$ ; \*\* =  $p < .01$ ;  $\alpha$  = internal reliability coefficient

The results show Motivation To Change is positively correlated with all of the four behaviours in the influencing innovation model, with Role Modelling showing the strongest relationship ( $r = .62$ ;  $p < .01$ ), supporting hypothesis 1. The results also show a positive relationship between Role Modelling and Challenging Behaviour ( $r = .46$ ;  $p < .01$ ), and a negative relationship between Role Modelling and both

Adaptation ( $r = -.66$ ;  $p < .01$ ) and Consistency of Work Styles ( $r = -.30$ ;  $p < .01$ ), supporting hypothesis 2. Further to this a weak negative correlation was found between Adaptation and Feedback ( $r = -.18$ ;  $p < .05$ ).

## 7.6 Discussion

The results provide support for Hypotheses 1 and 2. The results indicate that Motivation To Change is related to all behaviours of the influencing innovation model (hypothesis 1), and Role Modelling is positively correlated with Challenging Behaviour, and negatively correlated with Adaptation and Consistency of Work Styles (hypothesis 2). The implications of these results will now be discussed by exploring each of the four behaviours in the management of innovation model in turn.

The results indicate that the first factor, Role Modelling, is most closely related to the Innovation Potential Indicator model (Motivation to Change  $r = .62$ ,  $p < .01$ ; Challenging behaviour  $r = .46$ ,  $p < .01$ ; Adaptation  $r = -.66$ ,  $p < .01$ ; Consistency of Work-styles  $r = -.30$ ,  $p < .01$ ). The high negative correlation between Role Modelling and Adaptation indicates that Role Modelling involves a manager 'thinking outside of the box', generating new ideas and not having a preference for tried and tested methods. This provides construct validation for this factor, as facet behaviours include openness to challenge and new ideas, and an ability to generate new ideas.

Similarly the high positive correlation between Role Modelling and Motivation To Change supports the notion that Role Modelling is tapping a motivational

component of the manager's behaviour, and more specifically is tapping managerial motivation towards innovation and change. This concurs with the conceptualisation of the Role Modelling factor, as one of the facet behaviours is 'willingness to change'. The positive association between Role Modelling and Challenging Behaviour furthers the understanding of this managerial behaviour, and indicates that it is important that managers are seen to challenge the status quo when setting a role model for innovation. Finally, Role Modelling was also negatively correlated with Consistency of Work-Styles. Again this concurs with the conceptualisation of this factor, as facet behaviours are openness to challenge and new ideas, and a willingness to make changes. Overall, the relationships observed between the IPI model and Role Modelling indicates construct validation of this behaviour. The implications of the relationships observed in relation to each of the other managerial behaviours (Feedback, Empowerment, and Interpersonal Style), will now be reviewed.

Feedback was found to be related to Motivation To Change ( $r = .29, p < .01$ ). This demonstrates that when giving feedback managers tend to have a tolerance for ambiguity. It therefore seems likely that a manager high on this factor will discuss ideas but also tolerate the ambiguity which sometimes accompanies these ideas. The relationship between Feedback and Motivation To Change also indicates that managers who are willing to give feedback on ideas and guide ideas are motivated towards making changes at work.

In relation to the other factors within the IPI, no relationship was observed between Feedback and Challenging Behaviour. This is probably because



Feedback focuses on giving feedback to employees, rather than questioning the status quo, and centres on building ideas and has no relationship with challenging authority and taking risks. Unexpectedly, a low negative association was found between Adaptation and Feedback ( $r = -.18, p < .05$ ). However, this implies that when a manager gives guidance and feedback to employees about their ideas, the manager must think outside of the box and must not show a preference for tried and tested methods. Finally, feedback showed no relation to the fourth factor in the IPI model - Consistency of Work-Styles. This indicates that the provision of Feedback has no association with whether a manager is consistent or inconsistent in the way they approach their work.

The third factor in the managing innovation model is Interpersonal Style. As this is not an ideas-focused behaviour, it was not expected to be closely associated with the IPI model. As discussed above, Interpersonal Style did relate to Motivation to Change; however, no other relationships were observed. This indicates that Interpersonal Style is related to a manager's motivation to change, but is not related to how consistently a manager conducts his/her work, their thinking style or their preference to challenge other's point a view. Similarly the final behaviour in the four-factor influencing innovation model – Empowerment - was only associated with Motivation to Change in the Innovation Potential Model. This shows that Interpersonal Style and Empowerment have the weakest relationship with the Innovation Potential Indicator, which may support the notion that these two behaviours are non ideas-focused, because the IPI looks explicitly at the behaviour associated with innovation, to which ideas and ideas-focused behaviours are central.

Overall, this study has demonstrated that Motivation To Change has a positive relationship with all four behaviours in the management of innovation model. This demonstrates that a manager's own motivation towards change is important in influencing employee innovation. This also shows that even for the non ideas-focused behaviours (Interpersonal Style and Empowerment) it is important to be motivated to change. As the IPI model was most closely related to the Role Modelling factor, further exploration is needed of other personality characteristics which may relate to the other managerial behaviours in the management of innovation model (Interpersonal Style, Feedback, and Empowerment). Therefore, the four-factor management of innovation model will now be examined in relation to the Five Factor Model of personality (FFM). This study – Study 8 - is presented below.

### **7.7 Study 6: Management of innovation and manager personality**

In the past, personality has been postulated to relate to innovation. As innovation is part of some of the constructs in the management of innovation model, the four-factor influencing innovation model will now be explored in relation to other personality factors, in order to give further construct validation. By examining the four managerial behaviours in relation to personality, it will also further the understanding of the behaviours within the management of innovation model.

Attention is given to the Five Factor Model of personality because: 1) it is one of the most prominent models of personality, 2) it can be measured in standardised way, and 3) two of the five factors have consistently been related to innovation.

The previous literature exploring the Five Factor Model and innovation is presented below, followed by an exploration of how the Five Factor Model may relate to the four-factor management of innovation model.

### **7.8 The Five Factor Model (FFM) of personality and innovation**

The Five Factor Model (FFM) of personality is one of the most prominent personality frameworks in the innovation research. Out of the five factors within the FFM (openness to experience, extroversion, neuroticism, conscientiousness, and agreeableness) various and often-conflicting associations have been made with innovation.

One factor within the FFM, which has been thought to relate positively to innovation is openness to experience (Aguilar-Alonso, 1996; Costa & McCrae, 1992; McCrae, 1987). Costa and McCrae (1992) state that open individuals are more curious about the world and live their lives in a more experimental fashion. Therefore, by definition individuals high on openness are likely to entertain novel ideas and unconventional values, which relates to innovation.

In addition to the relationship with openness, relationships with innovation have been demonstrated with both introversion and extroversion. For instance, although many studies have shown that innovation is linked to introversion (Bachtold & Werner, 1973; Busse & Mansfield, 1984; Chambers, 1964; Helson, 1971, 1977; Rushton et al., 1987) and that creative people often work alone and are socially maladaptive, other research has found links between innovation and extraversion (King, Walker & Broyles, 1996; Martindale & Dailey, 1996; Patterson, 1999).

One explanation for this is that different components of extraversion and introversion may be linked to innovation. Feist (1998) conducted a meta-analysis on the research linking innovation and the FFM, and noted how the five factors in the FFM are so broad in scope that the model may overlook distinct dimensions in personality. Feist (1998) therefore dichotomised extraversion into two factors: 1) Confidence / Dominance / Achieving and 2) Sociability. The results of the meta-analysis showed that the Confidence / Dominance / Achieving component of Extroversion had a small positive effect, and that it was one of the characteristics that differentiated scientists from non-scientists. The sociability component on the other hand showed no effect. Therefore, Feist (1998) argued innovators are both confident and introverted.

As Extroversion and Openness have been associated with innovation, and one aspect of the managerial behaviours associated with employee innovation is a manager's own role modelling of innovation, the current study aimed to explore the influencing innovation model in relation to the facets of Extroversion and Openness.

The current study uses a recently developed scale of the Five Factor Model, which adopts 15 facets covering all five factors. Within this the Extroversion scale has three facets: (1) Sociability, (2) Assertiveness, and (3) Impulsivity. Furthermore, the Openness to Experience scale has four facets: (1) Change Orientation, (2) Typical Intellectual Engagement, (3) Abstract Thinking, and (4) Independent Mindedness. However, this study mirrored Feist's (1998) approach and only used the Sociability and the Assertiveness facets of Extroversion. The four-factor

model will now be explored in relation to the facets listed above in order to produce a series of hypothesis this study will test.

### **7.9 The management of innovation model and personality**

In examining the relationships between the facets of the Openness and Extroversion, Role Modelling is expected to be most closely related to the facets of Openness, as Role Modelling was most closely related to propensity to innovate in the previous study. Role Modelling is expected to be related to the assertiveness facet of Extroversion as Feist (1998) argues that this is most closely related to innovation and Role Modelling incorporates the behaviours of suggesting ideas and persisting with the implementation of those ideas. Therefore the following hypotheses are proposed:

*Hypothesis 1: Role Modelling will be positively associated to the openness facets: change orientation, typical intellectual engagement, abstract thinking and independent mindedness.*

*Hypothesis 2: Role Modelling will be positively associated to the assertiveness facet of Extroversion.*

The second behaviour in the managing innovation model that is ideas-focused is Feedback. As Feedback relates to guidance with ideas and Openness has been shown to relate to innovation, a positive association is expected between the Openness facets and Feedback. For example, as this factor relates to feedback in relation to the generation and implementation of new ideas is expected to be

positively related to Change Orientation. Further to this, Feedback is expected to be positively related to Independent Mindedness, as Feedback requires a manager to challenge employee ideas in a positive way and not just follow the general opinion. In addition, a positive relationship is expected between Feedback and Typical Intellectual Engagement, as a manager who gives guidance on new ideas needs to be interested in learning new things. Finally in order for a manager to give feedback on ideas he/she needs to be able to reflect on and help to develop those ideas and so is expected to relate to Abstract Thinking. Therefore hypothesis 3 was developed:

*Hypothesis 3: Feedback will be positively associated to the facets of Openness: Change Orientation, Typical Intellectual Engagement, Independent Mindedness, and Abstract Thinking.*

Since Interpersonal Style relates to how the manager interacts with the employees, it is further hypothesised that Interpersonal Style will be related to the sociability facet of Extroversion. However, as it is not an idea-focused behaviour, Interpersonal Style is not expected to show an association with any of the other facets.

*Hypothesis 4: Interpersonal Style will have a positive association with sociability and no relationship with the other facets.*

Empowerment is the factors that is least expected to correlate with the facets of Extroversion and Openness, as this factor focuses more on the managers working

style and less on his/her personal characteristics. However, Empowerment is expected to have a significant relationship with Change Orientation as Empowerment typifies a manager who gives employees responsibility for projects and enables employees to complete tasks independently and autonomously, as a result an empowering manager is less stuck in his/her way and more open to change. Therefore Hypothesis 5 was developed:

*Hypothesis 5: Empowerment will be associated to Change Orientation.*

In summary the behaviours in the management of innovation model are expected to most consistently relate to the Change Orientation facet of personality. Overall the aim of this study is to demonstrate construct validity of the four-factor managing innovation model in relation to personality by confirming the hypothesised relationships listed above.

## **7.10 Method**

### **7.10.a Participants**

A convenience sample of 49 employees was collected from a range of UK organisations. All were educated to a minimum of degree level. The age of the sample ranged from 25 – 56.

### **7.10.b Method**

Participants were administered two facet level scales of Extroversion (Sociability, and Assertiveness), and four facet level scales of Openness to Experience(Change

Orientation, Typical Intellectual Engagement, Abstract Thinking, and Independent Mindedness), from Warr's (2000) Personality Scale. Within this scale each facet was represented by between 4 and 6 items, 50% of which were reverse coded. The 35 item self-report management of innovation inventory was also administered. Participants were asked to rate themselves on both the personality and the management of innovation measures.

The scale scores for each measure were calculated and a series of Pearson's  $r$  correlations calculated. Correlational analysis was used to establish the degree of association between the four-factor management of innovation model and the facet personality scales, with the intention of examining construct validity.

### **7.11 Results**

The means, SDs and alpha coefficients for all scales in the study were calculated and are presented in Table 7.3. Correlations between the facet personality scales and the four behaviours in the influencing innovation model are also presented in Table 7.3. All scales in this study demonstrate sufficient internal validity (ranging from .58 to .83), apart from the Independent Mindedness scale, which has a low alpha of .41. An item was removed from this scale to increase the reliability to .48, and although this is still low this was still used in the analysis as Nunnally (1978) claims that reliabilities of .5 are acceptable during initial stages of research.



**Table 7.3: Means, SDs, alpha coefficients and correlations**

<i>N</i> = 49	Mean	SD	$\alpha$	Min	Max	Feedback	Interpersonal Style	Empowerment	Role Modelling
Assertiveness	21.96	2.18	.58	16	29	.03	.10	-.07	.43(**)
Sociability	24.57	2.50	.65	18	29	.19	.54(**)	.02	.16
Abstract Thinking	20.63	3.23	.63	14	26	-.01	.08	.08	.28(*)
Independent Mindedness	13.6	2.05	.48	9	19	.43(**)	.27	.31 (*)	.59 (**)
Typical Intellectual Engagement	25.83	2.65	.67	20	30	.31(*)	.21	.25	.37(**)
Change Orientation	22.47	2.97	.76	12	29	.31(*)	.09	.38(**)	.67(**)
Feedback	49.16	4.87	.78	37	60				
Interpersonal Style	33.88	3.20	.71	26	40				
Empowerment	15.32	2.69	.83	9	20				
Role Modelling	43.30	4.48	.74	34	55				

\* =  $p < .05$ ; \*\* =  $p < .01$ ;  $\alpha$  = internal reliability coefficient

Examination of the correlation matrix reveals that Role Modelling was positively related to Change Orientation ( $r = .67$   $p < .01$ ), Typical Intellectual Engagement ( $r = .37$ ,  $p < .01$ ), Independent Mindedness ( $r = .59$ ,  $p < .01$ ) and Abstract Thinking ( $r = .28$ ,  $p < .05$ ), thus fully supporting hypothesis 1. Role Modelling was also positively related to the Assertiveness facet of Extroversion ( $r = .43$ ,  $p < .01$ ), supporting hypothesis 2.

Feedback was shown to be positively related to Change Orientation ( $r = .31$ ,  $p < .03$ ), Typical Intellectual Engagement ( $r = .31$ ,  $p < .03$ ) and Independent Mindedness ( $r = .43$ ,  $p < .01$ ). However Feedback was not related to any of the

other facets. This partially supports hypothesis 3, as some of the facets of Openness were related to Feedback, but Abstract Thinking was not.

As Interpersonal Style has a positive relationship with Sociability ( $r = .54$ ,  $p < .01$ ) and had no relationship with the other facets, hypothesis 4 was also supported.

Finally Empowerment was positively related to Change Orientation ( $r = .38$ ,  $p < .000$ ) and therefore supported hypothesis 5. Further, a positive relationship between Independent Mindedness and Empowerment was observed ( $r = .31$ ,  $p < .05$ ), which was not hypothesised.

