

Assessing and improving  
the enablers of innovation:  
*the development of an  
Innovation Capability Assessment  
instrument*

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## Abstract

The ability to successfully innovate on a sustained basis is critical in today's 'hyper-competitive' environment characterised by increasingly rapid technological change and shortening product life cycles, and where competitors quickly imitate sources of competitive advantage. At the same time, organisations find managing innovation difficult; both larger firms who fight to avoid being outplayed by smaller, more nimble competitors, and smaller firms struggling to compete against the resources and reach of larger, global competitors.

This research develops an assessment instrument designed to assist organisations to improve their ability to innovate. An inductive, case-based methodology is adopted utilising action research techniques to develop the Innovation Capability Assessment instrument. The starting point of the research was an extensive analysis of the corporate entrepreneurship and innovation literature. The literature provided a basis for understanding what question areas might need to be included in such an instrument and led to the development of an initial theoretical framework and a preliminary assessment instrument.

The preliminary assessment instrument was further developed and refined via five exploratory case studies. Three subsequent confirmatory case studies were used to validate the instrument's effectiveness. The case studies were carried out at Australian organisations operating within a variety of industries and of varying sizes, all of whom were looking to improve their innovation performance. Data was collected through interviews with key members of each organisation and through assessment and action planning workshops involving participants from a cross-section of each organisation. The case studies led to additional assessment questions being added to the instrument, and the rationalisation of others.

This research identifies the enablers of organisational innovation and finds that these are common to all the case organisations involved in the fieldwork. The innovation enablers form the basis of the Innovation Capability Assessment instrument that measures innovation performance against 21 questions within three key assessment areas: strategic management of innovation, the internal environment, and a series of

innovation competencies. The relative importance of each innovation enabler to the organisation is also assessed.

The Innovation Capability Assessment instrument is shown to be very relevant across a variety of organisation types and sizes. In addition, it is useful for an organisation to identify and prioritise weaknesses, and develop actions for improving their innovation capability.

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Whilst commencing a professional doctorate can be a decision made a single person, its completion can only occur with the help of many people, too numerous to mention here, but whose support and friendship has been greatly appreciated.

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“I am always ready to learn although I do not always like being taught”

Winston Churchill

## **Statement of Original Authorship**

This thesis contains no material which has been accepted for the award of any other degree or diploma, and to the best of my knowledge, contains no material previously published or written by another person, except where reference is made in the text of the thesis.

Signed.....

Dated.....

Michael Edward Ottaviano

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# 1 Introduction

This chapter introduces the research undertaken by way of providing background to the research and describing the research problem. It introduces the underlying assumptions upon which the research is based and justifies the importance of the research and the contributions it makes. The methodology used and the scope and limitations of the research is discussed and, finally, an outline of the thesis is provided.

## 1.1 Background to the research

Many organisations understand the importance of corporate entrepreneurship and innovation to their on-going success. Many, however, also admit that their own performance in this area is unsatisfactory. This research focuses on the management of corporate entrepreneurship and innovation in Australian organisations and specifically addresses the concept of an organisation's *innovation capability*. The primary question the research sets out to answer is 'how can an Innovation Capability Assessment instrument be developed and applied to help improve organisational innovation performance.'

The importance of innovation to both individual organisations and the economic development of society has been highlighted in the literature as far back as Schumpeter (1942). Huber (1984) postulated that innovation, and institutionalised experimentation, will take on an added importance in post-industrial organisations, whose environments will be characterised by increasing knowledge, complexity and turbulence. More recent research has established a positive link between innovation and business performance (Covin and Slevin, 1989; Dess, Lumpkin and Covin, 1997; Morris and Sexton, 1996; Zahra and Covin, 1995). The ability to innovate on a sustained basis, an innovation capability, is important as recent research has shown that organisations possessing innovation capabilities have a sustained competitive advantage (Alvarez and Barney, 2000) and use it to achieve higher levels of performance (Hurley and Hult, 1998).

Organisations in a variety of industries articulate the importance of innovation in various ways, for example, in vision and mission and value statements, promotional messages, internal communications and the like. A recent survey by the Boston Consulting Group (2003) of senior managers from organisations across 30 countries

highlighted the importance of innovation to their organisations (69% ranked innovation as one of their top three strategic priorities) whilst the majority (57%) reported being dissatisfied with their financial return on their innovation investments to date.

Initially the author turned to the literature to determine what assessment tools already existed that would allow a broad range of organisations to better understand and improve their management of innovation. It is this area of the literature, and the gaps identified, that led to the author developing a new theoretical framework from the literature and refining it via a series of case studies.

## **1.2 Research problem**

The research problem addressed in this research is how can an Innovation Capability Assessment instrument be developed and applied to help improve organisational innovation performance.

The Innovation Capability Assessment instrument is intended to function independently of the organisation's industry sector and size (i.e. be generic) and is meant to provide a comprehensive assessment that is both useful for the organisation to aid improvement and simple to apply.

The research area relevant for this problem is the management of innovation in organisations. In particular the research addresses the concept of an organisation's 'innovation capability', that is the various competencies an organisation must be proficient in, in order to effectively manage the innovation process. The research outcome is an instrument that assesses an organisation's innovation capability in order to improve it.

Four specific research questions were developed:

*RQ1: What areas of organisation capability does an Innovation Capability Assessment instrument need to include?*

*RQ2: How applicable is the Innovation Capability Assessment instrument across a variety of organisations?*

*RQ3: How useful is the Innovation Capability Assessment instrument in aiding organisational change?*

*RQ4: How effective is the process used to deliver the assessment and to develop actions for improvement?*

These questions are discussed in detail at the end of Chapter 2 of this thesis.

### **1.3 Assumptions**

The key assumption underlying this investigation is that organisations with more effective innovation capabilities will experience superior performance. Many researchers have proposed a positive association between innovation and entrepreneurial behaviour and firm performance, measured as sales growth, profitability and the like (Covin and Slevin, 1991; Miller and Friesen, 1982; Peters and Waterman, 1982; Zahra, 1991). Some have however also noted the lack of empirical documentation of this relationship (Zahra, 1991). More recently though, research findings have indeed empirically confirmed such relationships (Covin and Slevin, 1989; Deshpande, Farley and Webster, 1993; Dess, Lumpkin and Covin, 1997; Lumpkin and Dess, 2001; Morris and Sexton, 1996; Zahra and Covin, 1995). Whilst the aim of this research is not to establish an empirical relationship between an organisation's innovation capability and overall performance, it is reasonable to assume that improving an organisation's ability to innovate on a sustained basis, would in turn lead to an improvement in performance.

### **1.4 Justification for the research and contributions**

The following section explains why the research problem is important and outlines the contributions the research findings make to the extant body of literature.

#### **1.4.1 The importance of innovation to organisations**

Innovation is generally seen as an area of critical importance to organisations and is generally considered a key source of competitive advantage (Alvarez and Barney, 2000; Covin and Miles, 1999). Today's business environment is characterised by increasingly rapid technological change that is often discontinuous rather than incremental, leading to decreasing product life spans. In such 'hyper-competitive' environments, where competitors quickly imitate sources of competitive advantage, the ability to successfully innovate on a sustained basis is critical (Slater, 1997). Competitive advantage rests with a firm's managerial and organisational processes and encompasses its competences and

capabilities (Teece, Pisano and Shuen, 1997). Hence, if one could develop or improve an organisation's innovation capability, then one might create or improve a source of competitive advantage.

Research has shown positive correlation between corporate entrepreneurship and innovation and firm performance (Covin and Slevin, 1989; Dess, Lumpkin and Covin, 1997; Morris and Sexton, 1996; Zahra and Covin, 1995). Therefore improving an organisation's ability to innovate on a sustained basis, would in turn lead to an improvement in overall performance.

#### **1.4.2 The importance of assessing organisational capabilities**

The assessment of an organisation's internal capabilities is less developed theoretically and practically than more externally focussed external environment or situational analyses (Barney, 1995). This is a critical gap in the literature due to both effective strategic management depending upon an understanding of an organisation's strengths and weaknesses and, the external environment being largely uncontrollable for most organisations (Duncan, Ginter and Swayne, 1998). Hence, internal organisational assessment and analysis is an area in need of further research.

The assessment of an organisation's internal capabilities could be the first step in improving these capabilities (Dooley and Johnson, 2001). Likewise, the assessment of an organisation's innovation capability could allow improvement in the organisation's innovative performance. A similar approach has been undertaken previously by Day (1994) who set out to improve the market-oriented capabilities of organisations. He achieved this by identifying, assessing and improving the specific capabilities required by market-driven organisations. Similarly the author proposes identifying, assessing and improving the capabilities that set innovative organisations apart with the aim of improving organisational performance.

#### **1.4.3 The difficulty of successfully managing innovation**

The literature reports that, irrespective of size, organisations experience difficulty with the management of innovation. For example, whilst large firms are generally considered to dominate smaller firms as the major source of technology and innovations (Pavitt 1991), they still struggle to compete in areas of emerging business against smaller, more nimble organisations (Christensen, 1997). It has also been shown that product

innovation is inherently difficult and is associated with high failure rates. Stevens and Burley (1997), for example, showed that only 60% of all new product launches are commercially successful and estimate that it can take 3000 raw ideas to lead to a single new product or process success. Other research has shown similar failure rates with brand innovation (Davidson, 1976). Additionally, (Andrew, 2003) reported that many organisations have implemented management processes and systems, yet do not feel that they are receiving the full benefit of such processes and systems.

#### **1.4.4 The gap in the literature**

A review of the literature on assessment instruments aimed at improving organisational innovation capability reveals a lack of assistance for organisations in this area. Whilst a number of innovation assessment tools are being offered in the marketplace they generally aren't targeted at either the organisational level or at the capabilities that constitute an innovation capability. This gap in the literature and reasons for the inadequacy of the available tools is discussed in greater detail Section 2.4. Given the apparent lack of research in this area, those assessment tools that do exist, and are offered by practitioners, must raise concern over the rigour behind their construction. This indicates that the demand for such tools has led practice to go beyond research, and highlights the need for further research in this area.

In addition, there has also been little research on innovation in Australia (de Souza, 1989). Those studies that have been conducted (for example, Atuahene-Gima, 1996; Morrison, Roberts and Von Hippel, 2000) have generally returned results in line with international studies (Cooper and Kleinschmidt, 2000). Therefore, additional research in Australia that draws upon extant research findings from international sources can add to what is known about innovation within Australian organisations.

### **1.5 Overview of the Methodology**

This research was carried out in three stages; the first of which involved analysing the extant corporate entrepreneurship and innovation literature in order to develop a theoretical assessment framework. The theoretical framework was converted into a preliminary assessment instrument, which in turn was further developed and refined by incorporating insights from practice via five exploratory case studies conducted with a variety of organisations. These exploratory case studies involved convergent interviews



and application of the framework as an assessment instrument via workshops. The last stage of the research involved delivering a finalised version of the assessment instrument to organisations during three confirmatory case studies, allowing its usefulness as a means of assessing and improving an organisation's innovation capability to be better understood.

An action research methodology was adopted for this research as this was seen as the most relevant and applicable for both the inductive nature of the assessment instrument development, as well as for facilitating improvement and change during the confirmatory case studies. The researcher was in a privileged position as a consultant for KPMG as this allowed both access to a variety of organisations as well as the opportunity to employ an action research methodology within these organisations.

## **1.6 Delimitations of scope**

The research focuses on developing a means of assessing the innovation capability of organisations in Australia. A limitation of this research therefore is that it may not be relevant to organisations outside of the Australian socio-economic environment.

One of the aims of the research is that the instrument should be widely applicable across a variety of organisations operating in different industries, of different sizes and with differing aims. However, due to the case study methodology adopted and to resources limitations, only eight organisations could be studied. Further research should be able to confirm wider applicability of the instrument, for example in foreign organisations or those operating in industries not included in this study, such as 'high-technology' industries.

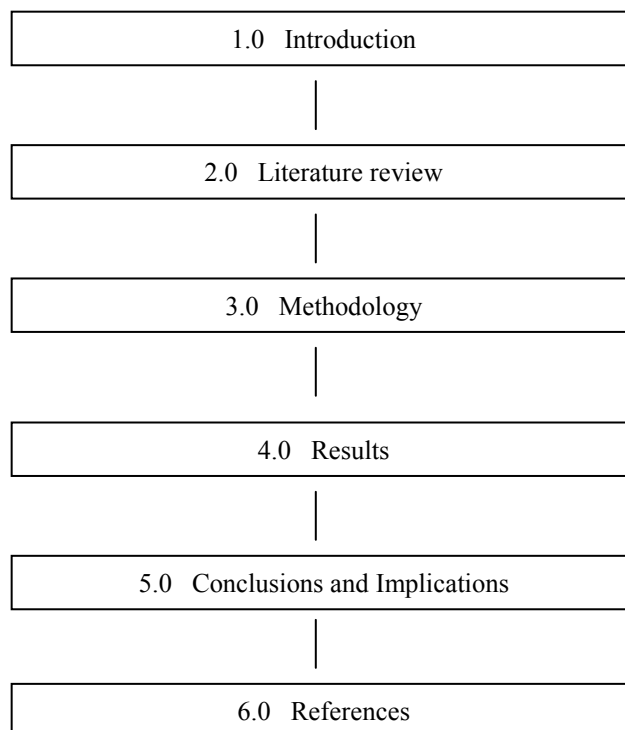
The evaluation as to the effectiveness of the assessment instrument is something that can only be determined over longer periods of time than the researcher's studies allowed. Therefore the focus of this research is on the development and improvement of such an instrument that may then be evaluated more rigorously in further study beyond the scope of this research.

## **1.7 Outline of thesis chapters**

The research is reported in five chapters in this thesis. Chapter 2 follows on from the Introduction by describing and analysing the extant corporate entrepreneurship and

innovation, and organisational assessment and change literature, concluding with the development of the theoretical assessment framework and research questions. Chapter 3 outlines the methodology used during the research. Chapter 4 presents the results of the exploratory and confirmatory case studies, whilst Chapter 5 discusses the results in relation to the research questions and the implications of the research for theory, practice and future research. A list of references and several appendices containing research instruments, within case analysis and the like are also included. Figure 1 below outlines the structure of the thesis.

**Figure 1.1: Outline of thesis structure**



*Source: author*

## **1.8 Chapter Summary**

This chapter introduced the research problem and aim of developing an Innovation Capability Assessment instrument that can be applied as a means of facilitating improved organisational innovation performance. Four specific research questions were highlighted and the methodology used to address these questions was outlined. The importance of this research was described as was the assumption upon which it is based; that improving an organisation's ability to innovate on a sustained basis, would in turn lead to an improvement in organisational performance. The following chapter details

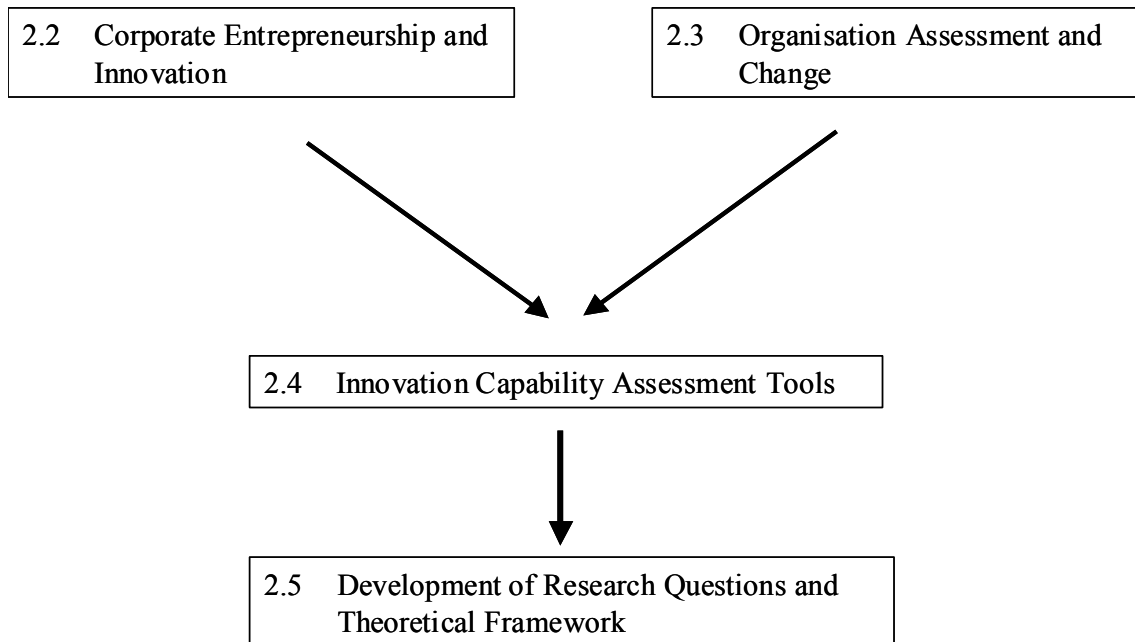
the literature relevant to the research problem and concludes with a discussion of the research questions answered during the fieldwork.

## **2 Literature Review**

The research focuses on the design of an assessment instrument aimed at stimulating improvement in an organisation's innovation capability. The literature that informs this research can be found in the corporate entrepreneurship and innovation field as well the organisational assessment and change fields. This chapter explores this literature and derives from it a conceptual framework for assessing an organisation's innovation capability. Because this research focuses on managerial and organisational capabilities and endeavours to adopt an holistic approach to the management of innovation, it draws upon a wide base of literature sources including product and process development, strategic management, research and development ('R&D') and technology management, resource-based organisational theory, organisational learning, intellectual property and the like.

The following section, 2.1, introduces and defines key terms used in the remainder of the research. Section 2.2 summarises the relevant literature on the constituent elements of organisational innovation capability and Section 2.3 introduces and summaries literature on organisational assessment and change. Section 2.4 addresses the area of innovation assessment tools and finally, Section 2.5 develops the theoretical framework that forms the basis of the Innovation Capability Assessment instrument and presents the development of the research questions to be addressed in this thesis. The conceptual schema for this chapter is given in Figure 2.1 below.

**Figure 2.1: Outline of Literature Chapter**



*Source: author*

## **2.1 Definitions**

There is a lack of consistency in the definition of many terms in the corporate innovation and entrepreneurship literature (Wolfe, 1994). The terms ‘innovation’, ‘entrepreneurship’, ‘corporate venturing’, ‘strategic renewal’ and ‘intrapreneurship’, for example, are often ill defined and their meanings overlap. Shane and Venkataraman (2000, p.218) note “perhaps the largest obstacle in creating a conceptual framework for the entrepreneurship field has been its [lack of] definition.” Other researchers agree. Hitt et al. (2001, p.488) highlight that whilst “entrepreneurship has existed as a practice and field of study for quite some time, there is no commonly accepted and well-developed paradigm for research in the field.” Sharma and Chrisman (1999, p.11) highlight the “striking lack of consistency in the manner in which these activities have been defined”. In summarising the literature on innovation, authors have likewise decried the lack of a theory or model of innovation that would enable a predictive understanding of its nature (Garcia and Calantone, 2002; Utterback, 1986; Van de Ven, 1986). Some authors have suggested that future innovation and entrepreneurship research should be more holistic in nature and endeavour to integrate the related fields of creativity, change and innovation (Brazeal and Herbert, 1999).

This section defines the following key terms that are used throughout the thesis:

- innovation;
- entrepreneurship;
- corporate entrepreneurship; and
- innovation capability.

### **2.1.1 Innovation and Entrepreneurship**

The interrelationship between entrepreneurship and innovation is a recurring theme in the corporate innovation and entrepreneurship literature. Lumpkin and Dess (2001) argue that a key dimension of an entrepreneurial orientation is an emphasis on innovation, whilst Guth and Ginsberg (1990) view corporate entrepreneurship as both the birth of new business within existing organisations, whether through innovation or joint/venture/alliances, and the transformation of organisations through strategic renewal.

Innovation is often seen as one aspect of entrepreneurship in the literature. For example, entrepreneurial attitudes and behaviours are described as consisting of three dimensions: innovativeness, risk-taking and proactiveness; where innovativeness is the seeking of creative, unusual, or novel solutions to problems and needs (Covin and Slevin, 1991; Morris, 1998).

For the purposes of this research, entrepreneurship is “*the process where individuals and teams create value by bringing together unique packages of resource inputs to exploit opportunities in the environment*” (Morris and Sexton, 1996, p.6). Corporate entrepreneurship is defined as “*the process whereby an individual or a group of individuals, in association with an existing organisation, create a new organisation, or instigate renewal or innovation within that organisation*” (Sharma and Chrisman, 1999, p.18). Sharma and Chrisman point out that the presence of innovation “...is viewed as a sufficient condition for entrepreneurship but not a necessary one” (Sharma and Chrisman, 1999, p.18). Therefore, innovation implies corporate entrepreneurship but not vice versa.

An alternative view, whereby entrepreneurship is seen as a component of innovation is proposed by Hurley and Hult (1988) who argue that, if entrepreneurship involves entering new or established markets with new or existing goods (Lumpkin and Dess, 1996), then innovation is a broader term than entrepreneurship, as innovation may occur without entering new markets. They use the example of Xerox Corporation implementing Total Quality Management as an administrative innovation that didn't involve entering new markets.

Damanpour (1991, p.556), defines innovation broadly as the "...adoption of an internally generated or purchased device, system, policy, program, process, product or service that is new to the adopting organisation". In maintaining consistency with an inclusive approach, the author has defined innovation as "*the development and implementation of new ideas by people who over time engage in transactions with others in an institutional order*" (Van de Ven, 1986, p.591). As the unit of analysis in this research is the organisation, then 'new' in this definition relates to the degree of 'newness' to the organisation – "as long as the idea is perceived as new to the people involved, it is an 'innovation' even though it may appear to others to be an 'imitation' of something that exists elsewhere" (Van de Ven, 1986, p.592).

For the purposes of this paper, the author has chosen to use the terms 'innovation' and 'innovation capability' but will draw upon the broad body of literature often referred to as the corporate entrepreneurship and innovation literature. Similar to Drucker (1985), who suggests that innovation is the primary activity of entrepreneurship, and Covin and Miles (1999), who argue that innovation is the common theme underlying all corporate entrepreneurship; this research focuses specifically on innovation rather than entrepreneurship. Where reference is made to entrepreneurship or corporate entrepreneurship, the author concentrates on the innovative aspects of both.

### **2.1.2 Dimensions of Innovation**

In addition to the lack of definition surrounding innovation, is the omission of many researchers to clearly identify the various dimensions (for example, type and degree) of the innovations they are studying. This minimal attention to the types and characteristics of the innovations studied hampers comparisons of findings and theoretical development (Wolfe, 1994). Varying descriptions are used depending on the particular focus of the innovation research.

The *type* of innovation is a common differentiator used in the literature. In this case, innovation is characterised by the outcome of an innovation process, often as either a product or process innovation (Bienayme, 1986; Bingham, 2003; Harmsen, Grunert and Declerck, 2000; Utterback, 1994). Other common terms used to distinguish the type of innovation are: business model innovation (Hamel, 2002), administrative innovation (Damanpour, 1991; Wolfe, 1994), organisational innovation (Huiban and Bouhsina, 1998; Ravichandran, 1999; Zahra, 1993), and marketing and management (Higgins, 1995). Pinchot and Pellman's (1999, p.107) definition of innovation as "both the creating and bringing into profitable use of new technologies, new products, new services, new marketing ideas, new systems, and new ways of operating" incorporates both product (and service) and process (marketing, systems, operating) together.

'Technological' (Tushman and O'Reilly, 2002) or 'technical' (Damanpour, 1991) innovation are common terms used throughout the literature. These are often considered to be another type of innovation, however these terms are in fact a modifier of the existing types of innovation discussed above rather than another distinct type. That is, product, service and process innovations may incorporate new technologies to varying extents. Previous researchers have also argued that most innovations involve both technical and administrative components (Van de Ven, 1986).

Abernathy and Clark (1985) evaluated innovation from the perspective of what advantage it allows an organisation with respect to its competitor, resulting in the categorisation of four innovation types:

- 'architectural' innovations leverage new technologies to open up new markets and renew old ones;
- 'niche' innovations allow the creation of new markets via the utilisation of existing technology;
- 'regular' innovations, similar to Christensen's (1997) 'sustaining' innovations, are continual, incremental changes that have a significant cumulative effect on product cost and performance; and
- 'revolutionary' innovations, similar to Christensen's (1997) 'disruptive' innovations, disrupt or render obsolete established production and technical



competencies in existing markets. As a contrast to this type of innovation, Christensen describes ‘sustaining’ innovations as those that complement an organisation’s existing technological competencies, allowing continual improvement of their products and processes.

In relating positive financial outcomes with innovative performance, Zahra (1991) talks of ‘internal entrepreneurship’; centred on reviving the existing business through innovation and venturing, and ‘external entrepreneurship’; centred on broadening and revising the concept of the business (business model innovation), and argues that future studies need to incorporate both aspects.

The *degree* of change an innovation results in, is another common aspect described in the literature. Innovations are often described as ranging from the incremental (often described as product extensions, continual improvement, total quality management and the like) through to radical (McDermott and O’Connor, 2002), breakthrough (Ahuja and Lampert, 2001), discontinuous (Rice et al., 1998; Tushman and O’Reilly, 2002), revolutionary (Abernathy and Clark, 1985; Rosson and Martin, 1985), or disruptive (Christensen, 1997). Foster and Kaplan (2001, p.107) describe three degrees of innovation – incremental, substantial and transformational and argue that “two factors determine the level of innovation: how new the innovation is and how much wealth it generates.” Likewise, (Garcia and Calantone, 2002) in their review of the literature, subdivide innovations into three similar categories based on degree – radical (12.5% of all innovations), really new (50%) and incremental (37.5%). Abernathy and Utterback (1978) argued that companies’ innovative patterns occur in a consistent manner where radical product innovations are followed by incremental innovations, which in turn are followed by process innovations once a dominant design is established.

Other means of description abound; Wolfe (1994) provides a comprehensive overview of these. For the purposes of this paper, the author will refer to four types of innovations. The first is the ‘type’ of innovation and includes:

- Product innovations – new or enhanced products or services introduced to meet an external user or market need (Damanpour, 1991);
- Process innovations – new elements introduced into an organisation’s production or service operations (Damanpour, 1991);

- Administrative innovations – changes to an organisations organisational structure and administrative processes that are indirectly related to basic work activities of the organisation and more directly related to its management (Damanpour, 1991); and
- Business model innovations – changes to the way in which an organisation serves its customers and generates income (Aldrich, 1999; Mitchell and Coles, 2004; Zahra, 1991).

The second dimension of innovation considered in this research by the author is ‘degree’. The degree of innovation is considered to extend along a continuum, either end of which are represented as:

- Incremental innovations – produce little change or result in a minor departure from existing practices (Damanpour, 1991; Ettl, Bridges and O’Keefe, 1984); and
- Radical innovations – produce fundamental change or result in clear departures from existing practices (Damanpour, 1991; Ettl, Bridges and O’Keefe, 1984).

### **2.1.3 Innovation Capability**

The term capability refers to an organisation’s ability to use organisational processes to marshal its resources and achieve desired objectives. Capabilities are firm-specific, information-based processes that are developed over time through complex interactions amongst the organisation’s resources (Amit, Brigham and Markman, 2000). Amit and Schoemaker (1993, p.35) give as examples of innovation-related capabilities, “...repeated process or product innovations, manufacturing flexibility, responsiveness to market trends or short product development cycles.”

Several authors have referred to the term ‘innovation capability’ in the literature. For example, Burgelman, Kosnik and van den Poel (1998, p.36) describe innovative capabilities as the “...comprehensive set of characteristics of an organisation that facilitate and support its innovation strategies”. Zien and Buckler (1997, p.276) highlight that “innovative companies, regardless of differences in industry and geographic culture, share a set of characteristics, qualities and behaviours that differentiates them from other less innovative companies.” A similar term, a ‘capacity

to innovate’, may have been first used by Burns and Stalker (1961) who describe it as the ability of an organisation to successfully adopt and implement new ideas, processes or products. The term ‘entrepreneurial capabilities’ is also used and is similarly described as the resources and capabilities that enable proactive agility, curiosity, opportunity recognition, learning and innovation (Amit, Brigham and Markman, 2000; Miles et al., 2000).

For the purposes of this research, the author defines an innovation capability as *the ability of an organisation to successfully innovate on a sustained basis*. Whilst researchers have referred to an organisation’s ‘innovativeness’ as the propensity for a firm to innovate or develop new products (Ettlie, Bridges and O’Keefe, 1984), and as the capacity of a firm to adopt innovations (Damanpour, 1991; Rogers, 2003), for this research, an innovation capability refers to both the generation or initiation, and the commercialisation or adoption of innovations. Researchers have shown that organisation’s possessing innovation capabilities have a sustained competitive advantage (Alvarez and Barney, 2000) and use it to achieve higher levels of performance (Hurley and Hult, 1998).

## **2.2 Corporate entrepreneurship and innovation literature**

The aim of this review of the corporate entrepreneurship and innovation literature is to identify the enablers of effective organisational innovation, as these will be the areas included in an Innovation Capability Assessment instrument. Upon analysis of the literature, three categories of innovation capability enablers emerged. This section in the literature chapter is sub-divided into three corresponding sub-sections:

- the Strategic Management of Innovation;
- the Internal Environment of the organisation; and
- Innovation Competencies.

### **2.2.1 Strategic Management of Innovation**

The first category of innovation capability enablers to be discussed is the ‘strategic management of innovation’. The following sub areas are reviewed in this section:

- innovation strategy and vision;

- future scenarios;
- competency management;
- funding management; and
- alliances and networks.

### **Innovation Strategy and Vision**

Much research has focussed on the relationship between strategy and innovation (Burgelman and Maidique, 1998; Dess, Lumpkin and Covin, 1999; Dodgson, 2000; Hitt et al, 2002; Meyer and Heppard, 2000; Miles and Snow, 1978; Mintzberg, 1998; Porter, 1980, 1985; Utterback, 1986).

The importance of taking a strategic approach to innovation has been described in the literature (Kanter, 1985; Kuratko, 1993). Strategic entrepreneurship has been described as integrating the entrepreneurial (i.e., opportunity-seeking actions) and the strategic (i.e., advantage-seeking actions) to create wealth (Hitt et al., 2001). Organisations have been described as ‘innovators’ when, rather than endeavouring to adapt to the environment, they instead avoid much of the competition by operating in relatively unexploited areas of the market (Miller and Friesen, 1978). Other similar descriptors have been used to describe such firms, for example, Miles and Snow’s (1978) ‘prospectors’ and Mintzberg and Water’s (1985) ‘entrepreneurial firms’.

An innovation strategic plan outlines the development path along which key capabilities will evolve, translates the mission and objectives into short- and long-term goals and allocates resources (Adler, MacDonald and MacDonald, 1992). In addition, it may suggest multiple areas that innovation or technology strategies can focus on including defining a mix of basic research, applied research and development, emphasizing product or process innovation, distinguishing between incremental and radical innovation (Adler, MacDonald and MacDonald, 1992), and indeed, whether to innovate or imitate (Higgins, 1995). Miles et al. (2000) likewise suggest management make strategic decisions on whether to pursue primarily product versus process innovation.

Much of the research on the strategic management of innovation has concentrated on organisations that have pursued product innovation strategies (Cooper, 1990; Mahajan,

Muller and Bass, 1990; Tufano, 1992; Urban, Hauser and Dholakia, 1997). This overlooks other aspects organisational innovation, such as administrative or process innovations, that have less obvious but at least as important potential benefits as product innovation. Indeed such innovations may be of greater value to organisations, as "... process and organisational innovations are less visible to competitors and therefore more difficult to imitate" (Zahra, 1993, p.49).

The link between an organisation's innovation strategy and vision is also discussed in the literature. Miles et al. (2000) point out the need for the strategy to be aligned to an overall organisational objective or vision. They argue that a strategic vision should be communicated by senior management that covers both content (e.g., the scope of the firm's efforts) and the processes necessary to achieve this (e.g., the entrepreneurial actions and the means to promote such actions). Alexander (1989) argues that high performing organisations require a clearly communicated organisational vision. Efforts that are aligned to an organisation's vision and strategy are more likely to achieve success as they are seen as a means of actualising an organisation's mission.

Another aspect of the strategic management of innovation in the literature is the ability and advantages associated with the speed at which organisations set out to develop innovations relative to competitors. Different strategic approaches are described, for example 'first-to-market', 'fast follower' or 'second but better', 'imitation' and the like (Foster, 1986; Johne and Storey, 1998; Utterback, 1994; Tufano, 1992). Christensen (1997) also highlights the importance of considering reactive or proactive strategic approaches but argues that the type of innovation determines what advantage is possible. Being first to market in sustaining innovations (those that build on commonly known technology and information) is not competitively important, however, there are strong first-mover advantages available for disruptive innovations, where significant investment of both time and resources are necessary for competitors to imitate.

Matching the innovation strategic choice with the external environmental conditions is crucial to organisational success. Zahra, Nash and Bickford (1995) outline several environmental conditions that promote aggressive first to market strategies including: when the rate of technological diffusion in the industry is low, and when there is market dynamism arising from changes in customer needs and expectations. Conversely, there are certain environmental conditions that would discourage such an approach. These

include: if the industry is undergoing a major technological upheaval; when the development of the market or industry requires major irreversible investments; and when the industry is well established and it has an accepted standard, as replacing this standard can be time consuming and costly. An understanding of the environmental conditions can be achieved through 'environmental scanning' - the process of data collection, analysis and interpretation of environmental conditions (Zahra, Nash and Bickford, 1995).

The measurement of progress against innovation strategies is another area highlighted in the literature (Brown, 1997; Cordero, 1990; Eccles, 1991; Geisler, 2002; Hauser, 1996; Voss, 1992). For example, Kuczmarski (2000, p.26) argues that one of the reasons executives and managers are reluctant to encourage innovation and risk taking in their organisations is due to "a lack of any metrics relating to return on innovation." He recommends firms use two types of metrics: innovation performance metrics that measure growth, and innovation program metrics that measure program management and control. Zien and Buckler (1997) found that corporate wide innovation metrics were central to all companies in their study of 12 global innovative firms. Other research has highlighted that organisations using innovation metrics (for example, the proportion of revenue contributed by new products) are typically in the minority (Boston Consulting Group, 2003).

### **Future Scenarios**

The development of strategies based upon some understanding of possible future occurrences and situations is another recurrent theme in the literature (Barker, 1993; Godet, 2000; Hamel, 2002; Hamel and Prahalad, 1994; Schwartz, 1991; Slaughter, 1989). This is based on the proposition that those organisations whose innovation efforts are directed toward possible futures and the development of likely competencies required, will be more successful than others (Pinchot and Pellman, 1999).

What is debated in the literature, however, is the best way to develop such an understanding of possible futures. For example Hamel and Prahalad (1994, p.89) argue in favour of foresight rather than scenario planning; "in 'unstructured' industries the number of future permutations is so multitudinous that any traditional scenario-planning process would be hard pressed to represent the range of potential outcomes". Foresight,

they argue, "...must be informed by deep insight into trends in lifestyles, technology, demographics, and geopolitics, but foresight rests as much on imagination as on prediction" (Hamel and Prahalad, 1994, p.89).

Likewise, Slaughter (1989, p.461) in his review of futures research urges less focus on the "over-hyped surfaces of gadgets and machines ...and paying much more attention to the hidden assumptions and commitments underlying them." This is necessary, he argues, because the key shifts that influence future outcomes occur at these deeper levels and are concerned with "...epistemological reconstruction and the recovery of meaning, value and purpose" (Slaughter, 1989, p.462).

### **Competency Management**

The concept of core competencies in the corporate innovation and entrepreneurship literature stems from the resource-based view of the firm which describes the firm as a heterogeneous combination of resources and capabilities that are leveraged to create competitive advantage (Alvarez and Barney, 2000; Amit and Schoemaker, 1993; Christiansen, 2000; Lei, Hitt and Bettis, 1996; Leonard-Barton, 1992; Meyer and Utterback, 1993; Stalk, Evans and Shulman, 1992; Teece, Pisano and Shuen, 1997; Utterback, 1994; Wernerfelt, 1984). More specifically, core competencies are a set of unique skills, complementary assets and practices (Teece, Pisano and Shuen, 1997) that provides access to a wide variety of markets, makes a significant contribution to the perceived customer benefit and is difficult for competitors to imitate (Hamel and Prahalad, 1990). Leonard-Barton (1992, p.113) extends this view to include "...the values and norms associated with...knowledge creation and control".

It has been suggested for some time now in the strategic management literature that firms should be viewed as portfolios of resources rather than as portfolios of products, as this provides a different and perhaps richer perspective on their growth prospects (Hamel and Prahalad, 1994; Wernerfelt, 1984). This 'resourced-based theory' of the firm – often considered to have been initiated by Penrose (1959) - could be used to complement the traditional industrial organisation view based on industry structure and market power. Here, strategic planning focuses on selecting an attractive industry and then positioning the firm optimally within the existing market structure according to a

generic strategy and by identifying which combination of segments, channels, price points and value chain configurations will be most advantageous (Porter, 1980).

The importance of competency management, and in particular, the identifying and developing of competencies difficult for competitors to emulate, is highlighted as one aspect of the most important strategic problems facing an innovating firm (Teece, Pisano and Shuen, 1997). Therefore, the strategic focus shifts from what products and services to offer, to what competencies and skills to develop. In fact, due to its longer term view and greater dynamic flexibility, there is substantial argument in the literature for the greater relevance of a competency-based view of strategy than an competitive forces view in ever-increasing complex and dynamic environments where innovation becomes more important (Hamel and Prahalad, 1994; Lei, Hitt and Bettis, 1996; Teece, Pisano and Shuen, 1997; Zack, 2002).

Barney (1995) argues for four essential elements of a firm's capabilities that must be present in order for them to be *core* competencies, and for the organisation to gain competitive advantage from them. These elements are:

- core competencies must add value by enabling the exploitation of opportunities and/or neutralisation of threats;
- core competencies must be rare;
- core competencies must be difficult to imitate; and
- the firm must be organised in such a way that allows the exploitation of their core competencies.

New competencies can be built by merger and acquisition (M&A), internal development (hiring or training) or by entering into alliances. These changes and the need for new competencies may be tracked and managed through a competency management system (Christiansen, 2000). This can be used to assist in determining what competencies the company currently has, where they are used, how important they are, what gaps exist and what competencies it should have, what it should retain, develop and divest. An understanding as to what constitutes an organisation's core competencies allows the development of strategic growth alternatives that are unique to the organisation and therefore a source of competitive advantage (Lei, Hitt and Bettis, 1996).



It is suggested those organisations that develop a detailed understanding of current competencies and formalised objectives for the development of future core competencies will be more effective at developing radical technologies (McDermott and Handfield, 2000). Further, organisations can gain profitable innovative advantages through building up firm-specific competencies that would require significant investment and time for competitors to imitate (Pavitt, 1991).

### **Funding Management**

The determination and distribution of funding is clearly a broader strategic management issue but one that has specific implications within the corporate innovation and entrepreneurship literature. There is the link with the management of competencies discussed above via funding allocation to develop competencies. This has unique difficulties "...since they involve processes that are both lengthy and uncertain, and whose outcomes...are often intangible and difficult to measure" (Pavitt, 1991, p.47).

Also highlighted in the literature is the source of funding for innovations from non-corporate areas. For example, Rice et al. (1998) identified that in eight out of eleven radical innovation projects studied, government was a major source of funds, which were used to extend, expand and accelerate projects.

The ability to quickly fund ideas as a means of 'fast-track' or 'fast-fail' concepts is also described in the literature. For example, Pinchot and Pellman (1999, p.26) describe the effect of 'seed money' as playing "...an important role in liberating the intrapreneurial spirit of the organisation". This allows the bypassing of normal, and often bureaucratic approval processes, allowing the momentum of an innovative idea to be maintained.

The allocation of resources and, in particular, the use of portfolio management techniques is also discussed in the literature. Portfolio management allows the prioritisation of funding and people across innovation initiatives, the linking of these initiatives to strategy and matching of risk and reward (Cooper, Edgett and Kleinschmidt, 2000; Pinchot and Pellman, 1999).

The degree of sophistication and appropriateness of methods to measure the value of such a portfolio or of individual innovation projects is also discussed. For example, several researchers argue that reliance on discounted cash flow (DCF) methods, which

view the innovation process as static, neglects their 'option value' and ignores the inherently dynamic nature of innovation (Pavitt, 1991; Seely Brown, 2003). Firms should combine DCF-type assessment with options valuation and qualitative measures that integrate learning and option values (Pavitt, 1991).

### **Alliances and Networks**

Innovative activity often must extend beyond the confines of the organisation as core competencies can lead to inertia and become core rigidities (Leonard-Barton, 1992) and bureaucratic management can lead to a stifling of internal initiatives (Hoskisson and Busenitz, 2002). Many authors have published research on the importance of pursuing external sources of financial and social capital, knowledge and technologies in order to complement in-house competencies, to learn and to gain competitive advantage (Alvarez and Barney, 2000; Cohen and Levinthal, 1990; Hitt et al., 2001; Ireland, Hitt and Viadyanath, 2002; Johnson and Van de Ven, 2002). Recently, Chesbrough (2003) has argued that the 'closed innovation paradigm' that existed for most of the 20<sup>th</sup> century, and was predicated primarily on internal research and development (R&D) efforts, is no longer sustainable. This is due to a variety of factors including: the increased mobility of highly experienced, educated and skilled people; the growing presence of venture capital specialising in the conversion of research ideas into commercialising companies; decreasing 'time-to-market' and product life cycles, and globalisation of competition.

Ireland, Hitt and Viadyanath (2002, p.415) cite numerous sources of value creation possible through the pursuing of alliances including "scale economies, the effective management of risk, cost efficient market entries and learning." In addition, they note that alliances help partners "to minimize transactions costs, cope with uncertain environments, reduce their dependence on resources outside their control, and successfully reposition themselves in dynamic markets." Whilst all of these advantages could be associated with innovation, several (risk management, learning, dealing with uncertain and dynamic environments) are particularly relevant.

Options for developing external linkages range from networks and strategic alliances through to joint venture arrangements and merger and acquisition activity. Hoskisson and Busenitz (2002) present a comprehensive framework outlining the most appropriate

mode of entering new areas that take advantage of entrepreneurial opportunities relating to the degree of market uncertainty and the degree of learning required.

Cooper (2002) describes the way alliances may be used at different phases of venture creation. Other authors talk about the ability of firms to learn from each other i.e., their 'absorptive capacity' and the implications of having capabilities that are too dissimilar (Cohen and Levinthal, 1990). Rice et al. (1998) highlight the widespread use of alliances for a variety of purposes including manufacturing, application development, market probing, and joint development of technology in disruptive innovation projects. Suitable partners include other large firms, universities, government laboratories, and small high-tech firms. Suppliers have also been highlighted specifically as strategic alliances partners characterised by open information-sharing, co-location of supplier design personnel, and joint future technology planning (McDermott and Handfield, 2000; Walter, 2003; Zirger and Hartley, 1996).

### **2.2.2 Internal Environment**

The second stream of innovation capability enablers to emerge from the literature pertains to an organisation's 'internal environment'. Whilst, the delineation between an organisation's internal and external environments is a somewhat artificial one, particularly in an increasingly 'networked' world, it is useful in order to concentrate on the factors that organisations have direct influence over. Similar delineations have been made in previous research (for example, Zahra and Covin, 1995). The internal environment factors discussed below are:

- organisational culture;
- organisational learning and knowledge management;
- enabling technology;
- organisational structure; and
- people management.

As outlined below, these factors have all been shown to have significant impact on innovation performance of organisations. For example, in one of the few such studies undertaken on Australian organisations, it was shown that the internal environment of

organisations can impact positively on innovation performance where the top management is committed to innovation, employees are empowered, innovation is rewarded and there is managed risk taking (de Souza, 1989).

### **Organisational Culture**

Numerous studies and publications have pointed to the crucial role that organisational culture has on innovation (Cabrera, Cabrera and Barajas, 2001; Drucker, 1985; Frohman, 1988; Hurt and Teigen, 1977; Knox, 2002; Pinchot and Pellman, 1999; Reigle, 2001; Smircich, 1983; Tushman and O'Reilly, 2002; Walton, 1985; Wilson, Ramamurthy and Nystrom, 1999). Indeed, there is probably no other area in the corporate entrepreneurship and innovation research that has such universal acceptance as to its importance. For example, Hornsby, Kuratko and Zahra (2000) identify, from both the literature and empirical study, five organisational factors that promote entrepreneurial activities in organisations that include three cultural variables: the use of rewards, top management support and the propensity for risk taking and failure tolerance. Likewise more 'popular' research has also emphasised the importance of culture in driving successful and innovative organisations such as Collins and Porras (2000), Kanter (1989) and Peters and Waterman (1982).

An organisation's culture has been referred to as, "the values and beliefs that employees hold: culture can be a de facto governance system as it mediates the behaviour of individuals and economises on more formal administrative methods" (Teece, Pisano and Shuen, 1997, p.520). In some areas of the literature a distinction has been made between the terms 'culture' and 'climate'. In this sense, 'culture' is the deeply embedded set of "values and beliefs that provide norms for behaviour in the organisation", whilst 'climate' is how the organisation operationalises its culture via the structures and processes that facilitate the achievement of its desired behaviours (Schein, 1990). For the purposes of this research, the author considered both aspects as described by Schein as simply 'culture'. This is partly due to the need of the developed assessment framework to be readily understood by management and staff of organisations where the term 'culture' is preferred, as well as there not being general consensus in the literature as to the distinction between the two terms (Slater and Narver, 1995).

Kuratko, Montagno and Hornsby (1990) carried out one of the most in-depth studies to date aimed at determining the cultural dimensions of intrapreneurial organisations. In their analysis of 87 Fortune 500 firms, they constructed a 28-item survey instrument based on five factors from the extant corporate innovation and entrepreneurship literature. Their results demonstrated five conditions critical in establishing a climate conducive for innovation in corporations: (1) senior management support; (2) risk-taking activity; (3) organisational structure; (4) rewards; and (5) resource availability.

Managed risk taking and failure tolerance is a common theme within the cultural aspects of innovation research (Farson and Keyes, 2002). The importance of organisations creating a culture where managed risk taking is supported and new ideas are explored is highlighted (Howell and Higgins, 1990), as is having a culture that promotes 'controlled experimentation' (Huber, 1984; Peters and Waterman, 1982) to test new ideas rapidly. Jennings and Lumpkin (1989) compared entrepreneurial and conservative financial service firms for a number of variables and their findings showed that the former differ significantly from the latter in displaying participative decision making, higher reliance on specialised personnel, participative construction of performance objectives and in providing rewards for risk taking and failure tolerance.

Leadership and senior management support for successful organisational innovation is another important area within the culture and innovation body of research (Bass, 1985; Bowman, 2000; Chiesa, Coughlan and Voss, 1996; Drucker, 1985; Geijsel, Slegers and van den Berg, 1999; Goleman, 2000; Hoffmann and Hegarty, 1993; Hornsby, Kuratko and Zahra, 2000; Howell and Higgins, 1990; Hubbard et al., 2002; Kanter, 1984, 1988; Miles et al., 2000; Pinchot and Pellman, 1999; Rule and Irwin, 1988; Senge, 1990; Topalian, 2000). For example, Van de Ven (1986) argues that effective leadership is critical in creating a cultural context that supports innovation as well as the strategies, structure and systems that facilitate innovation.

It has been argued that little innovation can occur without a visionary leader who is able to overcome internal and external obstacles and be prepared to accept responsibility for failure (Morris and Sexton, 1996). Various entrepreneurial aspects have been suggested as being important for leaders including promoting an entrepreneurial capability, encouraging the development of innovations that might threaten the firm's current business model, keeping the organisation's boundaries broad enough to encompass

promising opportunities, being prepared to question the current dominant logic focus and linking entrepreneurship and strategy (Covin and Slevin, 2002).

There has also been significant research into the role that 'champions' play in promoting innovation within the organisation by displaying a range of characteristics and behaviours including technical competence, knowledge of the market, drive and aggressiveness, influence and political astuteness, risk taking and innovativeness and the like (Chakrabarti, 1974; Hauschildt and Kirchmann, 2001; Howell and Higgins, 1990; Maidique, 1980). Rice et al. (1998) describe the initial recognition of an opportunity as a creative, cognitive act that requires linking disparate bits of information together. They observed that it was first-line managers rather than senior managers who recognized such opportunities. This necessitated the need for champions such as technical champions, project champions, senior management champions, and business unit champions for giving early validation to the value of the technology, overcoming internal resistance and providing access to scarce resources.

### **Organisational Learning and Knowledge Management**

The proposition that better knowledge and means to acquire that knowledge will lead to improved outcomes (and therefore increased innovation) has encouraged researchers to study organisational learning (Fiol and Lyles, 1985), its use as a source of competitive advantage (Choo and Bontis, 2002; Conner and Prahalad, 1996) and its link with innovation (Cohen and Levinthal, 1990; Buckler, 1996; Hurley and Hult, 1998; McAdam, 2000) and organisational performance (Calantone, Cavusgila and Zhaob, 2002; Coombs, Hull and Peltu, 1998; Nonaka, 1991; Senge, 1990; Seely Brown and Duguid, 1991). Knowledge can be a source of sustainable competitive advantage due to it being difficult to imitate and trade, and because the more a firm knows, the more it can learn (Cohen and Levinthal, 1990). Furthermore, the relationship between knowledge, innovation and competitive advantage is a fundamental one. Indeed, organisations cannot innovate without knowledge, therefore, cannot gain competitive advantage either (Ichijo, 2002).

It has been proposed in the literature that knowledge creation leads to continuous innovation (Edvinsson et al., 2004), which in turn leads to competitive advantage (Nonaka and Takeuchi, 1995). Other researchers have suggested a similar relationship,

arguing that when viewed from a behavioural change or implementation perspective, organisational learning is equivalent to innovation and conclude that organisations whose cultures emphasise learning are associated with a greater capacity for adaptation and innovation (Hurley and Hult, 1998). Others have made the link between innovation and knowledge at the strategic level. For example, differing innovation strategies - product line extension, product platform development and new business creation - have been linked with associated knowledge management strategies - leveraging existing knowledge, recombining and extending existing knowledge and importing or acquiring knowledge respectively (Kazanjian, Drazin and Glynn, 2002).

Performance differences between organisations can be explained as a result of their different stocks of knowledge and their differing capabilities in developing and deploying knowledge (Choo and Bontis, 2002). One way of achieving superior performance is utilising organisational learning for the development of core competencies, and translating them into new products and processes (Lei, Hitt and Bettis, 1996). Pavitt (1991) likewise related learning and competencies with his definition of learning as the adaptation and change of competencies. He identifies various means of learning: by doing, using, failing, studying, hiring, takeover and from competitors, and argues that, “personnel contact and discussions are the most frequent and effective means of communication and learning” (Pavitt, 1991, p.47).

Learning is often described as a process that an individual or organisation can experience. For example, Fiol and Lyles (1985, p.803) connect learning and knowledge in their definition of organisational learning as “...the process of improving actions through better knowledge and understanding.” They distinguish between lower-level learning, such as that which occurs through routine and repetition, and higher-level learning, which is typically more complex and involves the development of insights that may affect the whole organisation. This distinction is between lower and higher-level learning is common in the literature and similar to Argyris and Schon’s (1980) ‘single-loop and double-loop learning’ and Senge’s (1990) ‘generative learning’. Kolb (1976) described a four-phase learning process based on concrete experience, observation and reflection, the formation of abstract concepts and theories that are finally tested for validity and reliability. This can occur at the individual level or at the organisational level when it is a ‘collective experience’.

March (1991, p.85) describes organisational learning as both exploration and exploitation, where the "...essence of exploitation is the refinement and extension of existing competences, technologies and paradigms...[and the]...essence of exploration is experimentation with new alternatives." In this sense, innovation can be seen as a process involving both exploration and exploitation. Organisations that engage exclusively in exploration never gain the returns on its knowledge, whilst those that exclusively exploit, will suffer from obsolescence (Choo and Bontis, 2002). Therefore, "...maintaining an appropriate balance between exploration and exploitation is a primary factor in system survival and prosperity" (March, 1991, p.71). Innovating companies have been described as those that closely integrate knowledge exploration and exploitation (Zack, 2002).

Knowledge has also been described in at least two ways – ‘tacit’ and ‘explicit’ (Nonaka, 1991). Explicit knowledge is formal and systematic and therefore easily communicated and shared such as in product specifications or scientific formulae. Tacit knowledge however is hard to formalize, consists of mental models, beliefs, and perspectives so ingrained that they are not easily articulated. Interaction between tacit and explicit knowledge is described as a ‘spiral’ where tacit is shared through socialisation and converted to explicit through externalisation, and explicit is shared through a combination process and becomes tacit through internalisation (Nonaka, 1991; Nonaka and Takeuchi, 1995).

Lei, Hitt and Bettis (1996, p.556) uses a different interpretation of the term ‘tacit’ that stresses both internal and external sources of knowledge – "...knowledge obtained from both internal R&D efforts and vicarious learning through collaborative arrangements may be dichotomised into two broad forms: universal and tacit knowledge. Universal knowledge is generic...[whereas]...tacit forms of knowledge, however, are neither easily imitated nor clearly understood outside the firm." This highlights the importance for organisations to be aware of different mechanisms for learning from both sources of knowledge. Slater and Narver (1995) describe the acquisition of information (from either internal or external sources) as the first of three steps in organisational learning, the subsequent two being information dissemination and shared interpretation.

There are also many suggestions in the literature as to tactics or practices that can be pursued to encourage learning and knowledge transfer (Bessant and Buckingham, 1993;



Harryson, 2002; Nonaka and Takeuchi, 1995; Pace, 2002). Amit, Brigham and Markman (2000) for example suggest job transitions, rotations, transfers, international assignments, horizontal moves, and using cross-functional teams can promote organisational learning via individual learning. Slater and Narver (1995) suggest experimentation, for example, the conducting of small-scale market experiments, as an example of learning from an external source, as well as benchmarking and training.

Other practices from the literature include rotation of personnel through technical and non-technical departments and including previous members of projects teams into future projects to assist in transferring knowledge (Rice et al., 1998; Zien and Buckler, 1997), flatter structures and greater empowerment of teams, individual learning support such as coaching and mentoring, self-managed learning, and distance learning, experimentation opportunities, and learning resource information systems (Buckler, 1996).

### **Enabling Technology**

Various authors have highlighted the importance of utilising technology to assist in the management of innovation (Bessant and Buckingham, 1993; Mullin, 2002; Poliski, 2001; Quinn, Baruch and Zien, 2002). Particularly since 1970's and 1980's, researchers have highlighted the increasingly significant role that communication and computing technologies play in decision making, particularly in environments where innovation is important (Huber, 1984).

More recently, authors have described the advantages of such technologies in terms of shortening innovation processes, enabling rapid and inexpensive customer input to all stages of the product development process (Dahan and Hauser, 2002). These stages include the use of the Internet to better interact with customers, including allowing users to design their own virtual products, using technology-enabled conjoint analysis for product feature screening and virtual concept testing.

Technology applications range from the identification of opportunities, testing ideas and concepts through to improving the design and engineering of products much earlier in the process when there is less time and money at risk (Dahan and Hauser, 2002).

Likewise information technology is being used throughout the innovation process to shorten cycle times, cut costs and lower risk (Quinn, Baruch and Zien, 2002) and in automating design, simulation and prototyping, project tracking systems to continuously

monitor the status of products and projects in the development cycle, decision analysis systems to assist in determining likely financial returns at different stages of product development and inter-organisational communication systems such as bulletin boards, and databases (Davenport, 1993).

New technology also offers new tools to help in ‘innovating innovation’ or in ‘meta-innovation’ (Dooley and Johnson, 2001; Seely Brown, 2003). In this case technology not only allows the integration of the ‘customer’s voice’ but also the customer’s practices into areas such as prototype design. Seely Brown (2003) illustrates this by way of example when describing the use of ‘virtual prototyping’ in the automotive industry. Here, cars are first rendered in software and their performance simulated, to allow developers to understand customers’ tacit needs and desires, prior to the manufacture of expensive ‘real’ prototypes.

Technology-enabled idea generation and management is another example of using technology that features in the literature. Zien and Buckler (1997) describe Xerox’s Palo Alto Research Centre’s use of an electronic ‘blackboard’ where personnel can suggest, share and develop ideas promoting collaboration.

### **Organisational Structure**

Organisational structure is defined as “the arrangement of workflow, communication, and authority relationships within an organisation (Covin and Slevin, 1991, p.19). The importance of the organisational structure and its impact on innovation is highlighted throughout the literature (Cabrera, Cabrera and Barajas, 2001; Christiansen, 2000; Dess, Lumpkin and McGee, 1999; Eisenstat et al., 2000; Huiban and Bouhsina, 1998; Kanter, 1988; Knox, 2002; Leifer et al., 2000; Mintzberg and Quinn, 1991; Roberts, 1990; Rubenstein, 1989; Tushman and O’Reilly, 2002). Probably the first to examine the impact of organisational structure on an organisation’s ability to adapt to technological and commercial change was Burns and Stalker (1961) in their study of electronic firms. They distinguished between ‘mechanistic’ and ‘organic’ organisations and suggested that firms competing in complex and dynamic industries, adopt an organic form, namely an organisational architecture that is decentralised, with fluid and ambiguous job responsibilities and extensive lateral communication processes.

Huber (1984) proposes organisational designs that combine organic elements for experimental aspects of innovation and more mechanistic structures for the implementation of innovation. The same individuals may be in both organisations at different times - so-called 'collateral' organisations. More recently, Damanpour's (1991) meta-analysis of the extant literature confirms Burns and Stalker's findings. He describes organisational structures as existing along a continuum with mechanistic and organic representing ideal types at the either extreme. He also argues that not enough research has explored intermediate structures between these two types.

The literature supports taking a more holistic view of innovation as opposed to the traditional linear sequence of separable stages should be considered when designing organisational structures (Van de Ven, 1986). This can include encouraging greater integration between different units or levels through the exchange of information (Zahra, 1991). Van de Ven (1986) suggests designing organisational divisions to operate as autonomous units, allowing a capacity for self-organising by building in redundancy, matching the complexity of the operating environment with requisite variety of the individuals within the unit, and recognising the need to acknowledge associated change through the establishment of 'temporal linkages' such as 'celebrations' and 'funerals'.

Authors have suggested using combinations of functional groups for 'housekeeping activities' and project teams for specific tasks in order to share information more effectively, increase the flexibility of decision making and promote innovation and creativity (Mintzberg and Quinn, 1991). Other researchers have highlighted that the structure of the organisation is often reflected in its products and restricts the degree of innovation achievable (Christensen, 1997). In this case, organisations whose products comprise components that originate from different business units may find it difficult to achieve 'architectural' innovation, as this would require people and groups to communicate and work together across the existing structure.

Numerous researchers stress the importance of organisational structures that facilitate teamwork and, in particular, the use of cross-functional teams (Burgelman and Sayles, 1986; Burpitt and Bigoness, 1997; Cooper and Kleinschmidt, 2000; Dumas and Mintzberg, 1991; McDermott and O'Connor, 2002; Meyer, 1994; Zirger and Hartley, 1996). For example, Pavitt (1991) in his research carried out on large (greater than

10,000 employees) technological organisations in Europe, concludes that a key characteristic of innovative firms is their ability to cross functional and divisional boundaries. Likewise, Tsai and Ghosal (1996) concluded from their research on 15 business units in a large multinational electronics company that a business unit's resource exchange and combination with other units is positively related to the unit's level of product innovation. Similarly, Zien and Buckler (1997) describe 3M's use of a 'three-legged stool', which they use to develop ideas by incorporating marketing, technical and manufacturing personnel.

### **People Management**

The role that the individual plays within the entrepreneurial organisation has been investigated frequently throughout the corporate innovation and entrepreneurship literature (Burpitt and Bigoness, 1997; Foster, 1986; Jennings, 1994; Marion and Uhl-Bien, 2001; Morris, 1998; Rule and Irwin, 1988; Walton, 1985). Whilst innovation can be conceptualised as an organisational process carried out by teams, it is not possible without the individual (an entrepreneur) who is able to create ideas (Amabile, 1988), identify and capitalise on opportunities, manage threats and marry creativity with practical experience (Bienayme, 1986). Similarly, organisations learn only when its individual members learn and, while individual learning does not guarantee organisational learning, without it, no organisational learning can occur (Senge, 1990).

The term 'intrapreneurship' - a short-form of the term intra-corporate entrepreneurship - describes a process whereby individuals take new ideas and turn them into profitable realities (Pinchot, 1985) within an organisational context (Kuratko, 1993). Pinchot and Pellmann (1999) describe a typical intrapreneuring program as being strategically driven, involving the development and launch of ideas by intrapreneurs and having a corporate climate that supports innovation. The predisposition of certain people to innovation activities has been investigated by Stevens and Burley (2003) who, in a study of 267 new business development projects at a global chemical company, found that those individuals ranked in the top third by preferences for intuition (N) and thinking (T) on the Myers Briggs Type Indicator (MBTI) displayed a 97% success rate in taking significant development new business development (NBD) projects through to economic viability than compared with a 12% success rate displayed by the bottom

third. They argue, “the people selected to operate the NBD process are at least as important as the process itself” (Stevens and Burley, 2003, p.23).

The concept of empowerment of individuals within the entrepreneurial organisation has also been often researched (Burpitt and Bigoness, 1997; Hurt and Teigen, 1997; Walton, 1985; Zien and Buckler, 1997). The most important aspect for organisations in developing an entrepreneurial capacity is that workers at all levels of the organisation must have the opportunity and freedom to utilize these capacities and that “...this freedom of opportunity must be pushed well down into the organisation” (Miles et al., 2000, p.113).

Another theme relating to the management of people is the use of incentive mechanisms to stimulate entrepreneurial behaviour (Christiansen, 2000; Day et al., 2002; Jennings and Lumpkin, 1989; Miles et al., 2000; Pinchot and Pellman, 1999). The traditional organisation doesn't typically reward or even encourage entrepreneurial behaviour (Miles et al., 2000). Reward and recognition initiatives generally focus on current performance because measurement of the tasks that drive it - the exploitation of existing competencies- is much easier than measuring the exploratory nature of innovative activities that contribute to future growth (Day et al., 2002). This is despite the reluctance of individuals to share tacit knowledge required for innovation without suitable incentive structures (Leonard and Sensiper, 2002).

Morris (1998) proposes numerous policies that are consistent with encouraging innovative behaviour including broad job scopes with significant discretion, relying on external candidates for recruitment, individualised, continuous training, and including innovation and risk-taking in performance assessments that recognise both individual and team efforts.

### **2.2.3 Innovation Competencies**

The final innovation capability enabler stream to emerge from the literature was a series of management competencies relating to innovation performance. This final section is therefore termed ‘innovation competencies’ and consists of the following seven sections:

- market interface management;

- technology management;
- creativity and idea management;
- intellectual property management;
- commercialisation process management;
- process innovation management; and
- radical innovation management.

### **Market Interface Management**

The interaction of the firm with its external environment, which the author has termed the ‘management of the market interface’, emerged as the first of the innovation competency categories. This primarily involves interaction with customers, suppliers and competitors in the innovation process. Much research has focussed on the relationship of customers with the innovative organisation (Bailetti and Litva, 1995; Brunner, 2001; Flint, 2002; Urban, Hauser and Dholakia, 1987), the generation and dissemination of market intelligence (Day, 1994; Kohli and Jaworski, 1990) and, in particular, the integration of the customer at all stages throughout the innovation process (Dahan and Hauser, 2002; Dolan and Matthews, 1993; Prahalad and Ramaswamy, 2002).

A large stream of research has developed in the area of market orientation (Day, 1994; Hurley and Hult, 1998; Kohli and Jaworski, 1990; Slater, 1997; Slater and Narver, 1994, 1995). Kohli and Jaworski (1990, p.6) define market orientation, as “the organisation-wide generation of market intelligence that pertains to current and future customer needs, dissemination of intelligence across departments, and organisation-wide responsiveness.” Other authors have expanded upon this definition to include a broader focus on the market (e.g. competitors) rather than just customers (Narver and Slater, 1990; Jaworski and Kohli, 1996). In this light, competitor orientation becomes a component of market orientation and means that an organisation understands both the current strengths and weaknesses and the longer-term capabilities and strategies of current and potential competitors (Aaker, 1988; Narver and Slater 1990; Porter, 1980, 1985).

Day (1994, p.43) suggests that market orientation is a cultural element of organisations that can enhance business performance. He observes that, “a market-driven culture supports the value of thorough market intelligence and the necessity of functionally coordinated action directed at gaining a competitive advantage.” Slater (1997) connects a strong market orientation to innovation, highlighting that “successful innovation is the product of a market oriented culture coupled with entrepreneurial values.”

In a study of fifty major Japanese firms and their key customers, Deshpande, Farley and Webster (1993, p.34) conclude that organisations with a self-reported market and entrepreneurial-oriented cultures outperformed those that were more internally or hierarchically focussed – “simply put, customer-oriented and innovative firms do perform better.” Interesting to note from their study is that market orientation as reported by customers, is also related positively to business performance. In a study of 113 forest products business units of a major western corporation Narver and Slater (1990) conclude that market orientation is an important determinant of business profitability and that a degree of market orientation is beneficial in any market environment. Whilst some research has shown that the relationship between market orientation and business performance is to a limited extent dependent upon the environmental conditions in existence, market orientation as a strategy has long-term effects whilst environmental conditions are often transient (Slater and Narver, 1994).

Certain disadvantages of being market oriented have also been highlighted in the literature. For example, the “tyranny of the served market” (Hamel and Prahalad, 1991, p.83) may limit organisations to take risks by continuing to serve current customers with little regard for new customers and competitors. This is similar to what Christensen (1997) has famously called the ‘innovator’s dilemma’. There is also the related risk that the organisation may focus only the articulated needs of a customer rather than latent needs that may lead to innovative new products (Hamel and Prahalad, 1994; Slater and Narver, 1994). There has been recent interest on the importance of uncovering so-called latent or unarticulated needs of customers (Cooper, 2002; Dudon, 2002; Leonard and Rayport, 1997; Poolton and Ismail, 2000). Often consumers’ needs and desires are elusive because they “have not consciously formulated what they are or how to fulfil them. Even when consumers are aware of what they want and are willing to reveal it, their wants are likely to be conditioned by what is available” (Ciccantelli and Magidson, 1993, p.341).

The propensity of individuals and groups to adopt innovations has also been investigated in the literature (Rogers, 2003). Rogers argues that there are general ‘categories of adopters’ in a population that can be described as: innovators, early adopters, early majority, later majority, and laggards. The rate at which they will adopt innovations depends upon the following perceived characteristics of the innovation: relative advantage, compatibility, complexity, trialability, and observability. Also highlighted in the research on consumers, are those users that sometimes innovate on products and services themselves (Lilien et al., 2002; Morrison, Roberts and Von Hippel, 2000; von Hippel, 1986). Von Hippel (1986, p.791) has termed this segment ‘lead users’ and describes them as “users whose present strong needs will become general in a marketplace months or years in the future.” This means that they can be used as a “...need-forecasting laboratory for marketing research.”

### **Technology Management**

The literature highlights that the management of both technological and technical aspects of products, processes and services is critical for effective innovation performance (Atuahene-Gima, 1996; Bower and Christensen, 1995; Christensen, 1997; Drucker, 1985; Foster, 1986; Radnor, 1986). These are commonly represented in the literature as research and development (R&D) and information technology (IT), and technical, financial or engineering competencies. The effective deployment of such technological resources helps to build sustainable competitive advantage, which in turn leads to enhanced financial performance (Porter, 1985).

The management of the technical aspects of organisations that are not considered ‘high-technology’ (often service organisations, for example) is also considered to be technology management. ‘Technology’ is often described in the literature as the means adopted by an organisation of converting ideas, material and labour into goods or services (Chesbrough, 2003; Miles and Snow, 1978). Granstrand (1999) defines technology as a special kind of knowledge whose particular characteristics include it being linked with artefacts (e.g. material, products), with science and a practical purpose, as well as it having a high degree of code-ability (e.g. formulae, drawings, models etc). In this sense, the mathematical formula that guides a financial services product is a piece of technology in the same way that the design of an automotive might be. This is consistent with other descriptions in the literature of technology having both



a ‘hardware’ aspect, the material or physical object, and a ‘software’ aspect, consisting of the information base for the instrument (Rogers, 2003).

Firm performance can benefit from the creation and commercialisation of technology (Zahra, Nash and Bickford, 1995), however there should be alignment between the business strategy and the technology strategy (Zahra and Covin, 1993). When such alignment is achieved, an organisation can capitalise on its technological investments and capabilities to create competitive advantage. Conversely, focus on technological competencies to the exclusion of market and business strategies, can result in ‘technological myopia’ and inferior financial performance (Zahra and Covin, 1993).

In a study of successful Japanese innovating firms, Granstrand (1999) highlights their technology management as consisting of ‘acquisition’ strategies that consider various options including internal R&D, acquisition of technological companies, joint ventures and collaboration, purchasing licenses, technology scanning (for example, competitor intelligence), as well as ‘exploitation’ strategies that consider internal exploitation (for example, product and process innovation), creation of firms, joint ventures, technology selling or licensing.

More specifically, Granstrand (1999) highlights several common features of successful technology strategies including:

- synergistic product/technology diversification - utilising technologies in multiple ways to take advantage of economies of scale and scope and speeding technological transfer and commercialisation;
- ‘speed to market’ through exploratory R&D, incremental learning, concurrent engineering (overlapping both the stages and functions of a commercialisation process, as well as the development of subsequent product generations), sense of urgency, global marketing; and
- ‘speed to technology’ through technology scanning, experimentation, acquisition, central R&D, internal and external technology transfer and communication.

Technology transfer is the process by which “technological innovations are exchanged between individuals and organisations, such as those who conduct R&D on one hand,

and those who put technological innovations into use on the other hand”...and can include both hardware objects and information: “because technology is essentially knowledge, ‘transfer’ is essentially communication of that knowledge (and its subsequent use) from developers to implementers” (Van de Ven and Rogers, 1988, p.634).

Christensen (1997, p.xv) differentiates between sustaining technologies that “foster improved product performance” and disruptive technologies which lead to products that are “...typically cheaper, simpler, smaller and frequently more convenient to use.” Foster (1986, p.109) stresses the importance in implementing the right strategic choices manifesting in “...100% and 500% differences in technical productivity between competitors because one made the right technological choice and the other did not.”

### **Creativity and Idea Management**

The third area to emerge within the innovation competency category was that of creativity and idea management (Amabile and Grysiewicz, 1987; de Bono, 1992; Gautam, 2001; Martensen and Dahlgaard, 1999; McFadzean, 1999; Rickards and Bessant, 1980). Creativity is defined as “...the production of novel and useful ideas by an individual or small group of individuals working together” (Amabile, 1988, p.126). Whilst innovation is often abstracted as a linear process of several stages beginning with idea generation and ending in implementation, creative steps of divergence and convergence occur at each stage of this process (Leonard and Sensiper, 2002).

Amabile (1988) argues that at the individual level, three components are required to be present in order for effective creativity. These are: intrinsic motivation, skills within the task domain, and skills and techniques in creative thinking. Techniques aimed to improve the creative potential of individuals, groups and organisations by encouraging diversity in thinking have been researched in the literature and popularised in practice (Buzan and Buzan, 1993; de Bono, 1992; Perkins, 2000). Of these, perhaps ‘brainstorming’ is the best known. In his book popularising this technique, Osborn (1957) claimed that, compared with working alone, the average person in a brainstorming group could generate twice as many ideas. Sutton and Hargadon (1996) criticize previous research on brainstorming, much of which has dismissed it as an ineffective technique, for focusing heavily on the quantity (and less often the quality) of

ideas generated, and for using participants not trained or experienced in brainstorming techniques. They argue that broader benefits are to be gained from brainstorming including: utilising and adding to the organisational memory, providing staff to develop and utilise new skills, supporting an attitude of wisdom that can reinforce organisations' norms and values, impressing clients, and providing income for the firm.

Other examples of creativity techniques amongst numerous highlighted in the literature include 'mind mapping' (Buzan and Buzan, 1993), storyboarding, excursion, morphological analysis, lotus blossom (Higgins, 1996), jumpstarting (DeGraff and Lawrence, 2002), 'Six Thinking Hats', provocation and random input (de Bono, 1992).

An example research into organisational creativity is that undertaken by Amabile and Gryskiewicz (1987), where in a series of three studies, they interviewed 120 R&D scientists from 20 different corporations, 16 marketing and development employees from a bank and 25 marketing and sales employees of a railroad. They are able to demonstrate factors that promote and inhibit creativity from both an organisational environment, and a personal perspective.

Idea management is a process that incorporates generation, collection and evaluation of ideas for use in the innovation process (Flint, 2002; Lilien et al, 2002; Khurana and Rosenthal, 2002; Pinchot and Pellman, 1999; Urban, Hauser and Dholakia, 1987). Ideas can be seen as the input of an innovation process and provide a "vehicle for otherwise isolated, disconnected or competitive individuals and stakeholders to come together and contribute their unique frames of reference to the innovation process" (Van de Ven, 1986, p.593). Several researchers have recommended adoption of project management and project planning technologies for the managing and implementation of ideas (Huber, 1984; Van de Ven, 1986). Rice et al. (1998), in their research into disruptive innovations, found no evidence to suggest that any of the innovation projects arose from a systematic suggestion process, rather many originated as a result of isolated requests from senior management to respond to a specific challenge.

Other sources of innovation have been suggested and investigated in the literature. Drucker (1985), for example, suggested that successful innovation is more likely to result from the systematic pursuit of the following seven sources of innovations:

- unexpected occurrences;

- incongruities of various kinds;
- process needs;
- changes in an industry or market;
- demographic changes;
- changes in perception; and
- new knowledge.

The use of small teams to scan the environment and interact with existing and potential customers in order to generate novel ideas is described in the literature (Zien and Buckler, 1997). These teams often demonstrate a balance of technical and marketing skills and frequently operate in the customer's own environment. Other 'anthropological' techniques are also discussed in the literature, for example Leonard and Rayport's (1997, p.102) 'empathic design' calls for company personnel to "...watch customers using products and services in the context of their own environments. By doing so, managers can often identify unexpected uses for their products...[and]...uncover problems that customers don't mention in surveys..."

### **Intellectual Property Management**

The management of intellectual property ('IP'), that is, intangible assets that can be legally protected, is another important element of the corporate innovation and entrepreneurship literature (Adler, McDonald and McDonald, 1992; Dunn and Baker, 2003; Elton, Shah and Voyzey, 2002; Granstrand, 1999; Kline and Rivette, 2000; Lev, 2002; Sullivan, 2000).

Intellectual property consists of patents, copyrights, trademarks, licenses, designs, artistic works and trade secrets (Sullivan, 2000), and traditionally has been considered as a process extending from generation of the intellectual property, followed by obtaining legal protection, maintaining the protection through to finally its disposal or expiration. More recently, however, researchers have observed that entrepreneurial organisations go beyond generating and protecting intellectual property and extend into exploiting this as additional sources of revenue (Elton, Shah and Voyzey, 2002).

Indeed, Chesbrough (2003) argues companies should be both active buyers and sellers of IP and that few organisations take full commercial advantage of their own IP beyond using it in their own business.

The use of intellectual property to create competitive advantage can occur through various means. Granstrand (1999) describes several examples including using patents as a marketing instrument to demonstrate technical superiority, preventing imitation by competitors by keeping the product or process technology secret (a 'trade secret') or using patent protection to effectively create a temporary monopoly situation. In addition, advantage might be created by licensing the technology to other producers. Kline and Rivette (2000, p.54) suggest that companies can use their intellectual property to improve performance "...by establishing a proprietary market advantage, improving financial performance, and by enhancing overall competitiveness." Along with the protection of traditional intangible assets via product patents and the like, they discuss efforts by some corporations to protect business models as well as stressing the importance of strategically managing intellectual property.

Recently the term 'intellectual capital' has appeared in the literature (Bontis, 2002; Granstrand, 1999; Sullivan, 2000), and is used as a broader term that encapsulates intellectual property as well as know-how and knowledge (tacit and explicit), human or structural capital (e.g. competencies) and relational capital (e.g. market interface knowledge). Relevant aspects of intellectual capital, other than those pertaining directly to intellectual property, are covered in other areas of this literature chapter.

The literature in economics and management on IP strategies is generally limited and is typically given from a legal rather than a management perspective (Granstrand, 1999). Granstrand (1999) stresses the importance of the IP strategy being aligned with technology and corporate strategies, and describes various defensive and offensive strategic approaches to IP including: patenting to block competitors from pursuing certain research directions ('fencing') or patenting over the life cycle of a product from the basic technology, to the product itself, to the production process.

### **Commercialisation Process Management**

The process to manage the development of ideas through to outcomes that create value for the organisation is a further theme present in the corporate entrepreneurship and

innovation research. The creation and commercialisation of new technology can allow a company to target and control premium market segments, establish its technology as the industry standard, build a favourable reputation, determine the industry's evolution, and achieve high profits (Zahra, Nash and Bickford, 1995). The literature in this area highlights several ways of commercialisation of new ideas including: innovation processes, product and service innovation and corporate venturing.

The process leading to the creation of innovations has been described in various ways throughout the literature such as the 'innovation-decision process' (Rogers, 2003), the 'organisational innovation process' (Amabile, 1988), 'innovation process model' (Schroeder et al., 1989) and the intra-firm innovation process (Saren, 1984). In his review of innovation models, Saren classifies innovation processes into five types:

- departmental-stage models – the process stages reflect the organisation's departments e.g. R&D, design, engineering, production, marketing etc.;
- activity-stage models – based on the various activities carried out during innovation e.g. search for problem source, generation of alternatives, evaluation of alternatives, selection of alternatives etc.;
- decision-stage models – each stage represents a required decision and set of steps that must occur e.g. gathering information to reduce uncertainties, evaluation of information, decision making, and identification of remaining key uncertainties;
- conversion process models – unspecified sequence of activities within an innovation system converting inputs (such as raw materials, knowledge) into outputs (such as new products); and
- response models – innovation is seen as the organisation's response to an external stimulus.

Some research has focused on organisational variables that impact innovativeness differently at different stages of the innovation process (Rogers, 2003). For example, Zaltman, Duncan and Holbek (1973) argue that low centralisation, high complexity, and low formalisation facilitate initiation of innovations, but have a negative relationship with the implementation of innovations.

One specific type of innovation process that has attracted the majority of attention in the literature is that of the product development process. The development of new products and the modification of existing products can be an important means for penetrating existing and new markets, maintaining customer loyalty and attracting new customers (Porter, 1980). Many researchers have investigated management techniques aimed at achieving better control of this process. An example is that of the Stage-Gate process developed by Cooper (Cooper and Kleinschmidt, 2001) and widely used in practice (Urban, Hauser and Dholakia, 1987).

Traditionally, product innovation has been carried out via the widespread use of product development processes. These are often described in the literature as being linear processes where an idea is generated by marketing or R&D, converted into a product concept, developed into a prototype prior to testing and manufacturing, after which it is the responsibility of sales and marketing for selling to the customer (McDermott and Handfield, 2000).

Limitations of such linear processes have been highlighted in the literature including: poor communication between the functional areas (Cooper, 1990), little feedback that might otherwise result in improvements in the product during the process (McDermott and Handfield; 2000), and their departure from reality as rarely is innovation so rational and ordered as the models indicate (Saren, 1984).

More recently, product development processes have been restructured, in particular to allow the operation function to become more involved initially. This is referred to as concurrent or simultaneous engineering and allows earlier input regarding the production capacity, potentially improving speed-to-market and product performance (Cooper, 1990; Riedel and Pawar, 1994; Zirger and Hartley, 1996).

More generally, there has been a large amount of research that has investigated the factors that facilitate successful new product innovation or development (Brown and Eisenhardt, 1995; Cooper, 1990; Cooper, Edgett and Kleinschmidt, 2000; Crawford, 1980; de Brentani and Cooper, 1992; Griffin and Page, 1996; John and Snelson, 1988; Kuczmarski, 1992; Mahajan, Muller and Bass, 1990; Meyer and Utterback, 1993; Montoya-Weiss and Calantone, 1994; Ozer, 1999; Riek, 2001; Zirger and Maidique, 1990). Given the varied research methods and geographical locations, there has been

surprising consistency in key factors identified. These typically include: product superiority, satisfaction of customer needs, effective planning and execution of activities prior to development (that is, the 'front-end' of the product development process), strong market orientation, synergy with the organisation's competencies and market attractiveness.

Some research has been directed specifically at improving the development process often by either concentrating on the 'front-end' of the development process (Khurana and Rosenthal, 2002; Lilien et al., 2002; Smith, Herbein and Morris, 1999) or by reducing the overall time taken to develop ideas to products (Dooley and Johnson, 2001; Flint, 2002).

More recently there has been increased focus on the development of new services specifically, much of which has highlighted the similarities with product development (Johne and Storey, 1998; Kaplan, 2000; Kelly and Storey, 2000; Kleinknecht, 2000; Martin and Horne, 1993; Meyer and DeTore, 1999; Voss, 1992). De Brentani (1995) describes a series of new service scenarios, each with their own likelihood of success that have three common elements relating to successful development; services that respond to a market need, that are synergistic with the firm's resources and that involve effective management of the development process, often through a formal stage-gate process.

Another common structure for commercialisation of innovation and R&D commonly described in the literature is corporate venturing (Bower and Christensen, 1995; Burgelman, 1984; Burgelman and Sayles, 1986; Kanter, 1985; Mason and Rohner, 2002; Miles and Covin, 2002; Zahra, Nash and Bickford, 1995). In fact, corporate venturing is often explicitly mentioned in definitions of 'corporate entrepreneurship'. For example, in synthesising the extant literature and producing comprehensive definitions for many innovation-related terms, Sharma and Chrisman (1999) define corporate entrepreneurship as both strategic renewal and corporate venturing efforts. Likewise Jennings (1994) defines corporate entrepreneurship as product and/or market development achieved via organisational innovation, organisational structure or corporate venturing.



Corporate venturing is the process by which R&D outcomes are transformed into new businesses and, by doing so, allowing companies to develop competencies not available in existing mainstream businesses (Burgelman, 1984). Corporate venturing is often managed as a separate, autonomous division within an organisation. Indeed, having separate units is often recommended especially when the ventures are based on radically different technologies thus helping to eliminate conflicts with existing units (Zahra, Nash and Bickford, 1995). The creation of organisations that are completely independent of the mainstream business is also suggested as a way to successfully develop radically different business ideas (Bower and Christensen, 1995).

Organisations pursue corporate venturing with the aim of achieving at least three objectives including: organisational development and cultural change, strategic benefits and the creation of real options and quick financial returns (Miles and Covin, 2002). Burgelman (1984) describes corporate venturing as a process involving various levels of management within the corporation and includes core processes (relating to the creation of the product or business) and overlaying processes (relating to the integration and structuring of the new business within the existing organisation). Several implications are drawn from his research including the importance of individuals to the internal corporate venturing process, the difficulties associated with resource procurement, the key role of middle-level managers in the strategy-making process and the role of corporate management as primarily limited to 'retroactive rationalisation'. Other researchers have described four generic types of corporate venturing based on the funding mechanism (direct or indirect) and focus of the venture (internal or external) (Miles and Covin, 2002).

### **Process Innovation Management**

A significant amount of research has focussed on the relationship between product and process innovations (Abernathy and Utterback, 1978; Barras, 1986; Utterback, 1994), yet in general, the greater attention has been concentrated on product development to the exclusion of process innovation, and few researchers have studied process innovation at an organisational level of analysis (Damanpour and Golpalakrishnan, 2001).

Whilst product innovation is undoubtedly a critical component of any organisation's innovation capability, it offers only a limited view of entrepreneurial activities in an established company (Kanter, 1989). Companies that overemphasize product development may overlook the potential large gains resulting from other innovation initiatives such as process innovations. Process innovation efforts have the advantage of usually being less visible to competitors and therefore more difficult to imitate (Zahra, 1993). In addition, distinguishing between product and process innovations is important because their adoption requires different organisational capabilities. Product innovations demand the understanding of customer needs, and the manufacturing of a product designed to meet these needs; process innovations involve the application of technology to improve the efficiency of production and commercialisation processes (Ettlie, Bridges and O'Keefe, 1984).

The most well known of the research conducted at an industry level is that of Abernathy and Utterback (1978), who argued that companies' innovative patterns occur in a consistent manner where radical product innovations are followed by incremental innovations, which in turn are followed by process innovations once a dominant design is established. In this sense, process innovations are critical to the ongoing success of a product innovation in enabling its effective and efficient production and delivery. Barras (1986) conducted analogous research in the financial services industry and describes a reverse cycle to that of Abernathy and Utterback's. That is, a first phase where technology is used to increase the efficiency of existing services, followed the application of technology to improve the quality and effectiveness of services; and finally the generation of wholly transformed or new services.

The adoption of technology, and in particular, 'information technology' has dominated recent research on process innovation where the focus is to enable efficiency and effectiveness gains (Bessant and Buckingham, 1993; Hubbard et al, 2002; Martensen and Dahlgaard, 1999). Much of the focus on process innovation efforts centres on incremental improvements of existing business processes (Davenport, 1993). Numerous techniques have been developed and used in practice to achieve these improvements often by focusing on reducing variation in process outputs, for example, 'Six Sigma' (Pande, Neuman and Cavanagh, 2000), 'Total Quality Management' (Deming, 1982), 'Kaizen' (Imai, 1986) and the like. More recently, significant attention

has been given to efforts targeted at more radical improvements in process performance such as 'reengineering' (Hammer and Champy, 1993). In this case rather than refining current processes, the aim is to invent new processes to replace existing ones.

Apart from the immediate gains possible from the process innovation acts themselves, other benefits can arise that may assist in creating later innovations. For example, Teece, Pisano and Shuen (1997, p.558) describe the cumulative experiences gained from continuous improvement experimentation as helping to "refine the firm's core competencies." They also point out the connection between process innovation efforts and teamwork in that "process-related improvements depend on close interrelationships among key personnel in various functions rather than on strict control rules and procedures" (Teece, Pisano and Shuen, 1997, p.558).

### **Radical Innovation Management**

The vast majority of the research conducted to date on innovation has focussed on product development and, within this area, on incremental innovation (McDermott and Handfield, 2000). A more recent theme in the corporate innovation and entrepreneurship literature has been the increasing focus on the management of so-called 'disruptive' or 'radical' innovation (Ahuja and Lampert, 2001; Aldrich, 1999; Bower and Christensen, 1995; Christensen, 1997; Ettlie, Bridges and O'Keefe, 1984; Green, Gavin and Aiman-Smith, 1995; Leifer et al., 2000).

Whilst multiple definitions of radical innovations are used throughout the literature, Green, Gavin and Aiman-Smith (1995) characterise them as typically possessing significant technological uncertainty, the associated organisation having significant technical and business inexperience with technology commercialisation, and there being significant associated technology cost. Rice et al. (1988) outlined the following unique characteristics of radical innovations that impact their management:

- Long-term (typically ten years or longer);
- Highly uncertain, unpredictable;
- Sporadic, with many stops and starts, deaths and revivals;

- Non-linear; e.g., idea generation is not only a front-end activity but occurs throughout the process;
- Stochastic-key players come and go, priorities change, exogenous events are critical;
- Context-dependent-history, e.g., experience, corporate culture, personalities, and informal networks are important; and
- An extended front end to the stage-gate process, with extensive exploring and experimenting, probing and learning rather than targeting and developing.

There is a need for research into radical innovation management as sustaining organisational growth through incremental innovation requires traditional, administrative management practices whereas developing breakthrough innovations requires fundamentally different management practices (Rice et al., 1988). The literature suggests that radical innovation management departs in many critical ways from more traditional management (Rice et al. 1998). For example, there may be different strategies, structures and knowledge demanded as well as increased product development times and an increased likelihood that these innovation efforts will fail (Green, Gavin and Aiman-Smith, 1995). McDermott and O'Connor (2002, p.434) concur when they argue "firms might need to create different sets of rules for the two types of innovations."

Christensen (1997) gives several explanations as to why organisations incumbent in markets based on established technologies have difficulty in initiating disruptive changes. These reasons include: organisations being dependant upon existing customers and investors for resources and thereby potentially overlooking new, emerging technologies from non-traditional competitors; new technologies initially generating only small markets that don't solve the growth needs of large, established companies; and as the ultimate use of new technologies is not known in advance, traditional market analysis and forecasts are not appropriate as these markets don't yet exist.

The strategy and structure of organisations that generate and adopt radical innovations differ from the more traditional arrangements of those who tend towards new product introduction and incremental process adoption (Ettlie, Bridges and O'Keefe, 1984).

From their research into radical process and package adoption in the food industry, Ettlie, Bridges and O'Keefe (1984) found that radical innovations are significantly promoted by an aggressive technology policy, centralisation, informal structures and the concentration of technical specialists. Conversely, incremental process adoption and new product introduction tends to be promoted in large, complex, decentralised organisations that have market dominated growth strategies.

Rice et al. (1998) suggest several ways in which the management of radical innovation projects differs from that of incremental ones. These include the evaluation and screening of ideas and proposals. Whilst their research showed that traditional evaluation criteria focussed on short-term profitability and return on investment, these were generally not perceived by the technicians and management at the project level to be relevant. Typically, they found that of greater interest to these organisations was the eventual longer-term impact of the innovation on the market and the magnitude of the benefit to the market.

Another characteristic of these radical innovation projects is the methods undertaken to test market potential. More traditional market research methods such as written surveys, focus groups, or concept tests were eschewed for more experimental (rather than analytical), hands-on approaches designed for market learning more than market evaluation and a reliance on past experience to assess the value of the technology to the market (Rice et al., 1998). Such methods included the use of simple, early prototypes to aid in gaining support internally, involving potential future customers or 'lead users' (von Hippel, 1986) over extended trial periods, and presentation of data at professional conferences to gauge community and potential customer interest.

Rice et al. (1998) also highlight differences in organisational structures based on the degree of innovation. They point out that radical innovation seems to work best, especially in the highly uncertain 'fuzzy front end' of the process, when it is separated from ongoing business activities. They explain this as resulting from the conflict in goals within an operating unit, whose focus is typically on short-term profitability, in contrast to the longer-term, uncertain benefits but immediate cost impact of radical innovation projects.