## 7.12 Discussion

This section will discuss the results found in this study in relation to each of the four behaviours in the managing innovation model. The first factor to be discussed is Role Modelling

The results show that Role Modelling relates positively to all of the facets of Openness, thus supporting hypothesis 1. As Role Modelling is most closely associated with a manager's own innovation, this concurs with a large body of research investigating innovation and its relation with Openness (e.g. McCrae, 1987). This also demonstrates that the Role Modelling factor taps a manager's ability to think abstractly and generate ideas, which has been overlooked in previous literature relating to managerial behaviours associated with employee innovation. Furthermore, Role Modelling was associated with being independently mindedness and orientated towards change, showing that managers

high on this behaviour may tend not to follow others, which may help develop the norm for innovation and change.

Furthermore, Role Modelling was also positively related to one of the facets of Extraversion, Assertiveness (thus supporting Hypothesis 2). This concurs with Feist (1998), who found that the sociability component of Extroversion was not related to innovation while the confidence/dominance facet was. This helps to bring clarity to the previous literature on personality and innovation. Previous confusion over the influence of Introversion and Extraversion on innovation may have resulted from previous research settings, as a number of studies were not conducted in an occupational environment. As the sample in this study consisted of managers, and Role Modelling represents a manager's own innovation, it seems that in an occupational context, the Assertiveness component of Extraversion is an aspect of innovation, while the Sociability component is not.

The second factor to be discussed is Feedback. The results suggest support for hypothesis 3, as Feedback was shown to relate to Change Orientation. Thus for a manager to give positive, guiding feedback on ideas (both generating and implementing ideas) he or she must be orientated towards change, and making changes at work. This provides support for the framework presented in Chapter 3, which places Feedback as an ideas-focused behaviour. Further to this, Feedback was also shown to have a small positive relationship with Independent Mindedness and Typical Intellectual Engagement, suggesting that a manager who gives feedback on ideas is also interested in extending his/her knowledge and is not afraid to tell others his / her opinion.

The third factor to be discussed is Interpersonal Style. The results support hypothesis 4 as Interpersonal Style showed a positive correlation with the Sociability facet of Extraversion. This supports the notion that Interpersonal Style is not an ideas-focused behaviour but is employee-focused. Similarly as no other relationships were observed between Interpersonal Style and the Openness personality facets, it seems that Interpersonal Style is not associated with a manager's openness to change and curiosity about the world.

The final factor to be discussed is Empowerment. Hypothesis 5 was supported demonstrating that Empowerment is related to Change Orientation. Although Empowerment has not been categorised as an ideas-focused behaviour (see framework presented in Chapter 3) this positive relationship with Change Orientation implies that Empowerment is related to a manager's openness to new ways of doing things. It is likely that in order for a manager to empower employees, he or she has to be orientated towards change and not hold the view that there is one correct way to carry out a task. Furthermore, it is important that a manager is open to allowing employees to adopt their own approach to tasks, and is thus willing to give them the freedom to do this.

In summary, it seems the managerial behaviour Empowerment is associated with being orientated towards change, and as the personality facet Change Orientation is not specifically associated with new ideas and incorporates flexibility in working styles. Therefore Empowerment can still be categorised as a non ideas-focused, and as a task-focused behaviour, within the framework of managerial

behaviours which may influence innovation. This framework is also presented in the general discussion below and shown in figure 7.1

Finally it is important to note that Empowerment was also associated with Independent Mindedness. Although this relationship was not hypothesised, it indicates that managers who empower employees tend to be independent thinkers, and this may be related to accepting that there is no one correct way to approach a task.

Overall this study, has presented further evidence for construct validity of the four-factor management of innovation model. This has been done by exploring the four-factor model in relation to the facets of two personality factors that have been consistently associated with innovation: Openness and Extroversion. The results presented here have enhanced the understanding of the constructs in the management of innovation model by illustrating those factors of personality they relate to, and those they do not relate to.

However, it is important to note that this study is not without limitations. The sample size presented here is small and future research needs to ideally replicate these results using a larger sample. Furthermore, as one of the facet scales had low reliability and was still used in the study, this result needs further replication.

In order to provide clarity, this discussion will now go on to summarise the four construct validation studies presented in the previous three chapters. Each behaviour in the management of innovation model will be discussed in turn.

### **7.13 General discussion of the construct validation studies**

Below is a general discussion summarising the findings of Chapter 5, 6 and 7. An interpretation is given of each of the four managerial behaviours associated with innovation, based on the results of the previous four studies.

#### **7.13.a Factor 1: Role Modelling**

Role Modelling was shown to be positively associated with transformational leadership (see Study 3). The facet of transformational leadership, which had the strongest relationship with Role Modelling, was Inspirational Motivation, demonstrating that Role Modelling involves communicating expectations to others and inspiring and motivating employees. Furthermore, the positive relationship between Role Modelling and an organisational climate that supports innovation (see Study 4) suggests that Role Modelling may help set the norm for innovation by communicating to employees the need for innovation. A key aspect of the construct space occupied by Role Modelling is a manager's own potential to innovate, as demonstrated by the relationships between Role Modelling and all facets of the IPI. Finally this factor was strongly associated with the facets of Openness and Extroversion.

#### **7.13b Factor 2: Feedback**

Feedback was also found to be positively related to Transformational Leadership. However, Feedback showed the strongest relationship with the provision of Contingent Rewards, which has previously been identified as an aspect of Transactional Leadership. Contingent Rewards is described as an economic and

emotional exchange which clarifies role requirements by rewarding and appraising desired outcomes. This concurs with the notion that positive feedback is an important aspect of the Feedback behaviour in the management of innovation model, and that this involves managerial guidance and rewards for ideas.

Furthermore, the strong positive correlation between Feedback and Contingent Rewards demonstrates that this behaviour may influence employee motivation to innovate (as with Role Modelling) as contingent reward leadership has been described as reasonably effective in motivating followers (Bass & Avolio, 1997).

Further to this, Feedback is also suggested to play a significant role in the formation of LMX relationships, which supports the notion that this behaviour represents an employee-focused managerial behaviour, as shown in Figure 7.1.

Feedback was also shown to predict some of the variance in the structure and work processes aspect of the organisational factors which enhance innovation. A key factor of this is that the work is organised to encourage and reward innovation.

Feedback was also positively related to Motivation To Change in the IPI model and the Change Orientation facet of Openness, demonstrating that a manager's own motivation to change influences how he or she responds to the ideas of others.

Similarly feedback was related to Independent Mindedness and Typical Intellectual Engagement, indicating that Feedback relates to thinking about ideas and a manager constructing his/her own opinions about ideas.

### **7.13.c Factor 3: Interpersonal Style**

Throughout the studies presented in this chapter, Interpersonal Style has shown a small positive correlation with all of the facets of Transformational Leadership, -

supporting the notion that Interpersonal Style represents a manager who is approachable, fun to work with and has perceived proximity. Furthermore, one of the strongest negative correlations was found between Interpersonal Style and Management By Exception Passive ( $r = -.31$ ;  $p < .01$ ), which is an aspect of transactional leadership. A high Management by Exception Passive manager waits until someone has deviated from the norm and then intervenes; in contrast a fun, approachable manager, is available before 'things go wrong', which may explain the negative correlation observed between these two factors. Interpersonal Style also played a significant role in the formation of LMX (as would be expected), as this behaviour is focused on the employee and represents a manager's interpersonal style.

As Interpersonal Style is not ideas-specific, it did not predict variance in employee's perception of the organisational factors which enhance innovation. However, Interpersonal Style was positively related to Motivation To Change (in the IPI model), demonstrating that, although not specific to ideas this behaviour still relates to a manager's own motivation (in relation to innovation).

Finally the results indicate, that in relation to personality, interpersonal style is positively associated with Sociability, again supporting the notion that this factor focuses on employee–manager interaction and is employee focused.

#### **7.13.d Factor 4: Empowerment**

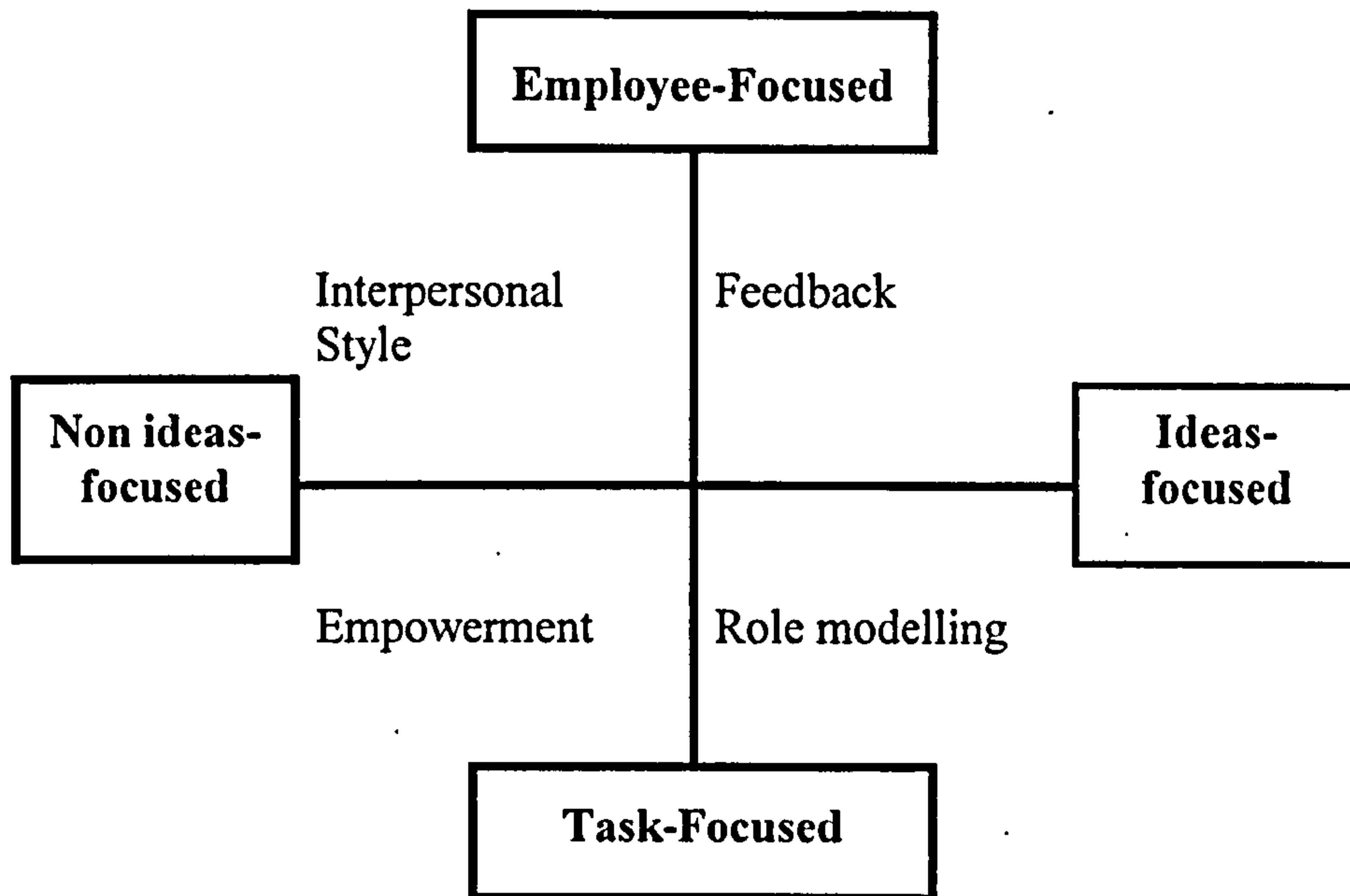
Empowerment was the only behaviour within this model that showed no relationship with the Full Range Leadership Model. Empowerment was shown



however to play a role in LMX formation, as this scale represents manager delegation. As Empowerment is a non ideas-focused behaviour, it did not play any role in the transmission of the organisational factors which foster innovation. Finally Empowerment was positively associated with Motivation To Change, Change Orientation and Independent mindedness, showing that a manager's own motivation to change is important when giving others the freedom to innovate and choice in the way tasks are carried out. This also demonstrates that the Empowerment scale is characteristic of a manager who does not see that there is one correct way to carry out a task.

Overall the results provide considerable support for the hypothesised construct space occupied by the four-factor management of innovation model. In summary, support has also been shown for the framework presented in Chapter 3 (shown in Figure 7.1 overleaf). supporting the proposition that there are two central dimensions along which the managerial behaviours associated with innovation can be plotted: 1) ideas-focused versus non-ideas focused behaviours and 2) employee-focused versus task-focused behaviours. This is shown overleaf in Figure 7.1.

**Figure 7.1: The framework of the four managerial behaviours associated with innovation**



This thesis will now present two studies which aim to explore preliminary evidence for criterion-related validity of this model.

## Chapter 8: Criterion-related validation

This study is devised to test whether the model (and inventory) of managerial behaviours that associated with innovation measures what it claims to measure, and therefore aims to establish criterion-related validity.

It is important to note that conducting validation studies in large organisations is problematic due to logistical and practical constraints. Furthermore, criterion measures often have limited robustness, often referred to as the *criterion problem* (Cook, 1996; Smith & Robertson, 1993). The criterion problem is outlined below before two criterion related validation studies are presented, which attempt to overcome this problem.

### 8.1 The criterion problem

As Campbell (1990) notes, it is not uncommon to witness criterion validation studies with a reliance on poorly-constructed criterion measures, known as the criterion problem. Within organisations, the criterion data available are often open to a range of errors (Cook, 1996; Patterson & Silvester, 1998); therefore the two studies presented below have separate, specifically designed criterion measure.

The two separate studies aim to demonstrate criterion validity and assess the constructs that the four-factor management of innovation model claims to measure.

A key issue in both of these studies is the identification of a criterion measure that is not only meaningful but also practically measurable.

Since criterion validation is an essential part of theory development, efforts were made to reduce sources of potential bias. In the first study, the criterion is at the organisation level in terms of the managerial behaviours witnessed in two separate organisations. In the second study, the criterion is at the individual level; the behaviours of individual managers. These two studies are presented respectively below.

## **8.2 Study 7: Criterion-related validity within two organisations**

This study aimed to explore two separate organisations and their mean scores on the management of innovation inventory developed in Chapters 3 and 4. The two organisations were separated by culture, organisational vision / strategy and management training.

Two organisations were selected (using an inclusion criteria see section 8.3b) from the participants who completed the inventory administered in Chapter 3.

Organisation 1 was the Brewing Organisation, and Organisation 2 was one of the functions within the civil service.

Due to these differing managerial styles in the organisations (as depicted by the inclusion criteria), it was predicted that the two organisations would show significant differences in their scores on the four-factor management of innovation inventory. Thus it is proposed:

*Hypothesis 1: Organisation 1 will be higher on all four behaviours within the management of innovation inventory; Feedback, Interpersonal Style, Empowerment and Role Modelling, than Organisation 2.*

### **8.3 Method**

#### **8.3.a Participants**

*Organisation 1:* A convenience sample of 52 employees participated from this organisation. The age of the sample ranged from 24 – 57, with a mean age of 40 years, S.D. 9.28. The mean ‘number of years working for your current manager’ was 2.78, S.D. 3.94. The mean ‘number of years in your current job’ was 2.90, S.D. 3.84. 48.1% of the sample was female and 51.9% of the sample was male.

*Organisation 2:* A convenience sample of 111 employees from this organisation participated in this study. The age of sample ranged from 20 – 63, with a mean age of 40, S.D. 9.88. The mean ‘number of years working for your current manager’ was 2.14, S.D. 1.81. The mean ‘number of years in the job’ was 8.29, S.D. 7.17. 25.2% of the sample was female and 64.9% of the sample was male, 9.9% did not respond to this question.