## 2.2.4 Summary of the corporate entrepreneurship and innovation literature

The key enablers of organisational innovation were reviewed under three main headings: Strategic Management of Innovation, Internal Environment and Innovation Competencies. These key categories along with the main concepts from each are summarised in Tables 2.1, 2.2 and 2.3 following:

**Table 2.1: Literature Summary: Strategic Management enablers of organisational innovation**

Enabler Categories	Key Concepts	References
Innovation Strategy and Vision	<ul style="list-style-type: none"> <li>• Strategic approaches e.g. technology, IP, product, process etc</li> <li>• Timing e.g. first to market etc</li> <li>• Strategic alignment</li> <li>• Strategic measures</li> </ul>	Burgelman & Maidique (1998), Christensen (1997), Dess et al. (1999), Dodgson (2000), Foster (1986) Hauser (1996), Hitt et al (2001, 2002), Johne & Storey (1998), Kanter (1985), Meyer & Heppard (2000), Miles & Snow (1978), Miles et al. (2000), Miller & Friesen (1978), Mintzberg (1998), Mintzberg & Water (1985), Porter (1985, 1990), Tufano (1992), Utterback (1986), Utterback (1994, Voss (1992), Zahra (1993, 1995), Zahra, Nash and Bickford (1995)
Future Scenarios	<ul style="list-style-type: none"> <li>• Scenarios</li> <li>• Foresight and futures</li> </ul>	Barker (1993), Godert (2000), Hamel (2002), Hamel & Prahalad (1994), Marsh et al. (2002), Schwartz (1991), Slaughter, 1989
Competency Management	<ul style="list-style-type: none"> <li>• Resource-based view of the firm</li> <li>• Understanding competencies</li> <li>• Developing competencies</li> <li>• Leveraging competencies</li> <li>• Stretching competencies</li> </ul>	Alvarez & Barney (2000), Amit & Schoemaker (1993), Barney (1995), Christiansen (2000), Hamel & Prahalad (1990, 1994), Lei, Hitt and Bettis (1996), Leonard-Barton (1992), Meyer & Utterback (1993), Pavitt (1991), Penrose (1959), Stalk et al. (1992), Teece, Pisano and Shuen (1997), Utterback (1994), Wernerfelt (1984)
Resource Management	<ul style="list-style-type: none"> <li>• Funding &amp; budgeting</li> <li>• Portfolio management</li> <li>• Fast-tracking/failing</li> <li>• Valuation methods</li> </ul>	Cooper, Edgett and Kleinschmidt (2000), Pavitt (1991), Pinchot and Pellman (1999), Rice et al. (1998), Seely Brown (2003)
Alliances and Networks	<ul style="list-style-type: none"> <li>• Joint ventures</li> <li>• Strategic alliances</li> <li>• ‘Open’ innovation</li> <li>• Networks</li> <li>• Merger &amp; acquisitions</li> <li>• ‘Absorptive capacity’</li> </ul>	Alvarez & Barney (2000), Chesbrough (2003), Cohen & Levinthal (1990), Cooper (2002), Hitt et al. (2000), Hoskisson & Busenitz (2002), Ireland et al. (2002), Johnson & Van de Ven (2002), Lane & Lubatkin (1998), McDermott & Handfield (2000), Stuart (2000), Walter (2003), Zirger & Hartley (1996)

*Source: author*

**Table 2.2: Literature Summary: Internal Environment enablers of organisational innovation**

Enabler Categories	Key Concepts	References
Culture	<ul style="list-style-type: none"> <li>• Leadership &amp; senior management support</li> <li>• Champions</li> <li>• Failure tolerance</li> <li>• Risk-taking</li> <li>• Controlled experimentation</li> </ul>	Bass (1985), Cabrera, Cabrera and Barajas (2001), Chakrabarti (1974), Collins & Porras (2000), Drucker (1985), Farson & Keyes (2002), Frohman (1988), Goleman (2000), Hoffmann & Hegarty (1993), Hornsby et al. (2000), Howell & Higgins (1990), Hubbard et al. (2002), Huber (1984), Hurt & Teigen (1977), Jennings & Lumpkin (1989), Kanter (1984, 1988, 1989), Knox (2002), Kuratko et al. (1990), Maidique (1980), Miles et al. (2000), Peters & Waterman (1982), Pinchot & Pellman (1999), Reigle (2001), Rule & Irwin (1988), Schein (1990), Smircich (1983), Topalian (2000), Tushman & O'Reilly (2002), Walton (1985)
Learning & Knowledge Management	<ul style="list-style-type: none"> <li>• Organisational learning</li> <li>• Single and double-loop learning</li> <li>• Knowledge management</li> <li>• Individual learning</li> <li>• Exploration and exploitation</li> <li>• Tacit &amp; explicit knowledge</li> <li>• Learning and knowledge transfer</li> </ul>	Amit, Brigham and Markman (2000), Argyris & Schon (1980), Bessant & Buckingham (1993), Buckler (1996), Calantone et al. (2002), Choo & Bontis (2002), Cohen & Levinthal (1990), Conner & Prahalad (1996), Coombs et al. (1998), Fiol & Lyles (1985), Hurley & Hult (1998), Ichijo (2002), Kazanjian et al. (2002), Lei, Hitt and Bettis (1996), March (1991), McAdam (2000), Nonaka (1991), Nonaka & Takeuchi (1995), Pavitt (1991), Seely Brown & Duguid (1991), Senge (1990), Slater & Narver (1995), Zack (2002)
Enabling Technology	<ul style="list-style-type: none"> <li>• Communication &amp; computing technology</li> <li>• Systems support</li> <li>• Software support</li> <li>• Shortening cycle times</li> <li>• Customer integration</li> </ul>	Bessant & Buckingham (1993), Dahan & Hauser (2002), Davenport (1993), Dooley & Johnson (2001), Huber (1984), Mullin (2002), Poliski (2001), Quinn et al. (2002), Seely Brown (2003), Zien & Buckler (1997)
Organisation Structure	<ul style="list-style-type: none"> <li>• Organic versus mechanistic</li> <li>• Cross-functional teams</li> <li>• Self-managed teams</li> <li>• Inter-functional relationships</li> </ul>	Burgelman and Sayles (1986), Burns and Stalker (1961), Burpitt and Bigoness (1997), Christensen (1997), Covin and Slevin (1991), Cabrera, Cabrera and Barajas (2001), Christiansen (2000), Cooper and Kleinschmidt (2000), Damanpour (1991), Dess et al. (1999), Huber (1984), Kanter (1998), Knox (2002), Leifer et al. (2002), McDermott and O'Connor (2002), Meyer (1994), Mintzberg and Quinn (1991), Roberts (1990), Rubenstein (1989), Tushman and O'Reilly (2002), Van de Ven (1986), Zahra (1991), Zirger and Hartley (1996)
People Management	<ul style="list-style-type: none"> <li>• Recruitment</li> <li>• Training</li> <li>• Autonomy and empowerment</li> <li>• Incentive mechanisms</li> <li>• Reward and recognition</li> <li>• 'Intrapreneurship'</li> </ul>	Amabile (1988), Bienayme (1986), Burpitt & Bigoness (1997), Christiansen (2000), Day et al. (2002), Foster (1986), Hurt & Teigen (1997), Jennings (1994), Jennings & Lumpkin, (1989), Kuratko (1993), Marion & Uhl-Bien (2001), Miles et al. (2000), Morris (1998), Pinchot (1985), Rule & Irwin (1988), Senge (1990), Stevens & Burley (2003), Walton (1985), Zien & Buckler (1997)

Source: author

**Table 2.3: Literature Summary: Innovation Competencies enablers of organisational innovation**

Enabler Categories	Key Concepts	References
Market Interface Management	<ul style="list-style-type: none"> <li>• Customer and supplier integration</li> <li>• Competitor and market analysis and scanning</li> <li>• Adopter Types</li> <li>• Lead Users</li> <li>• Customer needs analysis</li> <li>• Market Orientation</li> </ul>	Bailetti and Litva (1995), Brunner (2001), Dahan and Hauser (2002), Day (1994), Dudon (2002), Flint, (2002), Hamel & Prahalad (1994), Hurley and Hult (1998), Kohli and Jaworski (1990), Leonard & Rayport (1997), Lilien et al. (2002), Morrison, Porter (1980, 1985), Prahalad & Ramaswamy (2002), Rogers (2003), Slater (1997), Slater and Narver (1995), Urban, Hauser and Dholakia (1987), Von Hippel (1986, 1988)
R&D/ Technology Management	<ul style="list-style-type: none"> <li>• Technology strategy</li> <li>• Technology scanning</li> <li>• Technology acquisition and transfer</li> <li>• R&amp;D management</li> </ul>	Adler et al. (1992), Atuahene-Gima (1996), Bower & Christensen, (1995), Christensen (1997), Drucker (1985), Foster (1986), Granstrand (1999), Radnor (1986), Van de Ven & Rogers (1988), Zahra et al (1995), Zahra & Covin (1993)
Creativity & Idea Management	<ul style="list-style-type: none"> <li>• Creativity techniques</li> <li>• Encouraging creativity</li> <li>• Sources of innovation ideas</li> <li>• Idea management</li> <li>• ‘Fuzzy’ front-end management</li> </ul>	Amabile (1988), de Bono (1993), DeGraff & Lawrence (2002), Drucker (1985), Flint (2002), Higgins (1996), Khurana & Rosenthal (2002), Leonard & Sensiper (2002), Lilien et al (2002), McFadzean (1999), Osborn (1957), Rickards & Bessant (1980), Sutton & Hargadon (1996), Urban, Hauser and Dholakia (1987), von Hippel (1988), Zien & Buckler, (1997)
Intellectual Property Management	<ul style="list-style-type: none"> <li>• IP strategy</li> <li>• IP capture, protection, leveraging, exploitation</li> <li>• Systems and processes</li> <li>• Intellectual capital</li> </ul>	Adler et al. (1992), Dunn & Baker (2003), Elton et al (2002), Granstrand (1999), Kline & Rivette (2000), Lev (2002), Sullivan (2000)
Commercialisation Process Management	<ul style="list-style-type: none"> <li>• Innovation processes</li> <li>• Product development</li> <li>• Stage-gate processes</li> <li>• Service development</li> <li>• Corporate venturing</li> </ul>	Amabile (1988), Brown & Eisenhardt (1995), Burgelman (1984), Cooper (1990), de Brentani & Cooper (1992), Griffin & Page (1996), Kanter (1985), Lilien et al (2002), Martin and Horne (1993), Mason and Rohner (2002), McDermott and Handfield (2000), Meyer and DeTore (1999), Miles and Covin (2002), Rogers (2003), Saren (1984), Urban, Hauser and Dholakia (1987), Zahra (1993, 1995), Zirger & Maidique (1990)
Process Innovation Management	<ul style="list-style-type: none"> <li>• Process innovation techniques e.g. Six Sigma, TQM, QFD, Reengineering etc.</li> <li>• Technology adoption</li> </ul>	Abernathy & Utterback (1978), Barras (1986), Bessant & Buckingham (1993), Damanpour & Gopalakrishnan (2001), Ettl et al (1984), Hammer & Champy (1993), Martensen & Dahlgaard (1999), Pande et al. (2000)
Radical Innovation Management	<ul style="list-style-type: none"> <li>• Characteristics of radical innovations</li> <li>• Enabling organisational characteristics e.g. strategy, structure etc.</li> </ul>	Christensen (1997), Ettl et al, Bridges and O’Keefe (1984), Green, Gavin and Aiman-Smith (1995), Leifer et al (2000), McDermott & O’Connor (2002), Rice et al. (1998, 2000), Utterback (1994)

Source: author



## **2.3 Organisational Change**

The Innovation Capability Assessment instrument is designed to aid organisations improve their innovation performance by facilitating organisational change. Hence, it is necessary to review the literature on organisational change, much of which draws upon the Organisation Development (OD) field of research. This section in the literature chapter highlights several relevant aspects of the organisational change literature and is sub-divided into three corresponding sub-sections:

- Organisational Assessment and Change;
- Consensus and Collaboration; and
- External Facilitation

### **2.3.1 Organisational Assessment and Change**

Change has been defined as observable differences in time along one or more dimensions of an entity (Van de Ven and Rogers, 1988). In order for organisational change to be successful it must take into account both the strategy or direction of the organisation, as well as the organisation itself, that is, its culture, structure, systems and people (Mintzberg, Ahlstrand and Lampel, 1998). OD is an approach to change that originated out of Lewin's 'planned change' method and has dominated organisational change efforts since the 1940s (Burnes, 2000). In its basic form it consists of three steps; 'unfreezing' the present level, moving to the new level and 'refreezing' the new level. OD is an ongoing process of change aimed at resolving issues through the diagnosis and management of the organisation's culture. (Paton and McCalman, 2000). Whilst it is often used for large-scale, long-term change efforts (French, Bell and Zawacki, 1994), its principles are equally applicable to shorter, more focussed efforts (Mink et al., 1993).

Dissatisfaction with the status quo is often cited as the pre-requisite motivation for successful change (Dooley and Johnson, 2001). Whilst this needs to be recognised by the senior management of the organisation, just as important is the diffusion of dissatisfaction throughout the whole organisation (Spector, 1989). An assessment of current performance might be one way of highlighting such shortcomings. Initial diagnosis or assessment has been seen as the first step in understanding what change is

required (French, Bell and Zawacki, 1994). Spector (1989) suggests highlighting shortcomings in current behaviours as an effective means of stimulating the motivation to change. An evaluation of the current 'as-is' situation may pinpoint specific areas in need of improvement and also help to prioritise and focus improvement efforts (Dooley and Johnson, 2001).

Assessment programs aimed at enhancing the organisational capabilities have been used previously. Day (1994), for example, utilised a six-step approach with the aim of improving the market-oriented capabilities of organisations, including a combination of bottom-up re-design and top-down direction, and recommended monitoring the progress through appropriate performance measures. Bottom-up involves forming accountable teams supported by information systems, incentives, training and communication forums. Top-down involves ensuring senior management commitment is demonstrated through such actions as articulating a challenging vision or target and encouraging participation. The implementation of change can then be driven by the development of specific actions. The actions should include the means to measure results to ensure that they do in fact aid in organisational performance (Schaffer and Thomson, 1992).

Several researchers have outlined essential steps to be considered for successful change to occur. For example, Kotter (1995) describes several necessary conditions for change efforts to be successful, including: establishing a sense of urgency, forming a powerful guiding coalition, creating and communicating a vision, and planning for and creating short-term wins.

### **2.3.2 Consensus and Collaboration**

A collaborative, consultative approach can be contrasted by a 'doctor-patient' model of consultation where the researcher/consultant is used to 'diagnose' a problem with the organisation and then 'prescribe' a form of change. This approach has been criticised in the literature as it may limit organisation members in being open about problems and, as they are not involved in developing solutions, they may be unable to understand it or be unwilling to engage in the change process (Paton and McCalman, 2000).

Developing an appropriate level of integration and participation without suppressing the ability of individuals to think independently is essential in any collaborative intervention (Marino, 1996). Fragmented team members pursue their own agendas with

minimum collaboration or exchange whilst, at the opposite end of the spectrum, highly cohesive and socially integrated teams risk 'groupthink' which may result in excessive like-mindedness and unanimity undermining critical analysis (Hambrick, 1995). Marino (1996) describes a 'consensus' process for understanding an organisation's core capabilities designed to overcome the two major problems of 'fragmentation' and 'groupthink'. The aim, he argues, is to design an assessment process that operates between these two extremes in order to overcome potential fragmentation and stimulate insightful analysis and debate.

Many authors have argued for the inclusion of employees into the design and implementation of the change program to ensure commitment to the tasks and to aid in the institutionalisation of the changes (Burnes, 2000; Pascale, Millemann and Gioja, 1997; Spector, 1989). Mohrman and Lawler (1988) argue that involving employees in change initiatives can be understood from at least four perspectives:

- humanistic values - it is argued that if employees participate in decisions they will be more satisfied, committed and willing to accept change;
- technical rationality - participation enables the most efficient information processing and task accomplishment;
- economic behaviour - employees will act to maximise their own benefits but at the same time will act to create a sense of equity between what they contribute to the organisation and what they receive in exchange; and
- political values - the organisation is seen as an extension of a democratic society and therefore employees demand meaningful input into the decisions that affect them.

### **2.3.3 External Facilitation**

One of the key influencing factors in the success of a change initiative is the role of the consultant acting as a facilitator of the change. Often an external 'change agent' is needed to move the part of the organisation contemplating change to its new position (Paton and McCalman, 2000). More specifically, when dealing with a highly complex research subject such as innovation, authors have called for researchers to "place

themselves in the manager's temporal and conceptual frames of reference" (Van de Ven and Rogers, 1988, p.640).

Schein (1988) argues that organisations need assistance in managing the process of change. Among several reasons he gives for an organisation to use a change agent, he notes that management often need help to diagnose exactly what their problems are and to identify what to improve. He also gives several reasons why this should be a collaborative effort between the consultant and the organisation including that most organisations could be more effective if they learn to diagnose and manage their own strengths and weaknesses and a consultant probably can't learn enough about the culture of the organisation to suggest reliable new courses of action on his own.

Margulies and Raia (1978) propose three attributes that an individual needs to enable them to take on a consulting role in the area of organisation development. A change agent should have:

- people oriented skills such as being able to establish, maintain and work on relationships, showing an awareness and sensitivity to social issues and an ability to listen and show empathy;
- both analytical and diagnostic skills to facilitate the change process; and
- client-related experience.

#### **2.3.4 Summary of the Organisation Change Literature**

The literature on organisation change highlighted three relevant aspects for research on the design and delivery of an instrument for improving the innovation capability of an organisation. Firstly, the improvement process should start with an assessment of the status quo; that is the organisation's current innovation capability, followed by developing actions aimed to address areas of weakness. Secondly, the assessment and action development should be a collaborative process involving those affected by the change as participants. Finally, a change agent external to the organisation, who has the requisite skill set that aids in assessment and improvement, should facilitate the process.

In summary, improving an organisation's innovation capability may be difficult to do as capabilities in general are often difficult to define and assess. This is because they are

often deeply embedded within the fabric of the organisation and much of the related knowledge is tacit and dispersed (Day, 1994). Therefore, an instrument specifically designed to assist organisations to identify and assess their innovation capability, delivered by an external facilitator, could be of great benefit.

## **2.4 Innovation Capability Assessment Tools**

A review of the literature aimed at identifying an instrument that would assist organisations to better understand and improve their management of corporate entrepreneurship and innovation revealed that there are few tools designed to do this.

Several innovation assessment frameworks operate at the industry or geographical unit of analyses (Bross, 1999; European Commission, 2001; Mairesse and Mohnen, 2002; Porter and Stern, 1999; Walker, Jeanes and Rowlands, 2002; Watanabe, Tsuji and Griffy-Brown, 2001). These typically measure and compare ‘innovation proxies’, for example intellectual property output or research and development (R&D) expenditure, in order to draw conclusions about the effectiveness of countries or industries to innovate.

Such frameworks offer little assistance to the individual organisation wishing to improve their innovation capability. In addition, some research has pointed out the limitations in using such proxies. Bienayme (1986, p.138), for example, talks of researchers who have “confused R&D and innovation.” In his view, analysis based on R&D investment is useful for little more than to “account for an expenditure of money, while innovation results in a tangible product or an efficient service satisfactory to a customer” (Bienayme, 1986, p.141).

There are many assessment tools that operate at the organisational level that also use similar indicators or proxies of innovation as a means to determine innovation performance of firms, rather than assess innovation capability (Cordero, 1990; Frigo, 2002; Hauser, 2001; Kaplan and Norton; 1992; Kuczarski, 2000; Tipping, Zeffren and Fusfeld, 1995; Voss; 1992). Again, these may assist organisations in providing a comparison about certain inputs (for example, R&D investment) or outputs of innovation (patent statistics and the like), and therefore could be related to the effectiveness of their innovation capability. However, they don’t provide organisations

with an understanding of what organisational capabilities contribute to convert these inputs into outputs and how these organisations might begin to make improvements.

Assessment tools also exist to measure organisations' environments or cultures with the aim of determining how conducive these environments may be for entrepreneurial or innovative activity (Kuratko, Montagno and Hornsby, 1990). These typically address some aspects of the internal environment literature referenced above and ignore other factors included in the areas of strategic management or innovation competencies.

Generally, the few tools that endeavour to address the innovation capability at the organisational level do not appear to have much academic rigour or provide little evidence that they have been applied successfully (Burgelman, Kosnik and van den Poel, 1988; Higgins, 1995; Pinchot and Pellman, 1999; Shapiro, 2002; Tidd, Bessant and Pavitt; 2001). Those that do tend to focus exclusively on the manufacturing sector as opposed to service industries (Chiesa, Coughlan and Voss, 1996); this is a persisting trend in the literature despite the increasing importance of services to most Western, developed economies (Pande, Neuman and Cavanagh, 2000). Other organisational level assessment tools focus on R&D and technology management rather than innovation in general (Geisler, 2002) or address some of the enablers of innovation but omit other important areas, for example organisation culture (Adler, McDonald and McDonald, 1992) and customers and market understanding (Burgelman , Kosnik and van den Poel, 1988).

Indeed, there has been a call for some time in the literature for a more general perspective on innovation as opposed to the often isolated views on individual aspects such as technological innovation, innovation diffusion, innovative cultures and the like (Lewin and Minton, 1986; Van de Ven, 1986).

Few tools define clearly whether they are designed to address all types of innovation, for example, product, process, business model and administrative. In addition, none were found that address all degrees of innovation, from incremental through to radical. Models that fail to address the difference between radical and incremental innovation management overlook one of the most important aspects of research on corporate innovation that has emerged in the last decade.

Three Innovation Capability Assessment instruments that represent the most comprehensive and robust found by the author in the literature are described in greater detail in order to provide a deeper understanding of the strengths and weaknesses of the current state of art in this area.

Chiesa, Coughlan and Voss (1996) present an innovation capability audit based on a process model of technical innovation. The underlying premise is that success in innovation is related to achieving better practice in the constituent management processes, which in turn leads to increased competitiveness. The model includes four core processes: concept generation, product development, process innovation, and technology acquisition. Supporting these core processes are three enabling processes: the deployment of human and financial resources, the effective use of appropriate systems and tools, and senior management leadership and direction. Whilst this assessment instrument appears to be the most comprehensive of those in the literature, its focus is on technical innovation only and has been applied only on manufacturing firms in the United Kingdom.

Another innovation capability framework is proposed by Burgelman, Kosnik and van den Poel (1988) that is based on five aspects of innovation capabilities: (1) understanding the technical environment; (2) understanding the industry; (3) understanding the culture (4) understanding the organisational structure and; (5) the strategic management capacity. Again, the focus is firmly on technology management with no apparent consideration of the customer or their needs. Also innovation is seen narrowly as product or service development, and there is no indication whether this framework has been tested.

The final assessment model to be discussed is WAVE™ Innovation Capabilities Audit (Bubner, 2001). Here the author contrasts better practice in six ‘foundation’ capabilities of ‘well-managed’ organisations, with six innovation capabilities that include:

- leadership;
- strategy for innovation;
- fostering innovation via the external environment;
- internal environment for innovation;

- innovation production process; and
- maintenance and measurement of innovation.

This instrument sets out to provide a holistic approach to innovation management and is apparently aimed at a range of organisations. For this reason, it appears the most promising of the Innovation Capability Assessment instruments identified in the extant literature. There is little published literature, however, as to its effectiveness in improving organisational innovation performance in practice.

In summary, whilst there have been previous attempts to develop assessment instruments aimed at measuring and improving innovation performance, few, if any, have addressed all the aims of this research for the following reasons:

- a focus at the industry- or country-level unit of analysis rather than organisational level;
- a lack of rigorous theory development;
- a focus almost exclusively on manufacturing industry;
- a focus on measuring performance ‘proxies’, such as patent production, rather than management capabilities that would more easily enable improvement;
- a focus on only one or two types of innovation e.g. product development; and
- little focus on Australian research.

## **2.5 Development of the Theoretical Framework and Research Questions**

In this section, the initial theoretical innovation capability framework is developed based on the literature and the research questions to be addressed during the fieldwork are proposed.

### **2.5.1 Innovation Capability Theoretical Framework**

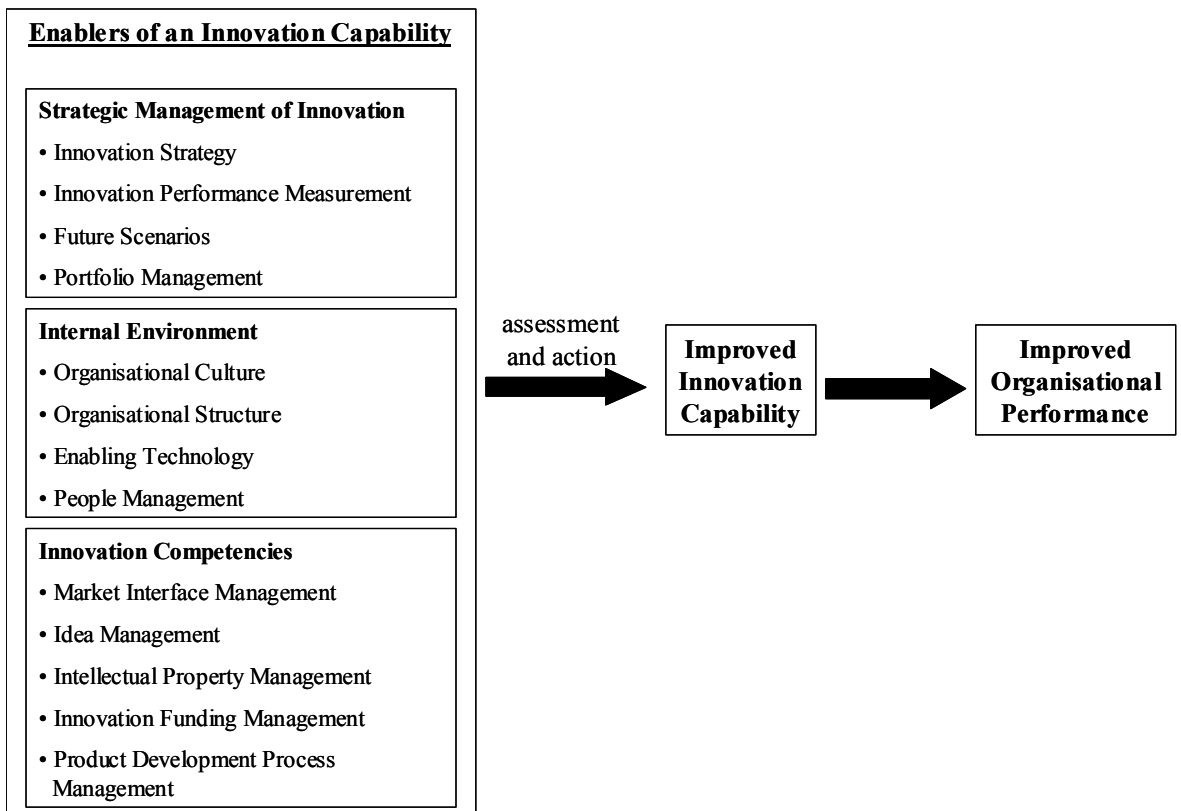
The three categories of innovation enablers that emerged from the corporate entrepreneurship and innovation literature, and summarised in Tables 2.1, 2.2 and 2.3, form the basis of the Innovation Capability theoretical framework presented in Figure



2.2. The literature discussed under each of the enabler categories in Section 2.4 forms the various sub-assessment areas in the theoretical framework. The theoretical framework, in turn, formed the basis of the preliminary Innovation Capability Assessment instrument (discussed in Section 3.9.4 and contained in Appendix 5).

It is important to note at this stage that the preliminary assessment instrument underwent development and modification during the subsequent research. Any changes that arose from insights during the exploratory case studies were confirmed through further analysis of the literature. Hence the final assessment instrument (see Appendix 6) contains areas not appearing in the initial theoretical framework. For reasons of completeness and clarity *all* the relevant areas of literature that are reflected in the finalised assessment instrument have been presented throughout Chapter 2 and are summarised in Tables 2.1, 2.2 and 2.3 even if they were not initially considered by the researcher when constructing the theoretical framework. Those areas included in the initial theoretical framework are shown in Figure 2.2.

**Figure 2.2: Initial innovation capability theoretical framework and the proposed link with organisational performance**



Source: author

It is proposed that effective performance in the constituents of the three *enabler* categories would translate into an effective innovation capability that, in turn, would lead to effective organisational performance. This suggested relationship is illustrated conceptually in Figure 2.2. Similar conceptualisations have been suggested previously, for example, Rogers (2003) summarises independent variables relating to organisational innovativeness under the three headings of: (1) Individual Leader Characteristics; (2) Internal Characteristics of Organisational Structure; and (3) External Characteristics of the Organisation.

The separation into three categories and 13 sub-areas by the author is, however, both new and, to some extent an artificial one, made to allow easier understanding of the possible constituents of an innovation capability. Other arrangements of these enablers could be imagined and may be just as legitimate and useful, due primarily to there being overlap in the some of the concepts discussed between different steams. For example, the use of alliances has been seen as a strategic choice to be made by an organisation and hence is included in the strategy management category. It could however be considered an issue of organisational structure, and is on occasions in the literature (for example Rice et al., 1998) and therefore could be in the internal environment category.

Likewise, some research shows a comprehensive understanding of the external environment is critical in order to formulate effective innovation strategies, and therefore external environment analysis could be included in a strategy management category. However due to the literature emphasising specific aspects of such analysis (market orientation, future scenarios and the like), the author has included these specific aspects in areas that best align with the three categories.

### **2.5.2 Research Question One**

The initial research questions and sub-questions to be addressed in the fieldwork is given below:

RQ1. What areas of organisation capability does an Innovation Capability Assessment instrument need to include?

- a. How relevant is the ‘strategic management of innovation’ area of the assessment instrument in assessing an organisation’s innovation capability?

- b. How relevant is the ‘internal environment’ area of the assessment instrument in assessing an organisation’s innovation capability?
- c. How relevant is the ‘innovation competencies’ area of the assessment instrument in assessing an organisation’s innovation capability?

Various authors have endeavoured to identify organisational characteristics that are determinants for effective innovation (Damanpour, 1991) and the organisational elements that constitute an innovation capability (Ahmed and Abdalla, 1999; Zien and Buckler, 1997). It is expected that some areas of the framework may not be as important to the organisations to be studied and could be omitted for the sake of brevity and clarity. Conversely, it is possible that there are some areas that are important that haven’t been included in the initial theoretical framework.

This research question was addressed in three ways in the research. Initially, during each of the exploratory studies, the relevance of the constituent areas of the theoretical framework was discussed during the convergent interviews. In addition, workshop participants rated and commented on the various constituents of the assessment framework in terms of importance to their organisations. Finally, during the confirmatory case studies, the participants again rated and commented on each of the assessment areas in terms of importance as well as also completing a case study evaluation (see Appendix 8) addressing the relevance of each constituent area.

### **2.5.3 Research Question Two**

The second of the research questions to be addressed in the fieldwork relates to the general applicability of the assessment instrument to a variety of organisations.

RQ2. How applicable is the Innovation Capability Assessment instrument across a variety of organisations?

- a. How applicable was the instrument in organisations of different size?
- b. How applicable was the instrument in organisations operating in different industries?

The assessment framework will be based on the common innovation enablers or principles identified from the literature. It is expected that different organisations may

operationalise these principles in different ways but that these principles will be generally applicable across different organisations. This approach is similar to Zien and Buckler (1997, p.276) who identified a number of principles common to each of 12 global innovative leaders but each of whom “customises the principles for their own corporate culture, both systematically and systemically implementing a set of practices and approaches throughout the whole enterprise.” It is likely that different sized organisations and organisations operating in different industries may find different aspects of the tool more or less important and useful.

There are conflicting views in the literature on the relationship between organisation size and innovation capability. The size of an organisation has been found to be positively related to the ability to adopt innovations (Mahler and Rogers, 1999), however there is also evidence in the literature that suggests that size does not have a moderating effect on the determinants of successful innovation (Damanpour, 1991). Rogers (2003) explains the prevalence of research linking size and innovation due to ‘size’ being easy to measure (whether through number of employees, revenue, number of customers and the like). The lack of clarity as to the influence it has on innovation performance is probably due to the fact that size is a surrogate measure of other organisational variables such as total resources, slack resources, employees’ expertise, organisational structure and the like (Rogers, 2003).

Much of the research on organisational innovation and, in particular, innovation assessment tools, has focused on the manufacturing sector as opposed to service industries (for example, Chiesa, Coughlan and Voss, 1996). Indeed innovation research has largely ignored service industries despite the importance of services to modern economies (Damanpour and Golpalakrishnan, 2001).

Given that innovation can be of importance to organisations irrespective of size or sector, then it is important the Innovation Capability Assessment instrument is applicable across a range of organisational sizes and industry types. This aim is consistent with suggestions in the literature for a more general perspective on innovation to be adopted as opposed to the often isolated views on individual aspects such as technological innovation, innovation diffusion, innovative cultures and the like (Lewin and Minton, 1986; Van de Ven, 1986). This research question was addressed by the selection of a variety of organisation types and sizes for case studies during the

fieldwork. A particular emphasis was placed on organisations operating in service industries in order to better understand innovation within these contexts. Participants from all organisations comment on the applicability of the assessment instrument to their organisation and those from confirmatory case organisations completed the case study evaluation instrument (see Section 3.9.6 and Appendix 8), which addressed this question.

#### **2.5.4 Research Question Three**

The third research question and sub-questions to be addressed in the fieldwork relate to the effectiveness of the assessment instrument in developing actions aimed at improving the innovation capability of the organisation.

RQ3. How useful is the Innovation Capability Assessment instrument in aiding organisational change?

- a. How useful is the assessment in identifying areas requiring improvement?
- b. How useful is the assessment in prioritising areas requiring improvement?
- c. How useful is the assessment in developing actions?
- d. How effective are the actions developed in aiding the improvement of the organisation's innovation capability?

Assessment of the current status is typically seen as the first step in understanding what change is required (French, Bell and Zawacki, 1994) by highlighting shortcomings and stimulating the motivation to change (Spector, 1989). Actions targeting the under performing areas can then be developed to aid in improvement in organisational performance (Schaffer and Thomson, 1992). As well as identifying areas in need of improvement, the assessment should also help with prioritisation and focusing of improvement efforts (Dooley and Johnson, 2001).

This research question was addressed in the field research in two ways. Initially, if the assessment process concludes in the development of actions, then this in itself can be deemed a successful outcome and a step toward organisational improvement. Secondly, participants from all organisations were asked to comment on the usefulness of the assessment instrument for improvement action development, and those from

confirmatory case organisations completed the case study evaluation instrument (see Section 3.9.6 and Appendix 8), which addressed this question.

#### **2.5.5 Research Question Four**

The final research question and sub-questions to be addressed in the fieldwork relate to the process used to deliver the assessment instrument and to develop the actions aimed at improving the innovation capability of the organisation.

RQ4. How effective is the process used to deliver the assessment and to develop actions for improvement?

- a. How effective is the use of workshops and collaborative voting technology in promoting a participative approach to assessment and action development?
- b. How effective is the use of an external facilitator to assist in the assessment and action development?

Many authors have argued for the inclusion of employees into the design and implementation of the change program to ensure commitment to the tasks and to aid in the institutionalisation of the changes (Burnes, 2000; Pascale, Millemann and Gioja, 1997; Spector, 1989). Developing an appropriate level of integration and participation without suppressing the ability of individuals to think independently is essential in any collaborative intervention (Marino, 1996). In addition, the use of an external ‘change agent’ is often argued as being necessary in order to move the part of the organisation contemplating change to its new position (Paton and McCalman, 2000; Schein, 1988; Van de Ven and Rogers, 1988).

This research question was addressed in the field research at the conclusion of each of the confirmatory case studies by the participants completing the case study evaluation instrument (see Section 3.9.6 and Appendix 8), which addressed this question.

## **2.6 Chapter Summary**

In this chapter, the corporate entrepreneurship and innovation and organisational assessment and change bodies of literature were reviewed, due to their relevance to the research problem investigated in this thesis. A theoretical framework was developed from the literature based on the enablers of organisational innovation. This framework

in turned formed the basis of the preliminary assessment instrument used in assessing an organisation's innovation capability discussed in the next chapter. Four specific research questions to be addressed during the fieldwork were also developed: three questions addressing the effectiveness of the Innovation Capability Assessment instrument, its general applicability and its ability to assist in improving performance, and one focussing on the assessment process to be undertaken. The next chapter outlines the methodology of the research project.

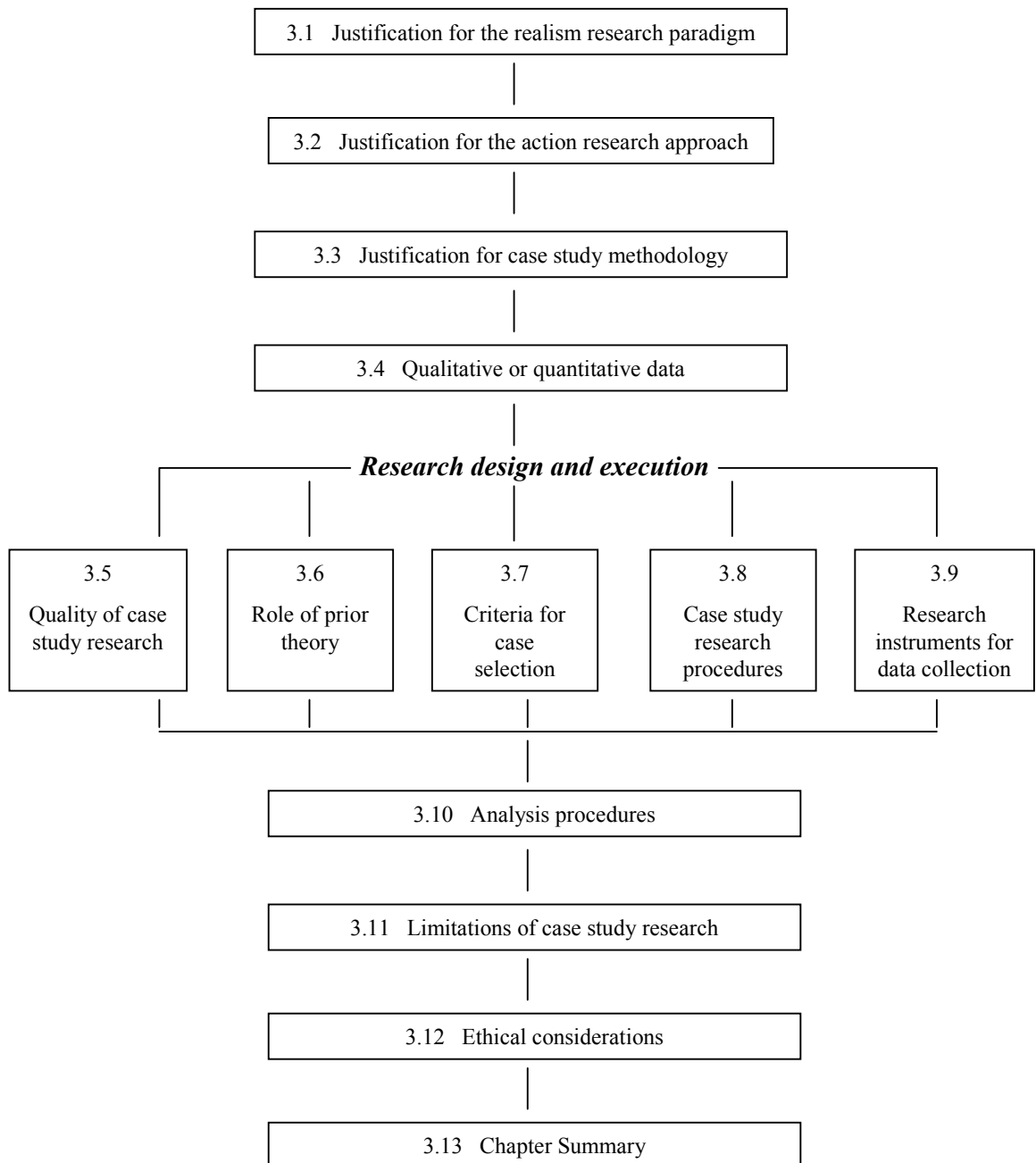
### **3 Methodology**

Chapter Two reviewed the relevant literature on Organisational Innovation, Assessment and Change and concluded with four research questions to be addressed during the fieldwork stage. This chapter focuses on research design selection; the methods for data collection and analysis, as well as the overall configuration of the research, including what, how and from where evidence is gathered and interpreted in order that ‘good answers’ are provided to the research problem (Easterby, Thorpe and Lowe, 1991). Chapter Three consists of thirteen sections as depicted in Figure 3.1.

The chapter begins with the justification of the realism paradigm selected for this piece of research in Section 3.1 followed by the justification for the action research approach, the case study methodology adopted and the type of data collected during the fieldwork stage in Sections 3.2, 3.3 and 3.4 respectively. Sections 3.5 through to 3.8 then outline in detail the research design and execution, dealing with in turn, how validity and reliability issues were addressed (Section 3.5), the role played by prior theory in this research (3.6), the criteria for the number and nature of cases selected (3.7), the procedures for case study research are explained (3.8) and finally the instruments used for data collection are described (3.9). Section 3.10 outlines the data analysis techniques used, and the chapter ends with a discussion of how the limitations (3.11) and ethical considerations (3.12) were addressed during the research, and some concluding remarks (3.13).



**Figure 3.1: Chapter 3 structure**



*Source: author*

### **3.1 Justification for the realism research paradigm**

A paradigm represents a ‘worldview’ that allows an individual to understand the nature of their ‘world’ and their place in it (Guba and Lincoln, 1994). A researcher’s paradigm is the overall conceptual framework within which he or she operates, either explicitly or implicitly (Perry, Riege and Brown, 1999). It is a set of linked shared assumptions that provides a conceptual and philosophical framework for the organised study of the world (Deshpande, 1983). There is no way to establish the ultimate truthfulness of a paradigm as the beliefs are accepted simply on faith (Guba and Lincoln, 1994).

The selection of the most appropriate paradigm through which this investigation was to be conducted was the initial step in the research design. This is important as the selection of the paradigm defines for the inquirers what falls within and outside the limits of legitimate inquiry (Guba and Lincoln, 1994) and what methods are available to the researcher (Deshpande, 1983). Four paradigms compete for acceptance within social science: positivism, realism, critical theory, constructivism and it is argued that realism is the most appropriate for business research (Perry, Riege and Brown, 1999). The primary assumptions that support each of these paradigms and the differences between them are highlighted in Table 3.1. The three dimensions of Table 3.1 are ontology, epistemology and methodology and they can be described as answering the following questions:

- Ontology - What is the form and nature of reality and, therefore, what is there that can be known about it?
- Epistemology - What is the nature of the relationship between the researcher and what can be known?
- Methodology - How can the researcher go about finding out what he or she believes can be known? (Guba and Lincoln, 1994).

**Table 3.1: Comparison of four research paradigms considered for this research**

	Positivism	Critical Theory	Constructivism	Realism
Ontology Form and nature of reality	<u>Naïve realism</u> apprehensible reality exists driven by immutable natural laws and mechanisms.	<u>Historical realism</u> shaped by social, economic, ethnic, political, cultural and gender values, crystallised over time	<u>Critical relativism</u> multiple local and specific constructed realities	<u>Critical realism</u> imperfectly apprehensible reality
Epistemology Relationship between researcher and reality	Objectivist Two-way mirror observer. Findings true	Subjectivist Value mediated findings	Subjectivist Created findings	Modified objectivist Findings probably true
Methodology Techniques for data collection and analysis	Chiefly quantitative methods; verification of hypotheses	Dialogic/ dialectical	Hermeneutical/ dialectical  In depth, unstructured interviews	Case studies, convergent interviewing, triangulation

*Source: adapted from Guba and Lincoln (1994) and Perry, Riege and Brown (1999).*

Each of the four paradigms is now reviewed and reasoning given as to their suitability to this piece of research.

**Positivism.** The positivism paradigm is the traditional scientific approach, or ‘received view’, that focuses on efforts to verify or falsify a priori hypotheses through deductive testing, often utilising quantitative methodologies (Guba and Lincoln, 1994). The aim of the enquiry is explanation, ultimately allowing the prediction and control of physical or human phenomena (Guba and Lincoln, 1994).

Data is usually collected via experiments and sample surveys which are outcome oriented (Perry, Riege and Brown, 1999) and where the observer and the observed object are assumed to be independent entities (Guba and Lincoln, 1994). The belief is that the investigator is capable of studying the object without influencing it or being influenced by it (Guba and Lincoln, 1994) and the data, therefore, is value free and ‘true’ (Perry, Riege and Brown, 1999). Confounding conditions must be controlled (manipulated) to prevent outcomes from being improperly influenced (Guba and Lincoln, 1994).

The key idea of positivism is that the social world exists externally, and that its properties should be measured through objective methods, rather than through being inferred subjectively through sensation, reflection or intuition (Easterby, Thorpe and Lowe, 1994). It is assumed that it is “possible to separate the knower (subject) from the known (object)” (Symon and Cassell, 1998, p.2). A positivistic view is inappropriate when investigating a social science phenomenon where context is important for understanding (Perry, Riege and Brown, 1999), and where case study participants and environment cannot be controlled (Guba and Lincoln, 1994).

**Critical Theory.** The second paradigm, critical theory, adopts an historical realism ontology. Here, truth is a construction shaped by social, economic, ethnic, political, cultural and gender values that have been crystallised into a series of structures that are now taken as ‘real’ (Guba and Lincoln, 1994). Unlike positivism, where the investigator and the investigated are assumed to be independent of one another, critical theorists’ values are interactively linked with their subjects and inevitably influence the inquiry (Guba and Lincoln, 1994). The findings therefore are value mediated.

The aim of the enquiry is the liberation of participants from ignorance to a new consciousness and assumes that the inquirer or those affected understand what transformations are required (Guba and Lincoln, 1997). Meaning arises from discourse between parties and, in this sense, knowledge is created from the accumulation of insights, rather than from fixed laws and principles (Symon and Cassell, 1998).

The critical theory paradigm is unsuitable for this research. Whilst the primary aim of the research is the development of an assessment instrument, which, if successful, will facilitate change, the researcher is not placing himself in the role of a ‘transformative intellectual’, aiming to liberate participants from their ignorance and change social, economic, ethnic, political, cultural and gender values (Guba and Lincoln, 1994).

**Constructivism.** The constructivism paradigm holds that individuals or groups construct realities that are not ‘true’ but based on their own perceptions of reality (Perry, Riege and Brown, 1999). Reality, therefore, is a mental construct of individuals or groups that occurs between the researcher and participant(s) during the study (Guba and Lincoln, 1994). That is, the findings of the research are created between the investigator and the subject during the inquiry and knowledge becomes those constructs about which there is general consensus (Perry, Riege and Brown, 1999).

The constructivism paradigm was not considered appropriate as this research focuses on

understanding how an instrument can be developed that assesses how organisations currently manage innovation rather than psychological constructs. This paradigm has been rejected in the past for social research into business organisations as it excludes concerns about the ‘real’ economic and technological aspects of business (Hunt, 1991).

**Realism.** The last of the four paradigms (the final column in Table 3.1) is the realism paradigm and the one considered to be the most appropriate for this piece of research. Whereas constructivists and critical theorists consider there are multiple realities, realists believe there is a ‘real world’ of which multiple perceptions exist (Guba and Lincoln, 1994). Realists do not believe that the perception is the reality, rather they argue that a better understanding of reality can be obtained via the triangulation of multiple perceptions (Perry, Riege and Brown, 1999). The ultimate aim of the critical realist therefore is the arrival at an imperfect understanding of the common reality of a system in which many people operate independently (Perry, Riege and Brown, 1999).

As the aim of this research was to address gaps in the extant literature by developing an instrument capable of assessing the innovation capabilities of organisations operating in a real and complex world, the realism paradigm was most appropriate for this study. Research methodologies operating within the realism paradigm are usually qualitative ones such as case studies or convergent interviews. A case study methodology was likewise adopted for this research and the justification for its selection is outlined in Section 3.3. Prior to this however, the next section discusses the reasons for adopting an action research approach.

## **3.2 Justification for the Action Research approach**

An action research approach utilising case studies has been adopted as the most appropriate for this research as the intended outcome involves change and improvement to participating organisations. Whilst the next section discusses the case study methodology in detail, this section focuses on justifying the action research approach.

Action research has its origins with Kurt Lewin (1946) who used it in his work as a social psychologist. He particularly emphasised its collective nature and its application where there was a commitment to improvement. For this particular study, an action research methodology was adopted as it has been found to be particularly useful when the aim of the investigation is innovation and change (Wilson-Evered and Hartel, 2001).

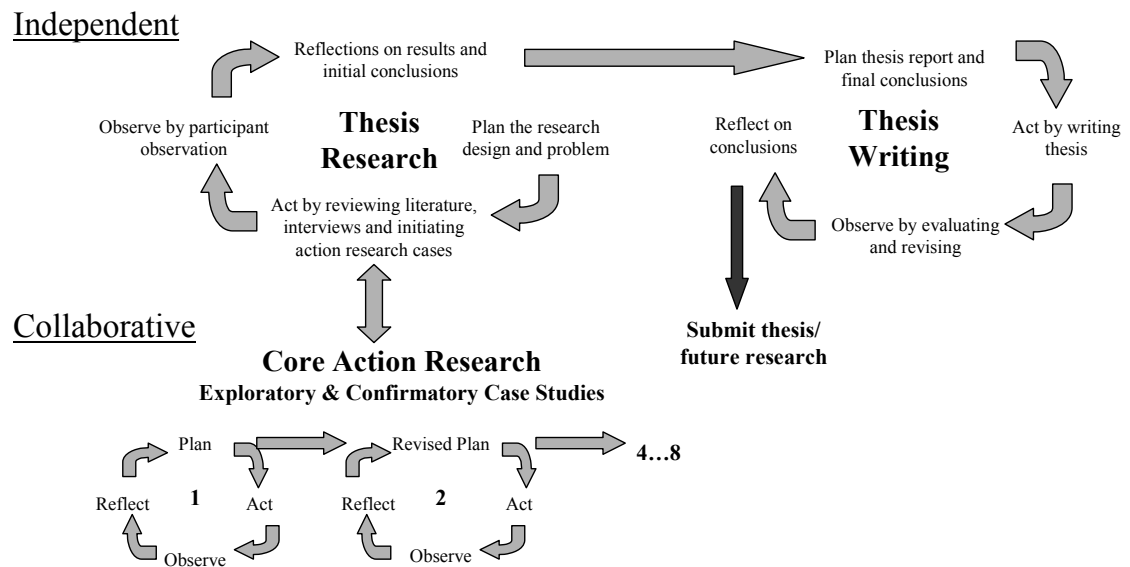
Indeed Dick (1997, p.1) highlights that, “as the name implies, action research is intended to produce both change (‘action’) and understanding (‘research’)”. These could be described as the twin aims of this piece of research. In addition, action research has been found to be particularly useful in the past where the research aimed to have practical implications and had uncertain outcomes (Sankaran, 2001).

The collaborative aspect of action research is designed to generate both knowledge and produce action and practical outcomes (Park, 1999; Reason, 1999). Both the researcher and the participants are involved in data gathering, analysis and diagnosis. Successful change depends upon an individual's inner realisation that change is necessary and must be felt by all participants (Burnes, 2000). Action research methods were used to ensure that affected personnel within each of the case study organisations played a key role in what happened in their workplace (Easterby, Thorpe and Lowe, 1991; Reason, 1999).

A cyclic approach typical of action research has been adopted here that operates as a continuing repeating pattern of: plan, act, observe and reflect. For this research, there were two levels of action research being carried out as depicted in Figure 3.2. At the independent level this initially involved the researcher *planning* the research design and problem, *acting* through the review of the literature and interviews leading to the development of the preliminary assessment framework and subsequent initiating of the case studies, *observing* during the case studies, and *reflecting* on the results and the refined assessment framework. At the completion of the case studies and analysis, the researcher then entered a second independent cycle of *planning* the thesis report, *acting* by writing the thesis, *observing* by evaluating and revising the thesis, and *reflecting* on the results and conclusions drawn.

Within each of the exploratory and confirmatory cases a collaborative action research model, based on the work of other action researchers such as French, Bell and Zawacki (1994), followed a process of diagnosis, data gathering, feedback to the participant group, reflection and discussion by the client group on the results, action planning and action. These two levels of action research cycles are similar to that recommended by Zuber-Skerrit and Perry (2002).

**Figure 3.2: Action Research Cycle adopted for this research**



*Source: adapted from Zuber-Skerrit and Perry (2002)*

Qualitative research techniques were primarily used such as interviews, case-based interventions, a reflective research diary and workshops, to aid in revealing the richness of data available and these are discussed in further detail in subsequent sections. It is worth pointing out here however, that an action research approach is also an effective means in dealing with the large body of data that qualitative research generates. Action research offers economy in that only the interpretations need be carried from cycle to cycle (Dick, 1997).

### **3.3 Justification for the case study methodology**

Once the realism paradigm and action research approach had been established, a research methodology had to be selected. This section describes the case study research method and justifies its use in this research.

A case study is an empirical enquiry that investigates a contemporary phenomenon within its real-life context (Yin, 1994). It focuses on “understanding the dynamics present in a single setting” (Eisenhardt, 1989, p.534). Whilst case studies have been used in a wide variety of academic fields, and often as a teaching device (Perry, 1998),

it is only more recently that the case study methodology has become recognised as a legitimate and comprehensive research method (Yin, 1994).

Whilst case study research can be used for both theory development and testing, it is essential that some element of theory development is included as part of its design (Yin, 1994). The outcome of theory building from case studies may be concepts, a conceptual framework, or possibly a mid-range theory (Eisenhardt, 1989).

The selection of a research method depends upon several variables including:

- the type of research question,
- the control the researcher has over behavioural events, and
- the focus on contemporary as opposed to historical phenomena (Yin, 1994).

Each of these choices is summarised in Table 3.2 below which compares case study research with four other research methods: experiment, survey, archival analysis and histories.

**Table 3.2: Choices for research methodology selection**

Methodology	Type of research questions	Requires control over events?	Focused on contemporary events?
Experiment	How, Why	Yes	Yes
Survey	Who, What, Where, How many, How much	No	Yes
Archival Analysis	Who, What, Where, How many, How much	No	Yes/ No
Histories	How, Why	No	No
Case Research	How, Why	No	Yes

*Source: adapted from Yin, 1994*

Case study research methodology has been selected for this research as:

- it seeks to answer a ‘how’ question – how can an Innovation Capability Assessment instrument developed?,



- about a contemporary phenomenon – the innovation capability of existing organisations,
- in which the investigator has little or no control over events – the research takes place within the organisations’ context in the midst of their day-to-day activities.

Whilst ‘case study’ and ‘qualitative’ are terms often used interchangeably (Yin, 1994), the reality is that for case study research, data may be qualitative or quantitative or both (Eisenhardt, 1989). The next section explains the choice of data collected within the case study research method.

### **3.4 Quantitative versus qualitative data**

The issue of whether to adopt qualitative or quantitative data collection means is one that is much debated and discussed in research literature (Eisenhardt, 1989; Miles and Huberman, 1994; Parkhe, 1993; Yin, 1994). Qualitative data are grounded, rich descriptions and explanations of processes collected within their local contexts (Miles and Huberman, 1994). Quantitative data collection usually involves fitting varying perspectives and experiences of people into predetermined response categories to which numbers are assigned (Paton, 1990). Whilst the latter allows the measurement, comparison and parsimonious presentation of large samples of respondees, it is also criticised as not very effective in understanding processes or the significance that people attach to actions and in generating theories (Easterby, Thorpe and Lowe, 1991). Indeed it has been argued that quantitative data on their own are not capable of capturing the complexities of the ‘messy’, subtle phenomena of organisational behaviour (Parkhe, 1993).

Qualitative data, on the other hand, is raw experience that has been converted into words (Huberman and Miles, 1994). The data comes in the respondent’s own words (Sykes, 1991) typically based on observation, interviews, or documents and carried out close to a local setting for a sustained period. As Miles and Huberman (1994) highlight, qualitative data can be used to generate or revise conceptual frameworks.

There were at least three reasons for adopting a qualitative case study methodology for this research:

- Qualitative methods favour theory building rather than theory testing and verification (Tsoukas, 1989). The collected data is used to confirm or disconfirm theory rather than being tested for generalisability (Perry, Riege and Brown, 1999). Conversely, in the early stages of theory development where phenomena are not well comprehended, the use of quantitative research methods can lead to inconclusive findings (Parkhe, 1993);
- Qualitative methods focus on naturally occurring, ordinary events embedded in their contexts (Miles and Huberman, 1994). The need to understand the phenomenon can best be achieved by getting “physically and psychologically closer to the phenomena” through the intimacy of interviews (Perry, Riege and Brown, 1999, p.21); and
- The ability of case studies to allow the researcher to understand the complex relationships between categories identified during the research (Perry, Riege and Brown, 1999).

Miles and Huberman (1994) argue that both numbers and words are necessary in order to understand the world. Indeed, it has been suggested that combining both data types may lead to synergistic benefits (Yin, 1994). Whilst quantitative data can highlight relationships not previously discernible to the researcher, qualitative evidence allows those relationships to be explained (Eisenhardt, 1989). Miles and Huberman (1994) assert that the question shouldn't be about whether to adopt quantitative or qualitative methods but whether the methods should be combined and how that might be done. Whilst this research adopted a primarily qualitative case study approach, the Innovation Capability Assessment instrument is designed to collect both quantitative and qualitative data in order to increase the richness of data. Similar to Miles and Huberman (1994), the ‘numbers’ are kept closely associated with the ‘words’ during display and analysis in order to ensure they remain within context. So whilst the focus of this research is on the development of a new framework, and hence relies upon inductive, qualitative case studies to do so, some quantitative data was also collected. This was done in order to capitalise on the numerous advantages of combining both types of data including: enabling triangulation or corroboration, elaborate analysis, initiate new lines of thinking, possibly expanding the scope and breadth of the study and the like (Miles and Huberman, 1994).

### 3.5 Quality of Case Study Research

The previous two sections justified the use of case study research methodology and the type of data to be collected within each of the cases. This section now discusses the criteria by which the quality of case study research can be judged: construct validity, internal validity, external validity and reliability. The specific tactics employed at each stage of this piece of research to ensure a high quality outcome was achieved, are discussed below in turn and are also summarised in Table 3.3.

**Table 3.3: Case study research quality test and tactics**

Test	Case Study Tactic	Phase of Research and Thesis Section
Construct validity	Multiple sources of evidence	Data collection
	Establish chains of evidence	Data collection
	Have key informants review draft case study reports	Data collection (Section 3.5)
Internal Validity	Pattern-matching	Data analysis
	Explanation building	Data analysis (Section 3.5 and Chapter 4)
External Validity	Multiple case design	Case selection
	Replication logic	Case selection (Section 3.5)
Reliability	Case study protocol	Data collection
	Case study data base	Data collection
	Action research diary	Data collection (Section 3.5)

*Source: adapted for this research from Yin (1994)*

**Construct validity** deals with the development of a sufficiently operational set of measures used to collect data (Yin, 1994). Three tactics were used to increase construct validity in this research. Firstly, the triangulation of data was achieved by the use of multiple sources of evidence. These sources included an extensive literature review, case study research protocols, documents collected during the case studies, multiple

interviewees during each case at the conclusion to evaluate the effectiveness of the assessment instrument, and the use of workshops involving multiple participants and the collection of both quantitative and qualitative data.

Secondly, a chain of evidence was established that involves all the collected data being systematically documented and stored with appropriate referencing to allow a reader to link the developments and conclusions with original source data.

Finally, all collected data were presented back to workshop for confirmation and all case study reports were reviewed by key informants. This allowed any inconsistencies or ambiguities to be detected thus increasing the construct validity of the research (Miles and Huberman, 1994).

**Internal validity** is concerned with the internal coherence of the findings (Sykes, 1991) and the validity of causal relationships between variables investigated (Yin, 1994). Case study research generally only allows for such relationships to be suggested within the study context rather than establish causation (Perry, Riege and Brown, 1999), however, in this type of research, a high degree of internal validity is achievable due to the possibilities for cross-checking (Sykes, 1991). For this research, internal validity was enhanced by the use of pattern matching and explanation building. Pattern matching involves comparing predictive patterns with empirically derived ones and explanation building involves analysing the collected data by building an explanation about the case (Yin, 1994).

**External validity** relates to how generalisable a study's findings are beyond the immediate case study (Yin, 1994). That is, to what extent will the ideas and theories generated in one setting, apply in other settings (Easterby, Thorpe and Lowe, 1991). In case studies, the researcher is generalising the findings to a broader theory - analytic generalisation - rather than to a broader population - statistical generalisation (Yin, 1994). In this research, external validity was enhanced by the use of theoretical and literal replication in the selection of cases and via comparison of the findings with the extant literature (Yin, 1994).

**Reliability** is concerned with the minimising of errors and biases in the study so that a later investigator following the same procedures would arrive at the same findings and conclusions when conducting the same case study (Yin, 1994). The reliability of case study research is often criticised due its flexibility and absence of experimental control

(Sykes, 1991). Reliability in this research was enhanced by the use of a case study research protocol and database, an interview guide (see Appendix 1) and an action research diary (see Appendix 2). The case study database is available to the reader upon request subject to non-disclosure agreements.

### **3.6 The Role of Prior Theory**

The role that prior theory and the extant literature played in case study research is discussed in this section. Prior theory is critical in the defining of the research question in theory-building research and aids in determining both the type of organisation to be studied and data to be collected (Eisenhardt, 1989).

It has been suggested that the theory-building researcher should commence with no prior theory or hypothesis as “preordained theoretical perspectives or propositions may bias and limit the findings” (Eisenhardt, 1989, p.536). However prior knowledge will inevitably influence the researcher, who should be aware of this and avoid “uncritical appropriation of this reserve of ideas” (Perry, 1998, p.788). Thus starting from scratch with an absolutely clean theoretical slate is neither practical nor preferred (Perry, 1998). Indeed, prior theory can enhance construct validity by allowing the development of more accurate measures in interview protocols and questionnaires and internal validity and reliability via the comparison of research findings with the extant literature (Eisenhardt, 1989).

**Induction versus deduction.** Inductive research is where theory *emerges from* data, where as deductive research involves theory *definition by* the data (Easterby, Thorpe and Lowe, 1991; Eisenhardt, 1989). While some researchers have argued for more induction in case study research (for example, Eisenhardt, 1989) and others for more deduction (for example, Yin, 1994), it is unlikely that any researcher could, in reality, pursue a pure form of either approach, nor want to - “pure induction might prevent the researcher from benefiting from existing theory, just as pure deduction might prevent the development of new and useful theory” (Perry, Riege and Brown, 1999, p.6).

Other researches have argued that inductive and deductive methods are in fact complementary and should be exploited as such via research that combines elements of both (Parkhe, 1993). This is the approach considered most appropriate for this research as it allows the researcher to benefit from existing theory, via the development of the

theoretical framework, whilst developing and modifying it through exploratory case studies.

Researchers of organisational innovation have called for greater use of interpretive, inductive perspectives to avoid both the premature adoption of limiting frameworks, as well as allowing a deeper understanding of organisational innovation (Wolfe, 1994; Van de Ven and Rogers, 1988). As the focus of this research is the development of a new framework, it was appropriate that an emphasis was placed on the inductive, exploratory cases. Whilst eight case studies were carried out in total, the initial five were of an exploratory nature where the assessment framework was developed and modified, whilst the final three confirmatory case studies involved no modification of the assessment instrument in order to evaluate its effectiveness. The selection of the cases is now discussed in the following section.

### **3.7 Criteria for case selection**

Once the research methodology, the type of data to be collected and the tactics employed to ensure high quality had been selected, the criteria by which the type and number of cases to be studied had to be developed. This section outlines and justifies the selection of the multiple case design adopted in this research. Firstly the choice of single versus multiple cases is discussed, followed by the number of cases, the type of cases, the level of analysis, the selection of participants and, finally, the actual case organisations selected are introduced.

#### **3.7.1 Single versus Multiple Cases**

There is a need to decide prior to any data collection whether a single or multiple case design will best address the research questions. Yin (1994) outlines three situations when single case study approaches are most appropriate including: testing a well-formulated theory; when the case is unique or describes an extreme situation; or when it is revelatory in nature. As the focus of this research was on the development of a new framework, requiring multiple settings and data sources to ensure a robust outcome, a single case would have been unsuitable. Despite the inherent disadvantages, such as the greater resources and time required, a multiple-case design based on the logic of replication (Parkhe, 1993; Yin, 1994) was determined to be most appropriate for theory

development, via extension and replication (Eisenhardt, 1989), and more robust due to it drawing on multiple sources of evidence (Yin, 1994).

### **3.7.2 Number of cases**

There are no rules outlining the ‘correct’ number of cases to choose in case study research. To the contrary, researchers have been advised not to follow any rules as the “validity, meaningfulness and insights generated from qualitative inquiry have more to do with the information-richness of the cases selected and the observational/analytical capabilities of the researcher than with sample size” (Patton, 1990, p.185). Eisenhardt (1989) recommends continuing to add cases until ‘theoretical saturation’ is reached, at which point the incremental learning diminishes and the researcher observes little new to inform the findings. Similarly, Lincoln and Guba (1985) recommend sampling until ‘redundancy’.

Whilst theoretical saturation or redundancy is the ideal, in practice, the researcher has to take into consideration constraints such as the limitations of time and money (Eisenhardt, 1989). This being the case, the literature suggests somewhere between four and ten to fifteen as being acceptable (Perry, 1998). Less than this may result in data unable to support rich, empirically grounded theory generation, and more will probably result in the researcher becoming overwhelmed by the volume of data (Eisenhardt, 1989).

For this research, five exploratory cases were carried out during which the theoretical framework based on the extant literature was developed and modified. Five exploratory cases were conducted as little change occurred in the assessment instrument as a result of the fourth and fifth exploratory cases other than consolidation of some questions in order to expedite the workshop assessment process. A further three confirmatory cases were then conducted holding the developed assessment instrument constant. Three confirmatory cases were conducted on a variety of organisations in order to cover as many organisational characteristic variables as possible whilst meeting the resource and time constraints of the research.

### **3.7.3 Type of Case Study Organisations**

Once it had been decided to pursue a multiple case study design, the criteria for case selection had to be developed. Yin (1994) recommends multiple cases be regarded as

multiple experiments and not multiple respondents in a survey. Additionally, Eisenhardt (1989, p.537) argues that “random selection of cases is neither necessary, nor even preferable.” Therefore organisations were deliberately selected in such a way as to “increase the chances of covering the range of issues, phenomena, types of individuals and so on” (Sykes, 1991, p.5).

Replication logic (not random sampling logic) was adopted with the aim that organisations would either:

- produce similar results for predictable reasons (that is, literal replication); or
- produce contrary results for predictable reasons (that is, theoretical replication) (Yin, 1994).

Replication logic in sampling allows “patterns to be more clearly distinguished and chance associations to be removed” (Eisenhardt, 1991, p.620). Various strategies recommended in the literature were adopted for case selection including ‘maximum variation’, ‘homogeneous selection’ (Patton, 1990), ‘confirming/disconfirming selection’ (Perry, 1998) and ‘extreme case’ (Pettigrew, 1988). The application of these strategies and their purpose is outlined in Table 3.4.

**Table 3.4: Case study strategies used in this research**

Case selection strategies	Purpose	Application in this research
Maximum variation	Documents variations and identifies common patterns	The inclusion of large and small sized organisations
Homogeneous, confirming	Focuses, reduces, simplifies initial analysis	Multiple for-profit organisations. Multiple service organisations.
Disconfirming cases	Seeking exceptions, looking for variation	Inclusion of an organisation which had not articulated the importance of innovation
Opportunistic	Following new leads; taking advantage of the unexpected	Inclusion of not-for-profit organisations Inclusion of KPMG client organisations

*Source: adapted from Miles and Huberman (1994) and Patton (1990)*

Four criteria were initially adopted for the selection of case organisations as outlined in Table 3.5. Firstly, organisations were selected that had either articulated the importance



of innovation to their business, for example by references in their websites, public reporting, mission or value statements, strategic goals and the like. It was felt that such organisations were more likely to be willing to be involved in a study aimed at developing an instrument aimed at improving their innovation performance.

**Table 3.5: Initial criteria for case organisation selection**

Initial criteria for case study selection	Justification
Organisation has articulated the importance of innovation e.g. via mission/ value statements, strategy etc.	More likely to commit resources such as their employees' time to the study.
For-profit organisations	Reflect the majority of extant literature upon which the theoretical instrument was based
Australian organisations	Researcher able to commit more time within resource constraints
Favour service-based organisations	Extend the current manufacturing-dominated extant body of knowledge

*Source: author*

Secondly, it was felt that as the majority of literature upon which the theoretical assessment framework had been developed pertained to 'for-profit' organisations, that selection of case organisations should similarly be limited to for-profit organisations. Thirdly, organisations selected were restricted to those based in Australia, the domicile of the researcher, in order to maximise the length and depth of interaction possible between the researcher and case organisations.

Finally, research into innovation predominately draws upon studies on manufacturing-based organisations despite the increasing importance of service organisations to western economies (Damanpour and Golpalakrishnan, 2001). Less is therefore known about innovation within service organisations (Voss, 1992). For this reason, the final criteria in the selection of organisations for case studies was a bias placed towards service organisations in order to ensure an additional contribution to the extant body of knowledge. It was felt that the first organisation should be a manufacturing organisation, similar to that upon which much of the extant literature is based. The selection of subsequent cases however was informed by a desire to better understand the application of the assessment instrument within a service context.

As already mentioned, replication logic was adopted during case selection. Additionally, as highlighted in Table 3.4, opportunistic selection was also employed. During the course of the research the opportunity to carry out case studies on two organisations that did not meet the above criteria (as they were not-for-profit organisations) that would allow the opportunity for literal and theoretical replication respectively were pursued. These selections are discussed briefly in the next section and are described in more detail in Chapter 4.

#### **3.7.4 Actual Cases Selected**

The eight case study organisations were all selected finally due to their ability to provide information-rich data and to demonstrate both literal and theoretical replication. For example, literal replication was achieved via the selection of five service-based organisations – three exploratory and two confirmatory cases. Theoretical replication was achieved through the selection of an organisation that hadn't articulated a commitment to innovation (exploratory case number 4) and the selection of two organisations that were not-for-profit entities in order to provide contrasting results for predictable reasons. In addition organisations were selected that provided significant variety such as through organisations size (revenue, number of employees and the like), nature of products and the industry in which they operated. Finally, where possible, opportunistic selection was utilised by including organisations that had requested services from the researcher's employer, KPMG, and who also agreed to participate for the purposes of research.

#### **3.7.5 Level of Analysis**

The level of analysis for the research at these organisations was conducted at either the organisational or sub-organisational (e.g. business unit) level. Zahra (1993) highlights that innovation (through corporate entrepreneurial activities or product and market development) can occur at the organisational, divisional, functional or project levels within an organisation. Low and MacMillan (1988) argue that innovation and entrepreneurship researchers should consider multiple perspectives in their studies such as the micro (individual, team, firm) and macro (industry, region, national), and that integration of these multiple level studies is desirable. As this research seeks to understand the concept of organisational innovation capability, a firm or micro-level unit of analysis was deemed appropriate.

### **3.7.6 Participant Selection**

The actual individuals chosen to participate in the research was also an important factor that needed to be considered once case organisations had been selected. There was typically a ‘case study sponsor’ who was the initial contact point in the organisation and who continued throughout the study to assist with logistical matters and important communications. Potential participants were selected through discussion between the researcher and the sponsor and then approached and asked if they were willing to participate. Each participant was given an overview of the study details and made aware of the voluntary nature of their participation. Further details of this are outlined in Section 3.12.

Participants were invited based on their involvement in innovation-related activities. This varied from organisation to organisation but often included those involved with product development, research and development, marketing and sales, human resources, organisational strategy, operational management and the like.

Of particular importance was the inclusion of both senior and middle management. It has been pointed out previously that much of the research into innovation highlights the importance of senior management for successful organisational innovation (for example, Bass, 1985; Hoffmann and Hegarty, 1993; Howell and Higgins, 1990; Kanter, 1984, 1988). Possibly just as important, however, is the role that middle management play in innovation (Hornsby, Kuratko and Zahra, 2002). Others have likewise suggested that middle-management sponsors are required to get innovations through the early stages of development (Pinchot and Pellman, 1999) and highlighted their key role in enabling senior management initiatives and feeding back information from lower level staff to senior management (Burgelman, 1983).

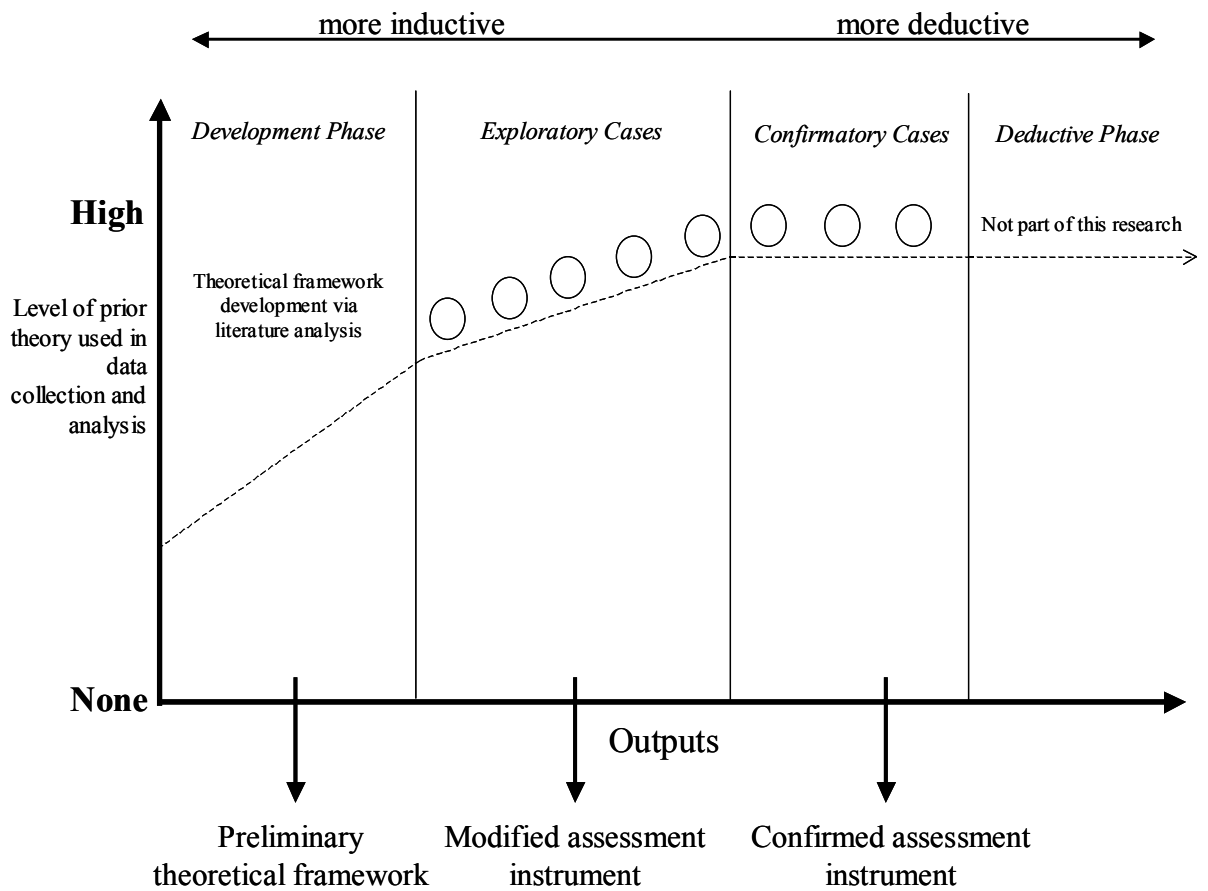
## **3.8 Case study research procedures**

A phased approach was taken to the research based on the case study methodology framework of Perry (1998), descriptions by Parkhe (1993) and a later version of Perry’s framework in Carson, Perry and Gronhand (2001). An overview of this approach is shown in Figure 3.3. It was designed to obtain a balance between the inductive elements of the development and exploratory phases and the more deductive nature of the

confirmatory cases. The balance of induction versus deduction in the research design was described in Section 3.6.

The initial research phase involved analysing the extant literature and developing the preliminary assessment framework as described in Chapter Two. This initial phase of research was carried out in order to benefit as much as possible from the existing theory.

**Figure 3.3: Multi-phase research approach showing outputs of each stage**



*Source: adapted from Perry (1998) and Carson, Perry and Gronhand (2001)*

As Figure 3.3 shows, the initial inductive approach was most suitable for developing the preliminary theoretical framework. Huberman and Miles (1994) point out that loose, inductive research designs are appropriate where the terrain is unfamiliar and the research exploratory, whilst tighter research designs are suitable when the researcher is familiar with the setting and is seeking a more confirmatory stance.

The second phase of the research involved developing and refining the preliminary assessment instrument via exploratory case studies with five organisations. During each of these cases, participants were involved in interviews and workshops and were invited to use the assessment instrument to self-assess their own organisation's innovation capability. Participants, along with the researcher, then developed action plans aimed at improving this capability. Modification of the theoretical assessment framework occurred at the completion of each exploratory case based on the feedback of the participants and the observations of the researcher. This phase involved iterating between the extant literature and the data from the cases, as the development of theory requires the continual cycling between theory and data (Parkhe, 1993). The refinement and development of the assessment tool during these cases corresponded with the improved understanding of the researcher and contributed to the internal validity of the study (Huberman and Miles, 1994).

The third phase of the research involved delivering the finalised assessment instrument via a number of confirmatory case studies to organisations across a range of sizes and industries. Often, assessing an organisation's internal capabilities results in lists of strengths and weaknesses that are "usually very long, not very concrete, and agreed on only by a relatively few people" (Duncan, Ginter and Swayne, 1998, p.7). For this reason, the author also developed a participatory approach, via a series of workshops, combining qualitative and quantitative data collection. Minutes of discussions and reflections were recorded during interviews and workshops. In addition, collaborative voting technology was utilised during workshops that allowed participants representing a cross-section of the organisation to efficiently reach consensus on which of the various elements of the assessment framework are most applicable within their context. Other innovation researchers have called for greater use of participatory research methods due to highly uncertain and complex nature of innovation, "which can be best understood from the point of view of the actors involved in the innovation process" (Van de Ven and Rogers, 1988, p.638).

A fourth and final stage, the deductive phase, also shown in Figure 3.3, doesn't form part of this research but could be undertaken in the future to assess the Innovation Capability Assessment instrument via a quantitative study across a large sample population. This is similar in approach to Harmsen, Grunert and Declerck (2002) who adopted a qualitative approach to propose a new model of the relationship of R&D and

market orientation on business performance via innovation, which was intended to be tested quantitatively in later research.

### **3.9 Research Instruments for Data Collection**

As theory-building researchers typically combine multiple data collection methods, enhancing the validity of results (Eisenhardt, 1989), a number of data collection methods and instruments were developed and used throughout the research. These are discussed in the following sections, following an overview of the case study protocol developed for the research.

#### **3.9.1 Case Study Protocol**

A case study protocol includes an overview of the study, the field procedures to be followed, interview questions and a guide for the research report (Yin, 1994). Its development and use is essential in enhancing the reliability of multiple case study design allowing the researcher to outline prior to data collection the procedures to be followed and data collection instruments to be used. The content of the case study protocol is outlined in the following sections: the overview of the study is provided in Chapter 1; the field procedures adopted during this research are outlined in this chapter; the research report format is outlined in Appendix 3, and the data collection instruments are discussed in the following sections.

#### **3.9.2 Case study introductory interview guide**

In order to accurately collect the defining characteristics of the case study organisations for comparison during later data analysis, a questionnaire was developed and used during an initial interview for both exploratory and confirmatory cases. This captured features such as size, structure, environmental characteristics and the like. This questionnaire is provided in Appendix 4.

#### **3.9.3 Convergent interview instrument**

A number of convergent interviews (Dick, 1990) were conducted at the commencement of each of the exploratory case studies as an initial step in the theory-building process (Perry, 1998). These interviews involved relevant management from each organisation and began with unstructured questions aimed not to lead the interviewee to some preconceived destination of the researcher but rather, to capture the interviewee's

perceptions. These perceptions are of interest because they provide triangulation data about the ‘real’ world outside the interviewee and the interviewer (Perry, 1998).

The researcher initially ignored the assessment categories emerging from the literature and begun by asking broad questions and, following Perry’s (1998) advice, invited the interviewee to tell the story of their experience with innovation. Other researchers have likewise recommended that initial questions be almost ‘content-free’ to ensure that responses didn’t occur because the questions created a self-fulfilling prophecy (Dick, 1990).

A standard format was followed for each interview. The questions became more specific, or ‘converged’, upon the research problems as the interview progresses. To aid in this, some probe questions were also included in the interview guide to ensure that the outcomes from the analysed literature are addressed. Data were collected via interview notes and subsequently analysed via key word coding. A copy of the interview guide can be found in Appendix 1.

Later interviews concluded with interviewees completing a Likert-scale assessment framework. This was used to summarise the overall perceptions of the respondent against each of the potential innovation capability enablers. The use of Likert-scaled frameworks has been recommended in the literature for this reason (Carson, Perry and Gronhand, 2001). Care was taken to preserve the richness of the respondents’ responses by not introducing the scaled questions until after the unstructured questions had been satisfactorily answered.

#### **3.9.4 Innovation Capability Assessment instrument**

The initial phase of this research involved developing a theoretical assessment framework incorporating areas key to the management of innovation from the corporate entrepreneurship and innovation literature as described previously and presented in Chapter 2.

The initial theoretical framework formed the basis for the development of the preliminary assessment instrument used in the first phase of the empirical study. The preliminary instrument, included in Appendix 5, consisted of 37 questions organised under three key assessment areas based on the 3 key literature streams; strategic management of innovation, internal environment, and innovation competencies.

This preliminary assessment instrument was then further developed and modified during five exploratory cases in an iterative process where the researcher drew upon both the empirical data collected and the extant literature. After the completion of the exploratory cases, final changes were made and the instrument became the finalised Innovation Capability Assessment instrument used in the three confirmatory case studies. This instrument consisted of 21 main assessment questions under the three original key assessment areas, with each assessment question consisting of between 5 and 10 support or ‘probe’ questions. A high level version of the assessment instrument showing the 21 questions is included in Appendix 6 and an excerpt of the detailed instrument is included in Appendix 7. A complete, detailed assessment instrument including all ‘probe’ questions is the intellectual property of KPMG and hence can’t be included here without the thesis needing to be embargoed. It is available to the reader subject to non-disclosure agreements.

The primary aim of the assessment instrument was to highlight an organisation’s strengths and weaknesses in areas critical to innovation performance and to facilitate the development of actions that would allow for their improvement. It is argued that by improving these areas, the overall performance of these organisations would also improve (see Section 2.5.1).

The researcher set out to develop an assessment instrument that would be applicable to a wide range of organisations. It wasn’t known whether this would be possible particularly as a key insight from the literature, interviews and anecdotal sources indicated that innovation performance is strongly contextual. That is, what might work well for one organisation may not for another. In acknowledging the complexity and interdependencies present in organisations, Teece, Pisano and Shuen (1997, p.519) commented that replication of organisational processes “...may be difficult because it requires systemic changes throughout the organisation and also among interorganisational linkages...Put differently, partial imitation or replication of a successful model may yield zero results.”

Therefore the author devised two means to allow for greater applicability of the assessment instrument. These were the use of dual assessment criteria and, the use of support or ‘probe’ questions. Both are discussed below.



**Dual assessment criteria.** Participants using the Innovation Capability Assessment instrument were asked to assess their organisation against each of the 21 questions areas both in terms of ‘performance’ and ‘importance’. The performance rating allowed the determination of relative strengths and weaknesses of their organisations in each of the assessment areas. The importance rating, on other hand, allowed the organisations to relate each assessment area to their own context, as well as providing guidance with regards to the prioritisation of subsequent improvement actions. In addition, the importance criteria allowed the researcher to better understand the relative usefulness of each area, aiding in decisions regarding the modification of the instrument.

The dual assessment criteria allowed two scores for each question to be identified. These could be compared across each of the 21 questions creating a ‘gap analysis’ between how well an organisation performs and how important each area is to an organisation. Areas where there were large identified gaps, that is, low performance in an important area, would become the focus for subsequent action. It has been previously highlighted that a performance gap or “the difference between how an organisation’s members perceive its performance, in comparison to what they feel it should be” can be a strong impetus to seek change (Rogers, 2003, p.422).

Previous research has highlighted the difficulty of identifying an organisation’s capability strengths and weaknesses and their significance for competitive advantage or disadvantage (Duncan, Ginter and Swayne, 1998). In this sense, the importance measure was used to aid in identifying which areas of the assessment framework have relevance within the organisation’s context. For example, unlike traditional products, knowledge based products and services can enjoy increasing returns (Choo and Bontis, 2002), so for a firm that delivers such products, the ‘learning and knowledge management’ area assessment area is likely to be of greater importance than to more traditional, tangible product manufacturers. Other capability assessment tools or audits have used similar dual scoring criteria (Coombs et al.; 1998).

Participants were asked to respond to both the performance and importance criteria along a 5-point Likert scale as outlined in Table 3.6. A sixth option, ‘don’t know’, was included for participants who weren’t in a position to respond to specific questions. The use of Likert scaled questions summarizing the overall perceptions of participants has been recommended to complement qualitative data collection in order to assist in data

analysis (Perry, 1998; Yin, 1994). Collaborative voting technology was utilised in the assessment workshops to allow the assessment process to be automated. Apart from the advantage of streamlining data collection and analysis, this allowed instant display of assessment results back to the workshop participants, which in turn generated additional, useful discussion.

**Table 3.6: Criteria utilised in the assessment instrument**

	1	2	3	4	5	6
<b>Performance</b>	Poor	Less than satisfactory	Satisfactory	Effective	Excellent	Don't know
<b>Importance</b>	Not at all important	Less than important	Important	Very Important	Essential	Don't know

*Source: author*

The researcher deliberately avoided assigning certain practices to each of the performance criteria in order to avoid making the assessment process too prescriptive. This was seen as particularly important due to the previously mentioned context-specific nature of innovation.

**The use of ‘probe’ questions.** Each of the main 21 assessment questions contained between 6 and 10 support or ‘probe’ questions to clarify and contextualise the assessment questions. The probe questions allowed for a greater understanding of the main assessment questions to be answered, which in turn allowed participants to better understand how the underlying concept might be relevant in their organisation’s context. The content of the probe questions was based on examples of better practice identified from the literature and convergent interviews. An example of an assessment question with probe questions is included in Appendix 7.

### **3.9.5 Case study field notes**

Qualitative data were recorded throughout the assessment workshops in the form of field notes. This allowed the context in which the assessment was being made to be noted, thus informing the development and modification of the assessment instrument. It also assisted in the data analysis process. Case study research is often characterised by the frequent overlap of data collection with data analysis (Eisenhardt, 1989). During the workshops, details of issues and discussions between participants were recorded

separately to observations and analysis to provide clarity to the researcher, and in keeping with the principles of action research (Dick, 1997). Data collection and analysis occurring simultaneously allows an added flexibility, well suited to research involving theory building and data collection instrument modification (Eisenhardt, 1989).

### **3.9.6 Case study evaluation instrument**

At the conclusion of each case, that is, after actions had been developed and a report prepared and presented to the case organisation, an evaluation of the intervention was carried out via means of an interview with the case study sponsor. The interview focused on the value the organisation perceived they had gained from the study and, during the exploratory studies, allowed the insights to be captured relating to possible required developments to the assessment instrument. For confirmatory cases, Likert-scaled questions were again used to assist in later analysis. These questions reflected the research questions outlined in Chapter 2. A copy of this evaluation questionnaire can be found in Appendix 8.

### **3.9.7 Action Research Diary**

As the primary aim of this research was the development and modification of an assessment instrument, the thought processes and reflections of the researcher that led to the developments and modifications in the instrument were of significant importance. In order to record and track these critical reflections, and to enhance the reliability of the research, an 'Action Research Diary' was developed and maintained throughout the data collection and analysis periods. This is recommended in action research literature (Dick, 1997) and involved recording the steps of the 'plan, act, observe, reflect' cycle as outlined in Section 3.2. An excerpt from the Action Research Diary is included in Appendix 2.

### **3.9.8 Summary of data collection instruments**

The following table summarises each of the data collection instruments that were used to aid in the answering of the research questions. Each research question and data collection instrument is presented along with whether the instrument was used for data collection for the question. Where relevant, the section of the specific instrument used is highlighted.

**Table 3.7: Summary of data collection instruments and corresponding research questions**

Research questions	Convergent Interview Instrument	Innovation Capability Assessment instrument	Case study field notes	Case study evaluation questionnaire	Action Research Diary
1. What areas of organisation capability does an Innovation Capability Assessment instrument need to include?	Yes, questions 1-3.	Yes.	Yes.	Yes.	Yes.
2. How applicable is the Innovation Capability Assessment instrument across a variety of organisations?	Yes, questions 4.	Yes.	Yes.	Yes.	Yes.
3. How useful is the Innovation Capability Assessment instrument in aiding organisational change?	Yes, questions 5a & b.	No.	Yes.	Yes.	Yes.
4. How effective was the process used to deliver the assessment and to develop actions for improvement?	Yes, question 5c.	No.	Yes.	Yes.	Yes.

*Source: author*

### 3.10 Analysis procedures

This section outlines the approach and techniques adopted for the analysis of the data collected during the fieldwork phase of the research in order to explore the research questions described in Chapter 2.

There is much more written about qualitative data collection than there is about qualitative data analysis (Jones, 1985). This is despite case study analysis being the most important part of case study research as well as the most difficult part of the process (Eisenhardt, 1989). Case study research analysis is critical as the “raw” data collected have “no inherent meaning; the interpretive act brings meaning to those data” (Marshall and Rossmann, 1995, p.113). Fortunately however, there are a number of suggestions and techniques in the literature to guide the qualitative researcher.

Data analysis can be seen as beginning as early in the qualitative research process as the selection of research design and questions, the cases and the instrumentation; as these all involve ‘anticipatory data reduction’ eliminating certain variables, relationships and data and emphasising others (Huberman and Miles, 1994). Analysis then often continues to take place simultaneously with data collection (Eisenhardt, 1989). Indeed, decisions throughout the data collection process such as “deciding ‘what is’, and what is relevant and significant in ‘what is’, involve selective interpretation and conceptualisation” (Jones, 1985, p.57).