The samples therefore were similar on age distribution and number of years working for the current manager.

### **8.3.b Procedure**

The organisations were chosen for this study due assessment on an inclusion criteria. The inclusion criterion covered the organisations' strategy, culture and approach to management training. Specifically these organisations were chosen for a number of reasons: 1) a key aspect of Organisation 1's vision was for managers to ensure 'everyone had the freedom to create'; 2) all of the managers in Organisation 1 had received at least a two day innovation training course; 3) around 50% of the managers in Organisation 1 had received further training, focusing on developing innovation in others, and were now labelled 'creative coaches'; 4) Organisation 2 made no reference to the management of innovation in its strategic vision, and 5) Organisation 2 had received strong criticism on its managerial style, and a government report had noted that managers were overwhelmed by the process of change (HM Inspectorate of Prisons, 2000).

The four-factor management of innovation inventory was administered and participants were asked to rate their direct manager. The data was normally distributed, therefore it was analysed using a t-test, as this allows exploration of significant differences between means scores of organisation 1 and organisation 2 (Howell, 1997).

### **8.4 Results**

The four managing innovation behaviours demonstrated good internal reliability with all alpha coefficients ranging from .82 to .92 (see Table 8.1). The means and S.D. of all of the scales for both organisations are shown in Table 8.1. Initial

examination of the scale descriptives indicates that the managers in Organisation 1 scored higher on all of the scales than managers in Organisation 2.

**Table 8.1: Means SDs and alphas for Organisation 1 and 2**

	Organisation 1 mean (SD)	Organisation 2 mean (SD)	Organisation 1 $\alpha$	Organisation 2 $\alpha$
<b>Feedback</b>	3.80 (.51)	3.21 (.72)	.89	.92
<b>Interpersonal Style</b>	4.01 (.57)	3.58 (.75)	.88	.89
<b>Role Modelling</b>	3.87 (.49)	3.19 (.63)	.87	.89
<b>Empowerment</b>	4.24 (.51)	3.78 (.80)	.82	.89

$\alpha$  = Internal reliability alpha coefficient

**Table 8.2: T-test results**

	Sum of Squares	Df	F	Sig.
<b>Feedback</b>	3629.78	5	12.56	.00
<b>Interpersonal Style</b>	1419.06	5	9.32	.00
<b>Role Modelling</b>	3173.00	5	13.77	.00
<b>Empowerment</b>	189.66	5	5.43	.00

The data were then analysed using a series of t-tests for each scale. The results indicate significant differences between Organisations 1 and 2 on each of the four behaviours (see table 8.2).

## **8.5 Discussion and Conclusions**

The results show support for Hypothesis 1, as the means on the four scales were significantly higher for Organisation 1 than for Organisation 2 (Feedback,  $F = 12.56$ ,  $p < .001$ ; Interpersonal Style,  $F = 9.32$ ,  $p < .001$ ; Role Modelling,  $F = 13.77$ ,  $p < .001$ ; Empowerment,  $F = 5.43$ ,  $p < .001$ ).

This provides preliminary evidence that the four-factor model can discriminate between organisations that were judged on an inclusion criterion, to have managers who differ in their approaches to managing innovation. The preliminary evidence suggests that in an organisation which is overwhelmed by the processes of change, and does not emphasise the management of innovation in its organisational strategy, managers have a less of an influence on innovation. In contrast, the results also imply that in an organisation with a vision which espouses “managers should ensure that everyone has the freedom to create”, and that has given managers training to become creative coaches, managers have a greater influence on employee innovation. Although the organisational factors could be influencing the manager’s behaviour, the previous chapter used regression analysis to show how managerial behaviour predicts employee perceptions of organisational factors which influence innovation, yet causality cannot be implied from this study.

A limitation of this study is the potential subjective assessment of the inclusion criterion used. However bias in assessing the Organisation 1 and 2 on this criteria was reduced in two ways. Firstly some of the criteria did not require researcher judgement, for example, in relation to the vision and strategy, each organisation



either included or did not include managerial enhancement of innovation. Similarly, in relation to the labelling and training of managers as ‘creative coaches’, Organisation 1 had this, while Organisation 2 did not have this. Secondly, some of the criteria were rated independently, for example, an independent government report judged managers within the Organisation 2 to be overwhelmed by the process of change, and not positively facilitating change.

In the future, another approach research could try to adopt in order to explore criterion related validity is to use two groups of managers – one high and one low on their ability to influence innovation. A suggested approach would be to use an expert panel to assign the high and low influencing innovation labels to the managers. However, although this would allow exploration of criterion-related validity at the individual level, this approach would be open to the subjective bias of the expert panel, and it is often difficult to find members of an expert panel who are familiar with a large number of managers’ performance in an applied setting.

Therefore, in order to explore criterion-related validity at the individual manager level, another approach – a double blind design – was adopted in the next study. This study was conducted in order to provide further evidence of criterion-related validity. Triangulation was then used to gain further support for criterion-related validity of the four-factor management of innovation model. This study is presented below.

## **8.6 Study 8: Criterion-related validity - managers' on-the-job performance**

A further study was conducted to explore criterion-related validity using an independent assessment rating of performance as the criterion variable, using a double blind design. Participants (see overleaf for further explanation of the sample) were rated on the four managerial behaviours associated with innovation using the map of innovation (see below and Chapter 2). The participants were then asked to rate themselves on the management of innovation inventory, which was marked blind in order to minimise criterion contamination. The overall purpose of this study was to identify a relationship between the rating given on the map of innovation (based on actual managerial behaviour in the workplace) and a manager's self-rating on the four-factor management of innovation inventory. Therefore, the following hypothesis was formed:

*Hypothesis 2: There will be a significant positive association between scores on the map of innovation and the on the management of innovation model.*

## **8.7 Method**

### **8.7.a Participants**

A convenience sample of 39 people was obtained from a range of occupational settings; Marketing, Technical employees, Publishing, Information Technology and HR. All participants were educated to degree level, and covered an age range of 24 – 56.

### 8.7.b Design

Participants were asked to take part in the map of innovation (an interview tool developed in this research see Chapter 2). The map of innovation was developed during this research and aimed to map out the innovation process. This technique was based on the Critical Incident Technique (Flanagan, 1954) and asked a manager to recall their best example (within the last 6 months) of a time when they had facilitated innovation in one of their employees. The manager is asked to identify the two most prominent positive features and the two most prominent negative features which occurred at each phase of the innovation process (i.e. the generation of ideas; the application and evaluation of ideas; and the implementation of ideas). For example, one manager said during idea generation *“some team members were not very positive about other’s ideas”* which was deemed a negative feature, alternatively a positive feature reported by one manager was *“it was easy to scale down ideas as some would obviously not be tangible”*. Similarly during idea implementation one manager said a positive feature was *“the employees were all very enthusiastic”*. Each feature was then outlined by the manager and captured by the interviewer on a card and placed along a time-line (see figure 1). Each feature was then examined in turn, and the manager was asked to identify what role he or she played in the facilitation of this feature. Specifically the manager was asked *“what role did you play in facilitation of X (outline of the feature)”*, and then probed *“did you play any other role in this feature”*.

Each map was then marked using behavioural indicators of the four behaviours and the manager was given a score (1= Poor; 2 = Area of concern; 3 =

Satisfactory; 4= Good; 5= Excellent) on each of the four managerial behaviours associated with innovation. Trained facilitators who were Chartered Occupational Psychologists and had attended a one-day training course administered all the maps of innovation. During training the facilitators were introduced to the four managerial behaviours associated with innovation and the map of innovation technique.

The maps were then second blind marked by the researcher, to ensure consistency across participants and prevent liking bias or halo effect from influencing the first marker's rating. Any discrepancies in scores were discussed, and a mark agreed.

On the same day but at a different time, the managers were also asked to complete the 35 item four-factor management of innovation inventory (developed in Study 2). The managers self-rated their behaviour in relation to the four managerial behaviours associated with innovation.

## **8.8 Results**

The means, SDs and alpha coefficients for each of the scales and the four behaviours identified in the map are shown in table 8.3.

**Table 8.3: Means, SDs,  $\alpha$  and correlations with the map of innovation scores.**

<i>N</i> = 39	Mean	SD	$\alpha$	Correlations			
				Feedback map	Interpersonal Style map	Role Modelling map	Empowerment map
<b>Feedback</b>	4.09	.425	.82	.41*	.10	.10	.21
<b>Interpersonal Style</b>	4.23	.396	.76	.11	.31*	.02	-.03
<b>Role Modelling</b>	3.94	.407	.77	.15	.18	.36*	-.01
<b>Empowerment</b>	3.83	.667	.85	.10	-.05	-.12	.37*
<b>Feedback map</b>	4.13	.62					
<b>Interpersonal Style Map</b>	4.03	.63					
<b>Role Modelling Map</b>	3.85	.59					
<b>Empowerment Map</b>	3.74	.79					

\* =  $p < .05$ ;  $\alpha$  = Alpha reliability coefficient for the scale

The results show that the correlations between the map scores and the corresponding management of innovation scale scores are all positive and significant (Feedback:  $r = .41$ ,  $p < .05$ ; Interpersonal Style:  $r = .31$ ,  $P < .05$ ; Role Modelling:  $r = .36$ ,  $p < .05$ ; Empowerment:  $r = .37$ ,  $p < .05$ ).

## 8.9 Discussion

Hypothesis 1 was fully supported, as the results showed clear positive correlations between the managerial behaviours shown in the map of innovation and the self-reported behaviours on the managing innovation inventory. Furthermore, this chapter has also shown that when outlining positive examples of managing innovation, the behaviours exhibited by a manager can be categorised using the four-factor model, thus showing further support that these behaviours are associated with innovation.

Therefore the main implication of this study is that the four-factor management of innovation model has construct-related validity. Furthermore, this study implies that the map of innovation tool is a useful method to obtain data on the management of innovation. The positive relationship between the scales on the map of innovation and the inventory provide evidence of the maps validity, as well as that of the inventory.

A limitation of this study is its reliance on self-report data. The managers were asked to describe an incident in which they had facilitated an employee's innovation and may have therefore presented a biased view. However, the map of innovation adopts a structured approach and asks managers about their role in specific features of the innovation example, in order to minimise bias and the social desirability of their responses. Furthermore, honesty in responses was encouraged as all the participants completed this exercise as part of their development, and wanted structured feedback that could be used to identify their strengths and development needs.

However, in future it would also be useful to obtain a self-report of the manager's overall view of the extent to which he/she has a positive influence on employee innovation, as the managers' self-identity may influence the behaviours they report on the map of innovation, and thus influence their impression management.

Similarly the managers own self-efficacy may have influenced the behaviours the manager discussed in the innovation example, so future research should measure and control for this.

Another limitation of this study is that although positive correlations were identified between the scales on the map and the same scales on the inventory, no other associations were found between the scales in either the map or inventory data. As the four-factor model is an inter-correlated model (see Chapter 3), all the scales on both the map and the inventory would be expected to be correlated to some extent. However, the lack of correlations between the scales may have been due to a small sample size.

Overall, the easiest way to discredit the findings of both Study 7 and Study 8 would be to discredit the criterion variables used. However, since two different levels of analysis were used this adds strength to the notion of criterion validity. In Study 7 the decision to assign the organisations as high versus low on ability to manage innovation was based on a collection of evidence in relation to an inclusion criteria (i.e. the organisations' strategy on managing innovation, training received and external reports). Further to this, in Study 8 there was complete agreement between rater one and rater two on the map of innovation score, and the second score corrected for any liking bias or halo effect the interviewer may have had, as the map was marked blind by the researcher. In addition, each manager was asked to rate his / her behaviour *generally* on the behaviours which influence innovation, and not in relation to the example used in the map of innovation, thus avoiding memory bias or halo effects in relation to a specific example of managing innovation.

In summary, this chapter has provided preliminary criterion-related validation for the four-factor model and inventory. The four-factor management of innovation

inventory was able to significantly discriminate between high and low influencing innovation managers in two organisations, and has provided evidence of positive correlations between actual behaviour displayed in the workplace and self-report behaviours on an inventory.

A final study will now be presented. So far this thesis has identified a series of behaviours associated with innovation, explored the underlying factor structure of these behaviours and explored construct and criterion related validity of this model. As discussed in Chapter 1, innovation is likely to have three phases (Patterson 2004) and it is important to explore the role of the manager across these three phases. Therefore, the final study in this thesis will explore the managerial behaviours associated with innovation across the three phases of the innovation process.



## Chapter 9: Management of the innovation process

*“When a the spirit of a child enters in to the creative process, it is a wonderful force and something to be nurtured”*

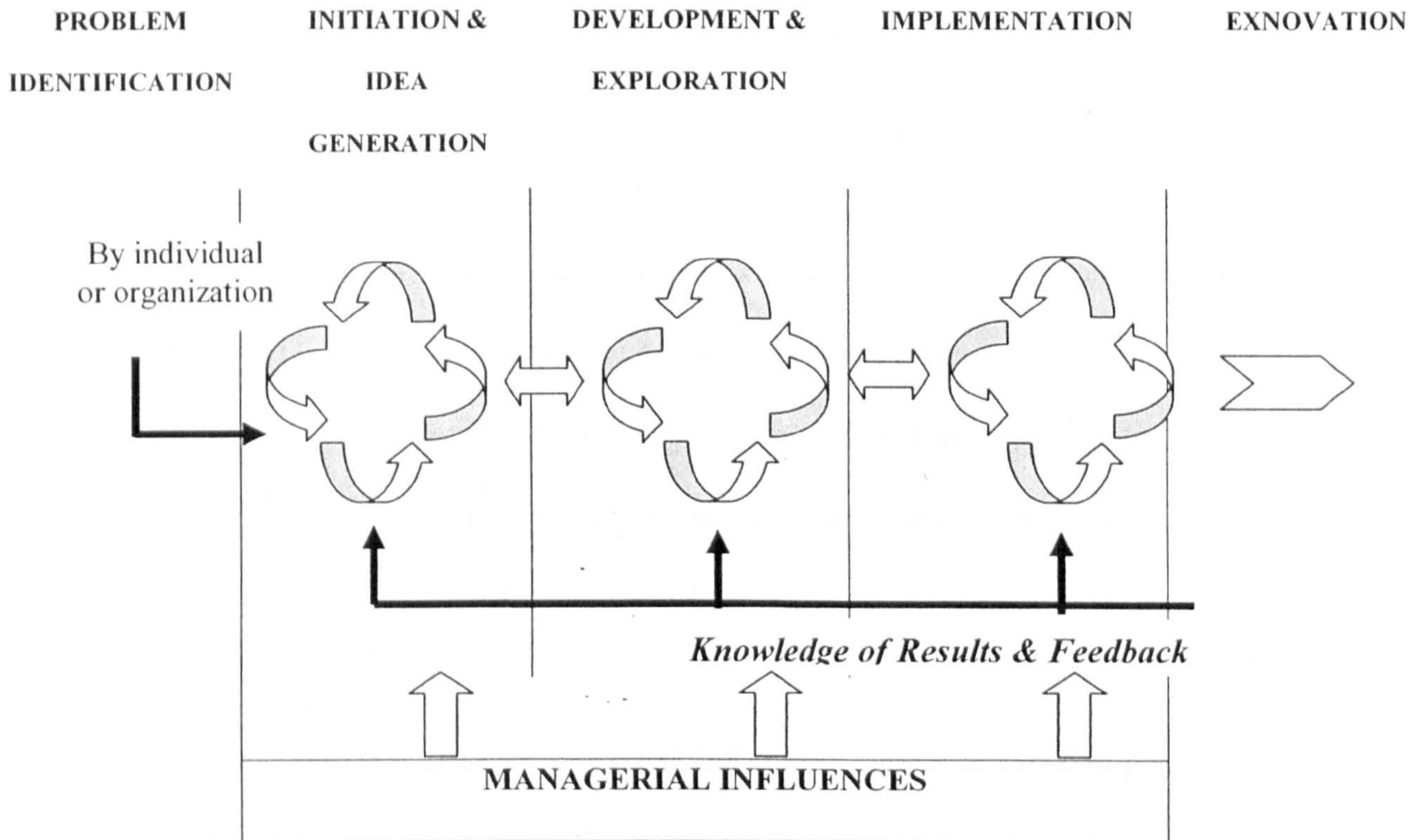
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The previous chapters presented in this thesis have: 1) identified the managerial behaviours associated with employee innovation, 2) explored the underlying factor structure to these behaviours, 3) explored the construct validity of the four-factor influencing innovation model, and 4) explored the criterion-related validity of this model.