The simultaneous collection and analysis greatly enhance the ability of the researcher to generate substantive theory that is grounded in empirical data. This is because qualitative data analysis is a “search for general statements about relationships among categories of data; it builds grounded theory” (Marshall and Rossmann, 1995, p.111). Simultaneous collection and analysis also allows a flexible approach to be adopted such as the addition of cases or modification to data collection questionnaires to improve the quality of the research outcome (Eisenhardt, 1989). Eisenhardt recommends using field notes which record both the observation and analysis separately. This technique was adopted by the researcher in his field notes during interviews and workshops. It was also further extended through by the use of the Action Research Diary, which separately recorded the researchers critical reflections upon the data.

Miles and Huberman (1994) explain data analysis as consisting of three flows of activity: data reduction, data display, and conclusion drawing and verification that occur concurrently. Data reduction involves selecting, simplifying and transforming the data collected in field notes. Data display involves organising data into ‘accessible’ information displays such as matrices, graphs, and charts. Finally, whilst final conclusions may not be drawn until after data collection is complete, they are often prefigured from the beginning, even when a researcher believes to have been working inductively. These conclusions are verified during analysis for their validity (Miles and Huberman, 1994).

The researcher followed the general outlines of data analysis as recommended above by Miles and Huberman. In addition, each of the cases was initially subjected to within-case analysis prior to cross-case analysis (Perry, 1998). This is done in order for the researcher to become intimately familiar with each case prior to generalising across

cases (Eisenhardt, 1989). Detailed write-ups for each case can be found in Appendix 10 and helped the researcher cope with the large amount of collected data early in the analysis process. For this reason, within-case analysis is “central for the generation of insight” (Eisenhardt, 1989, p.540).

For each case, data were initially collected during interviews and workshops via detailed notes and subsequently analysed via key word identification and coding. Coding is an efficient way of achieving data reduction however the researcher must take care to “remain sensitive to unanticipated categories that emerge during the fieldwork” so as to avoid categorising the data “within the a priori definitions of the researcher in precisely the ways that data collection methodology was intended to avoid” (Jones, 1985, p.58).

The researcher began the data collection process with the a priori categories identified by theoretical assessment framework allowing the establishment of a link between the data and prior theory. Care was taken however to avoid falling into the trap of anticipating the data categories and not allowing the emergence of new categories. For example, the convergent interview guide (Appendix 1) was adopted for all interviews and, as mentioned in Section 3.9.3, began almost ‘content-free’ to ensure that responses didn’t occur as a result of the questions creating a ‘self-fulfilling prophecy’ (Dick, 1990). The researcher also examined the data to look for negative instances of the patterns as well as searching for other plausible explanations for the relationships between data to challenge preliminary conclusions (Marshall and Rossmann, 1995). The subsequent cross-case analysis involved the researcher identifying and investigating relationships within the data and differences and similarities between cases. The researcher made extensive use of data displays which allowed the analysis of the data in a condensed form (Huberman and Miles, 1994). Cross-case analysis, which represents the bulk of the analysis in this thesis, is the preferred data analysis strategy in case study research as it builds on the theoretical propositions and research questions during the analysis (Yin, 1994).

The cross-case analysis for this research is presented in the following chapter after the limitations of case research and ethical considerations are discussed and some concluding remarks are made.

### 3.11 Limitations of case study research

This section outlines the limitations of case study research and the tactics employed by the researcher to overcome or mitigate these limitations. There are numerous criticisms levelled at case study research throughout the literature including: the development of either overly complex or narrow, idiosyncratic theory; the difficulty in conducting the research; external validity issues; and it being an insufficient approach for theory development. Each of these commonly highlighted limitations or criticisms and the mitigating strategies adopted by the researcher are discussed below and summarised in Table 3.8. Issues relating specifically to the quality of case study research have been previously discussed in detail in Section 3.4.

**Table 3.8: Limitations of case study research and mitigating strategies employed**

Limitation	Source	Strategic response	Thesis section addressing the limitation
Leads to overly complex theories	Eisenhardt, 1989; Parkhe, 1993	Literature review and research questions	Chapter 2
External validity	Dick, 1990; Parkhe, 1993; Perry, 1998; Yin, 1994	Triangulation Replication logic	Chapter 3 - sections 3.5, 3.7 & 3.9
No single approach is sufficient for valid and reliable theory development	Parkhe, 1993	Multi-phased research	Chapter 3 - section 3.8
Results in narrow, idiosyncratic theory	Eisenhardt, 1989	Extensive literature review Exploratory phase	Chapter 2 and Chapter 3 - section 3.8
Difficult to conduct	Parkhe, 1993	Case study protocol Action research diary	Chapter 3 - section 3.9

*Source: author*

**Overly complex theories.** Parkhe (1993) highlights a common criticism of case study research being unnecessarily complex theory development, sacrificing parsimony. Similarly, Eisenhardt (1989) asserts that extensive use of the large volumes of empirical data can result in overly complex theory, rather than focusing on the most important relationships. In order to overcome this, the researcher has developed clear, focused research questions, derived directly from the extant literature reviewed in Chapter 2.

**External validity concerns.** Concerns over the ability of case study research to achieve external validity have also been raised in the literature (Yin, 1994). Measures adopted during this research to overcome this include the use of a case study protocol (Dick, 1990) and using replication logic during case selection (Parkhe, 1993). This is discussed in greater detail in Section 3.5.

**Insufficient approach for valid and reliable theory development.** No one approach to theory development is likely to be sufficient in satisfying construct, internal and external validity and reliable results (Parkhe, 1993). This has been in part mitigated by the adoption of a multiple phase approach to the research, that is, an exploratory phase followed by a confirmatory phase (Perry, 1998). This, in turn, can be followed by another quantitative piece of research to further aid theory development (see Figure 3.3). In addition, this piece of research can be seen as simply one attempt to develop a more complete theory.

**Risk of producing narrow theories.** An additional criticism of case study research is that it risks producing ‘idiosyncratic’ theories reflecting only the ‘narrow’ range contexts in which the data was collected (Eisenhardt, 1989). To counter this, the researcher reviewed an extensive body of literature in order to produce the initial theoretical framework as well as carrying out eight cases in a variety of organisations. It is worth noting, however, that the findings are only relevant for the cases studied and only analytic generalisation is made from the findings in this research, that is, the empirical findings are generalised back to the extant theory rather than to a population (Yin, 1994).

**Research is difficult to conduct.** The final common criticism of case study research is that it is difficult to conduct (Eisenhardt, 1989). The researcher has adopted two strategies to overcome this limitation. Firstly, a case study protocol was developed and used to help guide the research and improve the reliability of the findings (Yin, 1994). Secondly, an action research diary was kept throughout the research period in order to record the researcher’s plans, actions, observations and reflections (Dick, 1990), also resulting in improved reliability.

### **3.12 Ethical considerations**

Once the selection of the case study methodology and action research approach had been made, it was necessary to consider the ethical implications of the research. The



nature of social research requires that measures are taken to protect and safeguard the rights and welfare of the participants (Emory and Cooper, 1992; Patton, 1992).

The researcher applied a strict approach to ethical considerations based on the guidelines of the Swinburne Human Research Ethics Committee, which conforms to the National Statement on Ethical Conduct in Research Involving Humans. Several steps were taken to safeguard participants including the use of a plain language statement describing the research aims and procedures, the protection of the identity of all individuals and organisations involved, and the protection of all commercially sensitive documents used during the research. In addition, the researcher took care to inform all participants throughout the research that their participation was voluntary and their privacy rights respected. A copy of the ‘informed consent’ document is included in Appendix 9.

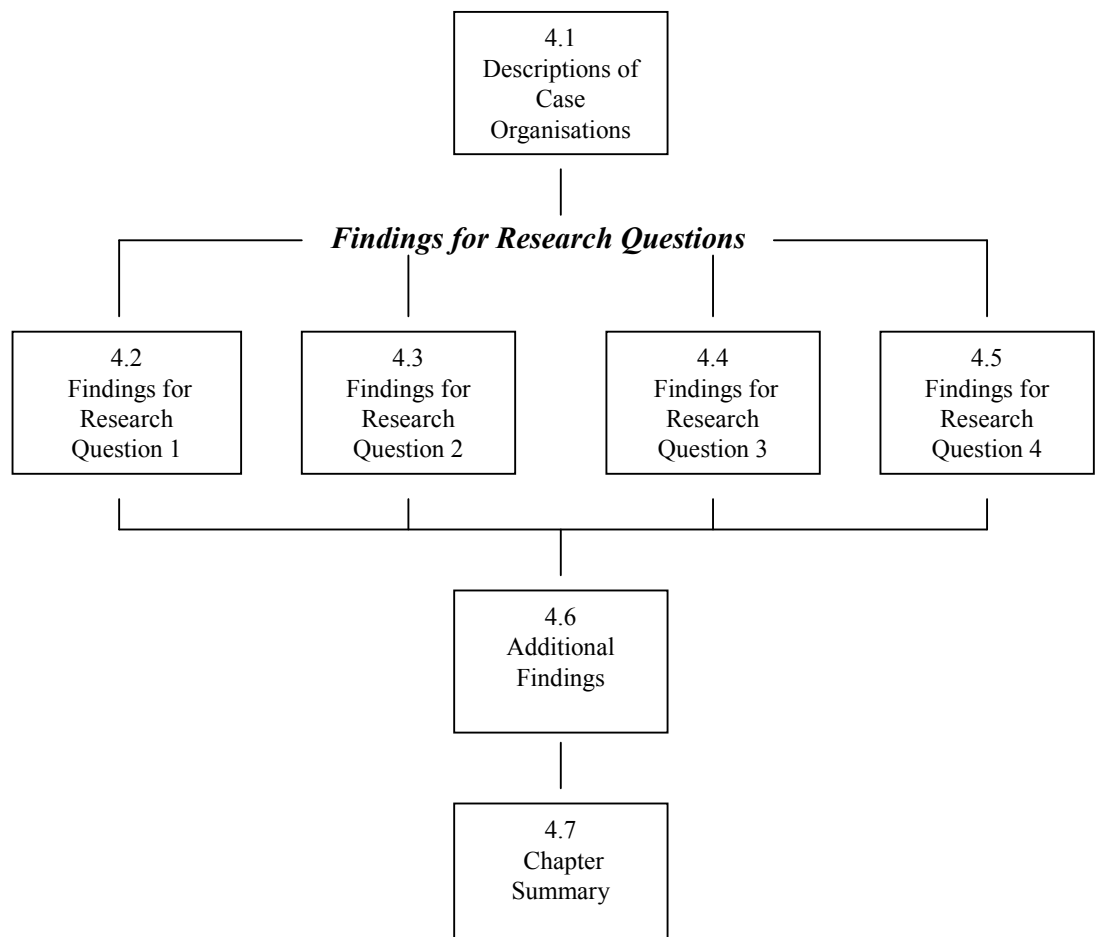
### **3.13 Chapter Summary**

This chapter described the selection and justification of the research paradigm, the action research approach, the case study methodology, and the data collection instruments used during the research. In addition, the steps taken to ensure high quality findings were presented, as were descriptions of the research and data analysis procedures. The chapter concluded with discussion of the strategies adopted to overcome the limitations of case study research and to ensure compliance with ethical considerations. Chapter 4 presents the research findings and data analysis for each of the research questions.

## 4 Results

Chapter 3 introduced and justified the methodological approach adopted during this research. Chapter 4 now presents the research findings for each of the research questions. The chapter consists of seven sections as illustrated in Figure 4.1. Initially, an overview of each case study organisation is presented (section 4.1), followed by cross-case analysis for each of the research questions (sections 4.2 to 4.5) and, finally in Section 4.6, discussion of additional findings that emerged during the data analysis. Section 4.7 presents a summary of the chapter.

**Figure 4.1: Chapter 4 structure**



*Source: author*

## 4.1 Case studies overview

Five exploratory case studies were carried out; these five cases contributed to the development and modification of the preliminary assessment instrument (see section 3.9.4 and see Appendix 5). Three confirmatory cases were subsequently carried out at the completion of the exploratory phase using the finalised Innovation Capability Assessment instrument (see Appendices 6 and 7). These were conducted to determine the effectiveness of the finalised instrument.

The data collected in both the exploratory and confirmatory cases provided findings for all the research questions. Hence, all eight cases are presented as a single set for the purposes of answering the research questions. The cases are numbered 1 to 8; Cases 1 to 5 are the exploratory cases and Cases 6 to 8, the confirmatory cases. Details of the findings for each individual case and the within-case analysis are presented in Appendix 10. The eight organisations involved in all these case studies are described below.

### 4.1.1 Case Study descriptions

**Case 1.** The first exploratory case study organisation chosen was a consumer goods manufacturer based in Victoria and with operations throughout Australia. It has been a publicly listed corporation since 1992, employs approximately 2000 people and turned over \$1.2 billion in sales revenue in the 2003 financial year. It was a suitable organisation for participation in this research as the development of new products was a key element of its strategic plan and it invests approximately \$3.5 million per annum in research and development. The organisation had articulated a need to be innovative via several means including annual financial reports, a mission statement that stresses the delivery of innovative products, and by recently incorporating responsibility for R&D and marketing into the dedicated role of ‘Executive General Manager (EGM), Innovation and Marketing’. It was this manager who became the ‘sponsor’ of the case study, aiding in selection of further participants from within the organisation.

**Case 2.** The second of the exploratory case studies was carried out at a Victorian based financial services organisation with operations throughout Australia. Employing 810 people and with \$17.3 billion funds under management in the 2003 financial year, Case 2 allowed some understanding of the suitability of the instrument within a (financial) service environment. The organisation had articulated a need to be innovative via a

mission statement that includes the delivery of innovative products and by having a senior management role responsible for product development.

**Case 3.** The third exploratory case study organisation was also a service provider, operating primarily within the insurance industry but also offering a broad range of complementary products (such as travel, motoring and financial products) to its membership base. Employing 950 people and having \$124 million funds under management in the 2003 financial year, it was selected to achieve literal replication with Case 2. The organisation highlighted the importance of innovation in its mission statement with an aim to provide innovative products, through one of its values being continuous improvement and innovation, and by the recent creation of an organisational group dedicated to developing new businesses and products.

**Case 4.** The fourth exploratory case study organisation was selected in order to achieve theoretical replication; that is to provide contrasting results for predictable reasons. This was an organisation that hadn't articulated a commitment to innovation and, being a government department, was a not-for-profit entity. This was seen as a unique opportunity to apply the assessment instrument within an organisation that did not have a shared commitment to innovation. Indeed, the primary reason for the organisation's agreement to participate was that whilst they currently operated primarily within a monopoly environment, there was the possibility that within a few years, legislative changes may force them into a competitive market place. It too operated within the financial services field holding \$4 billion funds under management and employing 240 people.

**Case 5.** The final exploratory case study organisation was also chosen to achieve literal replication with Cases 2 and 3 as it also operated within the financial service industry and, similar to Case 3, operated under a mutualised structure with a membership base. Employing 280 people and having \$1.64 billion worth of assets under management in the 2003 financial year, it had promoted itself actively in the marketplace as being innovative, had a strategic objective targeted at developing new income streams, and had in the preceding months launched a series of innovative products.

**Case 6.** The first confirmatory case study was conducted within one of three Australian business units of a global professional service organisation. This business unit

employed 540 people nationally and turned over \$83m in the 2003 financial year. This organisation was chosen again to maintain the focus on service organisations and because the national head of the business unit had articulated his desire for greater innovation during several conversations with the researcher. It also had an existing product development group and had an aggressive growth strategy (18% targeted annual growth).

**Case 7.** The next confirmatory case study was undertaken within one of four departments of Government higher and vocational education provider based in Melbourne, Australia. It had an operating budget of \$8.8 million, including \$320,000 from 'fee-for-service' activities and employed 280 staff. It had in recent years recognised the importance of innovation to the organisation evidenced by one of its organisation-wide 'key performance areas' being 'innovation and entrepreneurship'. This case study organisation allowed a better understanding of the application of the Innovation Capability Assessment instrument in a not-for-profit and public service environment and therefore also the chance for literal replication with Case 4.

**Case 8.** The final confirmatory case study was carried out at a small consumer goods manufacturing and wholesaling organisation based in Melbourne, Australia. Employing only 30 staff and turning over just \$6m, it was by far the smallest organisation to participate in the study. It was, for this reason, important in understanding the application of the Innovation Capability Assessment instrument in very small organisations. It also allowed for some comparison with the initial exploratory case organisation (Case 1) as they both operated in the consumer goods industry.

#### **4.1.2 Case study organisations summary**

A summary of the key characteristics of all the case study organisations involved in the research is presented in Table 4.1.

**Table 4.1: Summary of key characteristics of the case study organisations**

Case study organisation	Industry	Organisation Type	No. of Employees	Financial Size
1	Consumer goods	For-profit, Corporation	2,000	\$1.2 billion revenue
2	Financial investment	For-profit, Corporation	810	\$17.3 billion funds under management
3	Insurance	For-profit, Membership	950	\$124 million assets under management
4	Superannuation	Not-for-profit, Government	240	\$4 billion funds under management
5	Banking	For-profit, Membership	280	\$1.6 million funds under management
6	Professional Services	For-profit, Partnership	540	\$83m revenue
7	Education	Not-for profit, Government	280	\$8.8m budget
8	Consumer goods	For-profit	30	\$6m revenue

*Source: author*

## **4.2 Findings for Research Question One**

The case study fieldwork began by using the preliminary assessment instrument (see Appendix 5), which was derived from the theoretical assessment framework (Section 2.5.1), which in turn was based on the extant literature (Chapter 2). The first research question addressed the identification of areas for inclusion in the Innovation Capability Assessment instrument. The research question and sub-questions are listed below:

RQ1. What areas of organisation capability does an Innovation Capability Assessment instrument need to include?

a. How relevant is the ‘strategic management of innovation’ area of the assessment instrument in assessing an organisation’s innovation capability?

b. How relevant is the ‘internal environment’ area of the assessment instrument in assessing an organisation’s innovation capability?

c. How relevant is the ‘innovation competencies’ area of the assessment instrument in assessing an organisation’s innovation capability?

The content of the preliminary assessment instrument was developed and refined throughout the exploratory case studies based on convergent interviews, and assessment and action planning workshops. Data collected during these cases led to additional assessment areas being added to the preliminary assessment instrument. Prior to any newly identified areas being included in the assessment instrument the extant literature was reviewed to ensure sufficient evidence existed to support the inclusion.

The exploratory cases also resulted in identifying questions in the assessment instrument that were considered to be of lesser importance than others and hence, in keeping with the aim of constructing a concise instrument, some areas that were initially represented in the instrument as individual questions were consolidated into common questions that included only the most important aspects of each contributing question.

The following sections analyse the results of each of the three sub-questions for research question one.

#### **4.2.1 Relevance of the Strategic Management assessment area**

Findings from the exploratory cases (Cases 1 to 5) led to additions to the assessment instrument and to consolidation of some questions in the Strategic Management component of the assessment instrument. Findings from the confirmatory cases (Cases 6, 7 and 8) helped address the question of relevance of the Strategic Management assessment area.

#### **Adding Assessment of Alliances and Networks.**

An Alliances and Networks assessment area was added at the conclusion of the first exploratory case study. Whilst a substantial amount of research on the importance of pursuing external sources of financial and social capital, knowledge and technologies in order to complement in-house competencies, to learn and to gain competitive advantage (Alvarez and Barney, 2000; Cohen and Levinthal, 1990; Hitt et al., 2000; Ireland, Hitt and Viadyanath, 2002; Johnson and Van de Ven, 2002) has been carried out, it was not included in the theoretical framework nor the preliminary assessment instrument. The convergent interviews from Case 1 however highlighted this area's importance.

The concept of external relationships was raised in Case 1 in an interview with the Supply Chain group executive. He stressed in relationship to product innovation that

“we can’t do it all ourselves”. He highlighted that their most successful new product to date had been developed in conjunction with a research organisation in Europe: “We supplied the equipment, the relationships and the capital, they supplied the expert knowledge.” All of the subsequent interviewees agreed with the importance of such relationships. In addition, the Manager of Research and Development raised the same point unprompted in response to the second convergent interview question relating to the determinants of successful innovation. As per the Supply Chain executive, she spoke of being “unable to develop new technologies in isolation” and, in particular, stressed the need to form close relationships with universities and industry research bodies.

These sentiments are consistent with a more ‘open’ approach to innovation being called on in the literature as a result of a variety of factors including: the increased mobility of highly experienced, educated and skilled people; the growing presence of venture capital specialising in the conversion of research ideas into commercialising companies; decreasing ‘time-to-market’ and product life cycles, and globalisation of competition (Chesbrough, 2003).

The Alliances and Networks assessment area was, like all questions, assessed during all later cases to ensure its inclusion was appropriate. Subsequent cases rated this assessment area as between ‘important’ and ‘essential’ to their organisations.

### **Adding Assessment of Core Competency Management**

The addition of the core competency management question occurred at the conclusion of Case 3 upon critical reflection of the case study data by the researcher. During this exploratory case study, the General Manager of the business unit responsible for developing new business and products highlighted the importance of core competency management. When responding to the third question from the convergent interview guide (see Appendix 1) regarding failed innovations, he stressed the importance of understanding how an innovation related to the organisation’s current competencies. In particular, he said of a recent failed attempt, “the service line developed was not flawed, in fact it is now being replicated successfully by a number of our competitors, but we didn’t realise how different a skill-base was required to successfully develop and deliver this to the market”. Core competencies were defined in Chapter 2 as being a set of unique skills, complementary assets and practices (Teece, Pisano and Shuen, 1997) that



provides access to a wide variety of markets, makes a significant contribution to the perceived customer benefit and is difficult for competitors to imitate (Hamel and Prahalad, 1990).

As with any new piece of information uncovered during an interview, it was mentioned at the conclusion of subsequent interviews by the researcher if it had not already been discussed. This was done in order to better understand its importance. In this case, all subsequent interviewees agreed with the importance of core competency management but had little to add. This issue was taken up again however by another participant during the Case 3 assessment and action-planning workshops. A member of the team responsible for developing business cases for new products and businesses highlighted that a clear understanding of its current competencies was lacking and yet with this knowledge “we would be able to better estimate our ability to exploit opportunities prior to committing resources”.

After some discussion, this resulted in one of the developed actions being the definition of the Case 3’s core competencies. This action was developed despite competency management not being a part of the assessment instrument at the time of this case study. Part of the action also included using their knowledge of their organisation’s competencies not just as a screening mechanism for innovations but also exploiting this knowledge to develop innovations that would be difficult for competitors to imitate. Pavitt (1991) argues that organisations can gain profitable innovative advantages through building up firm-specific competencies that would require significant investment and time for competitors to imitate.

As for all assessment areas, added assessment questions were continually assessed throughout subsequent exploratory and confirmatory case studies to ensure that they were in fact relevant and appropriate for inclusion in the assessment instrument. Subsequent case organisations rated this area as between ‘important’ and ‘essential’ to their organisations.

### **Consolidation of Assessment Questions**

The exploratory case studies also resulted in several question areas that proved to be of less importance to participants being consolidated in order to make the assessment process as expeditious and focussed as possible. In these cases the content of the

consolidated questions was retained by including it into the probe questions of the consolidated assessment question. An example of the probe questions in the assessment instrument can be found in Appendix 7. The consolidations in the Strategic Management section included: an innovation strategy effectiveness question and an innovation performance measure question. These are summarised in Table 4.2.

**Table 4.2: Consolidated Strategic Management assessment questions**

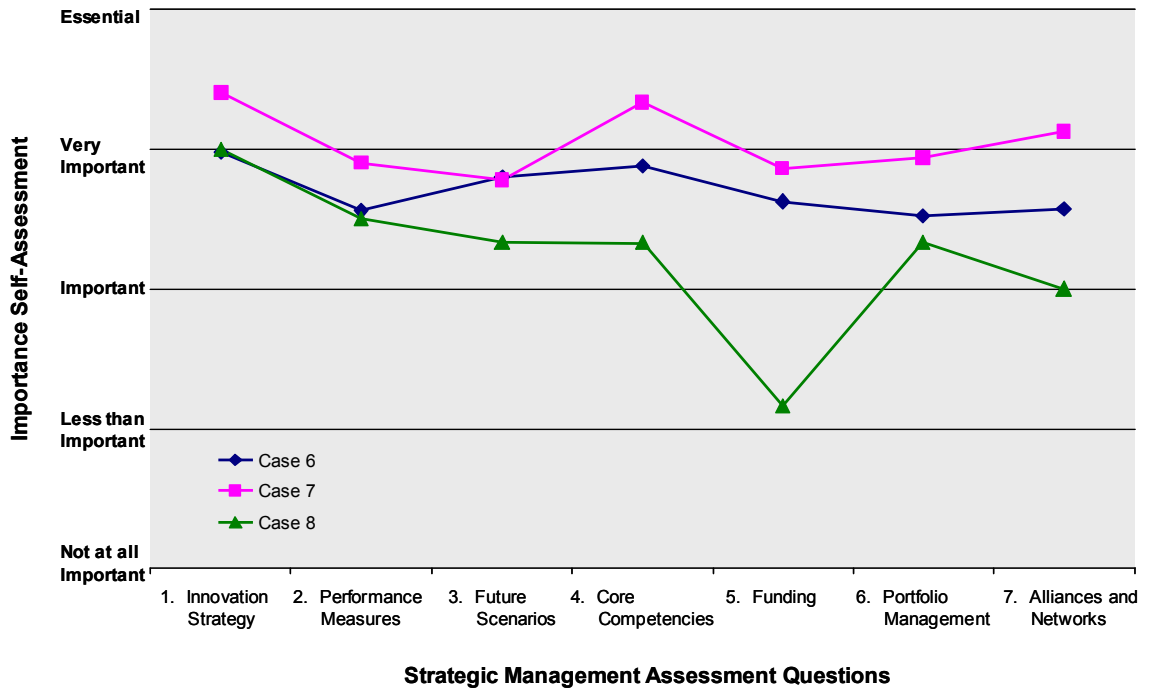
Consolidated questions	Original individual questions (How effective is...)
How effective is the current innovation strategy at guiding innovation activities?	<ul style="list-style-type: none"> <li>...the current innovation strategy at guiding innovation activities?</li> <li>... the alignment of the innovation strategy with corporate strategy and other related strategies?</li> <li>...the use of innovation strategic objectives in guiding innovation activities?</li> <li>...the communication of the innovation strategy and objectives throughout the organisation?</li> </ul>
How effective is the tracking and reporting of innovation performance measures?	<ul style="list-style-type: none"> <li>...the use of innovation critical success factors ('CSFs')?</li> <li>...the tracking and reporting of performance measures for innovation?</li> </ul>

*Source: author*

### **Importance and Relevance of the Strategic Management Assessment area**

The relevance of the strategic management of innovation assessment area was addressed in two ways during the confirmatory cases (Cases 6 to 8). Firstly, during the assessment workshops participants rated the importance to their organisation of each of the strategic management assessment questions. These results are provided in Figure 4.2 and show that for Cases 6 and 7, each of the strategic management questions (see Appendix 6) were deemed to be in a close range either side of the 'very important' score. For Case 8, the smallest of the case study organisations, scores were generally slightly lower after the initial two questions, yet remained above the 'important' rating for all remaining questions except question 5, relating to the funding for innovation activities. This is discussed further in Section 4.3.

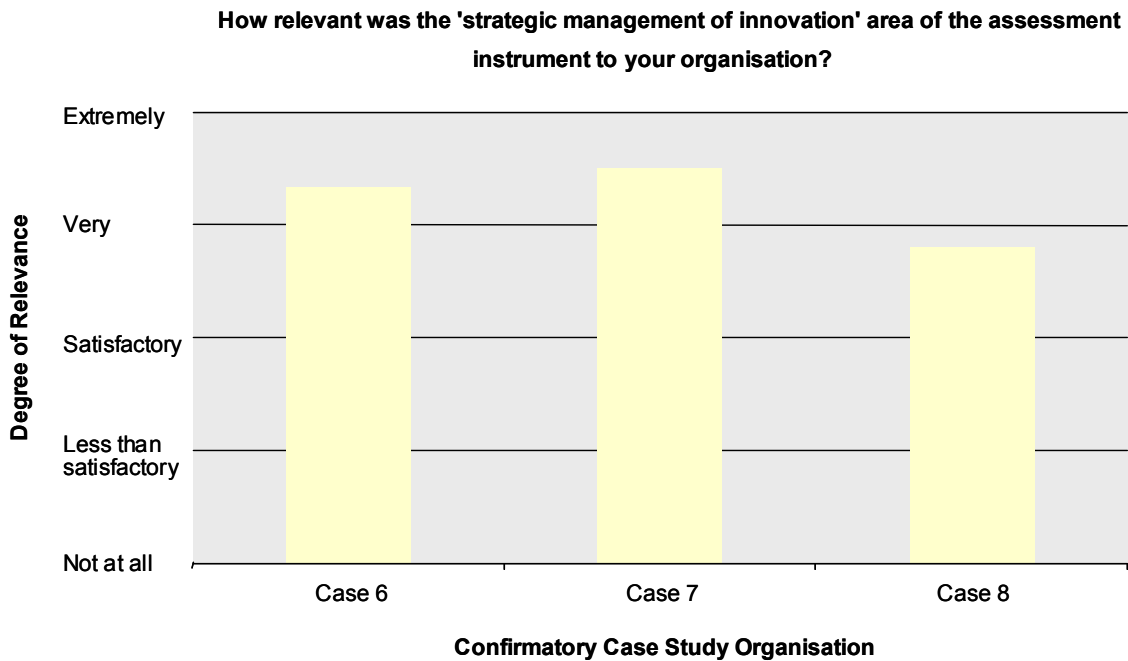
**Figure 4.2: Importance of the strategic management questions to the confirmatory cases**



*Source: author*

The second means by which research question 1a. was addressed during the confirmatory cases was in the completion of the case study evaluation instrument. At the completion of each case study, participants present during both assessment and action-planning workshops were asked to rate the relevance of each assessment section of the instrument to their organisation. These results are seen in Figure 4.3 and show that all organisations, on average, deemed the strategic management assessment area to be close to ‘very relevant’ to their organisations.

**Figure 4.3: Relevance of the strategic management questions for the confirmatory cases**



*Source: author*

#### **4.2.2 Relevance of the Internal Environment assessment area**

No additional assessment areas were added under the Internal Environment section of the assessment instrument as a result of the exploratory cases (Cases 1 to 5). Findings from the exploratory cases did lead to the consolidation of some questions in this section of the assessment instrument. Findings from the confirmatory cases (Cases 6, 7 and 8) helped address the question of relevance of the Internal Environment assessment area.

#### **Consolidation of Assessment Questions**

Several question areas were consolidated as a result of the exploratory case studies in order to expedite the assessment process. These consolidations included: an organisational culture question and a people management question. These are highlighted in Table 4.3.

**Table 4.3: Consolidated Internal Environment assessment questions**

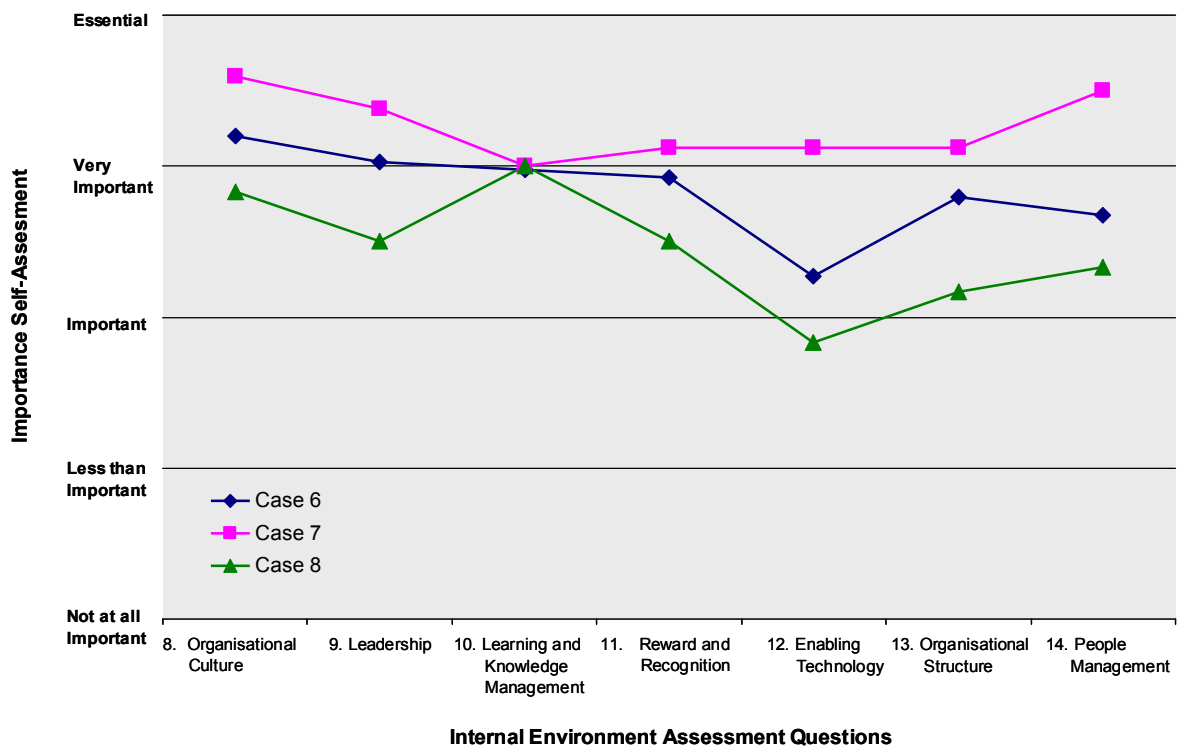
Consolidated question	Original individual questions (How effective is...)
How effective is the organisational culture in supporting and encouraging innovation?	<p>...the leadership of innovation throughout the organisation?</p> <p>...the management of successful and unsuccessful innovation outcomes?</p> <p>...innovation-related communication throughout the organisation?</p> <p>...the management of teams for innovation?</p>
How effective are people management practices in supporting innovation?	<p>...is recruitment and retention in supporting innovation?</p> <p>...is the amount of autonomy and empowerment staff have in carrying out innovation-related activities?</p> <p>...is training in supporting innovation-related activities?</p>

*Source: author*

### **Importance and Relevance of the Internal Environment Assessment area**

The relevance of the internal environment assessment area was determined in two ways during the confirmatory workshops. Firstly, during the assessment workshops participants rated the importance to their organisation of each of the internal environment assessment questions. These results are provided in Figure 4.4 and show that for case study organisations 6 and 7, each of the internal environment questions (see Appendix 6) were on average assessed by the participants within a close range of the ‘very important’ score. For Case 8, scores generally ranged between ‘important’ and ‘very important’ for all questions except question 12, relating to the effectiveness of enabling technology for innovation activities.

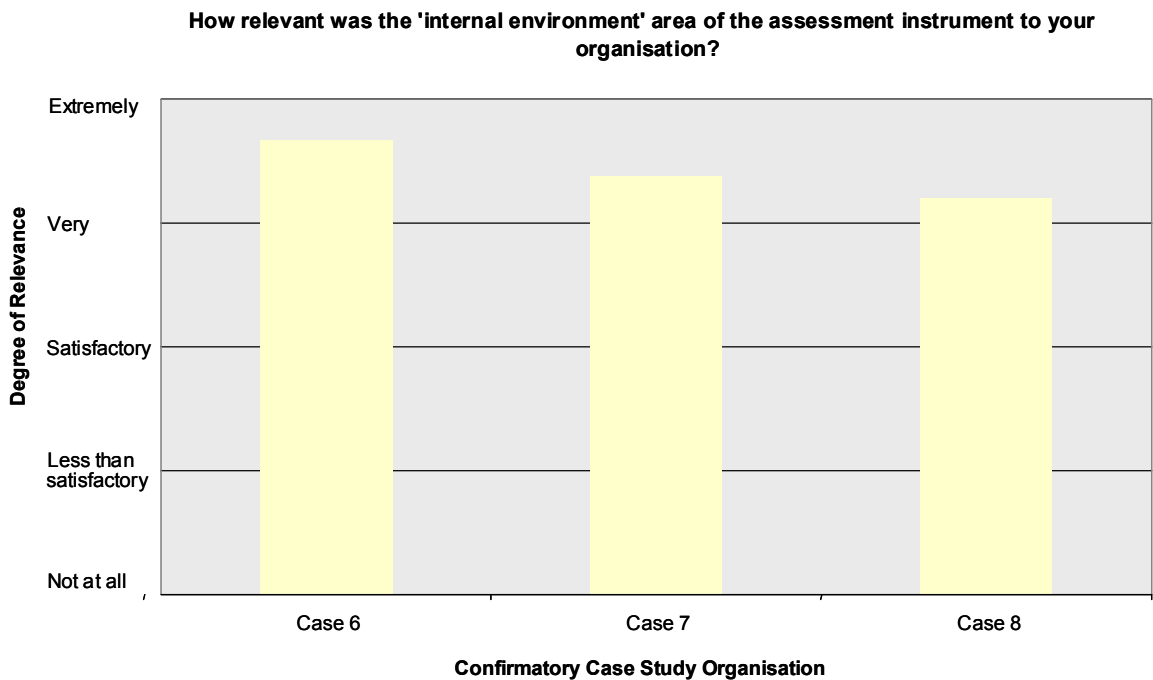
**Figure 4.4: Importance of the internal environment questions to the confirmatory cases**



*Source: author*

The second means by which research question 1b. was addressed during the confirmatory cases was in the completion of the case study evaluation instrument. These results are seen in Figure 4.5 and show that all organisations, on average, deemed the internal environment assessment area to be between ‘very relevant’ and ‘extremely relevant’ to their organisations.

**Figure 4.5: Relevance of the internal environment questions for the confirmatory cases**



*Source: author*

#### **4.2.3 Relevance of the Innovation Competencies assessment area**

Findings from the exploratory cases (Cases 1 to 5) led to three additions to the assessment instrument and to consolidation of some questions in the Innovation Competencies section of the assessment instrument. Findings from the confirmatory cases (Cases 6, 7 and 8) helped address the question of relevance of the Innovation Competencies assessment area.

#### **Adding Assessment of R&D and Technology Management**

The inclusion of an assessment question specifically addressing the management of research and development ('R&D') and technology was the first change made to the preliminary assessment instrument, occurring during Case 1 prior to the assessment workshops. Initially, the concept was raised during an interview with the Chief Operating Officer of Case 1 who stressed the importance of effectively understanding and integrating new technologies into both their products and processes: "the ability to develop and implement new technologies along our manufacturing lines and in our products is absolutely essential to maintaining and establishing competitive advantage."

It became apparent after a subsequent interview with the R&D manager from Case 1 and reviewing the relevant literature, that this was a competency that enabled effective innovation. As the R&D manager commented: “ultimately it [the organisation’s success] comes down to how well our products perform, and that depends upon how well the technologies that drive the products perform.” The literature is also clear on the role technology plays in financial performance of organisations: effective deployment of technological resources helps to build sustainable competitive advantage, which in turn leads to enhanced financial performance (Porter, 1985).

### **Adding Assessment of Process Innovation Management**

The addition of a question addressing the management of innovations along an organisation’s internal processes occurred at the conclusion of Case 4 upon critical reflection of the case study data by the researcher. It was, however, first considered by the researcher prior to the commencement of the exploratory cases during the literature analysis. At this point the researcher was unsure how to incorporate process innovation management into the theoretical framework and, as recorded in the Action Research Diary (see Appendix 2 for an excerpt from the diary), decided to continue to consider this area during the case studies. Innovating along internal processes was indeed discussed during each of the first three case studies.

During Case 1, an interview with the Chief Operating Officer described the importance of process innovations. Responding to the first question from the convergent interview guide (see Appendix 1), he expressed concern that these were often seen as less important within his organisation than product innovations “as process innovations and improvements don’t get airplay in the marketplace”. He illustrated their importance by describing a relatively recent innovation at the front-end of one of their key manufacturing processes that led to them gaining an “enormous advantage over [their main competitor] by reinventing the way we transform [a raw material] into product.”

This topic was again discussed during an interview with the Product and Marketing Manager from Case 2. He described the current need in the financial investment service industry to “launch a new product ‘each month’ ” and that, perhaps somewhat counter-intuitively, this made innovating internally of great importance: “gaining competitive advantage doesn’t happen with the delivery of a new product that any of us can go out



and copy within weeks, it has to come from innovating the way we execute our business.” This is consistent with the literature where it has been highlighted that, due to their being less visible to competitors, process innovations are more difficult to imitate (Zahra, 1993).

The need for an assessment question specifically addressing this area was confirmed during the interviews and assessment workshops with Case 4, a financial, public service organisation. Participants here highlighted the focus on innovating “the way we do things” more so than their products, probably due to their operating in a quasi-monopoly environment. The addition of a process innovation management question is consistent with the literature, where it has been suggested that successful process innovation requires different competencies to product innovation (Ettlie, Bridges and O’Keefe, 1984).

### **Adding Assessment of Radical Innovation Management**

Similar to the process innovation management competency, the radical innovation management assessment area was first considered by the researcher prior to the commencement of the exploratory cases and recorded in the Action Research Diary in November 2002. The issue of the relative importance of differing degrees of innovations was discussed during Case 1 in interviews with the case study sponsor and Group Executive of Marketing and Innovation. He suggested that his organisation’s focus was always “less than a two or three year time horizon” and therefore “our R&D efforts tend to result in incremental innovations even if they started off as bigger ideas.” He concluded that without a longer term focus and the preparedness for making larger investments, this would be unlikely to change.

The same theme was raised during an interview with the manager of product development at Case 2. Despite operating in a very different industry to Case 1 (financial services versus consumer goods), her comments reflected very closely that of the Group Executive of Marketing and Innovation at Case 1. She felt that in her organisation “without a conscious effort, innovation will always tend towards the incremental end of the spectrum,” and she related this back to their “conservative risk appetite”.

The need for an additional assessment question for the management of radical innovation was, however, decided after conducting interviews with the members of the recently formed new business and product development group during Case 3. Evidently this organisation had come to a similar realisation as the two previous organisations regarding radical innovation but had reacted by setting up a discrete business unit aimed at creating innovations that wouldn't otherwise have been supported within the traditional functional business units. It has been highlighted in the literature that the management of radical innovation requires fundamentally different management practices to that of more incremental innovation including separation from operating business units (Rice et al., 1998).

### **Consolidation of Assessment Questions**

Several questions areas were consolidated in order to increase the efficiency of the assessment process as a result of the exploratory case studies. These consolidations included: a commercialisation process management question, technology management, market interface management, and an idea management question. These are highlighted in Table 4.4.

**Table 4.4: Consolidated Innovation Competencies assessment questions**

Consolidated question	Original individual question (How effective is...)
How effective is the management of the commercialisation process?	<ul style="list-style-type: none"> <li>... business case development for the purposes of innovation project assessment and approval?</li> <li>... the use of a staged process for the development of ideas through to new products/services?</li> <li>... the approach taken to the management of the product development team?</li> <li>... is the management of risk throughout the life of innovation projects?</li> <li>... innovation project costs managed?</li> <li>... the management of regulatory compliance aspects of the innovation process?</li> <li>... prototyping and field-testing/trialing?</li> <li>... the management of launches for new products?</li> <li>... the handover of newly developed products to operations?</li> </ul>
How effective is the management of the market interface in supporting innovation activities?	<ul style="list-style-type: none"> <li>... market research in collecting research on consumers, competitors, industry trends etc required for the innovation process?</li> <li>... the integration of marketing activities and market research into the innovation process?</li> <li>... the integration of customers and suppliers into the innovation process?</li> </ul>
How effective is the management of the R&D, technology and technical in supporting innovation activities?	<ul style="list-style-type: none"> <li>... the generation of R&amp;D/technological information required for the innovation process?</li> <li>... the integration of R&amp;D/technological information and activities into the innovation process?</li> <li>... the balance between 'market pull' and 'technological push' maintained?</li> </ul>
How effective is the management of the ideas for innovation activities?	<ul style="list-style-type: none"> <li>... the generation of ideas for innovation projects conducted?</li> <li>... the process for idea collection?</li> <li>... the enhancement of collected ideas to ensure their full value is leveraged?</li> <li>... the evaluation and approval of ideas?</li> </ul>

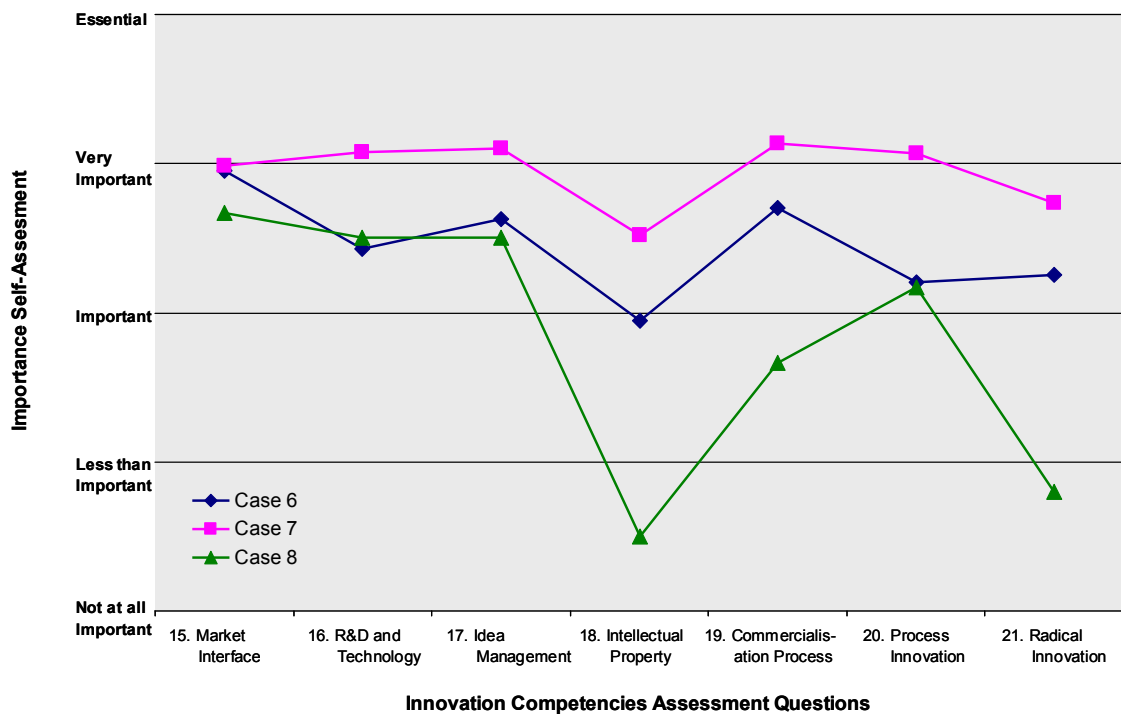
*Source: author*

### **Importance and Relevance of the Innovation Competencies Assessment area**

As for both the strategic management and the internal environment assessment areas, the relevance of the innovation competencies assessment area was determined in two ways during the confirmatory workshops. Firstly, during the assessment workshops participants rated the importance to their organisation of each of the innovation competencies assessment questions. These results are provided in Figure 4.6 and show that for Cases 6 and 7 each of the innovation competencies assessment questions (see

Appendix 6) were on average assessed by the participants as being between ‘important’ and ‘very important’ to their organisations. For Case 8, scores were generally close to or above the ‘important’ rating except for questions 18 and 21; intellectual property and radical innovation management respectively. Indeed, for all confirmatory case study organisations, intellectual property management was rated lower than any of the other categories. This is discussed further in Section 4.3.