However, as noted in Chapter 1, the current consensus among innovation researchers is that innovation is not a univariate concept, but rather contains a number of phases (see Patterson 2004; King & Anderson 2002; Axtell et al., 2000). Therefore, it is important to explore the managerial behaviours associated with innovation and how they relate to the various phases in the innovation process (i.e. Idea generation, exploration and development, and implementation).

Although there is not a general agreement regarding the number of stages of the innovation process (King & Anderson, 2002; see also Chapter 1), the most recent framework is the process framework of employee innovation (Patterson, 2004), presented in figure 9.1 overleaf.

**Figure 9.1: Phases in the innovation process and influencing variables.**



Adapted from: Patterson, F. (2004) Innovation. In C. Spielberger (Ed.) *Encyclopaedia of Applied Psychology*. New York: Academic Press.

Patterson’s (2004) process framework shows that there are three phases in the innovation process: 1) idea generation, 2) idea development and exploration, and 3) idea implementation. Port and Patterson (2004) found support for the existence of these three phases in innovation, when almost 40 case studies of employee innovation demonstrated the three phases. Furthermore, 69% of these case studies did not follow a linear pattern, providing further support for the notion that innovation is an iterative non-linear process, as depicted in Patterson’s (2004) framework (Port & Patterson, 2004).

In exploring the managerial behaviours that are associated with innovation, this thesis, has established a four-factor model and provided preliminary criterion and construct related-validity. Although Study 1, unlike other research in this area, did focus on both the generation and implementation of ideas (in order to ensure that the full construct domain of innovation was examined), until now research has not explored whether some of these managerial behaviours are more or less prominent in the different phases of innovation. Therefore this chapter aims to explore how frequently each of the four managerial behaviours associated with employee innovation relate to each of the three phases in the innovation process, as depicted by Patterson's (2004) framework (shown in Figure 9.1).

### **9.1 Managerial behaviour and contextual influences on the innovation process**

Patterson (2004) argues there are different person-level variables, that come into play at during the different phases of the innovation process. Similarly, it is likely that different managerial behaviours will play more or less prominent roles during the different phases of the innovation process. Supporting this notion, Anderson and King (1991) suggested a contingency model to account for the role of managers in innovation, however this has not been empirically tested.

Furthermore Axtell et al. (2000) argued that environmental factors (including managerial behaviour) would influence idea generation, but play a stronger role in influencing the implementation of ideas. This fits with a stereotype held in many organisations of managers as the resource providers. However Axtell et al. (2000) also found that autonomy had the strongest influence on idea suggestion, and this

research found the provision of autonomy by the manager to be associated with innovation.

The current research also proposes that managers may be associated with employee motivation to innovate, and thus have a greater influence at the beginning of the innovation process, during idea suggestion. Therefore overall the picture is mixed.

Thus, in order to explore the role of managers in the different phases of the innovation process, this study will explore the frequency of observations of each of the managerial behaviours in the management of innovation model, throughout the three phases of innovation.

Limited research has explored the role of the manager at the different phases of the innovation process, especially in relation to the four managerial behaviours identified by this research (Feedback, Interpersonal Style, Empowerment, and Role Modelling). However, as Role Modelling (an ideas focused behaviour) is expected to influence social learning around innovation, and help to set the norm for innovation (see Chapter 3 in this thesis), it is expected that this will be seen more frequently at the beginning of the innovation process and less frequently during the implementation of ideas. Furthermore, the second ideas-focused behaviour (Feedback) is expected to be seen more frequently at the beginning of the process as this involves the development of ideas and the provision of guidance to employees by managers. In contrast, the two non-ideas focused

behaviours (Empowerment and Interpersonal Style) are expected to be observed constantly throughout the innovation process.

Further to this it is important to explore each phase of the innovation process per se. This research has argued that managers may influence employee motivation to innovate, and therefore may have a large influence on innovation in phase one (idea generation). Therefore it is also argued that in phase one there will be no difference between the frequency of observations of each managerial behaviour. However in the second phase; Idea development and exploration, it is likely that the manager will have to give more feedback to employees. Therefore in relation to the other three managerial behaviour, it is expected that feedback will be seen most frequently in phase two. Finally in the third phase; idea implementation, it is expected that Role modelling will not be seen as frequently, as the norm for innovation will have already been established prior to the implementation of ideas.

As this research is exploratory and preliminary hypothesis were not developed.

## **9.2 Method**

### **9.2a Participants**

A convenience sample of 38 people was obtained from a range of occupational settings including; Marketing, Technical employees, Publishing, Information Technology and HR. All participants were educated to degree level, and covered an age range of 24 to 56. (This data was also used in Study 8, Chapter 8.)

### **9.2b Procedure**

The map of innovation was used (see Chapter 2 and 8 for further details).

Managers were asked to describe examples of when they had assisted an employee to innovate. The number of observations in relation to each of the four managerial behaviours was recorded for each phase.

### **9.2c Data analysis**

Each map was marked by the interviewer who conducted the map (all occupational psychologists), using competency indicators of each of the behaviours. The maps were then second marked by one occupational psychologist. The total number of observations of each of the four managerial behaviours was calculated for each of the phases in the innovation process (idea generation, idea development and exploration, and idea implementation). As the data was frequency data it was analysed using a non-parametric Friedman test.

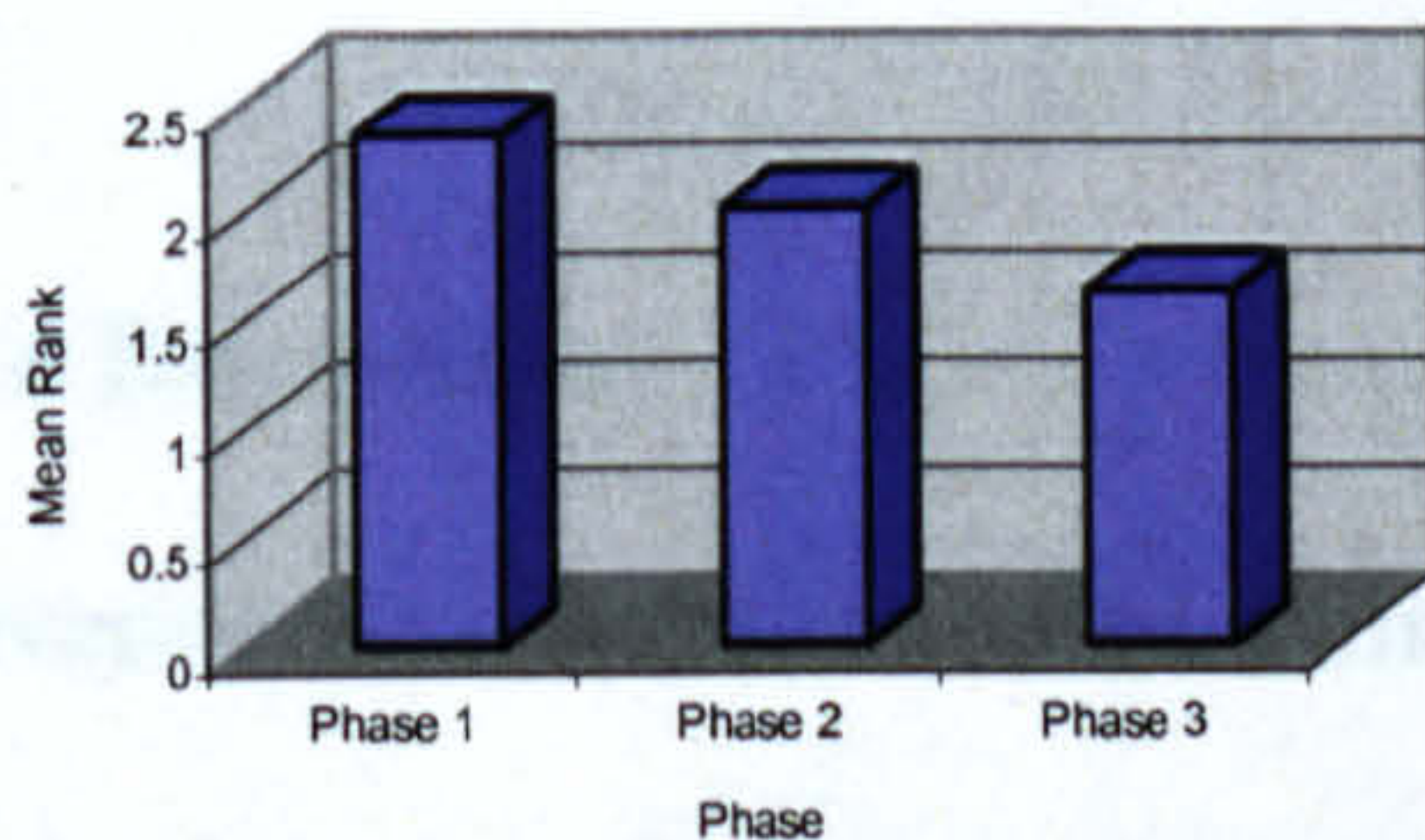
Firstly the data was explored in terms of each of the four behaviours across the three phases. This was to determine if any behaviours were seen significantly more or less frequently across the phase of the innovation process. Secondly each phase was examined by comparing the frequency of all four behaviours within idea generation, exploration and implementation. This was done to determine whether any of the behaviours were observed more or less frequently within each distinct phase.

### 9.3 Results

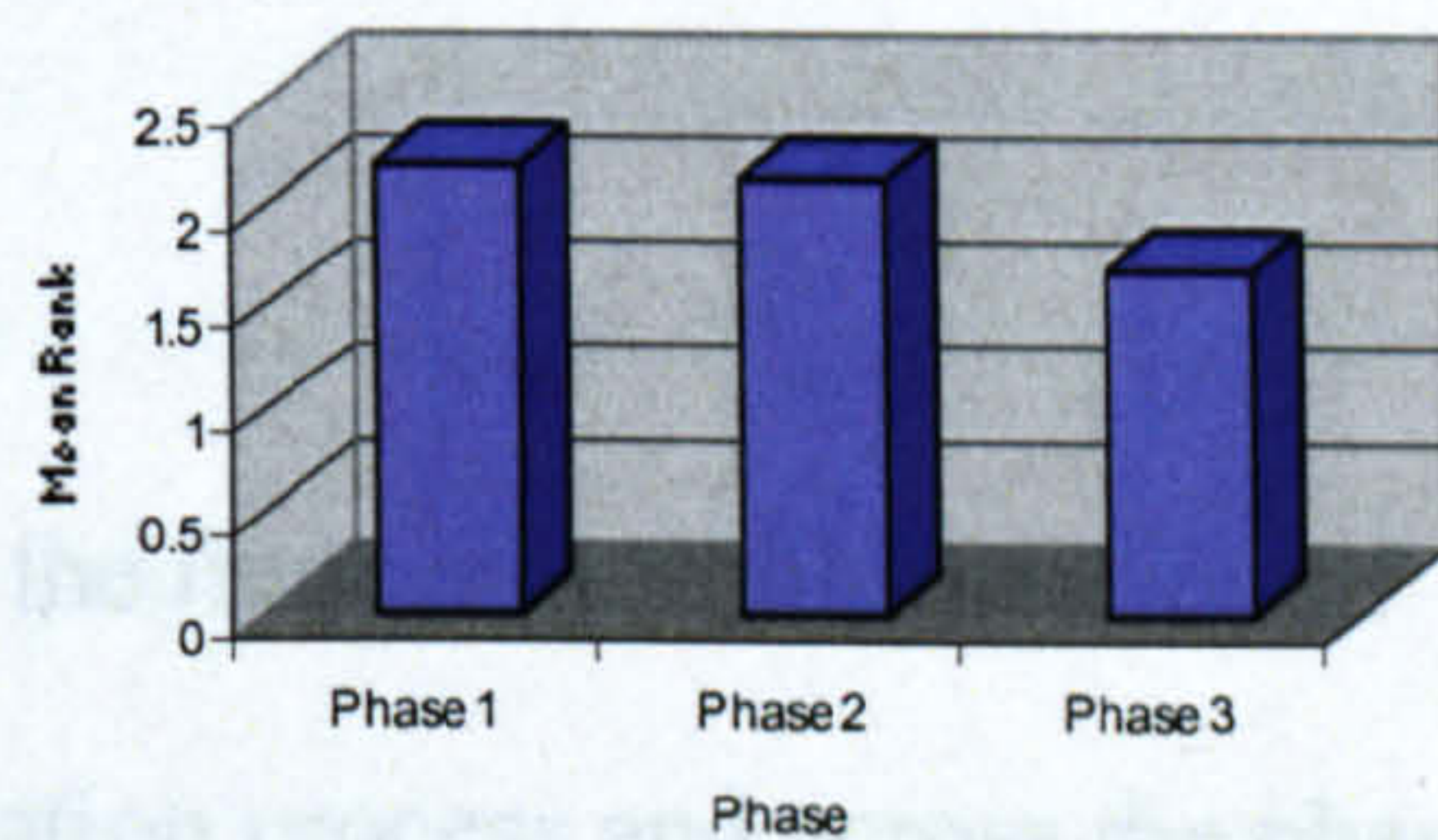
#### 9.3a Each managerial behaviour across the three phases of the innovation process

As the graphs below demonstrate, each managerial behaviour was observed more frequently in phase one of the innovation process. When each behaviour was examined across the innovation process a significant difference was observed for the two ideas-focused behaviours (Role Modelling and Feedback). Feedback was observed significantly less frequently during phase three ( $p < .05$ , Chi-squared = 7.58); Role Modelling was observed significantly more frequently during phase one ( $p < .01$ , Chi-squared = 14.70). The results were non significant for Interpersonal Style ( $p .30$ ) and Empowerment ( $p .06$ ).