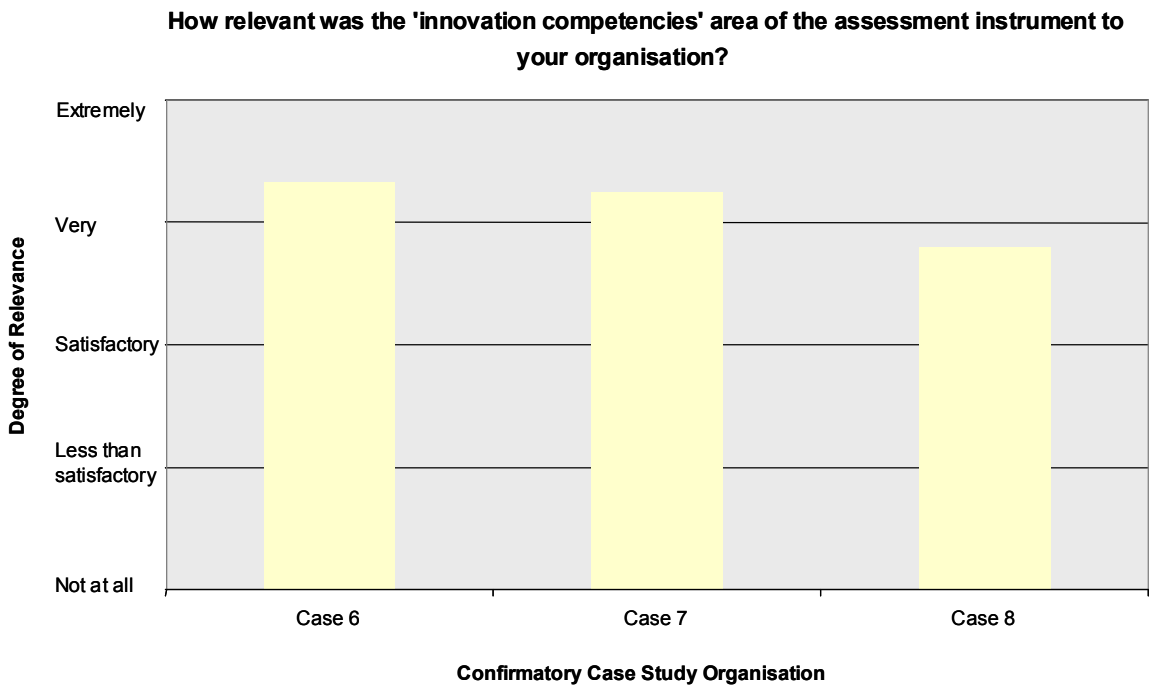
**Figure 4.6: Importance of the innovation competencies questions for the confirmatory cases**



*Source: author*

As for the strategic management and internal environment assessment areas, confirmatory case study participants present during both assessment and action-planning workshops were again asked to rate the relevance of each innovation competencies assessment question areas to their organisation. These results are seen in Figure 4.7 and show that all organisations, on average, deemed the innovation competencies assessment area to be close to ‘very relevant’ to their organisations.

**Figure 4.7: Relevance of the innovation competencies questions for the confirmatory cases**

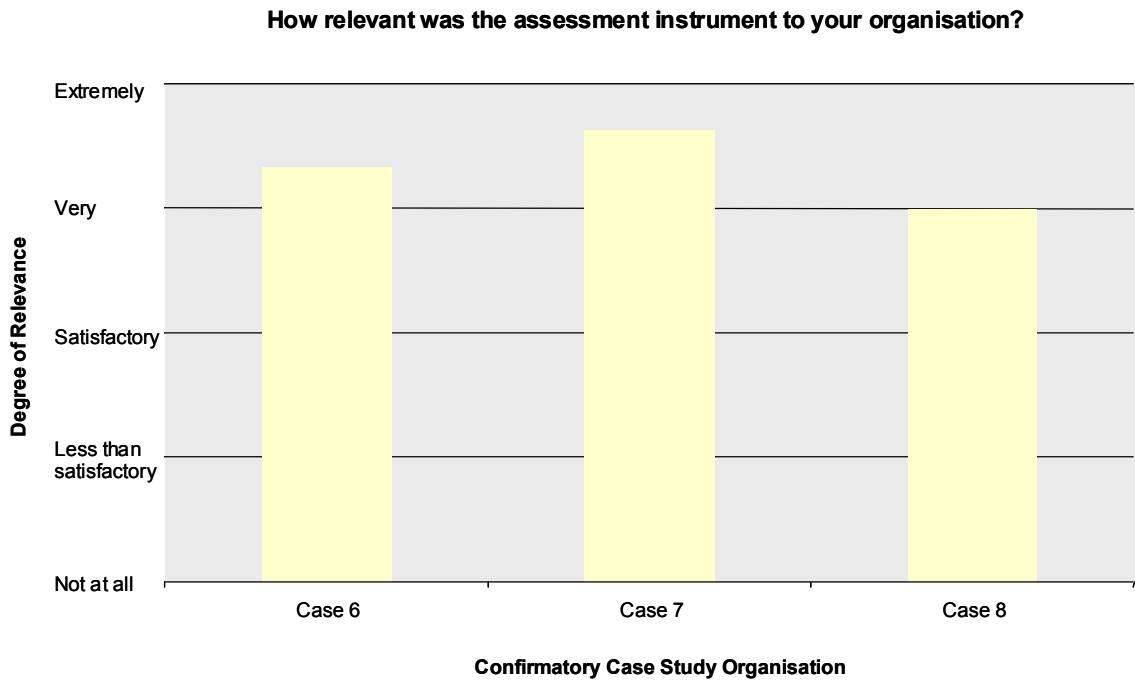


*Source: author*

### **Overall relevance of Innovation Capability Assessment instrument**

The confirmatory case studies were carried out using the finalised assessment instrument (Appendix 6) to confirm that the modified instrument was relevant and useful to the case study organisations. One question in the case study evaluation instrument asked participants of the confirmatory case studies to rate the overall relevance of the assessment instrument to their organisation. The results, shown in Figure 4.8, show that all organisations rated the instrument as being close to ‘very relevant’.

**Figure 4.8: Overall relevance of the assessment instrument to the confirmatory cases**



*Source: author*

### **4.3 Findings for Research Question Two**

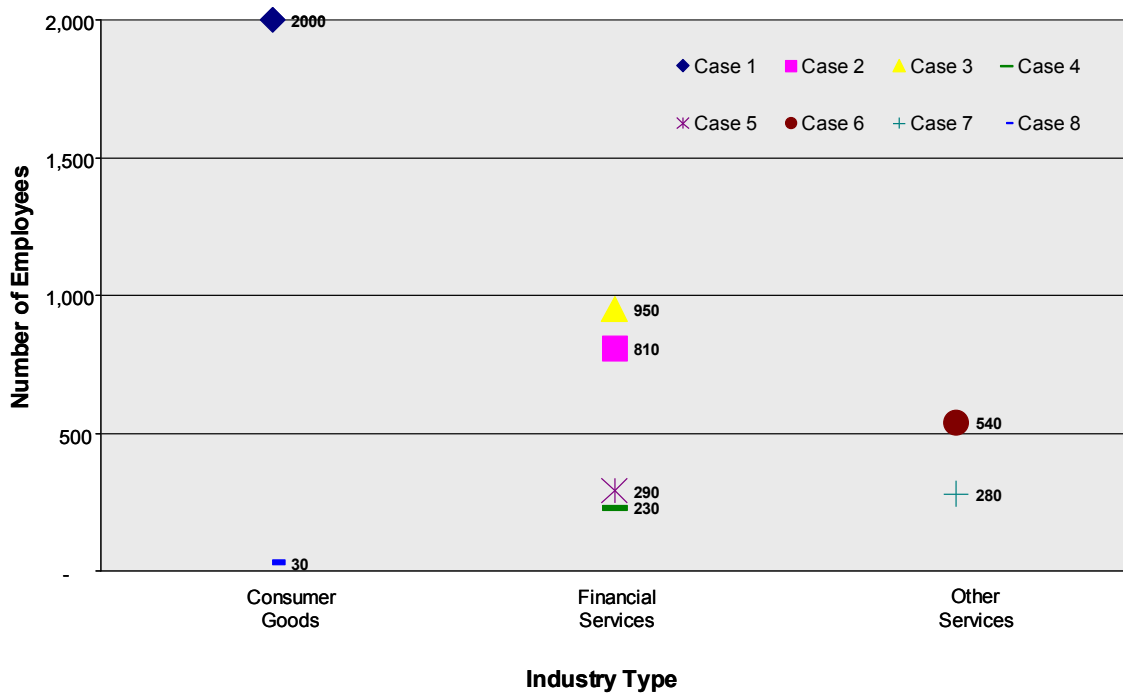
The Innovation Capability Assessment instrument aimed to be generally applicable to a variety of organisations. The second of the research questions addressed in the fieldwork related to this applicability. The research question and sub-questions are listed below:

RQ2. How applicable is the Innovation Capability Assessment instrument across a variety of organisations?

- a. How applicable was the instrument in organisations of different size?
- b. How applicable was the instrument in organisations operating in different industries?

Figure 4.9 below shows each of the case study organisations arranged by both organisation size i.e. number of employees, and by the industry type in which they operate. The following sections analyse the results for both sub-questions for research question 2 discussing both organisation size and industry type.

**Figure 4.9: Display of case organisations showing organisation size and industry type**



*Source: author*

### 4.3.1 Organisations of different sizes

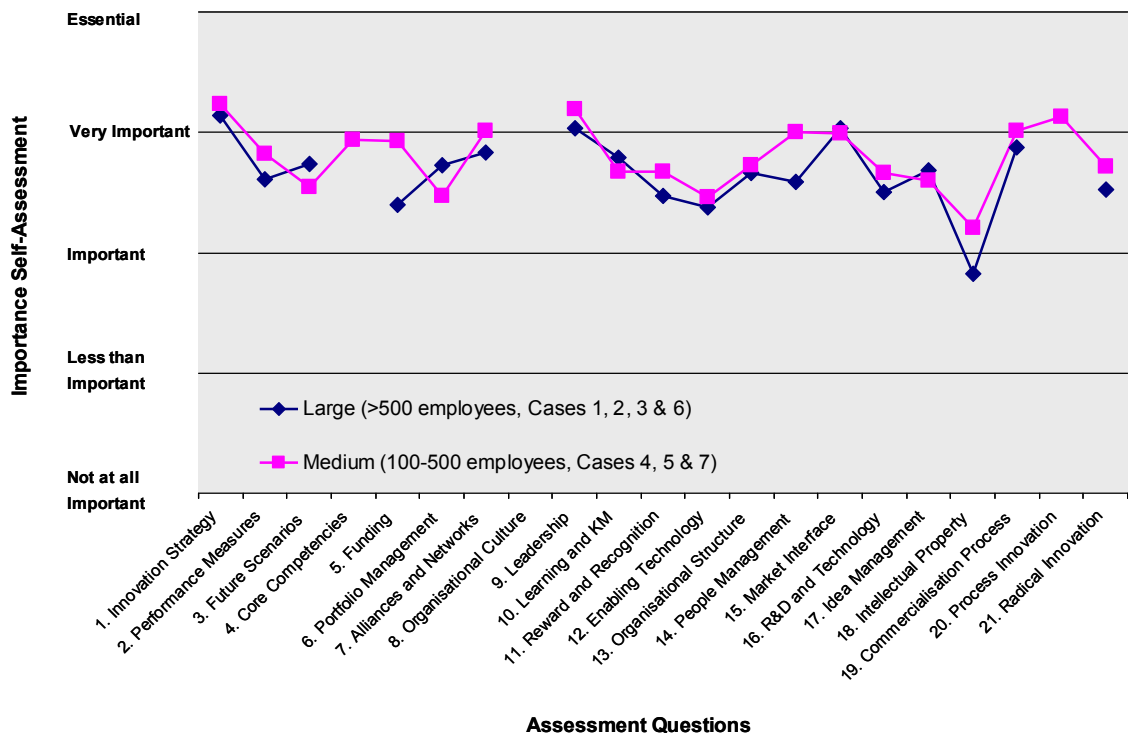
The characteristics used in the literature to represent the size of organisations are often financial ones such as sales revenue or market capitalisation. This is because such figures are readily understood, easily obtainable (for publicly listed organisations) and are reliable as they often have already been verified by a third party (such as an organisation’s auditors). These sorts of measures however were unsuitable for this research due to the nature of the companies involved. For example, financial service organisations typically don’t measure financial performance in terms of sales revenue; rather they use assets, capital or funds under management as a comparator. Also public service organisations will generally manage against an annual operating budget. In order to be able to compare financial service organisations with the consumer good and public service organisations in this research, organisational size was measured based on the number of full-time equivalent employees. Research into the relationship between innovation performance and organisation size has previously been carried out using the number of employees as a basis (Covin and Slevin, 1989; Pavitt, 1991).

Separation of the case organisations into groupings based on the number of employees was made as follows:

- Large organisations – those with more than 500 full-time employees (Cases 1, 2, 3 & 6);
- Medium organisations – those with between 100 and 500 full-time employees (Cases 4, 5 & 7);
- Small organisations – those with less than 100 full-time employees (Case 8).

Figure 4.10 shows the comparison of average self-assessed importance responses from the assessment workshops from large and medium sized case organisations. As not all exploratory case organisations were asked exactly the same questions, due to the instrument undergoing modification during this phase, only the results from questions asked of at least two organisations have been included.

**Figure 4.10: Importance of each question for large and medium sized organisations**



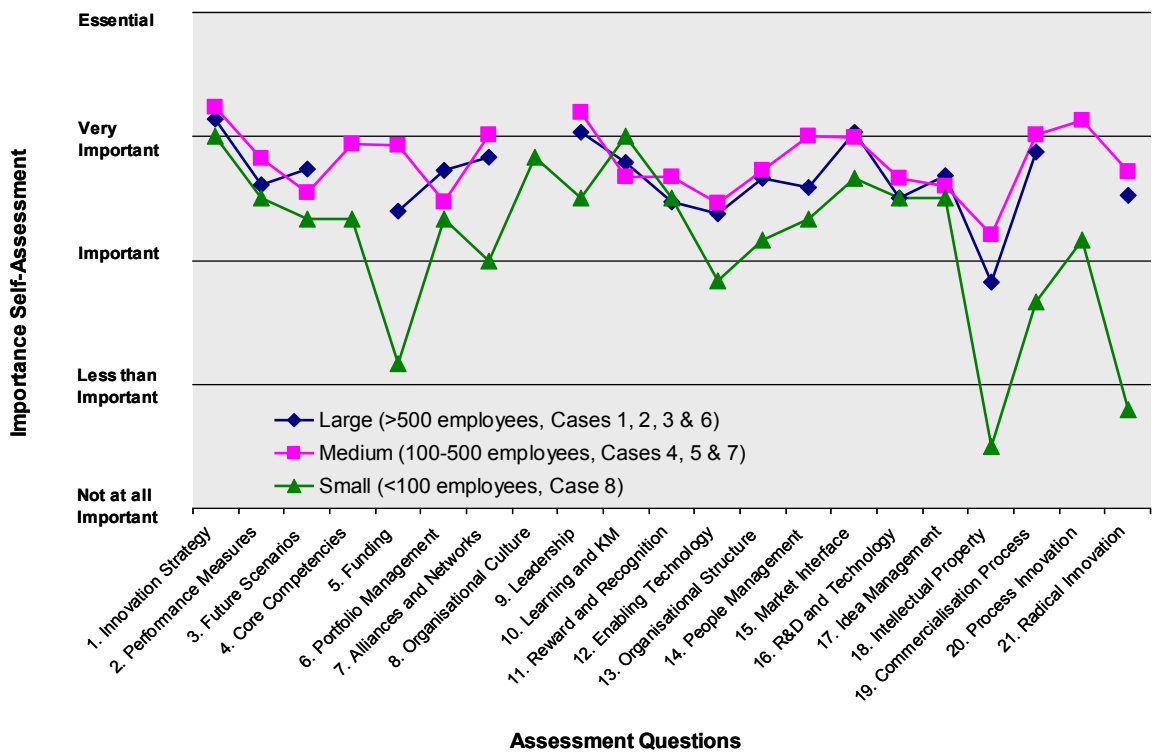
Source: author

A comparison of the importance responses for medium and large organisations for each question as seen in Figure 4.10, shows a very close tracking of results. Most results were between the ‘important’ and ‘very important’ range and trended in similar directions for most questions.



Figure 4.11 shows the same comparison of average self-assessed importance responses from the assessment workshops but includes Case 8 results representing small organisations.

**Figure 4.11: Importance of each question by organisation size**



Source: author

Case 8 was by far the smallest organisation selected in the research with only 30 staff. Case 4 was the next smallest with 230 employees. In comparing Case 8 with the medium and large organisations in Figure 4.11, it is apparent that the importance results generally track slightly lower for most questions but diverge significantly for three questions. These three questions are: the funding for innovation initiatives; the management of intellectual property; and the management of radical innovation. As for all the cases, the qualitative data recorded during Case 8’s assessment workshop was presented back to the participants in the form of a qualitative data display during their action-planning workshop. An excerpt of this data display containing three questions is presented in Table 4.4. This data supports the lower importance seen in Figure 4.11.

**Table 4.5: Qualitative data display excerpt from Case 8 for questions 6, 18 and 21**

Importance of...	Case 8: qualitative data
...effective innovation funding?	<ul style="list-style-type: none"> <li>• “There is no dedicated pool of funds for innovation initiatives”;</li> <li>• “We are small enough to be able respond quickly to an opportunity and divert funds when required”.</li> </ul>
...effective management of intellectual property?	<ul style="list-style-type: none"> <li>• “We don’t have the capabilities to conduct the scale of research necessary to warrant intellectual property management”;</li> <li>• “We are ‘market innovators’ not ‘technical’ innovators”.</li> </ul>
...effective management of radical innovation?	<ul style="list-style-type: none"> <li>• “We are not in the radical innovation ‘game’ ”.</li> </ul>

*Source: author*

The difference in the findings for these three questions for Case 8 can be explained by different reasons. The ‘innovation funding’ result divergence maybe due to a smaller organisation having fewer layers of bureaucracy and therefore not requiring a dedicated process for managing innovation funding outside of its usual resource allocation processes. The lower result for the management of intellectual property reflects Case 8’s focus on consumer-driven innovation rather than technological innovation. They operate in a global industry where the majority of research and development is carried out by a handful of large North American and European organisations. It is for this reason that the management of radical innovation was rated as being ‘less than important’. Case 8 see themselves as manufacturers and distributors of other organisations’ radical innovations. Case 8 therefore may not be representative for all small organisations; particularly those operating a ‘high-technology’ industries and involved in the development or commercialisation new technologies.

### **4.3.2 Organisations in different industries**

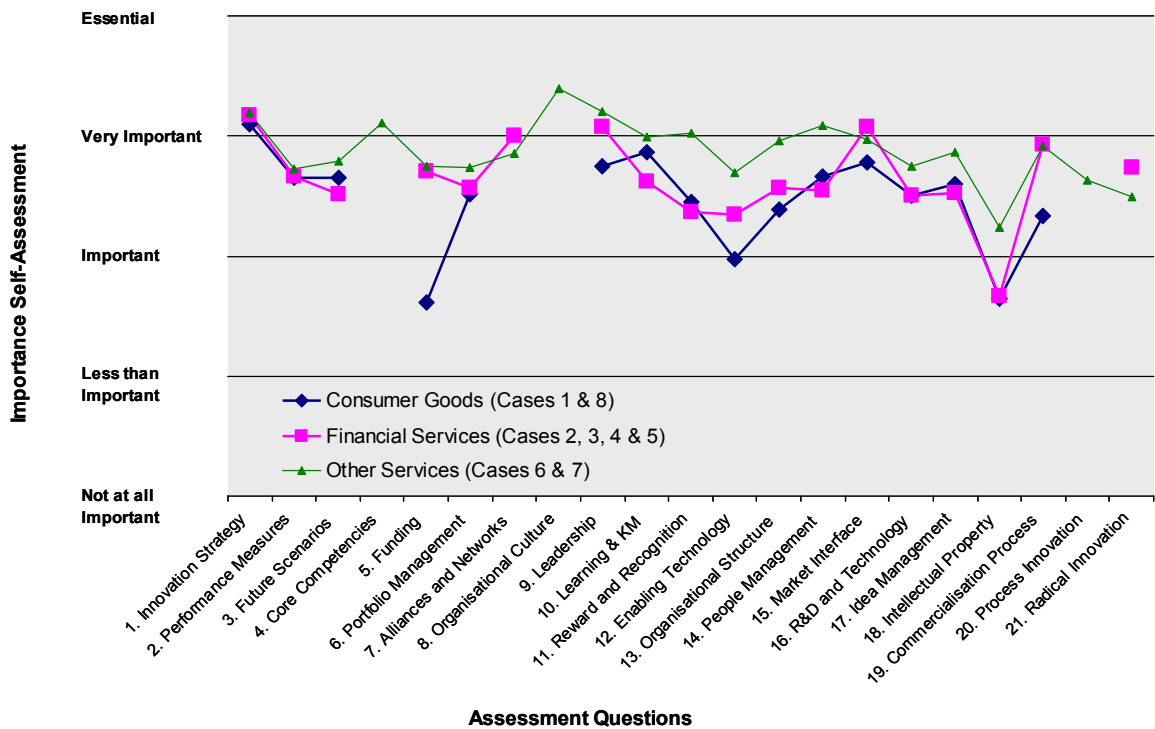
The researcher organised the eight case organisations included in this study into three industry groupings based on the primary product offering of each. The three groupings are:

- Consumer goods – Cases 1 and 8;

- Financial services – Cases 2, 3, 4 and 5; and
- Other services – Cases 6 and 7 (professional and educational services respectively).

The results of the self-assessed importance of each question area to the case organisations are presented Figure 4.12 arranged by industry grouping. As for the previous section, not all exploratory cases were asked exactly the same questions due to the development of the instrument. Therefore only those questions asked of at least two organisations have been included in Figure 4.12.

**Figure 4.12: Importance of each question by industry type**



Source: author

The results show a very similar response to all questions for the three groupings with one exception at question 5: innovation funding. The results here were low due to Case 8's 'less than important' rating. Case 1 rated this as slightly above 'important'. It is interesting to note that all three industry groupings assessed intellectual property management as the least important of any of the question areas. For the 'financial services' and 'other services' industry groupings; it is generally acknowledged in the literature that there are fewer options for protecting the intellectual property of

intangible products or services (for example, Sullivan, 2000) and hence this would naturally assume a position of less importance for these organisations. For the consumer goods grouping; again the results were weighted lower due to Case 8's low rating. As previously mentioned, their focus is on consumer-driven innovation (and therefore 'non-protectable' innovation) rather than technological innovation. Case 1 rated intellectual property management as being just below 'very important'.

#### **4.4 Findings for Research Question Three**

The third research question addressed in the fieldwork related to the effectiveness of the assessment instrument in developing actions aimed at improving the innovation capability of the organisation. The research question and sub-questions are listed below:

RQ3. How useful is the Innovation Capability Assessment instrument in aiding organisational change?

- a. How useful is the assessment in identifying areas requiring improvement?
- b. How useful is the assessment in prioritising areas requiring improvement?
- c. How useful is the assessment in developing actions?

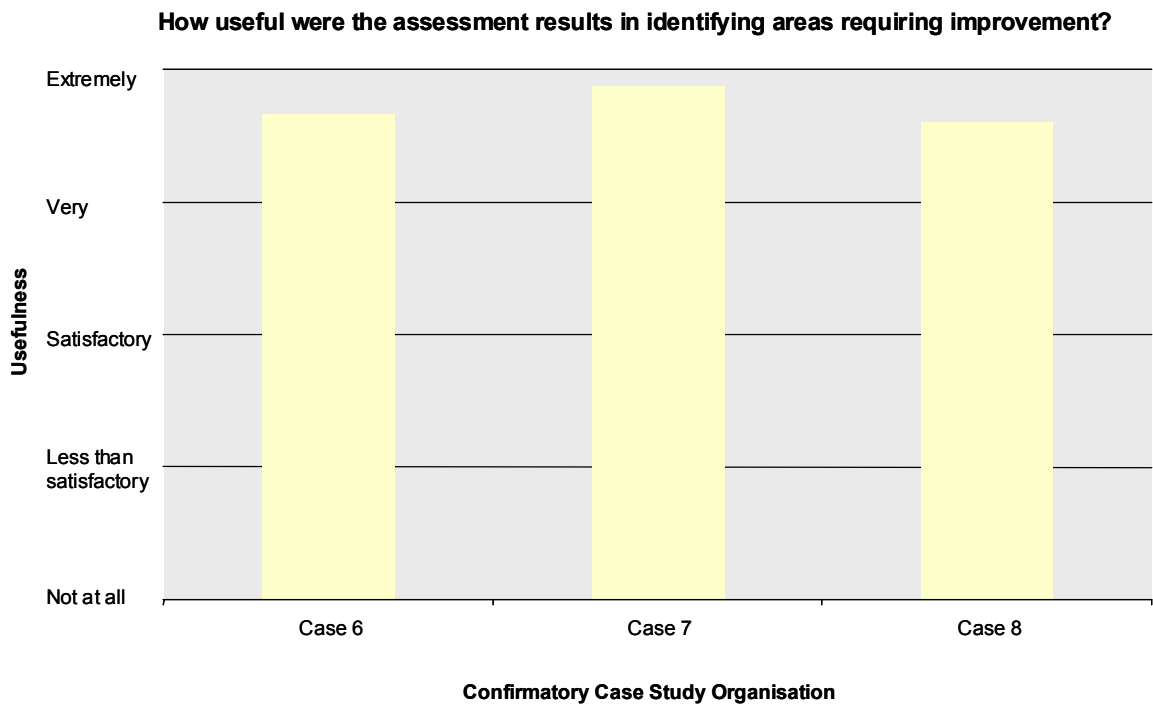
As the focus of the exploratory cases (Cases 1 to 5) was on the development of the assessment instrument and ensuring that it contained only relevant and useful content, research question three was addressed subsequent to this during the confirmatory cases (Cases 6 to 8). This was done primarily through the completion of the case study evaluation instrument (see Appendix 8) completed by participants of the confirmatory cases involved in both the assessment and action-planning workshops. The following sections analyse the results for each of the three sub-questions for research question three.

##### **4.4.1 Identification of areas for improvement**

The ability to clearly identify areas requiring improvement in an organisation is essential for the effective performance of an assessment instrument. Question 5 in the case study evaluation instrument (Appendix 8) asked participants from the confirmatory case study organisations to rank how useful the assessment results had been in identifying areas requiring improvement. As Figure 4.13 shows, all organisations felt

that the results were between ‘very useful’ and ‘extremely useful’ in identifying these areas. A participant from Case 8 recorded that the assessment results highlighted “clearly the areas of concern”.

**Figure 4.13: Usefulness of the assessment results in identifying improvement opportunities for the confirmatory cases**

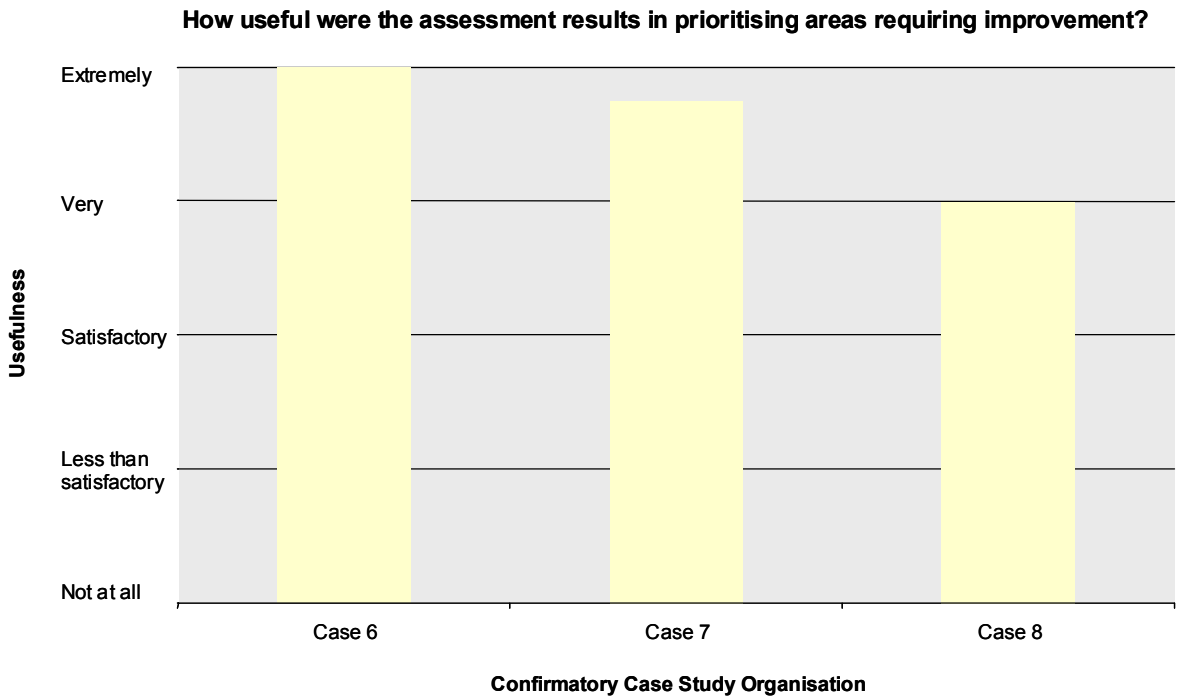


*Source: author*

#### **4.4.2 Prioritising areas for improvement**

In order to ensure that the participating organisation directs its resources at improving those areas of its innovation capability of greatest need, the assessment instrument needs to effectively identify these areas of greatest priority. Question 6 in the case study evaluation instrument (Appendix 8) asked participants from the confirmatory case study organisations to rank how useful the assessment results were in prioritising areas requiring improvement. As Figure 4.14 shows all organisations felt that the results were between ‘very useful’ and ‘extremely useful’ in identifying these areas. A participant from Case 8 recorded that the “degree of importance was clearly visible”, whilst one from Case 6 commented that the results “gave the facts from which to make decisions”.

**Figure 4.14: Usefulness of the assessment results in prioritising improvement opportunities for the confirmatory cases**



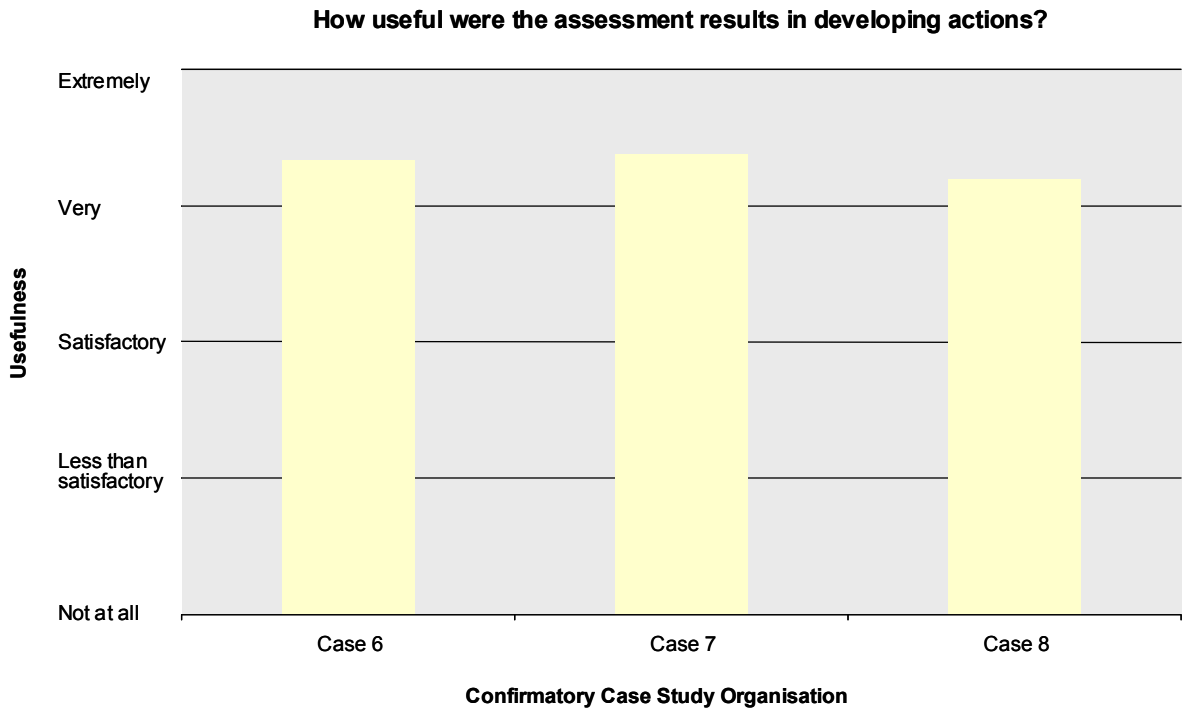
*Source: author*

#### **4.4.3 Development of actions**

Ultimately, the assessment process is worth little if there is no action taken as a consequence. In each of the cases undertaken, the quantitative and qualitative data collected during the assessment process was presented back during the action-planning workshops for discussion and critical reflection. The outcome of these workshops was the development of actions designed to improve the innovation capability of the organisation. The case study evaluation instrument asked participants of the confirmatory cases to answer two questions relating to the development of actions.

Question 7 asked how useful the assessment results were when developing actions. The results to this question, shown in Figure 4.15, show that all participants found on average the assessment results to be better than ‘very useful’ for developing actions. As a participant from Case 6 remarked, “the outputs from the review allowed a quite focussed action planning session with the [executive group] with quite practical actions resulting.”

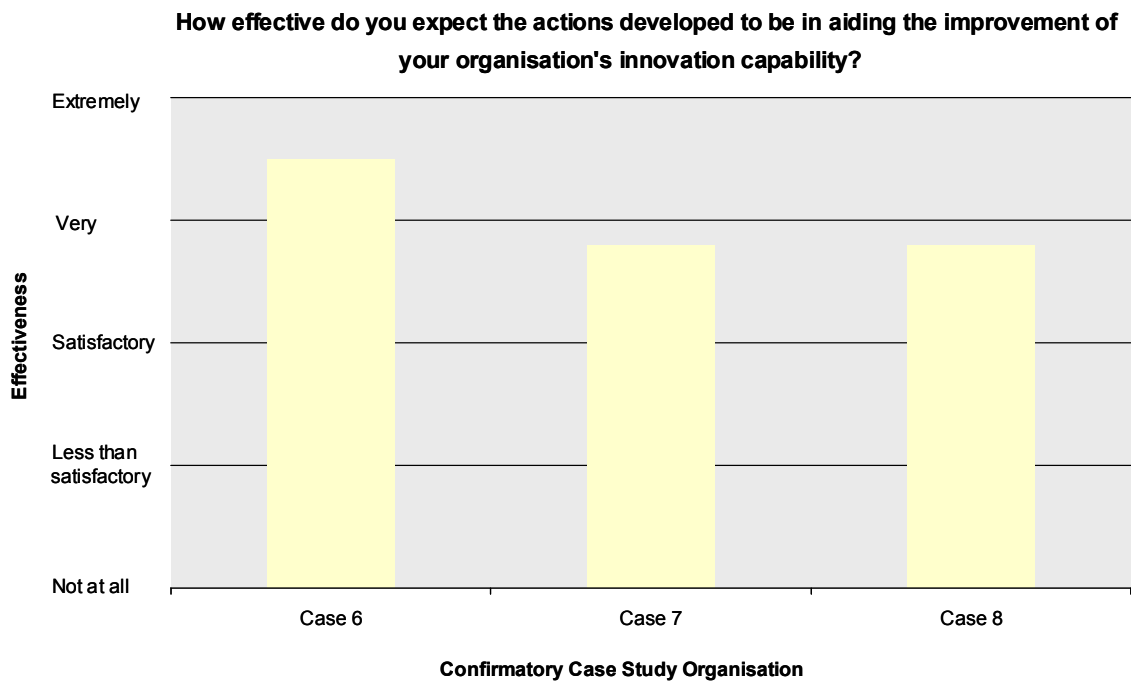
**Figure 4.15: Usefulness of the assessment results in developing improvement actions for the confirmatory cases**



*Source: author*

The second question (question 12) addressing actions in the case study evaluation instrument asked participants to estimate how effective they expected the developed actions were going to be in improving their organisation’s innovation capability. As seen Figure 4.16, participants responded with answers either side of the ‘very effective’ rating. As might be expected, this question prompted some indecision due to its speculative nature. Comments such as this from a participant in Case 6 were typical: “This is an area that is still relatively unproven. The early indications are that we will go to make changes/ improvements through various projects.”

**Figure 4.16: Expected improvement resulting from the developed actions for the confirmatory cases**



*Source: author*

Some months after each of the three final cases, a follow-up interview was conducted with the case study sponsor to better understand how each organisation had progressed with the implementation of actions and whether they felt they had achieved any improvement. In all cases the sponsors reported making significant progress with action implementation:

- Four months after the completion of the action-planning workshop **Case 6** had established an innovation program including: employing a dedicated manager; a group-wide, on-line idea submission and assessment system; strategic performance measures; reward and recognition initiatives; and associated internal marketing and communications initiatives. They budgeted to invest \$400,000 in this initiative in the 2005 financial year.
- The immediate action resulting from **Case 7** was the replication of the assessment process across all other departments with the organisation, at the request of the senior management group. In addition, five months after the action-planning workshop, they had launched an on-line idea management submission, evaluation and funding mechanism, as well as setting up several



formal and informal forums for innovation strategy and communication initiation. They had also held an innovation-themed conference for similar education and training providers in Victoria to showcase their results and actions.

- As they were the final organisation in the case studies, the follow-up interview with **Case 8** occurred only 2 months after the conclusion of the action-planning workshop. At this point, they had implemented an ‘innovation and ideas’ reward and recognition program integrated with a forum for idea submission. They had also begun documenting (‘mapping’) internal processes as a first step toward process innovation.

Each of the case sponsors felt that positive progress had been achieved and expected more to follow. Each also commented that these actions would not have otherwise occurred.

#### **4.5 Findings for Research Question Four**

The final research question addressed in the fieldwork related to the process used to deliver the assessment instrument and to develop the actions aimed at improving the innovation capability of the organisation. The research question and sub-questions are listed below:

RQ4. How effective was the process used to deliver the assessment and to develop actions for improvement?

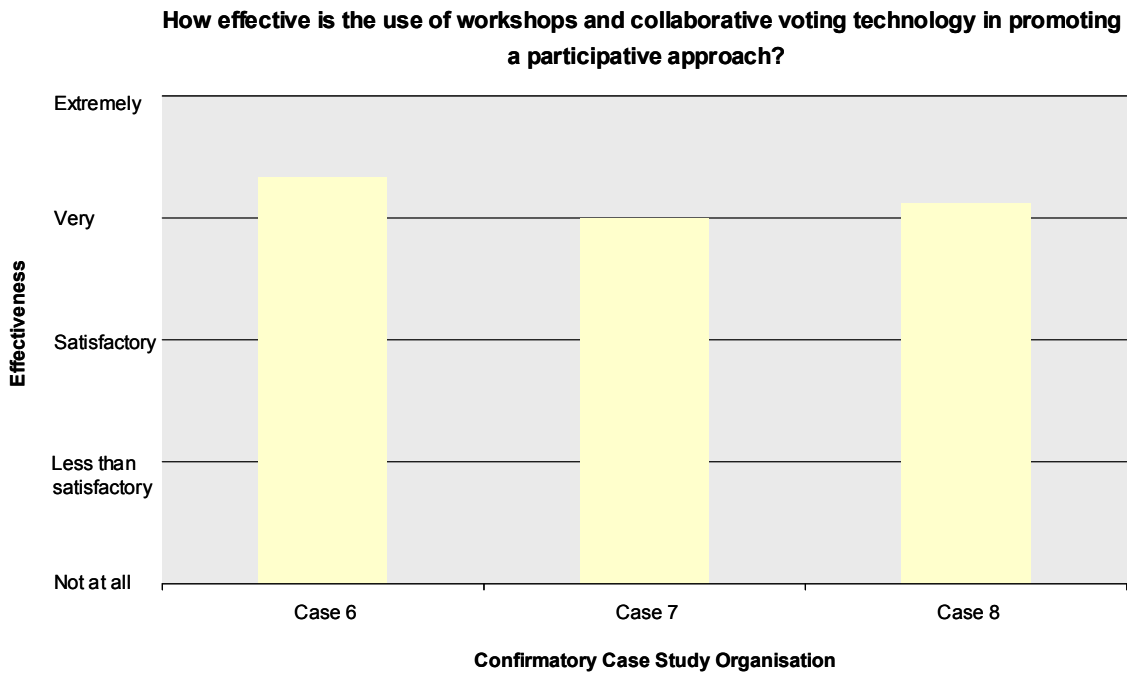
- a. How effective was the use of workshops and collaborative voting technology in promoting a participative approach to assessment and action development?
- b. How effective was the use of an external facilitator to assist in the assessment and action development?

As for research question three, the final research question was addressed during the confirmatory case studies due to the focus of the exploratory cases being on the development of the assessment instrument. Participants involved in both the assessment and action-planning workshops during the confirmatory case studies were asked to complete the case study evaluation instrument. The following sections analyse the results for both of the sub-questions for research question four.

#### **4.5.1 Participative approach**

Three questions (numbers 8, 9 and 10) in the case study evaluation instrument addressed the participative nature of the assessment and action development process. The first asked participants to rate the effectiveness of the use of the workshops themselves in promoting a participative approach. The second asked about the use of collaborative voting technology allowing confidential voting but the immediate display of results in order to provoke further discussion. The final question asked participants to assess the effectiveness of involving multiple stakeholders in the assessment process. As these questions all deal with the participative nature of the assessment process, the results for these questions have been consolidated and presented together in Figure 4.17. They show that the average response was that the assessment process was at least 'very effective' in creating a participative approach.

**Figure 4.17: Effectiveness of the participatory approach for the confirmatory cases**



*Source: author*

#### **4.5.2 External Facilitation**

The researcher was involved in the assessment and action development as a facilitator of these workshops. It was his role to explain the assessment instrument and process, to encourage the participants to explore their organisational performance through discussion and to reflect upon the results of the assessment, whilst remaining a ‘modified objectivist’ consistent with the realism paradigm (Perry, Riege and Brown, 1999).