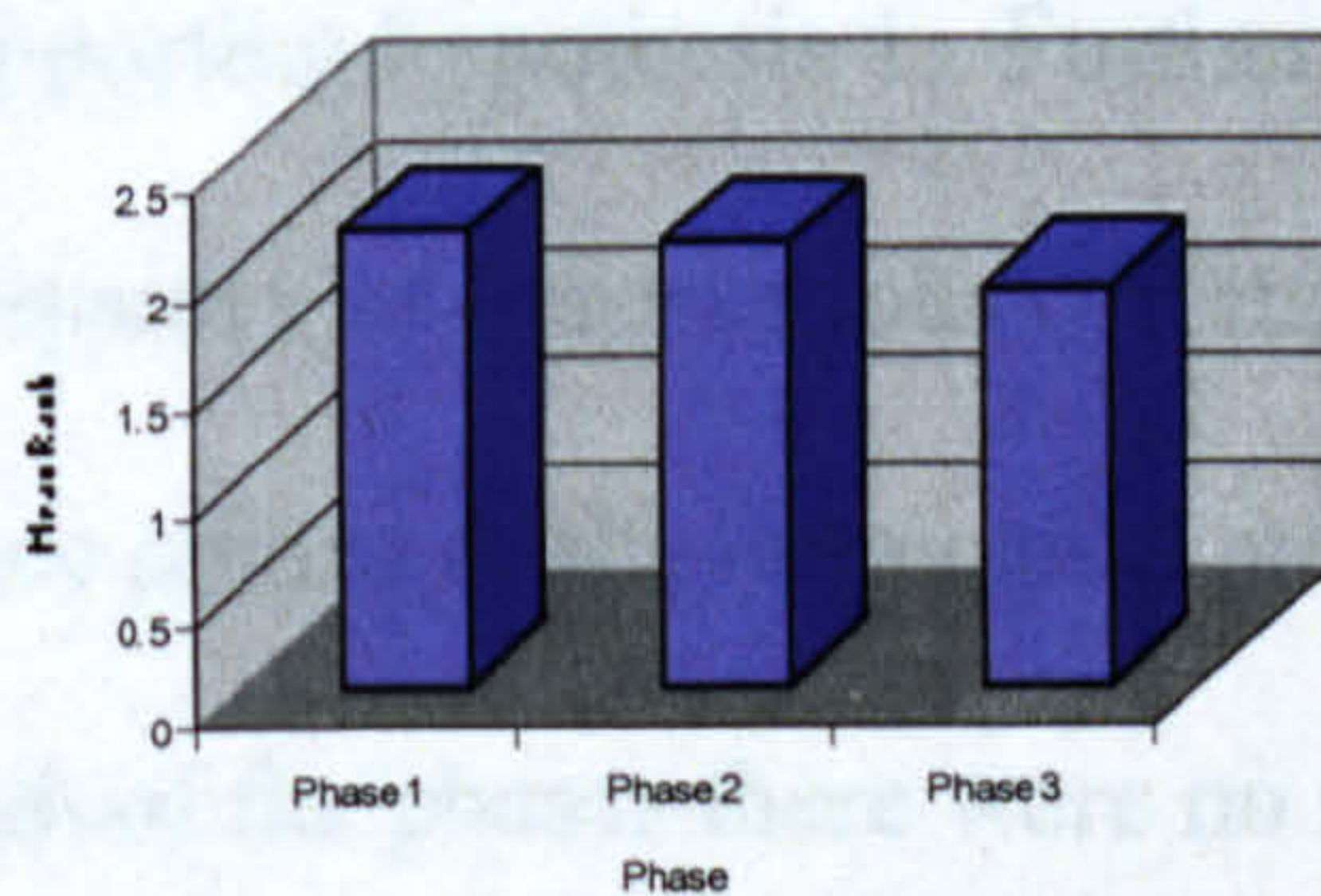
**Graph 9.1: The mean frequency of observation of Role Modelling across the three innovation phases**



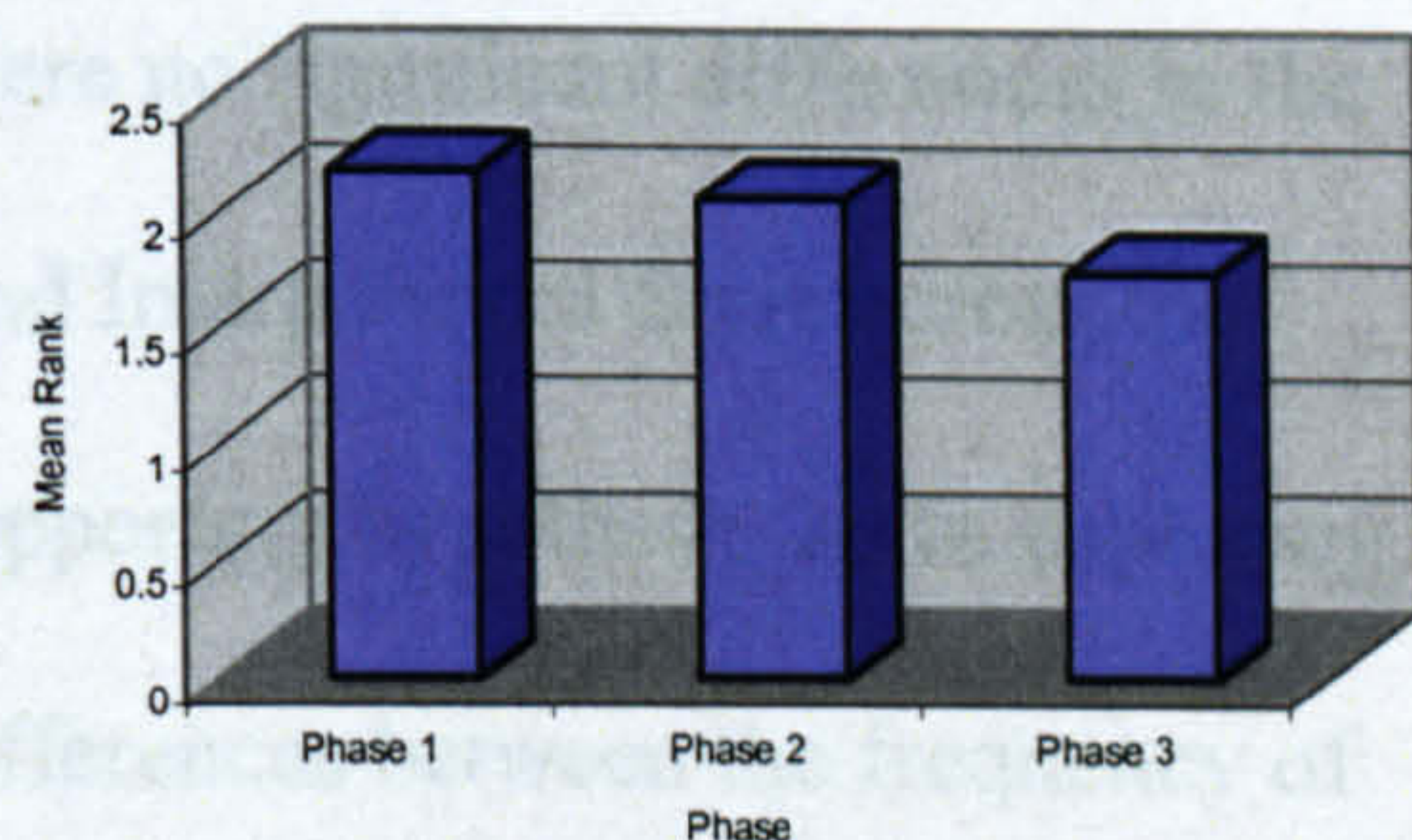
**Graph 9.2: The frequency of observations of Feedback across the three innovation phases**



**Graph 9.3: The frequency of observations of Interpersonal Style in the three innovation phases**



**Graph 9.4: The frequency of observations of Empowerment across the three innovation phases**



The next section will present the results of the observations within each of the three phases.

### **9.3b The managerial behaviours within each of the three phases**

The data was also explored within each of the phases of the innovation process (1. idea exploration, 2. idea development and exploration, 3. idea implementation).

The results indicated that in phase one there were no significant differences between the frequency of observation of each of the managerial behaviours. In phase two feedback was seen significantly more frequently than the other three managerial behaviours ( $p = < .003$ , Chi-squared = 14.23). In phase three Role Modelling was seen significantly less frequently than the other three behaviours ( $p = < .002$ , Chi-squared = 14.60).

## **9.4 Discussion**

Overall the results revealed some differences in the frequency of observation of behaviours, both within each phase of the innovation process and across the phases of the process. The results showed that the two ideas-focused behaviours were seen significantly more frequently in the earlier phases of the innovation process, supporting hypothesis 1. Furthermore there were no significant differences in the frequency of observations of Empowerment and Interpersonal Style across the three phases of the innovation process, thus supporting hypothesis 2. In exploring each of the phases there were no significant differences between the frequency of observation of the managerial behaviours during phase one, supporting hypothesis



3. In the second phase of the innovation process feedback was observed more frequently, supporting hypothesis 4. Finally in the final phase of the innovation process Role Modelling was seen significantly less than the other three managerial behaviours, thus supporting hypothesis 5.

As these results show different managerial behaviours were observed more and less frequently during the different stages, it suggests that the different behaviours may be more or less important during the different phases of the innovation process. Each phase is discussed in turn, before outlining each managerial behaviour.

#### **9.4a Phase one**

All four of the managerial behaviours associated with innovation were observed most frequently in phase one; the idea generation phase. This goes against previous stereotypes of the manager as the resource providers and shows managers to play a key role in the early stages of the innovation process. This also supports the proposition that managers may be influencing employee motivation by showing more of the behaviours associated with innovation at the very beginning of the innovation process.

#### **9.4b Phase two**

In phase two of the innovation process, feedback was seen more frequently than the in other managerial behaviours. This implies that during the second phase managers play a key role in guiding and advising employees about their ideas.

This also suggests that during the exploration and development of ideas, managers give employees feedback, reinforcement and encouragement.

#### **9.4c Phase three**

Finally in phase three Role Modelling behaviours were observed less frequently than the other three behaviours (Feedback, Empowerment and Interpersonal Style). This implies that during the *implementation* of ideas, managers are not required to set an innovation example and create the norm for innovation; in contrast it seems that such social learning is more important during the *early* phases of innovation.

When the behaviours were examined across each of the phases, the two non-ideas focused behaviours showed no significant differences in frequency of observations across the phases. This may be because Interpersonal Style and Empowerment are not ideas-focused but are more global behaviours that need to be shown constantly throughout the innovation process.

The two ideas-focused behaviours showed significant differences between the phases. In comparison to the observations in the other stages, Feedback was seen less in phase three. This suggests that feedback and guidance from a manager are particularly important during the generation and exploration of ideas. Furthermore Role Modelling was seen less in phase three, and more in phases one and two. This suggests that through Role Modelling, managers may influence employee learning and motivation, fostering enthusiasm for innovation early in the process.

Overall the results indicate that all of the managerial behaviours are present in all phases of the innovation process, but that managers have a key role to play at the *beginning* of the process where they may influence employee motivation to innovate. Although the relationship between motivation and the four managerial behaviours is not discussed here (see chapters 3, 8 and 10) figure 9.2 below pictorially illustrates the proposed process framework of the management of innovation, that was developed from the findings of this study. In figure 9.2 thicker lines denote greater frequency of observation of the managerial behaviour.

**Figure 9.2: The process framework of managing innovation developed in this thesis**

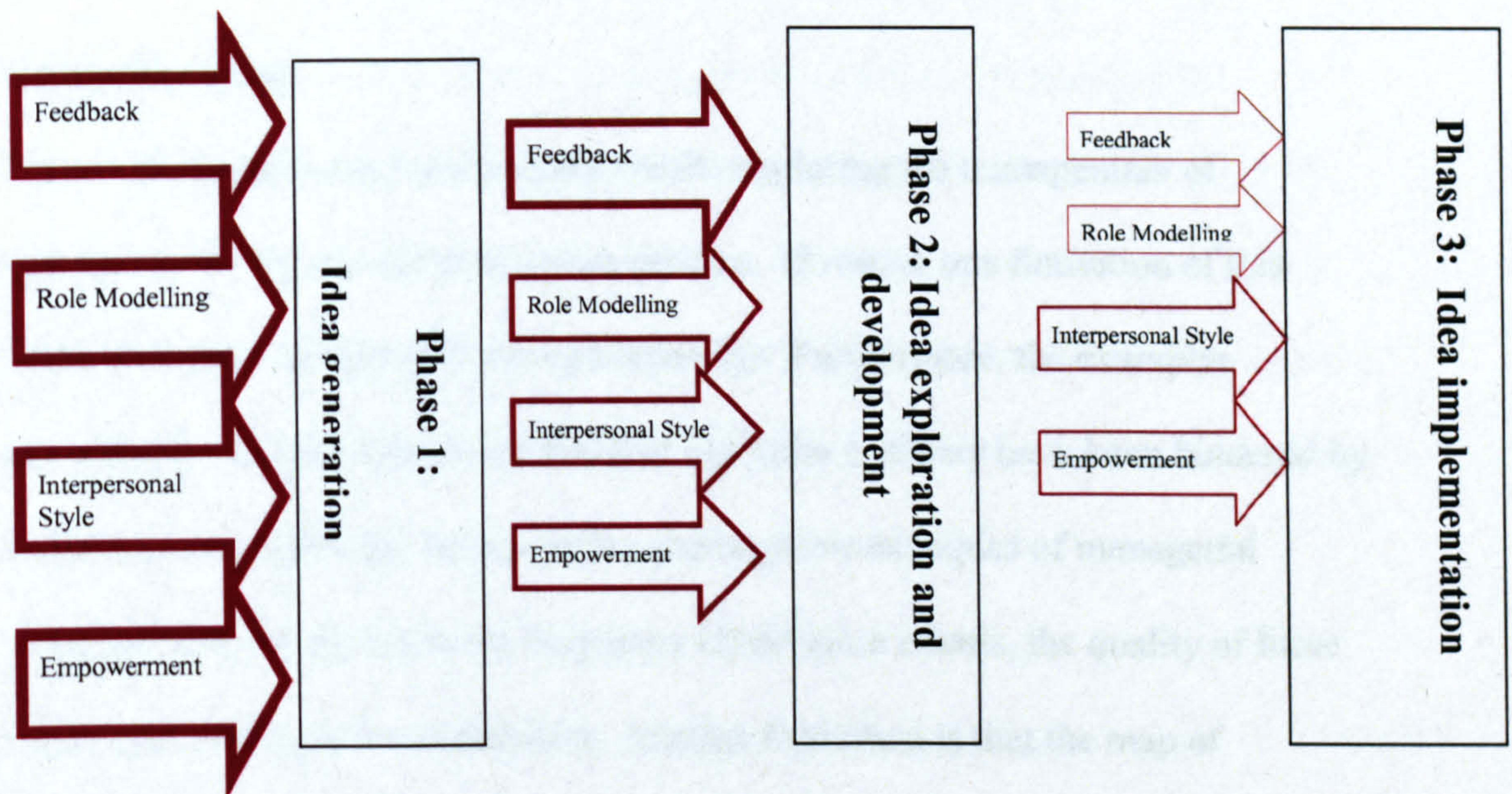


Figure 9.2 shows that all the managerial behaviours were observed most frequently in phase one and least frequently in phase three. Figure 9.2 also pictorially demonstrates how within phase one there are no differences between how

frequently the managerial behaviours were observed. This suggests that when employees generate ideas managers are approachable, give feedback on those ideas, set a role model by generating ideas of their own, and give employees the freedom to generate ideas. However, in phase two, Feedback is seen more often, suggesting that during the exploration and evaluation of ideas, managers give more feedback on ideas. Finally, in phase three, Feedback and Role Modelling are seen less often, suggesting that when ideas are being implemented managers give less feedback on ideas and spend less time setting an example of innovation, but are more likely to remain approachable and give freedom to employees.

This chapter will now go on to review the limitations of this study.

#### **9.4d Limitations**

This work has presented preliminary results exploring the management of innovation throughout the innovation process. However one limitation of this study is that the sample size was small (n=38). Furthermore, the examples described by the managers were positive examples and may have been hindered by memory bias. Although, both positive and negative examples of managerial behaviour were included in the frequency observation counts, the quality of these behaviours could not be established. Another limitation is that the map of innovation is also open to researcher bias, as a researcher conducts and marks this tool. However error in the coding of the statements given by the manager was reduced in a double blind marking of the map of innovation.

This study is an initial study into a new area of innovation research. However, this research has not explored the contingencies that influence the management of the innovation process. In order to gain a complete understanding of managing the innovation process, future research should adopt longitudinal designs to explore the interactions between the manager and the employee.

Despite its limitations, this work has made a number of unique contributions to this area. This chapter is the first to empirically test Patterson's (2004) process framework of innovation resulting in considerable support for the existence of three components in the innovation process. In addition this work had shown that the innovation process is an iterative one. Furthermore this chapter has shown that managerial behaviours associated with innovation are most frequently observed during the idea generation phase of the innovation process, supporting the proposition that managers may be influencing employee motivation to innovate.

This thesis will now go on to discuss this whole research programme exploring the practical and theoretical implications of this work.

## Chapter 10: Discussion

*“Many people are inventive, sometimes cleverly so. But real creativity begins with the drive to work on and on and on”*

Margueritte Harman Bro

This overall of this thesis was to identify and develop a psychometric model of the managerial behaviours that may be associated with employee innovation. In addressing this aim this thesis has examined the managerial behaviours associated with employee innovation. This thesis has also developed such managerial behaviours into a four-factor psychometric model. It was shown that four key managerial behaviours - Feedback, Role Modelling, Empowerment and Interpersonal Style are associated with influencing employee innovation. Furthermore, theories of learning and motivation have been used to explain the relationship between these behaviours and employee innovation. A psychometric measurement tool of these behaviours was developed, along with a tool that can be used to explore the innovation process: The map of innovation. A brief synopsis of the studies in this thesis is given below.

The first study presented here adopted an exploratory approach and aimed to identify all of the managerial behaviours which are associated with innovation, using a multi-method approach. The results replicated and added previous literature. The second study demonstrated that these behaviours could be psychometrically themed (using EFA and CFA) into four factors. Further studies then went on to test the construct and criterion related validity. A final study

explored the prominence of each of the managerial behaviours in each of the phases of the innovation process. In total nine studies were conducted, all of these studies are summarised in Table 10.1 below.

**Table 10.1: Table summarising the results and conclusions of the nine studies**

Study	Purpose	Measures / methods	Results	Conclusions
1.	To identify the managerial behaviours associated with employee innovation.	CIT and Repertory Grid interviews	15 specific managerial behaviours identified:	15 managerial behaviours were identified, replicating and adding to previous research findings.
2.	To identify the underlying structure of the 15 managerial behaviours.	1) Inventory of the managerial behaviours; 2) EFA; 3) CFA	The 15 managerial behaviours can be themed into four factors: Feedback, Role Modelling, Empowerment, Interpersonal Style.	An inter-correlated model of managerial behaviour was identified and initially validated.  There are two axes upon which the behaviours lie: 1) idea-focused versus non-ideas focused behaviour, and 2) employee-focused versus task-focused behaviours.
3	To assess the construct space occupied by the managerial behaviours associated with innovation in relation to leadership.	The influencing innovation inventory, MLQ, and a 7-item LMX scale.	The four behaviours were positively and negatively related to aspects of the full range of leadership model, and three of the managerial behaviours predicted formation of high LMX.	The model showed convergent and discriminant validity in relation to leadership.  The findings therefore support the framework of managerial behaviours associated with innovation.
4	To assess the construct space occupied by the managerial behaviours associated with innovation in relation to organisational context.	The influencing innovation inventory and a scale to measure the organisational factors that foster innovation.	Two of the four behaviours predicted variance in organisational climate, and work processes. The four behaviours had little influence on external environment factor.	The model showed convergent and discriminant validity in relation to organisational factors that foster innovation.  The findings therefore support the framework of managerial behaviour associated with innovation.



5 & 6	To assess the construct spaced occupied by the managerial behaviours which foster innovation in relation to a) innovation potential, & b) personality.	The influencing innovation inventory and a) Innovation Potential Indicator (IPI), b) Warr's (2000) Personality Inventory: Facet scales of Extroversion and Openness.	<p>a) Motivation to change is the factor in the IPI most strongly related to the four-factor model. Role Modelling is most closely related to the IPI model.</p> <p>b) Feedback related to facets of Openness; Interpersonal Style was related to sociability; Empowerment related to Change Orientation; Role Modelling related to Assertiveness and all facets of Openness.</p>	The model showed convergent and discriminate validity in relation to propensity to innovate and personality. The findings therefore support the framework of managerial behaviour associated with innovation.
7 & 8	To establish criterion-related validity	<p>a) Two organisations identified as high and low on influencing innovation using an external criteria.</p> <p>b) The map of innovation.</p>	<p>a) The four-factor management of innovation inventory can differentiate between organisations that were rated high or low on managing innovation.</p> <p>b) The map of innovation scores were found to correlate with scores on the four-factor inventory.</p>	Triangulation was used to establish criterion-related validity.
9	To explore the prominence of the four managerial behaviour in across the three phases in the innovation process.	Map of innovation and the management of innovation inventory.	The two ideas focused behaviours were seen more frequently in phase one and two of the innovation process. Empowerment and Interpersonal Style showed no significant variance across the innovation process.	The managerial behaviour show some variance in frequency of observation across the different phases in the innovation process. Further understanding was gained of managing the innovation process.

As Table 10.1 shows, these studies indicate that there are 15 managerial behaviours associated with employee innovation. Subsequently, a four-factor structure was then identified as underlying the 15 managerial behaviours. The four central behaviours are shown below in Table 10.2.

**Table 10.2: The four managerial behaviours associated with innovation**

<b>Managerial behaviour</b>	<b>Description</b>
<b>Feedback</b>	<p>This behaviour focuses on how the manager gives employees feedback. This type of exchange is specifically about feedback, guidance and recognition for innovation from the manager to employees. A manager high on this behaviour tends to welcome ideas and guides employees regarding the implementation of ideas. A manager low on this behaviour tends to be negative about employees' ideas and greet ideas with 'no' as a reflex.</p> <p>Example items: <i>My manager would not criticize me if a new idea did not succeed; My manager would express disapproval of me if one of my changes went wrong (R); My manager would give me recognition if I was creative in my job.</i></p>
<b>Empowerment</b>	<p>This behaviour concerns actions which focus on involving the employees in innovation. This includes giving autonomy to employees, trusting and delegating responsibility and involving employees. A manager high on this behaviour tends to trust employees and have confidence in them. A manager low on this behaviour tends to keep responsibility for projects to him / herself, and tries to control the way employees approach their work.</p> <p>Example items: <i>My manager has confidence in my ability to do the job well; My manager does not trust me to do the job well (R); My manager gives me a lot of freedom in my job.</i></p>
<b>Role Modelling</b>	<p>This behaviour is about a manager's personal skill and behaviour in the area of innovation and creativity. If high in this behaviour, the manager sets a good example and is a role model for his / her staff, expecting his / her staff to innovate. As a result the manager is open to other people's ideas and is optimistic about future plans.</p> <p>Example items: <i>My manager shows no enthusiasm for innovation (R); My manager has many creative ideas; My manager readily accepts new ideas.</i></p>

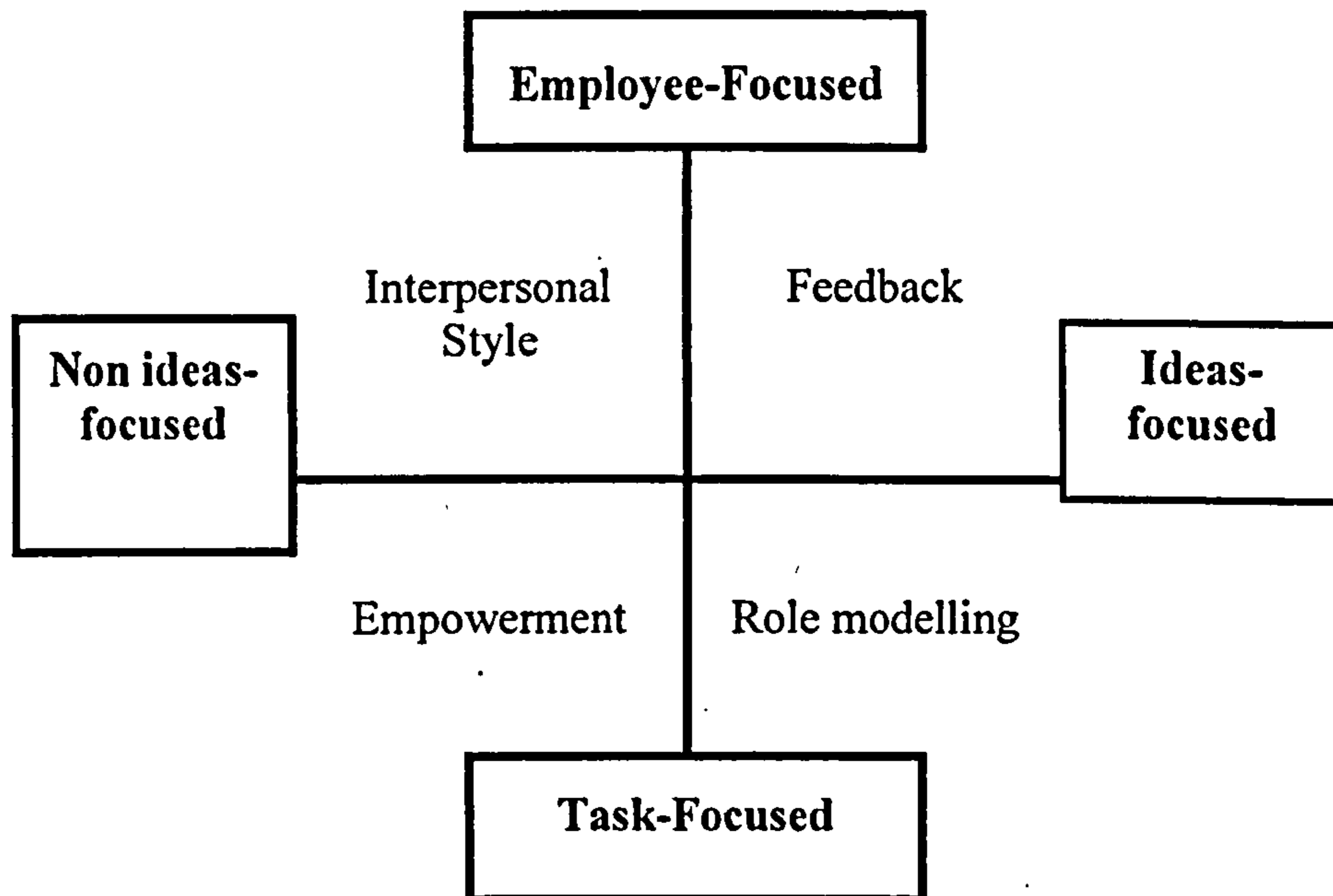
Continued overleaf

Managerial behaviour	Description
Interpersonal Style	<p>This behaviour is about how receptive the manager is to his / her employees on a general level (rather than relating specifically to the generation of ideas). It covers aspects of behaviour that make the manager approachable and fun to work with, which influences how welcoming the manager is to interaction with employees. A manager high on this behaviour tends to be approachable and have informal interaction with employees, characterised by having fun with employees. Such a manager is also perceived to have the interests of the employee at heart. A manager low on this behaviour tends to be formal, rigid and shows little warmth toward the progression or interests of employees. Example items: <i>My manager is difficult to talk to (R); My manager is easy to approach; My manager is fun to work with.</i></p>

*(R) denotes reverse coding*

The studies presented in this thesis then went on to shown that the four central behaviours can be organised in a framework of two axes: 1) Ideas-focused versus not ideas-focused, and 2) employee-focused versus task-focused behaviours. This framework, although explored in greater detail in the previous chapters, is depicted below in figure 10.1.

**Figure 10.1: The framework of managerial behaviours associated with innovation.**



Following identification of the four-factor model, the research aimed to test the construct validity of this model. The studies demonstrated that in relation to leadership, the four-factor model overlaps with, yet is distinct from, the Full Range Leadership Model. The results also suggest that three of the four behaviours (Interpersonal Style, Feedback, and Empowerment) predict formation of LMX. In relation to the three organisational factors that help to foster innovation, the results suggest that the manager influences employee perceptions of the organisational climate (in relation to innovation) through the two ideas-focused behaviours (Role Modelling and Feedback). The ideas focused behaviours also explain some of the variance in the 'work processes and structure' factor of the organisational scale: however the manager was shown to play a limited role in the third factor, 'external environment'. Using the Innovation Potential Indicator (IPI), the four-factor management if innovation model was shown also to relate to innovation potential as predicted. Each of the four behaviours in the management of innovation model

was positively related to Motivation to Change, and the Role Modelling factor was also positively correlated with Challenging Behaviour, and negatively correlated with Adaptation and Consistency of Work Styles.

Two studies were conducted and triangulation of the results of both studies supported criterion-related validation. In the first criterion-related validation study the four-factor managing innovation inventory differentiated between two organisations, one in which the managers were judged to enhance innovation, and one in which the managers were judged to hinder innovation. In the second criterion-related validation study, using the map of innovation to assess the manager's behaviour on the four managerial behaviours associated with innovation, correlations were found between the inventory and the map of innovation scores.

This discussion will now focus on the theoretical additions made by the identification of the four managerial behaviours associated with innovation. Specifically, the discussion will explore the relationship of the four behaviours to previous theories of motivation, along with the other theoretical implications of these four behaviours. On from this, the limitations of this work will be reviewed and a future research agenda discussed. Finally this chapter will conclude with an exploration of the practical applications of this work.

### **10.1 Theoretical implications**

Although the theoretical implications of this research are broad, they can be centralised into three areas: a) identification of a new model of managerial

behaviours associated with employee innovation, b) the role of motivation in managing innovation, and c) further understanding of employee innovation.

#### **10.1.a New model of managerial behaviours associated with employee innovation**

As outlined above, the main output from this work is the four-factor model of managerial behaviours associated with employee innovation. This is a theoretical addition, as previous research has failed to develop a coherent theoretical model within which to explore this arena. Furthermore, this model has incorporated the previous literature in this area and has made unique additions.

This research has provided a theoretical framework within which to conduct further empirical research. Such a framework has enabled specific exploration of the role of motivation in employee innovation and the role of contextual factors in this. The role of motivation is outlined below.

#### **10.1.b The role of motivation in managing innovation**

Previous research has shown that the motivational component of innovation explains a large proportion of the variance in innovative behaviours (Patterson, 1999). Motivation refers to people being moved to do something. When a person is motivated they tend to seek out challenges and novelty (Deci, 2000) - something inherent within innovation. In line with this, as discussed below, the current research postulates that managers are likely to influence positively or negatively employee motivation to innovate. As a result it is hypothesised here that one mechanism through which managers influence employee innovation is through

influencing employee motivation to innovate. As previously discussed, it is possible that a number of theories can explain the mechanisms through which the four managerial behaviours are associated with innovation. Traditional motivation theories identified a set of innate physiological *needs* (for food, water, sex) which give rise to 'drive states' (Hull, 1943), and drive states are then used to predict future behaviour. However, this approach could not provide a meaningful account of behaviours such as curious exploration, creativity and investigative manipulation: Therefore, theorists adopted a more social account of motivation. Following this trend the self determination theory defines *needs* as psychological rather than physiological, in that *needs* are "innate psychological nutrients that are essential for ongoing psychological growth, integrity, and well being" (Deci & Ryan, 2000; p. 229). Therefore the Cognitive Evaluation Theory (Deci & Ryan, 1985) a sub-theory of self-determination theory is drawn upon below to theoretically explain the results of this thesis in relation to employees' motivation to innovate.