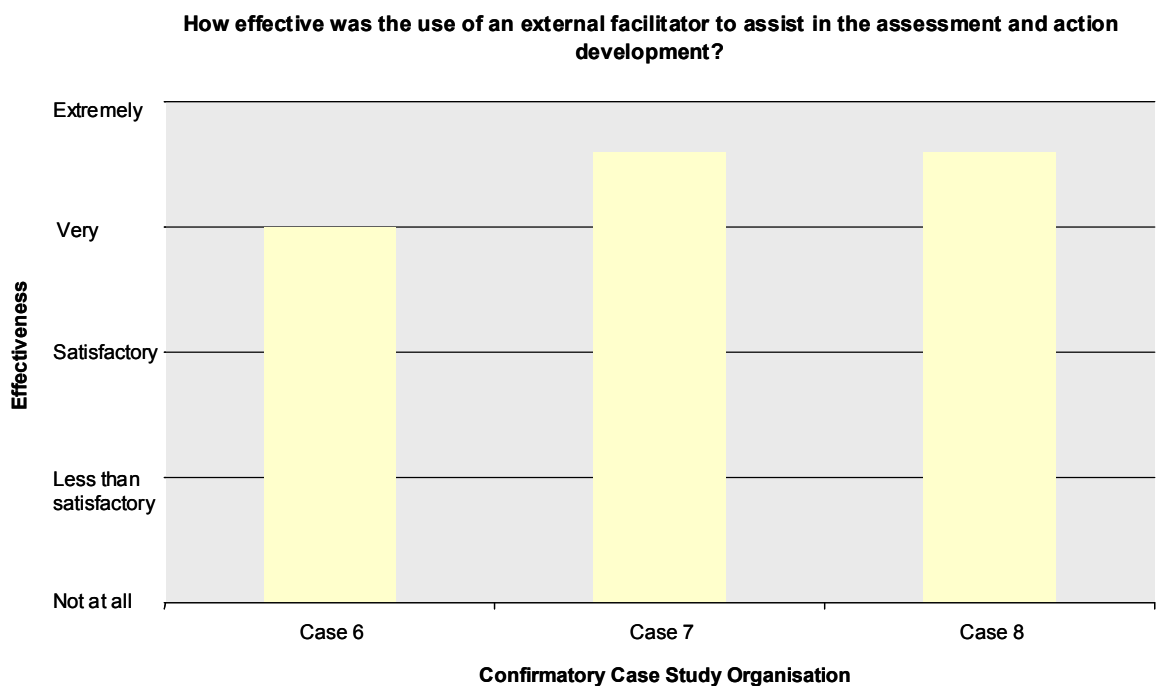
On occasions, the facilitator had to assist with the ‘translation’ of some of the content of the assessment instrument into the case study organisation’s context. For example, when discussing new product development with the participants of Case 7, an education service provider, it was necessary to discuss what this meant within their context and agree upon a common meaning. In this example, new product development was agreed to mean the development of new courses and new means of delivering courses.

Explanations for uncommon or jargon terminology were also provided. This occurred more frequently during the exploratory cases as, where possible, the instrument was modified to make it more clearly understandable without any loss of meaning. One outcome of this was the inclusion of a ‘concept introduction’ page for most questions

(see Appendix 7), which allowed the facilitator to explain the assessment concept and often illustrate it with examples from other organisations obtained from the literature.

Question 11 from the case study evaluation instrument asked participants to rate the effectiveness of using an external facilitator for the assessment and action-planning workshops. The average results for each of the cases are presented in Figure 4.18 and show that the use of a facilitator external to their organisation was judged to be between ‘very effective’ and ‘extremely effective’.

**Figure 4.18: Effectiveness of using an external facilitator for the confirmatory cases**



*Source:* author

## 4.6 Additional Findings

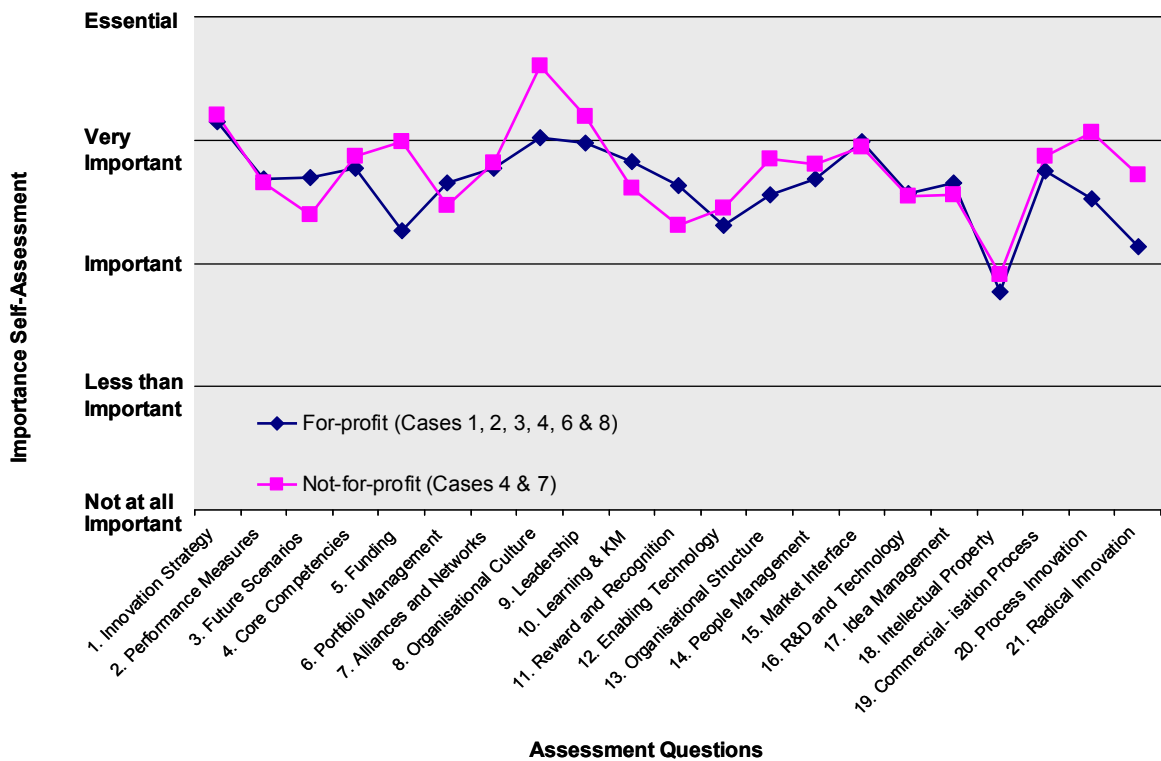
Some additional findings emerged whilst carrying out the fieldwork and the data analysis of the results that were not anticipated prior to commencing the case studies. As a result these were not included in the original research questions set out in at the end of Chapter 2. These additional findings are presented below separately.

#### **4.6.1 Not-For-Profit Innovators**

The original criteria for selection of case study organisations (Section 3.7.3) centred on Australian-based, for-profit organisations, preferably operating in a service industry that had articulated the importance of innovation. During the course of the fieldwork for this research, the opportunity presented itself to carry out an exploratory case within a government department dealing in financial services. The researcher decided to be opportunistic (Miles and Huberman, 1994; and see Table 3.4) and to take advantage of the opportunity to understand how the Innovation Capability Assessment might apply within a not-for-profit environment. Likewise, during the confirmatory stage, the opportunity presented itself to carry out a case study on a government funded educational provider. Again, the opportunity was taken advantage of, as this presented the chance to achieve literal replication between these two cases.

Figure 4.19 shows the average self-assessment importance results for the Cases 4 and 7, as the two not-for-profit organisations in comparison to the remaining cases presented as the for-profit organisations. The results show that the importance results compare very closely for both types of organisations. This includes a similarly lower importance result for intellectual property management. The not-for-profit organisations recorded a slightly higher average result for the importance of organisational culture. This result may simply reflect the individuals or organisations involved, or may in fact be related to the greater importance organisational culture may assume within not-for-profit organisations. In both Case 4 and 8, participants highlighted the need for cultural change to occur in order to become more effective innovators. For example, Case 4 participants described employees' roles as being historically one of "product administrators" and stressed the need for this to change to "product managers" and "product developers". Likewise, Case 7 assessment workshop participants highlighted current initiatives aimed at developing a more entrepreneurial culture.

**Figure 4.19: Importance of each assessment area for the not-for-profit and for-profit organisations**



Source: author

#### 4.6.2 A Learning Experience

In addition to the primary aim of improving their organisation’s innovation capability, some participants saw the opportunity to discuss their organisation’s innovation performance in an open forum as a ‘learning’ opportunity. The sponsor of Case 7 commented that she felt “the opportunity to have her middle and senior managers together discussing impediments and opportunities associated with innovation was enough even if nothing else was to result from it”. The individual and group learning was probably aided by the participatory nature of the assessment process as well as the adoption of the action-research approach, which has been shown to allow groups to learn effectively together (French, Bell and Zawacki, 1994).

Some months after the action-planning workshop, the sponsor of Case 7 reflected that the assessment process had “greatly deepened and spread understanding of innovation” in her organisation and had “made innovation ‘tangible’.” Other participants throughout the case studies made similar statements; for example, after the action-planning

workshop at Case 8, a director noted, “I have found the whole process enlightening and rewarding”.

#### **4.7 Chapter Summary**

This chapter analysed the findings for each of the research questions from the eight cases conducted. Research question one addressed the relevance of the Innovation Capability Assessment instrument to each organisation and resulted in new assessment areas being added and existing questions being consolidated to increase the focus of the instrument. The second research question dealt with the applicability of the instrument across different organisation types and organisations of different sizes. Research question three analysed the effectiveness of the assessment instrument in facilitating organisational change by identifying and prioritising improvement opportunities and assisting in action development. The final research question analysed the way in which the instrument was delivered to the case study organisations, in particular the degree to which the assessment and action-planning process was participatory. Finally, some additional findings that emerged during the data analysis were discussed.

The following chapter draws conclusions about each of the research questions and the research problem and outlines implications for both theory and practice.

## **5 Conclusions and Implications**

Chapter 4 presented the research findings and cross-case data analysis for each of the research questions. Chapter 5 now presents the conclusions for each of the research questions (Sections 5.1 to 5.4), for the additional findings (Section 5.5) and for the research problem (Section 5.6). Implications of the research for both theory (Section 5.7) and practice (Section 5.8) are then discussed followed by an outline of limitations of this research (Section 5.9). Finally, opportunities for further research are presented in Section 5.10 and some concluding remarks made in Section 5.11.

### **5.1 Conclusions about Research Question One**

Research question one dealt with identifying the constituent areas of an innovation capability assessment tool and ensuring their relevance. Specifically, it asked:

*What areas of organisation capability does an Innovation Capability Assessment instrument need to include?*

It is the most important of the research questions addressed in this study, as it directly led to the development of the Innovation Capability Assessment instrument. The original analysis of the extant literature led to the creation of three assessment areas in the instrument: the ‘strategic management of innovation’, the ‘internal environment’, and a series of ‘innovation competencies’. Whilst the subsequent case study research led to the retention of these three areas, the content of each area, initially represented by 37 questions (see Appendix 5), underwent modification and development as a result of the exploratory case studies. A finalised assessment instrument (Appendix 6), consisting of 21 questions, was used in three case organisations to confirm the relevance of the assessment instrument across a variety of organisations.

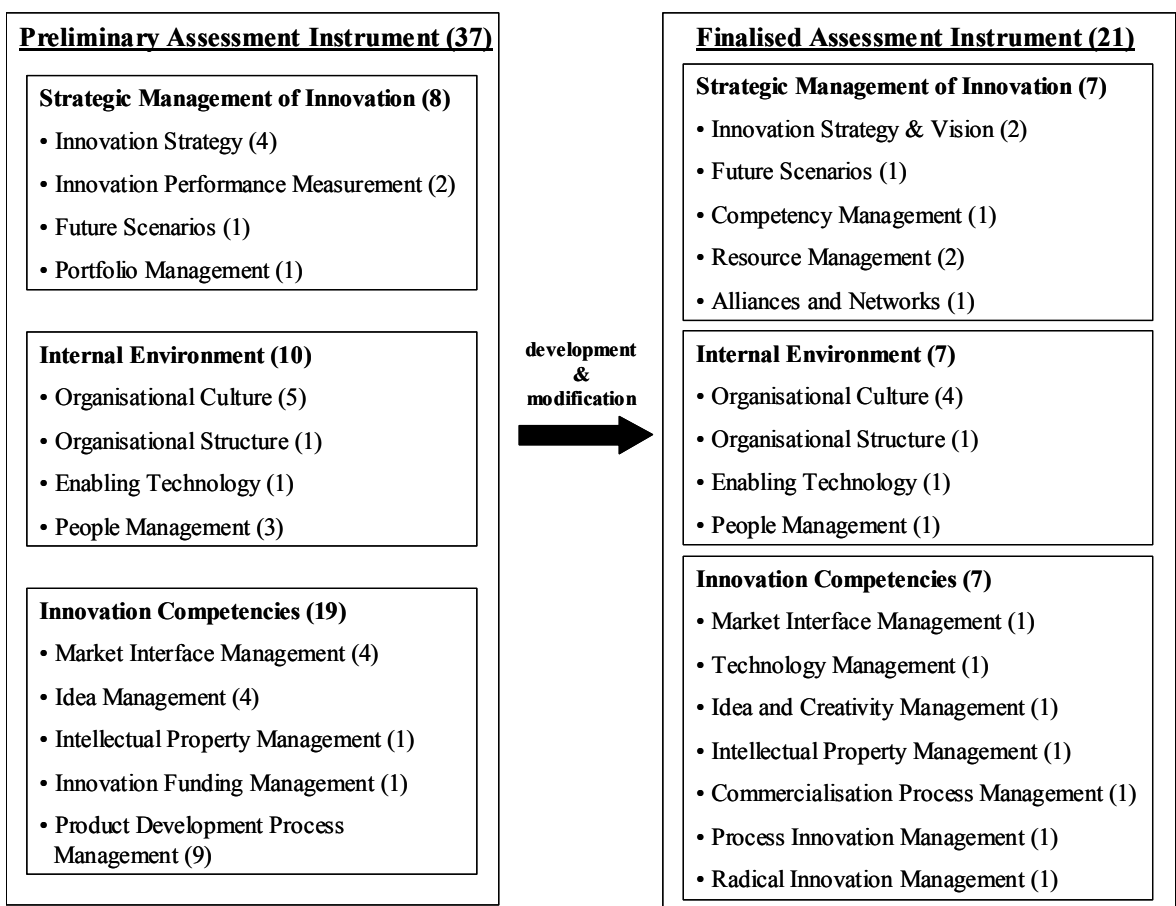
Whilst previous authors have investigated various determinants of innovation performance in isolation, such as organisational structure (for example, Burns and Stalker, 1961), the “soft and intangible factors” (for example, Ahmed and Abdalla, 1999), creativity (for example, Amabile, 1988) or radical innovation (for example, Leifer et al., 2000), few have taken a truly holistic approach. Those that have (for example, Damanpour, 1991) have presented little that would be easily ‘digested’ by a



practitioner, enabling the diagnosis and improvement of an organisation’s innovation capability.

The findings presented in Section 4.2 show the final Innovation Capability Assessment instrument was determined to be ‘very relevant’ to each of the confirmatory case organisations (Cases 6, 7 & 8). The final instrument had five additional assessment questions and underwent several consolidations as a result of the exploratory cases. It is a primary outcome of the research. The development of the finalised instrument from the preliminary instrument (based on the theoretical framework in Section 2.5.1) is summarised in Figure 5.1.

**Figure 5.1: From preliminary to final assessment instrument (number of questions shown in brackets).**



Source: author

## 5.2 Conclusions about Research Question Two

Research question two considered how widely applicable the Innovation Capability Assessment instrument might be across organisations of different types and sizes.

Specifically it asked:

*How applicable is the Innovation Capability Assessment instrument across a variety of organisations?*

Researchers in the past have called for greater consideration of organisational characteristics in innovation research. Wolfe (1994, p.16) argues, “mixing organisational contexts would confound research results and, further, that a distinction between organisational types is needed for developing empirically distinguishable theories of innovation”. The results from the eight cases undertaken during this research show that the Innovation Capability Assessment instrument was relevant for all organisations involved irrespective of size or organisation type.

The degree to which certain areas of the assessment instrument were deemed relevant or important to each organisation did appear to be influenced by size. For example, the results from the smallest of the organisations, Case 8, showed slightly lower importance and relevance across all questions but significantly lower importance for questions relating to funding for innovation initiatives and radical innovation management. Previous research has shown that organisation size does influence the determinants of successful innovation. Whereas large innovating firms gain advantage through developing strength in R&D laboratories, or in the design and operation of complex production technology or complex information technology, small innovating firms’ strengths often rest on the ability to closely “match technology with specific customer requirements” (Pavitt, 1991, p.43). Likewise, Case 8 described themselves as “market innovators”; meaning that their intimate knowledge of their customers allowed them to supply them with new products, often researched and developed by third parties overseas.

It is possible to conclude from the results that both service and non-service organisations in the research found the instrument to be of equal relevance to their organisations. As mentioned previously, given the increasing importance of service organisations to modern economies, this was a crucial aspect of the instrument’s

performance. Previous research has found some differences in the determinants of successful innovation between service and manufacturing organisations (Damanpour, 1991). For example, standardisation of work practices was found to facilitate innovation and direct supervision hinder innovation in a manufacturing context, whilst in a service environment, the opposite effects were reported.

It is thought that a wide range of organisation types would find the Innovation Capability Assessment instrument useful due to the dual assessment criteria. By assessing themselves against each area of instrument in terms of *importance* as well as *performance*, organisations are able to effectively ‘filter out’ areas of lesser importance and focus their subsequent action planning only on those areas of greatest importance.

The management of intellectual property was generally seen by case participants to be slightly less important than others irrespective of the organisation type and size. Given the deliberate bias towards service organisations in the selected cases this is not surprising. It is generally acknowledged in the literature that there are fewer options for protecting the intellectual property of intangible products or services (for example, Sullivan, 2000).

The selected case organisations only represented a small sample of possible organisations that may benefit from the application of such an assessment. For example, it is not possible to say whether the assessment instrument might be as relevant for small, ‘start-up’ companies with a focus on technology such as information technology or ‘bio-technology’ or very large organisations such as those employing greater 10,000 employees.

### **5.3 Conclusions about Research Question Three**

The third research question related to the effectiveness of the assessment instrument in developing actions for improving the innovation capability of an organisation. The research question was:

*How useful is the Innovation Capability Assessment instrument in aiding organisational change?*

Using an assessment of organisational capabilities to highlight shortcomings can be the first step in understanding what change is required within an organisation (French, Bell

and Zawacki, 1994). It can also be an effective means of stimulating the motivation to change (Spector, 1989). For these reasons, it was important to understand how useful the Innovation Capability Assessment instrument had been in assisting change. The literature shows that, as well as pinpointing specific areas in need of improvement, an evaluation of the current situation can also help to prioritise and focus improvement efforts (Dooley and Johnson, 2001). The results of the research show that all the confirmatory case organisations felt the assessment instrument was between ‘very useful’ and ‘extremely useful’ for the identification and prioritisation of improvement opportunities, as well as for the development of improvement actions. All organisations also expected the resulting actions to be very effective in driving improvement in their innovation capability, and indeed, follow-up interviews with each of the confirmatory case organisations revealed that benefits in the short-term had already been experienced.

#### **5.4 Conclusions about Research Question Four**

The final research question looked at the process used to deliver the assessment instrument and to develop the actions for improving the innovation capability of the organisation. The research question was:

*How effective was the process used to deliver the assessment and to develop actions for improvement?*

The literature highlights the benefits of integrating employees into the design and implementation of a change program to ensure commitment to the tasks and to aid in the institutionalisation of the changes (Burnes, 2000; Pascale, Millemann and Gioja, 1997; Spector, 1989). Mohrman and Lawler (1988) suggest there are least four reasons for doing so: humanistic values; technical rationality; economic behaviour; and political values. The results of the confirmatory case studies show that the participatory nature of the assessment and action development process was ‘very effective’ for all confirmatory cases.

Often an external ‘change agent’ is needed to move the part of the organisation contemplating change to its new position (Paton and McCalman, 2000). There are several reasons for an organisation to use a change agent including assisting management to help diagnose their problems and to identify what to improve (Schein,

1988). All the confirmatory cases felt that the use of an external facilitator in the role of change agent was between 'very effective' and 'extremely effective'.

## **5.5 Additional Conclusions**

**Not-For-Profit Innovators.** An unexpected opportunity arose during the course of the research to deliver the Innovation Capability Assessment instrument to two not-for-profit organisations. Innovation research has traditionally focussed heavily on the for-profit sector and particularly large corporations. More recently however, there has been increased interest in innovation in the not-for-profit and public sectors (for example, Bartlett, 2003; Mohamed, 2002; Walker, 2003). The importance of innovation to the public sector has been emphasised by research showing that some of these organisations are consistent producers of a large number of innovations (Borins, 2001).

In his meta-analysis of the extant literature, Damanpour (1991) concludes that whether an organisation is for-profit or not-for-profit has considerable moderating effect on the determinants of successful innovation. The high-level of task formalisation and centralisation of control often present in not-for-profit, public sector organisations act as inhibitors to innovation. The results of this research show that very similar responses for the importance of each of the assessment areas were received from the not-for-profit, public sector cases as for the remaining for-profit organisations.

A slight elevation in the importance of organisational culture for not-for-profits, might indicate that this area is of greater importance to these organisations. Other research has found that transformational leadership and creating climate for innovation to be critical for not-for-profit, public sector innovation (Parry and Proctor-Thomson, 2003).

Researchers have recommended the development of innovative cultures and a specific focus on the management of people, particularly through teams, as being critical in not-for-profit and public sector organisations ensuring that people understand innovation and facilitate their implementation (Walker, 2003).

**A Learning Experience.** Participants involved in using the Innovation Capability Assessment instrument consistently made reference to the assessment and action development process as being an opportunity for learning. Given the deliberately designed participatory nature of the process, and the adoption of an action-research approach, this may not be surprising, however it was not initially anticipated to be an

outcome of the assessment. Other innovation researchers have found that “personnel contact and discussions are the most frequent and effective means of communication and learning” (Pavitt, 1991, p.47).

Furthermore, the assessment process undertaken in this research reflects Fiol and Lyles (1985, p.803) definition of organisational learning as “the process of improving actions through better knowledge and understanding”. They describe the development of insights that may affect the whole organisation as higher-level learning, similar to Argyris and Schon’s (1980) ‘single-loop and double-loop learning’ and Senge’s (1990) ‘generative learning’.

## **5.6 Conclusions about the research problem**

The research problem addressed in this research was how can an Innovation Capability Assessment instrument be developed and applied to help improve organisational innovation performance.

Previously in this thesis, inadequacies in the array of innovation assessment instruments were outlined (see Section 2.4). These were summarised as being:

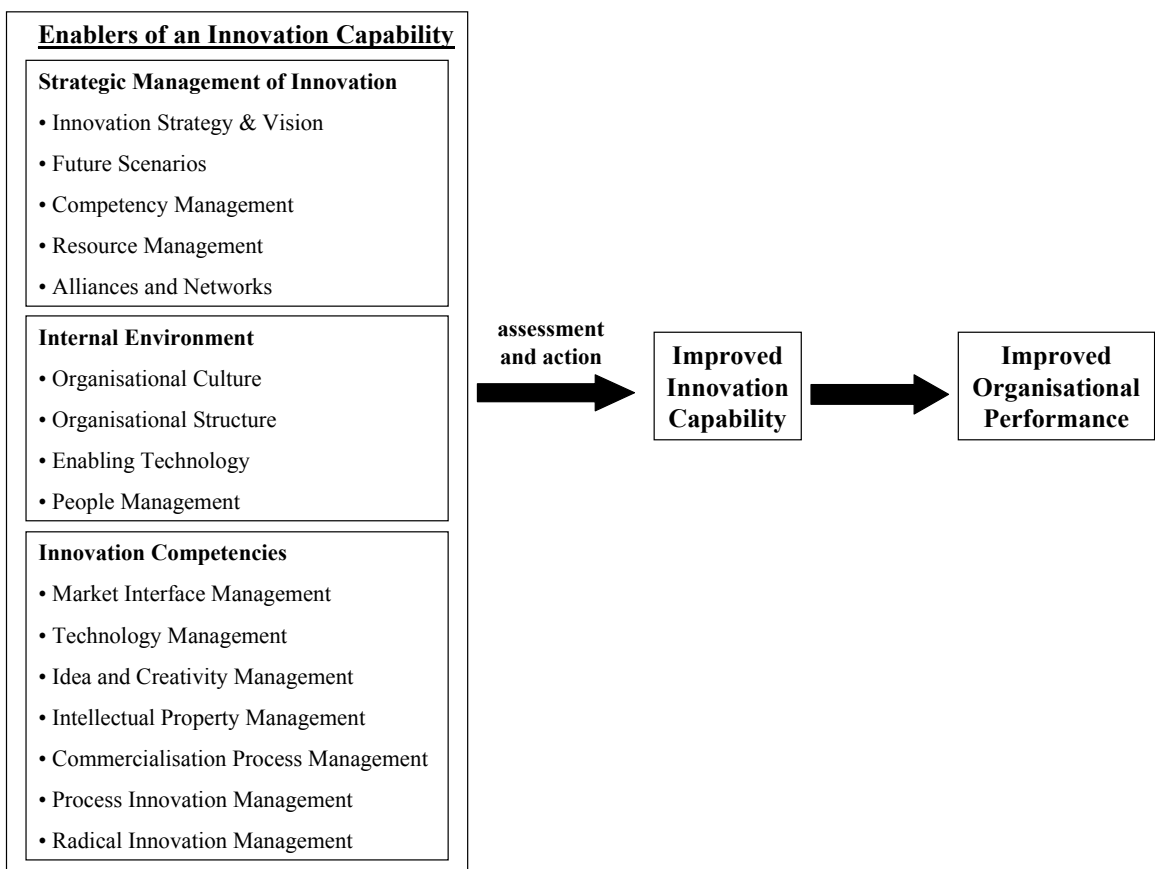
- a focus at the industry- or country-level unit of analysis rather than organisational level;
- a lack of rigorous theory development;
- a focus almost exclusively on manufacturing industry;
- a focus on measuring performance ‘proxies’, such as patent production, rather than management capabilities that would more easily enable improvement;
- a focus on only one or two types of innovation e.g. product development; and
- little focus on Australian research.

This research aimed to overcome these weaknesses by developing an Innovation Capability Assessment instrument that would enable organisations to improve their ability to innovate on a sustained basis. The research has shown that an effective means to develop such an Innovation Capability Assessment instrument is through a predominantly inductive, qualitative research process of literature analysis followed by

exploratory and confirmatory case studies. The resulting instrument has been assessed by the case study organisations involved as being very relevant to their contexts and has already led to positive results in the short-term that otherwise would not have been achieved. Longer-term benefits are also anticipated by each of the participating organisations.

Figure 5.2 reproduces the relationship first proposed in Section 2.2. This time it includes the finalised assessment areas resulting from the case studies. It posits that identification and development of improvement actions in areas of weakness in an organisation’s innovation capability enablers, will lead to an improved innovation capability, which in turn, will lead to improved organisational performance. The results of the research undertaken support the initial link in this proposed relationship for the organisations involved in the case studies.

**Figure 5.2: Finalised constituents of an organisation’s innovation capability and the proposed link with organisational performance**



*Source: author*

## **5.7 Implications for theory**

Authors have criticised the tendency of much of the research into organisational innovation being limited to single-organisational-type studies limiting the ability to generalise across different organisational contexts (Wolfe, 1994). In addition, other researchers have called for innovation theory development based on a ‘multi-dimensional approach’ in order to generate “richer data” for a “better understanding of the combined effects of different contingencies on organisational innovativeness” (Damampour, 1991, p.583).

This research has responded to both these above suggestions by developing a multi-dimensional assessment instrument that benefits from building on the extant literature and by subsequently undertaking inductive research across different organisational contexts.

The research has defined the constituents of an organisation’s innovation capability. Little, if any, qualitative research of this nature, aimed at understanding the enablers of an innovation capability, has previously been undertaken. Indeed, researchers have previously highlighted that no set of characteristics differentiating more from less innovative organisations has emerged (Wolfe, 1994). In addition, no evidence was found during the extensive literature review that any innovation assessment instrument has been developed based on such a rigorous, qualitative process.

The research makes a contribution to the field primarily by developing an Innovation Capability Assessment instrument that was found to be relevant to a variety of organisation types and sizes. The instrument was found to be effective in helping organisations to identify and prioritise areas of weakness, and develop actions for improvement.

In addition, the instrument was developed with eight Australian organisations, hence adding to the limited body of knowledge on innovation in Australia (de Souza, 1989). The overall contribution made to the field by answering each of the research questions is summarised in Table 6.1.



**Table 6.1: Research questions, associated findings and contribution of the findings**

Research question	Finding	Made explicit in extant literature	Made explicit in this research
1. How can an innovation capability assessment instrument be developed	Using a qualitative, primarily inductive process, an assessment instrument was developed.	No; current assessment instruments unsuitable for current research aims.	Yes
2. How applicable is the Innovation Capability Assessment instrument across a variety of organisations?	Shown to be 'very relevant' for case organisations across a number of industries and organisation sizes.	No; focus on manufacturing industries	Yes
3. How useful is the Innovation Capability Assessment instrument in aiding organisational change?	Instrument was found to be very to be 'extremely useful' in aiding improvement.	No	Yes, in the short-term
4. How effective is the process used to deliver the assessment and to develop actions for improvement?	Collaborative, facilitated assessment process found to be 'very effective'.	Not for innovation research; similar processes used in fields other than innovation.	Yes.

*Source: author*

## 5.8 Implications for practice

The Innovation Capability Assessment instrument has provided the case organisations involved in the research a framework against which to assess their ability to innovate. It has allowed these organisations to develop and implement initiatives in areas critical to their innovation capability, which have reportedly already delivered benefits in the short-term. It would be reasonable to assume that the assessment instrument could be of benefit to other organisations, of a variety of types and sizes, for use to improve their innovation capabilities. If it can be shown in further research (see Section 5.10) that improving the innovation capability of an organisation directly or indirectly contributes to improved overall organisational performance, then the Innovation Capability Assessment instrument could be a powerful means of assisting organisations to improve their competitiveness.

The delivery of the Innovation Capability Assessment instrument has also been shown to be of use to organisations as a means to aid in the learning of participants. The use of

an experienced facilitator and a participatory, action research approach is probably of significance during the delivery of the instrument. The cyclical nature of an action research approach allows the participant group to focus on new or more advanced problems as they learn, suggesting that repeated use of the instrument may have cumulative benefit (French, Bell and Zawacki, 1994).

The instrument also is an additional ‘tool’ in the ‘kit’ of practitioners who work with organisations to improve innovation performance. However, as the knowledge about effective innovation performance constantly evolves with further research, the Innovation Capability Assessment instrument will require continual improvement and updating. The author therefore envisages further changes to the instrument over time to keep up with research and practice. For example, currently there has been little research on business model innovation (Hamel, 2002; Mitchell and Coles, 2004) however this may emerge as an area that proves to deliver competitive advantage to organisations and therefore may need greater emphasis in a future version of the assessment framework.

## **5.9 Limitations**

There are several limitations that should be considered when viewing this research. Firstly, there are limitations that relate to the more general limitations of case study research previously discussed in Section 3.11. Primarily, this is that the results for this research have been generated based on the eight case studies involved in the fieldwork. Therefore they are only relevant for these cases and cannot be generalised across a broader population. This limitation has been partially lessened by the finalised assessment instrument initially being based upon an extensive review of the extant literature, which draws upon research into a large array of organisation types and sizes.

Researchers have highlighted the context-sensitive nature of innovation (Wolfe, 1994). This may limit the ability to generalise about successful enablers of organisational innovation. Whilst this research supports that the assessment areas identified were relevant in all cases undertaken irrespective of firm size or industry type, this may not be supported in a study of greater sample size. For example, very large and very small organisations or some industries such as ‘high-technology’ or agricultural organisations were not included in this research.

Additionally, due to time restrictions, the researcher has only been able to show the benefit of the assessment instrument within a short time period and to understand this benefit qualitatively. No attempt has been made at this stage to show any benefit that may translate to overall organisational performance. Whilst this is the ultimate test of the assessment instrument, this kind of benefit may not be realised for some years and, due to the inherently complex nature of organisations, would be difficult to relate back to any one event such as the use of the assessment instrument. Other researchers have highlighted the difficulty in measuring the financial consequences relating to a single innovative act, for example: “the use of a shorter evaluation period may not allow sufficient time for entrepreneurial actions to have their full market and corresponding financial impact” (Zahra and Covin, 1995, p.44).

A poor outcome when using the Innovation Capability Assessment instrument may not imply an organisation is a poor innovator as “even the most oppressive resource and capability limitations can be overcome by innovative leaders and heroic employees” (Duncan, Ginter and Swayne, 1998, p.15). Indeed, in such circumstances, highlighting a large performance gap may inspire a positive reaction, as it has been argued that deliberately creating a gap between ambitions and resources is the most important task of management (Hamel and Prahalad, 1993).

There may also be bias introduced from the fact that all participating organisations became involved in the research due to their desire to improve their own innovation performance. This can be considered a positive aspect for the purposes of the research as previous researchers have highlighted that organisational participants who perceive that there will be little benefit from a study’s findings will be less likely to provide access and information to the investigator (Van de Ven and Rogers, 1988). On the other hand, this might also mean that organisations were more likely to focus on the positive outcomes of the assessment, or that other initiatives occurring within the organisations also positively impacted innovation performance.

Finally, the impact of the Innovation Capability Assessment instrument may be limited by other contingent factors that are difficult for the organisation to control such as the competitive environment in which they operate. Some research, for example, has shown that innovative or entrepreneurial approaches are positively related to organisational performance in more hostile or dynamic environments (Zahra and Covin, 1995).

## **5.10 Further research**

This research was carried out using a primarily inductive, qualitative methodology. Further research adopting a quantitative research approach would be of benefit by allowing the relationship proposed in Figure 5.2 (the impact of improving the constituents of an innovation capability on overall organisation performance) to be tested for statistical generalisability. Other researchers have recommended subsequent statistical testing following inductive theory generation (Perry, 1998).

Longitudinal research could also be undertaken to follow-up the case organisations involved in this research aimed at better understanding the longer-term impacts of using the Innovation Capability Assessment instrument. This could involve endeavouring to quantify any improvement in typical measures of innovation output such as intellectual property generation, new product revenues and productivity gains.

Further research could use the Innovation Capability Assessment instrument in combination with multi-variate analysis approaches aimed at testing relationships between the applicability of the instrument and various other contingent variables such as the organisation's environment and strategy.

Finally, the process undertaken to develop the Innovation Capability Assessment instrument could be adopted by other researchers to develop assessment instruments aimed at improving other organisational capabilities. For example, Day (1994) adopted a similar approach for the improvement of the market-oriented capabilities of organisations.

## **5.11 Chapter Summary**

The ability to innovate on a sustained basis is a capability of great importance in an increasingly dynamic and globalised competitive environment. An instrument that may assist organisations to improve their ability to innovate therefore would be of great use to these organisations. This research set out to explore how an Innovation Capability Assessment instrument could be developed by adopting a qualitative, case-based methodology that built on the extant literature. A primary outcome of the research is the Innovation Capability Assessment instrument, which defines the constituents of an organisation's innovation capability and thereby addresses gaps identified in the extant literature.

This instrument has been shown, within the context of the case organisations involved in the research, to be ‘very relevant’ to a variety of organisation types and sizes. In addition, it has shown to be at least ‘very useful’ for all organisations in identifying and prioritising weaknesses, and developing actions for improving an innovation capability.

Implications for theory were discussed and include the definition of a set of innovation performance enablers that were found to be applicable across a range of organisations. Implications for practice include the development of a ‘tool’ that can be used by a range of organisations to aid in facilitating improvement.

Many organisations are beginning to accept that there is truth in Peter Drucker’s (1995, p.65) claim that “every organisation - not just businesses - needs one core competence: innovation. And every organisation needs a way to record and appraise its innovative performance”. If this indeed is true, then the Innovation Capability Assessment instrument may be an important tool for organisations striving to achieve sustainability in today’s ‘hyper-competitive’ environment.

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## **Appendices**

## Appendix 1 - Convergent interview guide

The following was the interview guide adopted for all convergent interviews carried out during the exploratory case studies in the fieldwork.

**Figure A.1: Convergent interview guide**

Questions
<p>1. Tell me about of your involvement in organisational innovation.</p> <p><i>Probe questions:</i></p> <ul style="list-style-type: none"><li>a. Different types of innovation – product, process, business model, administrative</li><li>b. Different degrees of innovation – incremental and radical</li></ul>
<p>2. From your experience, what elements of an organisation need to be present in order for innovation to occur and be successful?</p>
<p>3. From your experience, what elements of an organisation tend to prevent innovation from successfully occurring?</p>
<p>4. How do innovation enablers differ across different organisations?</p> <p><i>Probe questions:</i></p> <ul style="list-style-type: none"><li>a. Financial services, manufacturing, technology</li><li>b. Small/large</li></ul>
<p>5. Have you ever been involved in any attempts to assess the innovation ability or capability of an organisation?</p> <p><i>Probe questions:</i></p> <ul style="list-style-type: none"><li>a. What were the outcomes?</li><li>b. Did it result in any action or (sustained) change?</li><li>c. How was such an assessment carried out?</li></ul>

*Source: author*

## Appendix 2 - Action research diary (excerpt)

The following is an excerpt from the action research diary used by the researcher throughout the duration of the research.

**Figure A.2: Excerpt from the Action Research Diary**

Entry Date	Observe and Reflect	Plan and Act
<b>Sept 12, 2002</b>	<ul style="list-style-type: none"> <li>- How do I differentiate between product development and other types of innovation in the framework?</li> <li>- Is the NPD process actually a subset of an ‘innovation process’?</li> <li>- What is the unit of analysis for this research? Is it the organisation? If so, an assessment framework should include those factors that the organisation can influence or be influenced by e.g. its structure, culture, people etc</li> <li>- Is optimization (e.g. 6Sigma, TQM) innovation? Need to consider this during the initial exploratory cases to see how to incorporate this.</li> </ul>	<p>Mind Mapped Framework Areas: Major Areas include: Strategy &amp; Planning (Portfolio Mgt, Strategy Dev, Communication), Environment (Org Structure, People, Culture), Financial Mgt (Funding, Measurement), Intellectual Capital, NPD Process (Idea Mgt, Market Interface, Proj Mgt)</p> <ul style="list-style-type: none"> <li>- see July 23, 2003 re innovation process and product development</li> <li>- removed change mgt as this research focus is on the organisation and therefore evolution (species) and creative destruction (industries) aren’t relevant.</li> <li>- see June 28, 2003 entry re optimization &amp; process innovation</li> <li>- removed external influences as they are beyond the control/influence of the organisation</li> </ul>
<b>Oct 10, 2002</b>	<ul style="list-style-type: none"> <li>- Need to think about the questions to be asking participants to respond to under each assessment area. Maybe three questions:               <ol style="list-style-type: none"> <li>1. Does your organisation do this? (Existence)</li> <li>2. How effectively? (Performance)</li> <li>3. How important is it to your organisation? (Importance)</li> </ol> </li> </ul>	<ul style="list-style-type: none"> <li>- see Feb 25, 2003 for question format action</li> </ul>
<b>Nov 9, 2002</b>	<ul style="list-style-type: none"> <li>-The management of radical innovation is highlighted as very important and perhaps distinct from more incremental e.g. are radical innovation teams managed differently?</li> <li>- Am I only (or mostly) dealing with product development? Or does this need to be an ‘innovation process’</li> <li>- The ‘environment’ section is actually the organisation’s ‘internal environment’ as opposed to the external environment that needs to be included in market-interface.</li> </ul>	<p>Mind Mapped Framework Areas: Major Areas include: Strategy (Portfolio Mgt, Strategy Dev, Communication, Corp Venturing), Internal Environment (Org Structure, People, Culture), Intellectual Capital, Financial &amp; Measures (Process, Project, Funding, R&amp;D tax), Inn Process (Ideation, Market interface, Proj mgt)</p> <ul style="list-style-type: none"> <li>- see July 23, 2003 re innovation process and product development</li> <li>- see Radical Innovation mgt under May 21</li> </ul>

Source: author

### **Appendix 3 - Case study research report format**

The following format was used for all reports created at the completion of each case study and given to the case study organisations for review and agreement.

**Figure A.3: Case study research report format**

1.	Executive summary
2.	ICA Results – Strategic Management
3.	ICA Results – Internal Environment
4.	ICA Results – Innovation Competencies
5.	Action plan
Appendix A.	Scope and Methodology
Appendix B.	Other Results
Appendix C.	Modifications to Assessment Instrument

*Source: author*

## Appendix 4 - Case study introductory interview guide

The following interview guide was used at the commencement of each of the case studies in order to capture key characteristics of each of the case study organisations.

**Figure A.4: Case study introductory interview guide**

Questions
1. What measure(s) of success is your organisation driven by and over what time frame? e.g. share price, profit, short-term, turnover, sales growth, market share etc
2. How would you describe your organisation's current strategic objectives? e.g. cost-based, product differentiation, niche, growth-based, survival etc.
3. What does your organisation produce to generate its wealth?
4. Do you currently use any method of assessing your organisation's ability to manage innovation?
5. What is the current budget/level of investment for innovation (PD + R&D+ associated marketing etc)?
6. To what extent does the organisation aim for the output of your innovation efforts to favour incremental versus radical innovation?
7. How many staff/employees does the organisation have?
8. How would you describe the organisational structure? e.g. functional, business units, hierarchical etc
9. Previous years annual revenue?
10. Current year's target revenue?
11. How would you describe the market characteristics? e.g. growing, stagnating, dynamic, static
12. Does the organisation have corporate, innovation (NPD), marketing, R&D/technology and intellectual property strategy statements, objectives policies and procedures or guidelines?
13. Are there any innovation-related strategic goals?
14. Is there an innovation champion within in the organisation or an innovation steering group?
15. How many innovation projects are currently in progress?
16. What value do new products/services contribute to total sales revenue?
17. What is the value of R&D invested and as a percentage of total sales revenue?
18. What IP and how much/what value is currently held/generated?

*Source: author*

## Appendix 5 - Preliminary Innovation Capability Assessment instrument

The following presents an overview of the preliminary Innovation Capability Assessment instrument based on the theoretical framework derived from the extant literature. This instrument underwent development and modification as a result of the exploratory case studies. The finalised instrument is included in Appendix 6.

**Figure A.5: Preliminary Innovation Capability Assessment instrument**

Assessment questions	Probe questions content
<b>Key Assessment Area: Strategic management of innovation</b>	
1. How effective is the current innovation strategy at guiding innovation activities?	Content e.g. technology, IP, product, process etc Timing e.g. first to market etc
2. How effective is the alignment of the Innovation Strategy with corporate strategy and other related strategies?	Strategic alignment
3. How effective are the innovation strategic objectives in guiding innovation activities?	Defined, measurable, strategic objectives
4. How effective is the communication of the innovation strategy and objectives throughout the organisation?	Strategic awareness
5. How effective is the development of possible future scenarios and their integration into the innovation process?	Scenario planing Foresight and Futures
6. How effective is the management of the portfolio of innovation projects?	Portfolio management
7. How effective is the use of innovation critical success factors (“CSFs”)?	Definition of the enablers of strategic objectives
8. How would you rate the effectiveness of the tracking and reporting of KPIs for innovation performance?	Definition of strategic performance measures
<b>Key Assessment Area: Internal Environment</b>	
9. How effective is the leadership of innovation throughout the organisation?	Leadership, senior management support
10. How effective is innovation-related communication in the organisation?	Awareness of innovation initiatives, results
11. How effective is the management of both successful and unsuccessful innovation outcomes?	Failure tolerance
12. How effective are learning and knowledge management initiatives in supporting innovation?	Organisational Learning Knowledge Management
13. How effective are reward and recognition initiatives in supporting innovation?	Reward and recognition, extrinsic and intrinsic motivators

Source: author

**Figure A.5 (cont.): Preliminary Innovation Capability Assessment instrument**

Assessment questions	Probe questions content
14. How effective is the use of enabling technology in supporting innovation?	Systems support Software support
15. How effective is the organisational structure in supporting innovation?	Team-based Inter-functional relationships Reporting lines Hierarchy
16. How effective are recruitment and retention practices in supporting the innovation process?	Recruitment and retention
17. How effective are practices governing the degree of autonomy staff have in carrying out innovation-related activities?	Autonomy and Empowerment
18. How effective are training initiatives in supporting innovation-related activities?	Training in creativity, project management, scenarios etc.
<b>Key Assessment Area: Innovation Competencies</b>	
19. How effective is market research in collecting research on consumers, competitors, industry trends etc required for the innovation process?	Market trends, environmental scanning, competitor analysis
20. How effective is the integration of marketing activities and market research into the innovation process?	Use of marketing information
21. How effective is the integration of customers and suppliers into the innovation process?	Customer and supplier integration
22. How effective is the balance between “market pull” and “technological push” maintained?	Managed input of marketing and technology functions
23. How effective is the generation of ideas for innovation projects conducted?	Creativity Idea generation
24. How effective is the process for idea collection?	Idea collection and evaluation
25. How well are collected ideas enhanced upon to ensure their full value is leveraged?	Idea sharing and enhancement
26. How effective are processes for the evaluation and approval of ideas?	Idea evaluation and approval Assessment criteria
27. How effective is the management of Intellectual Property in the organisation?	IP strategy IP capture, protection, leveraging, exploitation
28. How effective is the process for the determination and distribution of innovation funding internally?	Funding & budgeting Seed funding
29. How effective is business case development for the purposes of innovation project assessment and approval?	Financial valuation e.g. net present value, options theory. Business case ‘gate’
30. How effective is the use of a staged process for the development of ideas through to new products/services?	Product development Stage-gate processes

Source: author

**Figure A.5 (cont.): Preliminary Innovation Capability Assessment instrument**

Assessment questions	Probe questions content
31. How effective is the approach taken to the management of the innovation team?	Cross-functional teams
32. How effective is the management of risk throughout the life of innovation projects?	Risk Management 'Front-loading'
33. How effective is innovation project costs managed?	Cost, budget and project management
34. How effective is the management of regulatory compliance aspects of the innovation process?	Regulatory compliance, advertising material, contents, legality etc
35. How effective is prototyping and field-testing/trialing?	Prototyping Field-testing, fast-failing
36. How effective is the management of product launches for new products?	Launch 'gate' Integration of pre/post function Launch strategy
37. How well is the handover of newly developed products managed?	Operations involvement PD team involvement

*Source: author*



## Appendix 6 - Final Innovation Capability Assessment instrument

The following figure presents an overview of the questions from the finalised Innovation Capability Assessment instrument along with the key content themes of the probe questions. The full detail of the instrument, including the probe questions, is the property of KPMG and cannot be included without the need to embargo the thesis. A more detailed excerpt is included in the following appendix. A complete version of the instrument can be made available subject to the signing of relevant non-disclosure agreements.