However, in order to provide triangulation for the theoretical position adopted here, two theories of motivation will be explored. Support for the notion that managers may influence employee motivation to innovate will be firstly drawn from Triandis' (1979) theory of human behaviour, and secondly there is support from a central theory of motivation – the Cognitive Evaluation Theory (CET; Deci & Ryan, 1985). In addition to this, one of the behaviours (Role Modelling) will be explored in relation to the Pygmalion effect (Livingston, 1969). Each of these will now be reviewed in turn before presenting an overall theoretical model of the management of employee innovation.

Triandis' model of behaviour. As outlined in Chapter 1, Triandis (1979)

hypothesised that four situational factors (or factors that are external to the individual) are important in motivating human behaviour. These factors; Culture, Reinforcement, Facilitating Environmental Resources, and Significant Others, were all replicated by the current research, and can be mapped onto the four managerial behaviours which influence innovation. This supports the notion that the four behaviours identified in this thesis may be influencing employee innovation through influencing employee motivation.

On from this, a central theory of human motivation within the social cognitive perspective – the Cognitive Evaluation Theory (CET) - provides a main theoretical platform for explaining the influence of the managerial behaviours on employee innovation. As is explained below the Cognitive Evaluation Theory has three key elements and these can be mapped on to the three of the four behaviours in the managing innovation model. This is outlined below, before the fourth behaviour is explained in relation to the Pygmalion effect and Social Learning Theory (Bandura, 1969).

Cognitive Evaluation Theory (CET): The Cognitive Evaluation Theory (CET: Deci & Ryan, 1985; Ryan & Deci, 2000) specifies the psychological conditions and social environments responsible for motivational development, and is a sub-theory with the Self-Determination Theory.

Representations of humanity show that people are curious and self-motivated



(Ryan & Deci, 2000). When at their best, people are inspired, strive to learn new skills and apply their talent responsibly. However it is clear that such spirit can be crushed, leading individuals to reject growth and responsibility, and that largely the social contexts can both foster and undermine such behaviour. According to CET, social contexts satisfy the needs for competence (Harter, 1978), autonomy (de Charms, 1968; Deci, 1975) and relatedness (Baumeister & Leary, 1995; Reis, 1994), which then nurture the development of self determination and motivation, and result in a person being either proactive and engaged or (if negative) passive and alienated. Furthermore, the CET suggests that when the work context allows satisfaction of these needs, it facilitates employee engagement (Deci, Connell, & Ryan, 1989). In relation to the current context, research has shown idea generation to result from promoting self-determination (Koestner et al., 1984). The CET identifies three factors within the social context that can influence motivation. These three factors; perceived competence, autonomy and relatedness, are discussed below, before they are explored in relation to three of the four behaviours within the managing innovation model.

*Perceived competence:* There is an innate need for competence that is fulfilled when one can bring about desired effects and outcomes. Perceived competence is an individual's perception of his/her efficacy at a particular task. Feelings or perceptions of competence with respect to an activity or domain are thought to be important for motivation, as they facilitate goal attainment and provide a sense of need satisfaction from engaging in an activity that a person feels effective at performing.

*Perceived autonomy:* The term autonomy refers to self-governance. However, Ryan and Deci (2000) note that autonomy does not imply that people's behaviour is determined independently of their social environment or free will. Furthermore, they suggest that the notion of autonomy is not merely selfishness or 'getting what you want'. Ryan and Deci (2000) maintain that autonomy is something that all people *need*, as demonstrated across a number of different cultures (Hayamizu, 1997).

Research suggests that autonomy is key to intrinsic motivation. Authors suggest events such as threats (Deci & Casino, 1972), surveillance (Lepper & Greene, 1975), and evaluation (Harackiewicz, Manderlink, & Sansone, 1984) lead to undermining of intrinsic motivation. In contrast, giving people choice enhances intrinsic motivation (Zuckerman, Porac, Lathan, Smith & Deci, 1978). Therefore, research suggests that perceived autonomy is one of the key psychological needs that has to be satisfied.

*Relatedness:* This concept refers to the extent to which a person feels meaningfully connected to others (Baumeister & Leary, 1995). The desire to belong and feel connected is essential to foster people's willingness to take in and endorse values and behaviours that are exhibited by significant others. People have a desire to feel integrated within a social sphere.

In the 1970s Anderson, Manoogain, and Reznick (1976) found that when children worked on an interesting task in the presence of an experimenter who ignored their attempts to interact, the children showed a very low level of intrinsic motivation.

The notion that relatedness is important for intrinsic motivation relates to attachment theory (Bowlby, 1969). Exploratory behaviour in infancy represents intrinsic motivation, and research suggests that exploration is more common in infants who are securely attached to a parent. CET hypothesises that intrinsic motivation will flourish in environments that are characterised by a sense of secure relatedness (Ryan & La Guardia, 2000).

In reference to the current thesis Deci, Connell and Ryan (1989) showed the impact managers have on relatedness. Deci et al. (2000) showed how managers can influence employee behaviour through influencing the factors in the CET. Therefore this chapter will now discuss the behaviours in the managing innovation model and their theoretical impact on innovation through the factors in the CET. In line with this it is argued that Feedback will influence perceived competence, Interaction Style will influence perceived relatedness, and Empowerment will influence perceived control. This is outlined in greater detail below.

### Feedback and the CET

Feedback is thought to enhance a person's *perceived competence*. Early experiments showed that positive feedback enhanced intrinsic motivation, relative to no feedback (Boggiano & Ruble, 1979; Deci, 1971). Deci and Ryan (1980) explained these results in reference to the need for competence (White, 1959), suggesting that positive feedback that signifies effective performance satisfies the need for competence, thus promoting intrinsic motivation. Vallard and Reid (1984) also conducted a study that confirmed perceived competence increased with feedback and thus confirmed the effects of positive feedback on intrinsic

motivation.

A key aspect of the feedback factor in the four-factor model of managing innovation is the giving of rewards for innovative behaviours. However, the negative effects of extrinsic rewards on intrinsic motivation were also established in the 1970s (Deci, 1971; Deci, 1972; Kruglanski, Friedman & Zeevi, 1971; Lepper, Greene, & Nisbett, 1973) and this notion been accepted by many researchers over the last three decades. However this notion was criticised by behaviouralist authors (e.g. Calder, & Staw, 1974; Scott, 1975).

This issue remained an area of hot debate and controversy throughout the 1970s and 1980s, and resulted in a number of meta-analytic reviews. Three meta-analyses were conducted between 1988 and 1995 which concluded that expected tangible rewards made contingent upon undertaking, completing and excelling in a particular activity will undermine intrinsic motivation in that particular activity (Rummel & Feinberg, 1988; Wiersuma, 1992). Despite this a further meta-analysis was then conducted by proponents of the behaviouralist perspective Cameron and Pierce (1994) who concluded that, overall, rewards do not decrease intrinsic motivation. In line with this, Eisenberger and Cameron (1996) claimed that the undermining of intrinsic motivation by extrinsic rewards was a myth.

However Deci, Koestner and Ryan (1999) published a counter meta-analysis stating that Cameron and Pierce (1994) had made substantial errors. In this article Deci et al. (1999) list all of the studies in the meta-analysis and explain where Cameron and Pierce (1994) made their errors, and conclude that their results were

fallacious. From early formal statements on the Cognitive Evaluation Theory Deci and Ryan (1980) have emphasised that the *informational* aspect of rewards can enhance intrinsic motivation by enhancing perceived competence, while *controlling* rewards which are contingent upon a specific output can decrease intrinsic motivation.

In summary this area remains an issue of hot debate. However, in reference to the current issue of managerial reward on employees' intrinsic motivation to innovate, it is important to note that rewards were highlighted in the interviews conducted in Study 1. However, rewards were not highlighted to be something that was used to drive or encourage innovation, but were shown to be something that communicated that innovation was required; for example one interviewer stated that "*innovation is not seen as a focus, as innovation is not rewarded*".

Furthermore, rewards were also perceived as a way a manager could communicate that he / she thought the employee was competent ("*it was rewarding, that they thought you were worthy of running the project*"). As a result, although managerial rewards are included as a small behavioural component of the Feedback factor in the four-factor management of innovation model, it is argued here that these rewards still influence employee innovation by enhancing perceived competence. Such rewards are therefore not given contingent on a specific employee behaviour, but are part of the process of giving feedback, and guidance throughout the innovation journey, and are thus informational. As Ryan, Mims, and Koestner (1983) noted positive feedback that provides information and indicates competency promotes intrinsic interest and persistence.

### Interpersonal Style and the CET

A manager's interaction style is deemed to relate to the *relatedness* aspect of CET. In support of this, greater intrinsic motivation has been shown in students who perceive their teachers as warm (Ryan & Grolnick, 1986; Ryan, Stiller & Lynch, 1994). In the model of managing innovation, Interaction Style is characterised by a manager who is warm, approachable, fun to work with and interacts socially with employees. Similarly several social behaviours, such as communicating about personally relevant matters (Parks & Floyd, 1996; Reis & Patrick, 1996) and participating in shared activities, (Markman & Kraft, 1989; Tiger, 1969; Wood & Inman, 1993) have been shown to contribute to feelings of relatedness.

In relation to enhancing innovation, attachment theories have suggested that a child who is strongly attached to his or her parent will show more exploratory behaviour (Frodi, Bridges & Grolnick, 1985). Similarly in an organisational context, a manager who has an interaction style that fosters relatedness is likely to enhance intrinsic motivation to innovate and thus increase exploratory behaviour amongst employees.

### Empowerment and the CET

Empowerment relates to *perceived control* in the CET. Research suggests that teachers who support autonomy do not set overly directive deadlines or give pressured evaluations. Similarly managers who give employees empowerment allow employees the freedom to choose how they tackle problems – an approach that Zuckerman, Porac, Lathin, Smith and Deci (1978) claimed increased intrinsic motivation by enhancing perceived control. This notion is supported by Deci and

Ryan (1985), who reported that controlling behaviour diminished intrinsic motivation.

The CET has been used to explain how three of the four behaviours within the management of innovation model, are associated with employee innovation. Like the behaviours in the four-factor management of innovation model, the factors in the CET are inter-correlated. For example, Ryan (1982) reported that positive feedback could be interpreted as either informational or controlling, depending on the communication style of the experimenter (illustrating that interpersonal context also plays a role). This therefore suggests that the CET is a useful theoretical framework in which to understand management of innovation, as the four managerial behaviours associated with innovation are also inter-correlated.

In addition to this the fourth factor, Role Modelling, can be examined within other theoretical frameworks: the Pygmalion Effect (Livingston, 1969) and Social Learning Theory (Bandura, 1977). This is outlined below.

#### **10.1.c Role Modelling and influencing innovation**

The fourth behaviour (Role Modelling) does not overlap with any of the factors that exist in the CET. However this behaviour does mirror the culture variable identified in Triandis's model. To this end Role Modelling is argued to influence innovation by setting innovation as the norm within a work group. Role Modelling involves encouraging others to innovate and communicating expectations; it is therefore likely to draw on the Pygmalion Effect (Livingston, 1969) as a theoretical basis. The Pygmalion effect is a special case of self-

fulfilling prophecy, where behaviour is influenced by whether significant others think the employee should engage in that behaviour. It is therefore possible that Role Modelling will foster innovation by communicating to employees that they are expected to innovate.

It is also possible that learning occurs through social modelling of the Role Modelling behaviours. Social learning approaches integrate cognition, learning, environmental and behavioural influences on action (see Bandura, 1977). New behaviours are often acquired, demonstrated and changed in the absence of direct experience (Bandura, 1977; Kanfer, 1977), and employees can learn new skills through observation, and through the establishment of expectations based on observations. It is argued that the Role Modelling managerial behaviour provides a model for the employee, which sets the context for innovative behaviour. This leads to employee imitation of this behaviour.

In summary Table 10.3 shows how the four-factor model is hypothesised to map onto the factors within the CET, the Pygmalion Effect, and Social Learning Theory.

**Table 10.3: Theoretical links of the four-factor influencing innovation model**

<b>Managerial behaviour</b>	<b>Theoretical link</b>
Empowerment	Perceived control (CET)
Feedback	Perceived competence (CET)
Interaction Style	Perceived relatedness (CET)
Role Modelling	Pygmalion Effect and Social Learning Theory



This discussion will now go on to explore a third theoretical contribution of this work; further understanding of employee innovation.

#### **10.1.d Further understanding of employee innovation**

A key theoretical addition of this research is that it has enhanced understanding of employee innovation. This has been done firstly by empirically demonstrating Patterson's (2002) process framework of innovation. Study 8 and Study 9 found that in using the map of innovation all of the managers interviewed could retrospectively identify the phases of idea generation, idea evaluation and application, and idea implementation, within their examples of employee innovation. Although King and Anderson (2002) note that in retrospect it is easier to identify phases within the innovation process, these results do support the notion of key phases within employee innovation.

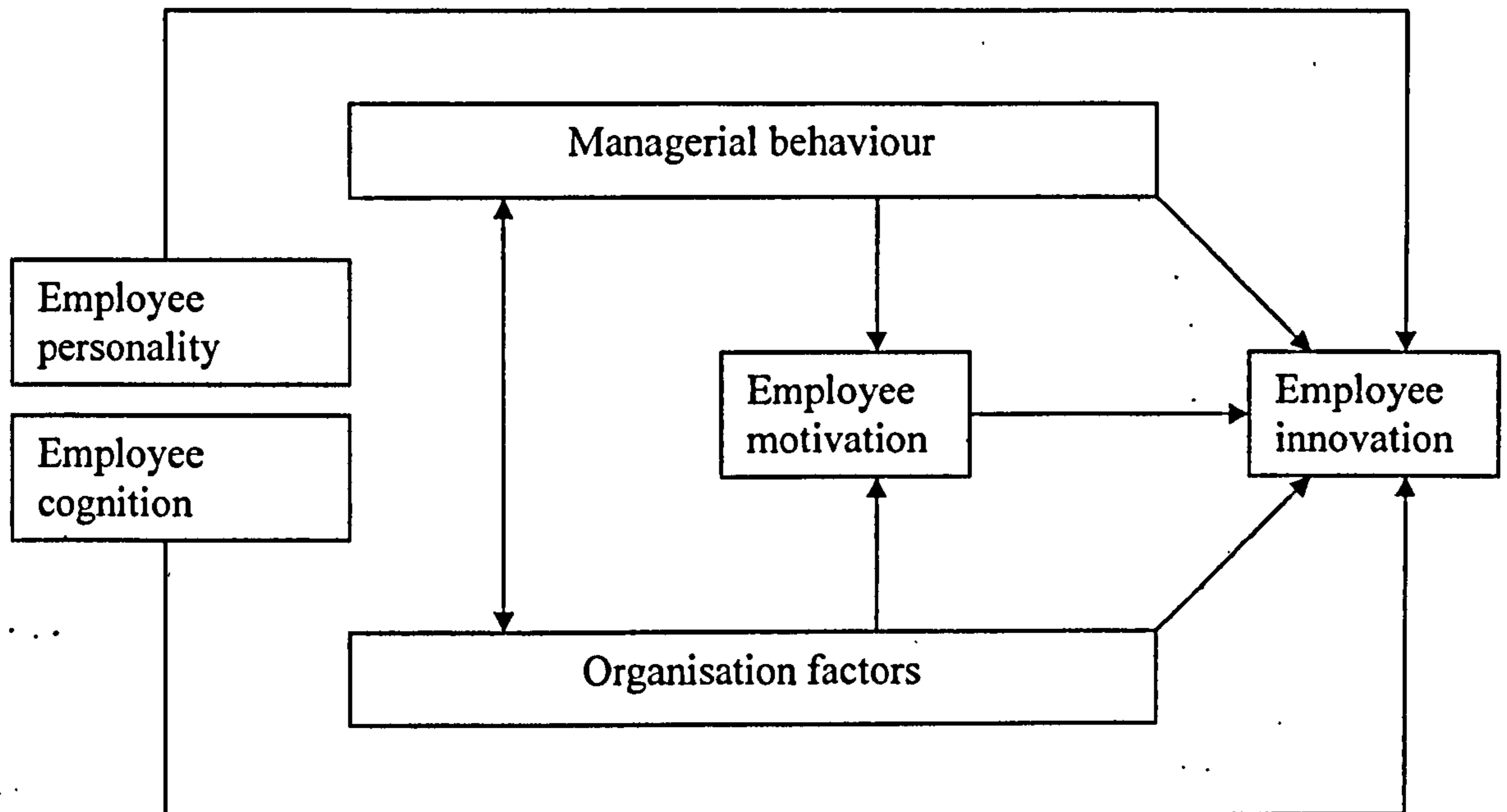
A second theoretical addition to the understanding of innovation is further support for the importance of motivation in employee innovation. Although this is not a new notion, the results reported here support the proposition presented by Amabile (1983) and Patterson (2002).

A third way in which this research has furthered the understanding of employee innovation is by increasing understanding of the contextual factors that influence variance in employee innovation. Although the current research has primarily focused on managerial factors, it has also explored the organisational factors that influence innovation. This facilitated the generation of an organisational

framework within which innovation operates (see Figure 10.2). Future research should aim to explore this framework using multi level modelling.

**Figure 10.2: The influence of the organisational context on employee**

**innovation**



This discussion will now explore the process of managerial influence on innovation.

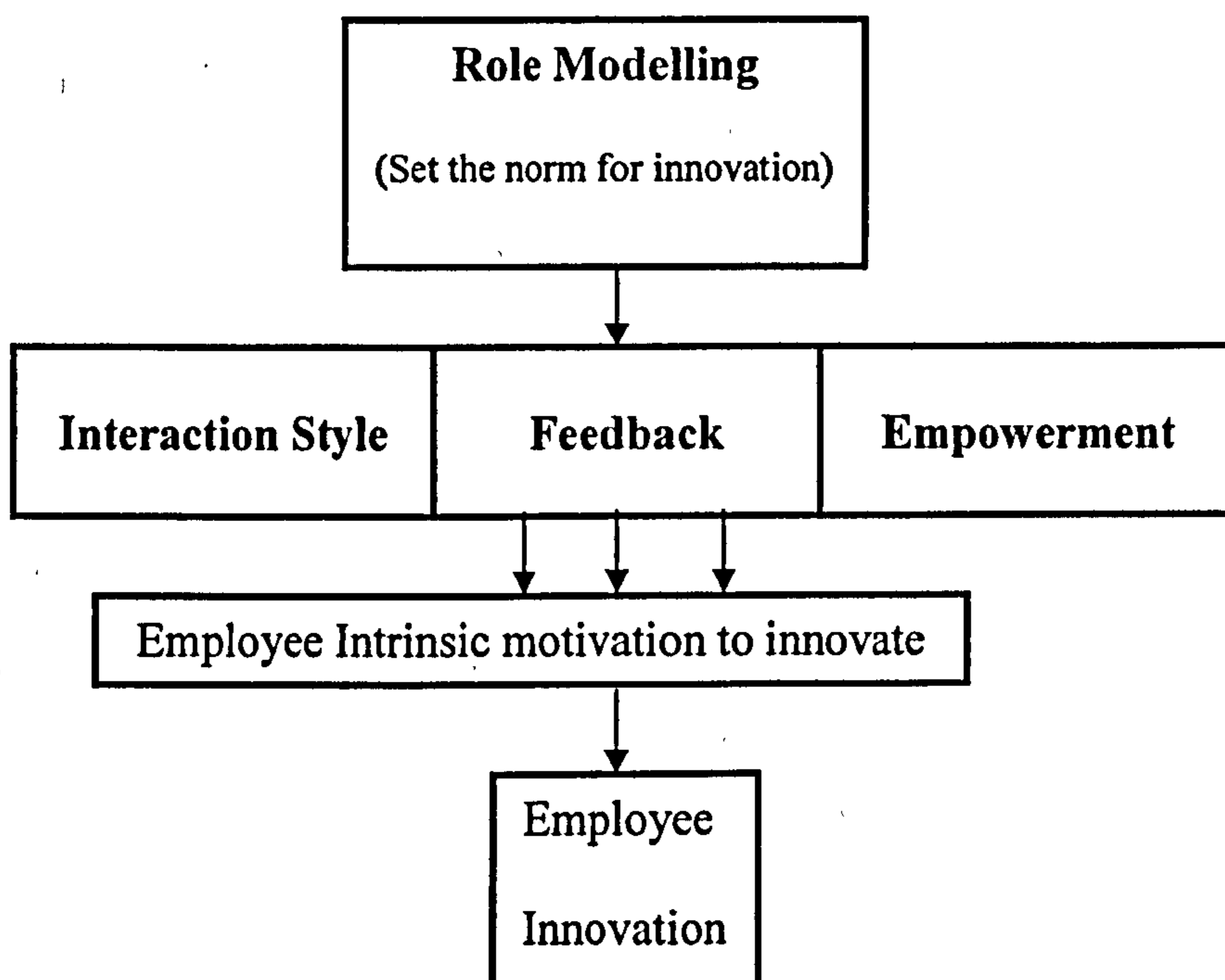
### 10.2 The process of managing innovation

A key contribution of this work is that this research has found evidence to suggest that managers can influence both the generation and implementation of ideas.

Previously it has been argued that managers play a prominent role in the implementation of ideas, and often within organisations are seen as the 'resource provider', yet play a limited role in influencing idea generation. Study 9 also showed how some of the managerial behaviours have stronger or weaker influences on the different phases of the innovation process.

On from this, theoretically it is possible that the managerial behaviours operate in a hierarchical process when influencing innovation. It is possible that that the Role Modelling managerial behaviour sets the scene for innovation. This involves the manager demonstrating idea generation and implementation and encouraging others to do so. This behaviour creates a norm of innovation and sets the context for innovation. As a result, it is proposed that the other managerial behaviours then operate within a context where the norm is for innovation. As the Role Modelling behaviour has set the context for innovation, the other three managerial behaviours enhance intrinsic motivation to innovate (and this motivation is *specific* to innovation). While Role Modelling is still occurring the Feedback, Empowerment and Interaction style will enhance intrinsic motivation and employee innovative behaviours are more likely to ensue. This is shown pictorially below in Figure 10.3.

**Figure 10.3: A process framework of the managerial enhancement of innovation**



This discussion will go on to discuss the practical implication of this work.

### **10.3 Practical implications**

There are many practical implications of this research. Firstly it seems that managers play a 'gatekeeper' role in influencing innovation. Therefore, managers may be selected and developed to manage employee innovation. Further to this, the current research has shown that managers influence employee perceptions of the organisational culture; therefore management-focused interventions could be used to affect changes to the organisation's climate.

The use of CET has also highlighted that human psychological need fulfilment is essential for innovation to ensue. It is vital that managers; foster environments that support autonomy, help to enhance perceived competence, and have relationships with employees that enhance relatedness.

This work was conducted in an applied context, and therefore the results of this research have already been used in a practical way by the sponsoring organisation. The practical applications of this work are outlined in greater detail below.

### **10.4 Existing practical applications**

This section outlines the practical applications and uses of the current research. Throughout this research programme, the tools developed have been used for practical purposes within organisations. A key practical application of the four-factor management of innovation model was in management development. This

was done in response to the sponsoring organisation's need and is outlined in greater detail below.

A management learning workshop was built to focus on the four behaviours within the management of innovation model. The aim of this was to design and develop a process to enhance managers' knowledge of what they can do to promote innovation in others, and to help managers identify their strengths and development needs. Designing and administering this process had a number of stages: 1) liaising with the client, 2) designing the development exercises, 3) trialing the exercises, 4) training the observers, 5) developing the learning resources/website 6) arranging the logistics of the development day, 7) inviting the participants, 8) carrying out the day, 9) feeding back to the participants, and 10) evaluation. These are outlined in greater detail below.

#### 1) Liasing with the client

A number of meetings were held with the sponsoring organisation in order to establish further use of the research results. Throughout these meetings the managers decided that they wanted to hold a number of 'learning workshops' which would help enhance awareness of the four-factor management of innovation model.

#### 2) Designing the development exercises

A number of exercises were developed to help assess managers' ability on the four behaviours within the management of innovation model. Firstly the map of innovation was developed (see Chapter 2, 8 and 9), and a number of group

exercises were used in order to gain behavioural representations of the four managerial behaviours associated with innovation. The psychometric tool developed in this thesis was also administered. Finally an interview structure for a facilitated development interview was developed which aimed to act as a facilitated self-review, assisting the manager to reflect on their behaviour and highlight their development needs. These exercises were all administered at the learning workshop, but as is outlined below were piloted first.

### 3) Piloting the exercises

The exercises were piloted using part time MSc and PhD students. The exercises were trialed on several criteria: 1) if they gave participants the opportunity to show the four managerial behaviours associated with innovation, 2) the time they took to complete, 3) if they were appropriate to the organisation, and 4) on the organisation's instruction were fun to take part in. As a result of the trials, several changes were made and time limits of exercises were set.

### 4) Training the observers

In total three learning workshops were carried out. At each centre a ratio of 2:1 observers to participants was used. Each observer attended a one-day training course which introduced them to the four-factor management of innovation, the exercises and the marking criteria. Each observer was asked to mark the exercises and familiarise themselves with the marking criteria. Each observer was also given a copy of the observer manual. A selection of the material from the observer manual is provided in Appendix 1.

#### **5) Developing the learning resources/website**

In order to facilitate self-directed learning after participation in the development centre, a website was built. This enabled managers to focus on their own specific development needs that were highlighted during the learning workshop. The website contained a number of tips, actions and tools in relation to each of the four influencing innovation behaviours, which managers could follow in their own time. A selection of example tips, actions and tools are shown in Appendix 2; and the website is <http://www.innovation-at-work.com>.

#### **6) Arranging the logistics of the learning workshop**

This entailed visiting the proposed site for the learning workshop, planning the timetables and ensuring all involved had the necessary information about the day.

#### **7) Inviting the participants**

The participants were invited first informally by a senior manager within the organisation, and then formally by an email. The email sent to the participants outlined the aim of the day and the timetable of activities, and provided the location, times and contact details of the researcher.

#### **8) Conducting the learning workshop.**

The learning workshop consisted of a one-day event attended by 7 to 12 managers. In total three workshops were conducted. At the learning workshop an introduction was given by myself and a senior manager, and the team of observers were then introduced. The various exercises were carried out by participants throughout the day, who were given a facilitated self-review interview after

completing all the development tasks.

#### 9) Feeding back to the participants

Two weeks after the learning workshop, managers were visited in the workplace and given a feedback report outlining their strengths and development needs.

Managers were also given access to the website to use its content to assist with self-development.

#### 10) Evaluation

Due to organisational restraints, it was not possible to evaluate the learning workshops using a post attendance evaluation form. Therefore, the managers attending the workshop the managers were asked to review the day during the feedback interview (see point 9). All of the managers said they had enjoyed the day and learnt from it, and suggested ways in which the day could be improved. However it is important to note that the managers may have been biased, due to the presence of the researcher.

This chapter will now review the limitations of this research and outline future directions for work in this area.

### **10.5 Limitations**

As with all research there are a number of limitations to the studies conducted here. Such limitations - the lack of a longitudinal approach, no account of the contingencies, common method variance and sample size (in some of the studies), - will now be discussed and their impact explored.



The approach taken here was not longitudinal. Instead, the approach took 'snap shots' of the managerial behaviours and asked participants to focus on idea generation and idea implementation. This is a limitation as full understanding of the process of innovation and the role managers play in employee innovation, requires innovations to be studied *as they evolve*. However, as is noted later in the suggestions for future directions section, this work has provided a platform from which longitudinal work can be conducted.

A second limitation is that the methods used in this study do not allow full exploration of the contingencies under which some of the managerial behaviours identified become more or less influential on employee innovation. Contingencies theories are prominent in leadership literature (see Fielder, 1967; House, 1971; Hersey & Blanchard, 1988); however in practical settings it is logistically difficult to identify and fully understand the all contingencies under which managerial behaviours are associated with employee innovation.

A methodological limitation of this research is common method variance.

Although a multi-method approach was adopted throughout this research, with a range of qualitative and quantitative methods (including CIT interviews, Repertory Grid interviews, questionnaires and the development of the map of innovation), in the construct validation studies there was a strong dependence on self report data, answered solely either by the manager or the employee, which may have led to common method variance, as participants were rating either themselves or their manager on a number of scales. However, this approach was adopted as it is a

recommended way to establish construct validity (see Kline, 1993). This problem was also observed in one of the criterion validation studies, where the manager was required to self-report on both the inventory and the map of innovation.

Another methodological limitation is that this thesis failed to obtain both views of the manager and views of the employee at the same time. Although the questionnaires in some instances asked participants to self-report (administered to the manager) and in other instances to asked participants to report on their manager (administered to the employee), simultaneous ratings of the manager by him/herself *and* by his/her employees were not obtained. This would have been useful to examine similarities and differences in ratings, and would have enabled the tool to be developed as a 360 degree development tool. However, due to practical constraints it was not possible to collect 360 degree data.

A further limitation is that two of the studies employed a relatively small sample size (n= 39 in Study 8 and n=38 in Study 9). Although ideally a larger sample would have been obtained, as this procedure took over an hour the organisations and managers involved were reluctant to give up a large amount of time. It was therefore difficult to find participants for such a time consuming process.

Unfortunately this is, of course, one of the logistical constraints faced by all researchers conducting field research.

## **10.6 Future directions**

This thesis has stimulated numerous research questions. Clearly the main finding of this work is the identification of four managerial behaviours associated with employee innovation. This research has also proposed the theoretical mechanism through which managers are associated with innovation, through the influence on intrinsic motivation and social learning. However, future research needs to empirically test this proposition. This could be done using both applied and experimental paradigms; for example, managers could be rated on the inventory developed in this research and employees could self-report their perceived competence, autonomy and relatedness. Alternatively the managerial behaviours could be manipulated and tasks which measure intrinsic motivation could be administered. The difficulty with the latter approach is that there are many behaviours which typify Feedback, Interpersonal Style and Empowerment, and this would have to be done in a laboratory setting, and therefore would have limited ecological validity.

As previously discussed one of the limitations of the work presented here is that there is a lack of multi-rater perspectives. Therefore, future research should aim to obtain self-ratings from a manager and ratings from his/her employees. This would allow this work to be applied in a 360 degree feedback development context. It is also important that future research uses multi-level modelling to explore the contingencies which influence the four-factor management of innovation model.