**Figure A.6: Final Innovation Capability Assessment instrument**

Assessment questions	Probe questions content
<b>Key Assessment Area: Strategic management of innovation</b>	
1. How effective is the current strategy at guiding innovation activities?	<ul style="list-style-type: none"> <li>• Strategic approach e.g. technology, IP, product, process etc</li> <li>• Timing e.g. first to market, fast follower</li> <li>• Strategic alignment</li> <li>• Strategic objectives</li> </ul>
2. How effective is the tracking and reporting of innovation performance measures?	<ul style="list-style-type: none"> <li>• Strategic measures</li> <li>• Critical success factors</li> </ul>
3. How effective is the development and use of possible future scenarios for innovation activities?	<ul style="list-style-type: none"> <li>• Scenario planing</li> <li>• Foresight and Futures</li> </ul>
4. How effective is the management of core competencies and their use for innovation?	<ul style="list-style-type: none"> <li>• Understanding, developing, exploiting, stretching organisation's core competencies</li> </ul>
5. How effective is the process for determination and distribution of funding of innovation initiatives?	<ul style="list-style-type: none"> <li>• Funding &amp; budgeting</li> <li>• Seed funding, Fast-tracking/failure</li> </ul>
6. How effective is the management of the portfolio of innovation initiatives?	<ul style="list-style-type: none"> <li>• Portfolio management</li> <li>• Valuation methods</li> </ul>
7. How effective is the use of external networks and alliances in supporting innovation activities?	<ul style="list-style-type: none"> <li>• Joint ventures and strategic alliances</li> <li>• 'Open' innovation, networks</li> <li>• 'M&amp;A'</li> <li>• 'Absorptive capacity'</li> </ul>
<b>Key Assessment Area: Internal Environment</b>	
8. How effective is the organisation's culture in supporting and encouraging innovation?	<ul style="list-style-type: none"> <li>• Failure tolerance, Risk-taking, Controlled experimentation</li> <li>• Support for new ideas</li> </ul>
9. How effective is the leadership of innovation throughout the organisation?	<ul style="list-style-type: none"> <li>• Leadership, champions</li> <li>• Senior management support</li> </ul>

Source: author

**Figure A.6 (cont.): Final Innovation Capability Assessment instrument**

Assessment questions	Probe questions content
10. How effective are learning and knowledge management initiatives in supporting innovation?	<ul style="list-style-type: none"> <li>• Organisational Learning, Single and double-loop</li> <li>• Knowledge Management</li> <li>• Training</li> </ul>
11. How effective are reward and recognition initiatives in supporting innovation?	<ul style="list-style-type: none"> <li>• Reward and recognitions initiatives</li> <li>• Individual performance measurement</li> <li>• Extrinsic and intrinsic motivators</li> </ul>
12. How effective is the use of enabling technology in supporting innovation?	<ul style="list-style-type: none"> <li>• Systems and software support</li> <li>• Shortening innovation cycles</li> <li>• Customer integration</li> </ul>
13. How effective is the organisational structure in supporting innovation?	<ul style="list-style-type: none"> <li>• Cross-functional teams, Self-managed teams</li> <li>• Organic vs. Mechanistic, Flat vs. Hierarchical</li> </ul>
14. How effective are people management practices in supporting innovation?	<ul style="list-style-type: none"> <li>• Recruitment and retention</li> <li>• Training</li> <li>• Reward and recognition, Incentive mechanisms</li> <li>• Autonomy and Empowerment</li> <li>• Intrapreneurship</li> </ul>
<b>Key Assessment Area: Innovation Competencies</b>	
15. How effective is the management of the market interface in supporting innovation activities?	<ul style="list-style-type: none"> <li>• Market trends, Environmental scanning</li> <li>• Customer and supplier integration</li> <li>• Innovator adopter types</li> <li>• Customer needs analysis, Competitor analysis</li> <li>• ‘Market orientation’</li> </ul>
16. How effective is the management of R&D, technology and technical information in supporting innovation?	<ul style="list-style-type: none"> <li>• R&amp;D and Technology strategy</li> <li>• Technology scanning, acquisition and transfer, R&amp;D management</li> </ul>
17. How effective is management of ideas for innovation initiatives?	<ul style="list-style-type: none"> <li>• Creativity techniques, group and individual creativity</li> <li>• Idea generation, collection and evaluation</li> <li>• ‘Front-end’ management</li> </ul>
18. How effective is the management of intellectual property?	<ul style="list-style-type: none"> <li>• IP strategy, IP systems and processes,</li> <li>• IP capture, protection, leveraging, exploitation</li> </ul>
19. How effective is the management of the commercialisation process?	<ul style="list-style-type: none"> <li>• Product development, Stage-gate processes, Risk Management, Service development, Innovation processes</li> <li>• Corporate venturing</li> </ul>

Source: author

**Figure A.6 (cont.): Final Innovation Capability Assessment instrument**

Assessment questions	Probe questions content
20. How effective is the management of process innovation?	<ul style="list-style-type: none"><li>• Innovation along internal processes,</li><li>• Process innovation techniques e.g. TQM, reengineering, kaizen etc, Technology integration</li></ul>
21. How effective is the management of radical innovation?	<ul style="list-style-type: none"><li>• Aggressive technology/ R&amp;D strategy</li><li>• Long pay-back periods</li><li>• Alternative organisational structures</li><li>• Iterative processes</li></ul>

*Source: author*

## Appendix 7 - Final Innovation Capability Assessment instrument (detailed excerpt)

The following is an excerpt from the Innovation Capability Assessment instrument provided to demonstrate how the instrument was delivered to workshop participants during each of the case study organisations. The particular question presented below is on the use of performance indicators to track progress against innovation strategic objectives. Like all questions, it consists of a concept introduction page and a probe question page. Participants were asked to answer bolded question at the top of the second page and inform their answers by consideration of the probe questions. Probe questions were initially developed from the literature and, like the whole instrument itself, underwent modification during the exploratory cases.

**Figure A.7: Excerpt from the Innovation Capability Assessment instrument: Concept introduction page from question 2**

### 2. Innovation Performance Measures

*Concept Introduction:*

- The strategic management of innovation can include tracking key factors that enable effective innovation performance. Such measures may include:
  - *Lagging* (often financial) e.g. created value, new sales ratio, R&D/ turnover ratio, ROI, customer satisfaction, IP revenue, degree of innovation, new brand awareness etc.
  - *Real-time* (often process related) e.g. innovation spend, innovation spend:sales ratio, internal failure rate, no. of killed projects, no. of patents pending, staff participation etc.
  - *Leading* (often climate related) e.g. number of ideas, idea pipeline, idea sources, idea response rates, staff motivation, meeting of strategic objectives etc.
  - *Learning* (often improvement related) e.g. % post-completion reviews, % use of cross-functional teams, (reduction in) cycle time, training, (reduction in) break even time etc.
- Measures should be derived from key factors defined as critical to the success of innovation. These might include:
  - the timely identification of opportunities, the ability to respond quickly to market opportunities/ competitive threats, meeting customer requirements on price and performance, senior management commitment and leadership, a supportive culture etc

*Source: author*

**Figure A.8: Excerpt from the Innovation Capability Assessment instrument: Assessment and probe question page from question 2**

## **2. Innovation Performance Measures**

**How effective is the tracking and reporting of innovation performance measures?**

*Probe questions:*

- Are factors defined as critical to the success of innovation used to determine what performance indicators should be tracked? e.g.
  - timely identification of opportunities
  - ability to respond quickly to market opportunities or competitive threats
  - meeting consumer/customer requirements on price and performance
  - senior management commitment and effective leadership and management
  - a culture that fosters creativity and innovation
- Are all types of innovation measured? e.g. product, process, incremental, radical, organisational, technical etc.
- Is there a mix of lagging, real-time, leading and learning measures adopted?
- Are innovation KPIs reported on through to senior management at both a project and a portfolio level?
- Are there systems to support the tracking and reporting of innovation KPIs?

*Source: author*

## Appendix 8 - Case study evaluation instrument

The following is the case study evaluation instrument used to help determine the effectiveness of the finalised Innovation Capability Assessment instrument and the delivery process.

**Figure A.9: Case study evaluation instrument**

**Organisation name:** \_\_\_\_\_

**Date:** \_\_\_\_\_

**Participant name (optional):** \_\_\_\_\_

Instructions for completion: please select the answer that best applies for each of the 12 questions below. Please add any comments where appropriate.

**a. How relevant was the assessment tool to your organisation?**

Not at all	Less than Satisfactory	Satisfactory	Very	Extremely

Comments: \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

**b. How relevant was the 'strategic management of innovation' area of the assessment tool in assessing your organisation's innovation capability?**

Not at all	Less than Satisfactory	Satisfactory	Very	Extremely

Comments: \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

**c. How relevant was the 'internal environment' area of the assessment tool in assessing your organisation's innovation capability?**

Not at all	Less than Satisfactory	Satisfactory	Very	Extremely

Comments: \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

**Figure A.9 (cont.): Case study evaluation instrument**

- d. How relevant was the ‘innovation competencies’ area of the assessment tool in assessing your organisation’s innovation capability?**

Not at all	Less than Satisfactory	Satisfactory	Very	Extremely

Comments: \_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_

- e. How useful were the assessment results in identifying areas requiring improvement?**

Not at all	Less than Satisfactory	Satisfactory	Very	Extremely

Comments: \_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_

- f. How useful were the assessment results in prioritising areas requiring improvement?**

Not at all	Less than Satisfactory	Satisfactory	Very	Extremely

Comments: \_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_

- g. How useful were the assessment results in developing actions?**

Not at all	Less than Satisfactory	Satisfactory	Very	Extremely

Comments: \_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_

- h. How effective was the use of workshops in promoting a participative approach to assessment and action development?**

Not at all	Less than Satisfactory	Satisfactory	Very	Extremely

Not at all	Less than Satisfactory	Satisfactory	Very	Extremely

Comments: \_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_

**Figure A.9 (cont.): Case study evaluation instrument**

- i. **How effective was the use of collaborative voting technology in promoting a participative approach to assessment and action development?**

Not at all	Less than Satisfactory	Satisfactory	Very	Extremely

Comments: \_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_

- j. **How effective was the involvement of multiple stakeholders in promoting a participative approach to assessment and action development?**

Not at all	Less than Satisfactory	Satisfactory	Very	Extremely

Comments: \_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_

- k. **How effective was the use of an external facilitator to assist in the assessment and action development?**

Not at all	Less than Satisfactory	Satisfactory	Very	Extremely

Comments: \_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_

- l. **How effective do you expect the actions developed to be in aiding the improvement of your organisation's innovation capability?**

Not at all	Less than Satisfactory	Satisfactory	Very	Extremely

Comments: \_\_\_\_\_  
 \_\_\_\_\_



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*Source: author*

## Appendix 9 - Informed consent form

The following is the form of disclosure and informed consent used for each participant of the case study research.

**Figure A.10: Participant consent form**

<p style="text-align: center;">SWINBURNE UNIVERSITY OF TECHNOLOGY</p> <p style="text-align: center;">HUMAN RESEARCH ETHICS COMMITTEE</p> <p style="text-align: center;">FORM OF DISCLOSURE AND INFORMED CONSENT</p> <hr/>
<p>PROJECT TITLE</p> <p>The development of an Innovation Capability Assessment instrument</p>
<p>INVESTIGATORS</p> <p>Michael Ottaviano is conducting this research as part of the requirements of the Doctorate of Business Administration at the Australian Graduate School of Entrepreneurship at Swinburne University of Technology.</p> <p>Professor Angele Cavaye, Director – DBA Program, is the principal supervisor and Professor Adolph Hanich, Director AGSE, is the second supervisor.</p>
<p>EXPLANATION OF PROJECT</p> <p>The purpose of the investigation is the development and application of a tool to assess an organisation’s Innovation Capability with the aim of improving this capability. This involves delivering an assessment instrument via interviews and facilitated workshops. Typically this process spans about 10-15 hours in total over a 2-week period. In addition pre-delivery and post-delivery interviews (approximately 2-3 months after the final workshop/interview) are requested.</p>

## **Figure A.10 (cont.): Participant consent form**

### EXPECTED BENEFITS

It is expected that the application of the assessment tool will facilitate the improvement in the ability of the organisation to innovate. Direct outcomes are hoped to include the development and execution of specific actions that allow improvement of the organisation's innovation capability.

Participation in this research is voluntary. Both the organisation and/or any individual involved as a participant in the research may withdraw consent and to discontinue participation in the study at any time.

Any questions regarding the project entitled "The development of an Innovation Capability Assessment tool" can be directed to the Senior Investigator, Angele Cavaye, Director DBA program, Australian Graduate School of Entrepreneurship, on telephone number (03) 9214 8462.

### PRIVACY PROTECTION

Only the principal investigator will have access to any data collected. Data may be used in a non-attributable manner (de-identified) for the purposes of publication. If confidentiality is required to be broken, this may only be done by the Principal Investigator after consultation with the Participant in writing.

### COMPLAINT PROCEDURE

The participant can lodge a complaint about the way he/she has been treated during the study, or a query that the Senior Investigator has been unable to satisfy. This can be done by contacting the either Head of the Australian Graduate School of Entrepreneurship or the Human Research Ethics Committee as below:

Adolph Hanich, Australian Graduate School of Entrepreneurship, Swinburne University of Technology, P O Box 218, HAWTHORN. VIC. 3122, Phone: (03) 9214 8462; or

The Chair, Human Research Ethics Committee, Swinburne University of Technology, PO Box 218, HAWTHORN. VIC. 3122, Phone: (03) 9214 5223

**Figure A.10 (cont.): Participant consent form**

AGREEMENT

I ..... have read (or, as appropriate, have had read to me) and understood the information above. Any questions I have asked have been answered to my satisfaction.

I agree to participate in this activity, realising that I may withdraw at any time.

I agree that research data collected for the study may be published or provided to other researchers on the condition that anonymity is preserved and that I cannot be identified.

NAME OF PARTICIPANT.....

POSITION OF PARTICIPANT.....

SIGNATURE..... DATE.....

NAME OF PRINCIPAL INVESTIGATOR.....

SIGNATURE..... DATE.....

*Source: author*

## **Appendix 10 – Within case data analysis**

The following sections outline the findings for each of the eight case studies conducted during the research. Whilst the results of all case studies are discussed below, for reasons of succinctness, the gap analysis data displays resulting from the assessment workshops are included only for Case 1. A full set of results for all case studies can be made available subject to the appropriate non-disclosure agreements.

### **10.1 Exploratory cases**

The findings for the five exploratory cases are discussed below. They each discuss the:

- data collection process undertaken; typically interviews, followed by assessment workshops, action planning workshops and final interviews or assessments;
- assessment results;
- action planning results; and
- resultant development and modification of the Innovation Capability Assessment instrument.

#### **10.1.1 Case 1**

**Brief organisation overview.** Case 1 was a national consumer goods manufacturer based in Melbourne, Australia. Employing approximately 2,000 people and turning over \$1.2 billion in 2003, they were the largest organisation included in this study.

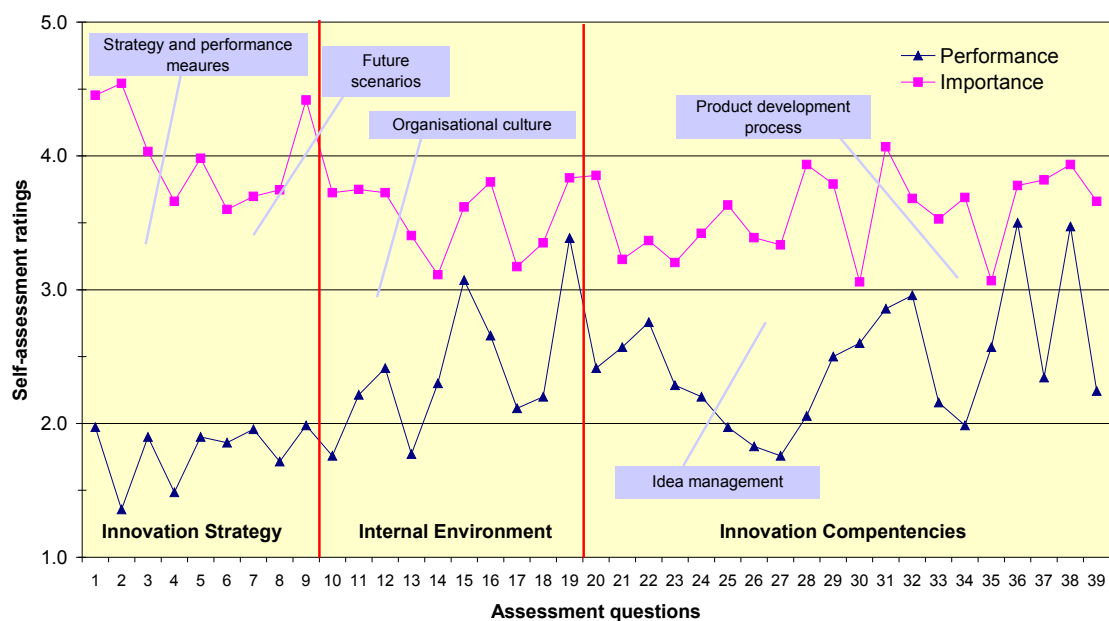
**Data collection.** Initially interviews were held with five members of senior management (operations, sales, innovation and marketing, R&D and supply chain) as identified by the case study sponsor. As discussed in Chapter Three, these interviews were convergent in nature, following the interview guide (see Appendix 1), beginning as broadly as possible on the subject of innovation in order to determine the completeness and the applicability of the framework within this organisation.

Three assessment workshops were then held with different groups representing key functions as selected by the case study sponsor. Conducting each workshop separately

made it possible to compare the views of each, informing subsequent discussion and action development. The three groups represented in the workshops were marketing and sales, technology and product development, and operations.

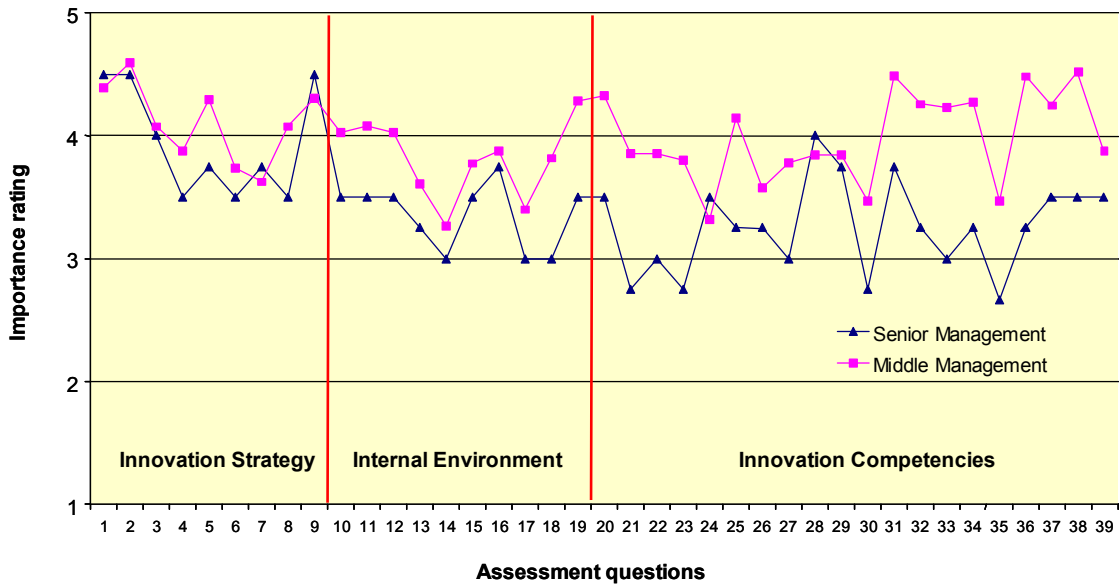
**Assessment results.** The results from the interviews and workshops were compiled by the researcher and presented back to the key stakeholders from within the organisation responsible for actioning improvements in the innovation-related areas (in this case, the general manager responsible and several of his team) at a final action planning workshop. These results included a ‘gap analysis’, displaying the gap between performance and importance scores against each question for each of the three functional workshops and an overall average score gap analysis (see Figure A.11). Other data displays were used to clearly communicate results including gap analysis result comparisons between senior and middle management (see Figure A.12) and between functional groups, radar graphs for each of the three key assessment areas – innovation strategy (see Figure A.13), internal environment and innovation competencies – as well as field notes recorded by the researcher during interviews and workshops in the form of data displays against each question (see Figure A.14).

**Figure A.11: Gap analysis results for Case 1 organisation highlighting areas of perceived weakness**



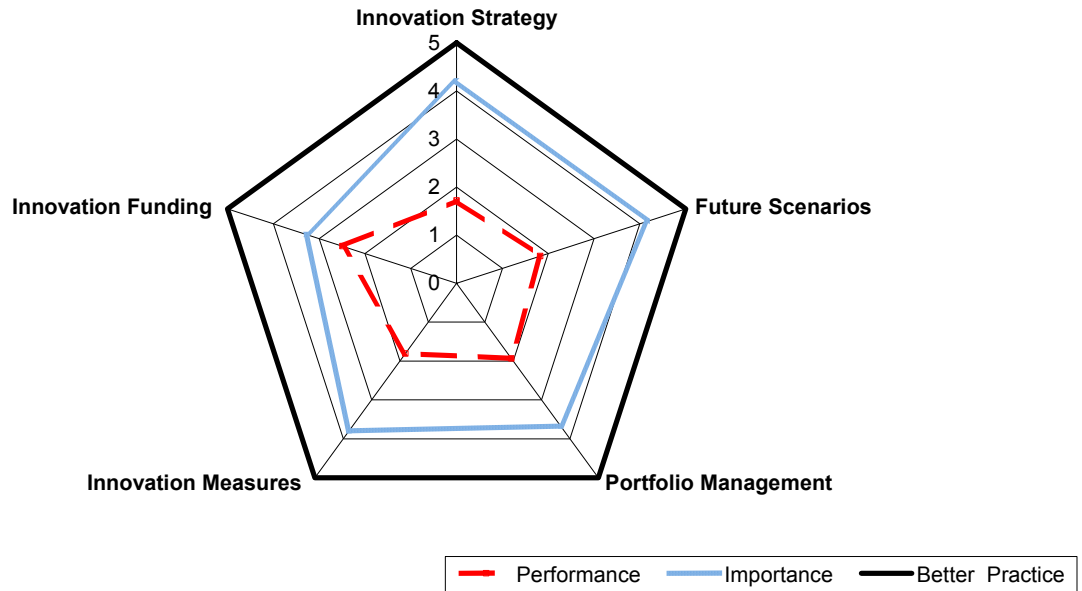
Source: author

**Figure A.12: Gap analysis results for Case 1 organisation comparing senior and middle management perceived importance results**



Source: author

**Figure A.13: Radar data display for Case 1 organisation highlighting results for the strategic management assessment area**



Source: author

**Figure A.14: Qualitative data display for Case 1 organisation highlighting an excerpt of comments and results for the internal environment assessment area**

Internal Environment	Senior management	Marketing & Sales	R&D & Technology	Operations
<b>Leadership</b>	Good vocal support Steering committee to coordinate organisational mgt	Very good within marketing dept. Not good across organisation	Good at within tech dept. Not good across organisation	Little emphasis placed on innovation by senior management
<b>Communication</b>	Probably ok at management level but could be better to staff	Ok. "We generally initiate things, so we know more about it than others"	Again good within dept but probably less so between depts	Little communicated to operations on innovation. "Often the last to know"
<b>Outcome management</b>	"Staff know that if they do everything right and it doesn't work out, that there won't be any redress"	Should be greater recognition that some failures are inevitable	There is an understanding that failures will occur	Failures seem to happen more often than they should and its us that has to fix them up
<b>Knowledge Management and Learning</b>	Newsletters E-learning available Little analysis of projects	Field of Study Practices Very little between depts	Newsletters Little inter-dept communication	Sharing is done via newsletters rather than face-to-face.
<b>Reward and Recognition</b>	Recognition via personal thanks	No formal recognition or reward mechanisms	Nothing specific to encourage innovation efforts	"R&R is important as innovation often involves going beyond the call of duty"
<b>Enabling technology</b>	New systems allow for greater flexibility in products and processes	Good market research technology	Debate about whether a PD proj mgt system would be of benefit	"We focus on integrating new technologies into our processes"
<b>Organisational structure</b>	Recent restructure created a clear reporting line.	Combining marketing and technology reporting lines should aid interfunctional relationships	Combining marketing and technology reporting lines should aid interfunctional relationships	Involved in PD teams throughout the development and implementation.
<b>People Management</b>	Training is provided for all innovation and technology departments	Recent training has been useful. Some doubts about the amount of time made available	"Our success depends on our people". Good training and a fair degree of autonomy allowed.	Few initiatives aimed specifically at operations personnel

Source: author



Weaknesses identified from the assessment workshops and interviews centred around the lack of a clearly articulated strategic approach to innovation and effective strategic measures of innovation performance, the lack of a common understanding of what future scenarios may be relevant and no process to elicit and manage innovation ideas from staff.

Relative strengths were also identified and discussed. These included the management and presence of sufficient funding for innovation initiatives, recent restructuring to give innovation a more direct reporting line to senior management and the use of enabling technology.

**Action planning results.** The results were presented back to a cross-section of senior and middle management for reflection and to spur discussion and debate during an action-planning workshop. Various scenarios and example actions were discussed prior to a final list of improvement actions being developed. The actions developed as a result of the assessment focused on those areas of greatest priority. Key actions included:

- the clarification of the organisation's strategic approach to innovation;
- developing innovation-related performance measures in order to determine if progress was being made strategically;
- adopting a portfolio management approach to all innovation initiatives across the organisation;
- greater adherence to the existing product development process;
- improving their ability to understand where markets, competitors and technologies might be heading in the future;
- leadership and reward and recognition initiatives for innovation; and
- improved clarity at the 'front-end' of the innovation process by means of an idea management sub-process that would allow for the generation, collection, sharing and evaluation of ideas from staff.

The determination as to whether the delivery of the assessment instrument was successful was judged in several ways. Firstly, if the intervention led to the creation of an action plan as intended, then this was already a positive result. A follow-up interview was also conducted with EGM Innovation and Marketing some six months after the case study to determine whether there were lasting, positive changes as a result of the assessment. In this case, the EGM still felt that the assessment process had been very valuable, the assessment instrument relevant to their organisation, and that they were making satisfactory progress with the implementation of the developed actions.

**Development of the assessment instrument.** Throughout the case study and at its conclusion, the researcher critically reflected upon the results of the interviews and workshops to determine what changes would be required to improve the assessment tool. This exploratory case study began with the preliminary Innovation Capability Assessment instrument derived from the literature. As a result of the convergent interviews and the assessment and action planning workshops, the researcher identified numerous examples of minor changes required including the use of overly academic language and formatting errors. These were modified as they were discovered. Three more significant changes however were identified as a result of the case study:

- The interviews highlighted the importance of R&D and technology management. This wasn't anticipated and there was no section of the theoretical instrument that dealt specifically with technology or R&D management. It became clear, however, from all interviewees that this was a key determinant in how successful innovation efforts would be within Case 1. For this reason, after a review of the literature confirmed its importance, a 'technology management' assessment area was added to the instrument as an additional competency. Probe questions were developed and informed by the relevant literature;
- A question relating to regulatory compliance of new products was added as it became apparent that this would be an issue for any organisation launching new products into the market place; and
- Finally, it was determined that matters relating to the funding of innovation initiatives, were in fact generally seen to be of strategic importance and hence

this question was moved from the innovation competencies section to the innovation strategy area of the instrument.

There were other potential required changes that were highlighted during this, and indeed all case studies, but, due to a lack of overwhelming evidence, either from the empirical data or from the literature, these changes were not made at this time. Such examples from Case 1 include the management of process innovations, radical innovation management and the use of strategic alliances. These were recorded in the researcher's Action Research Diary to allow for critical reflection, and where appropriate, included in the instrument at a later stage when supported by sufficient evidence.

### **10.1.2 Case 2**

**Brief organisation overview.** The second of the exploratory case studies was carried out at a Victorian based financial services organisation (Case 2) with operations throughout Australia. Employing 810 people and with \$17.3 billion funds under management in the 2003 financial year, Case 2 allowed some understanding of the suitability of the instrument within a (financial) service environment.

**Data collection.** As with the first exploratory study, convergent interviews were initially held with a number of the senior management (CFO, sales and marketing, strategy and operations), again in order to determine the completeness and the applicability of the framework to the organisation. The same procedure was followed then as for the first case study with two assessment workshops then held with different functional groups. The two workshops conducted included operations and product development, and compliance and legal functions. The case study sponsor selected these as the comparison of results between these two groups was expected to provide additional insights.

**Assessment results.** For Case 2, strengths included the organisational culture, the use of enabling technology, sufficient funding available for innovation initiatives and a supportive organisational structure. Weaknesses included not having strategic measures relating to innovation, an absence of a strategic portfolio that included all significant

new product initiatives, and areas relating to the management of the market interface including clear definition of customers and market segments.

**Action Planning results.** The results of the assessments were presented back to a final workshop of key stakeholders and again these included both the data collected in the form of gap analyses and radar graphs, as well as direct comments recorded during the interviews and workshops and the researcher's own reflections. The actions developed as a result of the second exploratory study assessment again included the developing of greater clarity around the strategic management of innovation and the development of strategically aligned, innovation performance measures. In addition, it was determined that the existing innovation process required clarification and potentially simplification as well as the addition of a 'front-end' as a means to generate and evaluate ideas from staff.

**Development of the assessment instrument.** As for the first exploratory study, the convergent interviews and the assessment and action planning workshops, led to a number of additions and changes to the Innovation Capability Assessment instrument. Some of these involved amalgamating questions dealing with similar areas. Two of the more significant changes involved:

- the addition of an 'Alliances and Networks management' assessment area that included the use of external resources and competencies to complement those existing internally for more effective or 'open' innovation (Chesbrough, 2003); and
- the addition of a 'Radical Innovation management' competency assessment area dealing specifically with the characteristics particular to the management of radical or disruptive innovations, such as longer-term strategies, larger and alternative resource requirements, alternative organisational structures, opportunity identification and the like (Leifer et al., 2000).

### 10.1.3 Case 3

**Brief organisation overview.** The third exploratory case study organisation (Case 3) was also a service provider, operating primarily within the insurance industry but also

offering a broad range of complementary products (such as travel, motoring and financial products) to its membership base. Employing 950 people and having \$124 million funds under management in the 2003 financial year, it was selected to achieve literal replication with Case 2. The organisation highlighted the importance of innovation in its mission statement with its aim to provide innovative products, through one of its values being continuous improvement and innovation, and by the recent creation of an organisational group dedicated to developing new businesses and products.

**Data collection.** The data collection process for Case 3 focused on the newly created business unit aimed at developing and delivering innovation primarily via new business and product development. Five convergent interviews were held with senior management, followed by a single assessment workshop held with middle management.

**Assessment results.** The results of the assessment workshop highlighted strengths in the use of innovation performance measures, communication, senior management support and the effective use of cross-functional teams. Weaknesses were perceived in the overall strategic approach to innovation including a lack of understanding of strategic objectives, learning and knowledge management, the recruitment and training of personnel, the use of enabling technology and the management of ideas.

**Action Planning results.** The outcomes from the interviews and the assessment workshop were presented back to a representative group of senior and middle management from Case 3 for discussion and critical reflection during an action-planning workshop. This resulted in the development of ten actions including: clarification of the innovation strategy and strategic objectives; the development of an idea management process; definition of the organisation's core competencies and their use in generating and evaluating new opportunities; and a series of learning and knowledge management and people management initiatives.

**Development of the assessment instrument.** The third exploratory case study resulted in several minor changes including combining similar assessment area questions in order to make the instrument more focused and expedite the workshop process. The convergent interviews and the assessment and action planning workshops, also led to one significant change:

- the addition of a ‘Core Competency management’ assessment question in the Strategic Management of Innovation section of the instrument. This question included having an understanding of the organisation’s core competencies and how these may be combined and capitalised upon in order create innovations that are difficult for competitors to imitate.

#### 10.1.4 Case 4

**Brief organisation overview.** The fourth exploratory case study organisation (Case 4) was selected in order to achieve theoretical replication; that is to provide contrasting results for predictable reasons. This was an organisation that hadn’t articulated a commitment to innovation and, being a government department, was a not-for-profit entity. This was seen as a unique opportunity to apply the assessment instrument within an organisation that did not have a shared commitment to innovation. Indeed, the primary reason for the organisation’s agreement to participate was that whilst they currently operated primarily within a monopoly environment, there was the possibility that within a few years, legislative changes may force them into a competitive market place. It too operated within the financial services field holding \$4 billion funds under management and employing 240 people.

**Data collection.** Initial convergent interviews were held with a number of the senior management (finance, IT, strategy and operations), which were then followed with two assessment workshops held with different functional groups. One of the workshops groups included those staff heavily involved in innovation, including product development and operations, whilst the second included staff from shared service functions including IT and marketing.

**Assessment results.** The strengths identified during the assessment included the organisational culture, the management of the market interface including determining and understanding the customers’ needs and sufficient and well-managed funding for innovation initiatives. Weaknesses included limitations of existing technology for use in innovation initiatives, a lack of inter-functional collaboration and having no means to manage staff ideas and suggestions.

**Action planning results.** At the request of the case study sponsor, the intended action-planning workshop was not held, and therefore no actions were developed for Case 4. After the assessment process was complete, the case study sponsor felt that “innovation was not a priority for [Case 4] at this stage of their development”. This outcome highlights two pertinent issues with the delivery of the assessment instrument. Firstly, the successful delivery of the instrument relies upon support from senior management within the case study organisation. Without this, the facilitator has no mandate to carry out research. Even partial or passive support, may not be enough to encourage members of the organisation to fully ‘buy-in’ to the participatory nature of the process. In this case, the personnel involved participated fully but the process was halted by the case study sponsor. Secondly, this event highlights the need for an organisational culture that is open and robust enough to withstand critical self-reflection. By default, this will entail the exploration of weaknesses and may at times be uncomfortable for some participants. It is important that individuals feel that they can participate in an honest way without fear of retribution.

**Development of the assessment instrument.** Whilst this case study didn’t lead to the development of actions, one significant change to the assessment instrument resulted from the convergent interviews and the assessment planning workshops:

- the inclusion of a ‘Process Innovation management’ assessment question as an additional Innovation Competency. Process innovation management had been highlighted in earlier case studies as being an area that the theoretical framework had overlooked. This area dealt specifically with innovations along internal processes; in this case, those that lead to the delivery of services, but more generally, could apply to innovations along manufacturing processes, often through the application of new technologies.

### 10.1.5 Case 5

**Brief organisation overview.** The final exploratory case study organisation (Case 5) was chosen to achieve literal replication as it also operated within the financial service industry and, employing 280 people and having \$1.64 billion worth of assets under management in the 2003 financial year, it had important similarities to Cases 2 and 3.

The organisation promoted itself actively in the marketplace as being innovative, had a strategic objective targeted at developing new income streams, and had in the preceding months launched a series of innovative products.

**Data collection.** Seven convergent interviews were held with senior management from a cross-section of the organisation including: marketing and sales; operations; product development; information technology (IT); and strategy. Two assessment workshops were held with middle management representing the key stakeholder groups involved in innovation such as human resources, IT, product development, product management, operations, project management and the like.

**Assessment results.** The results of the interviews and assessment workshops highlighted strengths in the areas of the management of core competencies, portfolio management, organisational structure and risk management. Weaknesses identified included the lack of innovation performance measures, ‘back-end’ innovation process management and the inadequate use of enabling technology.

**Action planning results.** The action planning workshop involved operations, product development, IT and strategy representatives and resulted in the development of six actions aimed at improving Case 5’s innovation capability. These included: the development of strategically aligned innovation performance measures; the establishment of a forum to encourage greater communication of innovation initiatives and integration of participants; the development of an idea management process; an evaluation of the IT capabilities of the organisation and their impact on the development and delivery of products; and the initiation of post-implementation reviews of all innovation projects as a means of generating and sharing knowledge.

**Development of the assessment instrument.** The final exploratory case study resulted in only incremental changes to the assessment instrument. No additions were made to the instrument and the only changes deemed necessary were the combining of some questions to add greater focus. Indeed, it was because of the lack of further development required as a result of this case study, that this became the final exploratory case consistent with Eisenhardt’s (1989) “theoretical saturation” or Lincoln and Guba’s (1985) concept of “redundancy”.



## 10.2 Confirmatory cases

Upon completion of the exploratory case studies and associated development of the assessment instrument, three confirmatory cases were undertaken holding the assessment instrument constant. The findings for the confirmatory cases are discussed below and each include the:

- data collection process undertaken; typically interviews, followed by assessment workshops, action planning workshops and final interviews or assessments;
- assessment results;
- action planning results; and
- the case study evaluation instrument results.

### 10.2.1 Case 6

**Brief organisation overview.** The first confirmatory case study was conducted within one of three Australian business units of a global professional service organisation (Case 6). This business unit employed 540 people nationally and turned over \$83m in the 2003 financial year. This organisation was chosen again to maintain the focus on service organisations and because the national head of the business unit had articulated his desire for greater innovation during several conversations with the researcher. It also had an existing product development group and had an aggressive growth strategy (18% targeted annual growth).

**Data collection.** Initially interviews were conducted with three key members of Case 6; the national partner in charge, the head of marketing and the manager in charge of product development. These were followed by a series of four assessment workshops with both middle and senior management from operations and support services.

**Assessment results.** The assessment workshops highlighted multiple gaps between perceived performance and importance in many of the assessment areas. In particular, weaknesses were identified in the area of the innovation strategy and performance

measures, reward and recognition for innovation efforts of staff, idea management, product development and radical innovation management.

**Action planning results.** The collated qualitative and quantitative data from the assessment workshops were presented back to management during the first of two action-planning workshops for discussion and critical reflection. A second planning workshop was convened in order to further develop and refine the outcomes of the initial workshop. The focus of the actions centred around the development of an innovation program including the recruitment of an innovation manager, the initiation of an periodical, idea generation, collection and evaluation process, and the establishment of a reward and recognition program aimed particularly at encouraging larger, more radical innovations.

**Case study evaluation results.** The participants of the action planning workshops who were also involved in an assessment workshop were asked to complete the case study evaluation instrument (see Appendix 8) to record their impressions as to the effectiveness of the innovation capability instrument. The average of their results against each of the questions is recorded Table A.1.

**Table A.1: Summary of case evaluation results for Case 6**

Question	Average response (n = 3)
How relevant was the assessment tool to your organisation?	Very
How relevant was the 'strategic management of innovation' area of the assessment tool to your organisation?	Very
How relevant was the 'internal environment' area of the assessment tool to your organisation?	Extremely
How relevant was the 'innovation competencies' area of the assessment tool to your organisation?	Very
How useful were the assessment results in identifying areas requiring improvement?	Extremely
How useful were the assessment results in prioritising areas requiring improvement?	Extremely
How useful were the assessment results in developing actions?	Very
How effective is the use of workshops and collaborative voting technology in promoting a participative approach? (average of questions h, i & j)	Very
How effective was the use of an external facilitator to assist in the assessment and action development?	Very
How effective do you expect the actions developed to be in aiding the improvement of your organisation's innovation capability?	Extremely

*Source: author*

### 10.2.2 Case 7

**Brief organisation overview.** The second confirmatory case study was undertaken within one of four departments (Case 7) of a Government higher and vocational education provider based in Melbourne, Australia. It had an operating budget of \$8.8 million, including \$320,000 from 'fee-for-service' activities and employed 280 staff. It had in recent years recognised the importance of innovation for the organisation seen through one of the seven organisation-wide 'key performance areas' being 'innovation and entrepreneurship'. This case study organisation allowed a better understanding of the application of the Innovation Capability Assessment instrument in a not-for-profit and public service environment.

**Data collection.** Two interviews were initially conducted with the divisional director of Case 7 and the key manager responsible for innovation. This was then followed by an assessment workshop with the senior management group, and then four assessment workshops with the middle management of each of the Case 7's departments. Participants in the action-planning workshop also completed the case study evaluation instrument.

**Assessment results.** Strengths identified from the assessment workshops included the use of alliances and networks to provide resources and knowledge for innovative activities, the use of technology in their products and processes, and people management initiatives. Key weakness included the lack of a clear strategic approach to innovation, the development of future scenarios, the lack of funding made available for innovation initiatives, idea management, and both process and product innovation.

**Action planning results.** Results of the five assessment workshops were presented back to the senior and middle management participants of the action planning workshop. Key actions outcomes included: the development of an innovation strategy and performance measures and the communication of both throughout the division, the identification of additional funding sources, developing an idea management process, and the definition of the division's core competencies for subsequent use in generating innovation initiatives.

**Case study evaluation results.** The participants of the action planning workshops who were also involved in an assessment workshop were asked to complete the case study evaluation instrument (see Appendix 8) to record their impressions as to the effectiveness of the innovation capability instrument. The average of their results against each of the questions is recorded below Table A.2.

**Table A.2: Summary of case evaluation results for Case 7**

Question	Average response (n = 8)
How relevant was the assessment tool to your organisation?	Extremely
How relevant was the 'strategic management of innovation' area of the assessment tool to your organisation?	Extremely
How relevant was the 'internal environment' area of the assessment tool to your organisation?	Very
How relevant was the 'innovation competencies' area of the assessment tool to your organisation?	Very
How useful were the assessment results in identifying areas requiring improvement?	Extremely
How useful were the assessment results in prioritising areas requiring improvement?	Extremely
How useful were the assessment results in developing actions?	Very
How effective is the use of workshops and collaborative voting technology in promoting a participative approach? (average of questions h, i & j)	Very
How effective was the use of an external facilitator to assist in the assessment and action development?	Extremely
How effective do you expect the actions developed to be in aiding the improvement of your organisation's innovation capability?	Very

*Source: author*

### 10.2.3 Case 8

**Brief organisation overview.** The final confirmatory case study was carried out a small consumer goods manufacturing and wholesaling organisation based in Melbourne, Australia (Case 8). Employing only 30 staff and turning over just \$6 million, it was by far the smallest organisation to participate in the study. It was, for this reason, important in understanding the application of the Innovation Capability Assessment instrument in very small organisations. It also allowed for some comparison with the initial exploratory case organisation (Case 1) as they both operated in similar industries.

**Data collection.** Following an initial interview with the general manager of Case 8, an assessment workshop was held with the directors and senior and middle management.

The action-planning workshop involved the same participants who also completed the case study evaluation instrument.

**Assessment results.** The assessment workshop resulted in the identification of numerous perceived weaknesses in Case 8's innovation capability. These included: the innovation strategy, the management of core competencies, reward and recognition initiatives, idea management and process innovation.

**Action planning results.** The action-planning workshop resulted in the development of four key recommendations aimed at improving Case 8's innovation capability. These were the implementation of an idea management program with associated reward and recognition, greater emphasis from the leadership in encouraging staff to generate innovation, mapping of key processes as a first step towards developing process innovation initiatives; and the integration of innovation objectives into the current strategy.

**Case study evaluation results.** The participants of the action planning workshops who were also involved in an assessment workshop were asked to complete the case study evaluation instrument (see Appendix 8) to record their impressions as to the effectiveness of the innovation capability instrument. The average of their results against each of the questions is recorded below Table A.3.

**Table A.3: Summary of case study evaluation results for Case 8**

Question	Average response (n = 5)
How relevant was the assessment tool to your organisation?	Very
How relevant was the 'strategic management of innovation' area of the assessment tool to your organisation?	Very
How relevant was the 'internal environment' area of the assessment tool to your organisation?	Very
How relevant was the 'innovation competencies' area of the assessment tool to your organisation?	Very
How useful were the assessment results in identifying areas requiring improvement?	Extremely
How useful were the assessment results in prioritising areas requiring improvement?	Very
How useful were the assessment results in developing actions?	Very
How effective is the use of workshops and collaborative voting technology in promoting a participative approach? (average of questions h, i & j)	Very
How effective was the use of an external facilitator to assist in the assessment and action development?	Extremely
How effective do you expect the actions developed to be in aiding the improvement of your organisation's innovation capability?	Very

*Source: author*